

Healthy Michigan Plan
Section 1115 Demonstration
Final Summative Evaluation Report

Demonstration Period January 1, 2019 – December 31, 2023

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A. Executive Summary

A.1. Summary of the demonstration

In September 2013, Michigan enacted the expansion of its Medicaid program under the Affordable Care Act (ACA) through a Section 1115 waiver which was later approved by the Centers for Medicare & Medicaid Services (CMS) and then launched in April 2014. The new program, the Healthy Michigan Plan (HMP), administered by the Michigan Department of Health and Human Services (MDHHS), included adults ages 19 to 64 with household income up to 133% of the federal poverty level (FPL). HMP expanded access to health coverage for hundreds of thousands of Michigan residents and offered the opportunity to test innovative approaches to beneficiary cost-sharing and personal responsibility.

Beneficiary cost-sharing policies were a part of the program since the inception of HMP. Until December 31, 2023, with the exception of certain exempt groups, beneficiaries enrolled in managed care (HMP-MC) with incomes above 100% FPL were assessed a monthly fee of 2% of their household income, and beneficiaries with incomes from 0 to 133% FPL were subject to service-related co-payments for some services. Each HMP-MC beneficiary had a MI Health Account that tracked fees, co-payments, and health care expenditures. To promote the use of preventive care, healthy behaviors, and responsible decision-making about health care use, beneficiaries could reduce their cost-sharing through the Healthy Behaviors Incentives Program.

CMS approved the renewal of the Healthy Michigan Plan Section 1115 Demonstration Waiver in December 2018. The new 5-year waiver for 2019 through 2023 provided approval for MDHHS to implement the following new policies:

- (1) Beneficiaries ages 19-62 without medical frailty were required to complete and report 80 hours per month of community engagement as a condition of eligibility, and
- (2) Beneficiaries with incomes >100% of the FPL who had been enrolled in the demonstration ≥48 months were required to (a) pay a monthly premium of 5% of income, and (b) complete a Health Risk Assessment (HRA) at redetermination or complete a healthy behavior in the prior 12 months as conditions of eligibility.

The community engagement policy was implemented on January 1, 2020. However, on March 4, 2020, a U.S. District Court judge vacated the CMS approval of Michigan's community engagement requirement. The 48-month policy was slated to begin October 1, 2020, but it was never implemented due to the maintenance of effort requirements of Section 6008 of the Families First Coronavirus Response Act (FFCRA) during the COVID-19 Public Health Emergency (PHE).

In July 2023, the Michigan legislature passed and Governor Whitmer signed Public Act 98 of 2023 and Public Act 99 of 2023 making changes to HMP policies related to cost-sharing and the Healthy Behaviors Incentives Program.¹ To comply with new provisions in state law, MDHHS allowed the demonstration to expire on December 31, 2023,² and shifted the authority for the Healthy Michigan Plan to the Medicaid State Plan effective January 1, 2024.

¹ [Michigan Medicaid Policy Bulletin \(MMP 23-71\): Healthy Michigan Plan Program Changes, November 2023](#)

² [HMP Section 1115 Demonstration Expiration Letter, December 2023](#)

A.2. Summary of the evaluation

Consistent with the approved evaluation design, this Healthy Michigan Plan Summative Evaluation Report for the waiver period of 2019 through 2023 focuses on the two HMP policies implemented under the Section 1115 waiver demonstration (Healthy Behaviors Incentives Program and beneficiary cost-sharing), and the four broad goals of the overall demonstration: reduce uninsurance and uncompensated care, promote primary care/responsible use of services, support financial well-being, and support coordinated strategies that address social determinants of health.

The following sources of data were used in this evaluation:

- Administrative data from the State of Michigan's Enterprise Data Warehouse
- Beneficiary survey (Healthy Michigan Voices (HMV))
- Interviews with beneficiaries
- Interviews with providers
- Interviews with key informants
- Credit report data from one of the three large U.S. credit agencies
- Behavioral Risk Factor Surveillance System (BRFSS) from the National Center for Health Statistics
- American Community Survey (ACS) from the U.S. Census Bureau
- HCUP Fast Stats inpatient discharge data from the Agency for Healthcare Research and Quality
- Medicare cost reports from the Centers for Medicare and Medicaid Services (CMS)

A.3. Results and interpretations

Healthy Behaviors Incentives Program

The Healthy Behaviors Incentives Program was intended to support the HMP objectives of strengthening beneficiary engagement and personal responsibility, and encouraging individuals to seek preventive care, adopt healthy behaviors, and make responsible decisions about their healthcare. This evaluation observed modest changes to utilization patterns (e.g., increased use of preventive services, decreased emergency department visits) suggesting greater beneficiary engagement in health and more responsible decision making about healthcare. However, there was little evidence linking these changes to the Healthy Behaviors Incentives Program. Therefore, the evaluation findings suggest that the HRA component of the Healthy Behaviors Incentives Program had a limited effect in achieving these objectives.

Some beneficiaries and PCPs described the HRA as an opportunity to identify and set goals for health behavior change, particularly for beneficiaries who have been without a primary care provider for an extended period, or for patients new to a primary care practice. However, HRA completion was uneven, which may have reflected the inconsistency in how it was introduced to beneficiaries and providers. Some primary care settings (often federally qualified health centers (FQHCs)) monitored which patients were due for an HRA and were proactive about encouraging completion. In other primary care settings, beneficiaries were responsible for initiating the process of completing an HRA.

Longitudinal analyses of HMO survey cohorts found that many beneficiaries with substantial or moderate health burden at baseline reported improvement in their health burden in subsequent years. PCPs emphasized that health improvement was often prompted by behavior change, which requires sustained engagement and support. However, this engagement and behavior change were not well facilitated through the HRA framework. The HRA form did not prompt PCPs to identify patients who should receive sustained engagement, which could include working with a care manager, social worker, or community health worker in the practice; engaging with a health promotion program (e.g., diet, exercise or smoking cessation programs); and regular follow-up visits with the PCP. Moreover, in most primary care practices, the HRA form was not integrated into the practice's electronic medical record (EMR), so it did not enable PCPs to track progress over time or recall behavior change goals chosen by the beneficiary in the prior year. Without EMR integration, the clinical usefulness of the HRA was limited.

Consistent with our evaluation of the first waiver period (2014-2018), analyses of administrative data found an association between HRA completion and receipt of preventive services. However, the magnitude of this association was small compared to the association between continuity of primary care visits and receipt of preventive services.

An important feature of the Healthy Behaviors Incentive Program was its financial incentive. Our HMO survey found that less than one-third of beneficiaries knew they could get a reduction in their HMO cost sharing by completing an HRA or healthy behavior. PCPs were similarly unaware of this financial incentive. Interviews with beneficiaries confirmed that the Healthy Behaviors Incentives Program was typically not the primary motivator of their engagement in healthy behaviors. While many beneficiaries recalled completing at least one HRA, most were unaware of financial incentives associated with doing so; among the few who knew about the possibility of a financial reward, they said it was not their reason for adopting a healthy behavior goal. Instead, most reported self-motivation or encouragement from their providers supported their adoption of healthy behaviors. Changes in the financial incentives over time (e.g., the discontinuation of program-wide gift cards³) and income-based differences in the incentive structure may have contributed to beneficiaries' general lack of awareness about the financial incentives. For example, beneficiaries who were under 100% FPL and did not reach the threshold of paying 2% of their income in copays did not receive a financial incentive.

The Healthy Behaviors Incentives Program was discontinued on January 1, 2024, after the Section 1115 waiver expired on December 31, 2023. MDHHS is working with the Medicaid health plans to develop financial incentives for beneficiaries who demonstrate improved health outcomes, engage in healthy behaviors, or utilize health care services that improve health outcomes.⁴ This new approach may promote further innovation in how healthy behaviors are encouraged and incentivized for patients and providers. Based on our evaluation findings related to the strong association of preventive care with primary care access and continuity, we strongly recommend that this revised model emphasize the PCP-patient relationship and ensure ongoing access to primary care services.

³ MDHHS Medical Care Advisory Council, June 18, 2018 Meeting Minutes

⁴ Michigan Medicaid Policy Bulletin (MMP 23-71): Healthy Michigan Plan Program Changes, November 2023

Cost-sharing

HMP cost-sharing was intended to support the HMP objectives of strengthening beneficiary engagement and personal responsibility and encouraging individuals to make responsible decisions about their healthcare. The evaluation findings suggest that the HMP cost-sharing features had a limited effect in achieving these objectives.

The MI Health Account statement was the primary method of communicating with beneficiaries about HMP cost-sharing. Although most beneficiaries recalled receiving a MI Health Account statement in the past year, few understood how the amount owed was calculated; most said they simply checked to see what they owed.

Our analysis of cost-share data found that beneficiaries whose cost-share obligations included monthly fees had higher rates of full payment than those with episodic service-related co-payments. The consistency of the monthly fees may have allowed beneficiaries to plan for and achieve a more consistent payment pattern. Additionally, beneficiaries who did not have regular obligations may have had difficulty understanding how their amount owed was calculated.

Our Interim Evaluation Report suggested that the state consider modifying HMP cost-sharing policies to increase payment compliance and improve beneficiary understanding. Now that updated cost-sharing policies are in effect, including changes to HMP co-payment amounts and collection processes and discontinuation of MI Health Accounts and MI Health Account monthly fees for those with incomes above 100% FPL, it will be important to assess whether these changes lead to improved beneficiary understanding and better payment compliance.

Reduce uninsurance

A broad goal of the HMP demonstration was to improve access to healthcare for uninsured or underinsured low-income Michigan residents. Findings from this evaluation suggest that the HMP demonstration has been highly effective in achieving this objective.

The changes in insurance coverage we observed in the first few years after HMP implementation were sustained through 2022. In particular, Michigan adults ages 19 through 64 experienced significant and substantial gains in Medicaid coverage and reductions in the fraction uninsured compared with those in states that did not expand Medicaid. These effects were concentrated among low-income adults and consistent across all regions of the state.

It is important to note that our evaluation period ended while Michigan was in the middle of “unwinding” the maintenance of enrollment policies associated with the COVID-19 PHE.

Promote primary care/responsible use of services

An objective of the HMP demonstration was to encourage individuals to seek primary care and preventive services and make responsible decisions about their healthcare. Findings from this evaluation show that the HMP demonstration has been effective in achieving this objective.

Consistently, our HMP surveys have found that nearly all beneficiaries reported having a known primary care provider and most reported having a primary care visit in the prior year.

In HMP surveys, beneficiaries who initiated HMP enrollment near or during the PHE were more likely to report difficulty accessing primary care compared to beneficiaries with earlier HMP initiation. It seems likely that among the long-term enrollees, having an established primary care home may have buffered HMP beneficiaries from the challenges of constrained healthcare resources during the PHE.

Many PCPs described practice-based strategies to support HMP beneficiaries in responsible use of primary care services. Some practices have adjusted their scheduling practices to offer more same-day appointments and after-hours appointments. Many practices have protocols in place to contact patients after an ED visit, utilizing this opportunity to educate patients about using the primary care practice as the first-choice option in the future. Many primary care practices have care managers and community health workers conducting regular outreach to high-need beneficiaries to support their self-management of health conditions, identify problems with social determinants of health, and avoid unnecessary ED visits.

Our analysis of administrative data demonstrated that among beneficiaries with a primary care visit in their first year of enrollment, ED rates decreased in subsequent years. This finding may have been related to health conditions being diagnosed and treated, as well as ensuring that beneficiaries have a source of care when they feel unwell. However, the role of the primary care office in decreasing unnecessary ED use warrants further examination. In HMP surveys, only one-quarter of beneficiaries reported contacting their PCP before going to the ED; many noted that their PCP office was closed at the time they needed care, suggesting that after-hours advice was either not available or not known to the beneficiary. Challenges with access to primary care, including lack of appointments, prompted some beneficiaries to seek ED care.

Overall, our evaluation findings highlight the importance of primary care access and continuity.

Support financial well-being

A goal of the HMP demonstration was to support the financial well-being of beneficiaries. Findings from this evaluation provide qualitative evidence that the HMP demonstration has been effective in achieving this objective. Beneficiary and key informant interviews highlighted many examples of HMP having a positive impact on beneficiaries' financial well-being, including the role of coverage in minimizing out-of-pocket health care costs and worries and freeing up financial resources for other life needs such as food, transportation, and housing. Notably, longitudinal analyses of HMP surveys found that individuals with improved health burden were more likely to gain new employment; this is strong evidence of the positive impact of HMP.

New analyses of credit report data demonstrated significant and consistent reductions in medical debt in collections for beneficiaries up to seven years post-enrollment. In addition, beneficiaries who enrolled in 2014 and 2015 experienced reductions in non-medical debt in collections and in rates of subprime credit score, while beneficiaries who enrolled in 2016 and 2017 experienced

increases in both these outcomes. Small increases in rates of recent bankruptcy were also noted after HMP enrollment.

Sustain the safety net and support coordinated strategies to address social determinants of health

An objective of the HMP demonstration was to reduce uncompensated care to sustain the safety net and to support coordinated strategies to address social determinants of health. Findings from this evaluation indicate that the HMP demonstration has been highly effective in reducing uncompensated care for hospitalized patients and effective in supporting coordinated strategies to address social determinants of health (SDOH).

Changes in insurance coverage at the population level were reflected in changes in the payer mix for inpatient hospitalizations, whereby increases in Medicaid as a source of payment were associated with a significant decline in the fraction of discharges coded as self-pay. Hospital uncompensated care in Michigan was reduced by half following HMP implementation, a stark contrast to the experience of states that did not expand Medicaid, which experienced no decline in uncompensated care. The changes in hospital payer mix and hospital uncompensated care in the early years after HMP implementation were sustained through 2022.

Key informant interviews highlighted numerous examples of HMP's key role in fostering collaboration and coordination of health and human services organizations, including safety net providers, health plans, healthcare systems, and social service organizations. This role has been particularly important for sustaining safety-net providers, enabling them to implement and maintain innovative programs focused on SDOH by addressing both health care and social needs of beneficiaries.

HMP coverage for large numbers of adults, including new populations not previously covered by Medicaid, increased access to reimbursable care, contributed to interagency partnerships and coalitions and innovations in programs and service delivery, including those that address SDOH, that could be sustained over time. This expanded coverage contributed to the financial stability of safety-net provider organizations and the ability to expand key services to meet growing needs, including those for substance use disorders and COVID-19. HMP increased access to care and was associated with improved health and other outcomes for beneficiaries, many of whom were previously uninsured or unconnected to services addressing SDOH. During the COVID-19 pandemic, HMP maintained access to coverage and care for beneficiaries and offered coverage for new beneficiaries affected by unemployment and coverage losses. Partnerships among diverse organizations enhanced outreach and communication about initiating and maintaining enrollment and meeting HMP requirements.

Trends in the state's costs for HMP have facilitated its sustainability. Capitation rates for administrative claims costs have remained relatively stable for the HMP population since 2016. However, medical costs during the PHE increased at a steeper rate in HMP than in other Medicaid benefit programs.

A.4. Recommendations

Regarding the four specified goals of the overall demonstration, we learned that HMP was highly effective in:

- Reducing uninsurance
- Promoting primary care
- Supporting financial well-being
- Sustaining the safety net and supporting strategies to address social determinants of health

Based on the success in achieving these four main goals of the overall demonstration, we recommend that Medicaid expansion through the Healthy Michigan Plan continue with strong support beyond the recently completed Section 1115 waiver demonstration period.

In the evaluation of the first waiver period, we learned that the HRAs and healthy behaviors incentives were not well understood by many HMP beneficiaries and were not viewed as clearly effective by primary care providers. In response, MDHHS implemented changes to the Healthy Behaviors Incentives Program.⁵ Some changes facilitated the completion of HRA forms, including implementing streamlined secure statewide HRA submission processes for providers and removing the lab results portion of the HRA form. Other changes facilitated broader beneficiary participation in the Healthy Behaviors Incentives Program; these changes included documenting healthy behaviors through claims/encounter data (e.g., completing an annual medical check-up, a dental check-up or cleaning, and recommended cancer screenings or vaccinations), as well as completing an approved wellness program (e.g., evidence-based tobacco cessation) through a Medicaid health plan. To improve understanding of the Healthy Behaviors Incentives Program, MDHHS updated beneficiary guidance and worked with an external partner to educate providers. Despite these notable changes, findings from the current evaluation suggest that many beneficiaries remained unaware of the connection between the HRA and healthy behaviors incentives.

Given the challenges with informing beneficiaries and with facilitating usefulness to providers, we offer the following recommendations to states considering incorporating HRAs and healthy behaviors incentives into a Medicaid expansion program:

- Expand the focus from completing the HRA form to supporting sustained engagement in health promotion over time.
- Facilitate mechanisms for providers to integrate program tools into EMRs and other practice systems.
- Plan for ongoing communication about program goals, processes, and incentives to beneficiaries and providers.

We also learned that beneficiary understanding of HMP cost-sharing policies was uneven and generally incomplete, even with the simplified MI Health Account statement implemented by MDHHS in 2017 as well as subsequent changes. Thus, if incorporating cost-sharing into a Medicaid expansion program:

⁵ [Medical Service Administration Bulletin \(MSA 18-05\): MI Marketplace Option and Healthy Michigan Plan Updates, April 2018.](#)

- Implement a simplified approach with (a) income-based fees and/or a method of charging equal quarterly amounts so that beneficiaries know more generally what costs to expect, and (b) co-payments for a small number of high-priority services (e.g., ED visits) so that beneficiaries can better understand the link between service utilization and cost-share obligations.

In conducting this evaluation, we learned the value of a longitudinal approach to our Healthy Michigan Voices telephone surveys and of offering the surveys in multiple languages (Arabic, English, and Spanish). We fielded baseline surveys with three cohorts of HMP enrollees using standard inclusion criteria and recruitment in their second year of HMP enrollment; comparing baseline survey responses from the three cohorts allowed us to explore differences over time in beneficiaries' early experiences with HMP. We also fielded follow-up surveys with HMP Cohorts 1 and 2, allowing us to track individuals over time. This was particularly useful for characteristics not available in administrative claims, such as employment and health burden.

The Healthy Michigan Plan has provided a reliable source of insurance coverage and access to care to many Michigan residents during the COVID-19 pandemic, which posed substantial risks to their health and financial well-being. In the most recent Section 1115 waiver demonstration period from 2019 through 2023, HMP met its four key goals despite the pandemic challenges. While some of the key features that were the focus of this evaluation have ended, many findings from various stages of this evaluation spanning 10 years have been used to inform state policy and will continue to be useful to our state, to Medicaid health plans, and to other states considering or implementing a Medicaid expansion program with similar features. It is evident from this evaluation that Medicaid expansion has become a key component of the state's healthcare system and safety net over the past decade and that the Healthy Michigan Plan is likely to continue to play a vital role in promoting and supporting health and well-being in Michigan into the future.

B. General Background Information

B.1. Overview and history of the demonstration

In September 2013, Michigan enacted the expansion of its Medicaid program under the Affordable Care Act (ACA) through a Section 1115 waiver which was later approved by the Centers for Medicare & Medicaid Services (CMS) and then launched in April 2014. The new program, the Healthy Michigan Plan (HMP), administered by the Michigan Department of Health and Human Services (MDHHS), included those who had participated in the Michigan Adult Benefits Waiver (ABW) and newly eligible adults age 19 to 64 with household income up to 133% (138% including the 5% income disregard) of the federal poverty level (FPL). HMP expanded access to health coverage for hundreds of thousands of Michigan residents and offered the opportunity to test innovative approaches to beneficiary cost-sharing and personal responsibility. HMP beneficiaries receive a full health care benefit package, which includes all the ACA-mandated essential health benefits. Most are enrolled in a managed care benefit (HMP-MC) through one of the state's Medicaid health plans in which they can choose or be assigned a primary care provider (PCP).

Beneficiary cost-sharing policies were a part of the program since the inception of HMP. Until December 31, 2023, HMP-MC beneficiaries with incomes above 100% FPL, except for certain exempt groups, were subject to a monthly fee (formerly known as a contribution) equal to 2% of their household income, similar to an insurance premium. In addition, beneficiaries with incomes from 0 to 133% FPL, except for certain exempt groups, were subject to service-related co-payments. Certain services were exempt from co-payments including preventive services and services for chronic condition management, behavioral health services, and pregnancy. Each HMP-MC beneficiary had a MI Health Account that tracked fees, co-payments, and health care expenditures with information shared via quarterly statements.

To promote the use of preventive care, healthy behaviors, and responsible decision-making about health care use, beneficiaries could reduce their cost-sharing through the Healthy Behaviors Incentives Program. The Healthy Behaviors Incentives Program was designed to encourage beneficiaries, in collaboration with their primary care provider, to implement and maintain healthy behaviors via an annual Health Risk Assessment (HRA). Subsequently, in 2018 claims-based preventive services and wellness program options were added to document completion of healthy behavior activities among beneficiaries who did not complete an HRA.⁶

In December 2017, MDHHS submitted an application to continue the HMP demonstration for an additional five years. Then in September 2018, the State applied to amend elements of HMP to comply with new provisions in state law. CMS approved the renewal of the Healthy Michigan Plan Section 1115 Demonstration Waiver (Project No. 11-W-00245/5) on December 21, 2018, for the period January 1, 2019 to December 31, 2023. The waiver provided approval for MDHHS to implement the following new policies:

- 1) Beneficiaries ages 19-62 without medical frailty were required to complete and report 80 hours per month of community engagement as a condition of eligibility; and
- 2) Beneficiaries with incomes >100% of the FPL who had been enrolled in the demonstration ≥48 months, with some exemptions, were required to (a) pay a monthly premium of 5% of income, and (b) complete an HRA at redetermination or complete a healthy behavior in the previous 12 months as conditions of eligibility (48-month policy). The premiums would represent the beneficiary's full obligation, with no additional co-payments.

The community engagement policy was implemented on January 1, 2020. However, on March 4, 2020, a U.S. District Court judge vacated the CMS approval of Michigan's community engagement requirement. The 48-month policy was slated to begin October 1, 2020, but it was never implemented due to the maintenance of effort requirements of Section 6008 of the Families First Coronavirus Response Act (FFCRA) during the COVID-19 Public Health Emergency (PHE).

In July 2023, the Michigan legislature passed and Governor Whitmer signed Public Act 98 of 2023 and Public Act 99 of 2023 making changes to HMP policies related to cost-sharing and the Healthy Behaviors Incentives Program.⁷ These policy changes included changes to HMP co-

⁶ [Medical Service Administration Bulletin \(MSA 18-05\): MI Marketplace Option and Healthy Michigan Plan Updates, April 2018.](#)

⁷ [Michigan Medicaid Policy Bulletin \(MMP 23-71\): Healthy Michigan Plan Program Changes, November 2023](#)

payment amounts and collection processes, the discontinuation of MI Health Accounts and MI Health Account monthly fees for those with incomes above 100% FPL, and changes to the Healthy Behaviors Incentives Program. To comply with new provisions in state law, MDHHS allowed the demonstration to expire on December 31, 2023,⁸ and shifted the authority for the Healthy Michigan Plan to the Medicaid State Plan effective January 1, 2024.

Consistent with the approved evaluation design, this Summative Evaluation Report for the waiver period of 2019 through 2023 focuses on the two HMP policies implemented under the Section 1115 waiver demonstration (Healthy Behaviors Incentives Program and beneficiary cost-sharing), and the four broad goals of the overall demonstration: reduce uninsurance and uncompensated care, promote primary care/responsible use of services, support financial well-being, and support coordinated strategies that address social determinants of health.

B.2. Population groups impacted by the demonstration

HMP beneficiaries enrolled in managed care, unless otherwise exempt, were subject to the cost-sharing responsibilities and HRA/healthy behaviors incentives as described in the HMP Special Terms & Conditions (STC 22(d)) from CMS.

B.3. Goals of the demonstration

As stated by MDHHS, the overarching goals of the HMP demonstration were to increase access to quality health care, encourage the utilization of high-value services, promote beneficiary adoption of healthy behaviors, and implement evidence-based practice initiatives.

The main objectives for HMP stated by MDHHS include:⁹

- Improving access to healthcare for uninsured or underinsured low-income Michigan residents;
- Improving the quality of healthcare services delivered;
- Reducing uncompensated care;
- Strengthening beneficiary engagement and personal responsibility;
- Encouraging individuals to seek preventive care, adopt healthy behaviors, and make responsible decisions about their healthcare;
- Supporting coordinated strategies to address social determinants of health in order to promote positive health outcomes, greater independence, and improved quality of life;
- Helping uninsured or underinsured individuals manage their health care issues; and
- Encouraging quality, continuity, and appropriate medical care.

B.4. Relevant contextual factors

Several contextual factors are likely to affect broad trends in insurance coverage, health care utilization, and population health.

⁸ [HMP Section 1115 Demonstration Expiration Letter, December 2023](#)

⁹ [HMP Section 1115 Demonstration Extension Application, September 2018](#)

Health insurance market

HMP was initially implemented in April 2014 in the context of broader changes to health insurance markets in Michigan and in other states under the Affordable Care Act. In particular, the health insurance exchange, associated premium tax credits, mandates for some employers to offer health insurance, and individual mandate to obtain health insurance all affected consumer and employer behavior. However, the longer-term trend toward private plans with high deductibles means that more privately insured patients face large out-of-pocket obligations when they are hospitalized,¹⁰ which may increase hospital uncompensated care for privately insured patients who are unable to pay hospital charges not covered by their insurance.

COVID-19 pandemic

The COVID-19 pandemic had a dramatic effect on virtually all aspects of health and well-being for people in Michigan, including HMP beneficiaries. Direct health effects included many COVID-19 cases, with some individuals experiencing multiple infections and some experiencing “long COVID” symptoms that lingered over time. Indirect health effects included changes in access to health care. Particularly in the early months of the pandemic, there was limited availability for many health care services including primary care, non-emergency surgeries and procedures, and dental care. In addition, some individuals declined to seek services, to avoid exposure to COVID-19 or to preserve health care resources for others.^{11,12}

The COVID-19 pandemic also affected individuals’ employment and financial well-being. For many, COVID-related layoffs caused an unexpected loss of income as well as loss of employer-sponsored insurance. Some of those individuals became newly eligible for HMP.

After the federal government declared COVID-19 a Public Health Emergency (PHE), the US Congress provided increased Medicaid funding to states through Section 6008 of the Families First Coronavirus Response Act (FFCRA). States had to meet several conditions to receive FFCRA funds, including a maintenance of effort requirement that prohibited states from terminating most Medicaid beneficiaries’ coverage until the end of the PHE. Consistent with continuous coverage requirement, MDHHS paused redeterminations of eligibility; beneficiaries were not required to submit proof or attestations of income eligibility during the PHE.¹³ This federal policy change, along with an influx of newly eligible adults, led to a dramatic increase in HMP enrollment, from approximately 670,000 individuals in March 2020 to over 1 million individuals in June 2022. Most of these HMP beneficiaries were enrolled in Medicaid managed care plans. Since Medicaid eligibility redeterminations resumed in April 2023, HMP enrollment decreased to 927,890 individuals by the end of Section 1115 waiver in December 2023 and to 717,669 individuals as of June 2024.

At the state level, Michigan Medicaid officials altered certain HMP policies during the PHE, which spanned 3 years of this 5-year waiver period. Medicaid officials enacted changes to cost-

¹⁰ [National Center for Health Statistics \(NCHS\) Fact Sheet: NCHS Health Insurance Data, July 2019](#)

¹¹ [Medicaid and CHIP Payment and Access Commission \(MACPAC\) Issue Brief: Access in Brief: Effects of COVID-19 on Medicaid Beneficiaries’ Health and Health Care Utilization, March 2024](#)

¹² Anderson KE, McGinty EE, Presskreischer R, Barry CL. Reports of Forgone Medical Care Among US Adults During the Initial Phase of the COVID-19 Pandemic. *JAMA Network Open*. 2021;4(1):e2034882. doi:10.1001/jamanetworkopen.2020.34882

¹³ [Medical Services Administration Bulletin \(MSA 20-37\): COVID-19 Response: Suspending All Medicaid Renewals, August 2020](#)

sharing provisions, such that for the duration of the PHE, no HMP beneficiary would be charged a higher cost-share amount than the individual's pre-PHE cost-share amount. In addition, co-pays specific to the diagnosis and treatment of COVID-19 were waived. MDHHS did not have pre-offset letters mailed to beneficiaries in July 2020 due to the COVID-19 pandemic and the resulting increased unemployment rate. Therefore, state tax refunds and lottery winning offsets were not collected in calendar year 2021 for the 2020 tax year. Offset procedures resumed in calendar year 2022 for the 2021 tax year.

Michigan Medicaid also used the flexibility of the PHE to enact policies to address constraints on the health care system. For example, officials expanded the list of services that could be delivered via telehealth and eased rules for providers.

Following passage of the federal Consolidated Appropriations Act of 2023, MDHHS resumed conducting Medicaid eligibility renewals on April 1, 2023. MDHHS developed and implemented a detailed monthly eligibility renewal process, taking up to three months, which included sending awareness letters prior to an individual's renewal month to alert them that a renewal packet would be sent soon. For most individuals, their eligibility renewal was set for the same month it was before the COVID-19 PHE. Initially, individuals had a total of 30 days to return their renewal packets, however, MDHHS decided to delay procedural terminations for one month giving individuals a total of 60 days to return their renewal packets before their coverage would be terminated.¹⁴

C. Evaluation Questions and Hypotheses

Our evaluation builds on the key findings from the Healthy Michigan Plan Final Summative Evaluation Report for the first waiver period (2014-2018)¹⁵ and related articles published in academic research journals.¹⁶ Key findings from the first HMP Summative Evaluation Report in March 2020 were organized around the evaluation goals from the first HMP waiver period:

- *Evaluation Goal 1: The extent to which the increased availability of health insurance reduces the costs of uncompensated care borne by hospitals.* HMP was associated with substantially reduced costs of uncompensated care provided by Michigan hospitals. This reduction was comparable to other states that expanded Medicaid and contrasted with the increase in uncompensated care costs seen in states that did not expand Medicaid over the same period.
- *Evaluation Goal 2: The extent to which availability of affordable health insurance results in a reduction in the number of uninsured/underinsured individuals who reside in Michigan.* HMP substantially reduced the uninsured rate for low-income non-elderly adults by 7 percentage points relative to states that did not expand Medicaid.
- *Evaluation Goal 3: Whether the availability of affordable health insurance, which provides coverage for preventive and health and wellness activities, will increase healthy behaviors and improve health outcomes.* Access to care improved with enrollment in HMP coverage. Enrollees were more likely to have a regular source of care with HMP and fewer

¹⁴ [MDHHS Eligibility Notification Timeline](#)

¹⁵ [Healthy Michigan Plan Evaluation Final Summative Report, March 2020](#)

¹⁶ [IHPI Member Publications on Medicaid Expansion in Michigan](#)

reported that it was an emergency room (ER). A large majority of HMP enrollees used primary care and preventive services. Only one-quarter of HMP enrollees fully completed the HRA process, suggesting that HRAs may not be a key motivator for use of primary care and preventive services, but HRA completion was associated with higher rates of preventive service use.

- *Evaluation Goal 4: The extent to which beneficiaries feel that the Healthy Michigan Program has a positive impact on personal health outcomes and financial well-being.* Substantial proportions of HMP enrollees reported improved physical, mental, and oral health as well as greater financial well-being since enrolling in HMP. HMP coverage was particularly beneficial for enrollees with chronic health conditions that could be diagnosed and treated more effectively. Many enrollees also reported positive perspectives on HMP and that their ability to work had improved since enrolling in HMP.
- *Evaluation Goal 5: Examine the experiences of former HMP enrollees and individuals eligible for, but unenrolled in, HMP.* Former enrollees most commonly reported that their disenrollment was due to an income increase and/or getting other health insurance coverage. Many former HMP enrollees were uninsured and those with post-HMP coverage experienced challenges paying for coverage and care. Many of those eligible but unenrolled in HMP were unaware of HMP or thought they were ineligible.

Our evaluation for the 2018-2023 waiver period was originally organized around three HMP policies and four broad goals of the overall demonstration that reflected the MDHHS objectives outlined in Section B.3. Thus, the seven components that are the focus of this evaluation are:

- (1) Healthy Behaviors Incentives Program
- (2) Cost-sharing
- (3) 5% premium cost-sharing and HRA/healthy behavior requirements (48-month policy)*
- (4) Reduce uninsurance and uncompensated care
- (5) Promote primary care/responsible use of services
- (6) Support financial well-being
- (7) Support coordinated strategies to address social determinants of health

*As noted in Section B.1, the third policy listed above was not implemented during the waiver period, so this policy was not assessed in this evaluation.

Within each area, we have identified key evaluation questions that explore how HMP promotes the objectives of Titles XIX and XXI by improving access, continuity, and quality of care for low-income adults in Michigan. Because the MDHHS objectives for HMP are stated in qualitative terms, our hypotheses are framed to assess directional change rather than quantitative targets. The analysis plan was designed to identify both potential positive outcomes and possible adverse consequences. The full approved evaluation design is included as an attachment; evaluation questions and hypotheses are also presented in the results section of this report.

D. Methodology

D.1. Evaluation design summary

Our evaluation plan for the second waiver period (2018-2023) was approved by CMS on July 15, 2021.¹⁷ The plan uses multiple data sources, including state administrative data, publicly available data, and primary data collected through interviews and surveys, which are described in detail below.

The evaluation design (see the CMS-Approved Evaluation Design Attachment) was reviewed and deemed exempt by the University of Michigan Medical School Institutional Review Board (IRBMED) under Exemption 5 as an evaluation of a government health program. The evaluation plan was also reviewed and determined to be exempt by the MDHHS Institutional Review Board, with approval of a HIPAA Privacy Waiver for the use of protected health information.

D.2. Data sources, target and comparison populations, evaluation period, evaluation measures, and analytic approach

The following sources of data were used in this evaluation:

- Administrative data from the state Enterprise Data Warehouse
- Beneficiary survey (Healthy Michigan Voices)
- Interviews with beneficiaries
- Interviews with providers
- Interviews with key informants
- Credit report data from one of the three large U.S. credit agencies
- Behavioral Risk Factor Surveillance System (BRFSS) from the National Center for Health Statistics
- American Community Survey (ACS) from the U.S. Census Bureau
- HCUP Fast Stats inpatient discharge data from the Agency for Healthcare Research and Quality
- Medicare cost reports from the Centers for Medicare and Medicaid Services (CMS)

Descriptions of each of these data sources and methods are presented below. In some cases, we refer to information previously presented in the Interim Evaluation Report.¹⁸

D.2.1. State administrative data

Data source

State administrative data were obtained from the State of Michigan's Enterprise Data Warehouse. Data from Medicaid enrollment files include beneficiaries' start and end dates for HMP and other benefit plans, including months with managed care (MC) enrollment, as well as age, sex, race/ethnicity, preferred language and income level (documented as percent of FPL). Data from administrative claims encompass service-level data on paid claims (fee-for-service)

¹⁷ [HMP Evaluation Design Approval Letter](#)

¹⁸ [Healthy Michigan Plan Section 1115 Interim Evaluation Report, Demonstration Period January 1, 2019 – December 31, 2023](#)

and encounters (managed care), with accompanying billing and reimbursement information (e.g., CPT and ICD-10 diagnosis codes, billing modifiers, billing/rendering provider, paid amount) for inpatient, outpatient, pharmacy, durable medical equipment, dental, lab, and other services. Data from Health Risk Assessment (HRA) tables reflect individual-level data on date of HRA completion, provider attestation, and eligibility for HRA-related incentives (e.g., cost-share reduction). Data from cost-share tables encompass charges for co-pays and fees, cost-share reductions, and payment history.

Data were extracted by an authorized member of the evaluation team under the authority of a Business Associates Agreement executed between MDHHS and the University of Michigan. Data processing, encryption and storage were conducted in accordance with established data security protocols at the University of Michigan approved by the MDHHS Compliance Office.

This data source was used to examine evaluation questions 1.4, 2.2, 5.3, and 5.4.

Target and comparison populations

For the evaluation of health services utilization, the overall target population was HMP beneficiaries, with a focus on those enrolled in HMP-MC for two or more years. For each hypothesis, a target and comparison sub-population was further defined based on HRA completion, primary care continuity, and/or evidence of chronic conditions.

Our Interim Evaluation Report analyzed outcomes for beneficiaries with multiple years of HMP-MC enrollment (2-years, 3-years and 4-years enrollment duration groups). This Summative Report focuses on the first two years of HMP-MC enrollment. We defined an evaluation population of 524,424 beneficiaries who maintained HMP-MC enrollment for ≥ 11 of 12 months in each of the first and second years after their initial HMP-MC enrollment.

We used Medicaid enrollment files to document demographic characteristics for this population, including income, age, sex, and race/ethnicity; we also included urbanicity of residence (rural, suburban, urban) in their first month of HMP-MC enrollment and preferred written or spoken language. To enable analyses of change over time, particularly during the PHE, we incorporated a cohort group approach based on the initial year of HMP-MC enrollment; we also documented the point in HMP-MC enrollment at which the PHE began. Demographic characteristics of the evaluation population are presented in Administrative Data Table 1.

For the evaluation of cost-sharing patterns, the target population was Medicaid beneficiaries with continuous HMP-MC enrollment for at least 12 months. This minimum time period corresponds to the HMP cost-sharing policy where an initial observation period of 6 months serves as a baseline for the beneficiary's health service utilization and spending, followed by a calculation of the beneficiary's first amount owed on the MI Health Account/Healthy Michigan Plan statement, and at least 6 months to observe patterns in charges and payments.

Administrative Data Table 1. Demographic characteristics of the evaluation population for measures of health service utilization

	Evaluation Population N=524,422
FPL at initial HMP-MC enrollment	
0-35%	55.6%
36-99%	27.4%
≥100%	17.0%
Sex	
Female	50.4%
Male	49.6%
Age at initial HMP-MC enrollment	
19-20	16.5%
21-29	21.4%
30-49	37.6%
50-59	19.8%
60-64	4.7%
Cohort enrollment year	
2014-2015	37.4%
2016-2017	22.9%
2018-2019	22.3%
2020-2021	17.4%
Race/Ethnicity	
Hispanic	4.5%
Black, non-Hispanic	22.8%
White, non-Hispanic	62.6%
Other/Unknown	10.1%
Preferred written or oral language	
English	98.1%
Other language ¹	1.9%
Urbanicity at initial HMP-MC enrollment	
Rural	9.5%
Suburban	8.2%
Urban	82.3%
Public Health Emergency timing relative to enrollment	
PHE started before first HMP-MC month	12.9%
PHE started month 1-6	8.3%
PHE started month 7-12	6.7%
PHE started month 13-24	9.8%
PHE started month 25 or later	62.3%
Any other insurance (TPL) in first 2 years	4.2%

Percentages may not add up to 100% due to rounding.

¹Other language was most often Arabic or Spanish

We identified Medicaid beneficiaries who had new HMP-MC enrollment periods starting between January 2017 and July 2022 and who remained continuously enrolled in HMP-MC for at least 12 months. We followed beneficiaries through June 2023 and counted all months of

continuous HMP-MC enrollment. Gaps of up to two months were allowed, consistent with the state’s standard practice for calculating cost-share obligations. Gaps could reflect no Medicaid coverage or non-HMP coverage (e.g., fee-for-service Medicaid, incarceration, and emergency services only designations).

Beneficiaries were sorted into four cohorts based on the start date of their earliest HMP-MC continuous enrollment; cohort dates were chosen to correspond with the March 2020 start of the PHE, allowing us to explore potential differences in beneficiary characteristics, payment behaviors, and care-seeking experiences relative to the PHE period. Those in the first cohort (enrolled January 2017-December 2018) had at least a full calendar year of enrollment prior to the PHE. Those in the second cohort (enrolled January 2019-September 2019) had enrolled at least 6 months prior to the start of the PHE. The third cohort (enrolled October 2019-February 2020) had not completed their 6-month baseline period when the PHE began. Those in the final cohort (enrolled March 2020-July 2022) had their entire 6-month baseline period during the PHE.

Application of these criteria yielded an analytic population of 287,106 beneficiaries across the four cohorts (Administrative Data Table 2). While the cohorts were relatively similar based on several demographic characteristics, the later enrollment cohorts included a higher percentage of younger beneficiaries and beneficiaries from racial and ethnic minority groups.

Administrative Data Table 2. Characteristics of the evaluation population for measures of cost-sharing patterns (N=359,443)

	Cohort 1 (n=149,886)	Cohort 2 (n=43,526)	Cohort 3 (n=31,508)	Cohort 4 (n=134,523)
Female	51.7%	53.7%	51.3%	50.8%
Age at first enrollment				
19-34	55.3%	60.7%	62.1%	61.7%
35-44	16.7%	15.0%	14.6%	15.2%
45-54	15.2%	12.8%	12.6%	12.6%
55-62	12.7%	11.5%	10.7%	10.6%
Race/Ethnicity				
White, non-Hispanic	61.3%	61.0%	59.5%	58.8%
Black, non-Hispanic	22.7%	22.9%	23.4%	24.1%
American Indian/Alaska Native	0.9%	0.8%	0.8%	0.8%
Hispanic	4.9%	5.7%	6.4%	6.8%
Asian/Pacific Islander	3.0%	3.7%	3.8%	3.6%
Other	7.3%	5.9%	6.1%	5.9%
Region				
UP/NW/NE	8.3%	8.0%	7.3%	7.1%
W/E Central/E	27.2%	27.7%	28.4%	28.0%
S Central/SW/SE	19.9%	20.1%	20.6%	20.9%
Detroit Metro	44.6%	44.1%	43.8%	44.0%

Evaluation period

For evaluation of health services utilization, the evaluation period was April 2014 to September 2022.

For evaluation of cost-sharing patterns, the evaluation period was January 2017 through June 2023.

Evaluation measures

For evaluation of health services utilization, descriptor and outcome variables were derived from administrative data.

Chronic condition subpopulations. Within the target evaluation population, we identified beneficiaries with claims evidence of the four chronic conditions outlined in the evaluation plan: asthma (4.0% of the evaluation population), cardiovascular disease (3.8%), chronic obstructive pulmonary disease (COPD) (4.8%), and diabetes (7.0%) in either of their first two years of HMP-MC enrollment, using modified HEDIS® specifications from 2016 and 2022 for identification of condition-specific populations.¹⁹ We used claim type to identify beneficiaries who utilized specialty behavioral health services (9.3%).

To represent a more comprehensive view of chronic illness, we combined enrollment and claims data to create a composite disability indicator, defined as having any of the following: at least one month in a Medicaid disability-related benefit plan²⁰ in the 12 months before or 24 months after initial HMP-MC enrollment; any appearance in a medical frailty indicator table maintained by MDHHS in the 12 months before or 24 months after initial HMP-MC enrollment; or any chronic condition (asthma, cardiovascular disease, COPD, diabetes, or specialty behavioral health) identified in both the first and second years after initial HMP-MC enrollment. The composite disability indicator criteria were met by 40.1% of the evaluation population, and this group was more likely to be older, lower income, Black or White (vs. Hispanic), living in a suburban (vs. rural) area, and with initial HMP-MC enrollment in 2018 or later (Administrative Data Table 3).

HRA Completion: We identified the total number of HRA records with a provider attestation in the first year and the second year after the beneficiary's initial HMP-MC enrollment.

¹⁹ The Healthcare Effectiveness Data and Information Set (HEDIS®), National Committee for Quality Assurance

²⁰ Children's Special Health Care Services (CSHCS); ICO (Integrated Care – MI Health Link); MME (Medicaid-Medicare Dually Eligible); PACE (Program of All-Inclusive Care for Elderly); or Medicare SSI Recipients.

Administrative Data Table 3. Logistic regression - composite disability indicator

	Odds Ratio	95% CI		p-value
Cohort enrollment year				
2014-2015	REF			
2016-2017	0.940	0.925	0.954	0.000
2018-2019	1.398	1.377	1.420	0.000
2020-2021	1.121	1.102	1.141	0.000
FPL at initial HMP-MC enrollment				
0%	REF			
1-99%	0.671	0.662	0.680	0.000
100% or higher	0.628	0.618	0.638	0.000
Sex				
Female	REF			
Male	0.997	0.985	1.008	0.596
Age at initial HMP-MC enrollment				
19-20 years	REF			
21-29 years	1.278	1.253	1.303	0.000
30-49 years	2.086	2.049	2.124	0.000
50-59 years	3.461	3.392	3.531	0.000
60-64 years	3.154	3.061	3.249	0.000
Preferred written or oral language				
English	REF			
Other language	0.769	0.736	0.804	0.000
Race/Ethnicity				
Hispanic	REF			
Black, non-Hispanic	1.183	1.148	1.220	0.000
White, non-Hispanic	1.168	1.135	1.203	0.000
Other/Unknown	0.761	0.736	0.787	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	REF			
Suburban	1.108	1.078	1.138	0.000
Urban	0.982	0.963	1.002	0.077

Primary Care Continuity: We identified primary care visits based on Michigan Medicaid policy for primary care reimbursement. Classification of an outpatient visit as a primary care visit required two elements: (1) a procedure code included in the Physician Primary Care Rate Increase list²¹, and (2) a billing or rendering provider who was a Primary Care Provider of record for ≥1 Medicaid beneficiary in the Data Warehouse PCP table, who had been verified as a primary care provider for a prior MDHHS project, or who had a primary care specialty classification (e.g., family medicine, internal medicine) in both the Michigan Medicaid provider specialty table and the National Plan and Provider Enumeration System (NPPES) taxonomy table. We excluded National Provider Identifiers (NPIs) known to be inaccurate from prior analyses.

²¹ [MDHHS Physician Primary Care Rate Increase Initiative Database, January 2022](#)

Primary care visits identified through this method were used to create a flag indicating receipt of one or more primary care visits in each year of enrollment. We generated a summary measure of primary care continuity to reflect the pattern of primary care visits in the first two years of HMP-MC enrollment (both years, year 1 only, year 2 only, no years).

Preventive Visit: We identified preventive visits in each year of enrollment based on CPT visit codes (99381-99387, 99391-99397, G0402). Preventive visits could occur with any provider type, including specialists. We generated a summary measure of receipt of any preventive visit in the first two years of HMP-MC enrollment.

Dental Visit: We identified dental visits based on CPT procedure codes (Dxxxx for any dental visit, D1xxx for preventive dental visit) and generated a summary measure to reflect receipt of any dental visit and any preventive dental visit in the first two years of HMP-MC enrollment.

Vaccines: We used data from the Michigan Care Improvement Registry (MCIR) to document receipt of three vaccine types in the first two years of enrollment:

- Flu vaccine (both years, year 1 only, year 2 only, no years)
- Shingles vaccine (any vaccine administration for beneficiaries 50 years or older)
- COVID-19 vaccine (receipt of any COVID-19 vaccine in 2021 or later)

Cancer Screening: We assessed receipt of each type of cancer screening for beneficiaries who met eligibility criteria in the first two years of HMP-MC enrollment, based on the following measures:

- Breast Cancer Screening among women ages 40-64 years (NQF 2372)
- Cervical Cancer Screening among women ages 21-64 years (NQF 0032)
- Colon Cancer Screening among adults ages 50-64 years (NQF 0034)

Emergency Department (ED) Utilization: Identification of ED visits was modified from the HEDIS® Emergency Department Utilization (EDU) measure. Consistent with those specifications, we did not count ED visits that resulted in an inpatient admission. However, to reflect a more comprehensive view of ED utilization, we included observation visits and ED visits related to mental health or substance use.

ED visits identified through this method were used to calculate two outcome measures:

- *ED Visit Rate* – the number of ED visits per 1,000 member-months
- *High-Frequency ED Utilization* – the proportion of beneficiaries with >5 ED visits in the year

Chronic Disease Management: For each eligible beneficiary in the target population, we calculated the following chronic disease management measures in each of their first two years of HMP-MC enrollment:

- *Pharmacotherapy Management of COPD Exacerbation (HEDIS PCE):* The percentage of COPD exacerbations for members 40-64 years of age who had an acute inpatient discharge or ED visit and (1) were dispensed a systemic corticosteroid (or there was evidence of an active prescription) within 14 days, and (2) were dispensed a bronchodilator (or there was evidence of an active prescription) within 30 days.

- *Medication Management for People with Asthma (HEDIS MMA)*: The percentage of members 19–64 years of age who were identified as having persistent asthma and had a ratio of controller medications to total asthma medications of 0.50 or greater.
- *Statin Therapy for Patients with Cardiovascular Disease (HEDIS SPC)*: The percentage of males 21–64 years of age and females 40–64 years of age identified as having clinical atherosclerotic cardiovascular disease (ASCVD) and (1) were dispensed at least one high-intensity or moderate-intensity statin medication, and (2) remained on a high-intensity or moderate-intensity statin medication for at least 80% of the treatment period.
- *Statin Therapy for Patients with Diabetes (HEDIS SPD)*: The percentage of members 40–64 years of age with diabetes who do not have ASCVD who (1) were dispensed at least one high-intensity or moderate-intensity statin medication, and (2) remained on a high-intensity or moderate-intensity statin medication for at least 80% of the treatment period.
- *Follow-up after ED visit (HEDIS FMC)*: The percentage of emergency department (ED) visits for members 19 years of age and older who have multiple high-risk chronic conditions (e.g., COPD, CVD, dementia, stroke, depression, chronic kidney disease) who had a follow-up service within 7 days of the ED visit.

Inpatient Utilization: We generated inpatient utilization measures for condition-specific discharges, based on measures included in the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicators. For these measures, each chronic condition was linked to the discharge diagnosis (i.e., not based on utilization-based identification of chronic conditions). The condition-specific discharge measures included the following:

- *Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (NQF 0275)* – the number of discharges for chronic obstructive pulmonary disease (including asthma and bronchitis) per 100,000 beneficiaries 40-64 years of age
- *Heart Failure Admission Rate (NQF 0277)* – the number of discharges for congestive heart failure per 100,000 beneficiaries
- *Diabetes Short-Term Complications (NQF 0272)* – the number of discharges for diabetes short-term complications per 100,000 beneficiaries

Measures of cost-sharing patterns were derived from administrative data based on quarterly reports of beneficiaries' invoices and payments. For each quarter, we calculated:

- *Total amount owed* – combined monthly fee and co-payment amounts for that quarter, minus any reductions
- *Payment* – amount paid by the beneficiary for that quarter
- *Payment fraction* – payment amount applied to each quarterly statement, divided by the total amount due; we coded any overpayments to reflect the full amount of the invoice owed
- *Payment actions* – categorized as full payment, partial payment, or no payment, based on payment fraction; we defined any fraction of 0.99 or above as paid in full

The HMP cost-sharing policy authorized monthly fees for HMP-MC beneficiaries with household incomes above 100% of the federal poverty line (FPL) and service-related co-payments for all HMP-MC beneficiaries. To identify subgroups of beneficiaries based on their likely type of cost-sharing, we reviewed the monthly income (% FPL) data recorded in Medicaid

files for each beneficiary's period of continuous HMP-MC enrollment. We defined the cost-share income groups as:

- All HMP-MC months below 100% FPL
- Some HMP-MC months above, some months below 100% FPL
- All HMP-MC months above 100% FPL

Analytic methods

For evaluation of health services utilization, results presented in this Summative Evaluation Report focus on the first two years of HMP-MC enrollment, when beneficiaries were encouraged to establish a relationship with a primary care provider, complete a Health Risk Assessment, obtain recommended preventive services, and limit unnecessary ED utilization.

To explore the association of HRA completion and primary care continuity with receipt of preventive services, we employed bivariate analyses with chi-squared tests to evaluate differences by HRA completion and primary care continuity. Paired t-tests were performed to assess differences in ED visit rates across years. Two-tailed p-values <0.01 were considered statistically significant. We ran multivariate models controlling for beneficiary demographic characteristics, and multivariate negative binomial regression controlling for demographic characteristics to generate stratified results for those with chronic conditions (asthma, heart failure, COPD, diabetes).

To examine ED visit rate differences by primary care continuity, we performed a multivariate linear regression of the difference in ED visit rates between enrollment year 1 and year 2, adjusting for demographic characteristics, and computed the predicted average ED rate difference for each continuity category for each cohort year.

For measures of chronic disease management, we ran stratified analyses by cohort year, using multivariate logistic regression of receiving the recommended service on primary care continuity, adjusting for income, sex, preferred language, race/ethnicity and urbanicity; for visual comparison, we generated predicted probabilities of receiving recommended services by enrollment year and primary care continuity. For chronic condition admission rates, we ran multivariate linear regression of the difference between enrollment year 1 and year 2, adjusting for income, sex, preferred language, race/ethnicity, and urbanicity, and computed the predicted average admission rate difference for each cohort year.

For evaluation of cost-sharing patterns, we conducted a serial cross-sectional analysis, calculating by quarter each beneficiary's total amount owed, payment amount, and payment fraction. We generated average amounts owed, payment amounts, and payment fractions for our overall population and by cost-share income groups. We calculated cumulative cost-sharing burden for each beneficiary's continuous HMP-MC enrollment period, generating the average amounts owed, payment amounts, and payment fractions.

We assigned beneficiaries to a payment action group (full payment, partial payment, no payment) for each quarter of their continuous HMP-MC enrollment period, and for the full

period. We calculated the proportion in each payment action group for our overall population and by cost-share income group.

To assess the predictors of cost-sharing payment, we first estimated an ordered logistic regression model with three outcomes representing increased payments (no payment, partial payment, or full payment). This model included all beneficiaries in our sample who had a payment obligation in at least one quarter and predicts the cumulative payment status for the entire observed enrollment period. Subsequent models modified this approach to predict quarter-by-quarter payment status. These models allowed us to track, for example, how payment status evolved at the individual enrollee level as duration of enrollment increased. Each enrollee in our sample was included in each quarter in which they faced a cost-sharing obligation. To account for the repeated observations at the enrollee level, the model was estimated as a mixed effects ordered logistic model with standard errors clustered at the enrollee level. The final set of multivariate results involved estimating these mixed effects models separately for each of the four enrollment cohorts to assess the extent to which predictors of payment differed by cohort.

Methodological limitations

Our evaluation of health care utilization has several limitations. As noted in Section B.4, the COVID-19 pandemic had a significant impact on the availability and delivery of health care services, on health and health-seeking behaviors, and on HMP enrollment. To address this limitation, we incorporated year of initial HMP-MC enrollment into multivariate analyses, to compare outcomes between beneficiaries whose first two years of HMP-MC enrollment occurred prior to the start of the PHE vs. those for whom some or all their first two years of HMP-MC overlapped with the PHE. However, the timing of this report precluded us from examining outcomes for beneficiaries who enrolled in HMP-MC after the PHE ended.

In the Interim Evaluation Report, subgroup analyses focused on four chronic conditions outlined in the evaluation plan; however, beneficiaries may have had other conditions that affected their utilization patterns. For this Summative Evaluation Report, we created a composite measure of disability that incorporated disability-related benefit plans, the state's medical frailty indicator, and claims-based identification of specialty behavioral health care and the four conditions of interest. We used this composite disability indicator in multivariate analyses.

Our determination of a primary care visit was based on a combination of visit codes and provider identifiers; in some instances, primary care providers may have delivered services outside those visit codes and some providers working in a primary care setting may not have been accurately identified. In addition, the definition of primary care likely included situations in which primary care providers delivered care in urgent care or other settings.

This report focuses on beneficiaries who maintained continuous enrollment for two years after their initial HMP-MC enrollment time. Thus, results do not represent beneficiaries with gaps in enrollment.

Analyses of cost-sharing patterns have potential limitations. Our results are limited to beneficiaries whose enrollment was sufficiently long to accrue experience with HMP cost-

sharing and may not represent the experiences of those with shorter durations of HMP-MC enrollment. Descriptive data were presented to characterize some of the dimensions along which shorter- and longer-term beneficiaries differ. Some of our measures of cost-share obligations may be “noisy” due to incomplete information about factors that may exempt beneficiaries from cost-share obligations, which may change over time. For example, during the PHE, beneficiaries’ monthly fees could not increase even if they experienced an increase in income.

In addition, we included only beneficiaries who began new periods of continuous HMP-MC enrollment in 2017 or later, thereby focusing on beneficiaries during the most recent waiver period. We excluded beneficiaries who enrolled in the initial years of HMP (2014-2016) and maintained HMP-MC coverage. Therefore, this analysis represents a “flow” of new enrollments and does not include the “stock” of enrollments that occurred near the program’s initiation. These more recent enrollees may be more representative of those enrolling in HMP going forward.

D.2.2. Beneficiary survey

Data source

Healthy Michigan Voices (HMV) beneficiary surveys have been fielded at key intervals since 2016 to understand the experiences with and impact of HMP features and policies on HMP beneficiaries. Surveys supplement administrative data by documenting beneficiary knowledge of key HMP policies such as the Healthy Behaviors Incentives Program and cost-share obligations, eliciting information on barriers that impede beneficiaries from effective use of health services, describing lifestyle behaviors that impact health status, and exploring the impact of HMP on beneficiary financial well-being.

This data source was used to examine evaluation questions 1.2, 1.3, 2.1, 5.1, 5.2, and 6.1.

Target and comparison populations

The primary HMV target population was beneficiaries enrolled, or previously enrolled, in HMP-MC, through which key HMP features are administered including primary care provider assignment, HRA, healthy behaviors incentives, and cost-sharing.

HMV surveys were fielded to three cohorts: Cohort 1 (baseline survey in 2016), Cohort 2 (baseline survey in 2018), and Cohort 3 (baseline survey in 2021). Cohorts 1 and 2 each had the opportunity to complete at least one follow-up survey. Recontacting existing cohorts allowed for a more thorough understanding of the experiences of beneficiaries over time. Cohort 3 allowed for greater understanding of the experiences of those who enrolled more recently and whose initial years of enrollment included the PHE.

Beneficiary Survey Table 1 describes each cohort by their initial enrollment period and survey completion over time. For details about each survey’s eligibility information and completion

rates, please refer to the individual survey reports and Interim Evaluation Report.^{22,23,24}

Beneficiary Survey Table 1. Description of Healthy Michigan Voices cohorts

	Initial HMP enrollment	HMV survey completion years
Cohort 1	April 2014 - October 2015	2016 (N=4,108) 2017 (N=3,104) 2018 (N=2,608) 2021 (N=806)
Cohort 2	January 2016 - December 2017	2018 (N=2,602) 2021 (N=669)
Cohort 3	August 2019 - December 2020	2021 (N=2,607)

Baseline surveys for all three cohorts had the same inclusion criteria: at least 12 months in any HMP benefit; HMP-MC enrollment in the month of selection and in the at least 9 of the prior 12 months; preferred language of English, Spanish, or Arabic; and complete address and phone information. Follow-up surveys for Cohort 1 and Cohort 2 included respondents who agreed to be recontacted.

Evaluation period

The evaluation period for HMV surveys was 2016-2022.

Evaluation measures

Key outcome measures were based on validated items and scales used in prior HMV surveys. Health-related items were drawn from national surveys, including the National Health and Nutrition Exam Survey (NHANES),²⁵ Health Tracking Household Survey (HTHS),²⁶ National Health Interview Survey (NHIS),²⁷ Behavioral Risk Factor Surveillance System (BRFSS²⁸ and MiBRFSS²⁹), Short Form Health Survey (SF-12),³⁰ Food Attitudes and Behaviors Survey,³¹ Consumer Assessment of Healthcare Providers and Systems (CAHPS),³² Employee Benefit Research Institute Consumer Engagement in Healthcare Survey (CEHCS),³³ Commonwealth Fund Health Care Quality Survey,³⁴ and Patient Activation Measure.³⁵

²² Goold, S. D., & Kullgren, J. (2018). [Report on the 2016 Healthy Michigan Voices Enrollee Survey.](#)

²³ Goold, S. D., Clark, S., Kullgren, J., Beathard, E., Kirch, M., Bryant, C., Lewallen, M., & Ayanian, J. (2018). [2018 Healthy Michigan Voices Cohort II Survey Report.](#)

²⁴ [Healthy Michigan Plan Section 1115 Interim Evaluation Report, Demonstration Period January 1, 2019 – December 31, 2023](#)

²⁵ [NHANES \(National Health and Nutrition Exam Survey, CDC\)](#)

²⁶ [HTHS \(Health Tracking Household Survey\)](#)

²⁷ [NHIS \(National Health Interview Survey, CDC\)](#)

²⁸ [BRFSS \(Behavioral Risk Factor Surveillance System, CDC\)](#)

²⁹ [MiBRFSS \(Michigan Behavioral Risk Factor Surveillance System, MDHHS\)](#)

³⁰ [SF-12 \(Short Form Health Survey, RAND\)](#)

³¹ [FAB \(Food Attitudes and Behaviors Survey, NCI\)](#)

³² [CAHPS \(Consumer Assessment of Healthcare Providers and Systems\)](#)

³³ [Consumer Engagement in Health Care Survey \(EBRI: CEHCS\)](#)

³⁴ [Commonwealth Fund Health Care Quality Survey](#)

³⁵ Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the Patient Activation Measure (PAM): Conceptualizing and measuring activation in patients and consumers. *Health Services Research.* 2004;39(4 Pt 1):1005-26.

Survey items that address specific HMP features were informed by experiences, perspectives, and themes that arose in qualitative interviews with beneficiaries.

Measures of employment and social determinants of health, used in previous HMP surveys, were drawn from national surveys, such as the American Community Survey (ACS),³⁶ the Current Population Survey (CPS),³⁷ and the Health Reform Monitoring Survey (HRMS).³⁸

Measures used in Interim Evaluation Report

Specific health-related outcome measures featured in the interim report included:

- Physical, mental, oral health status (Excellent, Very good, Good, Fair, Poor)
- Number of days in past 30 days with poor physical health; with poor mental health; where poor physical or mental health kept you from usual activities
- Engagement in healthy lifestyle behaviors (physical activity/exercise, fruit/vegetable consumption, other attempts at healthy eating)
- Engagement in unhealthy lifestyle behaviors (smoking, binge drinking, substance use)
- Usual source of primary care
- Ease of getting primary care appointments, advice
- Barriers to accessing primary care, other services
- Patient activation (confidence in ability to take action to maintain or improve health)
- Report of ED visit in past 12 months
- Attempted contact with primary care provider prior to ED visit

Specific measures based on HMP policies included:

- Knowledge of HRA/healthy behaviors and cost-share reduction incentive
- Completion of an HRA, engagement with primary care provider around HRA
- Knowledge of cost-sharing obligations and link between service utilization and amount owed
- Recall of MI Health Account statement

Specific measures related to employment and social determinants of health to assess the goals of the overall demonstration included:

- Employment status (full/part time)
- Health-related barriers to employment
- Other barriers to employment (inconsistent work hours, transportation, caregiving responsibilities, discrimination due to prior conviction)
- Homelessness in past 12 months

Measures used in additional analyses in Interim Evaluation Report

For the Interim Evaluation report, we developed several composite variables that combine responses to multiple survey questions. For this Summative Evaluation Report, we continued to use several of these composite variables:

³⁶ [ACS \(American Community Survey\)](#)

³⁷ [CPS \(Current Population Survey\)](#)

³⁸ [HRMS \(Health Reform Monitoring Survey\)](#)

Healthy behavior score: ranging from 0 (neither healthy behavior) to 2 (both healthy behaviors) based on a summary of the following questions:

- In the past 7 days how many days did you eat 3 or more servings of fruits and vegetables? (1 point for response of 3-7 *days*)
- In the past 7 days, how many days did you exercise for at least 20 minutes? (1 point for response of 3-7 *days*)

Limiting unhealthy behavior score: ranging from 0 (all four unhealthy behaviors) to 4 (no unhealthy behaviors) based on a summary of the following questions:

- In the past 7 days, how many days did you have sugary drinks? (1 point for response of 0-2 *days*)
- In the past 7 days, how many days did you have [5 for men/4 for women] alcoholic drinks? (1 point for response of 0 *days*)
- In the past 30 days have you smoked or used tobacco in any form? (1 point for response of *no*)
- How often do you use drugs or medications which affect your mood or help you relax, other than exactly as prescribed for you? (1 point for response of *never* or *rarely*)

Self-efficacy score: ranging from 0 to 5, based on a summary of responses of *always* to the following statements:

- I know when I need to go to the doctor.
- I keep my appointments.
- I know how to prevent problems with my health.
- I am able to follow my doctor's treatment advice in between visits.
- When I have health care visits, I bring a list of questions or concerns I want to talk about.

Any health improvement: defined as a response of *gotten better* to one or more of the following questions:

- In the last year, would you say your physical health has gotten better, stayed the same, or gotten worse?
- In the last year, would you say your mental health has gotten better, stayed the same, or gotten worse?
- In the last year, has the health of your teeth and gums gotten better, stayed the same, or gotten worse?

Primary care barriers: defined by one or more of the following responses among those who reported having a primary care provider:

- Have you had any difficulties getting care at the primary care provider's office [open-ended]? (*yes* if respondent reported difficulties)
- In the last 12 months, how easy or difficult was it to get an appointment with your primary care provider? (*yes* if response of difficult or very difficult)
- In the last 12 months, when you contacted your primary care provider's office for advice or information, how often did you get a response within 24 hours? (*yes* if response of sometimes or never)

Any difficulties accessing prescription medications: defined as a response of *yes* to one or more of the following questions among those who reported any prescription medications in the past 12 months:

- In the last 12 months, were you ever charged more than expected for your prescription?
- In the last 12 months, have you delayed or avoided picking up your prescription because of the cost?
- In the last 12 months, have you taken less than instructed or skipped doses to make medications last longer?
- In the last 12 months, have you missed doses because you didn't get a refill on time?
- In the last 12 months, have you stopped taking your medicine or took a different dose without talking to a doctor?

New composite measures for the Summative Evaluation Report

We also developed several new composite variables that combine responses to multiple survey questions for this Summative Evaluation Report. These composite variables include the following items:

Health burden: We expanded our evaluation to incorporate a composite measure, based on the four items of the CDC's Healthy Days core health measure, to reflect an individual's combined burden of physical and mental health. In addition to facilitating analysis of change of time, this composite measure builds on our analysis of administrative data, as claims-based measures reflecting chronic disease and disability status may underrepresent individuals with health issues who are unable to receive needed services. Thus, to better reflect beneficiary perspectives of health burden, we developed a composite self-reported measure of health burden using the following survey items that were asked at each survey:

- Overall health status: In general, would you say your health is...excellent, very good, good, fair, or poor?
- Days poor physical health: For how many days during the last 30 days was your physical health not good?
- Days poor mental health: For how many days during the last 30 days was your mental health not good?
- Days health limited usual activities: During the last 30 days, for how many days did poor physical or mental health keep you from doing your usual activities?

Based on responses to these items, respondents were classified as having minimal, moderate, or substantial health burden at the time of each of their surveys. Only respondents who answered all items were included in this measure.

Beneficiary Survey Table 2. Composite health burden definitions

	Substantial health burden ≥2 of following:	Moderate health burden ≥2 of following:	Minimal health burden 0-1 of following:
Overall health status	Poor	Fair or poor	Fair or poor
Days in last 30 with physical health not good	15+ days	7+ days	7+ days
Days in last 30 with mental health not good	15+ days	7+ days	7+ days
Days in last 30 where poor health kept you from doing usual activities	15+ days	7+ days	7+ days

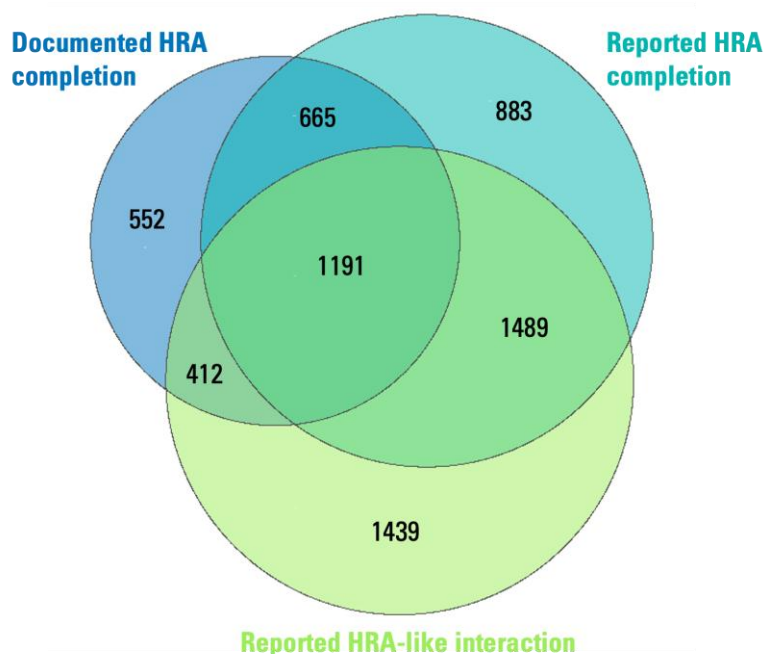
Health burden categorization at baseline for survey respondents across all three cohorts was 17.2% substantial, 13.3% moderate, and 69.5% minimal. The proportion categorized as substantial health burden was higher for Cohort 1 (19.3% vs. 16.9% for Cohort 2 and 14.2% for Cohort 3, $p < 0.001$) (Beneficiary Survey Appendix Table 1).

To validate the composite health burden variable, we conducted bivariate analyses to examine associations between health burden categories and linked Medicaid administrative data for each survey respondent, reflecting demographic characteristics, healthcare utilization (emergency department visits, inpatient stays) and chronic condition diagnoses (mental health, substance use disorder, physical health) in the year prior to survey completion, as well as programmatic variables (benefit plan based on disability or condition). Respondents categorized as having substantial health burden were more likely to be older, White, and at the lowest income level (Beneficiary Survey Appendix Table 2). Compared to those with minimal health burden, respondents with substantial health burden reported higher rates of ED and inpatient utilization, mental and physical conditions, and enrollment in a disability or condition-specific health plan (Beneficiary Survey Appendix Table 3).

HRA composite measures: Our Interim Evaluation Report findings suggested that many survey respondents did not recognize the term Health Risk Assessment and/or did not recall a specific HRA form. To better reflect beneficiary experiences around identifying and addressing health needs, we expanded our analysis of interactions between HMP enrollees and their PCPs through two composite variables:

- Reported HRA-like interaction: defined as reporting talking to a doctor, nurse, or other health professional about exercise or diet and nutrition in the last 12 months.
- Any type of HRA activity: defined as either having claims-based documentation of HRA completion, reporting an HRA completion, or reporting an HRA-like interaction.

Beneficiary Survey Figure 1. HRA activity at baseline HMV survey, all cohorts



Difficulty accessing primary care in past 12 months: Challenges with accessing primary care services can delay the receipt of care or impede beneficiaries from receiving care altogether. To ensure we captured both types of challenges, we created a composite variable of difficulty accessing primary care, defined as reporting that it was difficult or very difficult to get an appointment with primary care provider when needed or reporting not seeing PCP in past 12 months because they could not get an appointment, transportation issues or office being too far away, inconvenient hours, not liking their provider or office staff, or having to change or having a delay in getting a PCP.

Longitudinal measures for the Summative Evaluation Report

We derived several measures that combine responses to survey questions over time for longitudinal analyses presented in the Summative Evaluation Report. These composite variables include the following items:

Health burden improvement: defined as a positive change in composite health burden categorization from one survey to a subsequent survey, from moderate to minimal or from substantial to moderate or minimal.

Health behavior improvement: defined as a positive change from one survey to a subsequent survey in any of the following: a decrease in the number of days with sugary beverage consumption, an increase in the number of days eating 3 or more servings of fruit or vegetables, an increase in the number of days exercise for at least 20 minutes, a decrease in the number of days of alcohol consumption, or quitting smoking or using tobacco.

Gained employment: defined as a change from unemployed to employed/self-employed from one survey to a subsequent survey.

Ever reported HRA completion: defined as reporting during any survey that they discussed the Health Risk Assessment with their doctor or someone at their primary care provider's office in the last 12 months.

Ever reported HRA-like interaction: defined as reporting during any survey that they talked to a doctor, nurse, or other health professional about exercise or diet and nutrition in the last 12 months years.

Consistently had PCP: defined as reporting having a PCP in all surveys included in the specific longitudinal analysis.

Regularly saw PCP: defined as reporting having a PCP visit in the past year in all surveys included in the specific longitudinal analysis.

Analytic methods

Additional analyses from Interim Evaluation Report

This Summative Evaluation Report includes some additional analyses of data from the 2021 survey beyond those that were completed for the Interim Evaluation Report. These additions include new multivariate analyses and updated multivariate analyses using an additional variable representing claims-based evidence of chronic conditions.

New analyses for Summative Evaluation Report

For this Summative Evaluation Report, we conducted longitudinal analyses and incorporated new composite variables. Our analyses included:

- Comparison of baseline HMPV survey responses for three HMPV cohorts (baseline HMPV survey data collected 12-24 months after initial HMP-MC enrollment, Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021)
- Longitudinal analysis of survey responses among those who responded to surveys in 2016, 2017, and 2018 (from Cohort 1)
- Longitudinal analysis of survey responses among those who responded to surveys in 2018 and 2021 (from Cohorts 1 and 2)

Longitudinal analyses focused on 2016-2018 were typically constrained to Cohort 1 respondents who were enrolled in HMP-MC in 2018 (N=1,622). For certain questions, we included all respondents regardless of their enrollment in 2017 and 2018 (N=2,608), and for other questions we limited our analysis to those with continuous enrollment at the time of their follow-up surveys (N=1,536). Longitudinal analyses focused on 2018-2021 excluded Cohort 1 respondents who were not enrolled at the time of their 2018 survey.

For comparison of baseline HMPV responses, we looked at each measure overall, by cohort, and by health burden within cohort. We generated weighted proportions and 95% confidence intervals and used t-tests to compare cohorts both overall and by level of health burden. Within each cohort, we evaluated the relationship between health burden and the outcome measure using

Pearson chi-squared tests. We then used multivariable analysis with cohort and health burden as two of the key predictors of the outcome measure. We adjusted for age category, gender, race/ethnicity, and FPL category. We did not include chronic conditions in these multivariate models due to collinearity with the composite health burden variable.

For longitudinal analyses, we looked at responses to the same items over time. We generated weighted proportions and 95% confidence intervals at each time point both overall and by level of health burden. We evaluated the relationship between health burden and the outcome measure using Pearson Chi-squared tests and compared baseline survey health burden to subsequent surveys using an unadjusted mixed effects logistic regression model. We then derived new composite predictor and outcome measures by combining items from multiple survey years as described in the previous section. We employed bivariate analysis to describe the association between our outcomes and relevant predictor variables. We generated weighted proportions and 95% confidence intervals as well as p-values from Pearson's chi-squared tests. We used multivariable analysis to estimate the impact of predictors on key outcome variables. We adjusted for age category, gender, race/ethnicity, FPL category and, depending on the outcome, other relevant characteristics.

To adjust for the probability of selection, nonresponse bias, and other factors, we applied survey weights that were generated for each survey and described in prior reports.^{39,40,41}

Methodological limitations

As noted in Section B.4, the COVID-19 pandemic had a significant impact on the availability and delivery of health services, on health and health-seeking behaviors, and on HMP enrollment. The Cohort 3 baseline survey was conducted during the COVID-19 PHE, allowing for an exploration of how early HMP-MC experiences differed during the pandemic. However, our evaluation plan did not include a follow-up survey for Cohort 3, so we were unable to assess their experiences later in their HMP enrollment, or after disenrollment.

Our evaluation did not include two planned measures. First, we planned to document beneficiary participation in health-supporting measures, particularly those offered through health plans, which range from disease management programs to contributing to costs of gym memberships or weight loss programs. A key limitation was that health plans record this information in their proprietary internal records, but do not transfer the information to the state Data Warehouse; thus, we did not have a reliable source of information to document/confirm beneficiary participation in health-supporting measures. Additionally, we planned to collect the number of hours worked per week; however, we learned that many survey respondents did not have a set work schedule and could not give a standard number of hours. Therefore, we measured full- vs part-time employment and documented the proportion who had inconsistent work schedules.

³⁹ Goold, S. D., & Kullgren, J. (2018). [Report on the 2016 Healthy Michigan Voices Enrollee Survey.](#)

⁴⁰ Goold, S. D., Clark, S., Kullgren, J., Beathard, E., Kirch, M., Bryant, C., Lewallen, M., & Ayanian, J. (2018). [2018 Healthy Michigan Voices Cohort II Survey Report.](#)

⁴¹ [Healthy Michigan Plan Section 1115 Interim Evaluation Report, Demonstration Period January 1, 2019 – December 31, 2023](#)

HMV surveys were administered by phone in English, Arabic, or Spanish. Our results do not reflect the perspectives of beneficiaries who speak other languages. As with all surveys, respondents may differ from non-respondents in ways we cannot observe.

As with any survey, some responses could be biased due to social desirability, misinterpretation of questions, or limited ability to recall certain events. In addition, measures developed to assess knowledge about specific HMP features do not differentiate respondents' degree of certainty or their ability to apply that knowledge. To minimize survey response bias or misinterpretation, we relied on validated measures with neutral wording when possible. For areas without established measures, we trained phone interviewers to offer standardized explanations when beneficiaries asked for clarification.

Cohort 1 respondents completed up to four HMV surveys. Prior HMV surveys may have prompted them to become more aware of key HMP features. This expected educational value of the HMV surveys could influence results for this group.

Question wording, response options, and skip patterns were similar but not identical across all surveys. In addition, some items were not included in all surveys. For example, surveys in 2021 did not include equivalent questions about unmet healthcare needs used in prior surveys.

Limited sample size may have affected our ability to detect associations, particularly for outcomes that were relatively uncommon or in subgroups that were relatively small.

D.2.3. Interviews with beneficiaries

Data source

The interviews with beneficiaries were summarized in detail in the Interim Evaluation Report, and no additional analyses based on this data source were completed for the Summative Evaluation Report. The analytic plan for this data source was modified in February 2023 to not include additional beneficiary interviews or analyses of beneficiary interviews beyond those previously summarized in the Interim Evaluation Report. We found that beneficiaries were able to reflect and share perspectives on their entire time enrolled in HMP during the first set of interviews we conducted, so we were able to gather rich data on all the topics of interest during the one conversation. This modification to the evaluation design was included in the CY23 Q2 HMP Monitoring Report submitted to CMS. The description of the methods that follows was previously included in the Interim Evaluation Report.

Interviews with beneficiaries were used to gain a richer understanding of the multifaceted ways that those enrolled in HMP use and benefit from their coverage. In July and August 2021, we conducted in-depth qualitative telephone interviews with a purposive sample of 30 beneficiaries who had completed a prior HMV survey and agreed to be recontacted. We provided participants with a \$50 gift card in recognition of their time. We obtained consent to record interviews and generated verbatim transcriptions of those recordings.

This data source was used to examine evaluation questions 1.5, 2.3, 2.4, 5.5, and 6.3.

Study population

Our sampling frame for the beneficiary interviews included individuals who completed previous HMP surveys in English and who gave permission to be recontacted. To ensure HMP policy-oriented questions would be relevant, we focused on prior HMP survey respondents enrolled in HMP-MC as of June 2021 which yielded 2,351 beneficiaries from whom interviewees could be sampled. For these 2,351 beneficiaries, we queried the Data Warehouse to obtain updated information on:

- Address/region of residence as of June 2021
- FPL as of June 2021
- Evidence of HRA completion between January 2020 and June 2021
- Evidence of charge for contributions between January 2020 and June 2021
- Evidence of charge for co-pay between January 2020 and June 2021
- Evidence of healthy behavior reduction/adjustment between January 2020 and June 2021

We identified self-reported limited literacy and race and ethnicity from prior HMP survey responses.

Using the information above, we selected a purposive sample of beneficiaries for interviews, with the following intent:

- All had evidence of cost-sharing (contributions, co-pays, or both types)
- Variation in HRA completion (completion or non-completion)
- Variation in cost-sharing action related to healthy behavior (reduction/adjustment or none)
- Variation by sex, age, race/ethnicity, region, year of initial HMP enrollment, FPL group, low literacy

In all, 63 beneficiaries were contacted to participate in an interview and 30 beneficiaries were interviewed. The sample reflected diversity in geographic region, income, age, gender, race/ethnicity, length of HMP enrollment, health conditions, FPL group, and experience with HMP features.

Evaluation period

Interviews were conducted in July and August 2021 by a single trained interviewer from the evaluation team. Interviews focused on beneficiaries' experiences with HMP, with an emphasis on recent years of enrollment.

Evaluation measures

We developed a structured interview guide (see the Interim Evaluation Report Survey Instrument and Interview Guide Appendix) to explore:

- How HMP has affected beneficiaries' engagement in health behaviors and other efforts to maintain or improve health
- Beneficiaries' understanding and perceptions of the quarterly MI Health Account statement, including terminology, layout, and description of payment options
- Barriers and facilitators to making payments

- How HMP has impacted beneficiaries' physical, mental, and oral health over time and their use of health care services
- How HMP has affected beneficiaries' financial and material well-being, including out-of-pocket costs for medical care and ability to work

Analytic methods

We used an inductive approach to analysis, with iterative coding using standard qualitative analysis techniques and Dedoose software. We reviewed summaries and transcripts of the initial interviews to develop an initial codebook while data collection was still in progress. Codes were modified and added over time to capture emerging themes. We applied the codes to the transcripts and questions about coding were resolved by consensus in team meetings. We analyzed content within these codes to identify key themes. A summary of the themes and illustrative quotes was included in the Interim Evaluation Report. A longer version with additional quotes was included in the Interim Evaluation Report Beneficiary Interviews Appendix.

Methodological limitations

Our purposive sample of 63 beneficiaries was drawn from prior HMP survey respondents who were enrolled in HMP-MC during June 2021 and who had evidence of cost-share obligations. Results are not representative of all HMP beneficiaries, particularly those who did not have cost-share obligations. There may be selection bias in that the perspectives of beneficiaries who agreed to participate may not be representative of those who declined or did not respond to the invitation. Some interviewees may have provided what they perceived as socially acceptable responses to the interviewer.

D.2.4. Interviews with providers

Data source

The interviews with primary care providers (PCPs) were summarized in detail in the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report. The description of the methods that follows was previously included in the Interim Evaluation Report.

We interviewed a convenience sample of PCPs serving beneficiaries enrolled in HMP. We recruited providers via email using self-reported email contact information from the PCP survey we conducted during the initial waiver period, as well as professional contacts in health systems across the state. From March to May 2022, members of the HMP evaluation team conducted 21 interviews. Participating PCPs were offered a \$50 gift card in appreciation of their time. Interviews lasted 20-30 minutes and were recorded with the provider's permission. We generated transcriptions of those recordings.

This data source was used to examine evaluation question 1.6.

Study population

Our target population was physicians, nurse practitioners, and physician assistants serving as PCPs to HMP beneficiaries. We excluded providers who do not provide primary care.

Our 21 interview participants included 8 physicians, 9 nurse practitioners, and 4 physician assistants. Many have served as a PCP for HMP beneficiaries since the inception of the program in 2014, while several began serving as a PCP in the past 2 years. They practice at family medicine and internal medicine clinics representing all 10 prosperity regions in Michigan, with a mix of rural and urban locations. Their primary care practices are affiliated with three large tertiary care health systems, eight smaller health systems, four federally qualified health centers (FQHCs), and one rural health clinic. In addition to their PCP roles, 2 providers serve as site medical directors, another is involved in health system-wide quality improvement activities, and two have some clinical time allocated to urgent care settings.

Evaluation period

Interviews were conducted from March to May 2022 and focused on PCPs' experience with HMP, with an emphasis on 2019 to the present.

Evaluation measures

We developed a structured interview guide (see the Interim Evaluation Report Survey Instrument and Interview Guide Appendix) to explore PCPs' knowledge of and experience with HRA processes, including variation between health plans; perceptions of HMP beneficiaries' awareness of HRA processes and incentives; use of HRAs to facilitate conversations about health risks and healthy behaviors; and available services to support HMP beneficiaries' behavior change goals. We also explored strategies to decrease unnecessary emergency department utilization among HMP beneficiaries.

Analytic methods

We used contemporaneous notes and interview transcriptions to summarize PCP views, highlighting areas of concordance and disagreement. We identified key themes and illustrative quotes which were summarized in the Interim Evaluation Report.

Methodological limitations

This relatively small number of PCP interviews cannot fully represent the perspectives and experiences of all PCPs who provide care to HMP beneficiaries. However, the diversity of demographic and practice characteristics in our sample helps to mitigate this limitation.

D.2.5. Interviews with key informants

Data source

The key informant interviews focused on the costs and social impact of HMP were summarized in detail in the Interim Evaluation Report. No additional analyses based on interview data were completed for the Summative Evaluation Report. The description of the methods that follows was previously included in the Interim Evaluation Report.

For evaluation questions related to the overall costs of HMP, we interviewed Medicaid officials within MDHHS. Three group interviews were conducted in March and April 2022, lasting 30-60 minutes each. The interviews were recorded and transcribed. Following the interviews, Medicaid officials provided documents containing additional information related to evaluation questions. In January 2024, Medicaid officials provided additional information related to HMP costs for the Summative Evaluation Report.

For the evaluation question related to the broad social impact of HMP, we interviewed current and former leaders from governmental and non-governmental health and human services organizations who were directly involved with planning and/or implementing HMP. Interviews were conducted between December 2021 and February 2022 and lasted 30-45 minutes. Interview recordings were used to develop transcripts and summaries.

This data source was used to examine evaluation questions 7.1 and 7.2 (administrative and medical costs of HMP, respectively) and 7.4 (social impact of HMP).

Study population

For evaluation questions related to the overall costs of HMP, we interviewed eight Medicaid officials from Policy, Operations and Actuarial Services, Managed Care Plan Division, Customer Service Division, and Budget and Financing Division.

For evaluation questions related to the broad social impact of HMP, we interviewed 23 current and former leaders and key staff representing a variety of areas within MDHHS; health plans, health system and provider organizations, including safety net providers; and advocacy organizations; and coalitions.

Evaluation period

The key informant interviews focused on the costs and social impact of HMP from 2014 to early 2022. The evaluation period for administrative cost data was 2014 to 2023.

Evaluation measures

For evaluation questions related to the costs of HMP, we developed a semi-structured interview guide (see the Interim Evaluation Report Survey Instrument and Interview Guide Appendix) to explore:

- Administrative processes and contracts specific to HMP (relative to other Medicaid benefit plans)
- Extent to which HMP-specific administrative costs can be identified
- Trends over time in HMP administrative processes, contracts or costs
- Extent to which HMP-specific administrative processes or contracts have been used for other purposes/populations

Following the interview, key informants provided documents showing the annual capitation rate summary for HMP and two traditional Medicaid populations: Temporary Assistance for Needy Families (TANF) and Aged, Blind and Disabled (ABAD). The TANF population primarily includes children and their parents who qualify based on income and asset tests. The ABAD population includes primarily disabled individuals in all age cohorts. The capitation rate summary included base medical claims costs as well as non-benefit expense load (excluding supplemental payments and taxes). In January 2024, Medicaid officials provided additional information related to HMP costs.

For evaluation questions related to the broad social impact of HMP, we developed a semi-structured interview guide (see the Interim Evaluation Report Survey Instrument and Interview Guide Appendix) to explore how HMP:

- Facilitated or supported new or expanded initiatives and innovations in HMP enrollment
- Contributed to the sustainability of innovative policies and services addressing social determinants of health (SDOH)
- Promoted positive health outcomes, greater independence, and improved quality of life
- Facilitated innovative connections and partnerships, within MDHHS and among MDHHS, health plans, safety net providers, health systems and community-based organizations

Analytic methods

For evaluation questions related to the costs of HMP, we reviewed documents showing the annual capitation rate summary for HMP and two traditional Medicaid populations (TANF and ABAD). For question 7.1, we compared actual dollar amounts and percent point changes across years for administrative costs (non-benefit expense load). For question 7.2, we compared capitation rates based on medical claims.

For evaluation questions related to the broad social impact of HMP, we conducted thematic analysis of the interviews with the leaders and staff noted above. We identified major themes and subthemes related to the research question and selected quotes from the interviews that illustrated these themes. A summary of the themes and illustrative quotes was included in the text of the Interim Evaluation Report. A longer version with additional quotes was included in the Interim Evaluation Report Key Informant Interviews (Social Impact of HMP) Appendix.

Methodological limitations

For evaluation questions related to the costs of HMP, a major limitation is the inability to distinguish administrative costs for HMP from those of the broader Medicaid program. Medicaid staff are not assigned to HMP-specific tasks exclusively, and most administrative tasks are applicable to more than one benefit plan. Similarly, most administrative tasks included in the contract for the beneficiary call center vendor pertain to all Medicaid beneficiaries, not HMP exclusively. Some administrative cost data were available for vendor costs related to HRAs and MI Health Accounts. Thus, we could summarize these costs but were unable to conduct a detailed analysis of HMP administrative costs for Medicaid staff and the beneficiary call center.

Medicaid staff were able to provide detail about managed care capitation payments through FY2023, including comparison data for the TANF and ABAD populations. Our original evaluation plan called for comparison of trends in age- and sex-adjusted capitation rates for HMP vs. traditional Medicaid. However, the comparison data do not differentiate adults from children and do not include rates by sex. Thus, we limited our analysis to overall trends in capitation rates for administrative and medical costs.

Medicaid staff also provided limited information from an annual survey of health plans about their administrative costs. This effort, which started in FY2016, contains proprietary information and is managed by the state's actuarial firm. We received de-identified information about plan-reported changes in administrative costs from FY2019 to FY2022; we are unable to comment on plan-reported costs in any other years.

Finally, capitation rates for FY2020 included costs for health plans to implement work requirements in January 2020, as required by the Michigan legislature. However, work requirements were suspended by a federal district judge in March 2020. We were unable to distinguish FY2020 administrative costs for work requirements from those for administering other HMP features.

For evaluation questions related to the broad social impact of HMP, our key informants did not represent all potential experiences and perspectives of leaders or employees of the sectors they worked within. Also, while the key informants described the impact of HMP on beneficiaries, they were expressing their own perspectives, not those of individuals enrolled in HMP or other stakeholders. While we found that interviewees shared both successes and challenges quite openly, their direct involvement in the program could lead some key informants to share views that put HMP in a more favorable light, or political or other sensitivities could hinder what they shared, given their positions and stakes in the program's future. Nonetheless, we found that interviewees were quite candid, sharing both challenges and successes of HMP.

D.2.6. Credit report data

Data source

We used consumer credit report data from 2013–2021 to examine financial outcomes for HMP beneficiaries. Our data linkage procedure closely followed that which was used in a previous

study (not part of the HMP waiver evaluation) that examined financial outcomes for HMP beneficiaries.⁴² Additional details on the data linkage are available in the Credit Report Data Appendix.

This credit report data source was used to examine evaluation question 6.2. The analytic plan for this data source was modified in August 2023 to forego the purchase and analysis of later years of credit data; delays in the delivery and analysis of the initial credit data meant that a second data purchase would not have been available with sufficient time for analysis and inclusion in the Summative Evaluation Report. This modification to the evaluation design was included in the CY23 Q3 HMP Monitoring Report submitted to CMS.

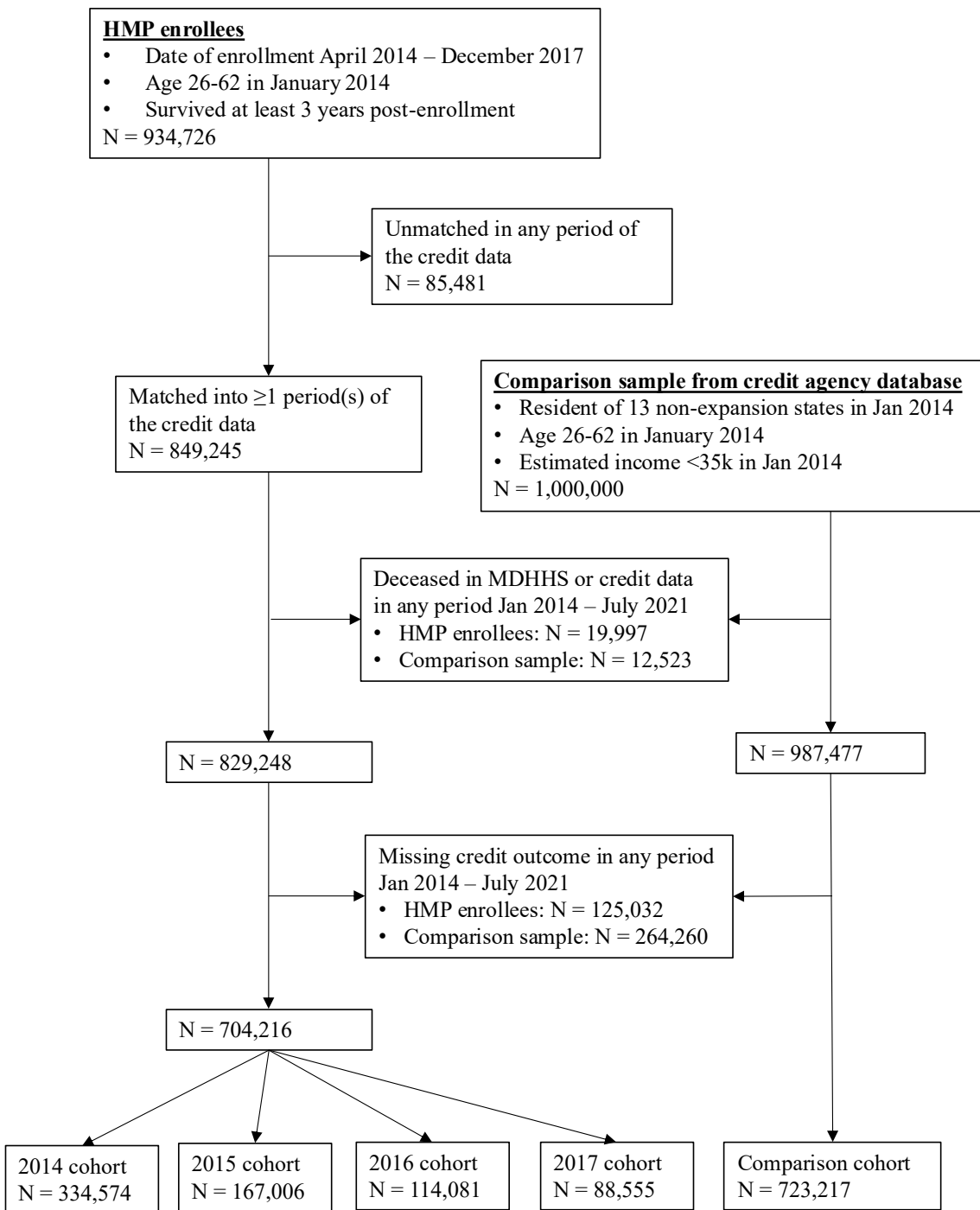
Target and comparison populations

Our target population was non-elderly adults who enrolled in HMP between April 2014 and December 2017. We restricted the sample to those age 26-62 years as of January 2014 because those younger than 26 would be potentially eligible for dependent coverage and those older than 62 years would transition to Medicare coverage within three years. We excluded beneficiaries who died within three years of their first month of HMP enrollment as they would lack sufficient post-enrollment follow-up data. The remaining individuals were linked to their credit reports at six-month intervals from 2013 to 2021, with credit snapshots obtained in January and July of each calendar year. Among HMP beneficiaries, 91.4% were matched to the credit data. Approximately one-quarter of HMP beneficiaries were excluded due to not matching with credit data in any period, missing at least one period of credit data, or being flagged as deceased (Credit Report Data Figure 1). We classified the remaining beneficiaries into cohorts by calendar year based on their first month of HMP enrollment; the 2014 cohort included April-December only, consistent with the launch of HMP, while all other cohorts included January-December enrollees.

To create a comparison sample, one million individuals were selected randomly from the credit agency's national database, restricted to individuals living in the 13 states that had not expanded Medicaid as of 2021 (Alabama, Florida, Georgia, Kansas, Mississippi, Missouri, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, Wyoming). To create an analogous population of individuals who would likely have been eligible for Medicaid had their state expanded, this random sample was also restricted to individuals ages 26-62 in January 2014 with an imputed income of less than \$35,000 per year. As with the HMP beneficiaries, credit report data in January and July of 2013 to 2021 were obtained for these individuals. Slightly over one-quarter of individuals in the comparison group were excluded due to missing at least one period of credit data or being flagged as deceased, a similar percentage as excluded HMP beneficiaries (Credit Report Data Figure 1).

⁴² Miller S, Hu L, Kaestner R, Mazumder B, Wong A. The ACA Medicaid Expansion in Michigan and Financial Health. *Journal of Policy Analysis and Management*. 2020;40(2):348-375. doi:<https://doi.org/10.1002/pam.22266>

Credit Report Data Figure 1. Cohort creation flowchart



Descriptive demographics of the HMP enrollment cohorts and the random sample comparison group are shown in Credit Report Data Table 1.

Credit Report Data Table 1. Descriptive statistics by enrollment cohort

	HMP 2014	HMP 2015	HMP 2016	HMP 2017	Comparison group	Total
Total (N)	334,574	167,006	114,081	88,555	723,217	1,427,433
Covariates, N(%)						
Female	178,513 (53.4)	83,837 (50.2)	58,391 (51.2)	44,303 (50.0)	373,652 (51.7)	738,696 (51.8)
Missing gender	19,201 (5.7)	9,720 (5.8)	6,836 (6.0)	5,196 (5.9)	50,974 (7.1)	91,927 (6.4)
Married	134,441 (40.2)	69,991 (41.9)	48,506 (42.5)	38,221 (43.2)	294,662 (40.7)	585,821 (41.0)
Missing marital status	102,230 (30.6)	50,520 (30.3)	33,543 (29.4)	25,659 (29.0)	232,002 (32.1)	443,954 (31.1)
Some college or more	142,168 (42.5)	74,349 (44.5)	51,061 (44.8)	39,569 (44.7)	258,491 (35.7)	565,638 (39.6)
Missing education level	50,827 (15.2)	24,989 (15.0)	17,104 (15.0)	12,938 (14.6)	108,069 (14.9)	213,927 (15.0)
Homeowner	113,494 (33.9)	59,131 (35.4)	39,484 (34.6)	31,374 (35.4)	182,609 (25.3)	426,092 (29.9)
Renter	33,760 (10.1)	15,431 (9.2)	10,467 (9.2)	8,151 (9.2)	73,159 (10.1)	140,968 (9.9)

Notes: Covariates displayed here are the binarized versions of the variables used in the analysis. All covariates use the values from the credit data in January 2014. The covariates of gender, marital status, and education level included unknown categories which were transformed into the binary variables reported here. The covariates for homeowner and renter included only the categories “Yes” and “Unknown,” and so did not require an additional binary variable for missing. Full covariate categories are displayed in Credit Report Data Appendix Table 1.

Evaluation period

The evaluation period was 2013 to 2021. The year 2013 was included to ensure at least one year of pre-enrollment credit data for the 2014 HMP cohort, and the years 2018 to 2021 were included to ensure at least four years of follow-up data on all HMP beneficiaries.

Evaluation measures

We examined four credit outcomes for each enrollment cohort: (1) medical debt in collections, (2) non-medical debt in collections, (3) having a subprime credit score (<600), and (4) bankruptcy in the past two years.

Medical and non-medical debt in collections both represent debt that has been sent by an original creditor to a third-party collection agency. We analyzed these outcomes as continuous dollar values. This debt could represent unpaid bills or severely derogatory credit accounts.

We used the Vantage 4.0 credit score, a proprietary score created by the credit agency that is analogous to the FICO credit score and ranges between 300-800. Lenders use this measure when

evaluating whether to extend credit and at what interest rate. As such, it is a concise summary of an individual's access to credit markets. We dichotomized credit scores as above or below the "subprime" (≤ 600) threshold, because individuals with credit scores in this range have much less access to credit or are only offered loans with higher interest rates.

Finally, we also analyzed the occurrence of personal bankruptcy in the past 24 months as a measure of severe financial distress.

Analytic methods

We used a synthetic control analysis to estimate the impact of enrollment in HMP on credit outcomes. The synthetic control method uses a comparison group to create a "synthetic control group" for each enrollment cohort. Each synthetic control group is a weighted version of the comparison group that matches the treatment group in all pre-treatment outcomes and covariates. Outcomes in the post-treatment period were then compared between each enrollment cohort and its synthetic control group, and the sum of the difference between these outcomes was the estimated impact of enrollment in HMP on the outcome. We divided this sum by the product of the number of individuals in the treatment group and the number of post-periods to estimate a mean per-period impact of HMP enrollment for each outcome. We also examined the dynamic per-period impact of HMP enrollment by calculating the difference in the sum of the HMP enrollment cohort and control groups in each period, divided by the number of people in the treatment group.

We conducted separate analyses for each enrollment cohort compared to the comparison group, as later enrollment cohorts could be expected to be different from earlier enrollment cohorts. For each enrollment cohort and its matched synthetic control group, the January observation for their enrollment year was designated as the final pre-period observation, and the mid-year observation for their enrollment year was excluded (e.g., for the 2016 enrollment cohort, January 2016 was the final pre-period, July 2016 was excluded, and January 2017 was the first post-treatment period).

The synthetic control analysis method matches enrollment cohorts to their synthetic control groups on all pre-enrollment outcomes as well as several covariates available in the credit data as of January 2014: sex, marital status, education status, homeowner, and renter. These covariates are added by the credit agency to their database from a combination of consumer surveys, derived from externally-linked information, or imputed from existing characteristics in the individual's credit report, and some are missing for a significant portion of the data. We therefore transformed these covariates into a set of time-invariant binary variables, with additional binary variables for unknown status included when applicable: female (yes/no), sex unknown (yes/no), married vs. not-married, marital status unknown (yes/no), some college or more vs. no college, education level unknown (yes/no), homeowner (yes/unknown), and renter (yes/unknown).

Standard errors for the effect estimates were derived via permutation tests (i.e., placebo tests). These tests ran the analysis 400 times, but each time used randomly-selected individuals to form the treatment group, and then we calculated the share of randomized estimates that are larger in

absolute value than the estimate obtained using the actual treatment group assignment. This share is the p-value corresponding to a two-sided test and reflects the probability of obtaining estimates as large as the true treatment group's estimate from a randomly selected group.

Additional details regarding our choice of synthetic control analysis, as well as additional descriptive results, are presented in the Credit Report Data Appendix.

This approach may contain some bias; specifically, some individuals may qualify for HMP due to sudden loss of income or a new health shock, which is likely to be negatively correlated with future credit outcomes. We refer to this as enrollment selection bias. To the extent enrollment selection bias is present in our analysis, we may underestimate the financial benefits of HMP enrollment, or perhaps attribute negative credit outcomes to HMP enrollment when in fact they were due to other health or financial circumstances that co-occurred with HMP enrollment.

We therefore conducted three sensitivity analyses of the potential magnitude of the bias in our estimates. First, we visually examined each outcome for each enrollment cohort before and after enrollment and looked for any qualitative signs of an increase in adverse credit outcomes prior to enrollment, because indications that beneficiaries' financial circumstances worsened prior to enrollment would suggest that poor outcomes post-enrollment may be due to other related events prior to enrollment, not the impact of HMP enrollment itself. We also visually inspected the results of our baseline effect estimates dynamically over time.

Second, we split our HMP cohort into two subgroups: beneficiaries who had an ED visit or inpatient admission in the same period as enrollment, and beneficiaries who did not. We then conducted a synthetic control analysis for each subgroup compared to the full comparison group. Hospitals in Michigan routinely screen patients without insurance in the ED and inpatient settings for HMP eligibility and assist them with enrollment if they are eligible. The health condition which brought these individuals to the hospital may also have been associated with subsequent worsened financial circumstances. For instance, someone with a hospital admission for a newly diagnosed cancer may also subsequently struggle to remain employed after their hospitalization and experience worsened financial outcomes for that reason. We would therefore expect the subgroup with an ED visit or hospital admission in the same period as HMP enrollment to potentially contain more selection bias than the subgroup without an ED visit or hospital admission in the same period as enrollment.

Third, we split individuals in the HMP and comparison cohorts into two subgroups: individuals who had any non-zero medical debt in collections in the periods prior to enrollment, and individuals who had no medical debt in collections in the periods prior to enrollment. We would expect that the individuals with medical debt in collections prior to the treatment period would be most likely to have enrolled in HMP due to co-occurring financial or health problems that made them eligible for HMP and therefore would contain more bias; conversely, we would expect the analysis of individuals without any medical debt in collections prior to treatment to have the least degree of potential bias. Of note, for the subgroup without any medical debt in collections, we are unable to analyze the outcome of medical debt in collections itself. This is because the analytic package used to perform the synthetic control analysis is unable to construct weights for an outcome that is by construction equal to zero in all pre-periods for both the

treatment and comparison groups. For the subgroup without any medical debt in collections in the pre-periods, therefore, we only analyzed the other three outcomes (non-medical debt in collections, subprime credit score, and bankruptcy).

We also conducted several sensitivity analyses in addition to the main analysis. First, we excluded individuals who had other Michigan Medicaid coverage in the six-month period prior to enrolling in HMP; this includes individuals who were enrolled in the Adult Benefit Waiver (ABW) program, a pre-HMP Michigan Medicaid program that offered limited insurance coverage to certain individuals with incomes above the limit for categorical eligibility. We also excluded individuals who had third-party liability (i.e., another source of insurance coverage) in the same six-month period in which they enrolled in HMP. Second, we tested the robustness of the findings of the main analysis by excluding individuals with a new bankruptcy during the study period.

Methodological limitations

There are limitations to our analysis. The comparison group had many potential control units, and earlier enrollment cohorts had small numbers of pre-treatment data available for matching. These two factors increased the risk of overfitting and thus potential error in the results. However, this potential overfitting would not produce systematic bias in the results, and our results are precisely estimated across multiple model specifications and subgroup analyses. Furthermore, the statistical package we used to estimate synthetic control models was specifically designed to handle these issues and was validated on data with similar numbers of pre-treatment periods. Our use of repeated permutation tests for statistical inference also reduces the risk that overfitting in our models has produced spurious results.⁴³ Our analysis is also limited by the fact that we only had covariates from 2014 available for matching, so these may have been less accurate for individuals included in the later enrollment cohort analyses. However, we would not expect these variables to be systematically less accurate over time for individuals in the HMP enrollment cohorts compared to the comparison sample, so this is unlikely to bias our results.

Another limitation comes from the exclusion of individuals who died or had incomplete data during the study period; approximately a quarter of both HMP enrollees and the comparison group were excluded from our analysis. This could produce bias in our results if the likelihood of poor financial outcomes changed differently post-enrollment among excluded HMP enrollees relative to their weighted synthetic control groups, although the direction of this bias is difficult to predict. This exclusion may also limit the generalizability of our results, as they may not be applicable to individuals with inconsistent credit data over time.

We had originally also planned to examine three other outcomes: amount of debt 30 or more days past due, number of months a consumer has overdrawn a credit card, and evictions. However, two of these measures (number of months overdrawn and evictions) were ultimately unavailable in the final dataset we obtained from the credit agency, as the specific variables

⁴³ Robbins MW, Saunders J, Kilmer B. A Framework for Synthetic Control Methods With High-Dimensional, Micro-Level Data: Evaluating a Neighborhood-Specific Crime Intervention. *Journal of the American Statistical Association*. 2017;112(517):109-126. doi:10.1080/01621459.2016.1213634

provided by the credit agency had changed by the time we completed our data purchase. The third outcome (past-due debt) was found to be highly variable with a much larger standard deviation than the other debt outcomes in the credit data. Our preliminary analyses with this outcome had such wide confidence intervals that no definitive conclusions could be drawn about the impact of enrollment on the outcome. We also had concerns about this variable's reliability and validity given that it had such a high variance compared to the other debt outcomes. We therefore omitted it from the final version of the analysis.

D.2.7. Behavioral Risk Factor Surveillance System (BRFSS)

Data source

We used national survey data from the Behavioral Risk Factor Surveillance System (BRFSS)⁴⁴ to estimate changes in health behaviors and health status at the population level. The BRFSS is a nationally representative telephone survey of U.S. adults conducted at the state level and overseen by the Centers for Disease Control & Prevention (CDC). This state-based sampling allows comparisons of changes in self-reported health status and health behaviors among low-income Michigan residents to low-income residents in Medicaid expansion states without a healthy behaviors incentive or requirement, and to low-income residents in states that did not expand Medicaid. Household income as a proportion of the federal poverty line (FPL) for each respondent was estimated from income and household variables available in the BRFSS.

This data source was used to examine evaluation question 1.1.

Target and comparison populations

To focus on individuals who were likely to be eligible for HMP, we included a target group of Michigan adults ages 18 to 64 (the BRFSS age categories do not allow us to separate individuals age 18 from individuals 19 and older) with reported income $\leq 138\%$ FPL. Similar to prior work,⁴⁵ we assessed this group against two comparison groups. We used public information sources^{46,47,48} to categorize the comparison states as follows:

To understand the impact of Medicaid expansion in Michigan, we compared adults ages 18 to 64 with incomes $\leq 138\%$ FPL in Michigan to adults ages 18 to 64 with incomes $\leq 138\%$ FPL in the 11 states that had not expanded Medicaid under the ACA as of December 2022: Alabama, Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, and Wyoming. South Dakota and North Carolina were included as non-expansion states in this analysis because their expansions occurred after December 2022 (July 2023 for South Dakota and December 2023 for North Carolina) and all data in the study were during the non-expansion period for these two states.

⁴⁴ [BRFSS \(Behavior Risk Factor Surveillance System, CDC\)](#)

⁴⁵ Nelson, D.B., Sommers, B.D., Singer, P.M., Arntson, E.K., & Tipirneni, R. (2020). [Changes in Coverage, Access, and Health Following Implementation of Healthy Behavior Incentive Medicaid Expansions vs. Traditional Medicaid Expansions](#). *J Gen Intern Med*, 35, 2521–2528.

⁴⁶ <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

⁴⁷ <https://www.kff.org/medicaid/issue-brief/medicaid-waiver-tracker-approved-and-pending-section-1115-waivers-by-state/>

⁴⁸ <https://www.macpac.gov/medicaid-101/waivers/>

To understand the impact of Michigan’s waiver-based expansion, we also compared adults ages 18 to 64 with incomes $\leq 138\%$ FPL in Michigan to adults ages 18 to 64 with incomes $\leq 138\%$ FPL in the 20 states that expanded Medicaid under the ACA but did not include a provision for a healthy behaviors incentive or requirement: Alaska, Arizona, Arkansas, Colorado, Hawaii, Illinois, Kentucky, Louisiana, Maryland, Montana, Nevada, New Hampshire, New Mexico, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Washington, and West Virginia. Indiana and Iowa, which expanded Medicaid with a healthy behavior provision, were excluded from analysis.

We also excluded states that implemented separate state Medicaid expansions prior to 2014 (California, Connecticut, Delaware, District of Columbia, Massachusetts, Minnesota, New Jersey, New York, Vermont, Wisconsin) or that expanded Medicaid between 2017 and 2021 (Idaho, Maine, Missouri, Nebraska, Oklahoma, Utah, and Virginia), because including these states would undermine the validity of the parallel-trends assumption required for the difference-in-differences models.

See BRFSS Appendix Table 1 for characteristics of individuals in Michigan and comparison states.

Evaluation period

The evaluation period was 2012 to 2022.

Evaluation measures

Health outcome variables in the analysis included:

- General health status (Excellent, Very good, Good, Fair, Poor), dichotomized as Excellent/Very good health vs. Good/Fair/Poor health
- Number of days with poor physical health in past 30 days
- Number of days with poor mental health in past 30 days
- Functional limitations due to either poor physical or mental health (number of days per month)

Health behavior variables in the analysis included variables in the following three categories:

Unhealthy lifestyle behaviors

- Smoking status (quit smoking in the past year, current smoker^a)
- Alcohol use (binge drinking, heavy alcohol use^a)

Healthy lifestyle behaviors

- Physical activity/exercise (any physical activity, minutes per week^c)
- Fruit consumption^{a,c} (intake per day)
- Vegetable consumption^c (intake per day)

Preventive health services

- Routine checkup in past year
- Cholesterol screening^c (ever had)

- HIV screening (ever received, received in the past year)
- Cancer screening: colorectal cancer screening including colonoscopy, sigmoidoscopy, or stool test^b (among adults ages 50-75), breast cancer screening with mammogram^b (among women ages 50-75), and cervical cancer screening with Pap smear^b (among women ages 21-65)
- Immunizations: Flu vaccine in the past year

^aDid not meet parallel trends test and thus excluded from difference-in-difference analysis.

^bVariables assessed every other year in Michigan BRFSS, with baseline pre-period year 2012.

^cVariables assessed every other year in Michigan BRFSS, with baseline pre-period year 2013 and final analysis year 2019 or 2021.

Analytic methods

We used a difference-in-differences analytic approach, comparing trends in health and health behavior outcomes in Michigan to trends in the other expansion states without a similar healthy behavior waiver and to non-expansion states. The pre-period included the years 2011-2014 (prior to implementation of the first HMP waiver in 2014), and the post-period included the years 2015-2022. The regression model included fixed effects for state and quarter such that the model accounted for systematic (non-random) differences within states and quarters. We applied the BRFSS survey weights to all analyses to account for the complex survey design. The models also adjusted for the following covariates: age, gender, race/ethnicity, marital status, education, income, employment status, and whether the respondent was part of the BRFSS cell phone sample. Post-regression average marginal effects were used to estimate the values of each variable before and after HMP implementation. To meet the assumptions of the difference-in-differences analysis, we assessed for parallel trends between target and comparison groups among all outcomes in the pre-period. We tested this assumption by 1) visually inspecting graphs of pre-period trends for each outcome variable; and 2) running adjusted regression models for each outcome during the pre-period with an interaction term between study year and state class. The assumption was violated if the interaction term was statistically significant at the $\alpha = 0.05$ level. The parallel trends assumption was met for all measures except for the following variables: current smoker, heavy alcohol use, and fruit intake; therefore, these three variables were excluded from the difference-in-differences analysis.

Methodological limitations

The COVID-19 pandemic likely influenced secular trends in Michigan as well as in comparison states. The inclusion of time fixed effects in our models may partially but not completely mitigate this potential bias. Given higher enrollment in Medicaid during the PHE and economic downturn starting in 2020, sample selection may also have changed during the pandemic in Michigan and comparison states, despite using the same sample inclusion criteria. This potential bias would be more likely to affect within-Michigan trends than the difference-in-difference analyses, as all states were affected by changing enrollment during the PHE.

To assess for potential changes in the low-income samples, we examined differences in sociodemographic characteristics across years after 2019 compared with the baseline year in

2013 and found that post-pandemic samples had adults with older ages, slightly fewer females, a greater proportion of Hispanic individuals and in some years fewer Black individuals, more married/partnered individuals, and a higher proportion of cell phone respondents; these differences in post-pandemic samples were demonstrated similarly across the three state groupings (BRFSS Appendix Tables 2-5). In 2020-2022, a higher proportion of individuals were in moderately higher income brackets within the low-income sample and fewer were employed. Given the similar trends in Michigan and the two comparison state groups, as well as the adjustment for all relevant sociodemographic covariates, we do not believe these differences threaten the validity of the difference-in-differences analytic design. However, we cautiously interpret within-Michigan differences in outcomes for post-pandemic years (BRFSS Appendix Table 1.1.1).

The analyses may also be limited by statistical power when comparing low-income adults from a single state to multiple states; this would bias results toward the null hypothesis of no effect of HMP on outcomes.

D.2.8. American Community Survey (ACS)

Data source

The data for the analysis of insurance coverage came from the American Community Survey (ACS), a nationally representative survey conducted annually by the Census Bureau.⁴⁹ Data include CY2010 to CY2022. The sample size in the ACS public release is approximately 3 million individuals in each year. Our analysis was limited to adults ages 19 through 64, the age group potentially eligible for HMP, which yielded approximately 1.8 million observations in each year. Of these, approximately 58,000 in each year are in Michigan, while about 1.1 million observations are in other states that have expanded their Medicaid programs and approximately 690,000 are in states that have not expanded Medicaid. We dropped approximately 4 percent of all observations that were missing data on family income.

Since 2008, the ACS has included a question about health insurance that asks respondents to indicate sources of current health insurance for every household member.⁵⁰ Respondents may mark more than one option. We used these data to create binary indicators of four different insurance outcomes: Medicaid or related public coverage, private non-group coverage, employer-sponsored coverage (including TRICARE), and uninsured. Note that with the exception of uninsured, these outcomes are not mutually exclusive; someone might have, for example, both private non-group coverage and Medicaid. However, this is relatively unusual. Additional sources of coverage – primarily Medicare for individuals under age 65 who are disabled or have end-stage renal disease – are not discussed in this report.

Additional ACS variables in some of our analyses included family income relative to poverty, race/ethnicity (White non-Hispanic, Black non-Hispanic, Asian non-Hispanic, other non-Hispanic, and Hispanic [any race]), education, and employment status (currently working for pay

⁴⁹ Technical documentation for the ACS is available [here](#)

⁵⁰ Additional information about the ACS health insurance measure is available [here](#)

or not working). We also merged unemployment rate data from the Bureau of Labor Statistics to ACS observations at the state-year level.⁵¹

This data source was used to examine evaluation question 4.1.

Target and comparison populations

The target state was Michigan. We used public information sources^{52,53,54} to categorize the comparison states as follows:

To understand the impact of Medicaid expansion in Michigan, we compared outcomes in Michigan to outcomes in the 12 states that had not expanded Medicaid under the ACA as of December 2022: Alabama, Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and Wyoming. Note that this categorization differs from our 2022 Interim Evaluation Report, where Missouri and Oklahoma were included as non-expansion states; their implementation of the ACA Medicaid expansion in 2021 excluded them from this analysis. Conversely, South Dakota and North Carolina were included as non-expansion states in this analysis because their expansions occurred after December 2022 (July 2023 for South Dakota and December 2023 for North Carolina).

To understand the impact of Michigan’s waiver-based expansion, we compared outcomes in Michigan to outcomes in the 22 states that expanded Medicaid under the ACA in January 2014 without a Section 1115 waiver similar to Michigan in its benefit, co-payment, and healthy behavior provisions: Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Illinois, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia. We refer to this group as “traditional expansion” states.

Because our evaluation design relied on comparing Michigan with states that either (1) did not expand Medicaid as of December 2022 or (2) implemented a traditional expansion prior to April 2014 when Michigan implemented Medicaid expansion, we excluded the 13 states that expanded Medicaid between August 2014 and December 2022 (date of expansion in parentheses): New Hampshire (8/2014), Pennsylvania (1/2015), Indiana (2/2015), Alaska (9/2015), Montana (1/2016), Louisiana (7/2016), Virginia (1/2019), Maine (1/2019), Idaho (1/2020), Utah (1/2020), Nebraska (10/2020), Oklahoma (7/2021), and Missouri (8/2021). We also excluded Arkansas and Iowa, which expanded Medicaid in 2014 through waivers similar to Michigan, and New Mexico, which implemented a traditional expansion in 2014 but since 2019 has operated under a waiver similar to Michigan.

Evaluation period

The evaluation period was 2010 to 2022.

⁵¹ Specifically, we use series LNS14000000 from the Bureau of Labor Statistics, available [here](#)

⁵² <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

⁵³ <https://www.kff.org/medicaid/issue-brief/medicaid-waiver-tracker-approved-and-pending-section-1115-waivers-by-state/>

⁵⁴ <https://www.macpac.gov/medicaid-101/waivers/>

Evaluation measures

The outcomes were the proportion of adults ages 19 to 64 with four types of insurance coverage: no coverage, Medicaid, private non-group insurance, and employer-sponsored insurance.

Analytic methods

We generated descriptive figures comparing trends over time in Michigan versus the comparison populations for the period 2008 through 2022. We fit difference-in-differences regression models for the period 2010 through 2022, which summarized the relative change over time in outcomes in Michigan compared with the two separate comparison groups before and after the implementation of HMP in 2014. We began our evaluation period for the regression models in 2010, rather than 2008, so as not to capture the changes in insurance status from 2008 to 2010 which were likely the result of the recession. The specification for the difference-in-differences models was the following:

$$(1) Y_{ist} = \alpha_0 + \sum_{2011}^{2022} \alpha_{1t} YEAR_t + \alpha_2 \cdot (YEAR_t \geq 2014) \cdot MICHIGAN + \alpha_3 \cdot STATE + \alpha_4 X_{ist} + \alpha_5 UNEMPLOYMENT RATE_{st} + e_{ist}$$

The vector X_{ist} included the individual-level controls for gender and marital status, race/ethnicity, age, employment status, and education. Both descriptive figures and difference-in-difference regression models were generated for the total adult population and the subset of adults in households with income below 138% of the federal poverty level.

Methodological limitations

The analysis relied on the assumption that in the absence of the interventions being studied, the trend in outcomes in Michigan would have been similar to the trend in outcomes observed in the comparison states. For example, to examine the impact of Michigan expanding Medicaid, we assumed that trends in Michigan would have been similar to trends in non-expansion states had Michigan not expanded its Medicaid program. Similarly, to examine the impact of Michigan's waiver-based expansion, we assumed that trends in Michigan would have been similar to trends in traditional expansion states had Michigan taken that approach. These assumptions cannot be directly tested, though the similarity of trends across the three groups prior to 2014 suggest that these assumptions are valid.

D.2.9. HCUP Fast Stats inpatient discharge data

Data source

Data on inpatient payer mix were obtained from the FastStats program of the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project (HCUP). The payer mix data are reported on a quarterly basis and are accessible from the HCUP website.⁵⁵

⁵⁵ [HCUP website](#)

The Fast Stats program aggregates state-level data contributed by states to HCUP. In the years that we analyzed for this report, there are no data from Alabama, Connecticut, the District of Columbia, Idaho, or New Hampshire.

This data source was used to examine evaluation question 7.3.

Target and comparison populations

The target state was Michigan. We used public information sources^{56,57,58} to categorize the comparison states as follows:

To understand the impact of Medicaid expansion in Michigan, we compared outcomes in Michigan to outcomes in the 11 states in the HCUP data that had not expanded Medicaid under the ACA as of December 2022: Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and Wyoming. Most states have data for 2003 through 2021 (Georgia, Kansas, South Carolina, South Dakota, Texas, Wisconsin) or 2003 through 2020 (Florida, North Carolina, Tennessee); exceptions are Mississippi, with data for 2013 through 2021, and Wyoming, with data for 2007 through 2020. Note that this categorization differs from our 2022 Interim Evaluation Report, where Missouri and Oklahoma were included as non-expansion states; their implementation of the ACA Medicaid expansion in 2021 excludes them from this analysis. Conversely, South Dakota and North Carolina were included as non-expansion states in this analysis because their expansions occurred after December 2022 (July 2023 for South Dakota and December 2023 for North Carolina).

To understand the impact of Michigan's waiver-based expansion, we compared outcomes in Michigan to outcomes in the 20 states in the HCUP data that expanded Medicaid under the ACA in January 2014 without a Section 1115 waiver similar to Michigan in its benefit, co-payment, and healthy behavior provisions: Arizona, California, Colorado, Delaware, Hawaii, Illinois, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia. We refer to this group as "traditional expansion" states. Most states have data for 2003 through 2021 (Arizona, California, Colorado, Hawaii, Kentucky, Maryland, Minnesota, New Jersey, New York, Ohio, Oregon, Rhode Island, Vermont, West Virginia) or 2003 through 2020 (Illinois, Massachusetts, Nevada, Washington); exceptions are North Dakota, with data for 2011 through 2021, and Delaware, with data for 2016 through 2020.

Because our evaluation design relied on comparing Michigan with states that either (1) did not expand Medicaid as of December 2022 or (2) implemented a traditional expansion prior to April 2014 when Michigan implemented Medicaid expansion, we excluded the 13 states that expanded Medicaid between August 2014 and December 2022 (date of expansion in parentheses): New Hampshire (8/2014), Pennsylvania (1/2015), Indiana (2/2015), Alaska (9/2015), Montana (1/2016), Louisiana (7/2016), Virginia (1/2019), Maine (1/2019), Idaho (1/2020), Utah (1/2020), Nebraska (10/2020), Oklahoma (7/2021), and Missouri (8/2021). We also excluded Arkansas

⁵⁶ <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

⁵⁷ <https://www.kff.org/medicaid/issue-brief/medicaid-waiver-tracker-approved-and-pending-section-1115-waivers-by-state/>

⁵⁸ <https://www.macpac.gov/medicaid-101/waivers/>

and Iowa, which expanded Medicaid in 2014 through waivers similar to Michigan, and New Mexico, which implemented a traditional expansion in 2014 but since 2019 has operated under a waiver similar to Michigan.

Lastly, the following states are not included in the HCUP data and were therefore excluded from HCUP analyses: Alabama, Connecticut, and the District of Columbia. Idaho and New Hampshire are also not included in the HCUP data but would have been excluded anyway because they expanded Medicaid between August 2014 and December 2020 (as noted above).

Evaluation period

The evaluation period in this report was 2003 to 2021.

Evaluation measures

The evaluation measure was the proportion of adult (ages 19-64) inpatient hospital discharges by three sources of payment: Medicaid, self-pay, and private insurance.

Analytic methods

We generated descriptive figures comparing trends over time in Michigan versus the comparison populations for the period 2003 through 2021.

We also fit difference-in-differences regression models for the period 2010 through 2021, which summarized the relative change over time in the proportions of discharges in each payment category in Michigan compared with the two separate comparison groups of states before and after the implementation of HMP in 2014. The specification for the difference-in-differences models was the following, where $PERIOD_t$ represents calendar year and quarter):

$$(1) Y_{ist} = \alpha_0 + \sum_{2010Q2}^{2021Q4} \alpha_{1t} PERIOD_t + \alpha_2 \cdot (YEAR_t \geq 2014Q1) \cdot MICHIGAN + \alpha_3 \cdot STATE + \alpha_4 X_{ist} + e_{ist}$$

Methodological limitations

The HCUP data have some limitations. As noted above, not all states are represented in the data. In addition, for adults ages 19-64, the data do not include individuals with Medicare coverage, such as those who are disabled or have end-stage renal disease.

The analysis relies on the assumption that in the absence of the interventions being studied, the trend in outcomes in Michigan would have been similar to the trend in outcomes observed in the comparison states. For example, to examine the impact of Medicaid expansion in Michigan, we assumed that trends in Michigan would have been similar to trends in non-expansion states had Michigan not expanded its Medicaid program. Similarly, to examine the impact of Michigan's waiver-based expansion, we assumed that trends in Michigan would have been similar to trends in traditional expansion states had Michigan taken that approach. These assumptions cannot be

directly tested, though the similarity of trends across the three groups prior to 2014 suggests that these assumptions are valid.

D.2.10. Medicare cost reports

Data source

All hospitals that receive payments from the Medicare program are required by CMS to submit cost report data annually. The data are maintained by CMS in the Healthcare Provider Cost Reporting Information System (HCRIS). We obtained a cleaned version of these data from the RAND Corporation (hospitaldatasets.org). Hospitals report data on a fiscal year basis. RAND creates analytic files that organize the data on either a fiscal year or calendar year basis. Our analysis was based on the calendar year version of the data.

This data source was used to examine evaluation question 7.3.

Target and comparison populations

The HCRIS data include general acute care hospitals and critical access hospitals located in the 50 states and the District of Columbia.

The target state was Michigan. We used public information sources^{59,60,61} to categorize the comparison states as follows:

To understand the impact of Medicaid expansion in Michigan, we compared outcomes in Michigan to outcomes in the 12 states that had not expanded Medicaid under the ACA as of December 2022: Alabama, Florida, Georgia, Kansas, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Wisconsin, and Wyoming. Note that this categorization differs from our 2022 Interim Evaluation Report, where Missouri and Oklahoma were included as non-expansion states; their implementation of the ACA Medicaid expansion in 2021 excludes them from this analysis. Conversely, South Dakota and North Carolina were included as non-expansion states in this analysis because their expansions occurred after December 2022 (July 2023 for South Dakota and December 2023 for North Carolina).

To understand the impact of Michigan's waiver-based expansion, we compared outcomes in Michigan to outcomes in the 22 states that expanded Medicaid under the ACA in January 2014 without a Section 1115 waiver similar to Michigan in its benefit, co-payment, and healthy behavior provisions: Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Illinois, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia.

Because our evaluation design relied on comparing Michigan with states that either (1) did not expand Medicaid as of December 2022 or (2) implemented a traditional expansion prior to April

⁵⁹ <https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/>

⁶⁰ <https://www.kff.org/medicaid/issue-brief/medicaid-waiver-tracker-approved-and-pending-section-1115-waivers-by-state/>

⁶¹ <https://www.macpac.gov/medicaid-101/waivers/>

2014 when Michigan implemented Medicaid expansion, we excluded the 13 states that expanded Medicaid between August 2014 and December 2022 (date of expansion in parentheses): New Hampshire (8/2014), Pennsylvania (1/2015), Indiana (2/2015), Alaska (9/2015), Montana (1/2016), Louisiana (7/2016), Virginia (1/2019), Maine (1/2019), Idaho (1/2020), Utah (1/2020), Nebraska (10/2020), Oklahoma (7/2021), and Missouri (8/2021). We also excluded Arkansas and Iowa, which expanded Medicaid in 2014 through waivers similar to Michigan, and New Mexico, which implemented a traditional expansion in 2014 but since 2019 has operated under a waiver similar to Michigan.

Evaluation period

The evaluation period was 2011 to 2022.

Evaluation measures

The evaluation measures were hospital uncompensated care expressed in dollars (indexed for inflation to 2020) and as a percentage of total hospital expenditures.

Analytic methods

We generated descriptive figures comparing trends over time in Michigan versus the comparison populations. We also fit difference-in-differences regression models, which summarized the relative change over time in Michigan compared with the two separate comparison groups.

Methodological limitations

The Medicare cost report data have some limitations for the purpose of our analysis. As noted, hospitals report data on a fiscal year basis. The timing of the fiscal year varies across hospitals; data reported to CMS in a given year pertain to different periods for different hospitals based on the hospital's fiscal year. For example, most states that expanded Medicaid did so as of January 1, 2014; for hospitals whose fiscal years correspond to the calendar year, this timing allows for a clean definition of the pre- and post-expansion period. In contrast, for a hospital whose fiscal year runs from July to June, FY2014 would contain six months of pre-expansion data and six months of post-expansion data. Because HMP was established in April 2014, FY2014 data from most Michigan hospitals include a mix of pre- and post-HMP data, with the exact mix varying depending on the timing of each hospital's fiscal year.

RAND creates the calendar year version of the data; we averaged data across adjacent fiscal years, which solved the problem of data from different hospitals pertaining to different years. However, this had the effect of smoothing the data around the time of HMP implementation. Consider a hospital whose fiscal year runs from July 1 to June 30; its FY2014 data included 9 months of pre-HMP experience (July 2013 through March 2014) and three months of post-HMP data (April 2014 through June 2014). FY2013 was entirely in the pre-HMP period. However, the way calendar-year observations are formed means that both the CY2013 and CY2014 data included a mix of pre- and post-HMP experience.

Another known issue with the HCRIS data is potential errors in reporting that yield extreme values for certain variables in certain years. RAND uses an algorithm to identify likely errors and replace them with interpolated values.

The analysis assumed that in the absence of the interventions being studied, the trend in outcomes in Michigan would have been similar to the trend in outcomes observed in the comparison states. For example, to examine the impact of Medicaid expansion in Michigan, we assumed that trends in Michigan would have been similar to trends in non-expansion states had Michigan not expanded its Medicaid program. Similarly, to examine the impact of Michigan's waiver-based expansion, we assumed that trends in Michigan would have been similar to trends in traditional expansion states had Michigan taken that approach. These assumptions cannot be directly tested, though the similarity of trends across the three groups prior to 2014 suggests that these assumptions are valid.

E. Methodological Limitations

Methodological limitations specific to each data source are described above.

F. Results

The results presented in this Summative Evaluation Report include data available to the evaluation team and summarized as of April 2024. The results are organized by evaluation question and corresponding hypotheses. In some cases, we refer to information previously presented in the Interim Evaluation Report.⁶²

F.1. Healthy Behaviors Incentives Program

Evaluation question 1.1: How has the health and healthy behavior engagement among Michigan adults changed since introduction of HMP and its Healthy Behaviors Incentives Program?

Hypothesis 1.1: Health status will improve and healthy behaviors will increase over time among income-eligible adults in Michigan compared with similar adults in comparison states.

Data source: Behavioral Risk Factor Surveillance System (BRFSS) (as described in D.2.7)

Results

Our Interim Evaluation Report found that aggregate health and health behavior measures did not improve for low-income adults in Michigan after HMP implementation compared to other Medicaid expansion and non-expansion states, except for a large increase in the rate of routine checkups in Michigan in 2015. However, that increase was not sustained in subsequent years through 2019.

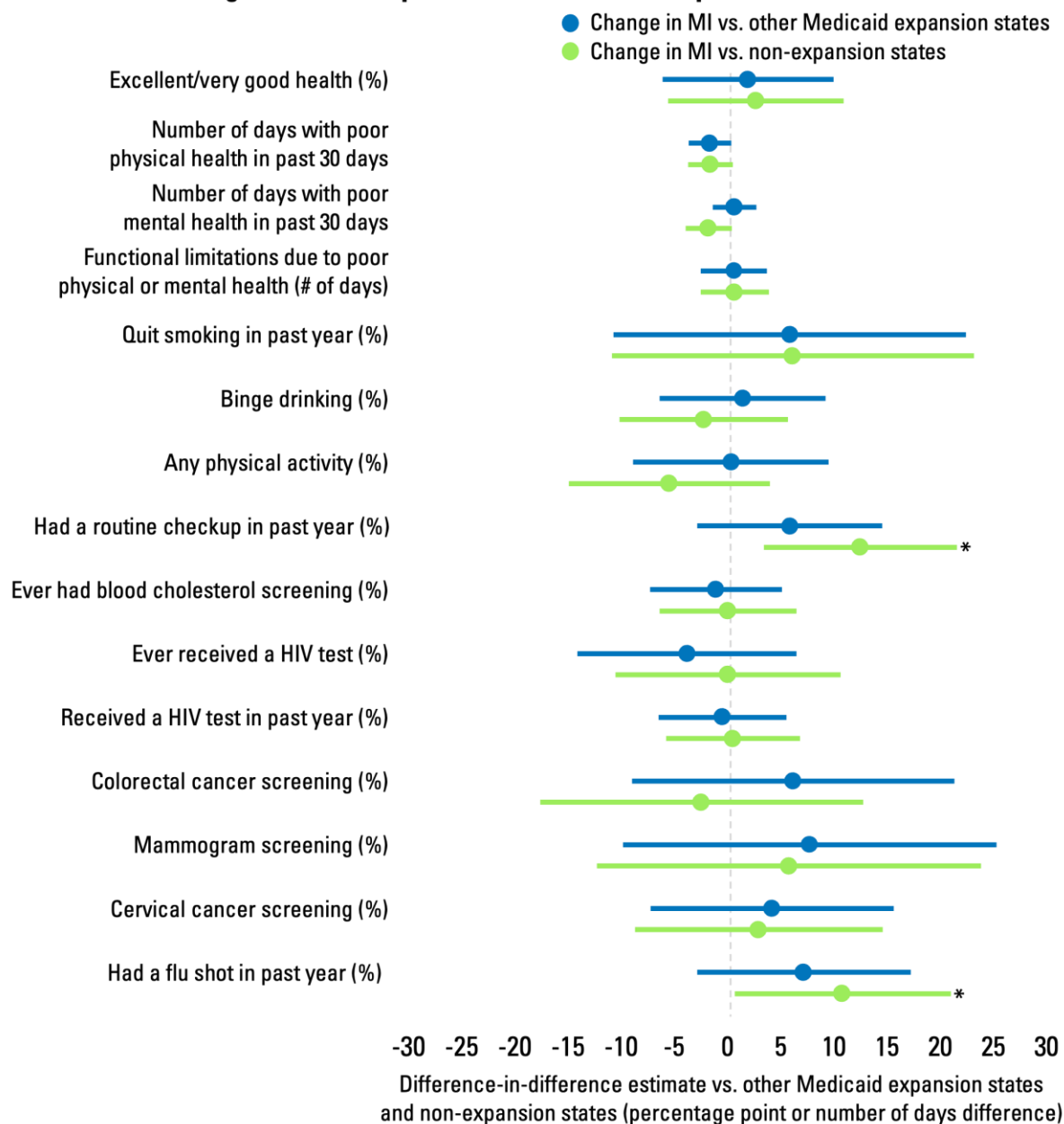
For this Summative Evaluation Report, we expanded our analyses to include two additional years of data (2021 and 2022).

⁶² [Healthy Michigan Plan Section 1115 Interim Evaluation Report, Demonstration Period January 1, 2019 – December 31, 2023](#)

Within Michigan, the following health and health behavior measures improved significantly among low-income adults between the years prior to HMP implementation and the last year of analysis (BRFSS Appendix Table 1.1.1): percent reporting being a current smoker (decrease of 8 percentage points), routine checkup in past year (increase of 19 percentage points), and ever having a cholesterol screening (increase of 8 percentage points). It is possible that aspects of HMP such as wellness program participation could have contributed to these outcomes. However, as noted above (Section D.2.7), based on the methods used for this analysis, we cautiously interpret within-Michigan changes in outcomes during 2020 through 2022 to be related to differences in the composition of low-income individuals who were eligible for HMP during the public health emergency when HMP enrollment increased substantially by nearly half.

Comparing Michigan to other Medicaid expansion states and to non-expansion states, difference-in-difference (DID) analyses showed no statistically significant change in most health or health behavior measures from 2012 or 2013 as compared with post-expansion (2019, 2020, 2021, or 2022), depending on data availability. One notable exception was a statistically significant increase of 16 percentage points in having a routine checkup in Michigan compared to non-expansion states and of 10 percentage points compared to other Medicaid expansion states in 2015, the year after HMP was implemented. This significant difference compared to the other state groups was not initially sustained in 2016-2019. However, after 2020 there was again a statistically significant increase in routine check-ups in Michigan compared to other states, including an increase of 12 percentage points compared to non-expansion states in 2022. Several measures (binge drinking, physical activity, fruit intake, cholesterol screening, HIV screening, cervical cancer screening, flu shot) showed statistically significant changes in individual years compared to the other state groups, but health behavior measures showed no significant difference by the final year of analysis, except for flu shots which were significantly more common in Michigan relative to non-expansion states (BRFSS Appendix Table 1.1.2, Figure 1.1.A).

Figure 1.1.A. Comparison of changes^a in BRFSS self-reported health status and health behaviors in Michigan vs. other expansion states and non-expansion states



^aChanges in outcomes within each state group refer to pre-expansion compared with the most recent year of available data for the outcome measure.

*Statistically significant difference ($p < 0.05$) between changes in Michigan and changes in comparison state group

Summary of response to evaluation question 1.1

Overall, we did not find greater improvement in aggregate health or health behavior measures among low-income adults in Michigan after HMP implementation compared to other Medicaid expansion and non-expansion states, with two exceptions. Self-reported rates of routine check-ups increased in Michigan in 2015 compared to comparison state groups; this significant

difference compared to the other state groups was not initially sustained in 2016-2019 but returned in 2020. In addition, low-income adults in Michigan had an increase in self-reported rates of flu shots in 2020 relative to non-expansion states.

Evaluation question 1.2: What is the association between beneficiary knowledge of the Healthy Behaviors Incentives Program and efforts to maintain or improve health?

Hypothesis 1.2: Engagement in efforts to maintain or improve health will be higher among beneficiaries who report knowledge of the HMP Healthy Behaviors Incentives Program.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that beneficiaries with knowledge of the healthy behavior financial incentives reported greater self-efficacy in taking actions to maintain or improve their health and greater frequency of healthy behaviors and limiting unhealthy behaviors, compared to beneficiaries who were not aware of financial incentives. For this Summative Evaluation Report, we repeated multivariate analyses with an additional variable representing claims-based evidence of chronic conditions. Results from these expanded analyses (see Beneficiary Survey Appendix Tables 1.2.1 and 1.2.2) did not differ from those presented in the Interim Evaluation Report.

Summary of response to evaluation question 1.2

Overall, beneficiary knowledge of the Healthy Behaviors Incentives Program was low. The subset of beneficiaries who demonstrated knowledge of financial incentives were more likely to report self-efficacy in taking actions to maintain or improve their health and to report greater frequency of healthy behaviors and limiting unhealthy behaviors.

Evaluation question 1.3: Is HRA completion associated with improved health status and health behaviors?

Hypothesis 1.3: Beneficiaries who complete an HRA will report improvement in health status and health behaviors compared to beneficiaries who do not complete an HRA.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that beneficiaries who reported completing an HRA in the past year reported worse overall health and slightly better health behaviors, compared to beneficiaries who did not report completing an HRA. Among beneficiaries who did not report completing an HRA, many recalled HRA-like interactions with their PCP, including discussion of health behavior goals. For this Summative Evaluation Report, we repeated multivariate analyses with an additional variable representing claims-based evidence of chronic conditions. Results from these expanded analyses (see Beneficiary Survey Appendix Tables 1.3.1 and 1.3.2) did not differ from those presented in the Interim Evaluation Report.

For this Summative Evaluation Report, we conducted longitudinal analyses of HRA completion, health burden improvement, and health behavior improvement. We incorporated a new

composite variable, beneficiary-reported health burden, into these analyses. We also explored differences between HRA completion documented in Medicaid administrative files, HRA completion reported during an HMO survey, and HRA-like interactions with primary care providers reported during an HMO survey. Our analyses included:

- Comparison of baseline HMO survey responses for three HMO cohorts (baseline HMO survey data collected 12-24 months after initial HMO-MC enrollment, Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021)
- Longitudinal analysis of survey responses among those who responded to surveys in 2016, 2017, and 2018 (from Cohort 1)
- Longitudinal analysis of survey responses among those who responded to surveys in 2018 and 2021 (from Cohorts 1 and 2)

HRA completion at baseline, by level of health burden

In the bivariate analysis of baseline HMO surveys, a higher proportion of Cohorts 1 and 2 had HRA completion documented in Medicaid administrative files (31.4% and 31.0%) compared to Cohort 3 (18.8%); within each Cohort, documented HRA completion did not vary by level of health burden (Beneficiary Survey Appendix Table 1.3.3). These results were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 1.3.4).

In the bivariate analysis of baseline HMO surveys, a slightly higher proportion of Cohorts 1 and 3 self-reported HRA completion (49.2% and 48.0%) compared to Cohort 2 (43.4%). Within each Cohort, associations between reported HRA completion and health burden varied (Beneficiary Survey Appendix Table 1.3.3). In multivariate analyses, Cohort 2 beneficiaries were less likely to report completing an HRA (Beneficiary Survey Appendix Table 1.3.4).

In the bivariate analysis of baseline HMO surveys, a higher proportion of Cohort 1 reported HRA-like interactions (46.0%) compared to Cohort 2 (36.5%); respondents with substantial health burden were more likely than those with minimal health burden to report HRA-like interactions (Beneficiary Survey Appendix Table 1.3.3). These results were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 1.3.4).

In the bivariate analysis of baseline HMO surveys, a higher proportion of Cohort 1 had any type of HRA activity (including documented HRA completion, reported HRA completion, or reported HRA-like interaction) compared to Cohorts 2 and 3; within each Cohort, respondents with substantial and moderate health burden were more likely than those with minimal health burden to have any HRA activity, though only Cohort 1 achieved statistical significance (Table 1.3.A). In multivariate analyses, Cohort 1 respondents were more likely to have any type of HRA activity; there was no difference by health burden (Beneficiary Survey Appendix Table 1.3.4).

Table 1.3.A. Comparison of HRA completion at baseline HMP survey, by cohort and health burden at baseline HMP survey¹

	Any type of HRA activity ² % [95% CI]
Total	70.1 [68.8, 71.4]
Cohort 1 (N=4,108)	73.7 [71.9, 75.5]⁴
Substantial	76.7 [72.4, 80.5]
Moderate	77.3 [72.4, 81.6] ⁵
Minimal	72.1 [69.8, 74.3] ⁶
p-value ³	0.048
Cohort 2 (N=2,602)	64.3 [61.8, 66.7]⁴
Substantial	69.9 [64.2, 75.0]
Moderate	64.6 [57.0, 71.5] ⁵
Minimal	62.5 [59.5, 65.5] ⁶
p-value ³	0.104
Cohort 3 (N=2,607)	65.4 [63.1, 67.5]⁴
Substantial	70.7 [64.8, 76.0]
Moderate	65.8 [59.7, 71.4] ⁵
Minimal	64.4 [61.7, 67.1] ⁶
p-value ³	0.171

¹Baseline HMP survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Any type of HRA activity includes documented HRA completion, reported HRA completion, or reported HRA-like interaction (for Cohorts 1 and 2 only)

³Pearson chi-square test comparing by health burden within Cohort

T-tests showed that any type of HRA activity at baseline HMP survey was significantly different in:

⁴Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) overall

⁵Cohort 1 vs. Cohort 2 (p=0.004) and Cohort 3 (p=0.002) among those with moderate health burden at baseline

⁶Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) among those with minimal health burden at baseline

Health burden improvement over time, by HRA completion

Among Cohort 1 respondents with substantial or moderate health burden at baseline in 2016, half showed improved health burden in 2018. However, neither bivariate nor multivariate analysis demonstrated an association between any HRA activity (documented or reported HRA completion or reported HRA-like interactions) and health burden improvement in 2018 (Beneficiary Survey Appendix Tables 1.3.5 and 1.3.6). Similarly, among Cohort 1 and 2 respondents with substantial or moderate health burden in 2018, about half showed improved health burden in 2021; neither bivariate nor multivariate analysis demonstrated an association between any HRA activity (documented or reported HRA completion or reported HRA-like interactions) and health burden improvement in 2021 (Beneficiary Survey Appendix Tables 1.3.7 and 1.3.8).

Health behavior improvement over time, by HRA completion

Among Cohort 1 respondents, neither bivariate nor multivariate analysis demonstrated an association between any HRA activity (documented or reported HRA completion or reported

HRA-like interactions) and improvement in one or more health behaviors from 2016 to 2018 (Beneficiary Survey Appendix Tables 1.3.9 and 1.3.10). Similarly, among Cohort 1 and 2 respondents, neither bivariate nor multivariate analysis demonstrated an association between any HRA activity (documented or reported HRA completion or reported HRA-like interactions) and improvement in one or more health behaviors from 2018 to 2021 (Beneficiary Survey Appendix Tables 1.3.11 and 1.3.12).

Summary of response to evaluation question 1.3

HRA completion varied by cohort, with the highest completion among the earliest group of HMP enrollees. Many respondents reported completing an HRA or having HRA-like interactions with their PCP, even when there was no HRA completion documented in Medicaid administrative data. Cohort 3's level of any type of HRA activity was similar to Cohort 2, suggesting that the PHE had minimal impact in this area.

Approximately half of Cohort 1 and 2 beneficiaries with substantial or moderate health burden at baseline showed improved health burden in subsequent years. However, we did not find an association between HRA completion - documented or reported by enrollees - and improved health burden or health behaviors.

Evaluation question 1.4: Is HRA completion associated with higher rates of preventive service use?

Hypothesis 1.4: Beneficiaries who complete at least one HRA will demonstrate higher rates of preventive service use compared to beneficiaries who have similar primary care utilization but who have not completed an HRA.

Data source: Medicaid claims and encounter data; HRA tables (as described in D.2.1)

Results

In our Interim Evaluation Report, we found that among beneficiaries with the same duration of HMP-MC enrollment and similar continuity of primary care, those who completed at least one HRA demonstrated higher receipt of preventive care. This finding was consistent for services that can be completed in the primary care setting (e.g., preventive visits, cervical cancer screening) as well as those that typically require a different provider or location (e.g., dental visits, breast cancer screening). However, primary care continuity was a stronger predictor of cancer screening than HRA completion.

For this Summative Evaluation Report, we examined beneficiary characteristics associated with HRA completion, documented receipt of additional preventive services (flu, COVID-19 and shingles vaccines), and used multivariate logistic regression to explore the relative contributions of HRA completion and primary care continuity on receipt of preventive services, for our evaluation population overall and for subgroups with chronic conditions.

HRA completion in the first year (Administrative Data Appendix Table 1.4.1) or first two years of HMP-MC enrollment (Administrative Data Appendix Table 1.4.2) was associated with non-English preferred language, urban residence, and disability, in addition to characteristics

identified in our Interim Evaluation Report (e.g., earlier year of initial HMP-MC enrollment, higher income, female sex, older age, and White or Other/Unknown race/ethnicity).

In bivariate analyses, beneficiaries who completed an HRA in either their first or second year of HMP-MC enrollment were more likely to have primary care continuity and receive preventive services (Administrative Data Appendix Table 1.4.3). Beneficiaries with greater primary care continuity were more likely to receive preventive services (Administrative Data Appendix Table 1.4.4). In multivariate analyses, beneficiaries who completed an HRA in either their first or second year of HMP-MC enrollment were more likely to receive recommended preventive services; however, beneficiaries with primary care continuity had a much greater likelihood of receiving preventive services. This pattern was consistent for both the overall population and chronic disease subgroups and across all preventive services (Administrative Data Appendix Tables 1.4.5-1.4.23).

Multivariate analyses also revealed that the likelihood of receiving preventive services decreased with later HMP-MC initial enrollment; in particular, beneficiaries whose initial enrollment was in 2020-2021 – and whose first two years overlapped with the PHE – were least likely to receive preventive services. Higher income and female sex consistently had a greater likelihood of receiving preventive services, while other demographic characteristics (preferred language, disability, race/ethnicity, and urbanicity) had inconsistent associations.

Summary of response to evaluation question 1.4

HRA completion was associated with increased likelihood of receiving recommended preventive service use, but primary care continuity was more strongly associated with receipt of preventive services. In addition, receipt of preventive services was lower for beneficiaries whose first two years of HMP-MC enrollment overlapped with the PHE, likely a reflection of the constrained healthcare resources during that period.

Evaluation question 1.5: How has the Healthy Behaviors Incentives program, and HMP as a whole, affected beneficiaries' engagement in health behaviors and other efforts to maintain or improve health over time?

Hypothesis 1.5: Beneficiaries will describe assistance from primary care providers in setting health goals and engaging in behavior change to meet those goals.

Data source: Interviews with beneficiaries (as described in D.2.3)

Results

The results from the interviews with beneficiaries were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 1.5

As stated in the Interim Evaluation Report, in interviews, beneficiaries noted that the Healthy Behaviors Incentives Program was not their primary motivation to engage in healthy behaviors,

and most were not aware of details of the program. Most reported that self-motivation or encouragement from their providers supported their adoption of healthy behaviors, while information and guidance from primary care providers and health plans (e.g., health education, reminders, goal setting, monitoring), along with HMP coverage itself, were important to their efforts to maintain or improve their health over time.

Evaluation question 1.6: How do primary care providers use the HRA to assist in patient engagement and health promotion?

Hypothesis 1.6: Primary care providers will describe that they have become more knowledgeable over time about how to use the HRA to engage patients enrolled in HMP.

Data source: PCP interviews (as described in D.2.4)

Results

The results from the interviews with primary care providers (PCPs) were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 1.6

As stated in the Interim Evaluation Report, PCPs had limited knowledge about HMP's Healthy Behaviors Incentives Program, including the financial incentives for patients. The volume of HRA completion was higher in primary care practices that had a specific mechanism for tracking and recalling patients due for HRA completion, but relatively low in practices that relied on patients to bring in the HRA form. Some PCPs used the HRA to engage patients in identifying and setting goals, but PCPs made limited use of the HRA as a tool to engage patients in health behavior change, primarily because they lacked a structure to incorporate the HRA into a more comprehensive, readily accessible system to provide support for health behavior change to patients over time.

F.2. Cost-sharing

Evaluation question 2.1: Do beneficiaries understand cost-sharing and other consumer-oriented features of HMP coverage?

Hypothesis 2.1: Beneficiaries who are aware of healthy behavior financial incentives will demonstrate a better understanding of cost-share obligations and connections between service utilization and amount owed.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that most beneficiaries recalled receiving MI Health Account statements and were aware that some services have no copays. Most beneficiaries did not understand other consumer-oriented features of HMP, including incentives for healthy

behaviors and HRA completion. Knowledge about consumer-oriented features was higher among beneficiaries subject to fees.

For this Summative Evaluation Report, we ran multivariate analyses including two additional variables: health literacy and claims-based evidence of chronic conditions. Results from the expanded analysis (see Beneficiary Survey Appendix Table 2.1.1) differ from the results presented in the Interim Evaluation Report in the following ways:

- In adjusted analyses, knowledge about consumer-oriented features was no longer higher among beneficiaries subject to fees.
- In adjusted analyses, beneficiaries with worse health literacy were less likely to understand the consumer-oriented features of HMP.

In adjusted analyses, duration of enrollment continued to be associated with knowledge of healthy behavior incentives and understanding there is a limit on the total amount one must pay.

Summary of response to evaluation question 2.1

Most beneficiaries recalled receiving MI Health Account statements and were aware that some services have no copays, but beneficiaries did not understand other consumer-oriented features of HMP, including incentives for healthy behavior and HRA completion. Knowledge about consumer-oriented features was higher among beneficiaries with greater health literacy, and for some features, those who had been enrolled in HMP longer.

Evaluation question 2.2: What factors are associated with beneficiaries' compliance with cost-share obligations?

Hypothesis 2.2: Beneficiaries with MI Health Account fees will have better payment compliance than their counterparts with service-based cost-sharing only.

Data source: Medicaid cost-share tables (as described in D.2.1)

Results

Our Interim Evaluation Report found that among beneficiaries who enrolled in HMP between January 2016 and October 2018 and had at least 18 months of continuous HMP-MC enrollment, slightly more than half faced cost-share obligations. Beneficiaries with income below 100% FPL in all eligible months were less likely to have cost-share obligations. Only 37.5% of the total obligation amount was paid. Compared to those with all months below or all months above 100% FPL, the proportion paid was lower for beneficiaries with some months above and some months below 100% FPL. Propensity to pay the full obligation amount was higher for beneficiaries with all months above 100% FPL and those who remained in the program longer.

For this Summative Evaluation Report, we extended our analyses to include a broader population with a longer follow-up period for four enrollment cohorts defined relative to the timing of the PHE. We also included multivariate models of the predictors of cost-sharing and payment of obligations.

Table 2.2.A describes the cost-share characteristics of the beneficiaries with at least 12 continuous months of enrollment in HMP-MC. Less than half of beneficiaries faced cost-share obligations (i.e., had a non-zero amount owed) in at least one quarter (n=135,659). Cost-share obligations differed substantially by income level. Among beneficiaries with incomes below 100% FPL during all eligible months, who would have co-payments only, a quarter or less had any cost-share obligations. In contrast, the proportion with cost-share obligations was high among beneficiaries with incomes above 100% FPL during some or all months, who may have had both co-payments and monthly fees. More recent enrollment cohorts were less likely to have cost-sharing obligations, which may reflect their shorter average follow-up time.

Table 2.2.A. Characteristics of the evaluation population for measures of cost-sharing patterns

Characteristic	Cohort			
	Jan 2017- Dec 2018 (n=149,886)	Jan 2019- Sept 2019 (n=43,526)	Oct 2019- Feb 2020 (n=31,508)	March 2020- July 2022 (n=134,523)
Eligible months of continuous HMP-MC enrollment				
12-17 months	27.5%	19.1%	14.4%	24.3%
18-23	23.6%	11.8%	12.8%	26.1%
24-29	12.2%	13.6%	13.9%	17.7%
30-35	7.4%	11.2%	8.8%	19.7%
36-41	4.8%	8.3%	8.8%	9.4%
42-47	3.7%	10.7%	33.9%	2.7%
48+	20.8%	25.5%	7.5%	0.0%
Cost-share income level				
All HMP-MC months below 100% FPL	62.0%	60.0%	61.4%	65.6%
Some months above, some months below 100% FPL	33.4%	34.7%	31.6%	24.6%
All HMP-MC months above 100% FPL	4.7%	5.3%	7.0%	9.8%
Cost-share obligation in continuous enrollment period				
At least one quarter with cost-share obligation	44.8%	40.2%	34.6%	29.9%
Cost-share obligation by cost-share income level				
All HMP-MC months below 100% FPL	24.7%	22.1%	18.9%	16.8%
Some months above, some months below 100% FPL	75.7%	64.7%	55.3%	49.0%
All HMP-MC months above 100% FPL	90.0%	84.7%	77.5%	69.2%

Table 2.2.B presents the average amount owed quarterly and cumulatively for beneficiaries' continuous enrollment periods, among those with cost-share obligations in at least one quarter. The average amount owed, both by quarter and cumulative for the entire enrollment period, was lowest for beneficiaries with incomes below 100% FPL during all months, and highest for those with incomes above 100% FPL during all months. In all four cohorts, quarterly and cumulative obligations for those always above 100% FPL averaged about 20 times as high as for those

always below 100% FPL, demonstrating that high obligations were driven more by monthly fees charged when income exceeds 100% FPL than by service-based co-payments.

Table 2.2.B. Average cost-share amount owed, among beneficiaries with cost-share obligations in at least one quarter

	Cohort (number with cost share obligations)			
	Jan 2017- Dec 2018 (n=67,106)	Jan 2019- Sept 2019 (n=17,496)	Oct 2019- Feb 2020 (n=10,885)	March 2020- July 2022 (n=40,172)
Average amount owed, quarterly	\$21.35	\$16.81	\$19.04	\$21.38
By cost-share income level				
All HMP-MC months below 100% FPL	\$2.95	\$2.24	\$2.16	\$2.49
Some months above, some months below 100% FPL	\$27.12	\$20.32	\$21.51	\$22.61
All HMP-MC months above 100% FPL	\$53.34	\$42.48	\$47.14	\$49.71
Average amount owed, cumulative (95% percentile)	\$161.01 (\$598.22)	\$131.26 (\$545.06)	\$159.57 (\$699.13)	\$130.15 (\$534.58)
By cost share income level (95% percentile)				
All HMP-MC months below 100% FPL	\$20.50 (\$73.50)	\$16.39 (\$58.79)	\$16.21 (\$55.00)	\$14.00 (\$45.00)
Some months above, some months below 100% FPL	\$212.60 (\$670.89)	\$155.20 (\$527.49)	\$173.54 (\$645.05)	\$141.12 (\$528.26)
All HMP-MC months above 100% FPL	\$360.45 (\$1,053.49)	\$352.43 (\$957.46)	\$420.81 (\$1,056.00)	\$298.47 (\$726.00)

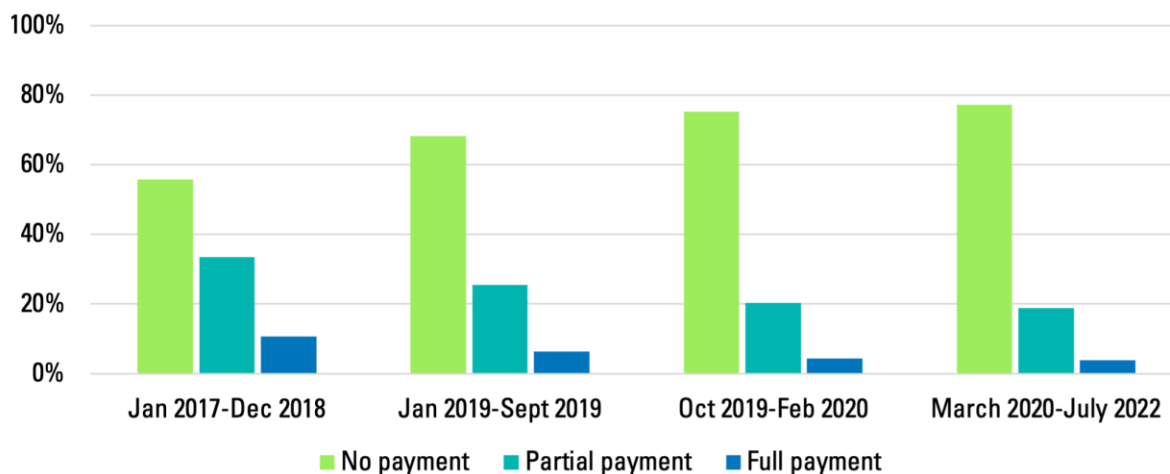
Cumulative cost-share obligations differed only modestly by enrollment cohort, ranging from \$130.15 in the last cohort (March 2020-July 2022) to \$161.01 in the first cohort (January 2017-December 2018) (Table 2.2.B). However, cumulative payments varied more strongly with cohort, ranging from \$22.01 in the last cohort (March 2020-July 2022) to \$57.54 in the first cohort (January 2017-December 2018) (Table 2.2.C). Overall, later enrolling cohorts tended to pay less cumulatively and as a percent of obligations across all three income groups. The proportion paid was similar across income groups in the first enrollment cohort but rose with income in the later three cohorts.

Table 2.2.C. Average cost-share amount paid, among beneficiaries with cost-share obligations in at least one quarter

	Cohort (number with cost share obligations)			
	Jan 2017- Dec 2018 (n=67,106)	Jan 2019- Sept 2019 (n=17,496)	Oct 2019- Feb 2020 (n=10,885)	March 2020- July 2022 (n=40,172)
Average amount paid, cumulative	\$57.54	\$35.23	\$38.45	\$22.01
By cost-share income level				
All HMP-MC months below 100% FPL	\$8.81	\$4.62	\$3.31	\$2.26
Some months above, some below 100% FPL	\$75.26	\$37.73	\$39.35	\$25.18
All HMP-MC months above 100% FPL	\$127.71	\$113.62	\$110.60	\$48.30
Proportion of total obligation paid, cumulative	33.1%	22.8%	17.0%	13.6%
By cost share income level				
All HMP-MC months below 100% FPL	32.9%	20.9%	14.0%	11.9%
Some months above, some below 100% FPL	33.1%	22.0%	16.2%	14.1%
All HMP-MC months above 100% FPL	33.3%	32.5%	25.8%	15.7%

In the multivariate analysis predicting cumulative payment status, we confirmed findings from the Interim Evaluation Report, including lower payment among beneficiaries with all months below 100% FPL, and increasing payments with longer length of time enrolled in HMP. We also found a significant association between cohort and payment, with those in later cohorts less likely to make any payments and less likely to make full payments. This is illustrated in Figure 2.2.D. In addition, several enrollee demographic characteristics were also associated with payment (Administrative Data Appendix Table 2.2.1).

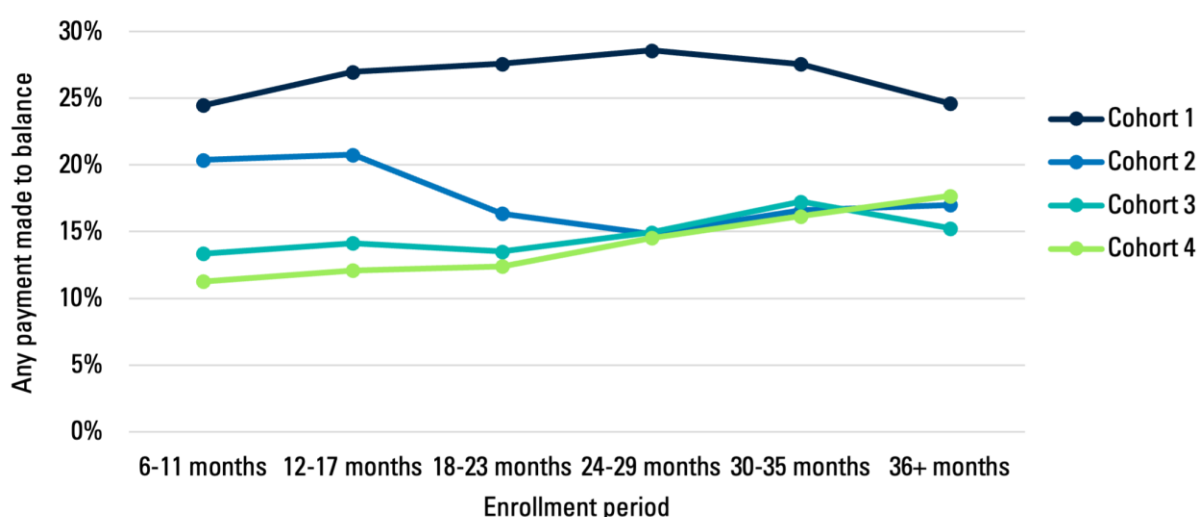
Figure 2.2.D. Predicted cumulative payment patterns, by cohort, January 2017-June 2023, among beneficiaries with cost-share obligations in at least one quarter (adjusted for enrollment characteristics and cohort case mix)



In the multivariate analysis of quarterly payment patterns, the likelihood of making partial or full payments in a quarter steadily declined for members of each subsequent cohort but was higher for those at higher income levels and in older age groups (Administrative Data Appendix Table 2.2.2). Cohort-specific models confirmed the declines in payments by later cohorts, and also showed declines in payments after the start of the PHE for the two earlier cohorts which faced payment obligations both before and after the PHE (Administrative Data Appendix Table 2.2.3).

Cohort-specific models also revealed differences by cohort in payments as a function of time enrolled (Figure 2.2.E). The clearest trend was in the last cohort (March 2020-July 2022), where payments steadily increased with time enrolled.

Figure 2.2.E. Cohort-specific per-quarter payment (partial or full payment of quarterly obligations), by number of continuous months enrolled



Summary of response to evaluation question 2.2

Beneficiaries whose cost-share obligations included fees were more likely to make payments than those with co-payments only. Beneficiaries who first enrolled in HMP near or after the start of the PHE were less likely to make payments toward their cost-share obligation, while earlier enrollees had a decline in likelihood of making payments after the start of the PHE.

Evaluation question 2.3: Are beneficiaries able to understand the MI Health Account statement?

Hypothesis 2.3: Beneficiaries will understand where to find the amount they owe but may not understand how that amount is calculated.

Data source: Interviews with beneficiaries (as described in D.2.3)

Results

The results from the interviews with beneficiaries were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 2.3

As stated in the Interim Evaluation Report, most beneficiaries with cost-share obligations recalled receiving a MI Health Account Statement and their focus when reviewing the statement was on how much they owed. Few interviewees knew how the amount they owed was calculated. Most were satisfied with the amount they owed; only a few expressed surprise or disappointment. Most interviewees did not know the consequences for non-payment.

Evaluation question 2.4: What are barriers and facilitators for beneficiaries to pay the amount owed?

Hypothesis 2.4: Beneficiaries will report financial barriers more often than logistical barriers to paying the amount owed.

Data source: Interviews with beneficiaries (as described in D.2.3)

Results

The results from the interviews with beneficiaries were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 2.4

As stated in the Interim Evaluation Report, we found that among a group of beneficiaries with cost-share obligations, most had made MI Health Account payments and felt the process was easy. Facilitators of payment included having different payment options (e.g., check, money order, online payment) and timeframes (monthly or quarterly). Some interviewees described difficulties with making payments; they cited financial barriers more often than logistical or other barriers.

F.3. 5% Premium cost-sharing & HRA/Healthy behavior requirements (48-month policy)

We did not evaluate this component of the waiver because it was never implemented.

F.4. Reduce uninsurance

Evaluation question 4.1: How have insurance coverage rates in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?

Hypothesis 4.1a: The decline in uninsurance among non-elderly adults in Michigan compared to other states that did not expand Medicaid that was observed in 2013-2017 will be sustained through subsequent years.

Hypothesis 4.1b: The decline in uninsurance among non-elderly adults in Michigan compared to other states that expanded without a waiver that was observed in 2013-2017 will be sustained through subsequent years.

Data source: American Community Survey (ACS) (as described in D.2.8)

Results

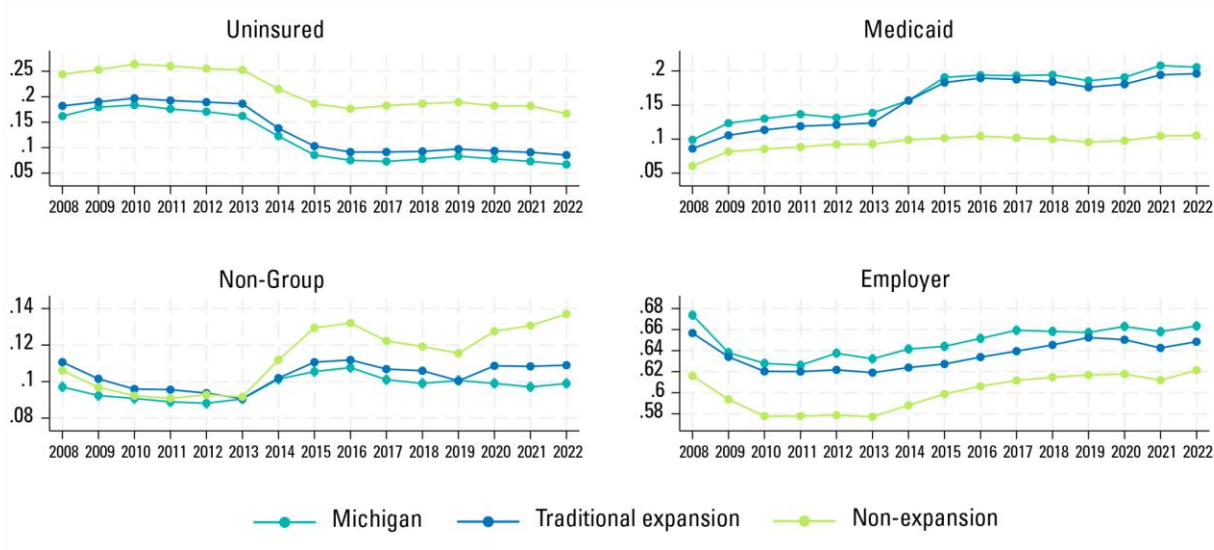
Our Interim Evaluation Report found significant, sustained reductions in uninsurance through 2020 as a result of increases in Medicaid coverage due to HMP, compared with states that did not expand Medicaid. We also found that Michigan had similar changes in coverage compared with states that expanded Medicaid without a waiver similar to Michigan. For this Summative Evaluation Report, we expanded those analyses to include two additional years of data (2021 and 2022).

Trends in insurance coverage among working-age adults in Michigan compared with non-expansion states and traditional expansion states

Figure 4.1.A shows trends in the four insurance outcomes (uninsured, Medicaid, private non-group, and employer coverage) for all adults ages 19 through 64 over the period 2008 through 2022 by state Medicaid expansion status. Non-expansion states had the highest rates of uninsurance in the pre-expansion period (2008 through 2013); the proportion uninsured in Michigan before 2013 was slightly lower than in traditional expansion states. The proportion uninsured dropped noticeably in all three types of states in 2014 and continued to drop in 2015 and 2016. In 2017 through 2022, the proportion uninsured fluctuated slightly in all three types of states. In 2022, the proportion uninsured in Michigan was at the lowest level observed during this 14-year period: 6.7%.

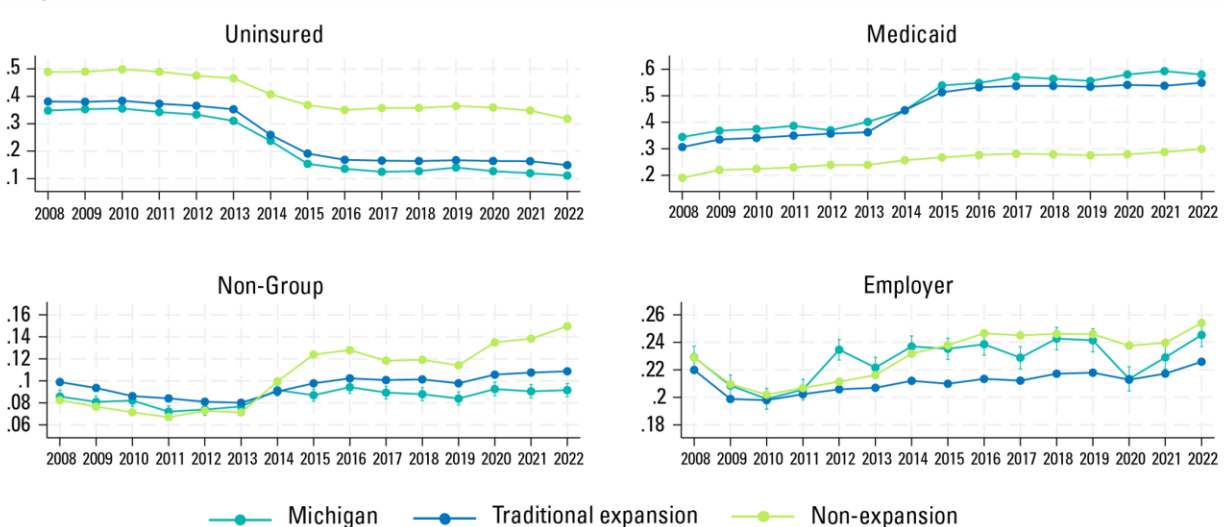
These changes in coverage in 2014 and later were driven largely by increases in Medicaid in Michigan and other expansion states, with increases in both non-group and employer coverage as well in 2014 and later years in all three types of states.

Figure 4.1.A. Insurance coverage among adults ages 19-64 by state Medicaid expansion status



Trends for low-income nonelderly adults were generally similar (Figure 4.1.B), although overall rates of uninsurance were much higher throughout this period.

Figure 4.1.B. Insurance coverage among low-income adults ages 19-64 by state Medicaid expansion status

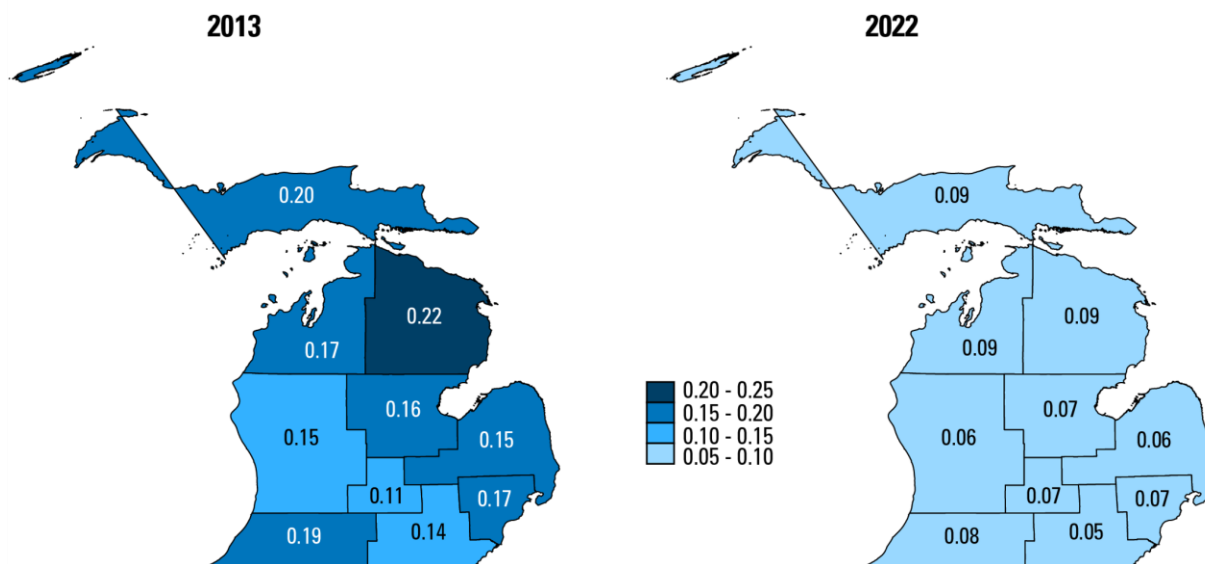


Medicaid and uninsured by Michigan prosperity region, 2013 and 2022

The decline in uninsurance and increase in Medicaid in Michigan over this period, shown in Figure 4.1.A above, reflects changes in all regions of the state. Figure 4.1.C shows the proportion uninsured in each of Michigan's prosperity regions in 2013 and 2022. In 2013, rates of uninsurance among adults ages 19 through 64 ranged from 11% in the South Central region to 22% in the Northeast region. As of 2022, uninsurance rates had dropped in all regions to levels ranging from 5% in Southeast region to 9% in the Northeast region and Upper Peninsula. Thus,

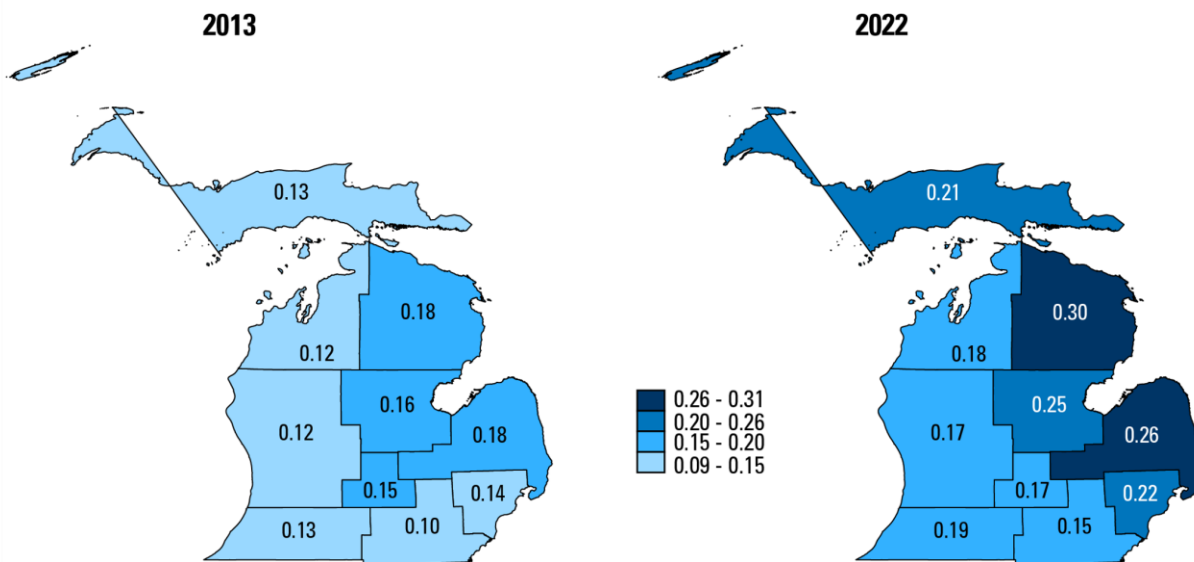
the region with the *highest* rate of uninsured adults in 2022 had a lower rate than the region with the *lowest* rate in 2013. In addition, the variability across regions in the proportion uninsured dropped between 2013 and 2022; while some regions still have lower rates than others, the maximum absolute difference between regions has dropped from 11 to 4 percentage points.

Figure 4.1.C. Proportion of all adults ages 19-64 uninsured in Michigan by prosperity region



These reductions in uninsurance reflect increases in Medicaid in all regions, as shown in Figure 4.1.D, with the largest absolute increase (12 percentage points) occurring in the Northeast region.

Figure 4.1.D. Proportion of all adults ages 19-64 with Medicaid in Michigan by prosperity region



Impact of HMP on health insurance coverage compared with non-expansion states

Table 4.1.E presents the coefficients from the difference-in-difference regressions for each of four insurance outcomes (uninsured, Medicaid, non-group, and employer coverage), for both the comparison with non-expansion and the comparison with traditional expansion states, for all non-elderly adults and for low-income non-elderly adults. Panel A of Table 4.1.E shows results for Michigan vs. non-expansion states for all non-elderly adults. These estimates indicate that compared to non-expansion states, HMP resulted in a significant reduction in the proportion of the non-elderly adult population without coverage of 1.5 percentage points in 2014 and later. This reduction represents about one-tenth of the proportion of all Michigan adults who were uninsured in 2013. This decline was due to an increase of 4.4 percentage points in Medicaid coverage, and small but significant offsetting declines in non-group and employer coverage of 2.4 and 0.8 percentage points, respectively. These offsetting declines were relative to trends in non-expansion states; in absolute terms, all types of coverage actually increased over time.

The effects were even larger for low-income non-elderly adults (Panel B of Table 4.1.E). For this population, HMP resulted in a 6.3 percentage point drop in uninsurance, thanks to an 11.1 percentage point increase in Medicaid offset by declines of 4.3 percentage points in non-group coverage and 0.8 percentage points in employer coverage.

Table 4.1.E. Difference-in-differences estimates of the impact of Medicaid expansion in Michigan on insurance coverage

	(1) Uninsured	(2) Medicaid	(3) Non Group	(4) Employer
A. Michigan vs. Non-expansion, all adults ages 19-64				
(Post 2014) x Michigan	-0.0150 (0.0086)	0.0441*** (0.0014)	-0.0238* (0.0093)	-0.0079** (0.0025)
Sample n	8,611,819	8,611,819	8,611,819	8,611,819
B. Michigan vs. Non-expansion, low-income adults ages 19-64				
(Post 2014) x Michigan	-0.0630*** (0.0110)	0.1111*** (0.0028)	-0.0428** (0.0102)	-0.0089** (0.0028)
Sample n	1,654,395	1,654,395	1,654,395	1,654,395
C. Michigan vs. Traditional expansion, all adults ages 19-64				
(Post 2014) x Michigan	0.0182 (0.0125)	-0.0144 (0.0094)	-0.0003 (0.0024)	-0.0069 (0.0037)
Sample n	13,559,571	13,559,571	13,559,571	13,559,571
D. Michigan vs. Traditional expansion, low-income adults ages 19-64				
(Post 2014) x Michigan	0.0185 (0.0119)	-0.0248* (0.0117)	-0.0021 (0.0019)	0.0060* (0.0023)
Sample n	2,251,184	2,251,184	2,251,184	2,251,184
Mean of outcome in MI, 2013:				
All adults 19-64	0.162	0.138	0.090	0.632
Low-income adults 19-64	0.311	0.402	0.077	0.415

*p<0.05; **p<0.01; ***p<0.001

Impact of HMP on health insurance coverage compared with traditional expansion states

The results showing the impact of HMP compared with traditional Medicaid expansion states are presented in Panels C and D of Table 4.1.E. These results are all small in magnitude and only two are statistically significant. Thus, in terms of the impact on coverage, insurance outcomes in Michigan did not differ substantially from outcomes in states that expanded Medicaid without a similar waiver.

Summary of response to evaluation question 4.1

Consistent with our Interim Evaluation Report findings, updated analyses demonstrate that Michigan experienced significant, sustained reductions in uninsurance through 2022 along with significant increases in Medicaid due to HMP, compared with states that did not expand Medicaid. We again found that changes in coverage in Michigan were similar to the changes experienced by states that expanded Medicaid without a waiver like Michigan's.

F.5. Promote primary care/responsible use of services

Evaluation question 5.1: Does HMP's facilitation of primary care access (e.g., through managed care PCP assignment) influence beneficiary engagement in health and maintenance or improvement in physical and mental health?

Hypothesis 5.1a: Beneficiaries who report no barriers to primary care will be more likely to report improved health status and ability to take action to improve or maintain their health.

Hypothesis 5.1b: Beneficiaries who make regular primary care visits will be more likely to report improved health status and ability to take action to improve or maintain their health.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that beneficiaries who had a PCP and reported no barriers to getting primary care described better health status and greater self-efficacy in managing their health compared to beneficiaries with a PCP who reported barriers to primary care, but not compared to those with no PCP. For this Summative Evaluation Report, we repeated multivariate analyses with an additional variable representing claims-based evidence of chronic conditions. Results from these expanded analyses (see Beneficiary Survey Appendix Tables 5.1.1-5.1.4) did not differ from those presented in the Interim Evaluation Report.

For this Summative Evaluation Report, we conducted longitudinal analyses of primary care experiences, health burden improvement, and self-efficacy in health care. We incorporated a new composite variable, beneficiary-reported health burden, into these analyses. Our analyses included:

- Comparison of baseline HMP survey responses for three HMP cohorts (baseline HMP survey data collected 12-24 months after initial HMP-MC enrollment, Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021)
- Longitudinal analysis of survey responses among those who responded to surveys in 2016, 2017, and 2018 (from Cohort 1)

- Longitudinal analysis of survey responses among those who responded to surveys in 2018 and 2021 (from Cohorts 1 and 2)

Primary care experiences at baseline, by level of health burden

In the bivariate analysis of baseline HNV surveys, a higher proportion of Cohort 1 reported having a PCP (93.2%) compared to Cohorts 2 and 3 (83.8% and 87.6%); within each Cohort, we did not find an association between having a PCP and level of health burden (Beneficiary Survey Appendix Table 5.1.5). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 5.1.6).

In the bivariate analysis of baseline HNV surveys, a higher proportion of Cohort 1 reported having seen a PCP in the past 12 months (79.3%) compared to Cohorts 2 and 3 (69.9% and 69.3%); within each Cohort, respondents with greater health burden were more likely to report having seen a PCP in the past 12 months (Beneficiary Survey Appendix Table 5.1.5). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 5.1.6).

In the bivariate analysis of baseline HNV surveys, a higher proportion of Cohort 3 reported difficulty accessing primary care in the past 12 months (12.3%) compared to Cohorts 1 and 2 (7.8% and 8.9%); within each Cohort, respondents with minimal health burden were less likely to report difficulty accessing primary care (Beneficiary Survey Appendix Table 5.1.5). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 5.1.6).

Primary care experiences over time, by level of health burden

Among Cohort 1 respondents, there was no change from 2016 to 2018 in the proportion of respondents who reported having a PCP, seeing a PCP in the past 12 months, or reporting difficulty accessing primary care in the past months. Across all baseline levels of health burden, over 90% reported having a PCP at each timepoint. Those with minimal health burden at baseline were less likely to report seeing their PCP or having difficulty accessing primary care at baseline (Beneficiary Survey Appendix Table 5.1.7).

Similarly, for Cohort 1 and 2 respondents, there was no change from 2018 to 2021 in the proportion of respondents who reported seeing a PCP in the past 12 months or difficulty accessing primary care in the past 12 months. Among beneficiaries with minimal health burden, the proportion who reported having a PCP increased from 2018 to 2021. Those with minimal health burden at baseline were less likely to report seeing their PCP; otherwise, there were few differences across levels of health burden (Beneficiary Survey Appendix Table 5.1.8).

Health burden improvement over time, by primary care experiences

Among beneficiaries in Cohort 1 with substantial or moderate health burden at baseline in 2016, consistently having a PCP was not associated with health burden improvement in 2018. Bivariate and multivariate analyses showed that regularly seeing a PCP was associated with lower likelihood of health burden improvement in 2018 (Table 5.1.A, Beneficiary Survey Appendix Table 5.1.11).

Similarly, for Cohort 1 and 2 respondents with substantial or moderate health burden in 2018, consistently having a PCP was not associated with health burden improvement in 2021. Bivariate and multivariate analyses showed that regularly seeing a PCP was associated with lower likelihood of health burden improvement in 2021 (Beneficiary Survey Appendix Table 5.1.12, Beneficiary Survey Appendix Table 5.1.13).

In bivariate and multivariate analyses, among those in Cohort 1 with substantial or moderate health burden at baseline in 2016, reporting difficulty accessing primary care was not associated with health burden improvement in 2018 (Beneficiary Survey Appendix Table 5.1.11). Similarly, among those in Cohort 1 and Cohort 2 with substantial or moderate health burden in 2018, reporting difficulty accessing primary care was not associated with health burden improvement in 2021 in either bivariate or multivariate analyses (Beneficiary Survey Appendix Tables 5.1.12 and 5.1.13).

Table 5.1.A. Multivariate logistic regression analyses predicting relationship between primary care experiences and health improvement from 2016 to 2018, Cohort 1

	Health burden improvement (2016-2018) ¹					
	Model 1 (N=474)		Model 2 (N=474)		Model 3 (N=768)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Consistently had PCP ^{2,3}	0.56	[0.29, 1.08]	-	-	-	-
Regularly saw PCP ^{2,4}	-	-	0.58*	[0.34, 0.96]	-	-
Difficulty accessing primary care ^{5,6}	-	-	-	-	0.68	[0.44, 1.05]
Age category ⁷						
19-34	REF		REF		REF	
35-50	0.65	[0.36, 1.19]	0.69	[0.37, 1.25]	0.65	[0.39, 1.07]
51-64	0.85	[0.48, 1.53]	0.90	[0.50, 1.62]	0.69	[0.43, 1.13]
Gender ⁷						
Male	REF		REF		REF	
Female	1.01	[0.64, 1.61]	1.01	[0.63, 1.60]	1.00	[0.69, 1.45]
Race/Ethnicity ⁷						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	1.89*	[1.07, 3.34]	1.87*	[1.06, 3.31]	1.73*	[1.11, 2.72]
Hispanic	1.40	[0.22, 8.87]	1.49	[0.23, 9.57]	1.48	[0.43, 5.09]
Other	0.72	[0.32, 1.60]	0.71	[0.33, 1.51]	0.78	[0.42, 1.45]
FPL ⁷						
0-35%	REF		REF		REF	
36-99%	1.29	[0.77, 2.17]	1.30	[0.78, 2.18]	1.57*	[1.05, 2.33]
>=100%	0.93	[0.50, 1.71]	0.97	[0.52, 1.81]	1.50	[0.93, 2.41]
Chronic condition ^{7,8}						
Yes	REF		REF		REF	
No	1.50	[0.83, 2.73]	1.40	[0.75, 2.61]	1.51	[0.92, 2.48]

Intercept	1.78	[0.74, 4.31]	1.55	[0.73, 3.28]	1.07	[0.62, 1.85]
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Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Health burden improvement from 2016 to 2018 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2016 were therefore excluded from this analysis

²Only includes respondents who were enrolled in 2017 and 2018

³Consistently had PCP defined as reporting having a PCP in 2016, 2017, and 2018

⁴Regularly saw PCP defined as reporting having a PCP visit in the past year in 2016, 2017, and 2018

⁵Includes respondents who were disenrolled in 2017 and/or 2018

⁶Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2016, 2017, or 2018 among those who reported having a PCP in 2016, 2017, or 2018

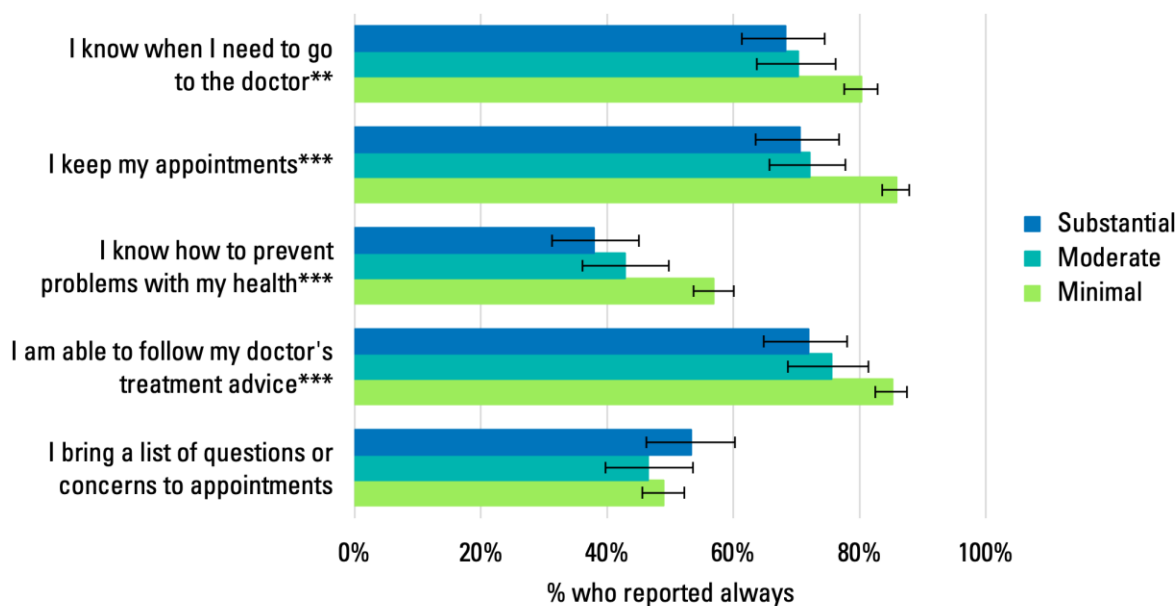
⁷In 2016

⁸Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

Self-efficacy in health care, by level of health burden and primary care experiences

In the 2021 HMV survey of Cohorts 1, 2, and 3, respondents with minimal health burden were more likely than those with substantial or moderate health burden to report *always* in response to four of the five statements about self-efficacy in health care (all except “I bring a list of questions or concerns to appointments”) (Figure 5.1.B, Beneficiary Survey Appendix Table 5.1.14).

Figure 5.1.B. Cohort 1, 2, and 3 responses about self-efficacy in 2021, by level of health burden in 2021 (N=4,082)



Pearson chi-square results, **p<0.01, ***p<0.001

Multivariate analysis showed that, among Cohort 1 and 2 respondents, those who consistently had a PCP from 2018 to 2021 were more likely to report *always* knowing when they need to go to the doctor, while those who reported regularly seeing a PCP from 2018 to 2021 were less likely to report *always* knowing how to prevent problems with their health. In contrast, those who reported difficulty accessing primary care in 2018 and/or 2021 were less likely to report

always knowing when they need to go to the doctor, keep their appointments, and follow their doctor's treatment advice (Table 5.1.C).

Table 5.1.C. Multivariate logistic regression analyses predicting relationship between primary care experiences from 2018 to 2021 and responses about self-efficacy in 2021, Cohorts 1¹ and 2

	<i>I always know when to go to the doctor</i>	<i>I always keep my appointments</i>	<i>I always know how to prevent problems with my health</i>	<i>I am always able to follow my doctor's treatment advice</i>	<i>I always bring a list of questions or concerns to appointments</i>
	aOR	aOR	aOR	aOR	aOR
Consistently had PCP ²	1.74*	0.78	0.84	0.94	1.17
Regularly saw PCP ³	1.44	1.14	0.64*	0.73	1.34
Difficulty accessing primary care ⁴	0.40***	0.42***	0.79	0.58*	1.02

Logistic regression results, each adjusted odds ratio represents the results of a multivariate logistic regression, *p<0.05, **p<0.01, ***p<0.001

Models adjusted for baseline age, gender, race and ethnicity, FPL, and chronic condition. Full model output can be found in Beneficiary Appendix Tables 5.1.16, 5.1.17, and 5.1.18

¹Only includes respondents who were enrolled in 2018

²Consistently had PCP defined as reporting having a PCP in 2018 and 2021

³Regularly saw PCP defined as reporting having a PCP visit in the past year in 2018 and 2021

⁴Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2018 or 2021 among those who reported having a PCP in 2018 or 2021

Summary of response to evaluation question 5.1

Across cohorts, beneficiaries with substantial and/or moderate health burden reported more difficulty accessing primary care at baseline compared to those with minimal health burden. High rates of having and seeing a PCP across all cohorts and all survey timepoints may have limited our ability to examine the association of those variables with improved health burden.

Beneficiaries with minimal health burden were more likely than those with substantial or moderate health burden to respond *always* to most items about self-efficacy in healthcare in 2021. Beneficiaries who reported difficulty accessing primary care were less likely to say they *always* know when to go to the doctor, *always* keep their appointments, and *always* follow their doctor's treatment advice.

In baseline surveys Cohort 3 beneficiaries, who enrolled in HMP just before or during the PHE, reported similar levels of having and seeing their PCP but more difficulty accessing primary care, compared to Cohort 2. In contrast, Cohort 1 and 2 beneficiaries did not report worse access to primary care (having a PCP, seeing a PCP and not reporting difficulty accessing primary care) during the PHE (2021 HMV survey) compared to 2018. These findings suggest that having an established primary care home may have buffered HMP beneficiaries from the challenges of constrained healthcare resources during the PHE.

Evaluation question 5.2: What factors influence beneficiaries' decisions about seeking care in the emergency department?

Hypothesis 5.2: Beneficiaries who report barriers to care will be more likely to report an emergency department visit without first attempting to contact their primary care provider.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that beneficiaries responding to the 2021 HMP survey who reported barriers to primary care were more likely than those who reported no barriers to contact their PCP office before going to the ED. For this Summative Evaluation Report, we repeated multivariate analyses with an additional variable representing claims-based evidence of chronic conditions. Results from this expanded analysis (see Beneficiary Survey Appendix Table 5.2.1) did not differ from those presented in the Interim Evaluation Report.

For this Summative Evaluation Report, we conducted longitudinal analyses of unmet healthcare needs, difficulty accessing primary care, reported emergency department visits, and attempted PCP contact before an ED visit. We incorporated a new composite variable, beneficiary-reported health burden, into these analyses. Our analyses included:

- Comparison of baseline HMP survey responses for three HMP cohorts (baseline HMP survey data collected 12-24 months after initial HMP-MC enrollment, Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021)
- Cross-sectional bivariate and multivariate analysis of ED visits by health burden, unmet healthcare needs and difficulty accessing primary care for each survey year (2016, 2017, 2018, 2021)

We also summarized descriptions of responses to open-ended questions from the 2021 HMP survey about reasons for ED use.

Unmet healthcare needs in past 12 months at baseline, by level of health burden

In the bivariate analysis of baseline HMP surveys, a higher proportion of Cohort 2 reported unmet healthcare needs in the past 12 months (23.3%) compared to Cohort 1 (15.6%); within both Cohorts, respondents with substantial and moderate health burden were more likely than those with minimal health burden to report unmet healthcare needs (Beneficiary Survey Appendix Table 5.2.2). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 5.2.3).

Unmet healthcare needs over time, by level of health burden

Among Cohort 1, the proportion of those with unmet healthcare needs in the past 12 months increased from 2016 to 2018. At each time point, respondents with substantial and moderate health burden were more likely than those with minimal health burden to report unmet healthcare needs in the past 12 months (Beneficiary Survey Appendix Table 5.2.4).

Reported ED use in past 12 months at baseline, by level of health burden

In the bivariate analysis of baseline HMPV surveys, a lower proportion of Cohort 3 reported having an ED visit in the past 12 months (32.6%) compared to Cohorts 1 and 2 (37.7% and 38.0%); within each Cohort, respondents with substantial and moderate health burden were more likely than those with minimal health burden to report an ED visit in the past 12 months (Table 5.2.A). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 5.2.6).

Table 5.2.A. Comparison of reported ED visit in past 12 months at baseline HMPV survey, by cohort and health burden at baseline HMPV survey¹, among those who reported having a PCP

	Reported ED visit in past 12 months ² % [95% CI]
Total	37.0 [35.6, 38.4]
Cohort 1 (N=3,872)	37.7 [35.7, 39.7]³
Substantial	56.0 [51.4, 60.5]
Moderate	49.7 [44.1, 55.4] ⁴
Minimal	30.2 [27.9, 32.5]
p-value ⁵	<0.001
Cohort 2 (N=2,264)	38.0 [35.4, 40.6]³
Substantial	60.9 [54.8, 66.8]
Moderate	49.0 [40.8, 57.2] ⁴
Minimal	30.8 [27.9, 33.9]
p-value ⁵	<0.001
Cohort 3 (N=2,295)	32.6 [30.4, 34.9]³
Substantial	53.6 [47.3, 59.9]
Moderate	36.9 [31.1, 43.1] ⁴
Minimal	27.2 [24.7, 29.9]
p-value ⁵	<0.001

¹Baseline HMPV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Among those who reported having a PCP

T-tests showed that reported ED visit in past 12 months at baseline HMPV survey was significantly different in:

³Cohort 3 vs. Cohort 1 (p=0.001) and Cohort 2 (p=0.002) overall

⁴Cohort 3 vs. Cohort 1 (p=0.002) and Cohort 2 (p=0.021) for those with moderate health burden at baseline

⁵Pearson chi-square test comparing by health burden within Cohort

Reported ED use in past 12 months, by difficulty accessing primary care, unmet healthcare needs, and health burden

In bivariate analyses, in each survey year HMPV respondents with a PCP who reported difficulty accessing primary care were more likely to report an ED visit than those who did not report difficulty (Table 5.2.B). Similarly, respondents who reported unmet healthcare needs were more likely to report an ED visit compared to those who did not report unmet healthcare needs. Greater health burden was also associated with the likelihood of reporting an ED visit.

Table 5.2.B. Reported ED visit in past 12 months, by difficulty accessing primary care, unmet healthcare needs, and health burden, among any respondent enrolled in HMP who reported having a PCP at the time of each survey (2016, 2017, 2018, 2021)

	Reported ED visit in past 12 months			
	2016 (N=3,866) % [95% CI]	2017 (N=2,274) % [95% CI]	2018 (N=3,797) % [95% CI]	2021 (N=3,670) % [95% CI]
Total	37.7 [35.7, 39.7]	33.3 [30.8, 35.8]	34.6 [32.6, 36.8]	32.5 [29.9, 35.3]
Difficulty accessing primary care in past 12 months				
Yes	50.9 [43.7, 58.1]	42.7 [34.9, 50.8]	42.9 [35.8, 50.2]	44.1 [35.9, 52.7]
No	36.6 [34.6, 38.6]	32.2 [29.6, 34.9]	33.8 [31.6, 36.0]	31.0 [28.3, 33.9]
p-value ¹	<0.001	0.012	0.015	0.003
Unmet healthcare needs in past 12 months				
Yes	48.0 [42.9, 53.2]	42.4 [37.2, 47.8]	41.7 [37.2, 46.3]	Not asked
No	35.8 [33.7, 38.0]	30.9 [28.2, 33.8]	32.6 [30.3, 35.0]	
p-value ¹	<0.001	<0.001	<0.001	N/A
Health burden				
Substantial	56.0 [51.4, 60.5]	53.5 [47.4, 59.4]	56.5 [51.1, 61.8]	54.8 [47.5, 61.9]
Moderate	49.7 [44.1, 55.4]	44.7 [38.4, 51.1]	48.0 [41.8, 54.2]	41.0 [34.1, 48.4]
Minimal	30.2 [27.9, 32.5]	26.5 [23.6, 29.6]	27.3 [25.0, 29.8]	26.8 [23.7, 30.1]
p-value ¹	<0.001	<0.001	<0.001	<0.001

¹Pearson chi-square test comparing by variable within year

In the multivariate analysis controlling for health burden and other factors, unmet healthcare needs were modestly associated with reported ED visits in 2018 (Beneficiary Survey Appendix Table 5.2.7). Difficulty accessing primary care was no longer significantly associated with greater likelihood of reported ED visits in either 2018 or 2021 (Beneficiary Survey Appendix Tables 5.2.7 and 5.2.8).

Reported PCP contact prior to ED visit in past 12 months at baseline, by level of health burden

In the bivariate analysis of baseline HMP surveys, a higher proportion of Cohort 1 reported attempting to contact their PCP prior to an ED visit in the past 12 months (28.5%) compared to Cohorts 2 and 3 (23.4% and 21.6%) (Table 5.2.C). Within Cohort 1, respondents with substantial health burden were more likely than those with moderate or minimal health burden to report attempting to contact their PCP prior to an ED visit in the past 12 months (Table 5.2.C). Multivariate analyses confirmed the difference between levels of health burden and between Cohort 1 and Cohort 3 in attempting to contact the PCP prior to an ED visit (Beneficiary Survey Appendix Table 5.2.9).

Table 5.2.C. Comparison of attempted PCP contact prior to ED visit in past 12 months at baseline HMP survey, by cohort and health burden at baseline HMP survey¹, among those who reported having a PCP

	Attempted PCP contact prior to ED visit in past 12 months ² % [95% CI]
Total	26.4 [24.4, 28.5]
Cohort 1 (N=1,386)	28.5 [25.7, 31.5]³
Substantial	35.9 [30.1, 42.2] ⁴
Moderate	26.5 [20.2, 33.9]
Minimal	24.5 [21.0, 28.5]
p-value ⁵	0.004
Cohort 2 (N=817)	23.4 [20.0, 27.1]³
Substantial	25.7 [19.6, 32.9] ⁴
Moderate	30.2 [21.0, 41.4]
Minimal	20.9 [16.6, 26.0]
p-value ⁵	0.170
Cohort 3 (N=760)	21.6 [18.4, 25.2]³
Substantial	23.8 [17.3, 31.7] ⁴
Moderate	21.3 [14.5, 30.2]
Minimal	21.2 [17.0, 26.0]
p-value ⁵	0.820

¹Baseline HMP survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Among those who reported having a PCP and an ED visit in the past 12 months

T-tests showed that attempted PCP contact prior to ED visit in past 12 months at baseline HMP survey was significantly different in:

³Cohort 1 vs. Cohort 2 (p=0.029) and Cohort 3 (p=0.003) overall

⁴Cohort 1 vs. Cohort 2 (p=0.026) and Cohort 3 (p=0.012) for those with substantial health burden at baseline

⁵Pearson chi-square test comparing by health burden within Cohort

Reported PCP contact prior to ED visit in past 12 months, by difficulty accessing primary care, unmet healthcare needs, and health burden

In bivariate analyses, respondents with substantial health burden were less likely in 2016, but not in later surveys, to say they went to the ED without contacting their PCP, compared to those with moderate or minimal health burden. In 2018 and 2021 surveys, respondents who reported no difficulty accessing primary care were more likely than those who reported difficulty to say they went to the ED without contacting their PCP (Beneficiary Survey Appendix Table 5.2.10).

Reported reasons for ED use and barriers to receiving health services

In the 2021 HMP survey, among respondents who said they contacted their PCP prior to their most recent ED visit, nearly two-thirds of them said the PCP office advised them to go to the ED. Beneficiary Survey Appendix Table 5.2.11 presents respondent descriptions of their reasons for contacting or not contacting their PCP prior to an ED visit. Many described situations that could be perceived as a medical emergency, including injuries, symptoms of a heart attack or stroke, allergic reactions, seizures and migraines, pregnancy complications, and mental health crises.

Nearly 10% gave reasons related to COVID-19; most often they were experiencing COVID-19 symptoms and were told by the PCP office to go to the ED for testing and/or treatment.

Nearly one-quarter of respondents who contacted their PCP indicated they were unable to get an appointment soon enough, while 10% said they sought ED care because their symptoms worsened; over 10% said the office was closed and/or they received no response after attempting to contact the PCP. Less than 5% reported getting advice that was not helpful or needing services (e.g., x-rays) not available at the PCP office.

Among respondents who said they did not attempt to call their PCP prior to the ED visit, about half believed the situation was a medical emergency, and described accidents and injuries, symptoms of a heart attack or stroke, difficulty breathing, seizures, pregnancy complications, and mental health crises. About one-third mentioned that the primary care office was not open when their medical situation was occurring. About 6% of respondents described a COVID-related reason, most often that they were experiencing COVID symptoms and/or sought COVID testing. Less than 5% of respondents described logistical factors such as being out of town and unable to get to the care office or not having a primary care provider at the time of the ED visit. Only 6% of respondents who did not call their PCP gave no explanation for that choice, and/or indicated that the ED was more convenient or better than their PCP office.

Similar circumstances were described as reasons to call the PCP or not call the PCP. This includes perceived medical emergencies (e.g., injuries, seizures, symptoms of stroke) as well as logistical factors such as needing care in the evening or on weekends.

Summary of response to evaluation question 5.2

Generally, HMO respondents with greater health burden, difficulty accessing primary care, and unmet healthcare needs were more likely to report having an ED visit in the prior 12 months. About one-quarter of respondents said they attempted to contact their PCP before going to the ED, and many were advised to go to the ED. Perceived medical emergencies, PCP office not open, and COVID-related symptoms and need for testing were common reasons for seeking ED care without contacting the PCP.

Evaluation question 5.3: Is use of the emergency department related to continuity of primary care?

Hypothesis 5.3: Beneficiaries with higher continuity of primary care will have lower rates of emergency department utilization and lower odds of being high-frequency ED utilizers.

Data source: Medicaid claims and encounter data (as described in D.2.1)

Results

In our Interim Evaluation Report, we found that beneficiaries with higher continuity of primary care had higher ED utilization, suggesting they may have chronic and/or acute conditions that require more frequent care.

For this Summative Evaluation Report, we focused on ED utilization and primary care continuity in the first two years of HMP-MC enrollment, using multivariate logistic regression to examine differences across cohort year groups.

Primary care continuity, defined as having a primary care visit in each of the first two years of HMP-MC enrollment, was more likely for beneficiaries who were older, had higher incomes, were disabled, preferred non-English language, were White, and were urban residents. Primary care continuity was less likely among men and Black beneficiaries, and those who initiated HMP-MC enrollment in later years (Administrative Data Appendix Table 5.3.1).

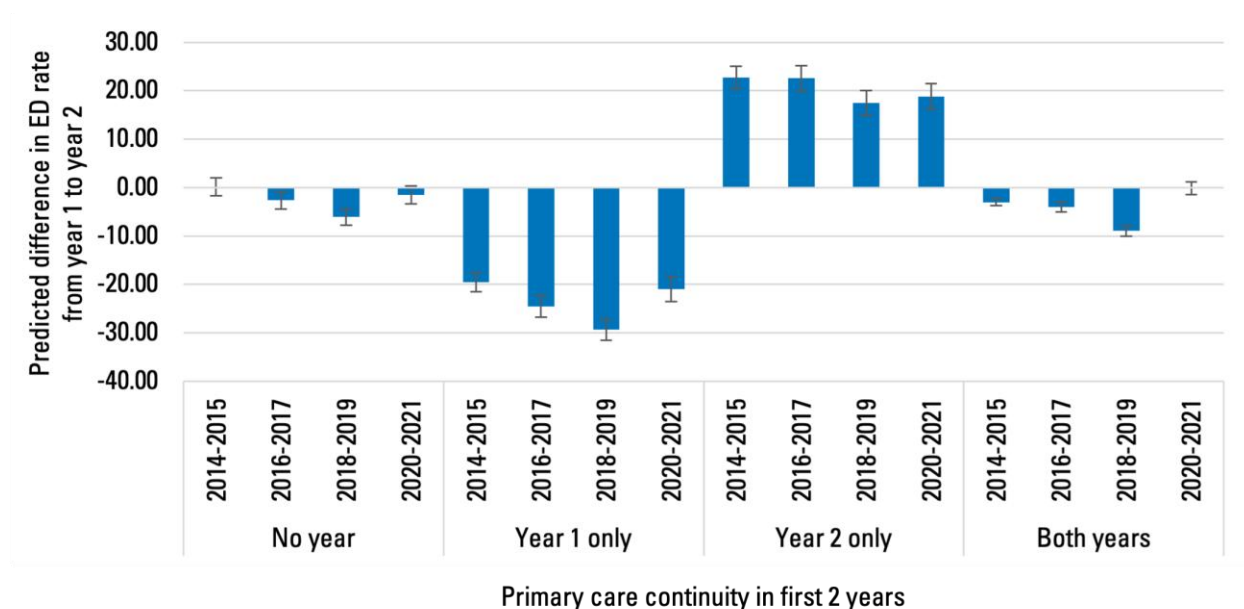
Both the ED visit rate and the proportion of high-frequency ED utilizers were highest among beneficiaries with the greatest primary care continuity, and lowest among beneficiaries with no primary care visits (Table 5.3.A).

Table 5.3.A. ED visit rate (per 1,000 member-months) and high-frequency ED utilizers (>5 ED visits in a year) in first two years of HMP-MC enrollment, by primary care continuity

	Year 1	Year 2
ED visit rate		
Overall	64.00	60.13
Primary care visits		
No year	32.24	29.91
Year 1 only	57.68	34.53
Year 2 only	45.75	66.49
Both years	77.28	73.09
High-frequency ED utilizers		
Overall	2.02%	1.86%
Primary care visits		
No year	0.59%	0.53%
Year 1 only	1.51%	0.72%
Year 2 only	1.07%	1.84%
Both years	2.69%	2.47%

Multivariate results revealed how the difference in ED visit rates from beneficiaries' first to second year of HMP-MC enrollment differed by primary care continuity. Those with primary care visits in both years and those with no primary visits had small declines in ED rates, while those with primary care visits only in the first year of enrollment had a substantial decrease. Increased ED rates were observed among beneficiaries who delayed primary care until their second year of enrollment. This pattern was consistent across all cohort years (Figure 5.3.B); however, patterns were less pronounced for those enrolling in 2020-2021.

Figure 5.3.B. Multivariate linear regression – Predicted difference in ED rate per 1,000 member-months between enrollment year 1 and year 2 by primary care continuity and cohort year, adjusted for income level, sex, preferred language, race/ethnicity, urbanicity and disability



Similar patterns were observed for the proportion of beneficiaries with high-frequency ED utilization in their second year of HMP-MC enrollment (Administrative Data Appendix Table 5.3.8). Disability was the strongest predictor of high-frequency ED utilization.

Summary of response to evaluation question 5.3

Beneficiaries with higher continuity of primary care had higher ED utilization, though they demonstrated small decreases in ED rates in their second year of enrollment. Among beneficiaries with no primary care in their first year of enrollment and initiation of primary care in their second year, a substantial increase in ED utilization was noted in their second year. The association between primary care and ED utilization was muted for those whose initial years of HMP-MC enrollment overlapped with the PHE.

Evaluation question 5.4: Does HMP promote more consistent use of services to manage chronic conditions over time?

Hypothesis 5.4: Beneficiaries with chronic conditions will demonstrate better rates of primary care utilization, and lower rates of ED visits and hospitalizations, over time compared to their initial year of HMP enrollment.

Data source: Medicaid claims and encounter data (as described in D.2.1)

Results

In our Interim Evaluation Report, we found that the majority of HMP beneficiaries with designated chronic conditions had established continuity of primary care and demonstrated reductions in ED utilization after their initial year of HMP-MC enrollment.

For this Summative Evaluation Report, we examined HEDIS measures of chronic disease management and used multivariate logistic regression to explore factors associated with the change in ED and inpatient rates from the first to second year of HMP-MC enrollment.

Among the overall evaluation population, there was significant but modest improvement from beneficiaries' first to second year of HMP-MC enrollment in six of eight measures of chronic disease management (Table 5.4.A).

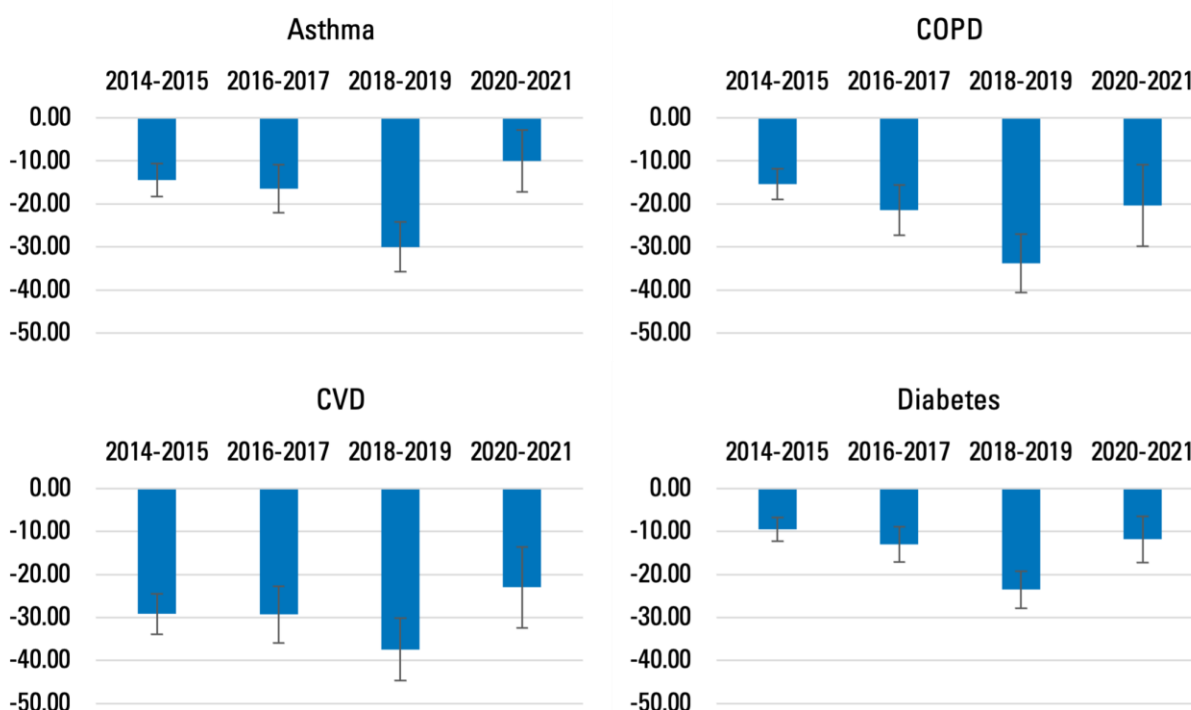
Table 5.4.A. Receipt of recommended chronic disease management in first two years of HMP-MC enrollment

Among those with	Year 1	Year 2	p-value
COPD exacerbations			
Corticosteroid within 14 days (PCE1)	75.02%	75.93%	0.452
Bronchodilator within 30 days (PCE2)	82.61%	84.80%	0.035
Atherosclerotic Vascular Disease (ASCVD)			
Received statin therapy (SPC1)	68.40%	71.94%	0.000
Statin adherence $\geq$ 80% (SPC2)	57.88%	60.38%	0.000
Diabetes, no ASCVD			
Received statin therapy (SPD1)	61.83%	65.57%	0.000
Statin adherence $\geq$ 80% (SPD2)	55.09%	57.83%	0.000
Persistent asthma			
Ratio of controller to total asthma medications $\geq$ 0.5 (AMR)	52.77%	54.43%	0.001
Multiple high-risk chronic conditions			
Follow-up visit 7 days after ED visit (FMC)	48.66%	48.99%	0.340

In multivariate analyses, beneficiaries with primary care continuity (primary care visits in both of their first two years of enrollment) generally had higher receipt of recommended chronic disease management compared to beneficiaries who had with no or less consistent primary care (Administrative Data Appendix Figures 5.4.1 to 5.4.8; Administrative Data Appendix Tables 5.4.9 to 5.4.16). However, this pattern was not consistent across all years or all cohort years.

Among beneficiaries identified in their first year of HMP-MC enrollment as having asthma, cardiovascular disease, COPD, or diabetes, the ED visit rate decreased from their first to second year of HMP-MC enrollment. Decreases were most pronounced for cohort year 2018-2019, and least for cohort year 2020-2021 (Figure 5.4.B).

Figure 5.4.B. Predicted difference in ED visit rate from HMP-MC enrollment year 1 to year 2, stratified by chronic condition and cohort year and adjusted for income level, sex, preferred language, race/ethnicity, and urbanicity



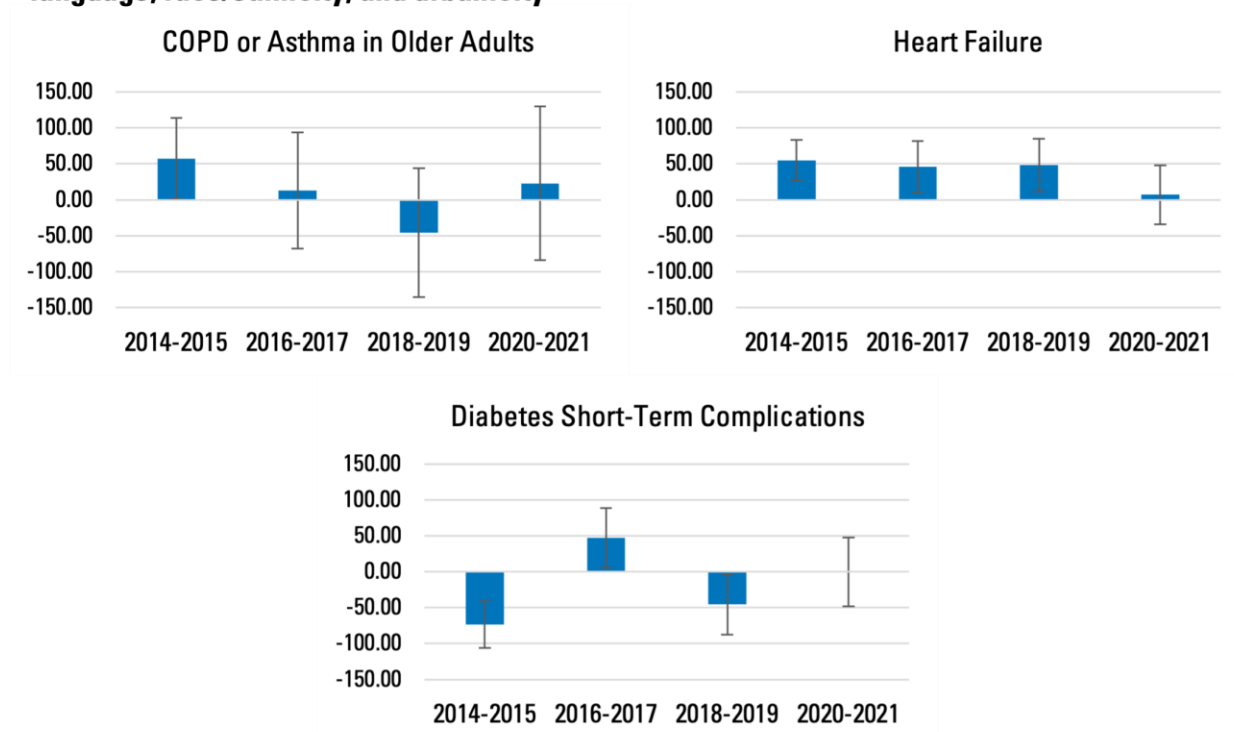
For the overall evaluation population, hospital admission rates increased for COPD/asthma and heart failure, but decreased for diabetes complications, from their first to second year of HMP-MC enrollment (Table 5.4.C). Across all conditions, admission rates were lowest among beneficiaries whose initial HMP-MC enrollment overlapped with the PHE.

Table 5.4.C. Unadjusted hospital admission rate (per 100,000 members) in first 2 years of HMP-MC enrollment for specific inpatient utilization measures, overall and by cohort year

	COPD or Asthma in Older Adults (NQF 0275)		Heart Failure (NQF 0277)		Diabetes Short-Term Complications (NQF 0272)	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Overall	381.88	394.01	121.85	165.13	216.24	189.54
Cohort year						
2014-2015	444.49	489.07	99.32	153.82	218.51	144.14
2016-2017	405.82	408.89	159.94	207.43	186.60	232.42
2018-2019	327.61	271.33	132.53	180.41	247.10	202.64
2020-2021	191.02	204.52	106.49	114.17	210.78	214.08

Multivariate analyses revealed that predicted differences in hospital admission rates varied by cohort year for COPD/asthma and diabetes short-term complications. In addition, differences for cohort year 2020-2021 were generally more modest than for other years (Figure 5.4.D).

Figure 5.4.D. Predicted difference in hospital admission rate from enrollment year 1 to year 2, stratified by chronic condition and cohort year and adjusted for income level, sex, preferred language, race/ethnicity, and urbanicity



Summary of response to evaluation question 5.4

We found an overall improvement in management of chronic conditions from beneficiaries' first to second year of HMP-MC enrollment, particularly for these with primary care continuity. While ED rates decreased among beneficiaries with chronic conditions, patterns for hospital admissions were variable. Changes from the first to second year of HMP-MC enrollment were less pronounced for beneficiaries whose initial HMP-MC enrollment overlapped with the PHE, compared to earlier enrollees.

Evaluation question 5.5: How has HMP impacted beneficiaries' physical, mental, and oral health and their use of health care services over time?

Hypothesis 5.5: Beneficiaries will describe HMP as allowing them to receive services that have a significant positive impact on their health and well-being.

Data source: Interviews with beneficiaries (as described in D.2.3)

Results

The results from the interviews with beneficiaries were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 5.5

As stated in the Interim Evaluation Report, most interviewees felt HMP coverage allowed them to access needed physical, mental/behavioral, dental, vision and other health care services. Some described barriers in access to specialists. Many interviewees said they were more likely to seek needed care for both acute and chronic conditions which led to improvements in their knowledge of how to take care of their health and in their health overall. Many described how HMP coverage improved their general sense of well-being by reducing their stress and worries, and many expressed gratitude for their HMP coverage and its positive impact on their lives.

F.6. Support financial well-being

Evaluation question 6.1: What impact has HMP had on beneficiaries' levels of employment and ability to work?

Hypothesis 6.1: Beneficiaries will report sustained or increased employment and decreased health-related barriers to employment over time.

Data source: Beneficiary surveys – longitudinal and new cohorts (as described in D.2.2)

Results

Our Interim Evaluation Report found that most beneficiaries were employed or self-employed at the time of the 2021 survey, although nearly half of these beneficiaries reported barriers to how much they could work or the type of work they could do. Health-related limitations were the most commonly cited barrier to employment for both working and non-working beneficiaries. For this Summative Evaluation Report, we ran a multivariate analysis with an additional variable representing claims-based evidence of chronic conditions. Results from this expanded analysis did not differ from those presented in the Interim Evaluation Report (see Beneficiary Survey Appendix Table 6.1.1).

For this Summative Evaluation Report, we conducted longitudinal analyses of employment. We also explored health-related limitations by incorporating a new composite variable, beneficiary-reported health burden, into these analyses. Our analyses included:

- Comparison of baseline HMPV survey responses for three HMPV cohorts (baseline HMPV survey data collected 12-24 months after initial HMP-MC enrollment, Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021)
- Longitudinal analysis of survey responses among those who responded to surveys in 2016, 2017, and 2018 (from Cohort 1)
- Longitudinal analysis of survey responses among those who responded to surveys in 2018 and 2021 (from Cohorts 1 and 2)

Employment at baseline, by level of health burden

In bivariate analyses of baseline HMPV surveys, Cohort 1 reported a lower level of employment (48.3%) compared to Cohorts 2 and 3 (55.8% and 57.6%) (Table 6.1.A). Within each Cohort, greater health burden was associated with lower employment at baseline; respondents with substantial health burden were the least likely and those with minimal health burden the most likely to be employed (Table 6.1.A). These findings were confirmed in multivariate analyses (Beneficiary Survey Appendix Table 6.1.2).

Table 6.1.A. Comparison of employment status at baseline HMPV survey, by cohort and health burden at baseline HMPV survey¹

	Employed/Self-employed % [95% CI]
Total	51.5 [50.2, 52.9]
Cohort 1 (N=4,108)	48.3 [46.3, 50.2]²
Substantial	19.1 [15.8, 22.8] ³
Moderate	44.3 [38.9, 49.9] ⁴
Minimal	58.0 [55.5, 60.4] ⁵
p-value ⁶	<0.001
Cohort 2 (N=2,602)	55.8 [53.3, 58.2]²
Substantial	28.8 [23.9, 34.3] ³
Moderate	50.2 [42.8, 57.6] ⁴
Minimal	63.6 [60.6, 66.5] ⁵
p-value ⁶	<0.001
Cohort 3 (N=2,607)	57.6 [55.3, 59.8]²
Substantial	37.2 [31.6, 43.1] ³
Moderate	57.5 [51.4, 63.3] ⁴
Minimal	62.6 [59.8, 65.2] ⁵
p-value ⁶	<0.001

¹Baseline HMPV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

T-tests showed that employment status at baseline HMPV survey was significantly different in:

²Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) overall

³Cohort 1 vs. Cohort 2 (p=0.002) and Cohort 3 (p=0.035) for those with substantial health burden at baseline

⁴Cohort 1 vs. Cohort 3 (p=0.002) for those with moderate health burden at baseline

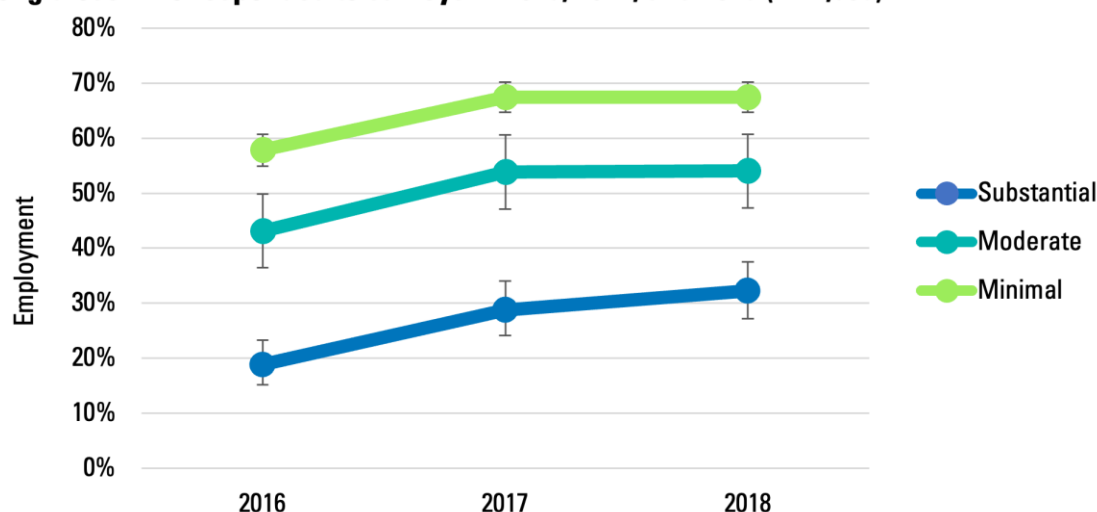
⁵Cohort 1 vs. Cohort 2 (p=0.004) and Cohort 3 (p=0.014) for those with minimal health burden at baseline

⁶Pearson chi-square test comparing by health burden within Cohort

Changes in employment over time, by level of health burden

Among Cohort 1 respondents, employment levels increased from 2016 to 2018 (Figure 6.1.B, Beneficiary Survey Appendix Table 6.1.3). In contrast, among Cohort 1 and 2 respondents, we did not observe a change in employment levels from 2018 to 2021 (Beneficiary Survey Appendix Table 6.1.4).

Figure 6.1.B. Cohort 1 employment over time, by level of health burden at baseline (2016), among those who responded to surveys in 2016, 2017, and 2018 (N=2,608)



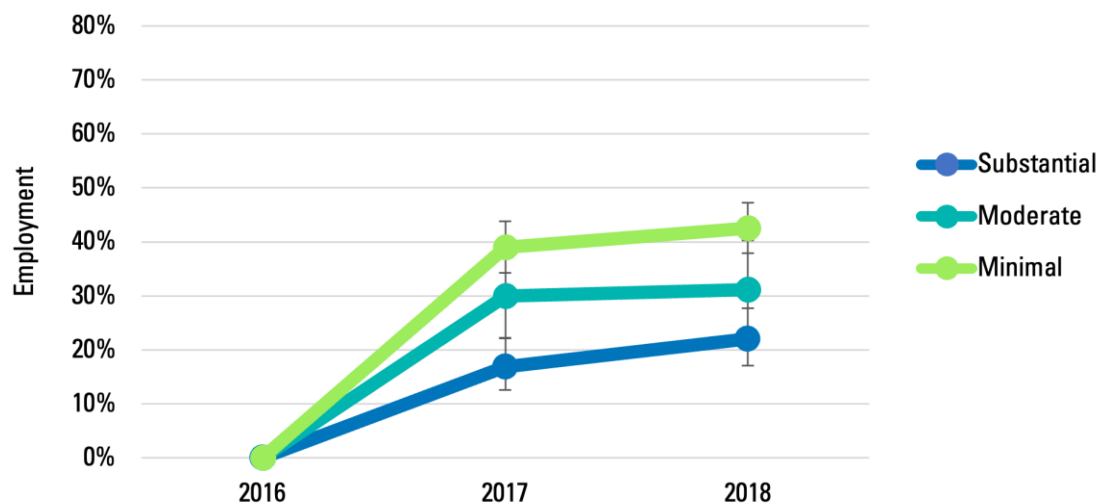
Note: Includes respondents not enrolled in HMP in 2017 and/or 2018

Changes in employment over time for those unemployed at baseline, by level of health burden

Among Cohort 1 respondents who were unemployed in 2016, 34.3% were employed in 2018; those with minimal or moderate health burden at baseline were more likely than those with substantial health burden to have gained employment by 2018 (Figure 6.1.C, Beneficiary Survey Appendix Table 6.1.7). In multivariate analysis, among those in Cohort 1 with substantial or moderate health burden who were unemployed in 2016, experiencing an improvement in health burden was associated with higher odds of having new employment in 2018 (Beneficiary Survey Appendix Table 6.1.8).

Similarly, among Cohort 1 and 2 respondents who were unemployed in 2018, 34.7% were employed in 2021 (Beneficiary Survey Appendix Table 6.1.9). However, in multivariate analysis, among those in Cohort 1 and Cohort 2 with substantial or moderate health burden who were unemployed in 2018, we found no association between experiencing an improvement in health burden and having new employment in 2021 (Beneficiary Survey Appendix Table 6.1.10).

Figure 6.1.C. Cohort 1 employment over time, by level of health burden at baseline (2016), among those unemployed at baseline (2016) who responded to surveys in 2016, 2017, and 2018 (N=1,297)



Note: Includes respondents not enrolled in HMP in 2017 and/or 2018

Summary of response to evaluation question 6.1

For all HMP cohorts, respondents with substantial health burden were the least likely, and those with minimal health burden the most likely to be employed, confirming our prior evaluation findings that health conditions were a common barrier to employment.^{63,64,65} Among beneficiaries in Cohort 3, whose initial HMP-MC enrollment overlapped with the PHE, levels of employment at baseline were similar to or higher than earlier cohorts. New employment gains between 2016 and 2018 were most pronounced for beneficiaries who experienced health burden improvement during their HMP enrollment. While we found gains in employment between 2018 and 2021 for those unemployed in 2018, improvement in health burden was not a significant predictor of new employment.

Evaluation question 6.2: How is HMP enrollment related to individual beneficiaries' financial outcomes during and after HMP enrollment?

Hypothesis 6.2: HMP enrollment will be associated with improved credit report outcomes for beneficiaries over time.

Data source: Credit report data linked to Medicaid enrollment (as described in D.2.6)

Results

Across all enrollment cohorts, HMP beneficiaries had less medical debt in collections, lower rates of subprime credit score, and higher rates of recent bankruptcy than the comparison sample (Table 6.2.A).

⁶³ 2017 Healthy Michigan Voices Follow-Up Survey Report, December 2018

⁶⁴ 2018 Healthy Michigan Voices Second Follow-Up Survey Report, May 2020

⁶⁵ Healthy Michigan Plan Section 1115 Interim Evaluation Report, Demonstration Period January 1, 2019 – December 31, 2023

Table 6.2.A. Unadjusted outcomes across all time periods

	HMP 2014	HMP 2015	HMP 2016	HMP 2017	Comparison group	Total
Total (N)	334,574	167,006	114,081	88,555	723,217	1,427,433
Outcomes						
Medical debt in collections, \$ (SE)	\$702 (3541.1)	\$636 (3318.6)	\$670 (3817.4)	\$676 (3466.1)	\$1,390 (6175.7)	\$1,039 (5058.5)
Non-medical debt in collections, \$ (SE)	\$833 (5488.0)	\$826 (2681.5)	\$870 (6161.6)	\$872 (2885.4)	\$934 (2671.4)	\$889 (3881.9)
Subprime credit score (< 600), (%)	57.1%	54.3%	55.2%	54.7%	67.5%	61.7%
Bankruptcy in past 2 years, (%)	2.6%	2.5%	2.5%	2.6%	1.8%	2.2%

Notes: All continuous outcomes are averaged over all time periods within each enrollment cohort; binary outcomes are reported as rates across all time periods within each enrollment cohort.

In the baseline analysis, all HMP enrollment cohorts experienced large and significant reductions in mean medical debt in collections, with larger reductions seen in earlier enrollment cohorts (Range: \$271 to \$403 less average debt per-person, all $p < 0.001$) (Figure 6.2.B). HMP enrollment was also associated with small but statistically significant increases in absolute rates of bankruptcy (Range: 0.55-0.67 percentage point increases, all $p < 0.001$) (Figure 6.2.C). Beneficiaries who enrolled in 2014 and 2015 also experienced significant reductions in mean non-medical debt in collections and rates of subprime credit score; this effect decreased with each subsequent year of enrollment and reversed for beneficiaries who enrolled in 2016 and 2017 (Figures 6.2.B and 6.2.C). Numeric values for the values presented visually in Figures 6.2.B and 6.2.C are available in Column 1 of Table 6.2.H.

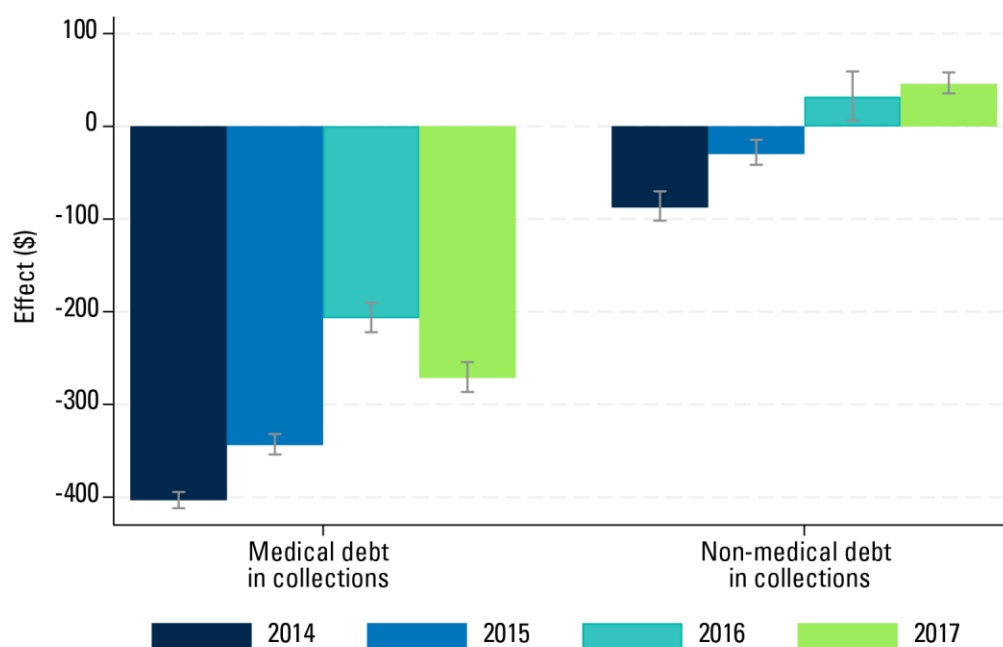
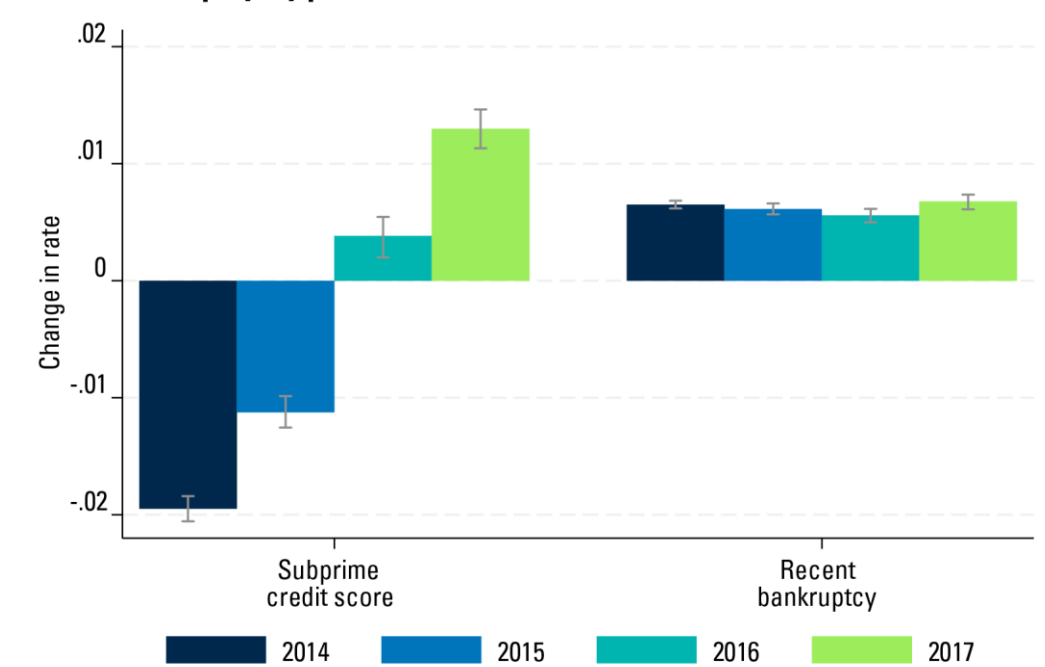
Figure 6.2.B. Effects of HMP enrollment on medical and non-medical debt in collections, by period of enrollment

Figure 6.2.C. Effects of HMP enrollment on rates of subprime credit score and recent bankruptcy, by period of enrollment



The results reported in Figures 6.2.B and 6.2.C show the total difference in outcomes across all time periods from our baseline analysis, normalized by the number of individuals and the number of post-periods. Figures 6.2.D-6.2.G display these same results for each outcome dynamically over time, depicting the points at which outcomes improved or worsened for HMP beneficiaries compared to their synthetic control groups.

Reductions in medical debt in collections began almost immediately post-enrollment and increased over time (Figure 6.2.D). Similar immediate improvements are seen among the 2014 and 2015 HMP enrollees for non-medical debt in collections and rates of subprime credit score, while the 2016 and 2017 enrollees experienced immediate post-enrollment worsening in these outcomes which eventually began to reverse by 1-2 years post-enrollment (Figures 6.2.E and 6.2.F). Rates of bankruptcy increased quickly within a year post-enrollment for all cohorts, and then began to reverse, however, they continued to remain higher than the synthetic control groups in all post-periods (Figure 6.2.G).

Figure 6.2.D. Per-period per-person impact of HMP enrollment on medical debt in collections

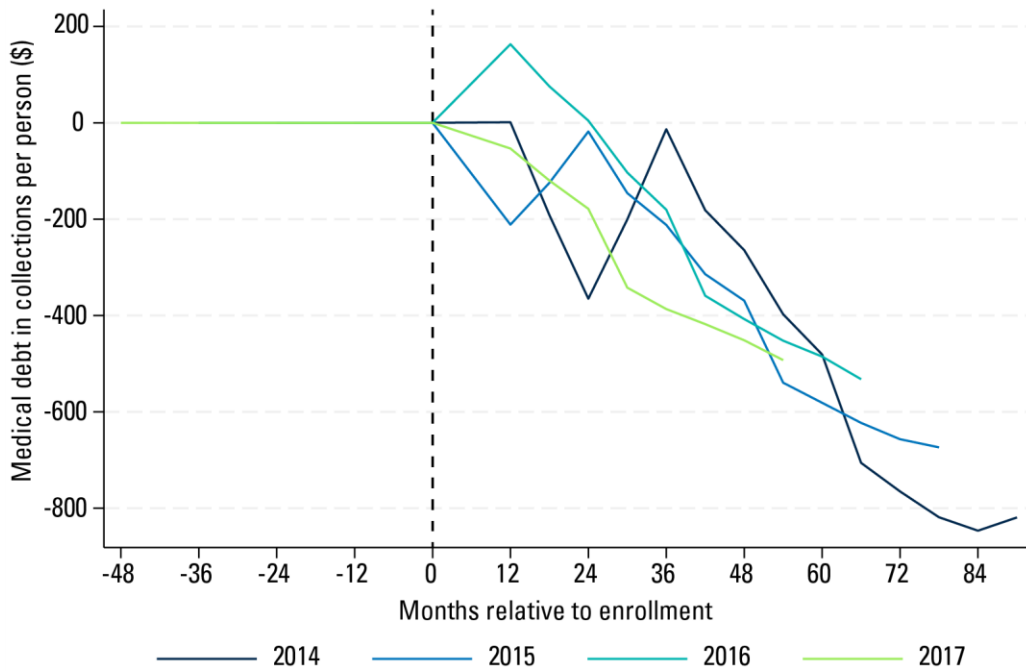


Figure 6.2.E. Per-period per-person impact of HMP enrollment on non-medical debt in collections

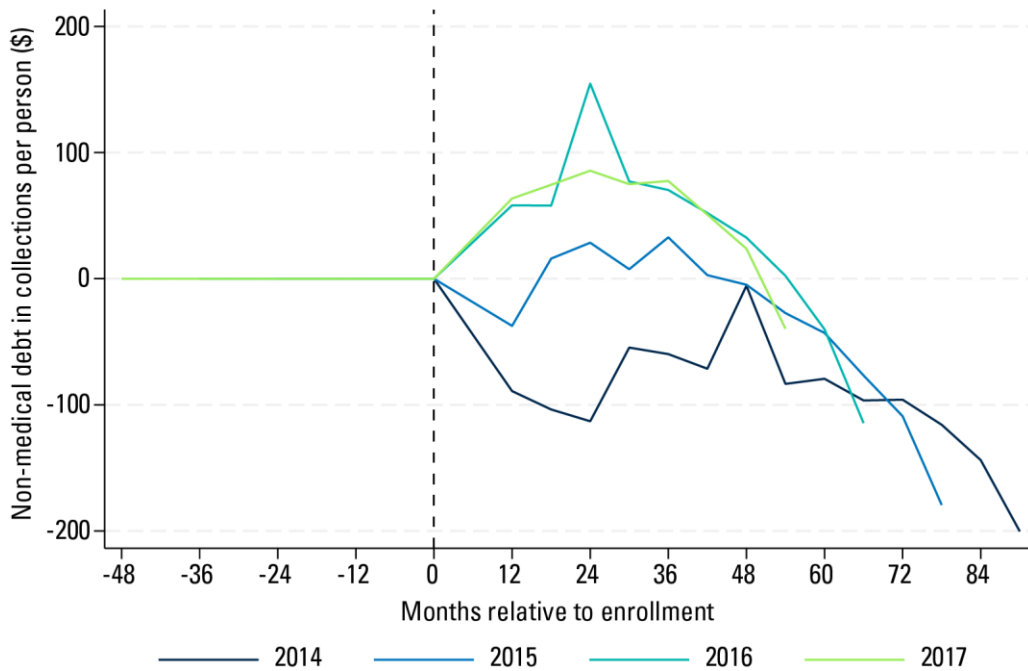


Figure 6.2.F. Per-period per-person impact of HMP enrollment on rates of subprime credit score

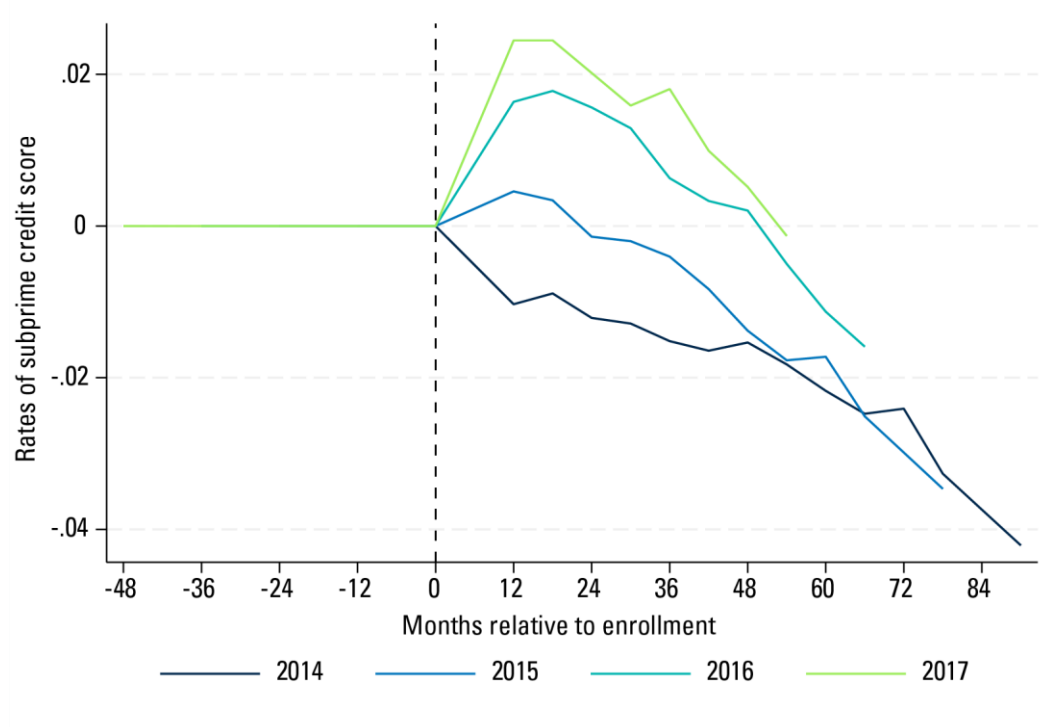
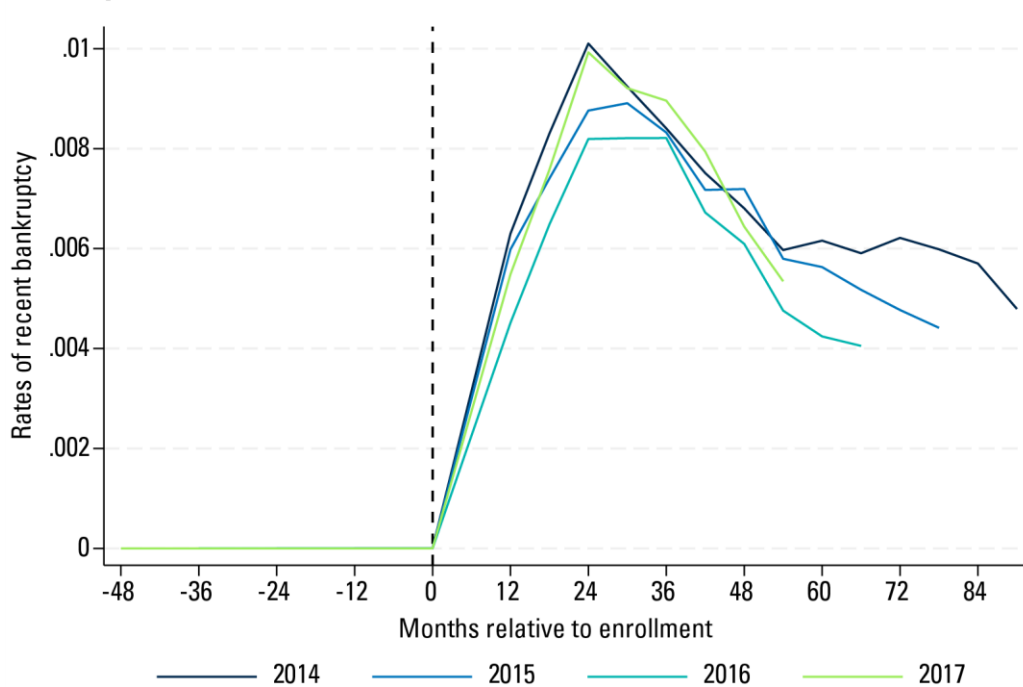


Figure 6.2.G. Per-period per-person impact of HMP enrollment on rates of recent bankruptcy



In sensitivity analyses examining potential enrollment selection bias, we found strong evidence of selection bias in the negative direction, that is, biasing results toward HMP having a null or negative impact on credit outcomes. In descriptive figures, there is visual evidence that the 2016 and 2017 cohorts have increased rates of subprime credit score and recent bankruptcy prior to enrollment (see Credit Data Appendix Figures 6.2.6 and 6.2.8). In baseline results, when we examine the effect of HMP enrollment over time for the 2016 and 2017 cohorts, non-medical debt in collections, rates of subprime credit score, and bankruptcy all increase quickly within the two years following enrollment, and then subsequently decrease after that (Figures 6.2.E, 6.2.F, and 6.2.G). When we compare result estimates for non-medical debt in collections, rates of subprime credit score, and recent bankruptcies between the two subgroup analyses examining the magnitude of selection bias, the subgroups where we would predict less selection bias would be present demonstrate improved financial outcomes compared with the baseline results, and the subgroups where we would predict more selection bias demonstrate worsened financial outcomes compared with the baseline results (Columns 2-5, Table 6.2.H).

The results of sensitivity analyses excluding individuals with prior Medicaid coverage or third-party liability and using half-year cohorts are very similar to the baseline results. In the sensitivity analysis excluding all individuals with new bankruptcies from the analysis, the effect estimates on medical debt in collections were similar to the results of the primary analysis (Columns 6 and 7, Table 6.2.H).

Table 6.2.H. Effect estimates of HMP enrollment across all models and subgroup analyses

Medical debt in collections							
Cohort	Baseline model	ED visit or hospital admission	No ED visit or hospital admission	Prior medical debt in collections	No prior medical debt in collections	No other coverage	No new bankruptcies
2014	-403.3***	-147.3***	-425.7***	-686.9***	n/a	-351.1***	-393.0***
2015	-343.8***	-284.8***	-346.8***	-604.5***	n/a	-336.2***	-336.3***
2016	-207.0***	-111.2***	-215.2***	-359.3***	n/a	-153.0***	-199.0***
2017	-271.4***	-252.1***	-273.6***	-467.0***	n/a	-213.7***	-272.7***
Non-medical debt in collections							
Cohort	Baseline model	ED visit or hospital admission	No ED visit or hospital admission	Prior medical debt in collections	No prior medical debt in collections	No other coverage	No new bankruptcies
2014	-87.5***	-35.4	-95.1***	-48.0*	-112.8***	-97.1***	-89.0***
2015	-30.0***	48.4***	-42.7***	19.5	-69.3***	-30.2***	-33.1***
2016	31.9*	109.8***	20.3	72.4***	-6.0	36.4	22.3
2017	45.7***	140.1***	31.2***	70.6***	22.6***	60.1***	44.1***
Rate of subprime credit score							
Cohort	Baseline model	ED visit or hospital admission	No ED visit or hospital admission	Prior medical debt in collections	No prior medical debt in collections	No other coverage	No new bankruptcies
2014	-.019***	.036***	-.026***	-.013***	-.022***	-.020***	-.018***
2015	-.011***	.029***	-.017***	-.006***	-.015***	-.008***	-.011***
2016	.004***	.040***	-.001	.006***	.001	.008***	.004***
2017	.013***	.041***	.009***	.013***	.013***	.017***	.014***

Cohort	Rate of recent bankruptcy						
	Baseline model	ED visit or hospital admission	No ED visit or hospital admission	Prior medical debt in collections	No prior medical debt in collections	No other coverage	No new bankruptcies
2014	.006***	.007***	.006***	.009***	.005***	.004***	-.00005***
2015	.006***	.008***	.006***	.009***	.004***	.004***	.00002
2016	.006***	.006***	.005***	.007***	.004***	.003***	-.00002
2017	.007***	.008***	.007***	.008***	.006***	.005***	.00001

*p < 0.05, **p < 0.01, ***p < 0.001

Summary of response to evaluation question 6.2

HMP enrollment was associated with significant and consistent reductions in medical debt in collections for beneficiaries up to seven years post-enrollment. This finding is consistent with other prior studies using both difference-in-differences and synthetic control analyses of state-level data.^{66,67}

Our estimates of the impact of HMP enrollment on non-medical debt in collections and rates of subprime credit score were mixed. The primary results suggest that beneficiaries who enrolled in 2014 and 2015 experienced reductions in non-medical debt in collections and in rates of subprime credit score, while beneficiaries who enrolled in 2016 and 2017 experienced increases in both outcomes.

We also found small increases in rates of recent bankruptcy across all cohorts and subgroups. For a small number of individuals, enrollment in HMP may be an impetus to declare bankruptcy and discharge medical debt accumulated prior to enrollment. Alternatively, enrollment in HMP may connect patients with other social services, such as legal aid, that may facilitate them to declare bankruptcy.

Evaluation question 6.3: How has HMP affected beneficiaries' financial and material well-being over time?

Hypothesis 6.3: Beneficiaries will describe examples of how HMP has improved their financial and material well-being.

Data source: Interviews with beneficiaries (as described in D.2.3)

Results

The results from the interviews with beneficiaries were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

⁶⁶ Miller S, Hu L, Kaestner R, Mazumder B, Wong A. The ACA Medicaid Expansion in Michigan and Financial Health. *Journal of Policy Analysis and Management*. 2020;40(2):348-375. doi:<https://doi.org/10.1002/pam.22266>

⁶⁷ Hu L, Kaestner R, Mazumder B, Miller S, Wong A. The effect of the Affordable Care Act Medicaid expansions on financial wellbeing. *Journal of Public Economics*. 2018;163:99-112. doi:10.1016/j.jpubeco.2018.04.009

Summary of response to evaluation question 6.3

As stated in the Interim Evaluation Report, interviewees described how HMP had a positive impact on their financial situation, describing how their out-of-pocket medical expenses had been reduced and/or insurance costs had improved their ability to pay for other living expenses. A few interviewees described how having HMP coverage had improved their ability to work.

F.7. Sustain the safety net and support coordinated strategies to address social determinants of health

Evaluation question 7.1: What are the categories and estimated amounts of the State's costs to administer key HMP demonstration policies (e.g., Healthy Behaviors Incentives program, cost-sharing)?

Hypothesis 7.1: Administrative costs to implement demonstration policies will remain stable during the current Section 1115 waiver period.

Data source: Key informant interviews (as described in D.2.5)

Results

As noted in the Interim Evaluation Report, Medicaid officials confirmed that there were administrative costs to implement HMP policies, but it was difficult to quantify those costs because they are not called out in budget documents, and because staff effort related to HMP often overlaps with other Medicaid-related duties.

Medicaid health plans

As noted in the Interim Evaluation Report, much of the administration burden of key HMP features, including the Healthy Behaviors Incentive Program and cost-sharing component, was borne by Medicaid health plans. Health plan contracts included capitated payments per member-month composed of medical claims and composite administrative costs. Capitated payments are calculated for each managed care population: HMP, TANF, and ABAD beneficiaries.

For this Summative Evaluation Report, Medicaid officials provided updated HMP capitation rates that included FY2022 and FY2023, encompassing both base medical claims cost and non-benefit expense load (administrative costs). The per-member per-month (PMPM) capitation rate for HMP administrative costs, in both dollar amount and as a percentage of the total managed care capitation rate, is shown in Table 7.1.A. Both the dollar amount and the percentage stayed relatively consistent over the first five years of HMP. In FY2020, administrative costs increased substantially due to added responsibilities to prepare for work requirements. In the years following, the dollar amount of administrative costs continued to increase in small increments through FY2023. Administrative costs as a percentage of total managed care capitation rate dropped off slightly beginning in FY2021.

Table 7.1.A. HMP capitation rates for administrative costs, PMPM, and as a percentage of total managed care capitation rates by fiscal year

FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
\$ 38.83	\$ 38.83	\$ 39.77	\$ 34.79	\$ 39.30	\$ 39.65	\$ 47.32	\$ 49.56	\$50.13	\$51.37
12.00%	12.00%	12.58%	12.00%	11.81%	11.88%	13.76%	13.07%	12.60%	12.38%

Note: FY2014-FY2021 values are from the Interim Evaluation Report. Updated data from MDHHS showed dollar amounts for FY2014-FY2021 that differed by 0.1% and 0.3% from data in Interim Report.

Medicaid officials provided updated data on capitation rates for two comparison populations: TANF and ABAD. As shown in Table 7.1.B, the FY2022 and FY2023 dollar amount of the administrative capitation rate for HMP remained higher than TANF and lower than ABAD. The percentage of the overall capitation rate for FY2023 administrative costs was comparable for HMP and TANF, and consistently higher than for ABAD.

Table 7.1.B. Capitation rates for administrative costs, PMPM: HMP vs. TANF vs. ABAD

	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
HMP \$	\$ 34.79	\$ 39.30	\$ 39.65	\$ 47.32	\$ 49.56	\$ 50.13	\$ 51.37
TANF \$	\$ 16.17	\$ 16.57	\$ 17.67	\$ 17.87	\$ 18.50	\$ 19.17	\$ 20.24
ABAD \$	\$ 59.72	\$ 61.32	\$ 71.79	\$ 71.23	\$ 72.73	\$ 72.15	\$ 78.78
HMP %	12.00%	11.81%	11.88%	13.76%	13.07%	12.60%	12.38%
TANF %	12.29%	12.32%	12.81%	12.81%	12.31%	12.30%	12.30%
ABAD %	9.51%	9.52%	10.01%	10.01%	9.51%	9.26%	9.26%

Note: FY2017-FY2021 values are from the Interim Evaluation Report. Updated data from MDHHS showed dollar amounts for FY2014-FY2021 that differed by up to 0.3% from data in Interim Report.

Comparing year-to-year changes (Table 7.1.C), both FY2022 and FY2023 saw substantial decreases in the percentage of HMP capitation rates allocated to administrative costs, while TANF saw very little change and ABAD had a decrease only for FY2021-FY2022.

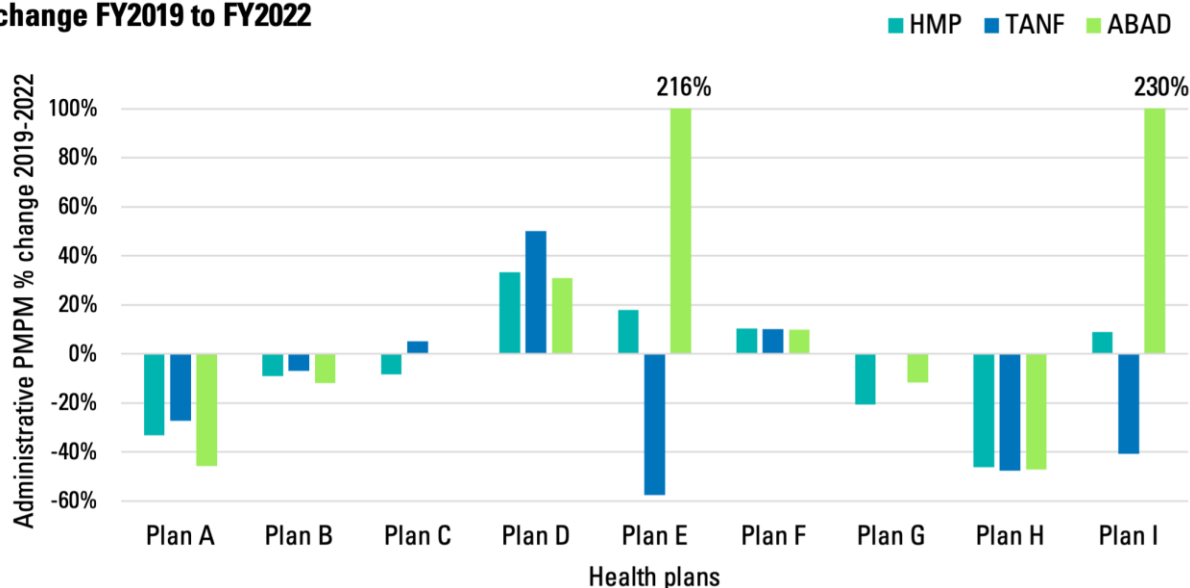
Table 7.1.C. Year-to-year change (absolute) in the percentage of the overall capitation rates allocated to administrative costs: HMP vs. TANF vs. ABAD

	FY2017 to FY2018	FY2018 to FY2019	FY2019 to FY2020	FY2020 to FY2021	FY2021 to FY2022	FY2022 to 2023
HMP	-0.19%	0.07%	1.88%	-0.69%	-0.47%	-0.22%
TANF	0.03%	0.49%	0.00%	-0.50%	-0.01%	0.00%
ABAD	0.01%	0.49%	0.00%	-0.50%	-0.25%	0.00%

Medicaid officials also provided more recent data (FY2022) on administrative costs reported by health plans on an annual survey conducted by the department's external actuarial firm; data are reported as per member-month. We compared FY2019, the first year of the demonstration period, to FY2022, excluding the first two years of the PHE. As shown in Figure 7.1.D, for FY2022, five plans reported decreased HMP administrative costs, while three plans reported administrative costs that were higher by less than 20%, and one plan reported administrative costs that were higher by more than 30%, compared to FY2019. In contrast, for both TANF and

ABAD, two plans reported FY2022 administrative costs that were more than 50% higher than FY2019. As noted in the Interim Evaluation Report, plans can change the methodology of how administrative expenses are allocated across programs and populations which could lead to shifts in reported values.

Figure 7.1.D. Health plan reported administrative dollars (administrative PMPM) percent change FY2019 to FY2022



Summary of response to evaluation question 7.1

Many tasks to administer key HMP demonstration policies are included in contracts for the Medicaid health plans. With the exception of an increase in FY2020, consistent with preparations to implement new HMP policies (work requirements and 48-month policies), HMP administrative costs for the Medicaid health plans have been relatively consistent as a percentage of the overall capitation rate (ranging from 11.81% to 13.76%) since the launch of HMP in 2014.

Evaluation question 7.2: How do trends over time in Medicaid expenditures per member-month for HMP beneficiaries compare to those for beneficiaries in traditional Medicaid managed care?

Hypothesis 7.2: Annual trends in age- and sex-adjusted expenditures per member-month will demonstrate a lower rate of increase over time for beneficiaries in HMP managed care than for beneficiaries in traditional Medicaid managed care.

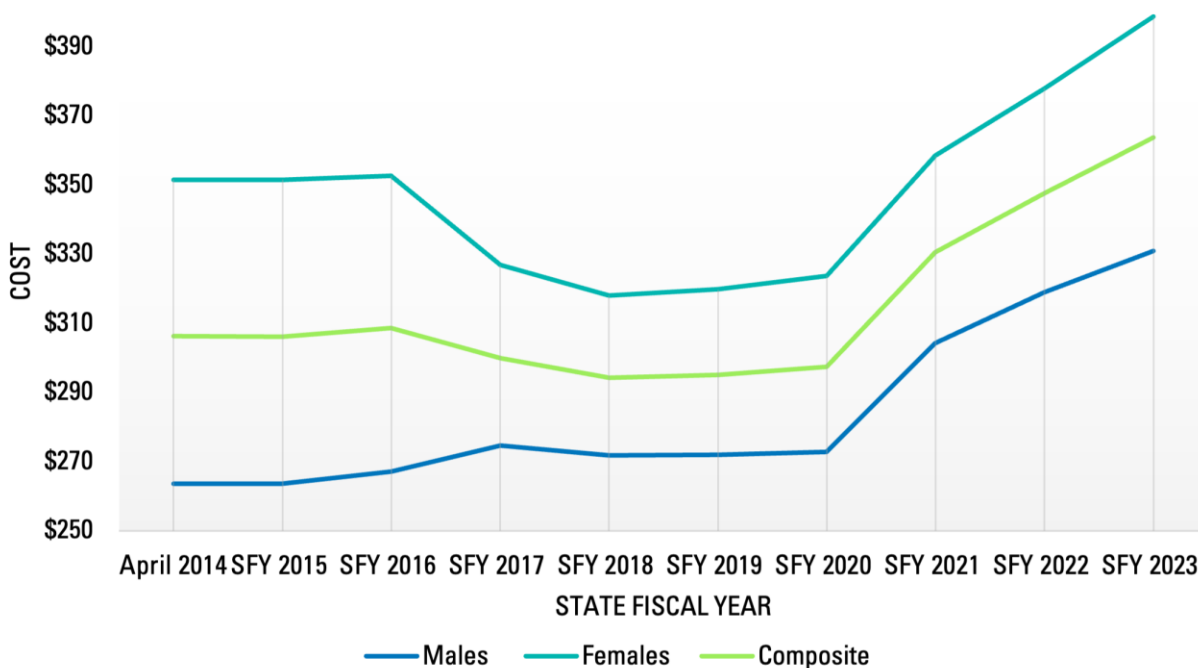
Data source: Key informant interviews (as described in D.2.5)

Results

Health plan contracts include capitated payments per member-month for the costs of medical care. Capitated payments are calculated for each managed care population: HMP, TANF, and ABAD beneficiaries. For this summative report, Medicaid officials provided updated HMP capitation rates for FY2022 and FY2023, including base medical claims costs.

The per member-month capitation rate for HMP medical claims costs overall and for males and females is shown in Figure 7.2.A. The overall capitation rate for medical costs remained relatively consistent over the first six years of HMP. Since FY2020, however, the PMPM capitation rate has increased at a relatively steady yet significant rate across males, females, and overall. The rates were at their highest to date in FY023.

Figure 7.2.A. Base HMP medical claims cost in health plan contracts, FY2014-FY2023



Notes: FY2014-FY2021 values are from the Interim Evaluation Report. Updated data from MDHHS showed dollar amounts for FY2014-FY2021 that differed between 0.15% and 0.63% from data in the Interim Report. FY2014-FY2017 represent aggregate medical and dental costs; subsequent years include medical only.

Comparing trends over time in Table 7.2.B, the base medical claims cost per member-month increased from FY2020 to FY2022 for all managed care population, but at a steeper rate for HMP than for TANF or ABAD.

Table 7.2.B. Year-to-year change in base medical claims cost in Medicaid health plan contracts for HMP compared to TANF and ABAD populations

	FY2017 to FY2018	FY2018 to FY2019	FY2019 to FY2020	FY2020 to FY2021	FY2021 to FY2022
HMP	-1.92%	0.29%	0.81%	11.11%	5.16%
TANF	2.18%	1.92%	1.17%	8.36%	3.70%
ABAD	2.62%	10.65%	-0.79%	8.08%	2.16%

Summary of response to evaluation question 7.2

After several years with little change, HMP medical claims costs increased substantially for HMP beginning in FY2020, and at a somewhat greater rate for HMP compared to the TANF and ABAD managed care populations.

Evaluation question 7.3: How have uncompensated care costs in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?

Hypothesis 7.3a: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that did not expand Medicaid that was observed between 2013 and 2017 will be sustained in subsequent years.

Hypothesis 7.3b: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that expanded Medicaid without a waiver that was observed between 2013 and 2017 will be sustained in subsequent years.

Data source: HCUP Fast Stats Inpatient Stay data (as described in D.2.9); Medicare cost reports (worksheet S-10) (as described in D.2.10)

Results

Our Interim Evaluation Report found that uncompensated care costs in Michigan hospitals had been cut in half since the implementation of HMP. Reductions in uncompensated care were significantly larger in Michigan than in states that did not expand Medicaid. These reductions in uncompensated care accompanied significant reductions in the fraction of hospitalized patients without insurance in Michigan, both in absolute terms and compared with states that did not expand Medicaid. The reduction in the fraction of self-pay patients was smaller in Michigan than in states that expanded Medicaid without a waiver. However, the reductions in hospital uncompensated care did not differ significantly between Michigan and traditional Medicaid expansion states.

For this Summative Evaluation Report, we included the most recent data available including one additional year of HCUP data (2021) and two additional years of Medicare cost report data (2021 and 2022).

Changes in inpatient payer mix (analysis of HCUP Fast Stats data)

Figure 7.3.A presents trends in the percentage of non-elderly adult inpatients with Medicaid in Michigan and the two groups of comparisons states. Prior to 2014, this outcome was increasing for all three groups. Between 2007 and 2014, the trends for the three groups were roughly parallel. The level for Michigan was very similar to the non-expansion states and lower than in the traditional Medicaid expansion states. In 2014, there was a discrete increase in the percentage of patients with Medicaid in Michigan and in the other expansion states, but not in the non-expansion states. By Q4 of 2014, the share of non-elderly adult inpatients covered by Medicaid was 43% in traditional expansion states, 39% in Michigan, and 30% in non-expansion states. In

subsequent quarters, there was a slight positive trend in the Medicaid share in Michigan and the traditional expansion states and a slight negative trend in non-expansion states.

Figure 7.3.A. Fraction of hospital discharges with Medicaid, by state Medicaid expansion status HCUP Data, Adults 19-64, 2003-2021

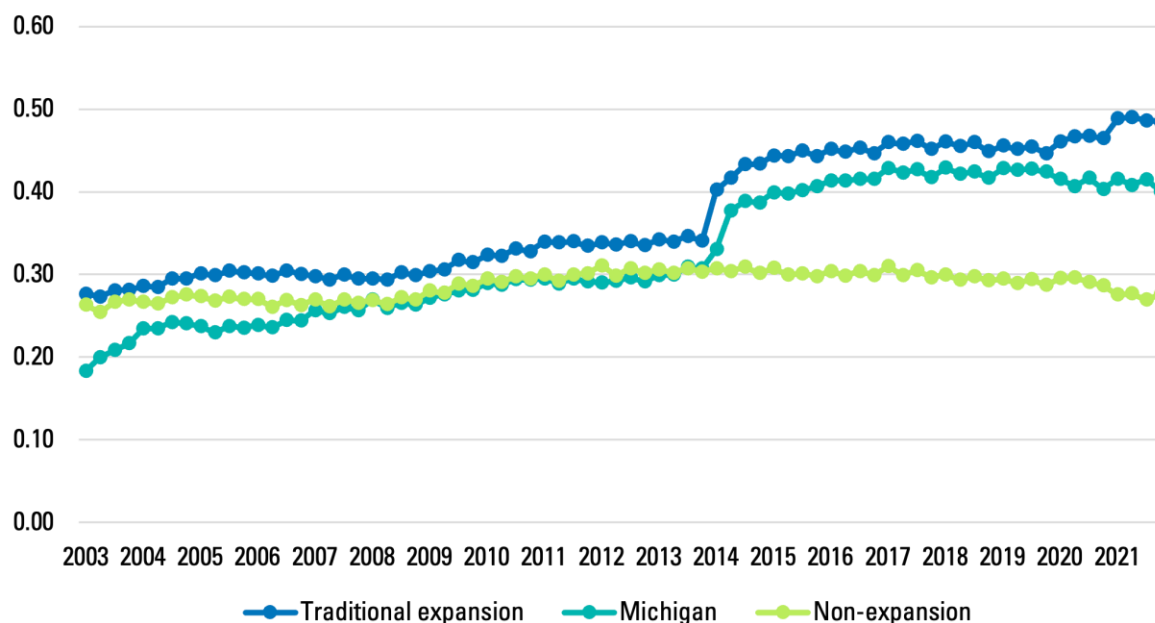


Figure 7.3.B presents trends for privately insured inpatients. For all three groups, the percentage of non-elderly adult inpatients with private insurance was trending downward in the years prior to 2014. In non-expansion states, the percentage ticked up in 2014; for the other two groups private coverage continued to decline without an obvious break in trend.

Figure 7.3.B. Fraction of hospital discharges with private coverage, by state Medicaid expansion status | HCUP Data, Adults 19-64, 2003-2021

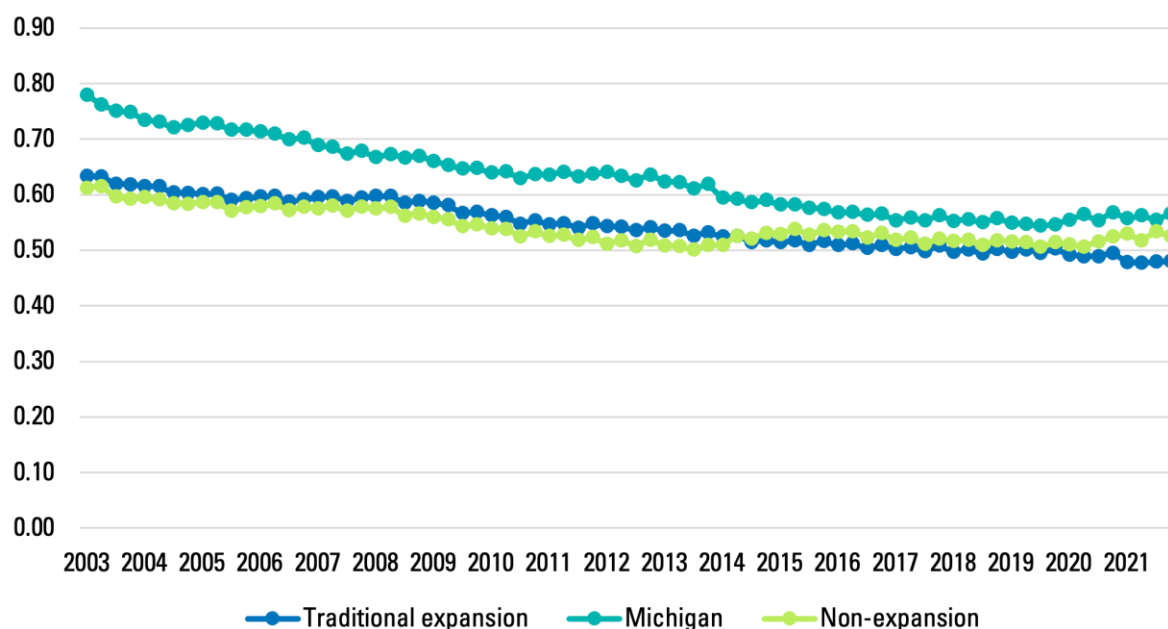


Figure 7.3.C completes the picture by presenting the percentage of non-elderly adult inpatients without insurance (labeled as self-pay in the HCUP data). Prior to 2014, the share of self-pay patients was highest in non-expansion states, lowest in Michigan, and trending upward for all three groups. Similar to the results for Medicaid, we see a discrete shift in 2014 for Michigan and traditional expansion states. Between Q4 in 2013 and Q4 in 2015, the percentage of self-pay inpatients fell by 5.5 percentage points in Michigan and by 8.7 percentage points in traditional expansion states. Relative to the Q4 2013 rate, these changes represent declines of 74% and 69%, respectively. The share of self-pay patients also decreased in non-expansion states, though not as dramatically: by 2.0 percentage points, roughly an 11% decline.

Between Q1 in 2016 and Q1 in 2021, the percentage of non-elderly adult inpatients without insurance in non-expansion states increased by roughly 3 percentage points, from 16.3% to 19.5%. For Michigan and traditional expansion states, the fraction uninsured was essentially flat, changing by less than 1 percentage point. Thus, the data in Figure 7.3.C provide visual support for Hypotheses 7.3a and 7.3b.

Figure 7.3.C. Fraction of hospital discharges that are self-pay, by state Medicaid expansion status | HCUP Data, Adults 19-64, 2003-2021

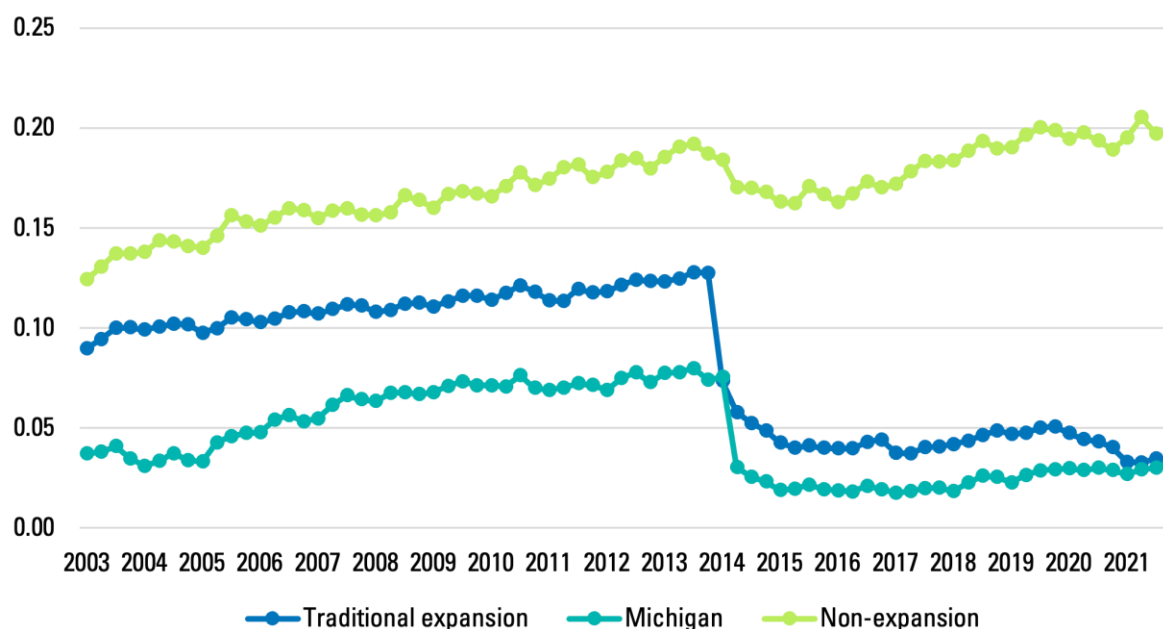


Table 7.3.D presents corresponding difference-in-differences estimates. The first three columns present results comparing Michigan to the non-expansion states. The results show that after 2014, the percentage of non-elderly adult inpatients with Medicaid increased by 11.7 points in Michigan relative to non-expansion states. The percentage of privately insured and self-pay patients fell significantly in Michigan relative to non-expansion states.

Columns 4 through 6 of Table 7.3.D present estimates from difference-in-differences models that compare Michigan to traditional expansion states. The results in column 4 indicate that the increase in the percentage of non-elderly adult inpatients with Medicaid was essentially the same in Michigan and traditional expansion states: an increase of nearly 12 percentage points. The percentage of patients with private coverage decreased both in Michigan and in traditional expansion states after 2014 (as shown in Figure 7.3.B), and this decline was about 2.6 percentage points greater in Michigan than in traditional expansion states. The percentage of patients who were self-pay declined more in traditional non-expansion states than in Michigan after 2014, leading to a relative “increase” of 3.0 percentage points in self-pay patients in Michigan from the difference-in-difference model (column 6 of Table 7.3.D).

Table 7.3.D. Difference-in-differences estimates HCUP Fast Stats data, 2010 - 2021

Outcome is share with:	Michigan vs. Non-expansion states			Michigan vs. Traditional expansion states		
	(1) Medicaid	(2) Private	(3) Self-pay	(4) Medicaid	(5) Private	(6) Self-pay
(Post-2014)	0.1182***	-0.0696***	-0.0487***	-0.0040	-0.0262***	0.0302***
* Michigan	(0.0046)	(0.0040)	(0.0034)	(0.0068)	(0.0043)	(0.0052)
Sample n	548	548	548	960	960	960
Mean in MI, 2013	0.304	0.619	0.077	0.304	0.619	0.077

Standard errors in parentheses

*p<0.05, **p<0.01, ***p<0.001

Changes in hospital uncompensated care (analysis of HCRIS data)

Figure 7.3.E presents trends in the mean level of uncompensated care per hospital measured in millions of dollars for the three groups of states, while Figure 7.3.F reports trends in the mean of uncompensated care measured as a share of total hospital expenditures. Whether measured in dollars or as a percentage of total expenditures, uncompensated care was lower in Michigan than the other two groups throughout the full analysis period. After 2014, uncompensated care fell in Michigan and the traditional expansion states. In non-expansion states, uncompensated care continued to trend upward.

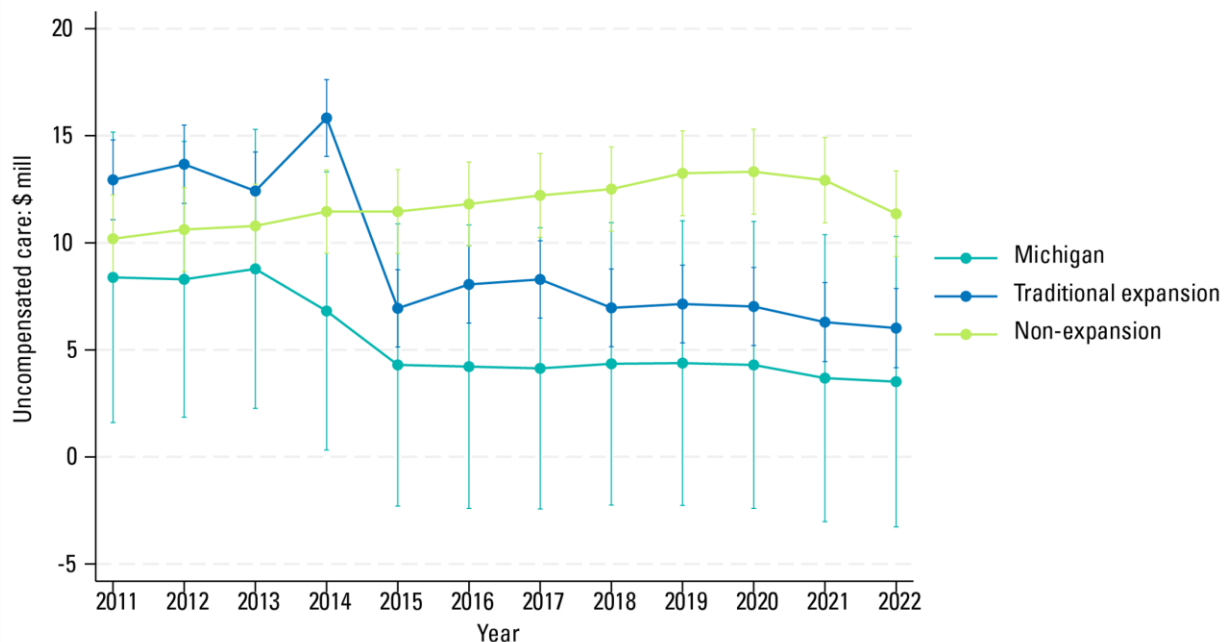
Figure 7.3.E. Mean uncompensated care costs – Michigan vs. Other states, 2011-2022

Figure 7.3.F. Uncompensated care as percent of expenses – Michigan vs. Other states, 2011-2022

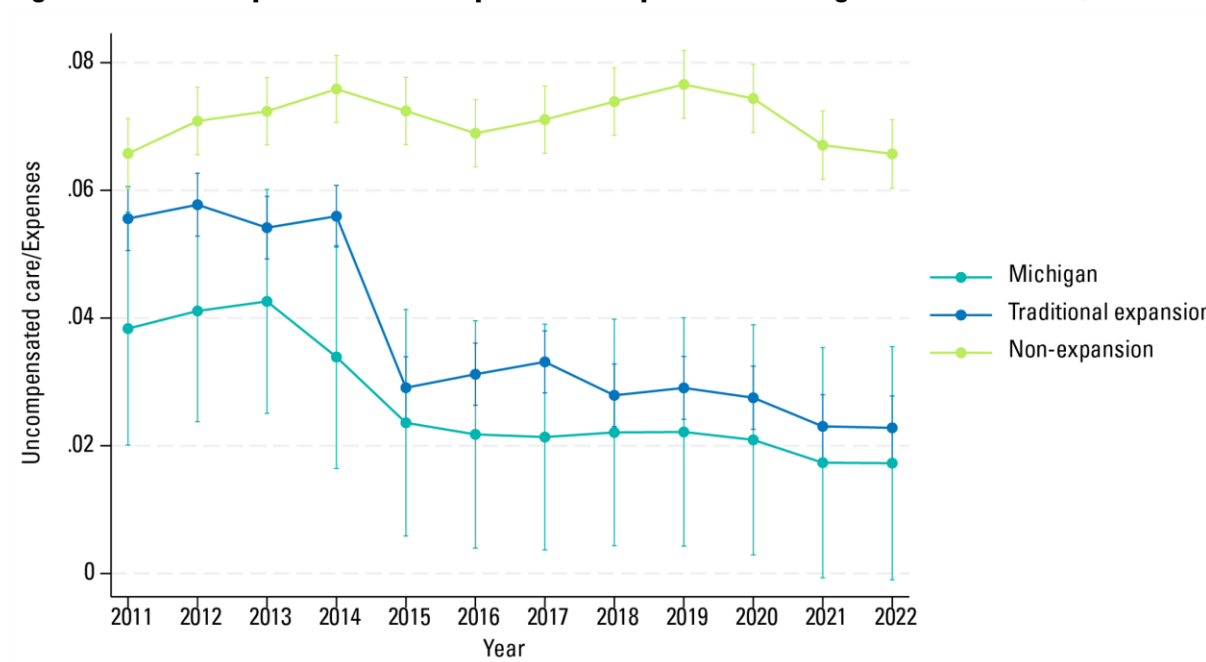


Table 7.3.G presents estimates from difference-in-differences regression models. The results in column 1 indicate a significant decline in uncompensated care in Michigan relative to non-expansion states. When the outcome is measured in dollars, the results indicate that the implementation of HMP was associated with an average decline in uncompensated care of over \$5 million per year. Measured as a percentage of total hospital expenses, the estimated effect is a reduction of 2 percentage points in Michigan. Relative to Michigan's pre-2014 mean of 4 percentage points, this is a 50% decrease. The results in columns 3 and 4 indicate that there was not a statistically significant difference in the change in uncompensated care after 2014 between Michigan and the traditional expansion states.

Table 7.3.G. Hospital uncompensated care difference-in-differences estimates

Outcome measured in:	Michigan vs. Non-expansion states		Michigan vs. Traditional expansion states	
	\$2020 (millions)	% of expenses	\$2020 (millions)	% of expenses
	(1)	(2)	(3)	(4)
(Post-2014)	-5.725***	-0.020***	0.905	0.006
* Michigan	(1.038)	(0.002)	(1.452)	(0.004)
Sample n	18,355	18,351	21,290	21,225
Mean in MI, 2003	8.782	0.043	8.782	0.043

*p<0.05, **p<0.01, ***p<0.001

Standard errors in parentheses.

Summary of response to evaluation question 7.3

Uncompensated care costs in Michigan hospitals have been reduced by half since HMP was implemented. Reductions in uncompensated care were significantly larger in Michigan than in states that did not expand Medicaid, and did not differ significantly from states that expanded Medicaid without a waiver. These reductions in uncompensated care accompanied significant reductions in the fraction of hospitalized non-elderly adults who lacked insurance in Michigan, both in absolute terms and compared with states that did not expand Medicaid. The reduction in the fraction of self-pay patients was smaller in Michigan than in states that expanded Medicaid without a waiver.

Evaluation question 7.4: How does HMP support new or broadened initiatives to address social determinants of health for low-income adults in Michigan?

Hypothesis 7.4: State officials and safety-net providers will describe specific examples of health-promoting initiatives that build on HMP's continuity, breadth of coverage, and primary care emphasis.

Data source: Key informant interviews (as described in D.2.5)

Results

The results from the key informant interviews focused on the social impact of HMP were summarized in detail for the Interim Evaluation Report. No additional analyses based on this data source were completed for the Summative Evaluation Report.

Summary of response to evaluation question 7.4

As stated in the Interim Evaluation Report, innovations in the HMP enrollment process led to more streamlined and integrated enrollment in other programs, in addition to HMP, that address SDOH. HMP coverage for large numbers of adults, including new populations not previously covered by Medicaid, increased access to reimbursable care, and contributed to interagency partnerships and coalitions and innovations in programs and service delivery, including those that address SDOH, that could be sustained over time. This expanded coverage contributed to the financial stability of safety net provider organizations and the ability to expand critical services to meet growing needs.

G. Conclusions

This evaluation was designed to assess two HMP policies and four broad goals of the overall demonstration that reflect the MDHHS objectives for HMP. We present conclusions below for each of these evaluation areas.

Healthy Behaviors Incentives Program

The Healthy Behaviors Incentives Program was intended to support the HMP objectives of strengthening beneficiary engagement and personal responsibility, and encouraging individuals to seek preventive care, adopt healthy behaviors, and make responsible decisions about their

healthcare. This evaluation observed modest changes to utilization patterns (e.g., increased use of preventive services, decreased ED visits) suggesting greater beneficiary engagement in health and more responsible decision making about healthcare. However, there was little evidence linking these changes to the HRA or the Healthy Behaviors Incentives Program. Therefore, the evaluation findings suggest that the HRA component of the Healthy Behaviors Incentives Program had a limited effect in achieving these objectives.

Some beneficiaries and PCPs described the HRA as an opportunity to identify and set goals for health behavior change, particularly for beneficiaries who have been without a primary care provider for an extended period, or for patients new to a primary care practice. However, HRA completion was uneven, which may have reflected the inconsistency in how it was introduced to beneficiaries and providers. Some primary care settings (often FQHCs) monitored which patients were due for an HRA and were proactive about encouraging completion. In other primary care settings, beneficiaries were responsible for initiating the process of completing an HRA.

Longitudinal analyses of HMP survey cohorts found that many beneficiaries with substantial or moderate health burden at baseline reported improvement in their health burden in subsequent years. PCPs emphasized that health improvement was often prompted by behavior change, which requires sustained engagement and support. However, this engagement and behavior change were not well facilitated through the HRA framework. The HRA form did not prompt PCPs to identify patients who should receive sustained engagement, which could include working with a care manager, social worker, or community health worker in the practice; engaging with a health promotion program (e.g., diet, exercise or smoking cessation programs); and regular follow-up visits with the PCP. Moreover, in most primary care practices, the HRA form was not integrated into the practice's electronic medical record (EMR), so it did not enable PCPs to track progress over time or recall behavior change goals chosen by the beneficiary in the prior year. Without EMR integration, the clinical usefulness of the HRA was limited.

Consistent with our evaluation of the first waiver period (2014-2018), analyses of administrative data found an association between HRA completion and receipt of preventive services. However, the magnitude of this association was small compared to the association between continuity of primary care visits and receipt of preventive services.

An important feature of the Healthy Behaviors Incentive Program was its financial incentive. Our HMP survey found that less than one-third of beneficiaries knew they could get a reduction in their HMP cost sharing by completing an HRA or healthy behavior. PCPs were similarly unaware of this financial incentive. Interviews with beneficiaries confirmed that the Healthy Behaviors Incentives Program was typically not the primary motivator of their engagement in healthy behaviors. While many beneficiaries recalled completing at least one HRA, most were unaware of financial incentives associated with doing so; among the few who knew about the possibility of a financial reward, they said it was not their reason for adopting a healthy behavior goal. Instead, most reported that self-motivation or encouragement from their providers supported their adoption of healthy behaviors.

The state modified the Healthy Behaviors Incentives Program to broaden the activities that qualified for the incentive, including claims evidence of preventive service receipt and

participation in health plan wellness programs. In HMP surveys conducted after these changes were implemented, we found that most beneficiaries were unaware of the incentives, which is consistent with findings from the evaluation of the first waiver period (2014-2018). Communication about the updates to the Healthy Behaviors Incentives Program may have been overshadowed by the information about the community engagement requirement and then by the COVID-19 PHE. Moreover, changes in the financial incentives over time (e.g., the discontinuation of program-wide gift cards⁶⁸) and income-based differences in the incentive structure may have contributed to beneficiaries' general lack of awareness about the financial incentives. For example, beneficiaries who were under 100% FPL and did not reach the threshold of paying 2% of their income in copays did not receive a financial incentive.

The Healthy Behaviors Incentives Program was discontinued on January 1, 2024, after the Section 1115 waiver expired on December 31, 2023. MDHHS is working with the Medicaid health plans to develop financial incentives for beneficiaries who demonstrate improved health outcomes, engage in healthy behaviors, or utilize health care services that improve health outcomes.⁶⁹ This new approach may promote further innovation in how healthy behaviors are encouraged and incentivized for patients and providers. Based on our evaluation findings related to the positive association of preventive care with primary care access and continuity, we strongly recommend that this revised approach emphasize the PCP-patient relationship and ensure ongoing access to primary care services. Future evaluations should seek to understand whether beneficiaries are aware of and able to access the new options available to promote healthy behaviors and support health improvements as implemented by their health plans.

Cost-sharing

HMP cost-sharing was intended to support the HMP objectives of strengthening beneficiary engagement and personal responsibility and encouraging individuals to make responsible decisions about their healthcare. The evaluation findings suggest that the HMP cost-sharing features had a limited effect in achieving these objectives.

The MI Health Account statement was the primary method of communicating with beneficiaries about HMP cost-sharing. Although most beneficiaries recalled receiving a MI Health Account statement in the past year, few understood how the amount owed was calculated; most said they simply checked to see what they owed.

Our analysis of cost-share data found that beneficiaries whose cost-share obligations included monthly fees had higher rates of full payment than those with episodic service-related co-payments. The consistency of the monthly fees may have allowed beneficiaries to plan for and achieve a more consistent payment pattern. Additionally, beneficiaries who did not have regular obligations may have had difficulty understanding how their amount owed was calculated.

Our Interim Evaluation Report suggested that the state consider modifying HMP cost-sharing policies to increase payment compliance and improve beneficiary understanding. Now that updated cost-sharing policies are in effect, including changes to HMP co-payment amounts and

⁶⁸ [MDHHS Medical Care Advisory Council, June 18, 2018 Meeting Minutes](#)

⁶⁹ [Michigan Medicaid Policy Bulletin \(MMP 23-71\): Healthy Michigan Plan Program Changes, November 2023](#)

collection processes and discontinuation of MI Health Accounts and MI Health Account monthly fees for those with incomes above 100% FPL, it will be important to assess whether these changes lead to improved beneficiary understanding and better payment compliance. Future evaluations should also monitor use of services that have a cost-share component, both to observe expected or positive changes (e.g., a decrease in non-emergent ED visits) and to monitor for adverse consequences (e.g., gaps in medication refills for beneficiaries with chronic disease).

Reduce uninsurance

A broad goal of the HMP demonstration was to improve access to healthcare for uninsured or underinsured low-income Michigan residents. Findings from this evaluation suggest that the HMP demonstration has been highly effective in achieving this objective.

The changes in insurance coverage we observed in the first few years after HMP implementation were sustained through 2022. In particular, Michigan adults ages 19 through 64 experienced significant and substantial gains in Medicaid coverage and reductions in the fraction uninsured compared with those in states that did not expand Medicaid. These effects were concentrated among low-income adults and consistent across all regions of the state.

It is important to note that our evaluation period ended while Michigan was in the middle of “unwinding” the maintenance of enrollment policies associated with the COVID-19 PHE. Future evaluations should assess the impact of the return to a regular cycle of Medicaid renewals, including trends in uninsurance.

Promote primary care/responsible use of services

An objective of the HMP demonstration was to encourage individuals to seek primary care and preventive services and make responsible decisions about their healthcare. Findings from this evaluation show that the HMP demonstration has been effective in achieving this objective.

Consistently, our HMV surveys have found that nearly all beneficiaries reported having a known primary care provider and most reported having a primary care visit in the prior year.

In HMV surveys, beneficiaries who initiated HMP enrollment near or during the PHE were more likely to report difficulty accessing primary care compared to beneficiaries with earlier HMP initiation. It seems likely that among the long-term enrollees, having an established primary care home may have buffered HMP beneficiaries from the challenges of constrained healthcare resources during the PHE.

Many PCPs described practice-based strategies to support HMP beneficiaries in responsible use of primary care services. Some practices have adjusted their scheduling practices to offer more same-day appointments and after-hours appointments. Many practices have protocols in place to contact patients after an ED visit, utilizing this opportunity to educate patients about using the primary care practice as the first-choice option in the future. Many primary care practices have care managers and community health workers conducting regular outreach to high-need beneficiaries to support their self-management of health conditions, identify problems with social determinants of health, and avoid unnecessary ED visits.

Our analysis of administrative data demonstrated that among beneficiaries with a primary care visit in their first year of enrollment, ED rates decreased in subsequent years. This finding may have been related to health conditions being diagnosed and treated, as well as ensuring that beneficiaries have a source of care when they feel unwell. However, the role of the primary care office in decreasing unnecessary ED use warrants further examination. In HMV surveys, only one-quarter of beneficiaries reported contacting their PCP before going to the ED; many noted that their PCP office was closed at the time they needed care, suggesting that after-hours advice was either not available or not known to the beneficiary. Challenges with access to primary care, including lack of appointments, prompted some beneficiaries to seek ED care. Overall, our evaluation findings highlight the importance of primary care access and continuity. Future evaluations should assess beneficiaries' ability to obtain timely primary care appointments, perhaps in conjunction with new federal standards for monitoring access to care,⁷⁰ and explore beneficiaries' understanding of options to receive after-hours advice.

Support financial well-being

A goal of the HMP demonstration was to support the financial well-being of beneficiaries. Findings from this evaluation provide qualitative evidence that the HMP demonstration has been effective in achieving this objective. Beneficiary and key informant interviews highlighted many examples of HMP having a positive impact on beneficiaries' financial well-being, including the role of coverage in minimizing out-of-pocket health care costs and worries and freeing up financial resources for other life needs such as food, transportation, and housing. Notably, longitudinal analyses of HMV surveys found that individuals with improved health burden were more likely to gain new employment; this is strong evidence of the positive impact of HMP.

New analyses of credit report data demonstrated significant and consistent reductions in medical debt in collections for beneficiaries up to seven years post-enrollment. In addition, beneficiaries who enrolled in 2014 and 2015 experienced reductions in non-medical debt in collections and in rates of subprime credit score, while beneficiaries who enrolled in 2016 and 2017 experienced increases in both of these outcomes. Small increases in rates of recent bankruptcy were also noted after HMP enrollment. Future evaluations should assess financial well-being among current and former beneficiaries in the period after the PHE, with a particular focus on those who lost coverage when eligibility renewals were reinstated.

Sustain the safety net and support coordinated strategies to address social determinants of health

An objective of the HMP demonstration was to reduce uncompensated care to sustain the safety net and to support coordinated strategies to address social determinants of health. Findings from this evaluation indicate that the HMP demonstration has been highly effective in reducing uncompensated care for hospitalized patients and effective in supporting coordinated strategies to address social determinants of health.

Changes in insurance coverage at the population level were reflected in changes in the payer mix for inpatient hospitalizations, whereby increases in Medicaid as a source of payment were

⁷⁰ [Federal Register \(89 FR 40542\): Medicaid Program; Ensuring Access to Medicaid Services, May 10, 2024](#)

associated with a significant decline in the fraction of discharges coded as self-pay. Hospital uncompensated care in Michigan was reduced by half following HMP implementation, a stark contrast to the experience of states that did not expand Medicaid, which experienced no decline in uncompensated care. The changes in hospital payer mix and hospital uncompensated care in the early years after HMP implementation were sustained through 2022. Future evaluations should assess trends in uncompensated care after the end of the PHE.

Key informant interviews highlighted numerous examples of HMP's key role in fostering collaboration and coordination of health and human services organizations, including safety net providers, health plans, healthcare systems, and social service organizations. This role has been particularly important for sustaining safety-net providers, enabling them to implement and maintain innovative programs focused on SDOH by addressing both health care and social needs of beneficiaries.

HMP coverage for large numbers of adults, including new populations not previously covered by Medicaid, increased access to reimbursable care, contributed to interagency partnerships and coalitions and innovations in programs and service delivery, including those that address SDOH, that could be sustained over time. This expanded coverage contributed to the financial stability of safety-net provider organizations and the ability to expand key services to meet growing needs, including those for substance use disorders and COVID-19. HMP increased access to care and was associated with improved health and other outcomes for beneficiaries, many of whom were previously uninsured or unconnected to services addressing SDOH. During the COVID-19 pandemic, HMP maintained access to coverage and care for beneficiaries and offered coverage for new beneficiaries affected by unemployment and coverage losses. Partnerships among diverse organizations enhanced outreach and communication about initiating and maintaining enrollment and meeting HMP requirements. Future evaluations should monitor how HMP health plans and providers are working with MDHHS, other state agencies, and community organizations to address SDOH among HMP beneficiaries.

Trends in the state's costs for HMP have facilitated its sustainability. Capitation rates for administrative claims costs have remained relatively stable for the HMP population since 2016. However, medical costs during the PHE increased at a steeper rate in HMP than in other Medicaid benefit programs. Future evaluations can continue to assess these cost trends and the main drivers of them, particularly as innovative but expensive new therapies (e.g., GLP-1 receptor agonists for diabetes and obesity) become more widely available.

H. Interpretations, and Policy Implications and Interactions with Other State Initiatives

Beyond the mostly positive findings tied to specific evaluation questions, HMP has been effective because it undergirds many other initiatives to promote health and health care for adults in Michigan. These initiatives include other Medicaid demonstration projects, such as the Section 1115 behavioral health demonstration focused on diagnosis and treatment of substance use disorders (SUD). The majority of Medicaid beneficiaries in Michigan receiving SUD treatment are enrolled in HMP. Michigan also has two integrated health homes programs - the Behavioral Health Home for serious mental illness/serious emotional disturbance and the Opioid Health

Home for opioid use disorder. HMP beneficiaries comprise a substantial number of Health Homes participants.

Because of its large enrollment, HMP facilitates the inclusion of low-income adults in the Medicaid Health Equity Project. This is a coordinated effort with the Medicaid health plans to address racial disparities through evidence-based interventions.

Many public health initiatives rely on HMP to cover recommended services for a substantial proportion of low-income adults. These initiatives include public health programs to treat hepatitis C and to promote adult immunizations including influenza, shingles, and COVID-19 vaccines.

Recent initiatives to facilitate healthcare coverage for individuals being released from prison rely on HMP. These programs allow prisoners to apply for HMP in advance of their release date, so they are covered and able to begin services as soon as they are released, including mental health and SUD treatment services and medications.

We identified two key policy implications of HMP related to other state health programs. First, because HMP covers a large number of low-income non-elderly adults (approximately 10% of the total Michigan population during the Public Health Emergency), the costs of other initiatives to extend or expand coverage are more manageable for the state. For example, on April 1, 2022, Michigan extended postpartum Medicaid coverage for pregnant women from 60 days to 12 months.⁷¹ Similarly, the state has expanded the Children's Special Health Care Services program to cover adults with sickle cell disease.⁷² Additionally, effective October 1, 2023, Michigan extended coverage under the Children's Special Health Care Services program from age 21 up to age 26.⁷³ Because many eligible adults with qualifying conditions for these three policies are already covered under HMP, the state funds required to cover the remaining adults are more feasible.

Second, because so many adults are now covered under HMP, Medicaid policies designed to expand access to specific services will reach many more people. For example, a 2022 policy update to broaden Medicaid beneficiaries' access to oral contraceptives,⁷⁴ a 2023 policy expanding the array of covered dental services,⁷⁵ and a 2024 policy expanding coverage of community health worker services⁷⁶ apply to a substantially larger number of adults who are enrolled in Medicaid through the Healthy Michigan Plan.

⁷¹ [Health and Aging Services Administration Bulletin \(HASA 22-08\): Postpartum Extension from 60 Days to 12 Months, April 2022](#)

⁷² [Health and Aging Services Administration Bulletin \(HASA 22-14\): Children's Special Health Care Services \(CSHCS\) Eligibility for Adults Over 21 Years of Age, June 2022](#)

⁷³ [Michigan Medicaid Policy Bulletin \(MMP 24-10\): Children's Special Health Care Services \(CSHCS\) Eligibility Expansion up to Age 26, April 2024](#)

⁷⁴ [Health and Aging Services Administration Bulletin \(HASA 22-12\): Update to Contraceptive Supply Limit, April 2022](#)

⁷⁵ [Michigan Medicaid Policy Bulletin \(MMP 23-13\): Changes to Medicaid Dental Coverage, March 2023](#)

⁷⁶ [Michigan Medicaid Policy Bulletin \(MMP 23-74\): Medicaid Coverage of Community Health Worker \(CHW\)/Community Health Representative \(CHR\) Services, December 2023](#)

I. Lessons Learned and Recommendations

Regarding the four specified goals of the overall demonstration, we learned that HMP was highly effective in:

- Reducing uninsurance
- Promoting primary care
- Supporting financial well-being
- Sustaining the safety net and supporting strategies to address social determinants of health

Based on the success in achieving these four main goals of the overall demonstration, we recommend that Medicaid expansion through the Healthy Michigan Plan continue with strong support beyond the recently completed Section 1115 waiver demonstration period.

Our evaluation findings also provide valuable insights for other states' Medicaid programs that may be considering implementing the features that were part of HMP during the Section 1115 waiver periods. Across several components of our evaluation, we learned that the HRAs and healthy behaviors incentives were not well understood by many HMP beneficiaries and were not viewed as clearly effective by primary care providers. Over time, MDHHS implemented several changes to the Healthy Behaviors Incentives Program⁷⁷ in response to our previous evaluation findings and feedback from HMP beneficiaries, providers, and health plans. Some changes facilitated the completion of HRA forms, including implementing streamlined secure statewide HRA submission processes for providers and removing the lab results portion of the HRA form. Other changes facilitated beneficiary participation in the Healthy Behaviors Incentives Program such as additional mechanisms to document healthy behaviors through claims/encounter data for preventive services and through participation in wellness programs sponsored by Medicaid health plans. To improve understanding of the Healthy Behaviors Incentives Program, MDHHS updated beneficiary guidance and worked with an external partner to educate providers.

Given the challenges with informing beneficiaries and with facilitating usefulness to providers, we offer the following recommendations to states considering incorporating HRAs and healthy behaviors incentives into a Medicaid expansion program:

- Expand the focus from completing the HRA form to supporting sustained engagement in health promotion over time.
- Facilitate mechanisms for providers to integrate program tools into EMRs and other practice systems.
- Plan for ongoing communication about program goals, processes, and incentives to beneficiaries and providers.

We also learned that beneficiary understanding of HMP cost-sharing policies was uneven and generally incomplete, even with the simplified MI Health Account statement implemented by MDHHS in 2017 as well as subsequent changes. Thus, if incorporating cost-sharing into a Medicaid expansion program:

- Implement a simplified approach with (a) income-based fees and/or a method of charging equal quarterly amounts so that beneficiaries know more generally what costs to expect,

⁷⁷ [Medical Service Administration Bulletin \(MSA 18-05\): MI Marketplace Option and Healthy Michigan Plan Updates, April 2018.](#)

and (b) co-payments for a small number of high-priority services (e.g., ED visits) so that beneficiaries can better understand the link between service utilization and cost-share obligations.

In conducting this evaluation, we learned the value of a longitudinal approach to our Healthy Michigan Voices telephone surveys and of offering the surveys in multiple languages (Arabic, English, and Spanish). We fielded baseline surveys with three cohorts of HMP enrollees using standard inclusion criteria and recruitment in their second year of HMP enrollment; comparing baseline survey responses from the three cohorts allowed us to explore differences over time in beneficiaries' early experiences with HMP. We also fielded follow-up surveys with HMP Cohorts 1 and 2, allowing us to track individuals over time. This was particularly useful for characteristics not available in administrative claims, such as employment and health burden.

The Healthy Michigan Plan has provided a reliable source of insurance coverage and access to care to many Michigan residents during the COVID-19 pandemic, which posed substantial risks to their health and financial well-being. In the most recent Section 1115 waiver demonstration period from 2019 through 2023, HMP met its four key goals despite the pandemic challenges. While some of the key features that were the focus of this evaluation have ended, many findings from various stages of this evaluation spanning 10 years have been used to inform state policy and will continue to be useful to our state, to Medicaid health plans, and to other states considering or implementing a Medicaid expansion program with similar features. It is evident from this evaluation that Medicaid expansion has become a key component of the state's healthcare system and safety net over the past decade and that the Healthy Michigan Plan is likely to continue to play a vital role in promoting and supporting health and well-being in Michigan into the future.

J. Attachments

- CMS-Approved Evaluation Design
- Administrative Data Appendix
- Beneficiary Survey Appendix
- Credit Report Data Appendix
- BRFSS Appendix

Healthy Michigan Plan
Section 1115 Demonstration
Summative Evaluation Report
Attachments

1. CMS-Approved Evaluation Design
2. Administrative Data Appendix
3. Beneficiary Survey Appendix
4. Credit Report Data Appendix
5. BRFSS Appendix

**Healthy Michigan Plan
Final Evaluation Design – June 2021**

June 24, 2021

**University of Michigan
Institute for Healthcare Policy & Innovation**

Healthy Michigan Plan Evaluation Design Narrative

A. General Background Information about the Demonstration and Evaluation

The Centers for Medicare & Medicaid Services (CMS) approved the renewal of the Healthy Michigan Plan (HMP) Section 1115 Demonstration Waiver (Project No. 11-W-00245/5) on December 21, 2018, for the period January 1, 2019-December 31, 2023. The waiver provided approval for the State to require the following:

- (1) Beneficiaries age 19-62 to complete and report 80 hours per month of community engagement as a condition of eligibility, and
- (2) Beneficiaries with incomes $>100\%$ of the Federal Poverty Level (FPL) who have been enrolled in the demonstration ≥ 48 months to (a) pay a monthly premium of 5% of income, and (b) complete a Health Risk Assessment (HRA) at redetermination or complete a healthy behavior in the previous 12 months as conditions of eligibility.

The community engagement policy was implemented on January 1, 2020. On March 4, 2020, the U.S. District Court vacated CMS approval of Michigan's community engagement waiver. The 48-month policy, consisting of the monthly premium and HRA/healthy behavior requirements, was slated to begin October 1, 2020, but was delayed due to the maintenance of effort requirements of Section 6008 of the Families First Coronavirus Response Act during the public health emergency (FFCRA) related to the COVID-19 pandemic.

This updated evaluation design reflects these modifications to the State's implementation plan. As a result, this evaluation design focuses on current HMP policies (cost-sharing and Healthy Behaviors Incentives program) and requirements expected to be implemented later in this waiver period (48-month policy). Activities to evaluate the impact of the community engagement requirement have been removed in response to the U.S. District Court decision as noted above. Activities to evaluate the impact of the 48-month policy are included, with a delayed timeline to reflect the uncertain date of implementation; these activities will be limited to descriptive trend analyses of administrative data to characterize enrollment patterns in individuals affected by the policy if the new 48-month policy is implemented after January 2023 because there otherwise would be insufficient time to complete the evaluation activities related to surveys of HMP beneficiaries affected by this policy for the summative report to be submitted to MDHHS in July 2024.

A.1. Overview and history of the demonstration

On April 1, 2014, Michigan expanded its Medicaid program under the Affordable Care Act (ACA) to include adults with incomes up to 133% FPL. To accompany this expansion, the Michigan Adult Benefits Waiver (ABW) was amended and transformed to establish HMP, through which the State intended to test innovative approaches to beneficiary cost-sharing and personal responsibility. HMP is administered through the Michigan Department of Health and Human Services (MDHHS). HMP beneficiaries receive a full health care benefit package, which includes all of the ACA-mandated essential health benefits. Most are enrolled in a managed care benefit (HMP-MC) and choose or are assigned a primary care provider through one of the State's Medicaid Health Plans.

Since 2014, to encourage beneficiary engagement and personal responsibility, HMP-MC beneficiaries with incomes above 100% FPL have been required to pay a monthly fee (formerly known as contributions) equal to 2% of their household income, similar to an insurance premium. In addition, all beneficiaries with incomes from 0 to 133% FPL have been required to pay service-related co-payments. Each HMP-MC beneficiary has a MI Health Account that tracks fees, co-pays, and health care expenditures. This cost-sharing policy was modified effective January 1, 2020, when medically frail beneficiaries became exempt from both fees and service-related co-payments.

To promote seeking preventive care, adopting healthy behaviors, and making responsible decisions about health care use, beneficiaries have opportunities to reduce their cost-sharing by participating in the Healthy Behaviors Incentives program, designed to encourage beneficiaries to maintain and implement healthy behaviors in collaboration with their primary care provider via a standardized Health Risk Assessment (HRA). Additional mechanisms to document healthy behaviors through claims/encounter data were later added to include beneficiaries who completed healthy behavior activities but did not submit an HRA.

In December 2017, MDHHS submitted an application to extend the HMP demonstration for an additional five years. In September 2018, the State applied to amend certain elements of HMP to comply with new provisions in state law, and these policy changes were approved by CMS in December 2018. Under the 48-month policy, beneficiaries with household incomes between 100% and 133% FPL and cumulative HMP enrollment of ≥ 48 months would be required to meet two conditions to maintain HMP eligibility. The first condition requires monthly premiums of 5% of their income in order for beneficiaries to become more familiar with how commercial coverage operates; the premiums would represent the beneficiary's full obligation, with no additional co-payments. Because the 5% premium is designed as a requirement to maintain eligibility, the evaluation team expects it will lead to higher rates of premium payment among those who are subject to this requirement. The second condition is completion of an HRA or documented engagement in a specified healthy behavior (e.g., cancer screening, influenza vaccination) within the twelve-month period prior to the annual eligibility re-determination deadline. Beneficiaries exempt from the new 48-month requirements include pregnant women, beneficiaries identified or self-attested as medically frail, beneficiaries not enrolled in a Medicaid Health Plan, and beneficiaries enrolled in the Flint Michigan Section 1115 demonstration. American Indian/Alaska Natives and children under 21 years of age are exempt from paying premiums but they will still be required to meet the HRA/healthy behavior requirement.

Implementation of the 48-month policy has been delayed, as noted above. Until implementation, HMP beneficiaries continue to be subject to the cost-sharing and HRA/healthy behavior policies described above.

A.2. Population groups impacted by the demonstration

HMP beneficiaries enrolled in managed care, unless otherwise exempt, will continue to be subject to the cost-sharing responsibilities and HRA/healthy behavior incentives as described in the HMP Special Terms & Conditions (STC 22(d)) from CMS.

HMP beneficiaries with incomes 100-133% FPL and cumulative HMP enrollment of ≥ 48 months, unless otherwise exempt, will be subject to the new policy of monthly 5% premiums and annual HRA/healthy behavior requirements, as approved by CMS.

A.3. Goals of the demonstration

As stated by MDHHS, the overarching goals of the HMP demonstration are to increase access to quality health care, encourage the utilization of high-value services, promote beneficiary adoption of healthy behaviors, and implement evidence-based practice initiatives.

The main objectives for HMP stated by MDHHS include:

- Improving access to healthcare for uninsured or underinsured low-income Michigan residents;
- Improving the quality of healthcare services delivered;
- Reducing uncompensated care;
- Strengthening beneficiary engagement and personal responsibility;
- Encouraging individuals to seek preventive care, adopt healthy behaviors, and make responsible decisions about their healthcare;
- Supporting coordinated strategies to address social determinants of health in order to promote positive health outcomes, greater independence, and improved quality of life;
- Helping uninsured or underinsured individuals manage their health care issues;
- Encouraging quality, continuity, and appropriate medical care

A.4. Other relevant contextual factors

HMP was initially implemented in April 2014 in the context of broader changes to health insurance markets in Michigan and in other states under the Affordable Care Act. In particular, the health insurance exchange, associated premium tax credits, and individual mandate all affected consumer and employer behavior. An increase in private insurance coverage as people enrolled in the health insurance Marketplace established in 2013 also reduced the number of uninsured individuals in the state.¹ However, the longer-term trend toward private plans with high deductibles has meant that more privately insured patients face large out-of-pocket obligations when they are hospitalized, which may increase hospital uncompensated care for patients who are unable to pay hospital charges not covered by their private insurance.

The HMP community engagement requirement was implemented January 1, 2020, following months of beneficiary and stakeholder education. The implementation process gave MDHHS valuable experience in broad communication of policy changes, development of efficient methods of identifying policy exemptions, and modifying information systems to track policy compliance. From the perspective of beneficiaries, the rapid changes, from policy implementation to suspension, may have introduced confusion. A prior version of the evaluation plan included a randomized controlled trial to understand the impact of the community engagement requirement, and beneficiary surveys had begun as part of this effort.² These

¹ Kaiser Family Foundation. [Marketplace Enrollment 2014-2019](#).

² [Evaluation of the Healthy Michigan Plan Section 1115 Community Engagement Requirement Waiver](#)

activities were discontinued after the March 2020 ruling that vacated CMS approval for the community engagement provision.

The first individuals diagnosed with COVID-19 in Michigan were identified in March 2020. Since that time, the COVID-19 pandemic has had a dramatic effect on health care utilization and costs and financial well-being for people in Michigan and across the country, including HMP beneficiaries. In particular, HMP enrollment, which had been quite stable in recent years, has grown substantially from approximately 670,000 individuals in March 2020 to over 874,000 individuals as of February 1, 2021. This substantial increase in enrollment can be attributed both to people becoming newly eligible for the program and also to the state's implementation of the maintenance of effort provisions of Section 6008 of the FFCRA.

B. Logic Model, Evaluation Questions, and Hypotheses

B.1. Logic model

Please see the evaluation logic models at the end of this document (pages 45-46).

B.2. Evaluation questions and hypotheses

The evaluation questions and hypotheses are organized around three HMP policies and four broad goals of the overall demonstration that reflect the MDHHS objectives outlined in Section A.3 above. The seven components of the evaluation are: (1) Healthy Behaviors Incentives program, (2) cost-sharing, (3) 5% premium cost-sharing and HRA/healthy behavior requirements (48-month policy), (4) reduce uninsurance and uncompensated care, (5) promote primary care/responsible use of services, (6) support financial well-being, and (7) support coordinated strategies to address social determinants of health. Within each area, we have identified key evaluation questions that explore how HMP promotes the objectives of Titles XIX and XXI by improving access, continuity, and quality of care for low-income adults in Michigan. Because the MDHHS objectives for HMP are stated in qualitative terms, we have framed our hypotheses below to assess directional change without associated quantitative targets. The analysis plan is designed to identify both positive outcomes and potential adverse consequences.

1. Healthy Behaviors Incentives Program

Evaluation question 1.1: How has the health and healthy behavior engagement among Michigan adults changed since introduction of HMP and its Healthy Behaviors Incentives Program?

Hypothesis 1.1: Health status will improve and healthy behaviors will increase over time among income-eligible adults in Michigan compared with similar adults in comparison states.

Evaluation question 1.2: What is the association between beneficiary knowledge of the Healthy Behaviors Incentives program and efforts to maintain or improve health?

Hypothesis 1.2: Engagement in efforts to maintain or improve health will be higher among beneficiaries who report knowledge of the HMP Healthy Behaviors Incentives Program.

Evaluation question 1.3: Is HRA completion associated with improved health status and health behaviors?

Hypothesis 1.3: Beneficiaries who complete an HRA will report improvement in health status and health behaviors compared to beneficiaries who do not complete an HRA.

Evaluation question 1.4: Is HRA completion associated with higher rates of preventive service use?

Hypothesis 1.4: Beneficiaries who complete at least one HRA will demonstrate higher rates of preventive service use compared to beneficiaries who have similar primary care utilization but who have not completed an HRA.

Evaluation question 1.5: How has the Healthy Behaviors Incentives program, and HMP as a whole, affected beneficiaries' engagement in health behaviors and other efforts to maintain or improve health over time?

Hypothesis 1.5: Beneficiaries will describe assistance from primary care providers in setting health goals and engaging in behavior change to meet those goals.

Evaluation question 1.6: How do primary care providers use the HRA to assist in patient engagement and health promotion?

Hypothesis 1.6: Primary care providers will describe that they have become more knowledgeable over time about how to use the HRA to engage patients enrolled in HMP.

2. Cost-Sharing

Evaluation question 2.1: Do beneficiaries understand cost-sharing and other consumer-oriented features of HMP coverage?

Hypothesis 2.1: Beneficiaries who are aware of healthy behavior financial incentives will demonstrate a better understanding of cost-sharing obligations and connections between service utilization and amount owed.

Evaluation question 2.2: What factors are associated with beneficiaries' compliance with cost-sharing obligations?

Hypothesis 2.2: Beneficiaries with MI Health Account fees will have better payment compliance than their counterparts with service-based cost-sharing only.

Evaluation question 2.3: Are beneficiaries able to understand the MI Health Account statement?

Hypothesis 2.3: Beneficiaries will understand where to find the amount they owe, but may not understand how that amount is calculated.

Evaluation question 2.4: What are barriers and facilitators for beneficiaries to pay the amount owed?

Hypothesis 2.4: Beneficiaries will report financial barriers more often than logistical barriers to paying the amount owed.

3. 5% Premium Cost-Sharing & HRA/Healthy Behavior Requirements (48-month policy)

Evaluation question 3.1: Do beneficiaries subject to the new 48-month policy understand the requirements and consequences for noncompliance?

Hypothesis 3.1: Beneficiary literacy level will be associated with understanding of specific provisions of the new 48-month policy.

Evaluation question 3.2: Is the penalty of disenrollment for failure to complete the HRA/healthy behavior requirement stronger than the incentive of cost-sharing reduction for HRA/healthy behavior completion?

Hypothesis 3.2: Among beneficiaries subject to the new 48-month policy, HRA/healthy behavior completion will increase for beneficiaries with income >100% FPL who are subject to disenrollment, with no change for beneficiaries with income <100% FPL who are not subject to disenrollment.

Evaluation question 3.3: Among beneficiaries with income above 100% FPL, how does payment compliance change with the new cost-sharing requirements (from 2% fee and service-related co-payments to a flat 5% premium)?

Hypothesis 3.3: Payment compliance will be higher among those subject to the 5% monthly premium requirement than under the previous cost-sharing requirements.

Evaluation question 3.4: To what extent is the 5% monthly premium requirement associated with disenrollment?

Hypothesis 3.4a: The rate of disenrollment will be higher after implementation of the 5% monthly premium requirement compared to before implementation.

Hypothesis 3.4b: Disenrollment will disproportionately occur among beneficiaries with low utilization in the 24 months prior to implementation of the 5% monthly premium requirement.

4. Overall demonstration: Reduce uninsurance

Evaluation question 4.1: How have insurance coverage rates in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?

Hypothesis 4.1a: The decline in uninsurance among non-elderly adults in Michigan compared to other states that did not expand Medicaid that was observed in 2013-2017 will be sustained through subsequent years.

Hypothesis 4.1b: The decline in uninsurance among non-elderly adults in Michigan compared to other states that expanded without a waiver that was observed in 2013-2017 will be sustained through subsequent years.

5. Overall demonstration: Promote primary care/responsible use of services

Evaluation question 5.1: Does HMP's facilitation of primary care access (e.g., through managed care PCP assignment) influence beneficiary engagement in health and maintenance or improvement in physical and mental health?

Hypothesis 5.1a: Beneficiaries who report no barriers to primary care will be more likely to report improved health status and ability to take action to improve or maintain their health.

Hypothesis 5.1b: Beneficiaries who make regular primary care visits will be more likely to report improved health status and ability to take action to improve or maintain their health.

Evaluation question 5.2: What factors influence beneficiaries' decisions about seeking care in the emergency department?

Hypothesis 5.2: Beneficiaries who report barriers to care will be more likely to report an emergency department visit without first attempting to contact their primary care provider.

Evaluation question 5.3: Is use of the emergency department related to continuity of primary care?

Hypothesis 5.3: Beneficiaries with higher continuity of primary care will have lower rates of emergency department utilization and lower odds of being high-frequency ED utilizers.

Evaluation question 5.4: Does HMP promote more consistent use of services to manage chronic conditions over time?

Hypothesis 5.4: Beneficiaries with chronic conditions will demonstrate better rates of medication management and primary care utilization, and lower rates of ED visits and hospitalizations, over time compared to their initial year of HMP enrollment.

Evaluation question 5.5: How has HMP impacted beneficiaries' physical, mental, and oral health and their use of health care services over time?

Hypothesis 5.5: Beneficiaries will describe HMP as allowing them to receive services that have a significant positive impact on their health and well-being.

6. Overall demonstration: Support financial well-being

Evaluation question 6.1: What impact has HMP had on beneficiaries' levels of employment and ability to work?

Hypothesis 6.1: Beneficiaries will report sustained or increased employment and decreased health-related barriers to employment over time.

Evaluation question 6.2: How is HMP enrollment related to individual beneficiaries' financial outcomes during and after HMP enrollment?

Hypothesis 6.2: HMP enrollment will be associated with improved credit report outcomes for beneficiaries over time.

Evaluation question 6.3: How has HMP affected beneficiaries' financial and material well-being over time?

Hypothesis 6.3: Beneficiaries will describe examples of how HMP has improved their financial and material well-being.

7. Overall demonstration: Sustain the safety net and support coordinated strategies to address social determinants of health

Evaluation question 7.1: What are the categories and estimated amounts of the State’s costs to administer key HMP demonstration policies (e.g., Healthy Behaviors Incentives program, cost-sharing)?

Hypothesis 7.1: Administrative costs to implement demonstration policies will remain stable during the current Section 1115 waiver period.

Evaluation question 7.2: How do trends over time in Medicaid expenditures per member-month for HMP enrollees compare to those for beneficiaries in traditional Medicaid managed care?

Hypothesis 7.2: Annual trends in age- and sex-adjusted expenditures per member-month will demonstrate a lower rate of increase over time for enrollees in HMP managed care than for enrollees in traditional Medicaid managed care.

Evaluation question 7.3: How have uncompensated care costs in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?

Hypothesis 7.3a: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that did not expand Medicaid that was observed between 2013 and 2017 will be sustained in subsequent years.

Hypothesis 7.3b: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that expanded Medicaid without a waiver that was observed between 2013 and 2017 will be sustained in subsequent years.

Evaluation question 7.4: How does HMP support new or broadened initiatives to address social determinants of health for low-income adults in Michigan?

Hypothesis 7.4: State officials and safety-net providers will describe specific examples of health-promoting initiatives that build on HMP’s continuity, breadth of coverage, and primary care emphasis.

C. Methodology

C.1. Evaluation design summary

This new evaluation builds on key findings from the summative report prepared by the HMP evaluation team at the University of Michigan Institute for Healthcare Policy and Innovation for the initial five years of HMP (2014-2018) that was submitted to CMS by MDHHS in May 2019 and finalized in March 2020.

This evaluation design responds to the evaluation requirements outlined in the new HMP Special Terms and Conditions (STCs) (Section XII. Evaluation of the Demonstration) and related guidance provided by CMS in Attachment A: Developing the Evaluation Design.³ The HMP evaluation team has also followed subsequent guidance released by CMS in March 2019 in its report, *Evaluation Design Guidance for Section 1115 Eligibility and Coverage Demonstrations*,

³ [Healthy Michigan Plan Section 1115 Demonstration Standard Terms and Conditions \(2018\)](#)

and guidance released in August 2020 in its report, *Implications of COVID-19 for Section 1115 Demonstration Evaluations: Considerations for States and Evaluators*.⁴

The evaluation will use multiple approaches, including analysis of state administrative data, publicly available data, and primary data collected through interviews and surveys. These data sources are described in detail in this evaluation narrative.

Institutional Review Board (IRB) Review and Considerations

Federal regulations governing human subjects protection specify categories of human subjects research that are exempt from the standard regulatory process, per the 2018 Common Rule (45CFR46 subpart A). Exemption category 5 includes:

1. Research and demonstration projects that are conducted or supported by a Federal department or agency, or otherwise subject to the approval of department or agency heads (or the approval of the heads of bureaus or other subordinate agencies that have been delegated authority to conduct the research and demonstration projects), and that are designed to study, evaluate, improve, or otherwise examine public benefit or service programs, including procedures for obtaining benefits or services under those programs, possible changes in or alternatives to those programs or procedures, or possible changes in methods or levels of payment for benefits or services under those programs. Such projects include, but are not limited to, internal studies by Federal employees, and studies under contracts or consulting arrangements, cooperative agreements, or grants. Exempt projects also include waivers of otherwise mandatory requirements using authorities such as sections 1115 and 1115A of the Social Security Act, as amended.
 - i. Each Federal department or agency conducting or supporting the research and demonstration projects must establish, on a publicly accessible Federal Web site or in such other manner as the department or agency head may determine, a list of the research and demonstration projects that the Federal department or agency conducts or supports under this provision. The research or demonstration project must be published on this list prior to commencing the research involving human subjects.

The evaluation plan has been reviewed and deemed exempt by the University of Michigan Medical School IRB under Exemption 5. The evaluation plan has also been reviewed and determined to be exempt by the MDHHS IRB, with approval of a HIPAA Privacy Waiver to use protected health information.

C.2. Target and comparison populations

The evaluation plan does not include a broad experimental design that covers all data sources. Rather, the specific target and comparison populations are described for each data source and corresponding hypotheses in the accompanying table.

C.3. Evaluation period

⁴ [CMS 1115 Demonstration State Monitoring & Evaluation Resources](#)

The evaluation period will include the current waiver demonstration period (January 1, 2019, to December 31, 2023). As specified in the descriptions of analytic methods, the period prior to January 1, 2019, will be used as a baseline comparison period when data from this period are available. The specific time periods to be utilized for each data source are described below.

C.4. Data sources, evaluation measures, and analytic approach

The following sources of data will be used in the evaluation:

- State administrative data
- Beneficiary survey (Healthy Michigan Voices)
- Interviews with beneficiaries
- Interviews with providers
- Interviews with key informants
- Credit data
- Behavioral Risk Factor Surveillance System (BRFSS)
- American Community Survey (ACS)
- HCUP Fast Stats inpatient discharge data
- Medicare cost reports

Descriptions of these data sources and how they will be included in the evaluation are presented below. Analyses related to the 48-month policy are included in italics given that they are contingent on implementation by January 2023. If the 48-month policy is implemented between January 2023 and June 2023, descriptive trend analyses of administrative data will be conducted, when feasible.

C.4.1. State administrative data

Data source

Administrative data will be used in a variety of ways to document changes over time in program enrollment, engagement and utilization, and compliance with cost-sharing requirements. Administrative data allow for multivariate modeling that adjusts for both beneficiary characteristics (e.g., age, sex, region) and programmatic characteristics (managed care vs fee-for-service coverage, cost-sharing requirements) to understand patterns in different subgroups of beneficiaries; this information may be used by policymakers to understand the differential engagement in and benefit from HMP features across subgroups. Administrative data also will be used to describe trends over time in expenditures, with the ability to generate expenditure trends by service type, adjusted estimates by beneficiary characteristics, and comparisons to expenditure trends for other Medicaid benefit plans (e.g., traditional Medicaid).

The state of Michigan offers a rich data environment for evaluation. The backbone of the data environment is the state's Enterprise Data Warehouse. The Data Warehouse maintains individual-level, identifiable data for numerous programs within MDHHS, including:

- Medicaid enrollment files include eligibility dates for different benefit plans, enrollment start and end dates, contact information (address, phone, email), key demographic characteristics (gender, race/ethnicity), and third-party liability coverage.
- Medicaid administrative claims include service-level data on paid claims (fee-for-service)

and encounters (Managed Care), with accompanying billing and reimbursement information (e.g., CPT and ICD-10 diagnosis codes, billing modifiers, billing/rendering provider, paid amount) for inpatient, outpatient, pharmacy, durable medical equipment, dental, lab, and other services.

- Specialty behavioral health administrative claims include individual-level data on services provided through Michigan's behavioral health system.
- Michigan Care Improvement Registry houses individual-level immunization history including vaccine product, date of administration, and provider.
- HRA tables include individual-level data on administration of HRAs (e.g., dates of completion, whether HRA completion was facilitated by a provider, answers to individual HRA questions, and eligibility for HRA-related incentives (e.g., cost-share reduction)).
- Cost-share tables include individual-level data on charges for HMP fees, premiums and co-pays, cost-sharing reductions, and payment history.
- Other tables house data related to specific Medicaid initiatives, such as indicators of medical frailty and other exemptions from program requirements, eligibility for supplementary or pilot programs, and compliance actions.

Each beneficiary has a unique Medicaid ID number that enables linkages across data files within the Data Warehouse. The Data Warehouse houses data from other components of state government, such as the Department of Corrections, Department of Treasury, and Department of Licensing and Regulatory Affairs. The State has implemented a Master Person Indicator that allows linkages across departments once authorization has been obtained.

The HMP evaluation team has a longstanding history of working with MDHHS staff on projects utilizing the state Data Warehouse. A Business Associates Agreement executed between MDHHS and the University of Michigan authorizes direct access to the Data Warehouse via an existing secure portal. The HMP evaluation team has established data storage protocols that comply with MDHHS regulations, including the use of encrypted files, secure networks, and multiple layers of password protection. The evaluation team has extensive experience processing the administrative claims data into analytic data files.

This data source will be used to examine evaluation questions 1.4, 2.2, 3.2, 3.3, 3.4, 5.3, 5.4, and 7.2.

Measures

Data from the state Data Warehouse will be extracted and processed to derive an array of variables.

Enrollment-related variables will include:

- Cumulative months of HMP enrollment (overall, in HMP-Managed Care)
- Enrollment disruptions (number of disruptions, length of enrollment gaps)
- Disenrollment/noncompliance actions
- Timing of initial HMP enrollment (2014-2018 vs. 2019-2023)
- Change from HMP to another Medicaid benefit plan

Demographic variables will include:

- Age at initial HMP enrollment
- Race ethnicity as categorized in data warehouse
- Geographic region, based on prosperity region
- Income level (% FPL) as documented in the data warehouse
- Medicaid Health Plan for months enrolled in HMP-Managed Care
- Medical frailty indicators

HRA-related variables will include:

- Number and timing of initial and subsequent HRA completions
- Target behavior selected, and self-reported health status on initial and subsequent HRAs
- HRA-related incentives

Cost-sharing variables will include:

- Quarterly/annual amount owed (fees, premiums, co-pays)
- Amount and frequency of payments
- Evidence of cost-share reductions
- Non-compliance determinations

Utilization-related variables will be derived from claims data using established measures from the Healthcare Effectiveness Data and Information Set (HEDIS) and from the CMS Core Set of Adult Quality Measures for Medicaid. We will apply modifications as appropriate (e.g., to incorporate state-specific billing codes and/or data sources, to adjust age ranges to be consistent with HMP eligibility). We will calculate utilization-related measures that reflect HMP policies regarding use of primary care/preventive services, avoiding overuse of the emergency department, and effective management of chronic conditions. Specific outcome measures include:

Primary Care and Preventive Services

- Flu Vaccinations for Adults (NQF 0039; measure steward NCQA): percentage of beneficiaries who received an influenza vaccine between July 1 and June 30 (annual measure, modified to use immunization documentation from the MCIR and Medicaid claims rather than self-report)
- Colon Cancer Screening (NQF 0034, measure steward NCQA): percentage of beneficiaries aged 50-64 who received colon cancer screening by high-sensitivity fecal occult blood test, sigmoidoscopy with FOBT, or colonoscopy.
- Breast Cancer Screening (NQF 2372; measure steward NCQA): percentage of women 40-64 who had a mammogram to screen for breast cancer at least once in a two-year period
- Cervical Cancer Screening (NQF 0032; measure steward NCQA): percentage of women 21-64 years of age who received a Pap test to screen for cervical cancer at least once in a three-year period
- Adults' Access to Preventive/Ambulatory Health Services (HEDIS AAP; measure steward HEDIS): percentage of beneficiaries who made an ambulatory or preventive care visit
- Annual Dental Visit (HEDIS ADV; measure steward HEDIS): percentage of beneficiaries who made at least one dental visit, modified to include a sub-measure for preventive dental services

Emergency Department Utilization

- Overall ED utilization (HEDIS EDU; measure steward HEDIS): rate of ED visits per 1,000 member months
- High Frequency ED utilization: proportion of beneficiaries who make >5 ED visits within a 12-month period

Management of Chronic Conditions

- Pharmacotherapy Management of COPD Exacerbation (HEDIS PCE; measure steward HEDIS): percentage of COPD exacerbations for members 40 years of age and older who had an acute inpatient discharge or ED visit and who were dispensed appropriate medications.
- Medication Management for People with Asthma (HEDIS MMA; measure steward HEDIS): percentage of members identified as having persistent asthma who were dispensed appropriate medications that they remained on during the treatment period.
- Statin Therapy for Patients with Cardiovascular Disease (HEDIS SPC; measure steward HEDIS): percentage of members who were identified as having clinical atherosclerotic cardiovascular disease and who (a) were dispensed at least one high- or moderate-intensity statin medication and (b) remained on a statin medication for at least 80% of the treatment period.
- Statin Therapy for Patients with Diabetes (HEDIS SPD; measure steward HEDIS): percentage of members with diabetes who do not have clinical atherosclerotic cardiovascular disease who (a) were dispensed at least one high- or moderate-intensity statin medication and (b) remained on a statin medication for at least 80% of the treatment period.
- Follow-Up After Emergency Department Visit for People with Multiple High-Risk Chronic Conditions (HEDIS FMC; measure steward HEDIS): percentage of ED visits for members who have multiple high-risk chronic conditions that had a follow-up service within 7 days of the ED visit.
- Diabetes, Short-term Complications Admission Rate (NQF 0272; measure steward AHRQ): number of discharges for diabetes short-term complications per 100,000 beneficiaries.
- Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (NQF 0275; measure steward AHRQ): number of discharges for COPD or asthma per 100,000 beneficiaries.
- Heart Failure Admission Rate (NQF 0277; measure steward AHRQ): number of discharges for CHF per 100,000 beneficiaries.

Analytic approach

For hypotheses based on utilization of health services and completion of HRAs, we first will identify the populations of interest based on the relevant evaluation timeframe (e.g., pre vs. post-implementation of the 5% premium), and beneficiary enrollment duration (e.g., cumulative enrollment of ≥ 48 months). We will also identify each beneficiary's enrollment dates in 12-month increments from initial enrollment, to facilitate longitudinal measures. We will apply measure specifications regarding age, diagnostic and utilization-based inclusion and exclusion criteria.

We will use paired t-tests to compare outcome measures across subgroups. We will employ multivariate negative binomial regression models controlling for demographic characteristics to

generate stratified results (e.g., beneficiaries with and without chronic conditions, those who did vs. did not complete an HRA). For beneficiaries with extended HMP enrollment, we will examine utilization over time (e.g., primary care continuity) and identify characteristics associated with suboptimal patterns (e.g., multiyear pattern of high-frequency ED use).

We will conduct three sets of sensitivity analyses: (1) examining the impact of enrollment disruptions by generating parallel measure results that maintain vs. relax HEDIS/NQA enrollment requirements; (2) examining the impact of managed care plan performance by generating parallel measure results for beneficiaries who do vs. do not remain in the same Medicaid Health Plan throughout their enrollment; and (3) examining the impact of data incompleteness by generating parallel measure results for beneficiaries who have evidence of other insurance in the Third-Party Liability fields.

For hypotheses related to compliance with cost-sharing obligations, we will use logistic regressions (any payment vs. no payment, full payment vs. partial payment) and ordered logistic regression (no payment, partial payment, full payment) analyses to examine differences in payment behavior for beneficiaries subject to fees vs. co-pays only. Analyses will adjust for age, gender, health conditions, race/ethnicity, urban/rural, income, length of HMP enrollment, and total cost-share liability.

Across all areas, we will conduct supplemental analyses, appropriate to each hypothesis, that address the impact of the COVID-19 public health emergency. For example, for measures that reflect a specific timeframe in the beneficiary's enrollment history, we will compare results for those whose measurement period occurred before, during or after the public health emergency. In addition, we will consider the impact of the public health emergency in the interpretation of results; for example, for measures tracking utilization rates over time, we will expect a larger decrease for services that require in-person care (e.g., flu vaccine, cancer screening) compared to services that can be delivered via telehealth (e.g., primary care visit, medication management) during the public health emergency.

The results of these analyses will be included in the interim report, with updated analyses included in the summative report.

Analyses related to the 48-month policy will incorporate three key characteristics: HRA/healthy behavior completion, payment compliance and maintenance of enrollment. Because the 48-month policy includes disenrollment for beneficiaries who do not meet the requirements, we expect that compliance will be higher among those who are subject to the requirements than it was for this group before the 48-month policy took effect. We will test these hypotheses and identify other factors associated with compliance, by estimating bivariate logistic regression models predicting HRA/healthy behavior completion, payment compliance and maintenance of enrollment as a function of beneficiary characteristics, income (above or below 100% FPL), and enrollment period (≥ 48 vs. < 48 months of cumulative HMP enrollment). We will conduct stratified analyses to compare beneficiaries with higher vs. lower utilization in the 24 months prior to implementation of the new requirements, including number of primary care visits, dental visits, ED visits, inpatient stays, and medication fills.

The results of analyses focused on the 48-month policy will be included in the summative report if this policy takes effect by January 2023. If the 48-month policy is implemented between January 2023 and June 2023, descriptive trend analyses of these administrative data will be conducted, when feasible.

C.4.2. Beneficiary survey

Data source

The Healthy Michigan Voices (HMV) beneficiary survey will be conducted from July 2021 to April 2022 to understand the experience and impact of HMP structures and policies. *HMV surveys focused on the 48-month policy will be conducted 6-12 months after implementation of that policy.* Surveys supplement administrative data by documenting beneficiary knowledge of key policies such as of the Healthy Behaviors Incentives program and cost-sharing obligations; eliciting barriers that impede beneficiaries from responsible use of health services; describing lifestyle behaviors that impact health status; and understanding the extended impact of HMP on beneficiary financial well-being.

The HMV target population will be beneficiaries with at least 12 months of enrollment in HMP's managed care benefit, through which key HMP features are administered including the primary care provider assignment, HRA, healthy behavior incentives, and cost-sharing.

The beneficiary survey will include two groups: beneficiaries who participated in prior HMV surveys (Longitudinal Cohort), and a refresher sample of more recently enrolled HMP beneficiaries (New Cohort). Recontacting existing cohorts allows for a more thorough understanding of the experiences of beneficiaries over time, while adding new respondents allows for broader representation of the HMP population and understanding the experiences and impact of the program for those who enrolled more recently.

This data source will be used to examine evaluation questions 1.2, 1.3, 2.1, 3.1, 5.1, 5.2, and 6.1.

Survey cohorts & sample size

The Longitudinal Cohort will be drawn from two prior HMV target populations:

- Cohort I included beneficiaries with initial HMP enrollment between April 2014 and October 2015. Cohort I completed their initial HMV surveys in 2016 (N=4,106), when beneficiaries had cumulative HMP enrollment of 13-28 months. Follow-up surveys were done in 2017 (N=3,104) and 2018 (N=2,608).
- Cohort II included beneficiaries with initial HMP enrollment between January 2016 and December 2017. Cohort II completed HMV surveys in 2018 (N=2,602) when beneficiaries had cumulative HMP enrollment of 13-24 months.

Inclusion criteria for initial selection into Cohorts I and II were enrollment in HMP-Managed Care in the month selected and at least 9 of the prior 12 months in managed care; preferred language of English, Arabic or Spanish; and having complete contact information (phone, address) in the MDHHS Data Warehouse. To ensure broad representation across income levels and geographic regions, stratified sample selection was done according to the following proportions:

Federal Poverty Level	Prosperity Region				
	UP/NW/NE	W/EC/E	SC/SW/SE	DET	Total
0-35%	7.0%	12.0%	8.0%	12.8%	39.9%
36-99%	6.0%	10.5%	7.0%	11.2%	34.8%
≥100%	4.9%	7.5%	5.0%	8.0%	25.5%
Total	17.9%	30.0%	20.0%	32.0%	100.0%

Eligibility for the Longitudinal Cohort will be based on enrollment in HMP-Managed Care in the month selected, regardless of any gaps in HMP coverage; and agreement to recontact on the prior HMV survey. As of October 2020, roughly 2,800 beneficiaries from HMV Cohorts I and II meet these criteria. We will target 2,000 completed surveys with the Longitudinal Cohort.

The New Cohort will be newly drawn from beneficiaries with initial HMP enrollment between August 2019 and December 2020; with the expected timing for data collection, beneficiaries will have cumulative HMP enrollment of 13-24 months. The New Cohort will be drawn using parallel inclusion criteria: enrollment in HMP-Managed Care in the month selected and at least 9 of the prior 12 months in managed care; preferred language of English, Arabic or Spanish; and having complete contact information (phone, address) in the MDHHS Data Warehouse. Stratified sample selection of the New Cohort will be done by income level and region using the same proportions as shown above. We will target 2,000 completed surveys with the New Cohort.

For two-tailed hypothesis testing with Type I error of 5% ($p < 0.05$), this sample size is designed to provide 80% statistical power to detect a 5 percentage-point difference (i.e. 50% vs. 55% or 45%) between those with excellent/very good/good vs. fair/poor health. This sample size also allows for reliable outcome estimates by FPL, region, length of enrollment, and gender.

Sampling for evaluation of the 48-month policy: We anticipate that the Longitudinal Cohort will yield about 400 beneficiaries who would be subject to the 5% premium and HRA/healthy behavior requirements, as verified by information from the state Data. If the Longitudinal Cohort yields fewer than 400, we will sample additional beneficiaries who have not participated in prior HMV surveys, in order to achieve a target number of at least 400 surveys with beneficiaries subject to the 48-month policy.

Measures

Key outcome measures will be based on validated items and scales used in prior HMV surveys. Health-related items will be drawn from national surveys, including the National Health and Nutrition Exam Survey (NHANES),⁵ Health Tracking Household Survey (HTHS),⁶ National Health Interview Survey (NHIS),⁷ Behavioral Risk Factor Surveillance System (BRFSS)⁸ and

⁵ [NHANES \(National Health and Nutrition Exam Survey, CDC\)](#)

⁶ [HTHS \(Health Tracking Household Survey\)](#)

⁷ [NHIS \(National Health Interview Survey, CDC\)](#)

⁸ [BRFSS \(Behavioral Risk Factor Surveillance System, CDC\)](#)

MiBRFSS⁹), Short Form Health Survey (SF-12),¹⁰ Food Attitudes and Behaviors Survey,¹¹ Consumer Assessment of Healthcare Providers and Systems (CAHPS),¹² Employee Benefit Research Institute Consumer Engagement in Healthcare Survey (CEHCS),¹³ Commonwealth Fund Health Care Quality Survey,¹⁴ and Patient Activation Measure.¹⁵

Specific health-related outcome measures to be used in the analysis include:

- Physical, mental, oral health status (Excellent, Very good, Good, Fair, Poor)
- Number of days in past 30 days with poor physical health; with poor mental health; where poor physical or mental health kept you from usual activities
- Engagement in healthy lifestyle behaviors (physical activity/exercise, fruit/vegetable consumption, other attempts at healthy eating)
- Engagement in unhealthy lifestyle behaviors (smoking, binge drinking, substance use)
- Engagement in efforts to address unhealthy behaviors (smoking cessation, substance use treatment, diet change)
- Participation in health-supporting programs (peer support, wellness or disease management programs)
- Usual source of primary care
- Availability of primary care advice after hours
- Barriers to accessing primary care, other services
- Patient activation (confidence in ability to take action to maintain or improve health)
- Reason for ED visit in past 12 months
- Attempted contact with primary care provider prior to ED visit

Survey items that address specific HMP features will draw on questions that were developed and used for prior HMP surveys by the evaluation team.^{16,17,18,19,20} If new policies are implemented or modified, items exploring those features (e.g., understanding of new requirements) will undergo pre-testing to assess clarity of wording and appropriateness of response choices. Additional items may be drawn from emerging topics identified during qualitative interviews with beneficiaries. Specific measures based on HMP policies will include:

- Knowledge of HRA/healthy behaviors and cost-share reduction incentive
- Completion of an HRA, engagement with primary care provider around HRA
- Knowledge of cost-sharing obligations and link between service utilization and amount owed
- Recall of MI Health Account statement

⁹ [MiBRFSS \(Michigan Behavioral Risk Factor Surveillance System, MDHHS\)](#)

¹⁰ [SF-12 \(Short Form Health Survey, RAND\)](#)

¹¹ [FAB \(Food Attitudes and Behaviors Survey, NCI\)](#)

¹² [CAHPS \(Consumer Assessment of Healthcare Providers and Systems\)](#)

¹³ [Consumer Engagement in Health Care Survey \(EBRI: CEHCS\)](#)

¹⁴ [Commonwealth Fund Health Care Quality Survey](#)

¹⁵ [PAM \(Patient Activation Measure\)](#)

¹⁶ Goold, S. D., & Kullgren, J. (2018). [Report on the 2016 Healthy Michigan Voices Enrollee Survey.](#)

¹⁷ Goold, S. D., & Kullgren, J. (2018). [Report on the 2016 Healthy Michigan Voices Enrollee Survey: Supplemental Analyses.](#)

¹⁸ Clark, S. J. & Goold, S. D. (2018). [Report on the Healthy Michigan Voices 2016-17 Survey of Individuals No Longer Enrolled in the Healthy Michigan Plan.](#)

¹⁹ Goold, S. D., Kullgren, J., Beathard, E., Kirch, M., & Bryant, C. (2018). [2017 Healthy Michigan Voices New Enrollee Survey Report.](#)

²⁰ Goold, S. D., Kullgren, J., Beathard, E., Kirch, M., Bryant, C., Tipirneni, R., Ayanian, J. Z. (2018). [2017 Healthy Michigan Voices Follow-Up Survey Report.](#)

- *Knowledge of new 48-month requirements and consequences for noncompliance*

Measures of employment and social determinants of health, used in previous HMP surveys, will be largely drawn from national surveys, such as the American Community Survey (ACS),²¹ the Current Population Survey (CPS),²² and the Health Reform Monitoring Survey (HRMS).²³ Items addressing the impact of the pandemic on employment and social determinants of health will be drawn from the NIH PhenX toolkit.²⁴ Specific measures related to employment and social determinants of health to assess the goals of the overall demonstration will include:

- Employment status (full/part time, number of hours worked)
- Health-related barriers to employment
- Other barriers to employment (inconsistent work hours, transportation, caregiving responsibilities, discrimination, homelessness in past 12 months)

Survey administration

HMP survey administration will build on strategies used successfully in previous HMP surveys. The evaluation team will utilize a Computer-Assisted Telephone Interviewing (CATI) system to administer surveys. Survey questions will be programmed into the CATI system, allowing for branching of survey items based on characteristics known prior to the survey and responses given during the survey. The CATI system will integrate individual characteristics (e.g. gender, name of Medicaid Health Plan) to allow for tailored question wording, as well as tailored branching based on identified characteristics (e.g., subject to 48-month policy). Interviewers will be trained on the survey instrument, including prompts and definitions, pronunciation of terms, and appropriate response to questions about coverage or services. Interviewers will engage in practice interviews and supervisor review of initial interviews until their proficiency is confirmed. Supervisors will conduct ongoing quality assessment checks to ensure fidelity to the interview protocol.

Sampled individuals will be mailed an introductory packet containing a letter explaining the project and a simple-language brochure with key information. The letter and brochure will provide phone, text and email options for individuals to indicate a preferred time/day for the interview or refusal to participate.

For sampled individuals who do not refuse to participate, interviewers will place phone calls between the hours of 9:00 AM and 8:30 PM. Non-respondents will receive two additional mailings with a brief letter and brochure encouraging participation. At the outset of the survey, interviewers will explain the purpose of the project, emphasize the confidentiality of responses, and obtain agreement to participate. Interviewers will note that completion of the survey is voluntary that questions can be skipped for any reason. Interviewers will also note that only aggregate data will be reported. Interviewers will ask if the interview can be recorded; in the prior HMP evaluation, over 95% of respondents agreed to be recorded. At the end of the survey, interviewers will ask if the respondent agrees to be re-contacted for future surveys and interviews and, if yes, the preferred phone, email, and text information to use. Individuals who complete the

²¹ [ACS \(American Community Survey\)](#)

²² [CPS \(Current Population Survey\)](#)

²³ [HRMS \(Health Reform Monitoring Survey\)](#)

²⁴ [NIH PhenX Toolkit](#)

survey will be mailed a gift card in an amount commensurate with the expected time for participation (e.g., \$25 for an interview of 20-30 minutes); incentives will be administered through the University of Michigan research incentive system, to allow for tracking and replacement of lost cards.

Initial data files will be generated from the CATI system. Trained research assistants will review recordings to verify the accuracy of coding and to categorize responses to open-ended questions. Variables describing respondents' demographic and health services utilization characteristics will be generated from Medicaid administrative data for use in analysis of survey data.

Analytic approach

Survey weights

Sample design and survey nonresponse will be handled through weights as well as adjustments to the weights. From the sample design, we will have base weights that account for over- or under-sampling based on the income and region stratification. Because the New Cohort will be drawn from the HMP enrollee list ("frame"), we will use a wide range of characteristics available in the frame to examine nonresponse patterns. A response propensity score model will be developed with multiple predictors. Using the estimated response propensity scores, we will develop weighting classes that include both respondents and nonrespondents and compensate for the potential nonresponse bias by adjusting the base weights of respondents. A similar procedure will be used for the Longitudinal Cohort sample with a wider range of characteristics available from the survey data. Once nonresponse adjustment is completed, we will combine the two samples and post-stratify to the known current beneficiary characteristics ascertained from the Data Warehouse (e.g., the population count of minority beneficiaries).

Note that weight adjustment addresses potential biases using the observed data from both the frame and the survey.

Overall analysis

The design of the survey cohorts allows for three types of analyses.

Cross-sectional analyses of data collected in this evaluation period will include descriptive analysis with subgroup analyses by key beneficiary characteristics (age, gender, race/ethnicity, urban/rural, income, chronic condition, and cumulative HMP enrollment). As appropriate to the hypothesis, cross-sectional analyses may include bivariate comparisons based on survey response patterns (e.g., comparing beneficiaries who do vs. do not report HRA completion).

Comparison of an individual beneficiary's responses over time will be done only for the Longitudinal Cohort. For many items, respondents from Cohort I will have a total of four data points while respondents from Cohort II will have two data points. Comparisons over time will use mixed effects logistic regression models, adjusting for age, gender, race/ethnicity, region, income level, and chronic disease status.

Comparison of aggregate responses for cohorts at a similar point in their HMP enrollment (13-24 months of cumulative enrollment) will be operationalized by comparing responses from the initial HMV Cohort I survey vs. the initial HMV Cohort II survey (both included in the

Longitudinal Cohort) vs. the New Cohort. We will use independent sample t-tests and multivariate regression models adjusting for age, gender, race/ethnicity, income, and chronic disease status within each cohort.

High-level findings from these analyses will be included in the interim report and findings from more detailed analyses (e.g. multivariate, longitudinal) will be included in the summative report.

Analyses related to the 48-month policy will include descriptive analysis with subgroup analyses by key beneficiary characteristics (age, gender, race/ethnicity, urban/rural, income).

The results of analyses focused on the 48-month policy will be included in the summative report if this policy takes effect by January 2023, which would allow a sufficient period for survey data collection from enrollees affected by this policy through the end of the current waiver period in December 2023 and for data analysis between January and April 2024 to be included in the final summative report that will be finalized in May and June and submitted to MDHHS in July 2024.

C.4.3. Interviews with beneficiaries

Data source

Interviews with beneficiaries will be used to gain a richer understanding of the multifaceted ways that beneficiaries interact with and benefit from HMP coverage. We will conduct in-depth longitudinal qualitative interviews by telephone, with a purposive sample of approximately 30 beneficiaries who have completed a prior HMP survey and agreed to be recontacted. Sampling will reflect diversity of geographic region, income, age, gender, race/ethnicity, length of HMP enrollment, and health conditions. This design will allow us to conduct both cross-sectional and longitudinal mixed-methods analyses, using qualitative and survey data. The first round of interviews will be conducted from June to September 2021 and the second round of interviews will be conducted from November 2022 to March 2023.

We will send participants a \$25 gift card in recognition of their time (approximately 30-45 minutes per interview). We will request permission to record the interview and will generate verbatim transcriptions of those recordings.

This data source will be used to examine evaluation questions 1.5, 2.3, 2.4, 5.5, and 6.3.

Measures

We will develop a structured interview guide to explore:

- How HMP has affected beneficiaries' engagement in health behaviors and other efforts to maintain or improve health
- Beneficiaries' understanding and perceptions of the MIHA statement, including terminology, layout, and description of payment options
- Barriers and facilitators to making payments
- How HMP has impacted beneficiaries' physical, mental, and oral health over time and their use of health care services
- How HMP has affected beneficiaries' financial and material well-being, including out-of-pocket costs for medical care and ability to work

Analytic approach

We will use an inductive approach to analysis, coding iteratively using standard qualitative analysis techniques and Dedoose software (<https://www.dedoose.com>). For the first stage of the process, immediately post-interview interviewers will complete a summary of major themes that arose during the interview that are relevant to the project aims. These summaries will be used to develop an initial codebook while data collection is still in progress. We will modify or add new codes to capture emerging themes. Then two team members will independently code the interviews, with differences in coding resolved by consensus in team meetings.

A cross-sectional analysis of initial interview data will be conducted for the whole group of beneficiaries, and in subgroups with shared experiences, e.g., those with cost-sharing obligations; those with chronic conditions. Case profiles will allow us to capture individual narratives in a reduced form that allows both within interviewee and between interviewee comparisons at the group level. Change over time at the individual level will be explored for specific research questions by analyzing responses to questions that remind interviewees of earlier responses and ask them to describe changes during the interval between interviews. Change over time at the group level will be assessed by comparing the overall key themes that emerged during the initial interviews to those that emerge from the follow-up interviews.

High level results from the initial interview data will be included in the interim report. This results of the longitudinal analysis of interview data will be included in the summative report.

C.4.4. Interviews with providers

Data source

Interviews with providers will offer a complementary perspective on how HMP, particularly the HRA process, facilitates beneficiary engagement with healthy behaviors. We will conduct 20-25 in-depth qualitative telephone interviews with a purposive sample of primary care providers from September-November 2021 who are the PCP of record for at least 5 HMP beneficiaries, based on information in the Data Warehouse from January to June 2021. The selected sample will reflect diversity of geographic region, setting (private practice, FQHC, health system-affiliated), and assigned number of HMP beneficiaries.

We will recruit providers via mailed invitation, with telephone and email follow-up. We will conduct 30-minute individual interviews via phone or Zoom, scheduled at the provider's convenience. We will offer a \$50 reimbursement for participation, an amount shown in prior projects to be sufficient to achieve recruitment goals. We will request permission to record the interview and will generate transcriptions of those recordings.

This data source will be used to examine evaluation question 1.6.

Measures

We will develop a structured interview guide to explore providers' knowledge of HRA processes, including variation between health plans; perceptions of HMP beneficiaries' awareness of HRA processes and incentives; use of HRAs to facilitate conversations about

health risks and healthy behaviors; and knowledge of and referral to support services (e.g., peer support groups, gym memberships, online tools).

Analytic approach

We will conduct a thematic analysis of the provider interviews. We will review transcriptions to identify key themes and illustrative quotations.

High-level findings from this analysis will be included in the interim report and findings from more detailed analyses will be included in the summative report.

C.4.5. Interviews with key informants

Data source

Interviews with key informants will provide insight and information about how Medicaid officials calculate and monitor the state cost impacts of HMP. These interviews will explore the costs of implementation and ongoing operations for specific demonstration policies, with a particular focus on components related to HRA/healthy behavior incentives and cost-sharing/premiums. This will include the costs of contracts to implement, monitor and evaluate demonstration policies, as well as staff time estimates to implement, administer, and communicate with beneficiaries. These interviews will also explore the short- and long-term effects of eligibility and coverage policies on Medicaid health service expenditures.

Interviews with key informants will also allow us to gain a broader understanding of how HMP has contributed to the development, facilitation, and maintenance of innovative approaches to system development and service delivery, including efforts to address social determinants of health. These innovations targeted to HMP and other Medicaid beneficiaries, and to the systems that serve them, are aimed at reducing barriers to care and improving connection, continuity, and coordination of care for beneficiaries. An example is the partnership between MDHHS and the Michigan Department of Corrections to initiate application for HMP prior to release of returning citizens from prison, facilitating transition to covered status upon release, and connection to primary care and behavioral health services. Other examples include the Michigan Opioids Task Force; Michigan's State Innovation Model and Health Homes initiatives; and use of community health workers by Medicaid health plans to facilitate outreach to beneficiaries, and coordination and connections to resources to address the social determinants of health. We expect to identify additional innovations during the interviews.

From December 2021 to March 2022, we will conduct 20-25 key informant interviews with two groups. The first group will focus on individuals familiar with Medicaid program administration, rate setting, budgeting, and operations, including the directors and/or key staff of Medicaid Policy, Operations and Actuarial Services, Managed Care Plan Division, and Customer Service Division. The second group will focus on administrators and service providers involved in developing and/or implementing state and local initiatives and services for HMP beneficiaries and HMP-eligible individuals, such as representatives from Medicaid health plans, Behavioral Health, and Public Health Administration; officials from other state departments, such as Michigan Department of Corrections; officials from provider organizations, such as the Michigan Primary Care Association (representing federally qualified health centers), the

Michigan Opioid Task Force and the Michigan State Medical Society; and representatives from relevant advocacy groups, such as the Michigan League for Public Policy.

Key informant interviews will be conducted, by telephone and are expected to take approximately 30-45 minutes. Interviews will be digitally recorded and transcribed.

This data source will be used to examine evaluation questions 7.1 and 7.4.

Measures

We will develop structured interview guides for each research question. For key informants who are familiar with Medicaid program administration, staffing and budgeting, we will discuss the state's calculation of the incremental costs associated with administering the distinctive policies of the Section 1115 waiver, including the Healthy Behaviors Incentives program, 5% premium cost-sharing requirement and HRA/healthy behavior requirement, and other cost-sharing provisions. For key informants involved in innovative approaches to system development and service delivery, including efforts to address social determinants of health, we will explore whether and how HMP facilitated or supported new or expanded initiatives, including; identifying eligible participants, how the initiatives facilitated connection, continuity and quality of care and addressing social determinants of health; barriers and facilitators to initiation, implementation over time focusing on the linkage to HMP; financing; and developing a model for sustainability for these initiatives.

Analytic approach

For key informant interviews pertaining to administrative costs, we will identify major themes related to monitoring and controlling costs. We will review documents shared by interview participants to identify changes in HMP costs over the period of HMP (2014-2023).

For key informant interviews related to programs to address social determinants of health, we will conduct a thematic analysis of the key informant interviews. Immediately following the interview, interviewers will complete a summary of major themes that arose. Subsequently, the interviewer will review the recording to confirm themes and identify illustrative quotations. These summaries will be used by evaluation team members to identify themes that emerged between interviews and quotes that exemplify these themes. This approach is designed to provide rapid but rigorous information to foster understanding of the contributions of HMP policy to systems and service system changes.

An overview of findings from this analysis will be included in the interim report and findings from more detailed analyses will be included in the summative report.

C.4.6. Credit data

Data source

Analysis of linked credit report data from commercial credit agencies presents a unique opportunity to examine the impact of several different aspects of the HMP program on financial outcomes for beneficiaries.

To estimate the effect of HMP on household financial outcomes, we will link HMP administrative data to data on consumer credit histories provided by a credit reporting agency (TransUnion, Experian, or Equifax). Our data linkage procedure will closely follow that used in a previous study led by a U-M faculty member in IHPI that examined financial outcomes for HMP beneficiaries.²⁵ Data from the credit reporting agency will be matched with the HMP administrative data using name, address, and Social Security number. To preserve the confidentiality of HMP beneficiaries' identities, the matching process will utilize a double-blind procedure. Evaluation team members at U-M will extract the identifying information on HMP beneficiaries and append to this dataset a randomly selected sample of approximately one million Michigan residents drawn from an unrelated state health database. These additional observations will serve as "masking" observations. A file consisting of personal information for both HMP beneficiaries and the masking observations will then be provided to the credit reporting agency, which will perform the final step of the data linkage, and then deliver the data to our team with all identifying information removed. Because of the masking procedure, the credit reporting agency will be unable to distinguish which observations are associated with HMP beneficiaries. In the prior study, approximately 98% of HMP beneficiaries were successfully matched to the credit reporting data. We will obtain semi-annual snapshots of credit report data for HMP beneficiaries and comparison groups in low-income zip codes of states that have not expanded Medicaid, beginning in 2013 through 2022 (the most recent data we anticipate being available for analysis).

This data source will be used to examine evaluation question 6.2.

Measures

The credit reporting agency data include several measures that have been used in previous studies of financial distress. Our analysis will be informed by this previous research. One measure is the total amount of debt that has been sent by an original creditor to a third-party collection agency. This debt could represent unpaid bills or severely derogatory credit accounts, such as a credit card bill that is over 180 days late. The credit reporting agency data provide details on the type of third-party collections. Medical bills are reported separately from other sources of debt and are of particular interest. Another indicator of financial distress is credit accounts that are 30 days or more past due but not yet sent to a collection agency. The amount of credit that is in collections and the amount past due but not yet in collections can be summed to form the total amount of debt on which a consumer is delinquent. Another marker of financial difficulties that we will examine is the number of months a consumer is overdrawn on his or her credit card out of the last 12 months. While being overdrawn is not a measure of delinquency *per se*, it is a sign that the consumer is having difficulty spending less than their card limit. This may be a precursor to delinquent debt. We will also analyze financial judgments from court proceedings, including evictions from housing and personal bankruptcies, as measures of severe financial distress.

Finally, we will examine credit score or similar summary of creditworthiness. Lenders use this measure when evaluating whether to extend credit and at what price. As such, it is a concise summary of an individual's access to credit markets. We will analyze the credit score as a

²⁵ Miller, S., Hu, L., Kaestner, R., Mazumder, B., & Wong, A. (2018). [The ACA Medicaid Expansion in Michigan and Financial Health](#). NBER Working Paper No. 25053.

continuous variable. We will also examine the probability that an individual has a credit score in the “subprime” (≤ 600) range, as well as in the “deep subprime” (< 500) range.

Analytic approach

We will construct several different cohorts of HMP beneficiaries with an appropriate comparison group for each cohort and examine credit report outcomes for all cohorts.

Early beneficiary cohort: Individuals who enrolled in HMP in 2014-2015 and have at least one year of total enrollment in HMP. *Comparison group:* Randomly selected individuals from low-income zip codes in states that have not expanded Medicaid.

Later beneficiary cohort: Individuals who enrolled in HMP in 2018-2019 and have at least one year of total enrollment in HMP. *Comparison groups:* (a) Randomly selected individuals from low-income zip codes in states that have not expanded Medicaid; (b) early beneficiary cohort.

2020 beneficiary cohort: Individuals who enrolled in HMP between March 2020 and March 2021 and have at least one year of total enrollment in HMP. *Comparison groups:* Randomly selected individuals from low-income zip codes in states that have not expanded Medicaid.

Disenrollment cohort: Individuals who disenrolled from HMP after at least one year of enrollment. *Comparison group:* Individuals matched on age, zip code, and initial enrollment period who remain enrolled in HMP.

For all analyses, we will use an event study framework to test for a break in trend from 2013 through 2022 within the cohort. We will also use standard difference-in-differences techniques using the comparison groups specified above, including using an evaluation of pre-trends in each cohort and its comparison group(s). If there is not good matching of the pre-trends between treatment and comparison groups, we will consider propensity score weighting or synthetic control methods combined with difference-in-differences analysis.

The results of the early beneficiary cohort and later beneficiary cohort analyses will be included in the interim report. The results of the 2020 beneficiary cohort and the disenrollment cohort will be included in the summative report.

C.4.7. Behavioral Risk Factor Surveillance System (BRFSS)

Data source

We will use national survey data from the Behavioral Risk Factor Surveillance System (BRFSS)²⁶ to estimate changes in health behaviors and health status at the population level. The BRFSS is a nationally representative telephone survey of U.S. adults conducted at the state level and overseen by the Centers for Disease Control & Prevention. Its state-based sampling will allow us to compare changes in health behaviors and health status among low-income Michigan residents to low-income residents in Medicaid expansion states without a healthy behavior incentive or requirement, and to low-income residents in states that did not expand Medicaid.

²⁶ [BRFSS \(Behavior Risk Factor Surveillance System, CDC\)](#)

Household income as a proportion of FPL for each respondent will be estimated from income and household variables available in the BRFSS.

This data source will be used to examine evaluation question 1.1.

Measures

Health outcome variables to be used in the analysis include [variable names]:

- General health status (Excellent, Very good, Good, Fair, Poor) [GENHLTH]
- Poor physical health days per month [PHYSHLTH]
- Poor mental health days per month [MENTHLTH]
- Poor physical or mental health keeping from doing usual activities [POORHLTH]

Health behavior variables to be used in the analysis [variable names] can be grouped into three categories:

Unhealthy lifestyle behaviors

- Smoking status, frequency, and cessation attempts [SMOKE100, SMOKDAY2, STOPSMK2]
- Alcohol use (unhealthy alcohol levels, binge drinking) [ALCDAY5, AVEDRNK3, DRNK3GE5, MAXDRNKS]

Healthy lifestyle behaviors

- Physical activity/exercise [EXERANY2, EXEROFT1, EXERHMM1]
- Fruit and vegetable consumption [FRUIT2, FVGREEN1, VEGETAB2]

Preventive health services

- Cholesterol screening [CHOLCH2]
- HIV screening [HIVTST7]
- Cancer screening: (e.g., colonoscopy, mammogram, Pap smear) [HADSIGM3, HADSGCO1, LASTSIG3, BLDSTOO, LSTBLDS3, HADMAM, HOWLONG, HADPAP2, LASTPAP2]
- Immunizations: Flu vaccine [FLUSHOT7]

Analytic approach

To focus on individuals who are likely to be eligible for HMP, the target group will include low-income Michigan adults between the ages of 19 and 64 with incomes less than or equal to 138 percent of the FPL. Similar to our prior work,²⁷ we will assess this group against two comparison groups: 1) low-income adults between the ages of 19 and 64 with incomes less than or equal to 138 percent of the FPL who reside in demographically or geographically similar states that expanded Medicaid as of the penultimate year of analysis (2019 for the interim report, 2021 for the summative report) but did not include a provision for a healthy behavior incentive or requirement; 2) low-income adults between the ages of 19 and 64 with incomes less than or equal to 138 percent of the FPL who reside in demographically or geographically similar states that did not expand Medicaid as of the penultimate year of analysis. Thus, states other than Michigan that expanded Medicaid with a healthy behavior provision (e.g., Indiana, Iowa) will be excluded from analysis.

²⁷ Nelson, D.B., Sommers, B.D., Singer, P.M., Arntson, E.K., & Tipirneni, R. (2020). [Changes in Coverage, Access, and Health Following Implementation of Healthy Behavior Incentive Medicaid Expansions vs. Traditional Medicaid Expansions](#). *J Gen Intern Med*, 35, 2521–2528.

We will use a difference-in-differences analytic approach, comparing trends in health and health behavior outcomes in Michigan to trends in expansion states without a similar waiver and to non-expansion states. The pre-period will include the years 2011-2014 (prior to implementation of the first HMP waiver in 2014), and the post-period will include the years 2015-2022. The regression model will include fixed effects for state and quarter and also control for covariates, such as age, gender, race/ethnicity, marital status, education, income, employment status, and whether the respondent was part of the BRFSS cell phone sample. We will apply the BRFSS survey weights to all analyses. To meet the assumptions of the difference-in-differences analytic approach, we will assess for parallel trends between target and comparison groups among all outcomes in the pre-period. If the parallel trends assumption is not met for any outcome, we will minimize confounding by using propensity score matching based on inverse probability of treatment weights. These weights will be formed by estimating a logistic model of Medicaid enrollment for a sample of Michigan residents in the years before the implementation of the HMP healthy behavior program features and then applying the estimated parameter models to observations from Michigan and the comparison states.

A confounder of secular trends in Michigan and comparison states will be the coronavirus disease 2019 (COVID-19) pandemic experienced by all states in 2020 and 2021. The inclusion of time fixed effects in our models may partially but not completely mitigate this potential bias. Given higher enrollment during the economic downturn in 2020, sample selection may also be changed before and after the pandemic, despite using the same sample inclusion criteria. We will assess this by examining target and comparison group characteristics before and after 2020. We will also conduct sensitivity analyses assessing trends in health and health behaviors before and after 2020 to ensure the parallel trends assumption of difference-in-differences analysis is met, incorporating quarters in calendar years 2020 and 2021 as a confounding covariate in analyses, and consider dropping calendar year 2020 and some or all of 2021 from analyses.

The results of this analysis using BRFSS data from 2015 to 2020 will be included in the interim report and the results of this analysis using BRFSS data from 2015 to 2022 will be included in the summative report.

C.4.8. American Community Survey (ACS)

Data source

The American Community Survey (ACS) is a nationally representative survey conducted annually by the Census Bureau. The sample size in the ACS public release is approximately 3 million individuals in each year. Our analysis will be limited to adults ages 19 through 64 since this is the group potentially eligible for HMP.

Focusing on observations for individuals from ages 19 to 64 yields approximately 1.8 million observations in each year. Of these individuals, approximately 58,000 in each year are in Michigan, while about 1.1 million observations are in other states that have expanded their Medicaid programs and about 690,000 are in states that have not expanded Medicaid. Based on

prior work with these data in the prior waiver evaluation,²⁸ we anticipate having to drop approximately 4 percent of all observations because they are missing data on family income.

This data source will be used to examine evaluation question 4.1.

Measures

Since 2008, the ACS has included a question about health insurance that asks respondents to indicate sources of current health insurance for every household member. Respondents may mark more than one option. We use these data (variable names HINS1 through HINS6) to create binary indicators of four different measures reflecting insurance outcomes: (1) Medicaid or related public coverage, (2) private non-group coverage, (3) employer-sponsored coverage (including TRICARE), and (4) uninsured. With the exception of uninsured, these outcomes are not mutually exclusive; someone might have, for example, both private non-group coverage and Medicaid; however, this is relatively unusual. Our primary outcomes of interest are Medicaid, private coverage, and uninsurance; trends in employer-sponsored coverage will also be reported. These data will be used to assess insurance coverage among non-elderly low-income adults ages 19 through 64 in Michigan relative to other states.²⁹

Analytic approach

To evaluate the effect of HMP on insurance coverage we will use data from the ACS to compare trends in Michigan with trends in demographically or geographically similar non-expansion states and in demographically or geographically similar expansion states without a similar waiver. Comparing trends in Michigan with trends in non-expansion states extends the analysis we did in the original waiver evaluation. Comparing trends in Michigan with trends in other expansion states without similar waiver provisions will shed light on the impact of Michigan's waiver policies. Our analysis of insurance coverage will separately test for effects on the percentage of people with private health insurance, Medicaid, and uninsured.

We will apply standard difference-in-differences techniques. In the analysis of individual-level data from the ACS we will control for a standard set of individual demographic variables and variables that capture economic conditions measured at the state and sub-state level. These control variables include age, race/ethnicity (white non-Hispanic, black non-Hispanic, other non-Hispanic, Asian non-Hispanic, and Hispanic [any race]), education, gender, and marital status. To account for differences in labor market conditions, we will merge unemployment rate data from the Bureau of Labor Statistics to ACS observations at the state-year level.

We plan also to run analyses that minimize the influence of observed confounders on estimates of program effect by limiting the analysis sample to low-income adults with incomes less than or equal to 150% FPL.

The results of this analysis using ACS data from 2008 to 2020 will be included in the interim report and the results of this analysis using ACS data from 2008 to 2022 will be included in the summative report.

²⁸ Levy, H. & Buchmueller, T. (2019). [Report on Reduction in the Number of Uninsured](#).

²⁹ ACS data are released annually in late September for the previous year. So, for example, 2023 ACS microdata would not be released until September 2024.

C.4.9. HCUP Fast Stats inpatient discharge data

Data source

The Healthcare Cost & Utilization Project (HCUP) sponsored by the federal Agency for Healthcare Research and Quality (AHRQ) provides the Fast Stats database (<https://www.hcup-us.ahrq.gov/faststats/landing.jsp>) as a timely source of state-level inpatient discharge data. These data include demographic variables, diagnoses, and payer for patients discharged from non-federal acute-care hospitals.

This data source will be used to examine evaluation question 7.3.

Measures

Outcomes of interest in the HCUP data include the fraction of hospital discharges for adults ages 19 through 64 for whom the primary payer is Medicaid or uninsured/self-pay. Additional outcomes include the fraction with private coverage or Medicare as primary payer.

Analytic approach

To evaluate the effect of HMP on hospital payer mix for non-elderly adults, we will use data from the Medicare cost reports to compare trends in Michigan with trends in demographically or geographically similar non-expansion states and in demographically or geographically similar expansion states without a similar waiver. Comparing trends in Michigan with trends in non-expansion states extends the analysis we did in the original waiver evaluation. Comparing trends in Michigan with trends in other expansion states without similar waiver provisions will shed light on the impact of Michigan's waiver policies. Payer mix for inpatient hospital stays, which is an important determinant of hospital uncompensated care

The results of this analysis using HCUP data from 2010 to 2021 will be included in the interim report and the results of this analysis using HCUP data from 2010 to 2023 will be included in the summative report.

C.4.10. Medicare cost reports

Data source

We will compare trends in uncompensated care provided by acute care hospitals in Michigan to trends for hospitals in other states using data from the Medicare Hospital cost reports. These data are available for all Medicare-certified hospitals in the U.S. Hospitals report data on a fiscal year basis. Information on uncompensated care comes from Schedule S-10 of the cost reports. The analysis in the prior waiver evaluation used cost report data corresponding to fiscal years 2011 to 2015. For the new waiver evaluation, we will extend the analysis period through 2024.

This data source will be used to examine evaluation question 7.3.

Measures

As in the prior waiver evaluation and consistent with the research literature,³⁰ we will focus on uncompensated care, which equals the sum of charity care and bad debt. Both types of uncompensated care can arise from patients who are uninsured or from those who have private insurance but are unable to afford the cost-sharing required by their insurance plan. The amounts of charity care and bad debt that hospitals report to CMS represent the *charges* corresponding to the care provided. The *cost* of this care can be calculated by applying the hospital's cost-to-charge ratio, which is another measure that hospitals provide in their cost reports. We will analyze the cost of uncompensated care measured in dollars and as a percentage of total operating expenses.

Before analyzing these data, it will be necessary to complete several data cleaning steps. In some cases, hospitals submit multiple cost reports, often for periods that are shorter than 12 months. In these cases, we will combine multiple reports to create a single fiscal year observation for the hospital. We will also check the data for infeasible entries in key fields. Where such outliers are found, we will check for consistency within the set of submissions for a particular hospital. A hospital that consistently reports extremely high values in certain fields is less of a concern than a hospital that reports extreme values in one year, but not others.

Analytic approach

To evaluate the effect of HMP on uncompensated care, we will use data from the Medicare cost reports to compare trends in Michigan with trends in demographically or geographically similar non-expansion states and in demographically or geographically similar expansion states without a similar waiver. Comparing trends in Michigan with trends in non-expansion states extends the analysis we did in the original waiver evaluation. Comparing trends in Michigan with trends in other expansion states without similar waiver provisions will shed light on the impact of Michigan's waiver policies. In regression analyses, we will include hospital and area-level control variables obtained from other sources, including the American Hospital Association annual survey, the Health Resources and Service Administration, and the Bureau of Labor Statistics. These covariates will include hospital ownership status, teaching status, bed count, participation in the 340B prescription drug program, and the county unemployment rate where the hospital is located.

The results of this analysis using Medicare cost report data from 2010 to 2021 will be included in the interim report and the results of this analysis using Medicare cost report data from 2010 to 2023 will be included in the summative report.

D. Methodological Limitations

The statewide implementation of the HMP waiver precludes the conduct of a randomized controlled trial. Where possible, we will rely on quasi-experimental designs (e.g., comparing statewide HMP trends to trends from other states; analyzing trends over time) using difference-in-differences or other appropriate methods to conduct more rigorous analyses of the main outcomes of interest. However, we will not be able to draw definitive causal inferences about specific features of HMP.

³⁰ See, for example, Rhodes, J. H., Buchmueller, T. C., Levy, H. G., & Nikpay, S. S. (2019). [Heterogeneous Effects of the ACA Medicaid Expansion on Hospital Financial Outcomes](#). *Contemporary Economic Policy*.

Several HMP features are complementary, notably the enrollment of beneficiaries into managed care with a specific primary care provider and the encouragement to complete an annual health risk assessment with the primary care provider. It may not be possible to separate the effects of these complementary features. However, state Medicaid officials have expressed interest in understanding the additive benefit of an HRA requirement; as such, the evaluation includes several analyses that attempt to understand the contribution of HRA completion in both changes in health status and engagement in healthy behaviors.

The COVID-19 pandemic has had profound effects the availability and delivery of health care services for Medicaid beneficiaries in Michigan and throughout the country. These effects will impact the evaluation by disrupting trends in patterns of enrollment, utilization of services, employment, and financial stability. We will incorporate sensitivity and supplemental analyses throughout the evaluation, based on the timing of the federal COVID-19 public health emergency, to interpret the impact on evaluation results.

During Michigan's COVID-19 public health emergency, HMP enrollment increased by 30% over a one-year period. It is difficult to estimate the proportion of the enrollment increase due to people becoming newly eligible vs. the proportion due to the lack of disenrollment related to the maintenance of effort provisions of Section 6008 of the FFCRA. This will affect the calculation of claims-based outcomes (e.g., HEDIS, NQF measures) that rely on the number of beneficiaries or member-months for a denominator. We will address this limitation by recalculating outcomes after maintenance of effort provisions expire and enrollment corrections are implemented.

Evaluation activities that utilize administrative data rely on complete and accurate information in the state Data Warehouse. For longitudinal measures, we anticipate some challenges due to modifications in the data structure, particularly for the cost-sharing and HRA tables. We will address these challenges by working with state partners to understand changes in definitions and data management procedures, and employing sensitivity analyses to assess how differential categorization may impact results.

Nonresponse bias can affect evaluation results based on beneficiary surveys. We will address this limitation by employing strategies used in the prior evaluation period, including colorful and engaging recruitment brochures, varying the timing of contact attempts, using email addresses of beneficiaries when listed in the Data Warehouse, and allowing unscheduled call-in surveys as well as scheduled appointments. In addition, we will incorporate nonresponse into our weighting of results. Beneficiary surveys include some measures of self-reported health care utilization (e.g., ED visits in prior year, completion of an HRA), which may suffer from recall bias. When possible, we will validate self-report with claims and encounter data from the Data Warehouse.

Finally, data sources that reflect multi-state or national datasets will use income variables to represent the HMP population. Invariably, this data will include some individuals who are eligible but not enrolled in HMP, which may dampen potential observable effects.

F. Attachments

Independent evaluator

The CMS approval of the Section 1115 waiver for the Healthy Michigan Plan requires that the evaluation be designed and conducted by researchers who will meet the scientific rigor and research standards of leading academic institutions and academic journal peer review. The University of Michigan Institute for Healthcare Policy and Innovation (IHPI) is an interdisciplinary university-wide institute at a premier public research university. The mission of the Institute is to improve the quality, safety, equity, and affordability of health care. The Institute includes more than 650 health services researchers from 15 schools and colleges across the university. IHPI faculty members and staff are national leaders in health services research, health economics, and population health with substantial experience conducting rigorous evaluations of access to care, quality of care, costs of care, and health outcomes.

The Institute for Healthcare Policy and Innovation faculty members participating on the HMP evaluation team represent the University of Michigan Medical School, School of Public Health, Institute for Social Research, Ross School of Business, Ford School of Public Policy, and School of Social Work. They conducted the independent evaluation of the Healthy Michigan Plan during the first five years of the Section 1115 demonstration waiver that authorized this program from April 2014 through December 2018.

A summary of the HMP evaluation reports and articles published in peer-reviewed journals by the evaluation team is available on the Institute for Healthcare Policy and Innovation [website](#).

Brief biographies of evaluation team

John Z. Ayanian, MD, MPP, is the Alice Hamilton Distinguished University Professor of Medicine and Healthcare Policy and Director of the Institute for Healthcare Policy and Innovation at the University of Michigan. He has led the team of faculty and staff conducting the CMS-authorized evaluation of the Healthy Michigan Plan in collaboration with MDHHS since 2014. He is a primary care physician and health services researcher whose research focuses on access to care, quality of care, and health care disparities, including the effects of insurance coverage on health services and outcomes. He is the lead author of three articles on the Healthy Michigan Plan published in the *New England Journal of Medicine*. Dr. Ayanian is an elected member of the National Academy of Medicine, a Master of the American College of Physicians, and the founding Editor of *JAMA Health Forum*.

Nora V. Becker, MD, PhD, is an Assistant Professor in the Department of Internal Medicine, Division of General Medicine, and at the Institute for Healthcare Policy and Innovation at the University of Michigan. Dr. Becker's research focuses on the impact of changes in health policy and health insurance coverage on health care utilization and health outcomes among women and economically disadvantaged populations. As a member of the HMP evaluation team, she brings expertise in health economics and working with insurance claims and financial data.

Thomas C. Buchmueller, PhD, is the Waldo O. Hildebrand Professor of Risk Management and Insurance at the University of Michigan's Stephen M. Ross School of Business. From 2012 to 2019 he served as the Chair of the School's Business Economics and Public Policy area. Buchmueller is an expert on the economics of health insurance and related public policies. His

areas of expertise on the HMP evaluation team include the impact of the expansion on health insurance coverage and on hospital uncompensated care. Other research on the Affordable Care Act includes studies on the law's effects on insurance coverage, hospital utilization and finances and labor market outcomes. In 2011-12 he served as Senior Health Economist to the President's Council of Economic Advisers.

Sarah J. Clark, MPH, is a Research Scientist in the Department of Pediatrics, based in the Susan B. Meister Child Health Evaluation and Research (CHEAR) Center at the University of Michigan. She also serves as Co-Director of the C.S. Mott Children's Hospital National Poll on Children's Health. Since joining the University of Michigan faculty in 1998, Ms. Clark has worked closely with Michigan Medicaid and other MDHHS units on projects evaluating programs and policies related to managed care, children with special health needs, substance use disorder, and provision of dental care, and others. She led the utilization analyses in the initial HMP evaluation, and oversaw data collection for the HMP beneficiary surveys.

Susan Dorr Goold, MD, MHSA, MA, is a Professor of Internal Medicine and Health Management and Policy. She engages patients and communities, particularly minority and underserved communities, in research on health policy. She served as the lead on the beneficiary and provider surveys in the initial HMP evaluation. The Healthy Michigan Voices surveys and interviews have become a national model for Medicaid expansion evaluations in numerous other states. She has served on a CMS panel advising state leaders about 1115 waiver evaluations, consulted for Mathematica as they developed guidance for 1115 waiver evaluations and serves on the advisory board for the Medicaid Demonstration Evaluation Learning Collaborative. Dr. Goold is a Fellow of the American College of Physicians and the Hastings Center.

Richard Hirth, PhD, is the S.J. Axelrod Collegiate Professor of Health Management and Policy at the University of Michigan School of Public Health. Dr. Hirth is an economist whose research focuses on healthcare spending, insurance design and payment systems. He led the cost-sharing analyses for the initial HMP evaluation. In that role, he led the analyses and report writing about the effects of HMP cost-sharing and premium contributions on spending, value of care, and program enrollment.

Edith C. Kieffer, MPH, PhD, is Professor Emerita at the University of Michigan School of Social Work. She conducts community-based participatory intervention research addressing disparities in health and health care. She has contributed to survey design, analyses, and development of reports, presentations and publications as part of the HMP evaluation team. She led the qualitative interviews and analyses conducted as part of the initial HMP evaluation which have provided an in-depth understanding of the perceptions and experiences of HMP beneficiaries, health care providers, and individuals who are eligible for HMP but unenrolled, in their own words. In 2015, she led cognitive interviews to assess HMP beneficiaries' understanding of their MI Health Account statements and recommend modifications.

Sunghee Lee, MS, PhD, is an Associate Research Scientist in the Survey Research Center at the University of Michigan's Institute for Social Research. She provides guidance on power analysis and sample design for the HMP evaluation and leads post-survey statistical weighting efforts.

Helen Levy, PhD, is a Research Professor at the University of Michigan's Institute for Social Research, Gerald R. Ford School of Public Policy, and School of Public Health. Her research interests include evaluating the impact of Medicaid expansion at both the state and national levels, the causes and consequences of lacking health insurance, and material hardship among older Americans. Her expertise on the HMP evaluation team includes the impact of the expansion on health insurance coverage and on hospital uncompensated care. She has also conducted research on the impact of Medicaid expansion nationally on economic outcomes including consumption and labor supply, and she co-authored a study of the fiscal impact of Michigan's Medicaid expansion on the state. Levy is also an Associate Director of the Health and Retirement Study, an NIH-funded longitudinal study of health and economic dynamics at older ages. She is a Research Associate at the National Bureau of Economic Research and served as a Senior Economist to the President's Council of Economic Advisers in 2010-11.

Minal Patel, MPH, PhD, is an Associate Professor in the Department of Health Behavior & Health Education at the University of Michigan School of Public Health. Emphases of her work include access to care, health care navigation, health-related financial burden, and team-based care. Dr. Patel has led studies focused on improving health insurance literacy in economically disadvantaged communities that are primarily covered under Medicaid/HMP, screening and addressing social determinants of health in clinical settings, and health care provider training in implementing guideline-based care. She contributed to the initial HMP evaluation by providing expertise to the survey team related to individuals with chronic conditions.

Zachary Rowe is Executive Director of Friends of Parkside, a non-profit, community-based organization that concerns itself with the health, education and safety of the residents that live in the Village at Parkside on the eastside of Detroit. He has more than 23 years of experience with community-based participatory research and was a founding member of the Detroit Urban Research Center (URC) Board. He serves on the Health Housing Heatwave Partnership Steering Committee, Healthy Environment Partnership Steering Committee, Community Action Against Asthma Steering Committee, the University of Michigan Clinician Scholars Program Advisory Committee and consults for the Michigan Institute for Clinical and Health Research. He has co-directed several projects with Dr. Goold, including the NIA-funded DECIDERS project.

Renuka Tipirneni, MD, MSc, is an Assistant Professor in the Department of Internal Medicine, Divisions of General Medicine and Hospital Medicine, and at the Institute for Healthcare Policy and Innovation investigating the impact of health reform policies and programs on low socioeconomic status, aging and other vulnerable populations, and on delivery of care in the health care safety net. As a member of the team conducting the initial HMP evaluation, she focused on assessing health and employment-related outcomes among enrollees. Dr. Tipirneni will continue to assist with evaluating these key measures in the next waiver evaluation.

Community Advisory Board. The HMP evaluation team has benefitted from the guidance and insights of a Community Advisory Board composed of leaders from minority and underserved communities across Michigan since 2014. These community leaders consult with the evaluation team to ensure Healthy Michigan Voices surveys and other evaluation activities are reflective of diverse perspectives. The Community Advisory Board has engaged with the University of

Michigan in Michigan-focused health policy projects since 2011 to give voice to these communities in decisions about health policy and health research.

Evaluation budget

The HMP evaluation team has prepared and submitted an evaluation budget which includes the total estimated cost, as well as a breakdown of estimated staff, administrative, and other costs for all aspects of the evaluation.

Evaluation data collection, analysis, and reporting milestones

The interim report will be submitted to MDHHS in July 2022 and will contain initial analyses of Data Warehouse (DW) enrollment and claims data, HMP survey data, beneficiary interview data, provider interview data, key informant interview data, credit report data, BRFSS data, ACS data, HCUP data, and Medicare cost report data, as well as findings from interviews with beneficiaries. The summative report will be submitted to MDHHS in July 2024 and will contain final analyses of administrative data, HMP survey data, beneficiary interview data, provider interview data, key informant interview data, credit report data, BRFSS data, ACS data, HCUP data, and Medicare cost report data, as well as the findings from provider interviews, beneficiary follow-up interviews, key informant interviews, and the HMP beneficiary survey.

The below timeline may be modified based on the duration of the federal declaration of the public health emergency, due to delays in data availability, as a result of any limitations on data collection due to pandemic workforce restrictions, or due to other reasons related to the COVID-19 pandemic. As noted above in Sections C.4.1 and C.4.2, evaluation activities focused on the 48-month policy will be limited to descriptive, trend analyses of administrative data if implementation of the new requirements occurs between January and June 2023.

Evaluation Activities/Reporting Milestones	Date
Initial linkages & analysis of DW data, credit report data, BRFSS data, ACS data, HCUP data, and Medicare cost report data	January 2021 – May 2022
Conduct beneficiary interviews	July 2021 – September 2021
Field HMP beneficiary survey	July 2021 – April 2022
Conduct provider interviews	September 2021 – November 2021
Conduct key informant interviews	December 2021 – March 2022
Conduct initial analyses of survey and interview data	October 2021-May 2022
Interim report submitted to MDHHS	July 2022
Ongoing analysis of HMP survey data, beneficiary interview data, provider interview data, key informant interview data, DW data, credit report data, BRFSS data, ACS data, HCUP data, and Medicare cost report data	August 2022 – May 2024
Conduct follow-up beneficiary interviews	November 2022 – March 2023
Summative report submitted to MDHHS	July 2024

Healthy Michigan Plan Evaluation Tables of Hypotheses & Research Questions

1. Healthy Behaviors Incentives Program

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 1.1: Health status will improve and healthy behaviors will increase over time among income-eligible adults in Michigan compared with similar adults in comparison states.			
Research question 1.1: How has the health and healthy behavior engagement among Michigan adults changed since introduction of HMP and its Healthy Behaviors Incentives Program?			
Similar adults in expansion states without a healthy behavior waiver provision	Proportion reporting fair/poor health status	BRFSS	Difference-in-difference regression model of health and health behavior outcomes in Michigan vs. comparison states not implementing similar waivers
	Proportion reporting >5 days in past 30 days with poor physical health, mental health, and physical or mental health keeping from usual activities		
Similar adults in states that did not expand Medicaid under the ACA	Proportion reporting engagement in unhealthy lifestyle behaviors		
	Proportion reporting engagement in healthy lifestyle behaviors		
	Proportion reporting receipt of preventive services		
Hypothesis 1.2: Engagement in efforts to maintain or improve health will be higher among beneficiaries who report knowledge of the HMP Healthy Behaviors Incentives Program.			
Research question 1.2: What is the association between beneficiary knowledge of the Healthy Behaviors Incentives program and efforts to maintain or improve health?			
Beneficiaries who report higher vs. lower knowledge of Healthy Behaviors Incentives program	Proportion reporting engagement in healthy lifestyle behaviors	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional survey outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, duration of HMP enrollment
	Proportion reporting that they are able to take actions to maintain or improve their health		
	Proportion reporting participation in health-supporting measures		
Hypothesis 1.3: Beneficiaries who complete an HRA will report improvement in health status and health behaviors compared to beneficiaries who do not complete an HRA.			
Research question 1.3: Is HRA completion associated with improved health status and health behaviors?			
Beneficiaries who do vs. do not report completion of an HRA	Proportion reporting fair or poor physical, mental and oral health status	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional survey outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, duration of HMP enrollment
	Proportion reporting >5 days in past 30 days with poor physical health, mental health, and physical or mental health keeping from usual activities		

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
	Proportion reporting improvement in physical and mental health over past 12 months		Mixed effects logistic regression models of Longitudinal Cohort responses over time, adjusting for age, gender, race/ethnicity, income, and chronic condition
	Proportion reporting engagement in unhealthy lifestyle behaviors		
	Proportion reporting engagement in healthy lifestyle behaviors		
Hypothesis 1.4: Beneficiaries who complete at least one HRA will demonstrate higher rates of preventive service use compared to beneficiaries who have similar primary care utilization but who have not completed an HRA.			
Research question 1.4: Is HRA completion associated with higher rates of preventive service use?			
Beneficiaries who do vs. do not have evidence of a completed HRA	Proportion with evidence of annual primary care and dental visits (HEDIS AAP, ADV)	Medicaid claims and encounter data; HRA tables	Bivariate comparison of outcomes; multivariate models adjusting for primary care continuity patterns; multivariate negative binomial regression controlling for demographic characteristics to generate stratified results for those with chronic conditions (asthma, heart failure, COPD, diabetes)
	Proportion with evidence of flu vaccine, cancer screening (NCQF 0039, 0034, 2372, 0032)		
Hypothesis 1.5: Beneficiaries will describe assistance from primary care providers in setting health goals and engaging in behavior change to meet those goals.			
Research question 1.5: How has the Heathy Behaviors Incentives program, and HMP as a whole, affected beneficiaries’ engagement in health behaviors and other efforts to maintain or improve health over time?			
n.a.	Reported impact on engagement in health behaviors	Interviews with beneficiaries	Descriptive cross-sectional and longitudinal qualitative analysis
	Reported impact on other efforts to maintain or improve health		
Hypothesis 1.6: Primary care providers will describe that they have become more knowledgeable over time about how to use the HRA to engage patients enrolled in HMP.			
Research question 1.6: How do primary care providers use the HRA to assist in patient engagement and health promotion?			
n.a.	Reported usefulness of HRA as tool to engage patients	PCP interviews	Descriptive cross-sectional qualitative analysis; assessment of variation by plan participation, volume of HMP-enrolled patients
	Reported understanding of the HRA process and financial incentives		

2. Cost-Sharing

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 2.1: Beneficiaries who are aware of healthy behavior financial incentives will demonstrate a better understanding of cost-sharing obligations and connections between service utilization and amount owed.			
Research question 2.1: Do beneficiaries understand cost-sharing and other consumer-oriented features of HMP coverage?			
Beneficiaries who do vs. do not report awareness of healthy behavior financial incentives	Proportion reporting awareness of financial incentives related to Healthy Behaviors Incentives program Proportion reporting correct information about payment obligations, link between service utilization and cost-sharing Proportion who recall receiving a MI Health Account (MIHA) statement	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional survey outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, literacy, duration of HMP enrollment
Hypothesis 2.2: Beneficiaries with MI Health Account fees will have better payment compliance than their counterparts with service-based cost-sharing only.			
Research question 2.2: What factors are associated with beneficiaries' compliance with cost-sharing obligations?			
Beneficiaries who are vs. are not subject to fees	Beneficiary-level payments (any payment, full payment) of amount owed	Medicaid cost-share tables	Descriptive quantitative analysis of the average amounts and distribution of cost-sharing obligations and estimating multivariate models adjusting for beneficiary characteristics including time enrolled, and subgroup analyses (such as age, gender, race/ethnicity, urban/rural, income, and length of HMP enrollment)
Hypothesis 2.3: Beneficiaries will understand where to find the amount they owe, but may not understand how that amount is calculated.			
Research question 2.3: Are beneficiaries able to understand the MI Health Account statement?			
n.a.	Understanding of MIHA terminology and layout	Interviews with beneficiaries	Descriptive cross-sectional qualitative analysis
Hypothesis 2.4: Beneficiaries will report financial barriers more often than logistical barriers to paying the amount owed.			
Research question 2.4: What are barriers and facilitators for beneficiaries to pay the amount owed?			
n.a.	Barriers and facilitators to making payments	Interviews with beneficiaries	Descriptive cross-sectional qualitative analysis

3. 5% Premium Cost-Sharing & HRA/Healthy Behavior Requirements (48-month policy)*

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 3.1: Beneficiary literacy level will be associated with understanding of specific provisions of the new 48-month policy.			
Research question 3.1: Do beneficiaries subject to the new 48-month policy understand the requirements and consequences for noncompliance?			
n.a.	Proportion reporting knowledge of HRA/healthy behavior requirement	Beneficiary surveys – longitudinal cohort (subject to 48-month policy)	Bivariate comparison of cross-sectional survey outcomes by literacy level; multivariate models adjusting for age, gender, race/ethnicity, chronic condition
	Proportion reporting knowledge of 5% monthly premium requirement		
	Proportion reporting knowledge of consequences for noncompliance		
Hypothesis 3.2: Among beneficiaries subject to the new 48-month policy, HRA/healthy behavior completion will increase for beneficiaries with income >100% FPL who are subject to disenrollment, with no change for beneficiaries with income <100% FPL who are not subject to disenrollment.			
Research question 3.2: Is the penalty of disenrollment for failure to complete the HRA/healthy behavior requirement stronger than the incentive of cost-sharing reduction for HRA/healthy behavior completion?			
Beneficiaries before vs. after implementation of the 48-month policy	Probability of completing an annual HRA or healthy behavior	Medicaid HRA tables	Regression model of HRA completion stratified by income group (</>100%), adjusted for demographic characteristics (gender, age, race/ethnicity, urban/rural)
Hypothesis 3.3: Payment compliance will be higher among those subject to the 5% monthly premium requirement than under the previous cost-sharing requirements.			
Research question 3.3: Among beneficiaries with income above 100% FPL, how does payment compliance change with the new cost-sharing requirements (from 2% fee and service-related co-payments to a flat 5% premium)?			
Beneficiaries before vs. after implementation of the 48-month policy	Rates of any payment, full payment of cost-share obligations	Medicaid cost-share tables	Regression model of payment adjusted for demographic characteristics (such as age, gender, race/ethnicity, urban/rural)
Hypothesis 3.4a: The rate of disenrollment will be higher after implementation of the 5% monthly premium requirement compared to before implementation.			
Hypothesis 3.4b: Disenrollment will disproportionately occur among beneficiaries with low utilization in the 24 months prior to implementation of the 5% monthly premium requirement.			
Research question 3.4: To what extent is the 5% monthly premium requirement associated with disenrollment?			
Beneficiaries with high vs. low utilization prior to implementation of the 48-month policy	Rate of HMP disenrollment	Medicaid enrollment files Medicaid claims and encounter data	Comparison of disenrollment rates for pre- vs. post-implementation period using paired t-tests. Multivariate negative binomial regression controlling for demographic characteristics to generate stratified results for those with high vs. low utilization.
	Utilization in prior 24 months (number of primary care visits, dental visits, ED visits, hospitalizations, medication fills)		

*Contingent on implementation, if implemented between January 2023 and July 2023, all analyses will be descriptive, trend analyses.

4. Overall Demonstration: Reduce uninsurance

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 4.1a: The decline in uninsurance among non-elderly adults in Michigan compared to other states that did not expand Medicaid that was observed in 2013-2017 will be sustained through subsequent years.			
Hypothesis 4.1b: The decline in uninsurance among non-elderly adults in Michigan compared to other states that expanded without a waiver that was observed in 2013-2017 will be sustained through subsequent years.			
Research question 4.1: How have insurance coverage rates in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?			
Similar adults in states that did not expand Medicaid under the ACA	Proportion of adults who are: • Uninsured	ACS (variables HINS1 through HINS6)	Difference-in-differences regression model of coverage among all non-elderly adults, among low-income adults (e.g. income <200% of FPL), and among adults with characteristics correlated with program eligibility (e.g., low levels of education)
Similar adults in expansion states without a similar waiver	• Insured through Medicaid • Insured through employer-sponsored coverage • Insured through private non-group coverage		Regression adjusted for observable demographic characteristics (age, gender, race/ethnicity)

5. Overall Demonstration: Promote primary care/responsible use of services

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 5.1a: Beneficiaries who report no barriers to primary care will be more likely to report improved health status and ability to take action to improve or maintain their health.			
Hypothesis 5.1b: Beneficiaries who make regular primary care visits will be more likely to report improved health status and ability to take action to improve or maintain their health.			
Research question 5.1: Does HMP's facilitation of primary care access (e.g., through managed care PCP assignment) influence beneficiary engagement in health and maintenance or improvement in physical and mental health?			
Beneficiaries who do vs. do not report difficulty accessing primary care	Proportion reporting it is easy to get advice or an appointment from their primary care provider	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional survey outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, literacy, duration of HMP enrollment
Beneficiaries who do vs. do not report regular primary care visits (avg 1 per year)	Proportion reporting fair or poor physical, mental and oral health status		Independent sample t-test comparison of aggregate responses for New Cohort vs. Longitudinal Cohort at a similar point in their HMP enrollment, with multivariate models adjusting for age, gender, race/ethnicity, income, and chronic condition
	Proportion reporting >5 days in past 30 days with poor physical health, mental health, and physical or mental health preventing usual activities		
	Proportion reporting improvement in physical and mental health over past 12 months		
	Proportion reporting that they are able to take actions to maintain or improve their health		Mixed effects logistic regression models of Longitudinal Cohort responses over time, adjusting for age, gender, race/ethnicity, income, and chronic condition
Hypothesis 5.2: Beneficiaries who report barriers to care will be more likely to report an emergency department visit without first attempting to contact their primary care provider.			
Research question 5.2: What factors influence beneficiaries' decisions about seeking care in the emergency department?			
Beneficiaries who do vs. do not report difficulty obtaining needed services	Proportion reporting it is easy to get advice or an appointment from their primary care provider	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional survey outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, duration of HMP enrollment
	Proportion reporting medical urgency vs. PCP recommendation vs. other reason for ED visit in the past 12 months		Independent sample t-test comparison of aggregate responses for New Cohort vs. Longitudinal Cohort at a similar point in their HMP enrollment, with multivariate models adjusting for age, gender,
	Proportion reporting they attempted to contact their primary care provider before going to the ED, among those reporting ED visit		

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
			race/ethnicity, income, and chronic condition
			Mixed effects logistic regression models of Longitudinal Cohort responses over time, adjusting for age, gender, race/ethnicity, income, and chronic condition
Hypothesis 5.3: Beneficiaries with higher continuity of primary care will have lower rates of emergency department utilization and lower odds of being high-frequency ED utilizers.			
Research question 5.3: Is use of the emergency department related to continuity of primary care?			
Beneficiaries with higher vs. lower primary care continuity	Rate of ED visits (HEDIS EDU)	Medicaid claims and encounter data	Comparison of ED outcomes using paired t-tests; multivariate negative binomial regression controlling for demographic characteristics to generate stratified results for those with chronic conditions (asthma, heart failure, COPD, diabetes)
	Proportion of high-frequency ED utilizers		
	Primary care continuity (average number of primary care visits per year)		
Hypothesis 5.4: Beneficiaries with chronic conditions will demonstrate better rates of medication management and primary care utilization, and lower rates of ED visits and hospitalizations, over time compared to their initial year of HMP enrollment.			
Research question 5.4: Does HMP promote more consistent use of services to manage chronic conditions over time?			
n.a	Rate of appropriate medication management (HEDIS PCE, MMA, SPC, SPD)	Medicaid claims and encounter data	Comparison of outcomes in initial vs. subsequent years using paired t-tests; multivariate negative binomial regression controlling for demographic characteristics to generate stratified results by continuity of primary care
	Emergency department visit rate (HEDIS EDU); Follow-up after ED visit for beneficiaries with multiple chronic conditions (HEDIS FMC)		
	Disease-specific hospitalization rates (NQF 0272, 0275, 0277)		
Hypothesis 5.5: Beneficiaries will describe HMP as allowing them to receive services that have a significant positive impact on their health and well-being.			
Research question 5.5: How has HMP impacted beneficiaries’ physical, mental, and oral health and their use of health care services over time?			
n.a.	Reported impact of HMP on health status (physical, mental, oral)	Interviews with beneficiaries	Descriptive cross-sectional and longitudinal qualitative analysis
	Reported impact of HMP on use of health care services		

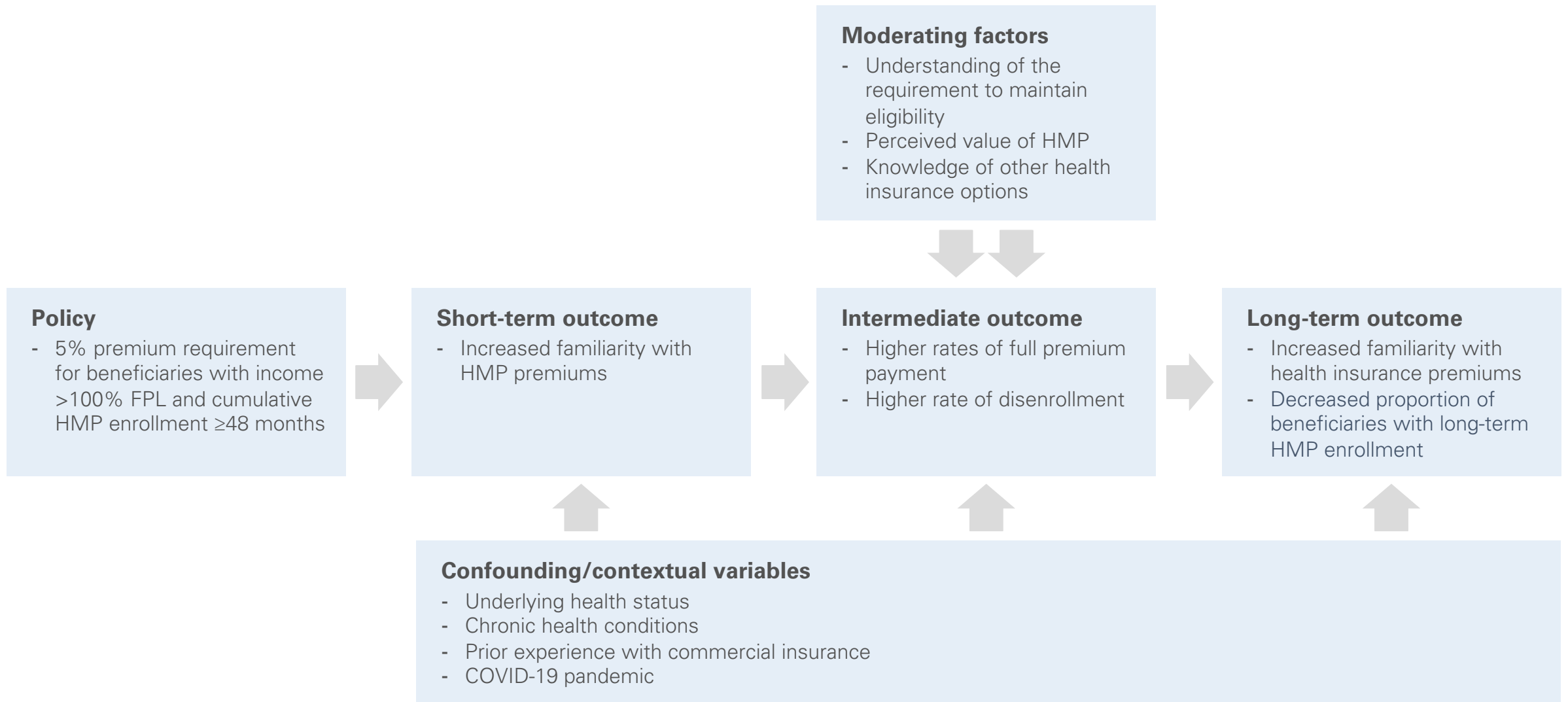
6. Overall Demonstration: Support financial well-being

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 6.1: Beneficiaries will report sustained or increased employment and decreased health-related barriers to employment over time.			
Research question 6.1: What impact has HMP had on beneficiaries' levels of employment and ability to work?			
n.a.	Proportion reporting full/part time employment	Beneficiary surveys – longitudinal and new cohorts	Bivariate comparison of cross-sectional outcomes; multivariate models adjusting for age, gender, race/ethnicity, income, chronic condition, duration of HMP enrollment
	Proportion reporting work hours >20 hours/week		
	Proportion reporting health-related barriers to work		
	Proportion reporting other barriers to work (inconsistent work schedule, transportation, caregiving responsibilities, homelessness, discrimination)		Independent sample t-test comparison of aggregate responses for New Cohort vs. Longitudinal Cohort at a similar point in their HMP enrollment; multivariate models adjusting for age, gender, race/ethnicity, income, and chronic condition
			Mixed effects logistic regression models of Longitudinal Cohort responses over time, adjusting for age, gender, race/ethnicity, income, and chronic condition
Hypothesis 6.2: HMP enrollment will be associated with improved credit report outcomes for beneficiaries over time.			
Research question 6.2: How is HMP enrollment related to individual beneficiaries' financial outcomes during and after HMP enrollment?			
Individuals from low-income zip codes in states that have not expanded Medicaid	Total debt past due	Credit report data linked to Medicaid enrollment	Event study regression models to test for break in trend over time
	Bills in collections (all, medical)		
HMP beneficiaries who enrolled in different time periods	Number of months with overdrawn credit cards		Difference-in-difference regression models
	Financial judgments (e.g., evictions, bankruptcies, and wage garnishments)		
	Credit scores		
Hypothesis 6.3: Beneficiaries will describe examples of how HMP has improved their financial and material well-being.			
Research question 6.3: How has HMP affected beneficiaries' financial and material well-being over time?			
n.a.	Reported impact on how HMP has facilitated ability to work	Interviews with beneficiaries	Descriptive cross-sectional and longitudinal qualitative analysis
	Reported impact on financial well-being, including out-of-pocket costs for health services		

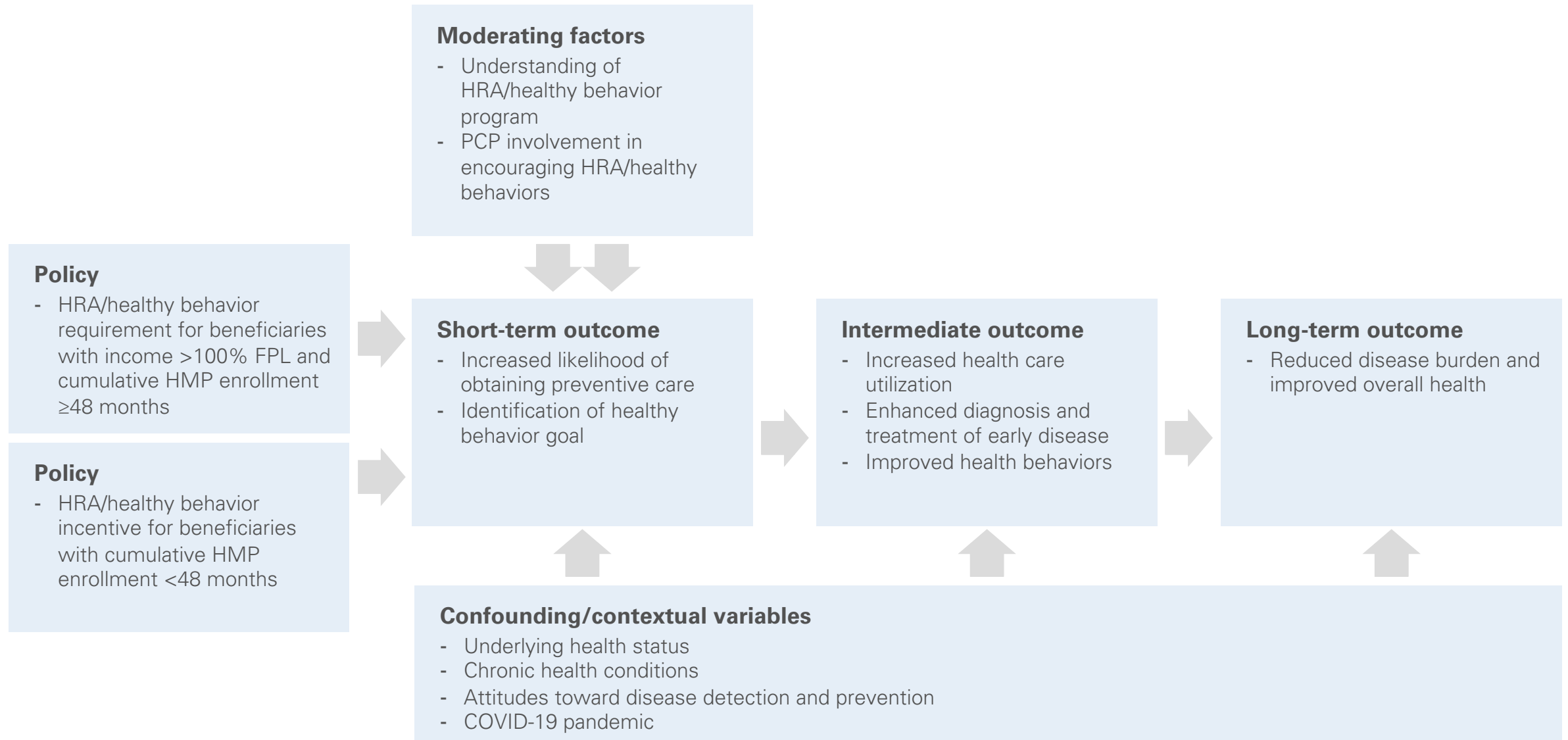
7. Overall Demonstration: Sustain the safety net and support coordinated strategies to address social determinants of health

Comparison strategy	Outcome measure(s)	Data sources	Analytic approach
Hypothesis 7.1: Administrative costs to implement demonstration policies will remain stable during the current Section 1115 waiver period.			
Research question 7.1: What are the categories and estimated amounts of the State’s costs to administer key HMP demonstration policies (e.g., Healthy Behaviors Incentives program, cost-sharing)?			
n.a.	Reported HMP administrative costs and staff effort over time	Key informant interviews	Descriptive cross-sectional qualitative analysis
Hypothesis 7.2: Annual trends in age- and sex-adjusted expenditures per member-month will demonstrate a lower rate of increase over time for enrollees in HMP managed care than for enrollees in traditional Medicaid managed care.			
Research question 7.2: How do trends over time in Medicaid expenditures per member-month for HMP enrollees compare to those for beneficiaries in traditional Medicaid managed care?			
HMP-MC vs traditional MA-MC	Total expenditures per member-month	Medicaid claims and encounter data	Year-to-rate change in member-month expenditures, adjusted for enrollee age and sex
Hypothesis 7.3a: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that did not expand Medicaid that was observed between 2013 and 2017 will be sustained in subsequent years.			
Hypothesis 7.3b: The decline in hospital uncompensated care and the fraction of hospital discharges among non-elderly adults in Michigan for whom the primary payer was uninsured/self-pay compared with states that expanded Medicaid without a waiver that was observed between 2013 and 2017 will be sustained in subsequent years.			
Research question 7.3: How have uncompensated care costs in the state changed since the implementation of HMP, compared with states that did not expand Medicaid and with states that expanded Medicaid without a waiver?			
States that did not expand Medicaid under the ACA	Proportion of hospital discharges for which primary payer was uninsured/self-pay	HCUP Fast Stats Inpatient Stay data	Comparison of trends in Michigan with other states by payer/age group (Medicaid, 19-64; Medicare, 65+; uninsured, 19-64; private, 19-64)
Expansion states without a similar waiver			
States that did not expand Medicaid under the ACA	Uncompensated care costs	Medicare cost reports (worksheet S-10)	Difference-in-differences regression models of uncompensated care costs comparing changes for Michigan to changes in expansion states that do not have a similar demonstration
Expansion states without a similar waiver			
Regression adjusted for state-level variables			
Hypothesis 7.4: State officials and safety-net providers will describe specific examples of health-promoting initiatives that build on HMP’s continuity, breadth of coverage, and primary care emphasis.			
Research question 7.4: How does HMP support new or broadened initiatives to address social determinants of health for low-income adults in Michigan?			
n.a.	Reported role of HMP in sustaining new or broadened initiatives	Key informant interviews	Descriptive cross-sectional qualitative analysis

Logic model for program goals as stated in HMP Section 1115 demonstration waiver 5% premium requirement (48-month policy)



Logic model for program goals as stated in HMP Section 1115 demonstration waiver HRA/healthy behavior requirement (48-month policy) and Healthy Behaviors Incentives program



Administrative Data Appendix

Introduction

The Administrative Data Appendix includes additional results using administrative data.

Additional Results

Evaluation question 1.4: Is HRA completion associated with higher rates of preventive service use?

Administrative Data Appendix Table 1.4.1. Logistic regression – HRA completion in first year of HMP-MC enrollment

	HRA completion in first year			
	OR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	—
2016-2017	0.872	0.856	0.889	0.000
2018-2019	0.599	0.586	0.612	0.000
2020-2021	0.583	0.569	0.597	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	—
1-99%	1.121	1.101	1.141	0.000
100% or higher	1.183	1.159	1.208	0.000
Sex				
Female	Ref.	—	—	—
Male	0.763	0.751	0.775	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	—
21-29 years	1.324	1.286	1.364	0.000
30-49 years	1.598	1.555	1.641	0.000
50-59 years	2.567	2.496	2.641	0.000
60-64 years	3.335	3.214	3.461	0.000
Preferred oral/written language				
English	Ref.	—	—	—
Other language	1.217	1.155	1.282	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	—
Black, non-Hispanic	0.889	0.850	0.929	0.000
White, non-Hispanic	1.321	1.268	1.377	0.000
Other/Unknown	1.271	1.214	1.332	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	—
Suburban	0.825	0.797	0.855	0.000
Urban	0.975	0.951	0.999	0.043
Disability (composite)				
No	Ref.	—	—	—
Yes	1.216	1.198	1.235	0.000

Logistic regression controlling for cohort year, income level, sex, age, preferred language, race/ethnicity, urbanicity, and disability composite indicator

Administrative Data Appendix

Administrative Data Appendix Table 1.4.2. Logistic regression – Any HRA completion in first 2 years of HMP-MC enrollment

	Any HRA completion in first 2 years			
	OR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	—
2016-2017	0.893	0.878	0.908	0.000
2018-2019	0.611	0.599	0.622	0.000
2020-2021	0.594	0.581	0.607	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	—
1-99%	1.129	1.111	1.147	0.000
100% or higher	1.250	1.227	1.273	0.000
Sex				
Female	Ref.	—	—	—
Male	0.748	0.738	0.758	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	—
21-29 years	1.190	1.161	1.221	0.000
30-49 years	1.473	1.440	1.507	0.000
50-59 years	2.284	2.229	2.340	0.000
60-64 years	2.918	2.822	3.017	0.000
Preferred oral/written language				
English	Ref.	—	—	—
Other language	1.310	1.251	1.373	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	—
Black, non-Hispanic	0.922	0.887	0.957	0.000
White, non-Hispanic	1.246	1.203	1.292	0.000
Other/Unknown	1.221	1.173	1.272	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	—
Suburban	0.861	0.834	0.889	0.000
Urban	1.060	1.036	1.084	0.000
Disability (composite)				
No	Ref.	—	—	—
Yes	1.264	1.247	1.282	0.000

Logistic regression controlling for cohort year, income level, sex, age, preferred language, race/ethnicity, urbanicity, and disability composite indicator

Administrative Data Appendix

Administrative Data Appendix Table 1.4.3. Receipt of primary care, dental care, and preventive services, by HRA completion in the first 2 years of HMP-MC enrollment

	HRA completion		
	In first year	In second year	No year
Primary care visit			
Both years	86.5%	81.5%	54.6%
Year 1 only	10.8%	2.7%	12.5%
Year 2 only	1.3%	13.4%	10.1%
No year	1.4%	2.5%	22.8%
Preventive visit			
Both years	33.8%	28.2%	11.4%
Year 1 only	31.1%	13.0%	16.5%
Year 2 only	11.2%	32.5%	12.6%
No year	23.9%	26.3%	59.5%
Any dental visit			
Both years	28.6%	25.6%	16.7%
Year 1 only	15.8%	14.5%	13.8%
Year 2 only	12.4%	15.1%	11.4%
No year	43.1%	44.8%	58.1%
Preventive dental visit			
Both years	17.0%	13.6%	8.4%
Year 1 only	9.8%	8.9%	7.9%
Year 2 only	10.0%	11.2%	7.8%
No year	63.2%	66.3%	76.0%
Receipt of flu vaccine			
Both years	18.4%	14.5%	8.2%
Year 1 only	11.9%	8.2%	7.6%
Year 2 only	10.0%	12.8%	7.4%
No year	59.8%	64.5%	76.9%
Receipt of COVID vaccine			
Yes	57.6%	57.7%	42.4%
No	41.5%	42.3%	57.6%
Receipt of shingles vaccine			
Yes	5.4%	4.5%	3.6%
No	94.7%	95.5%	96.4%
Colorectal cancer screening			
Yes	42.0%	40.0%	26.5%
No	58.0%	60.0%	73.5%
Breast cancer screening			
Yes	71.8%	68.2%	51.4%
No	28.2%	31.8%	48.6%
Cervical cancer screening			
Yes	53.2%	52.4%	39.4%
No	46.8%	47.6%	60.6%

Percentages may not sum to 100% due to rounding

Pearson chi-squared $p \leq 0.0001$ for difference by HRA completion for all services

Administrative Data Appendix

Administrative Data Appendix Table 1.4.4. Receipt of preventive services, by primary care continuity

	Primary care visit continuity			
	No year	Year 1 only	Year 2 only	Both years
Preventive dental visit				
Both years	2.5%	6.6%	6.2%	13.5%
Year 1 only	4.1%	9.4%	6.4%	9.5%
Year 2 only	3.3%	5.8%	8.5%	10.3%
No year	90.0%	78.2%	78.9%	66.7%
Receipt of flu vaccine				
Both years	1.2%	3.2%	3.1%	15.2%
Year 1 only	2.0%	10.3%	2.9%	10.6%
Year 2 only	1.9%	2.7%	10.4%	10.7%
No year	94.9%	83.9%	83.6%	63.5%
Receipt of COVID vaccine				
Yes	27.1%	37.9%	42.2%	56.0%
No	72.9%	62.1%	57.8%	44.0%
Receipt of shingles vaccine				
Yes	1.0%	1.9%	2.5%	5.0%
No	99.2%	98.1%	97.6%	95.0%
Colorectal cancer screening				
Yes	1.8%	18.8%	18.2%	38.2%
No	98.2%	81.2%	81.8%	61.8%
Breast cancer screening				
Yes	5.1%	35.5%	37.1%	66.4%
No	94.9%	64.5%	62.9%	33.6%
Cervical cancer screening				
Yes	4.7%	30.2%	33.6%	50.7%
No	95.3%	69.8%	66.4%	49.3%

Percentages may not sum to 100% due to rounding

Pearson chi-squared $p \leq 0.0001$ for difference by primary care continuity for all services

Administrative Data Appendix

Administrative Data Appendix Table 1.4.5. Multivariate logistic regression of preventive visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Preventive visit in first 2 years			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	1.086	1.068	1.105	0.000
2018-2019	1.003	0.985	1.021	0.737
2020-2021	0.906	0.889	0.924	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.133	1.116	1.150	0.000
100% or higher	1.147	1.127	1.168	0.000
Sex				
Female	Ref.	—	—	
Male	0.503	0.496	0.509	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	1.015	0.994	1.038	0.168
30-49 years	0.971	0.952	0.991	0.004
50-59 years	1.048	1.024	1.072	0.000
60-64 years	1.126	1.088	1.165	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	1.218	1.162	1.278	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	1.195	1.154	1.236	0.000
White, non-Hispanic	1.193	1.156	1.232	0.000
Other/Unknown	1.392	1.341	1.445	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.882	0.856	0.909	0.000
Urban	1.260	1.232	1.289	0.000
Disability (composite)				
No	Ref.	—	—	
Yes	0.719	0.709	0.729	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	2.768	2.718	2.820	0.000
Year 2	2.637	2.561	2.714	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	36.670	34.739	38.709	0.000
Year 2 only	34.458	32.614	36.406	0.000
Both years	89.812	85.233	94.637	0.000

Administrative Data Appendix

Administrative Data Appendix Table 1.4.6. Multivariate logistic regression of any dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

Demographic characteristics	Dental visit in first 2 years			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.715	0.704	0.726	0.000
2018-2019	0.556	0.547	0.565	0.000
2020-2021	0.478	0.470	0.486	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.093	1.079	1.108	0.000
100% or higher	1.060	1.043	1.077	0.000
Sex				
Female	Ref.	—	—	
Male	0.830	0.820	0.839	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	0.923	0.905	0.940	0.000
30-49 years	0.894	0.879	0.910	0.000
50-59 years	0.806	0.790	0.822	0.000
60-64 years	0.727	0.705	0.750	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	1.518	1.455	1.584	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	1.027	0.996	1.058	0.086
White, non-Hispanic	1.039	1.009	1.069	0.009
Other/Unknown	0.947	0.916	0.979	0.001
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.869	0.845	0.893	0.000
Urban	0.907	0.889	0.925	0.000
Disability (composite)				
No	Ref.	—	—	
Yes	1.022	1.010	1.035	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.277	1.257	1.298	0.000
Year 2	1.253	1.222	1.285	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	2.192	2.142	2.243	0.000
Year 2 only	2.197	2.143	2.253	0.000
Both years	3.746	3.678	3.817	0.000

Administrative Data Appendix

Administrative Data Appendix Table 1.4.7. Multivariate logistic regression of preventive dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Preventive dental visit in first 2 years			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.767	0.755	0.780	0.000
2018-2019	0.625	0.614	0.637	0.000
2020-2021	0.538	0.527	0.549	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.182	1.164	1.200	0.000
100% or higher	1.173	1.152	1.194	0.000
Sex				
Female	Ref.	—	—	
Male	0.722	0.712	0.732	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	0.724	0.709	0.739	0.000
30-49 years	0.547	0.537	0.558	0.000
50-59 years	0.450	0.441	0.461	0.000
60-64 years	0.439	0.424	0.455	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	1.392	1.332	1.454	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.884	0.855	0.915	0.000
White, non-Hispanic	1.058	1.024	1.092	0.001
Other/Unknown	0.998	0.962	1.035	0.901
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.788	0.765	0.812	0.000
Urban	0.795	0.778	0.812	0.000
Disability (composite)				
No	Ref.	—	—	
Yes	0.815	0.804	0.827	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.431	1.408	1.456	0.000
Year 2	1.285	1.251	1.319	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	2.236	2.172	2.302	0.000
Year 2 only	2.201	2.133	2.271	0.000
Both years	3.891	3.799	3.985	0.000

Administrative Data Appendix

Administrative Data Appendix Table 1.4.8. Multivariate logistic regression of any flu vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Flu vaccine in first 2 years			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.989	0.972	1.006	0.198
2018-2019	1.104	1.084	1.124	0.000
2020-2021	0.974	0.955	0.994	0.011
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.043	1.027	1.059	0.000
100% or higher	1.097	1.078	1.117	0.000
Sex				
Female	Ref.	—	—	
Male	0.788	0.778	0.799	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	0.959	0.938	0.982	0.000
30-49 years	0.956	0.937	0.977	0.000
50-59 years	1.430	1.398	1.463	0.000
60-64 years	1.952	1.890	2.016	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	1.229	1.175	1.285	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.596	0.575	0.616	0.000
White, non-Hispanic	0.842	0.815	0.869	0.000
Other/Unknown	1.039	1.002	1.078	0.039
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.931	0.903	0.960	0.000
Urban	1.016	0.993	1.039	0.168
Disability (composite)				
No	Ref.	—	—	
Yes	1.515	1.494	1.535	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.405	1.382	1.428	0.000
Year 2	1.244	1.212	1.277	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	3.162	3.049	3.280	0.000
Year 2 only	3.331	3.206	3.461	0.000
Both years	7.659	7.427	7.898	0.000

Administrative Data Appendix

Administrative Data Appendix Table 1.4.9. Multivariate logistic regression of flu vaccine in both of the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Flu vaccine in both of first 2 years			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	1.010	0.985	1.035	0.437
2018-2019	1.142	1.113	1.171	0.000
2020-2021	0.999	0.970	1.029	0.959
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.066	1.043	1.090	0.000
100% or higher	1.144	1.116	1.173	0.000
Sex				
Female	Ref.	—	—	
Male	0.770	0.755	0.785	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	1.153	1.110	1.198	0.000
30-49 years	1.270	1.227	1.314	0.000
50-59 years	2.171	2.097	2.249	0.000
60-64 years	3.173	3.038	3.314	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	0.899	0.843	0.959	0.001
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.567	0.538	0.597	0.000
White, non-Hispanic	0.940	0.896	0.985	0.010
Other/Unknown	1.067	1.011	1.125	0.018
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.932	0.893	0.972	0.001
Urban	0.970	0.941	1.000	0.053
Disability (composite)				
No	Ref.	—	—	
Yes	1.488	1.459	1.517	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.517	1.485	1.551	0.000
Year 2	1.288	1.243	1.335	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	2.263	2.103	2.436	0.000
Year 2 only	2.345	2.168	2.536	0.000
Both years	9.211	8.677	9.778	0.000

Administrative Data Appendix

Administrative Data Appendix Table 1.4.10. Multivariate logistic regression of any COVID vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	aOR	COVID vaccine		p-value
		95% CI		
Cohort year				
2014-2015				
2016-2017				
2018-2019				
2020-2021				
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.234	1.195	1.274	0.000
100% or higher	1.293	1.247	1.340	0.000
Sex				
Female	Ref.	—	—	
Male	0.852	0.828	0.876	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	
21-29 years	1.084	1.043	1.128	0.000
30-49 years	1.097	1.058	1.138	0.000
50-59 years	1.906	1.820	1.997	0.000
60-64 years	2.540	2.348	2.748	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	1.224	1.100	1.362	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.573	0.539	0.609	0.000
White, non-Hispanic	0.814	0.769	0.861	0.000
Other/Unknown	1.200	1.122	1.283	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.844	0.787	0.905	0.000
Urban	1.327	1.260	1.398	0.000
Disability (composite)				
No	Ref.	—	—	
Yes	1.014	0.985	1.044	0.350
HRA completion				
No year	Ref.	—	—	
Year 1	1.339	1.281	1.400	0.000
Year 2	1.255	1.174	1.341	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	1.565	1.490	1.644	0.000
Year 2 only	1.908	1.815	2.006	0.000
Both years	2.832	2.728	2.940	0.000

Cohort year not included due to lack of COVID vaccine availability prior to 2021

Administrative Data Appendix

Administrative Data Appendix Table 1.4.11. Multivariate logistic regression of any shingles vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	aOR	Shingles vaccine 95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.959	0.876	1.049	0.360
2018-2019	3.106	2.889	3.339	0.000
2020-2021	5.566	5.182	5.978	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	0.929	0.870	0.992	0.028
100% or higher	1.086	1.014	1.163	0.019
Sex				
Female	Ref.	—	—	
Male	0.774	0.732	0.818	0.000
Age at initial HMP-MC enrollment				
19-20 years				
21-29 years				
30-49 years				
50-59 years				
60-64 years				
Preferred written/oral language				
English	Ref.	—	—	
Other language	0.683	0.554	0.843	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.658	0.556	0.779	0.000
White, non-Hispanic	0.997	0.855	1.161	0.964
Other/Unknown	0.971	0.821	1.150	0.736
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.828	0.733	0.934	0.002
Urban	0.943	0.866	1.027	0.178
Disability (composite)				
No	Ref.	—	—	
Yes	1.005	0.950	1.062	0.866
HRA completion				
No year	Ref.	—	—	
Year 1	1.367	1.287	1.451	0.000
Year 2	1.078	0.970	1.197	0.163
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	2.660	2.135	3.316	0.000
Year 2 only	3.239	2.581	4.064	0.000
Both years	7.314	6.098	8.771	0.000

Age not included consistent with shingles vaccine age recommendations (>50 years)

Administrative Data Appendix

Administrative Data Appendix Table 1.4.12. Multivariate logistic regression of colorectal cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Colorectal cancer screening			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.912	0.885	0.940	0.000
2018-2019	0.790	0.763	0.818	0.000
2020-2021	0.707	0.679	0.736	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.037	1.008	1.067	0.012
100% or higher	1.055	1.021	1.090	0.001
Sex				
Female	Ref.	—	—	
Male	0.999	0.975	1.024	0.947
Age at initial HMP-MC enrollment				
19-20 years				
21-29 years				
30-49 years	Ref.	—	—	
50-59 years	2.308	2.189	2.433	0.000
60-64 years	2.439	2.301	2.585	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	0.830	0.765	0.900	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.999	0.925	1.080	0.983
White, non-Hispanic	0.961	0.893	1.034	0.285
Other/Unknown	0.946	0.872	1.026	0.177
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	1.092	1.036	1.150	0.001
Urban	1.009	0.971	1.049	0.647
Disability (composite)				
No	Ref.	—	—	
Yes	0.956	0.933	0.980	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.453	1.415	1.493	0.000
Year 2	1.398	1.337	1.462	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	11.541	10.157	13.113	0.000
Year 2 only	11.878	10.410	13.553	0.000
Both years	29.457	26.114	33.227	0.000

Younger age groups not included consistent with colorectal cancer screening guidelines.

Administrative Data Appendix

Administrative Data Appendix Table 1.4.13. Multivariate logistic regression of breast cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

	Breast cancer screening			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.930	0.890	0.971	0.001
2018-2019	0.809	0.772	0.848	0.000
2020-2021	0.754	0.714	0.796	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.116	1.073	1.160	0.000
100% or higher	1.228	1.175	1.284	0.000
Sex				
Female				
Male				
Age at initial HMP-MC enrollment				
19-20 years				
21-29 years				
30-49 years				
50-59 years	Ref.	—	—	
60-64 years	1.274	1.220	1.330	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	0.935	0.843	1.037	0.202
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	0.982	0.883	1.093	0.744
White, non-Hispanic	0.866	0.783	0.958	0.005
Other/Unknown	0.919	0.822	1.027	0.137
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.916	0.850	0.987	0.022
Urban	0.755	0.714	0.798	0.000
Disability (composite)				
No	Ref.	—	—	
Yes	0.887	0.857	0.918	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.751	1.684	1.820	0.000
Year 2	1.531	1.434	1.635	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	8.876	7.726	10.197	0.000
Year 2 only	10.510	9.096	12.144	0.000
Both years	31.233	27.505	35.467	0.000

Sex and younger age groups not included consistent with breast cancer screening guidelines

Administrative Data Appendix

Administrative Data Appendix Table 1.4.14. Multivariate logistic regression of cervical cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity, adjusted for demographic characteristics

for demographic characteristics	Cervical cancer screening			
	aOR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	
2016-2017	0.830	0.810	0.849	0.000
2018-2019	0.669	0.653	0.686	0.000
2020-2021	0.636	0.618	0.655	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	
1-99%	1.113	1.090	1.137	0.000
100% or higher	1.083	1.058	1.110	0.000
Sex				
Female				
Male				
Age at initial HMP-MC enrollment				
19-20 years				
21-29 years	Ref.	—	—	
30-49 years	0.879	0.858	0.900	0.000
50-59 years	0.611	0.595	0.628	0.000
60-64 years	0.503	0.482	0.525	0.000
Preferred written/oral language				
English	Ref.	—	—	
Other language	0.922	0.866	0.982	0.012
Race/Ethnicity				
Hispanic	Ref.	—	—	
Black, non-Hispanic	1.063	1.011	1.118	0.017
White, non-Hispanic	0.927	0.884	0.972	0.002
Other/Unknown	0.917	0.868	0.969	0.002
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	
Suburban	0.897	0.861	0.936	0.000
Urban	0.986	0.956	1.017	0.377
Disability (composite)				
No	Ref.	—	—	
Yes	0.795	0.780	0.810	0.000
HRA completion				
No year	Ref.	—	—	
Year 1	1.377	1.346	1.409	0.000
Year 2	1.333	1.286	1.383	0.000
Primary care visit in first 2 years				
None	Ref.	—	—	
Year 1 only	8.270	7.710	8.871	0.000
Year 2 only	9.964	9.274	10.706	0.000
Both years	20.533	19.257	21.894	0.000

Sex and younger age groups not included consistent with cervical cancer screening guidelines

Administrative Data Appendix

Administrative Data Appendix Table 1.4.15. Multivariate logistic regression of preventive visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	1.090	1.008	1.179	0.030	1.075	1.004	1.151	0.039
2018-2019	1.055	0.973	1.144	0.192	1.073	0.994	1.159	0.072
2020-2021	1.155	1.050	1.270	0.003	1.129	1.020	1.250	0.019
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.101	1.027	1.181	0.007	1.081	1.013	1.154	0.019
100% or higher	1.132	1.041	1.231	0.004	1.149	1.064	1.242	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.477	0.448	0.507	0.000	0.586	0.556	0.618	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	1.017	0.912	1.135	0.759	1.064	0.780	1.450	0.696
30-49 years	0.876	0.797	0.962	0.006	0.801	0.608	1.055	0.115
50-59 years	0.889	0.798	0.989	0.031	0.755	0.573	0.993	0.045
60-64 years	1.082	0.914	1.281	0.360	0.820	0.618	1.088	0.170
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.502	1.154	1.954	0.002	1.492	1.183	1.882	0.001
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.146	0.972	1.351	0.105	0.992	0.801	1.229	0.942
White, non-Hispanic	1.133	0.967	1.327	0.122	0.952	0.774	1.172	0.645
Other/Unknown	1.267	1.051	1.528	0.013	1.136	0.904	1.429	0.274
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.821	0.714	0.944	0.005	0.790	0.707	0.884	0.000
Urban	1.142	1.030	1.265	0.011	1.172	1.076	1.277	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	2.303	2.131	2.488	0.000	2.516	2.361	2.680	0.000
Year 2	2.351	2.061	2.681	0.000	2.175	1.959	2.416	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	10.159	7.235	14.264	0.000	6.861	4.565	10.313	0.000
Year 2	6.874	4.774	9.897	0.000	5.420	3.429	8.567	0.000
Both years	22.520	16.289	31.136	0.000	14.097	9.488	20.945	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.15. Multivariate logistic regression of preventive visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	1.146	1.063	1.237	0.000	1.169	1.105	1.238	0.000
2018-2019	1.190	1.097	1.290	0.000	1.224	1.153	1.299	0.000
2020-2021	1.328	1.202	1.467	0.000	1.287	1.199	1.381	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.058	0.983	1.139	0.131	1.082	1.027	1.139	0.003
100% or higher	0.992	0.914	1.078	0.857	1.119	1.054	1.189	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.565	0.532	0.600	0.000	0.509	0.487	0.531	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.968	0.639	1.466	0.877	1.180	1.000	1.392	0.050
30-49 years	0.890	0.615	1.287	0.535	1.114	0.967	1.284	0.135
50-59 years	0.999	0.691	1.444	0.996	1.188	1.031	1.368	0.017
60-64 years	1.056	0.727	1.534	0.775	1.181	1.016	1.373	0.030
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.306	1.059	1.612	0.013	1.463	1.274	1.681	0.000
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.402	1.146	1.717	0.001	1.302	1.168	1.452	0.000
White, non-Hispanic	1.340	1.103	1.627	0.003	1.400	1.263	1.551	0.000
Other/Unknown	1.486	1.201	1.839	0.000	1.667	1.482	1.876	0.000
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.803	0.702	0.919	0.001	0.765	0.690	0.848	0.000
Urban	1.216	1.097	1.347	0.000	1.210	1.119	1.308	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	2.302	2.143	2.472	0.000	2.017	1.916	2.123	0.000
Year 2	2.438	2.161	2.749	0.000	2.049	1.881	2.230	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	6.621	4.257	10.297	0.000	3.726	2.632	5.275	0.000
Year 2	7.068	4.394	11.370	0.000	2.783	1.862	4.160	0.000
Both years	16.359	10.698	25.016	0.000	8.075	5.792	11.259	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Administrative Data Appendix

Administrative Data Appendix Table 1.4.16. Multivariate logistic regression of any dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.740	0.687	0.796	0.000	0.770	0.721	0.822	0.000
2018-2019	0.577	0.535	0.622	0.000	0.582	0.541	0.627	0.000
2020-2021	0.510	0.467	0.558	0.000	0.543	0.493	0.599	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.060	0.993	1.133	0.081	1.089	1.023	1.160	0.008
100% or higher	0.955	0.883	1.033	0.247	1.008	0.936	1.085	0.833
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.789	0.744	0.837	0.000	0.855	0.813	0.900	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.990	0.894	1.097	0.853	1.221	0.909	1.642	0.185
30-49 years	0.965	0.884	1.054	0.429	0.934	0.719	1.214	0.610
50-59 years	0.853	0.771	0.942	0.002	0.785	0.604	1.020	0.070
60-64 years	0.707	0.607	0.825	0.000	0.617	0.472	0.808	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.579	1.242	2.009	0.000	1.220	0.983	1.515	0.072
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.974	0.833	1.138	0.741	0.967	0.787	1.188	0.749
White, non-Hispanic	1.051	0.904	1.221	0.517	1.000	0.820	1.219	0.997
Other/Unknown	1.003	0.840	1.196	0.976	0.965	0.775	1.201	0.748
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.823	0.719	0.941	0.004	0.964	0.865	1.075	0.514
Urban	0.813	0.736	0.897	0.000	0.957	0.881	1.040	0.301
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.249	1.166	1.339	0.000	1.242	1.171	1.317	0.000
Year 2	1.204	1.075	1.349	0.001	1.183	1.073	1.304	0.001
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.806	1.474	2.214	0.000	1.526	1.182	1.970	0.001
Year 2	1.884	1.488	2.384	0.000	1.436	1.039	1.984	0.028
Both years	3.245	2.717	3.875	0.000	2.692	2.124	3.412	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.16. Multivariate logistic regression of any dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.783	0.728	0.842	0.000	0.769	0.728	0.812	0.000
2018-2019	0.561	0.519	0.607	0.000	0.614	0.580	0.651	0.000
2020-2021	0.556	0.505	0.612	0.000	0.558	0.521	0.598	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.056	0.983	1.133	0.137	1.070	1.017	1.125	0.008
100% or higher	1.103	1.018	1.195	0.017	1.102	1.040	1.167	0.001
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.855	0.807	0.907	0.000	0.811	0.778	0.846	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	1.084	0.726	1.619	0.692	0.907	0.773	1.064	0.229
30-49 years	0.969	0.678	1.385	0.863	0.937	0.818	1.074	0.353
50-59 years	0.893	0.625	1.274	0.532	0.863	0.753	0.989	0.035
60-64 years	0.749	0.522	1.074	0.116	0.762	0.659	0.882	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.211	0.992	1.479	0.060	1.308	1.150	1.487	0.000
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.835	0.687	1.016	0.072	1.028	0.925	1.143	0.607
White, non-Hispanic	0.859	0.712	1.037	0.113	0.951	0.860	1.051	0.320
Other/Unknown	0.762	0.620	0.936	0.010	0.841	0.750	0.942	0.003
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.927	0.812	1.057	0.255	0.955	0.864	1.055	0.365
Urban	1.037	0.938	1.145	0.479	0.948	0.878	1.023	0.169
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.312	1.227	1.404	0.000	1.257	1.197	1.319	0.000
Year 2	1.220	1.092	1.364	0.000	1.255	1.159	1.358	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.641	1.263	2.133	0.000	1.288	0.990	1.675	0.060
Year 2	1.343	0.977	1.844	0.069	1.362	0.989	1.875	0.059
Both years	2.793	2.207	3.534	0.000	2.335	1.831	2.977	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Administrative Data Appendix

Administrative Data Appendix Table 1.4.17. Multivariate logistic regression of preventive dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.801	0.742	0.865	0.000	0.802	0.741	0.869	0.000
2018-2019	0.684	0.631	0.743	0.000	0.602	0.546	0.663	0.000
2020-2021	0.664	0.603	0.731	0.000	0.526	0.460	0.602	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.188	1.109	1.272	0.000	1.210	1.123	1.304	0.000
100% or higher	1.090	1.004	1.185	0.040	1.237	1.132	1.351	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.707	0.664	0.754	0.000	0.716	0.672	0.762	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.762	0.686	0.847	0.000	0.690	0.510	0.933	0.016
30-49 years	0.583	0.532	0.638	0.000	0.358	0.274	0.469	0.000
50-59 years	0.507	0.456	0.563	0.000	0.296	0.226	0.387	0.000
60-64 years	0.533	0.453	0.628	0.000	0.261	0.197	0.346	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.549	1.230	1.952	0.000	1.192	0.928	1.531	0.168
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.890	0.754	1.051	0.169	0.790	0.623	1.002	0.052
White, non-Hispanic	1.065	0.908	1.248	0.440	0.850	0.677	1.067	0.161
Other/Unknown	1.070	0.887	1.290	0.480	0.915	0.710	1.180	0.494
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.760	0.662	0.872	0.000	0.804	0.706	0.915	0.001
Urban	0.733	0.663	0.810	0.000	0.797	0.723	0.878	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.394	1.299	1.496	0.000	1.375	1.283	1.473	0.000
Year 2	1.225	1.091	1.377	0.001	1.291	1.152	1.446	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.921	1.479	2.496	0.000	1.121	0.779	1.614	0.539
Year 2	1.786	1.323	2.411	0.000	0.936	0.580	1.509	0.786
Both years	3.217	2.546	4.065	0.000	1.876	1.338	2.629	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.17. Multivariate logistic regression of preventive dental visit in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.852	0.781	0.930	0.000	0.847	0.797	0.900	0.000
2018-2019	0.610	0.551	0.675	0.000	0.637	0.595	0.681	0.000
2020-2021	0.539	0.475	0.613	0.000	0.573	0.527	0.622	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.208	1.110	1.315	0.000	1.175	1.111	1.242	0.000
100% or higher	1.196	1.087	1.317	0.000	1.268	1.189	1.352	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.781	0.728	0.838	0.000	0.776	0.740	0.814	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.788	0.516	1.203	0.270	0.718	0.606	0.851	0.000
30-49 years	0.405	0.278	0.589	0.000	0.552	0.478	0.638	0.000
50-59 years	0.376	0.259	0.548	0.000	0.478	0.413	0.552	0.000
60-64 years	0.357	0.243	0.523	0.000	0.470	0.402	0.549	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.216	0.968	1.528	0.093	1.217	1.059	1.399	0.006
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.817	0.645	1.036	0.095	0.874	0.776	0.985	0.027
White, non-Hispanic	0.983	0.784	1.233	0.883	0.990	0.885	1.108	0.866
Other/Unknown	0.898	0.699	1.154	0.402	0.840	0.737	0.956	0.008
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.818	0.698	0.958	0.013	0.809	0.725	0.903	0.000
Urban	0.913	0.812	1.027	0.128	0.798	0.735	0.867	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.495	1.383	1.617	0.000	1.363	1.293	1.438	0.000
Year 2	1.326	1.164	1.511	0.000	1.220	1.118	1.331	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.474	0.985	2.206	0.059	1.624	1.113	2.369	0.012
Year 2	1.054	0.637	1.745	0.837	1.247	0.786	1.977	0.349
Both years	2.645	1.834	3.816	0.000	2.726	1.913	3.886	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Administrative Data Appendix

Administrative Data Appendix Table 1.4.18. Multivariate logistic regression of any flu vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	1.036	0.962	1.116	0.350	0.996	0.932	1.064	0.902
2018-2019	1.028	0.952	1.111	0.476	1.071	0.994	1.154	0.073
2020-2021	0.852	0.777	0.934	0.001	0.974	0.882	1.075	0.595
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.962	0.900	1.028	0.249	0.943	0.885	1.004	0.068
100% or higher	1.066	0.985	1.154	0.114	1.128	1.047	1.214	0.002
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.838	0.789	0.890	0.000	0.870	0.826	0.916	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.917	0.824	1.020	0.109	0.880	0.639	1.212	0.434
30-49 years	1.078	0.984	1.181	0.105	1.383	1.042	1.836	0.025
50-59 years	1.691	1.527	1.873	0.000	1.951	1.470	2.589	0.000
60-64 years	2.209	1.888	2.585	0.000	2.649	1.983	3.540	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.113	0.884	1.402	0.361	1.338	1.076	1.663	0.009
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.604	0.516	0.707	0.000	0.643	0.522	0.792	0.000
White, non-Hispanic	0.853	0.733	0.992	0.039	0.960	0.785	1.173	0.688
Other/Unknown	0.908	0.760	1.085	0.287	1.025	0.821	1.279	0.828
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.990	0.865	1.133	0.885	0.917	0.822	1.023	0.120
Urban	0.999	0.905	1.102	0.983	0.938	0.863	1.019	0.129
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.302	1.215	1.394	0.000	1.321	1.246	1.402	0.000
Year 2	1.327	1.186	1.485	0.000	1.242	1.127	1.369	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	2.065	1.576	2.705	0.000	1.328	0.987	1.785	0.061
Year 2	2.338	1.728	3.162	0.000	2.926	2.061	4.155	0.000
Both years	5.060	3.972	6.446	0.000	3.906	2.968	5.142	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.18. Multivariate logistic regression of any flu vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.968	0.899	1.042	0.386	0.975	0.923	1.030	0.372
2018-2019	1.080	0.998	1.169	0.056	1.036	0.978	1.098	0.230
2020-2021	0.907	0.824	0.999	0.048	0.885	0.827	0.948	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.955	0.889	1.026	0.211	0.985	0.937	1.036	0.562
100% or higher	1.077	0.994	1.167	0.069	1.111	1.048	1.177	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.861	0.812	0.913	0.000	0.830	0.796	0.866	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	1.042	0.683	1.590	0.850	0.917	0.779	1.079	0.295
30-49 years	1.195	0.820	1.742	0.353	1.090	0.948	1.252	0.225
50-59 years	1.566	1.076	2.279	0.019	1.438	1.251	1.652	0.000
60-64 years	2.007	1.373	2.934	0.000	1.813	1.564	2.101	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.109	0.908	1.354	0.309	1.065	0.937	1.211	0.337
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.609	0.500	0.741	0.000	0.599	0.539	0.666	0.000
White, non-Hispanic	0.882	0.731	1.065	0.193	0.904	0.817	0.999	0.048
Other/Unknown	0.875	0.712	1.075	0.204	0.837	0.746	0.939	0.002
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.849	0.744	0.968	0.015	0.868	0.785	0.960	0.006
Urban	0.990	0.896	1.093	0.836	0.931	0.862	1.005	0.067
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.289	1.205	1.378	0.000	1.263	1.203	1.325	0.000
Year 2	1.344	1.202	1.502	0.000	1.139	1.052	1.232	0.001
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.828	1.340	2.494	0.000	1.249	0.939	1.660	0.127
Year 2	2.396	1.679	3.420	0.000	1.776	1.264	2.495	0.001
Both years	4.800	3.618	6.368	0.000	3.421	2.629	4.452	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Administrative Data Appendix

Administrative Data Appendix Table 1.4.19. Multivariate logistic regression of flu vaccine in both of the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.995	0.907	1.091	0.909	1.071	0.988	1.160	0.094
2018-2019	0.996	0.904	1.098	0.942	1.138	1.041	1.244	0.005
2020-2021	0.796	0.706	0.897	0.000	1.046	0.929	1.177	0.458
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.965	0.887	1.049	0.405	0.980	0.907	1.059	0.609
100% or higher	1.094	0.993	1.206	0.070	1.186	1.088	1.292	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.822	0.761	0.888	0.000	0.826	0.776	0.880	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	0.984	0.847	1.144	0.836	1.580	0.854	2.925	0.145
30-49 years	1.287	1.134	1.460	0.000	3.023	1.716	5.325	0.000
50-59 years	2.081	1.820	2.380	0.000	4.744	2.697	8.347	0.000
60-64 years	3.326	2.784	3.975	0.000	5.956	3.372	10.521	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.866	0.656	1.143	0.308	0.864	0.663	1.125	0.278
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.570	0.467	0.696	0.000	0.632	0.484	0.824	0.001
White, non-Hispanic	0.946	0.784	1.141	0.558	1.074	0.834	1.383	0.582
Other/Unknown	0.967	0.776	1.206	0.767	1.018	0.771	1.344	0.899
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.928	0.789	1.092	0.370	0.851	0.750	0.966	0.013
Urban	0.921	0.819	1.037	0.175	0.832	0.756	0.915	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.406	1.296	1.526	0.000	1.392	1.300	1.491	0.000
Year 2	1.259	1.099	1.442	0.001	1.335	1.193	1.495	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.172	0.745	1.842	0.492	0.785	0.460	1.340	0.376
Year 2	1.721	1.051	2.819	0.031	1.585	0.853	2.945	0.145
Both years	4.524	3.062	6.684	0.000	4.885	3.028	7.881	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.19. Multivariate logistic regression of flu vaccine in both of the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	1.134	1.038	1.239	0.005	1.069	1.004	1.138	0.038
2018-2019	1.169	1.063	1.285	0.001	1.061	0.993	1.134	0.078
2020-2021	1.006	0.894	1.133	0.917	0.930	0.858	1.008	0.079
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.970	0.889	1.059	0.502	1.026	0.968	1.087	0.392
100% or higher	1.150	1.047	1.263	0.003	1.154	1.081	1.231	0.000
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.836	0.778	0.897	0.000	0.818	0.779	0.859	0.000
Age at initial HMP-MC enrollment								
19-20 years	Ref.	—	—	—	Ref.	—	—	—
21-29 years	1.839	0.904	3.740	0.093	1.248	0.991	1.570	0.059
30-49 years	2.138	1.109	4.120	0.023	1.674	1.370	2.044	0.000
50-59 years	3.180	1.653	6.119	0.001	2.325	1.905	2.838	0.000
60-64 years	4.058	2.103	7.830	0.000	3.001	2.444	3.686	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.878	0.691	1.116	0.289	0.843	0.729	0.976	0.022
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.597	0.471	0.757	0.000	0.601	0.532	0.680	0.000
White, non-Hispanic	0.949	0.759	1.187	0.649	0.995	0.889	1.115	0.936
Other/Unknown	0.855	0.669	1.094	0.214	0.795	0.698	0.906	0.001
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.839	0.717	0.981	0.028	0.888	0.794	0.993	0.037
Urban	0.943	0.840	1.059	0.324	0.916	0.842	0.997	0.042
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.394	1.289	1.507	0.000	1.406	1.333	1.484	0.000
Year 2	1.493	1.315	1.695	0.000	1.279	1.171	1.397	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.542	0.835	2.845	0.166	0.605	0.392	0.933	0.023
Year 2	2.347	1.199	4.597	0.013	1.223	0.738	2.028	0.435
Both years	7.573	4.342	13.207	0.000	3.064	2.095	4.483	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Administrative Data Appendix

Administrative Data Appendix Table 1.4.20. Multivariate logistic regression of shingles vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	1.500	1.049	2.146	0.026	0.964	0.734	1.267	0.795
2018-2019	3.369	2.457	4.620	0.000	3.327	2.692	4.112	0.000
2020-2021	7.316	5.378	9.951	0.000	5.860	4.695	7.314	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.866	0.657	1.141	0.306	0.951	0.772	1.171	0.635
100% or higher	0.864	0.640	1.166	0.339	1.171	0.952	1.440	0.134
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.810	0.627	1.048	0.109	0.954	0.807	1.126	0.576
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years								
50-59 years								
60-64 years								
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.749	0.322	1.742	0.503	0.635	0.278	1.449	0.281
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.715	0.340	1.506	0.378	0.670	0.312	1.442	0.306
White, non-Hispanic	1.060	0.524	2.144	0.872	0.935	0.453	1.931	0.856
Other/Unknown	0.933	0.427	2.038	0.862	0.982	0.454	2.126	0.964
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.995	0.573	1.728	0.985	0.732	0.513	1.044	0.085
Urban	1.241	0.828	1.859	0.295	0.949	0.742	1.215	0.679
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.465	1.145	1.875	0.002	1.463	1.225	1.748	0.000
Year 2	1.194	0.767	1.857	0.432	1.070	0.780	1.469	0.674
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.128	0.338	3.768	0.844	0.768	0.248	2.375	0.647
Year 2	1.172	0.299	4.602	0.820	1.076	0.263	4.407	0.918
Both years	1.660	0.593	4.646	0.334	2.324	0.853	6.335	0.099

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.20. Multivariate logistic regression of shingles vaccine in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.955	0.732	1.246	0.732	0.856	0.699	1.048	0.133
2018-2019	2.528	2.029	3.151	0.000	2.799	2.393	3.272	0.000
2020-2021	5.226	4.201	6.502	0.000	4.881	4.170	5.713	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.964	0.785	1.184	0.727	0.935	0.808	1.081	0.362
100% or higher	1.213	0.991	1.486	0.061	1.029	0.884	1.198	0.709
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.919	0.777	1.085	0.318	0.840	0.745	0.947	0.004
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years								
50-59 years								
60-64 years								
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.676	0.354	1.290	0.235	0.566	0.376	0.854	0.007
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.817	0.431	1.547	0.534	0.848	0.613	1.174	0.321
White, non-Hispanic	1.403	0.772	2.552	0.267	1.188	0.880	1.602	0.260
Other/Unknown	1.192	0.629	2.260	0.590	0.929	0.666	1.296	0.664
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	1.033	0.708	1.507	0.865	0.889	0.662	1.195	0.437
Urban	1.195	0.900	1.586	0.217	1.078	0.868	1.338	0.496
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.457	1.219	1.743	0.000	1.243	1.092	1.415	0.001
Year 2	1.286	0.951	1.739	0.102	0.842	0.664	1.069	0.158
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.449	0.479	4.383	0.511	1.410	0.478	4.162	0.534
Year 2	2.576	0.788	8.415	0.117	1.938	0.549	6.839	0.304
Both years	3.149	1.159	8.560	0.025	3.032	1.110	8.278	0.030

*Chronic condition group includes those identified in the first year of HMP-MC enrollment
Age not included consistent with shingles vaccine age recommendations (>50 years)

Administrative Data Appendix

Administrative Data Appendix Table 1.4.21. Multivariate logistic regression of colorectal cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.867	0.750	1.002	0.054	0.895	0.823	0.974	0.010
2018-2019	0.732	0.623	0.859	0.000	0.776	0.705	0.854	0.000
2020-2021	0.801	0.665	0.966	0.020	0.736	0.650	0.834	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.949	0.830	1.085	0.445	1.075	0.991	1.165	0.082
100% or higher	1.017	0.873	1.185	0.829	1.053	0.962	1.153	0.262
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.987	0.874	1.115	0.833	1.038	0.971	1.109	0.271
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years	Ref.	—	—	—	Ref.	—	—	—
50-59 years	2.447	1.969	3.041	0.000	2.224	1.901	2.602	0.000
60-64 years	2.274	1.770	2.922	0.000	2.432	2.051	2.882	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.848	0.586	1.226	0.380	0.851	0.648	1.118	0.246
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.196	0.820	1.745	0.352	1.159	0.847	1.585	0.356
White, non-Hispanic	0.971	0.674	1.398	0.873	1.165	0.861	1.577	0.322
Other/Unknown	1.030	0.686	1.545	0.888	1.031	0.744	1.427	0.856
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	1.082	0.835	1.403	0.552	1.019	0.890	1.167	0.784
Urban	1.056	0.871	1.280	0.578	0.985	0.890	1.091	0.771
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.369	1.211	1.548	0.000	1.431	1.331	1.539	0.000
Year 2	1.401	1.137	1.725	0.002	1.348	1.191	1.525	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.809	0.761	4.298	0.179	3.539	2.011	6.228	0.000
Year 2	1.510	0.575	3.963	0.403	3.289	1.731	6.250	0.000
Both years	6.892	3.176	14.960	0.000	7.205	4.174	12.436	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.21. Multivariate logistic regression of colorectal cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (*continued*)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.906	0.827	0.992	0.033	0.879	0.816	0.947	0.001
2018-2019	0.789	0.715	0.871	0.000	0.823	0.760	0.891	0.000
2020-2021	0.776	0.688	0.876	0.000	0.733	0.666	0.806	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.034	0.945	1.130	0.467	0.996	0.929	1.067	0.909
100% or higher	1.028	0.933	1.133	0.573	0.979	0.906	1.058	0.591
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	0.923	0.858	0.993	0.032	0.905	0.854	0.959	0.001
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years	Ref.	—	—	—	Ref.	—	—	—
50-59 years	2.231	1.862	2.673	0.000	2.370	2.070	2.714	0.000
60-64 years	2.477	2.046	2.998	0.000	2.397	2.073	2.771	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.909	0.716	1.155	0.435	0.785	0.665	0.925	0.004
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.104	0.845	1.441	0.468	1.028	0.881	1.200	0.723
White, non-Hispanic	1.070	0.829	1.382	0.602	0.958	0.829	1.107	0.563
Other/Unknown	0.992	0.753	1.307	0.955	0.831	0.707	0.977	0.025
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	1.025	0.874	1.203	0.758	1.122	0.978	1.286	0.100
Urban	1.006	0.893	1.134	0.919	1.034	0.932	1.146	0.529
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.479	1.364	1.602	0.000	1.319	1.238	1.405	0.000
Year 2	1.336	1.165	1.531	0.000	1.364	1.228	1.514	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	2.214	1.373	3.573	0.001	1.436	0.855	2.410	0.171
Year 2	1.971	1.127	3.449	0.017	1.258	0.655	2.416	0.491
Both years	5.073	3.261	7.894	0.000	3.501	2.156	5.686	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Younger age groups not included consistent with colorectal cancer screening guidelines

Administrative Data Appendix

Administrative Data Appendix Table 1.4.22. Multivariate logistic regression of breast cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.834	0.692	1.006	0.058	0.898	0.794	1.015	0.084
2018-2019	0.823	0.676	1.001	0.051	0.739	0.645	0.846	0.000
2020-2021	0.782	0.621	0.984	0.036	0.691	0.581	0.822	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.956	0.808	1.130	0.597	1.198	1.070	1.341	0.002
100% or higher	1.186	0.974	1.443	0.090	1.282	1.130	1.455	0.000
Sex								
Female								
Male								
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years								
50-59 years	Ref.	—	—	—	Ref.	—	—	—
60-64 years	1.762	1.443	2.152	0.000	1.342	1.189	1.514	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	0.799	0.513	1.245	0.322	1.490	0.968	2.294	0.070
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	0.595	0.355	0.998	0.049	0.961	0.620	1.490	0.859
White, non-Hispanic	0.630	0.381	1.040	0.071	0.852	0.557	1.302	0.459
Other/Unknown	0.673	0.386	1.173	0.163	0.791	0.498	1.255	0.319
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.721	0.516	1.008	0.056	0.889	0.732	1.079	0.234
Urban	0.687	0.530	0.891	0.005	0.758	0.654	0.878	0.000
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.718	1.459	2.022	0.000	1.828	1.642	2.035	0.000
Year 2	2.109	1.572	2.830	0.000	1.275	1.073	1.514	0.006
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.370	0.618	3.034	0.438	1.711	0.828	3.533	0.147
Year 2	1.240	0.527	2.922	0.622	2.414	1.051	5.545	0.038
Both years	4.594	2.332	9.048	0.000	6.025	3.031	11.978	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.22. Multivariate logistic regression of breast cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (continued)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.937	0.808	1.086	0.387	0.892	0.799	0.995	0.041
2018-2019	0.748	0.640	0.875	0.000	0.751	0.670	0.842	0.000
2020-2021	0.862	0.708	1.049	0.138	0.681	0.595	0.780	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	1.085	0.943	1.247	0.254	1.161	1.050	1.283	0.004
100% or higher	1.239	1.066	1.441	0.005	1.292	1.156	1.444	0.000
Sex								
Female								
Male								
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years								
30-49 years								
50-59 years	Ref.	—	—	—	Ref.	—	—	—
60-64 years	1.262	1.102	1.446	0.001	1.208	1.094	1.334	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.213	0.854	1.722	0.281	0.991	0.799	1.228	0.931
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.339	0.880	2.037	0.173	1.066	0.855	1.329	0.569
White, non-Hispanic	1.047	0.699	1.571	0.822	0.862	0.701	1.062	0.163
Other/Unknown	1.003	0.644	1.562	0.991	0.807	0.640	1.016	0.068
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.808	0.622	1.050	0.111	1.095	0.890	1.346	0.390
Urban	0.792	0.647	0.968	0.023	0.790	0.678	0.921	0.003
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.732	1.518	1.976	0.000	1.541	1.402	1.692	0.000
Year 2	1.495	1.195	1.871	0.000	1.457	1.242	1.710	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	2.619	1.031	6.650	0.043	0.919	0.472	1.786	0.802
Year 2	2.608	0.889	7.647	0.081	1.080	0.473	2.468	0.854
Both years	7.969	3.308	19.197	0.000	2.614	1.402	4.875	0.003

*Chronic condition group includes those identified in the first year of HMP-MC enrollment
Sex and younger age groups not included consistent with breast cancer screening guidelines

Administrative Data Appendix

Administrative Data Appendix Table 1.4.23. Multivariate logistic regression of cervical cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition*

	Asthma				COPD			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.796	0.722	0.878	0.000	0.771	0.702	0.848	0.000
2018-2019	0.650	0.585	0.721	0.000	0.648	0.581	0.722	0.000
2020-2021	0.644	0.569	0.730	0.000	0.633	0.548	0.731	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	-		—
1-99%	0.984	0.902	1.073	0.710	1.007	0.924	1.097	0.875
100% or higher	1.096	0.989	1.213	0.079	1.027	0.928	1.136	0.605
Sex								
Female								
Male								
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years	Ref.	—	—	—	Ref.	—	—	—
30-49 years	0.736	0.661	0.820	0.000	0.690	0.547	0.869	0.002
50-59 years	0.506	0.448	0.571	0.000	0.525	0.417	0.660	0.000
60-64 years	0.440	0.364	0.533	0.000	0.433	0.337	0.555	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	-		—
Other language	1.392	1.035	1.873	0.029	1.479	1.068	2.049	0.018
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	-		—
Black, non-Hispanic	1.084	0.871	1.350	0.471	1.013	0.759	1.353	0.929
White, non-Hispanic	0.865	0.701	1.067	0.175	0.895	0.677	1.184	0.439
Other/Unknown	0.904	0.704	1.160	0.426	0.840	0.611	1.156	0.285
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	-		—
Suburban	0.919	0.771	1.095	0.343	0.955	0.820	1.111	0.550
Urban	0.973	0.853	1.110	0.687	1.100	0.980	1.235	0.107
HRA completion								
No year	Ref.	—	—	—	Ref.	-		—
Year 1	1.307	1.196	1.428	0.000	1.552	1.430	1.683	0.000
Year 2	1.555	1.340	1.804	0.000	1.447	1.270	1.648	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	-		—
Year 1	3.972	2.376	6.639	0.000	3.929	1.782	8.662	0.001
Year 2	3.255	1.855	5.710	0.000	4.417	1.864	10.471	0.001
Both years	9.551	5.929	15.387	0.000	10.034	4.660	21.607	0.000

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Administrative Data Appendix

Administrative Data Appendix Table 1.4.23. Multivariate logistic regression of cervical cancer screening in the first two years of HMP-MC enrollment, by HRA completion and primary care continuity adjusted for demographic characteristics, by each chronic condition* (*continued*)

	CV				Diabetes			
	aOR	95% CI	p-value		aOR	95% CI	p-value	
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	0.876	0.778	0.986	0.028	0.866	0.800	0.936	0.000
2018-2019	0.679	0.596	0.773	0.000	0.636	0.584	0.692	0.000
2020-2021	0.736	0.628	0.864	0.000	0.668	0.603	0.740	0.000
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.935	0.837	1.045	0.238	1.043	0.972	1.120	0.238
100% or higher	0.951	0.840	1.076	0.425	1.062	0.980	1.151	0.144
Sex								
Female								
Male								
Age at initial HMP-MC enrollment								
19-20 years								
21-29 years	Ref.	—	—	—	Ref.	—	—	—
30-49 years	0.725	0.522	1.007	0.055	0.859	0.746	0.988	0.033
50-59 years	0.525	0.379	0.728	0.000	0.611	0.531	0.703	0.000
60-64 years	0.469	0.334	0.660	0.000	0.488	0.417	0.572	0.000
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.398	1.040	1.879	0.026	1.219	1.027	1.447	0.023
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	1.088	0.793	1.494	0.601	0.998	0.859	1.158	0.975
White, non-Hispanic	0.924	0.679	1.258	0.616	0.876	0.760	1.009	0.066
Other/Unknown	0.962	0.681	1.358	0.824	0.902	0.767	1.062	0.215
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	1.075	0.866	1.334	0.513	0.980	0.849	1.131	0.782
Urban	1.040	0.880	1.230	0.642	1.163	1.041	1.299	0.008
HRA completion								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	1.485	1.337	1.648	0.000	1.268	1.185	1.357	0.000
Year 2	1.420	1.198	1.684	0.000	1.305	1.167	1.458	0.000
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1	4.595	1.613	13.088	0.004	4.084	1.842	9.056	0.001
Year 2	5.221	1.709	15.946	0.004	4.715	1.987	11.189	0.000
Both years	11.182	4.065	30.756	0.000	8.420	3.883	18.259	0.000

*Chronic condition group includes those identified in the first year of HMP-MC enrollment

Sex and younger age groups not included consistent with cervical cancer screening guidelines

Administrative Data Appendix

Evaluation question 2.2: What factors are associated with beneficiaries' compliance with cost-sharing obligations?

Administrative Data Appendix Table 2.2.1. Multivariate ordered logistic regression of predictors of payment (cross-sectional)

	Marginal effects (%)			p-value
	No Payment	Partial Payment	Full Payment	
Cohort				
January 2017-December 2018	55.7%	33.5%	10.7%	Ref.
January 2019-September 2019	68.2%	25.5%	6.3%	<0.001
October 2019-February 2020	75.2%	20.3%	4.4%	<0.001
March 2020-July 2022	77.2%	18.8%	3.9%	<0.001
Total months enrolled in HMP MC				
12-17 months	79.0%	17.4%	3.5%	Ref.
18-23	71.0%	23.5%	5.6%	<0.001
24-29	65.7%	27.1%	7.1%	<0.001
30-35	59.9%	30.9%	9.2%	<0.001
36-41	57.9%	32.1%	9.9%	<0.001
42-47	56.5%	33.0%	10.5%	<0.001
48+	54.2%	34.3%	11.5%	<0.001
Age				
18-34	71.8%	22.9%	5.3%	Ref.
35-44	66.5%	26.7%	6.8%	<0.001
45-54	58.6%	31.8%	9.6%	<0.001
55-62	46.5%	38.2%	15.3%	<0.001
Gender				
Male	64.2%	27.7%	8.1%	Ref.
Female	66.8%	26.0%	7.2%	<0.001
Race/Ethnicity				
White, non-Hispanic	61.3%	30.0%	8.8%	Ref.
Black, non-Hispanic	81.3%	15.6%	3.1%	<0.001
American Indian/Alaska Native	68.8%	25.0%	6.3%	<0.001
Hispanic	70.0%	24.1%	5.9%	<0.001
Asian	59.1%	31.3%	9.6%	0.001
Other	60.3%	30.6%	9.1%	0.045
FPL				
Always below 100% FPL	69.7%	24.1%	6.2%	Ref.
Switched	64.6%	27.5%	7.9%	<0.001
Always above 100% FPL	56.1%	32.6%	11.3%	<0.001
Region				
UP/NW/NE	63.2%	28.3%	8.4%	Ref.
W/E Central/E	65.5%	26.9%	7.6%	<0.001
S Central/SW/SE	66.0%	26.6%	7.4%	<0.001
Detroit Metro	65.1%	27.2%	7.8%	<0.001

Note: Among HMP beneficiaries with continuous 18+ month enrollment period starting between 2016 and 2018 who had non-zero cost-share obligations

Administrative Data Appendix

Administrative Data Appendix Table 2.2.2. Multivariate mixed effects ordered logistic regression of predictors of payment at each quarter

	No Payment	Marginal effects (%)		p-value
		Partial Payment	Full Payment	
Cohort				
January 2017-December 2018	73.2%	5.8%	21.0%	Ref.
January 2019-September 2019	80.9%	4.8%	14.3%	<0.001
October 2019-February 2020	86.1%	3.9%	10.1%	<0.001
March 2020-July 2022	88.2%	3.4%	8.4%	<0.001
Enrollment period				
6-11 months	79.0%	4.9%	16.1%	Ref.
12-17 months	77.5%	5.1%	17.3%	<0.001
18-23 months	78.0%	5.1%	16.9%	<0.001
24-29 months	77.6%	5.1%	17.3%	<0.001
30-35 months	78.1%	5.1%	16.9%	<0.001
36-41 months	80.1%	4.8%	15.2%	<0.001
42-47 months	82.1%	4.5%	13.5%	<0.001
48+ months	83.1%	4.3%	12.6%	<0.001
Age				
18-34	84.1%	4.2%	11.6%	Ref.
35-44	81.7%	4.6%	13.7%	<0.001
45-54	75.2%	5.6%	19.2%	<0.001
55-62	60.8%	7.3%	31.9%	<0.001
Gender				
Male	78.3%	5.0%	16.6%	Ref.
Female	79.6%	4.9%	15.5%	<0.001
Race/Ethnicity				
White, non-Hispanic	75.9%	5.5%	18.6%	Ref.
Black, non-Hispanic	91.1%	2.7%	6.2%	<0.001
American Indian/Alaska Native	82.6%	4.5%	12.9%	<0.001
Hispanic	83.0%	4.5%	12.5%	<0.001
Asian	74.5%	5.7%	19.8%	0.002
Other	75.2%	5.6%	19.2%	0.035
FPL				
Always below 100% FPL	81.0%	4.6%	14.3%	Ref.
Switched	78.6%	5.0%	16.4%	<0.001
Always above 100% FPL	74.8%	5.5%	19.7%	<0.001
Region				
UP/NW/NE	77.0%	5.2%	17.7%	Ref.
W/E Central/E	79.1%	4.9%	16.0%	<0.001
S Central/SW/SE	79.7%	4.8%	15.4%	<0.001
Detroit Metro	78.6%	5.0%	16.4%	<0.001

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Administrative Data Appendix Table 2.2.3. Multivariate mixed effects ordered logistic regression of predictors of payment at each quarter

Predictors of payment at each quarter	Marginal effects (%)			p-value
	No Payment	Partial Payment	Full Payment	
Cohort 1				
Enrollment Period				
6-11 months	75.5%	6.4%	18.1%	Ref.
12-17 months	73.0%	6.7%	20.3%	<0.001
18-23 months	72.4%	6.8%	20.8%	<0.001
24-29 months	71.4%	6.9%	21.7%	<0.001
30-35 months	72.4%	6.8%	20.8%	<0.001
36+ months	75.4%	6.4%	18.2%	0.619
Public Health Emergency				
No	71.8%	6.9%	21.3%	Ref.
Yes	76.2%	6.3%	17.5%	<0.001
Cohort 2				
Enrollment Period				
6-11 months	79.6%	3.9%	16.5%	Ref.
12-17 months	79.2%	3.9%	16.8%	0.304
18-23 months	83.6%	3.4%	13.0%	<0.001
24-29 months	85.2%	3.2%	11.7%	<0.001
30-35 months	83.4%	3.4%	13.2%	<0.001
36+ months	83.0%	3.5%	13.5%	<0.001
Public Health Emergency				
No	79.1%	3.9%	16.9%	Ref.
Yes	82.7%	3.5%	13.8%	<0.001
Cohort 3				
Enrollment Period				
6-11 months	86.6%	2.8%	10.5%	Ref.
12-17 months	85.8%	3.0%	11.2%	0.033
18-23 months	86.5%	2.9%	10.7%	0.712
24-29 months	85.1%	3.1%	11.9%	<0.001
30-35 months	82.8%	3.4%	13.8%	<0.001
36+ months	84.8%	3.1%	12.1%	<0.001
Cohort 4				
Enrollment Period				
6-11 months	88.7%	2.4%	8.9%	Ref.
12-17 months	87.9%	2.5%	9.6%	<0.001
18-23 months	87.6%	2.6%	9.9%	<0.001
24-29 months	85.5%	2.9%	11.6%	<0.001
30-35 months	83.8%	3.2%	13.0%	<0.001
36+ months	82.3%	3.4%	14.3%	<0.001

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Evaluation question 5.3: Is use of the emergency department related to continuity of primary care?

Administrative Data Appendix Table 5.3.1. Logistic regression – Primary care continuity (primary care visit in both of first 2 years of HMP-MC enrollment)

	Primary care continuity			
	OR	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	—
2016-2017	0.586	0.576	0.595	0.000
2018-2019	0.461	0.454	0.469	0.000
2020-2021	0.434	0.426	0.441	0.000
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	—
1-99%	1.321	1.302	1.340	0.000
100% or higher	1.423	1.398	1.448	0.000
Sex				
Female	Ref.	—	—	—
Male	0.382	0.378	0.387	0.000
Age at initial HMP-MC enrollment				
19-20 years	Ref.	—	—	—
21-29 years	0.917	0.900	0.935	0.000
30-49 years	1.309	1.286	1.332	0.000
50-59 years	1.860	1.822	1.900	0.000
60-64 years	2.364	2.283	2.448	0.000
Preferred oral/written language				
English	Ref.	—	—	—
Other language	1.752	1.668	1.840	0.000
Race/Ethnicity				
Hispanic	Ref.	—	—	—
Black, non-Hispanic	0.771	0.748	0.795	0.000
White, non-Hispanic	1.287	1.249	1.325	0.000
Other/Unknown	1.141	1.103	1.180	0.000
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	—
Suburban	1.028	0.998	1.058	0.065
Urban	1.151	1.126	1.176	0.000
Disability (composite)				
No	Ref.	—	—	—
Yes	2.783	2.747	2.820	0.000

Logistic regression controlling for cohort year, income level, sex, age, preferred language, race/ethnicity, urbanicity, and disability composite indicator

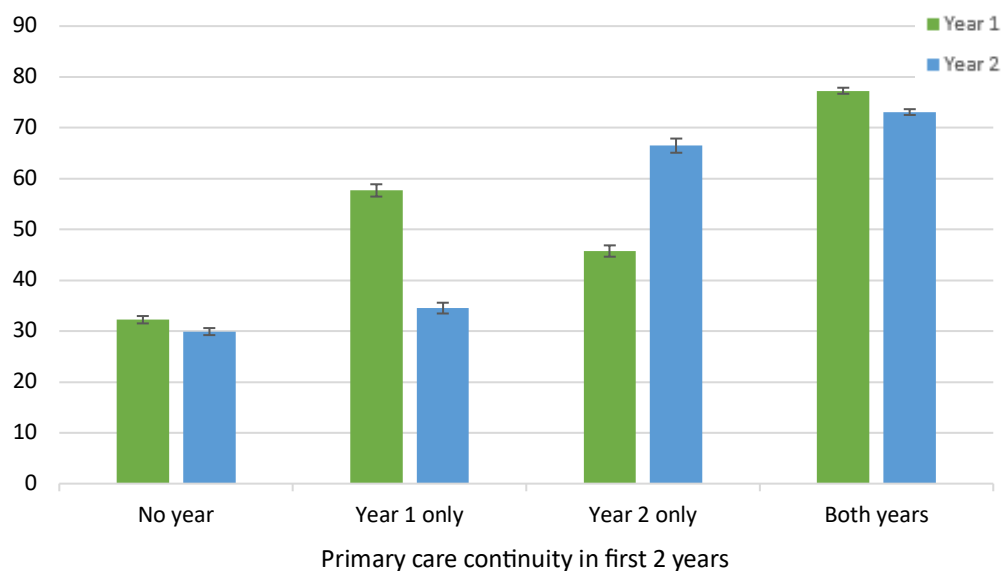
Administrative Data Appendix

Administrative Data Appendix Table 5.3.2. ED visit rate in first two years of HMP-MC enrollment, by primary care continuity, HRA completion, and preventive visit continuity

	Year 1			Year 2		
	Mean	95% CI		Mean	95% CI	
Overall	64.00	63.57	64.42	60.13	59.71	60.54
Primary care visit*						
None	32.24	31.52	32.97	29.91	29.22	30.60
Year 1 only	57.68	56.47	58.89	34.53	33.47	35.59
Year 2 only	45.75	44.64	46.87	66.49	65.09	67.88
Both years	77.28	76.69	77.88	73.09	72.52	73.66
HRA completion*						
None	65.04	65.55	65.53	60.77	60.30	61.24
In 1 st year	57.93	56.97	58.90	54.68	53.64	55.72
In 2 nd year	66.99	65.19	68.78	66.99	65.22	68.77
Preventive visit*						
None	64.61	63.98	65.24	59.88	59.27	60.49
Year 1 only	66.47	65.54	67.41	60.68	59.74	61.62
Year 2 only	66.80	65.67	67.93	67.51	66.39	68.62
Both years	56.73	55.80	57.66	54.06	53.18	54.93

*Pearson chi-squared $p \leq 0.0001$ in both Year 1 and Year 2

Administrative Data Appendix Figure 5.3.3. ED visit rates (per 1,000 member-months) by primary care continuity



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Administrative Data Appendix Table 5.3.4. Multivariate linear regression – Difference in ED visit rate between enrollment Year 1 and Year 2 by primary care continuity, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017			
	Coefficient	95% CI		p-value	Coefficient	95% CI		p-value
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1 only	-19.663	-22.703	-16.624	0.000	-21.777	-24.569	-18.986	0.000
Year 2 only	22.449	19.080	25.818	0.000	25.112	21.979	28.244	0.000
Both years	-3.515	-5.870	-1.156	0.003	-1.494	-3.635	0.647	0.171
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	0.079	-1.577	1.734	0.926	1.851	-0.007	3.710	0.051
100% or higher	-1.250	-3.329	0.829	0.239	1.947	-0.269	4.164	0.085
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	-0.952	-2.401	0.4980	0.198	0.252	-1.359	1.862	0.759
Preferred oral/ written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	2.826	-2.527	8.180	0.301	5.768	0.141	11.396	0.045
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	2.387	-1.876	6.650	0.272	1.122	-3.057	5.301	0.599
White, non-Hispanic	0.611	-3.497	4.719	0.771	-0.418	-4.360	3.524	0.835
Other/Unknown	1.168	-3.564	5.900	0.628	-0.962	-5.392	3.468	0.670
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	0.123	-3.112	3.358	0.940	2.186	-1.544	5.915	0.251
Urban	-1.006	-3.387	1.376	0.408	2.727	0.001	5.452	0.050
Disability (composite)								
No	Ref.	—	—	—	Ref.	—	—	—
Yes	-1.361	-2.839	0.118	0.071	-1.731	-3.406	-0.057	0.043

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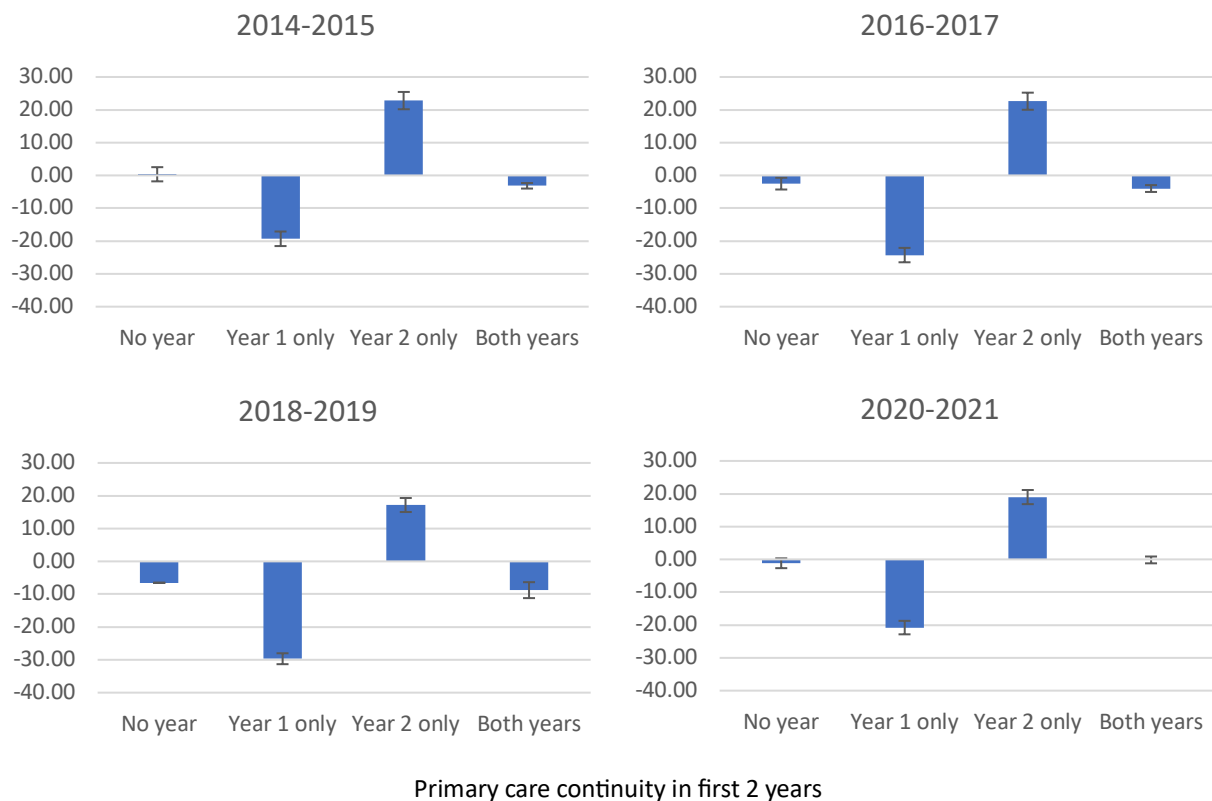
Administrative Data Appendix

Administrative Data Appendix Table 5.3.4. Multivariate linear regression – Difference in ED visit rate between enrollment Year 1 and Year 2 by primary care continuity, stratified by cohort year and adjusted for demographic characteristics (*continued*)

	2018-2019				2020-2021			
	Coefficient	95% CI		p-value	Coefficient	95% CI		p-value
Primary care visit in first 2 years								
No year	Ref.	—	—	—	Ref.	—	—	—
Year 1 only	-23.146	-25.820	-20.471	0.000	-19.603	-22.122	-17.084	0.000
Year 2 only	23.697	20.776	26.619	0.000	20.168	17.564	22.772	0.000
Both years	-2.244	-4.277	-0.211	0.031	1.018	-0.848	2.883	0.285
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	2.944	1.132	4.757	0.001	1.973	0.269	3.678	0.023
100% or higher	1.066	-1.012	3.145	0.315	1.672	-0.246	3.591	0.088
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	1.394	-0.195	2.982	0.085	-1.285	-2.788	0.217	0.094
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	1.425	-3.972	6.823	0.605	-2.998	-8.671	2.676	0.300
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	-4.983	-8.724	-1.242	0.009	-1.052	-4.276	2.173	0.523
White, non-Hispanic	0.407	-3.070	3.884	0.818	-0.296	-3.289	2.696	0.846
Other/Unknown	-0.335	-4.328	3.658	0.869	-1.590	-5.146	1.966	0.381
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	-0.317	-3.960	3.327	0.865	-0.167	-3.808	3.475	0.929
Urban	0.484	-2.205	3.173	0.724	-4.473	-7.198	-1.749	0.001
Disability (composite)								
No	Ref.	—	—	—	Ref.	—	—	—
Yes	-6.534	-8.129	-4.939	0.000	-3.239	-4.781	-1.697	0.000

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Administrative Data Appendix Figure 5.3.5. Multivariate linear regression – Difference in ED visit rate between enrollment Year 1 and Year 2 by primary care continuity primary care continuity stratified by cohort year and adjusted for income level, sex, preferred language, race/ethnicity, urbanicity, and disability



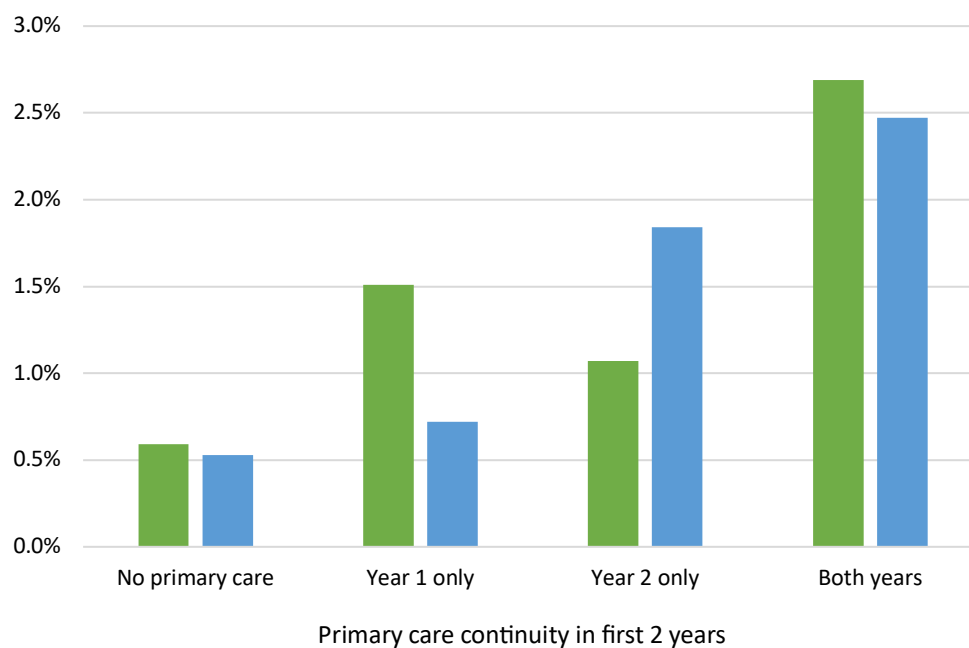
Administrative Data Appendix

Administrative Data Appendix Table 5.3.6. Proportion of high-frequency ED utilizers (>5 ED visits in a year) in first two years of HMP-MC enrollment, by primary care continuity, HRA completion, and preventive visit continuity

	High-frequency ED utilizers	
	Year 1	Year 2
Overall	2.02%	1.86%
Primary care visits*		
No year	0.59%	0.53%
Year 1 only	1.51%	0.72%
Year 2 only	1.07%	1.84%
Both years	2.69%	2.47%
HRA completion*		
No year	2.08%	1.88%
In 1 st year	1.71%	1.64%
In 2 nd year	2.17%	2.18%
Preventive visit*		
No year	2.09%	1.91%
Year 1 only	2.15%	1.85%
Year 2 only	2.13%	2.09%
Both years	1.56%	1.49%

*Pearson chi-squared $p \leq 0.0001$ in both Year 1 and Year 2

Administrative Data Appendix Figure 5.3.7. High-frequency ED utilizers by primary care continuity in first two years of HMP-MC enrollment



Administrative Data Appendix

Administrative Data Appendix Table 5.3.8. Logistic regression – High-frequency ED utilization (>5 ED visits) in year 2 of HMP-MC enrollment

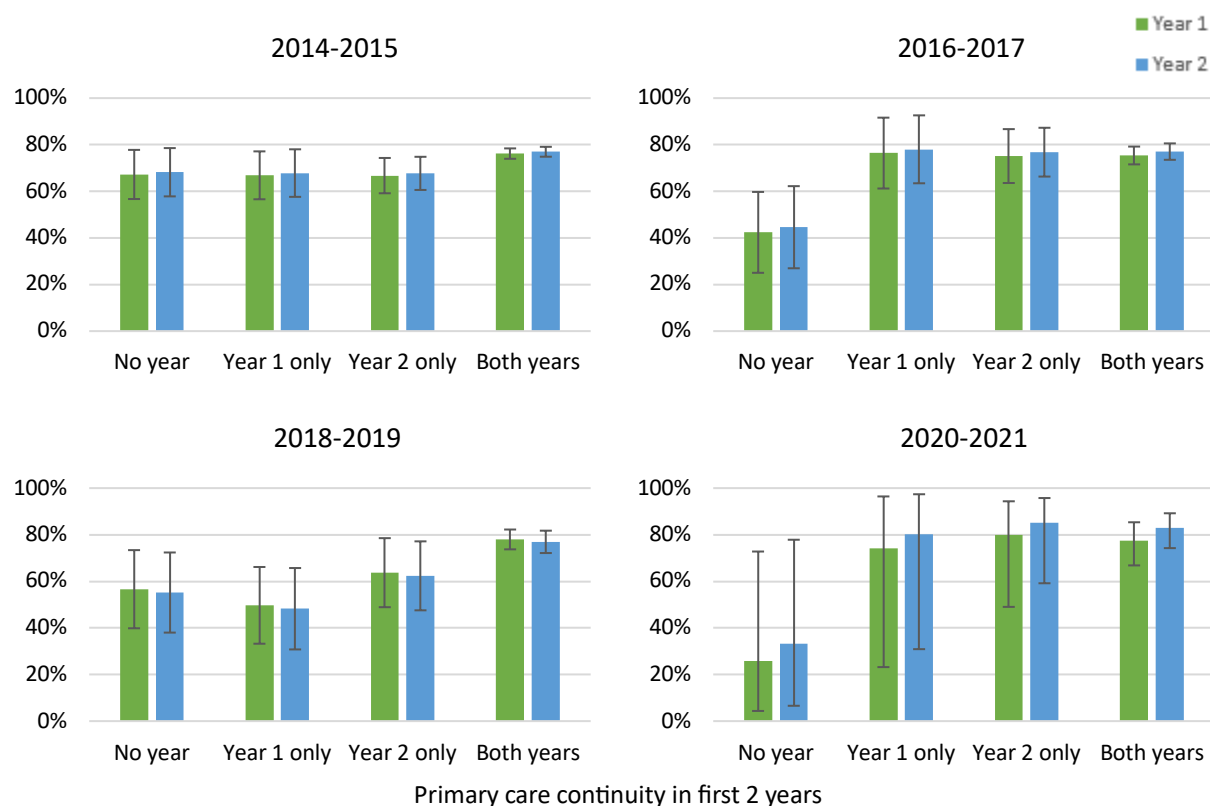
	High ED utilizers in Year 2		
	OR	95% CI	
Cohort year			
2014-2015	Ref.	–	–
2016-2017	0.782	0.742	0.823
2018-2019	0.493	0.464	0.523
2020-2021	0.395	0.367	0.426
FPL at initial HMP-MC enrollment			
0%	Ref.	–	–
1-99%	0.651	0.618	0.685
100% or higher	0.516	0.480	0.553
Sex			
Female	Ref.	–	–
Male	0.782	0.750	0.816
Age at initial HMP-MC enrollment			
19-20 years	Ref.	–	–
21-29 years	1.075	1.006	1.150
30-49 years	0.738	0.693	0.786
50-59 years	0.304	0.280	0.329
60-64 years	0.193	0.164	0.226
Preferred oral/written language			
English	Ref.	–	–
Other language	0.651	0.529	0.801
Race/Ethnicity			
Hispanic	Ref.	–	–
Black, non-Hispanic	1.351	1.210	1.508
White, non-Hispanic	0.928	0.834	1.033
Other/Unknown	0.700	0.612	0.800
Urbanicity at initial HMP-MC enrollment			
Rural	Ref.	–	–
Suburban	1.428	1.295	1.575
Urban	1.107	1.024	1.198
Disability (composite)			
No	Ref.	–	–
Yes	4.859	4.625	5.104
Primary care visit in first 2 years			
No year	Ref.	–	–
Year 1 only	1.213	1.066	1.379
Year 2 only	2.967	2.654	3.318
Both years	3.368	3.067	3.698

Logistic regression adjusting for cohort year, income level, sex, age, preferred language, race/ethnicity, urbanicity, disability composite indicator, and primary care continuity

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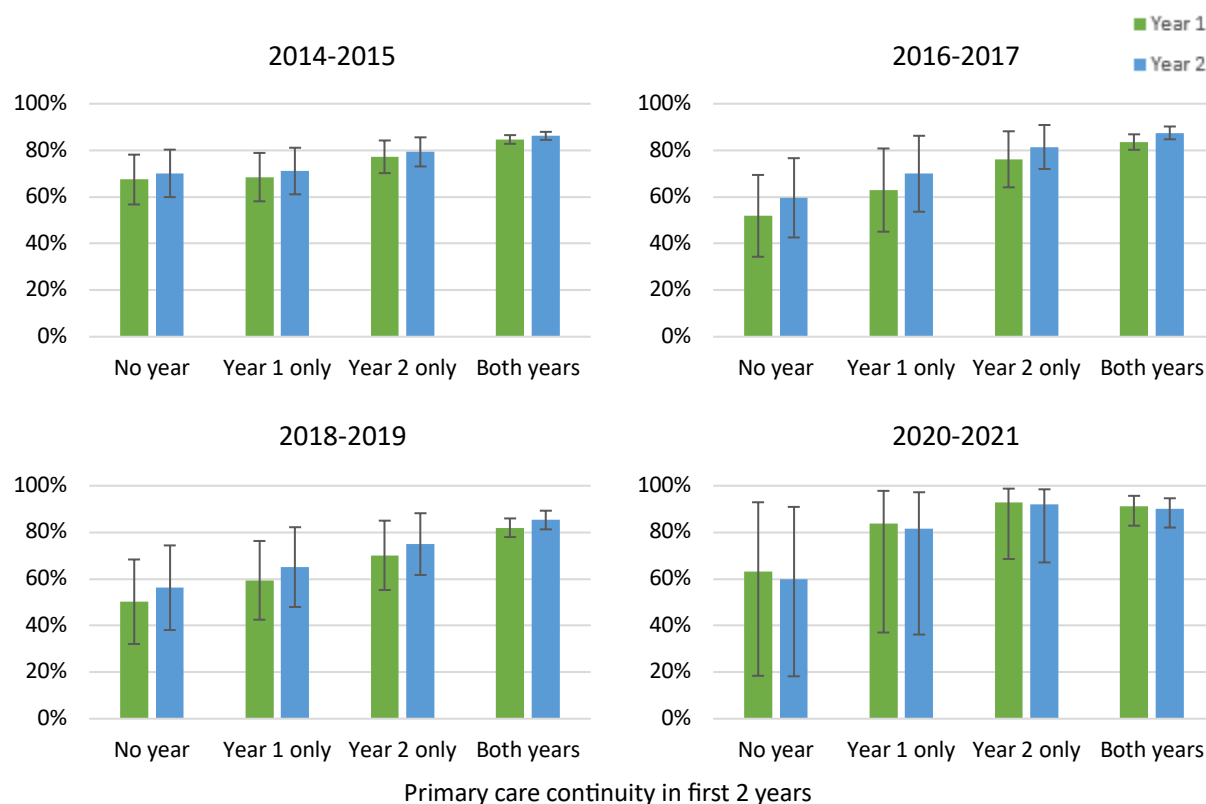
Evaluation question 5.4: Does HMP promote more consistent use of services to manage chronic conditions over time?

Administrative Data Appendix Figure 5.4.1. Predicted proportion with corticosteroids within 14 days (PCE1) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



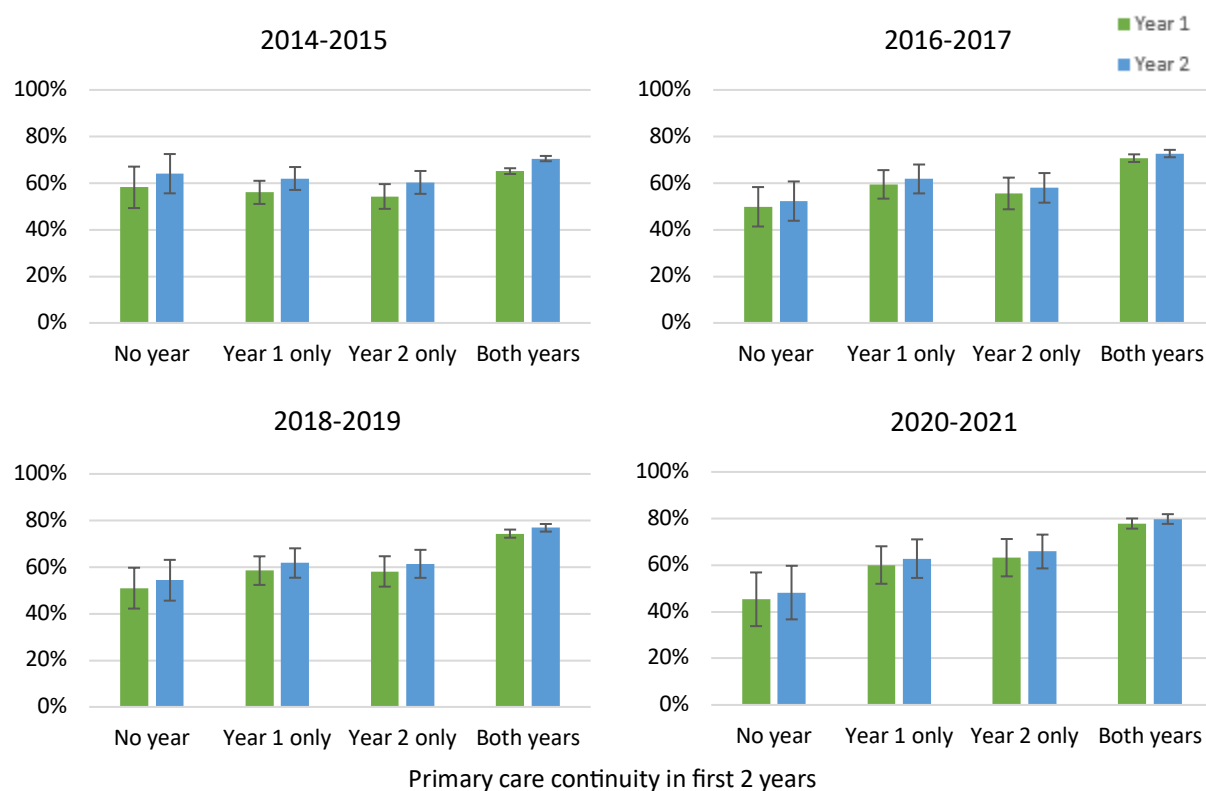
Administrative Data Appendix

Administrative Data Appendix Figure 5.4.2. Predicted proportion with bronchodilators within 30 days (PCE2) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



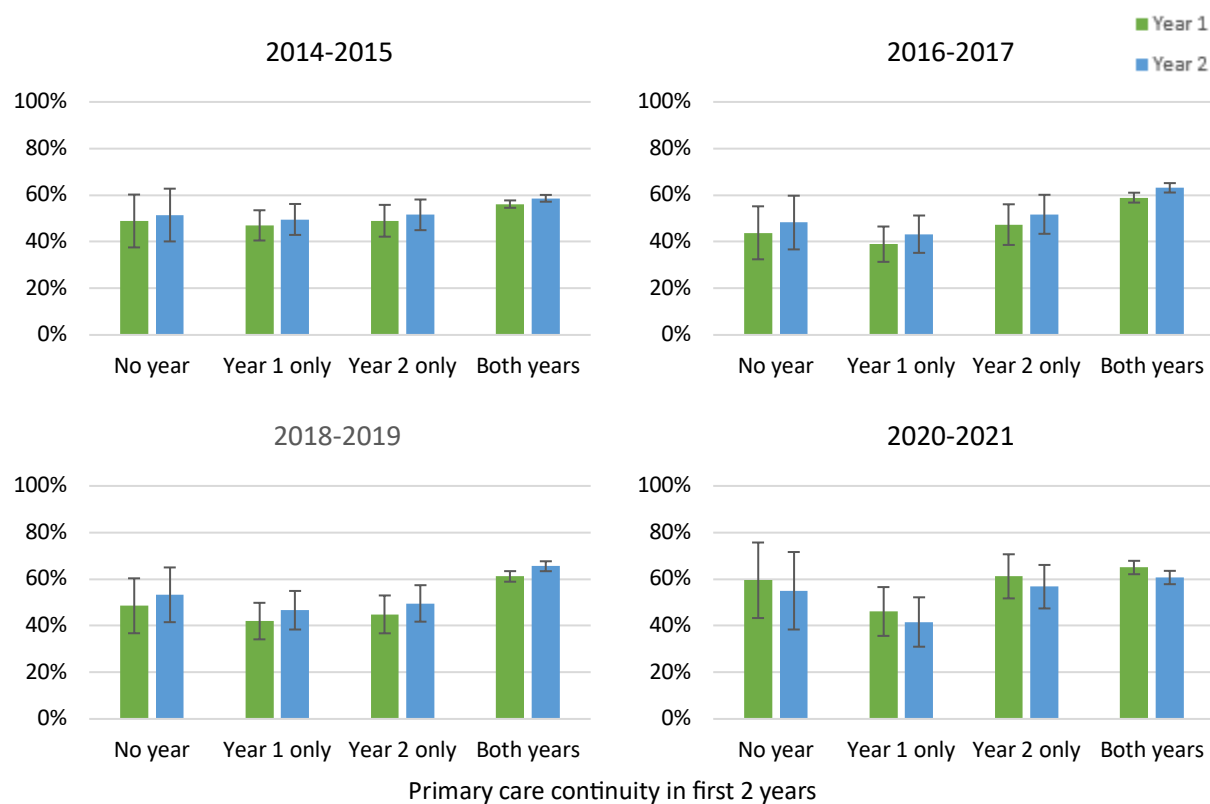
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Administrative Data Appendix Figure 5.4.3. Predicted proportion with statin therapy (SPC1) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



Administrative Data Appendix

Administrative Data Appendix Figure 5.4.4. Predicted proportion with statin adherence $\geq 80\%$ (SPC2) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



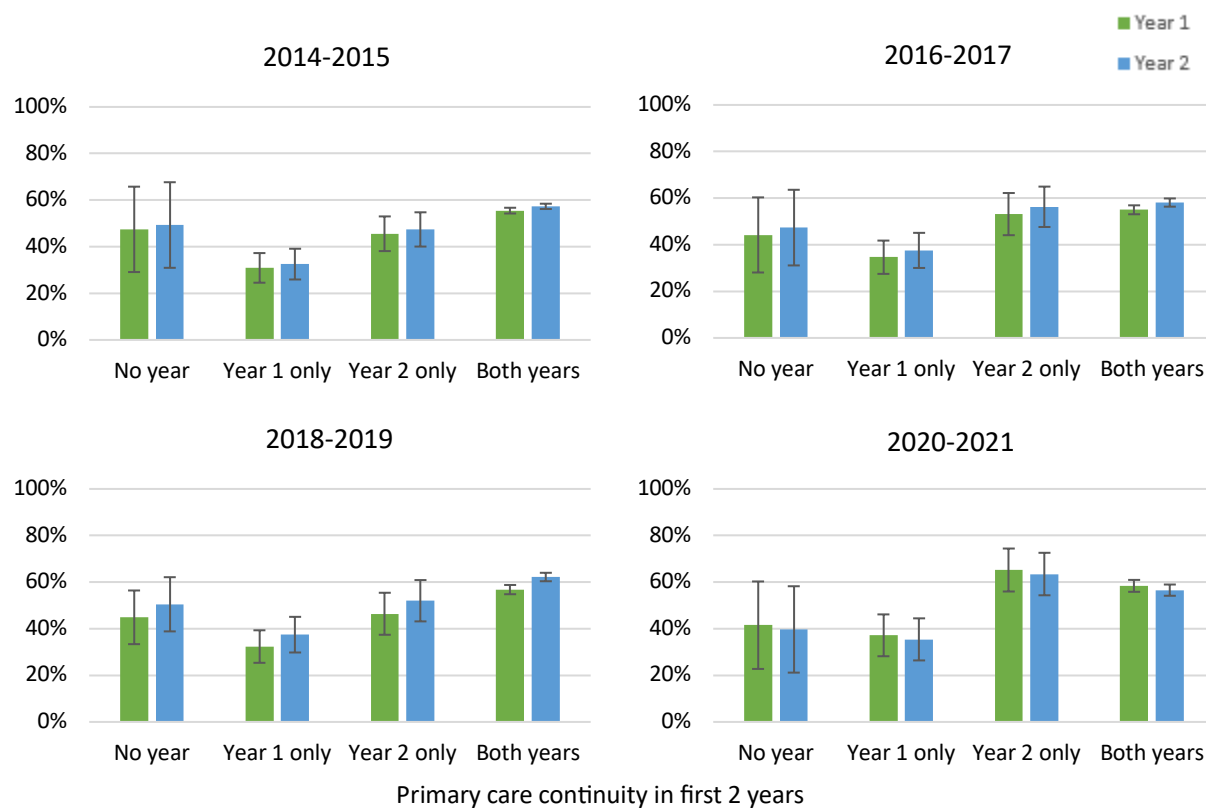
Administrative Data Appendix

Administrative Data Appendix Figure 5.4.5. Predicted proportion with diabetes with statin therapy (SPD1) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



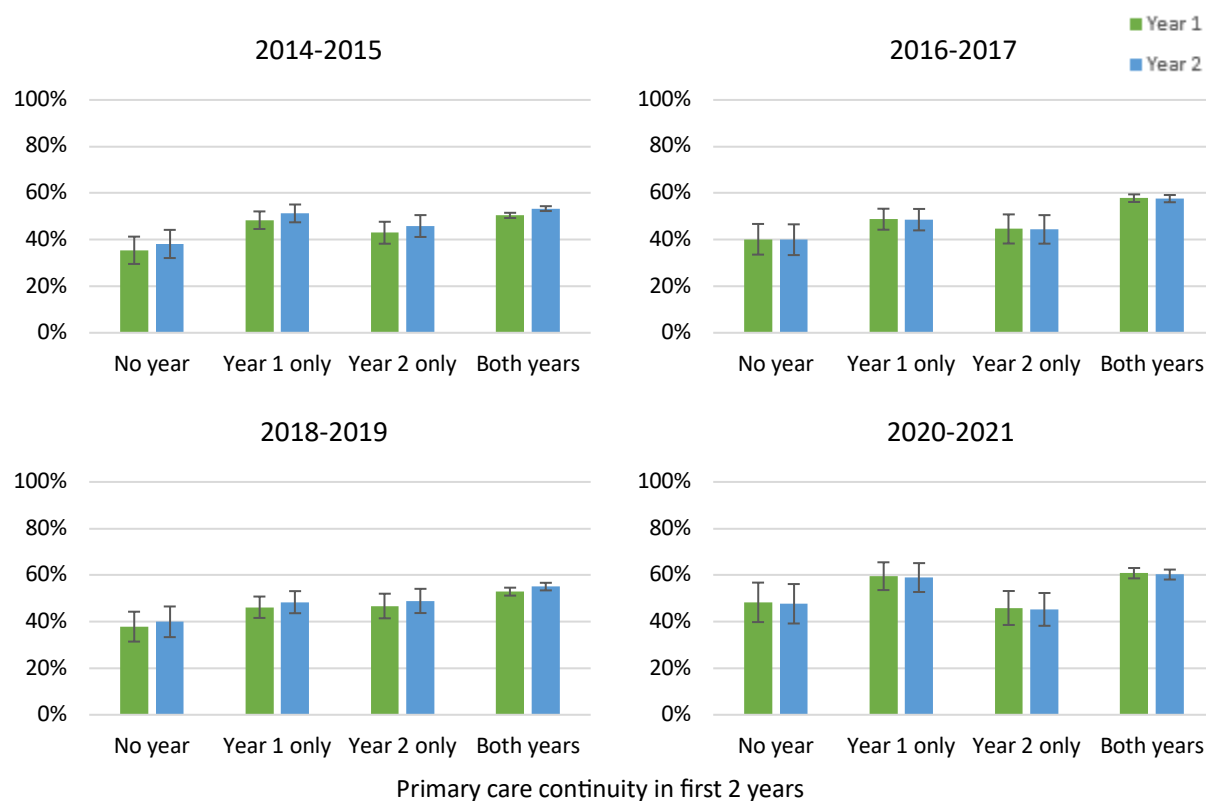
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Administrative Data Appendix Figure 5.4.6. Predicted proportion with diabetes with statin adherence $\geq$ 80% (SPD2) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



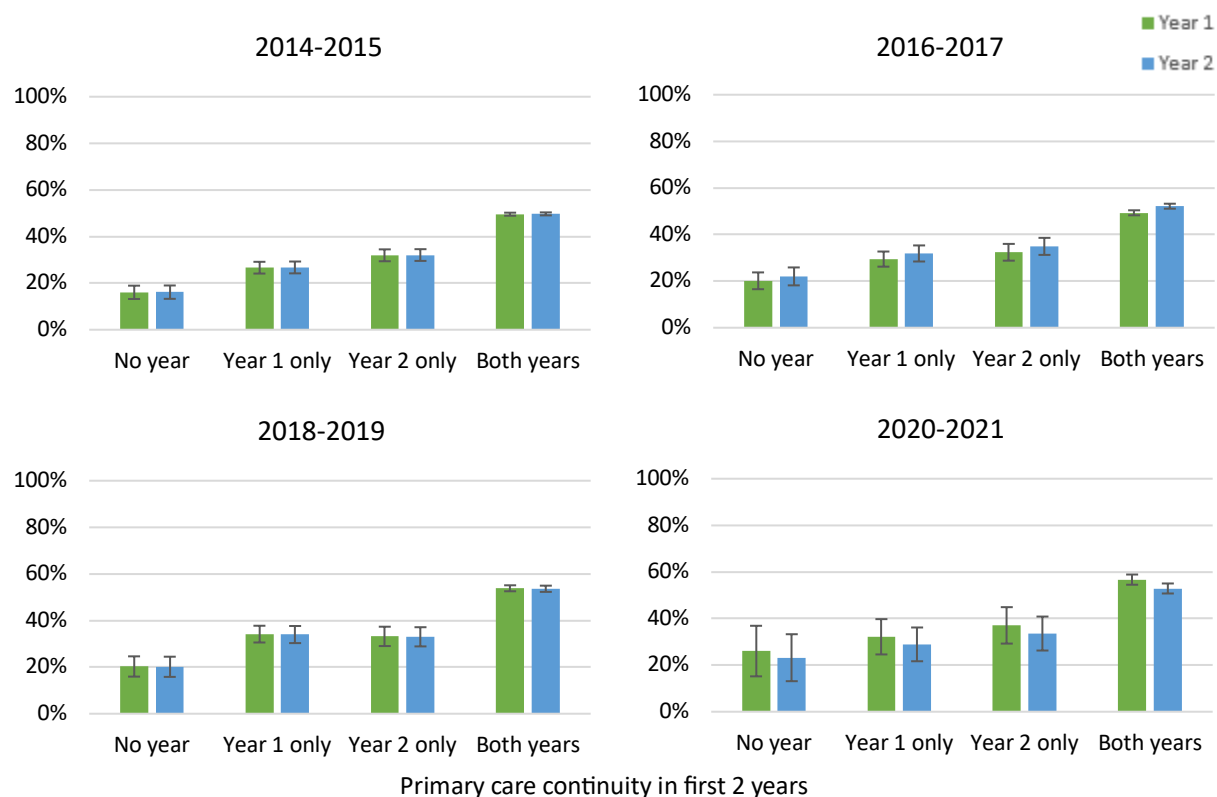
Administrative Data Appendix

Administrative Data Appendix Figure 5.4.7. Predicted proportion with persistent asthma with asthma medication ratio ≥ 0.5 (AMR) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



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Administrative Data Appendix Figure 5.4.8. Predicted proportion with multiple chronic conditions with follow-up within 7 days after ED visit (FMC) by primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for income, sex, race/ethnicity, preferred language, and urbanicity



Administrative Data Appendix

Administrative Data Appendix Table 5.4.9. Multivariate logistic regression – Proportion with corticosteroids within 14 days (PCE1) with primary care continuity in the first two years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.638	0.392	1.038	0.070	0.221	0.104	0.470	0.000	0.349	0.167	0.729	0.005	0.102	0.013	0.774	0.027
Year 1 only	0.627	0.391	1.007	0.054	1.060	0.437	2.572	0.897	0.259	0.125	0.539	0.000	0.834	0.088	7.945	0.874
Year 2 only	0.624	0.444	0.876	0.007	0.986	0.523	1.858	0.965	0.478	0.241	0.948	0.035	1.170	0.289	4.741	0.826
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.045	0.884	1.236	0.605	1.101	0.822	1.473	0.520	0.940	0.655	1.350	0.737	1.425	0.696	2.918	0.333
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.206	0.957	1.518	0.112	1.054	0.699	1.591	0.801	0.991	0.640	1.537	0.969	0.871	0.396	1.913	0.731
100% or higher	1.231	0.922	1.642	0.158	1.742	1.052	2.884	0.031	1.647	0.972	2.791	0.064	1.075	0.391	2.959	0.889
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.796	0.672	0.942	0.008	0.554	0.410	0.749	0.000	0.753	0.518	1.096	0.138	0.527	0.254	1.094	0.086
Preferred oral/written language																
English	Ref.	–	–	–					Ref.	–	–	–				
Other language	0.754	0.375	1.518	0.430					0.226	0.013	3.961	0.309				
Race/Ethnicity																
Hispanic	1.151	0.514	2.577	0.732	0.665	0.123	3.597	0.636	0.541	0.098	2.992	0.482				
Black, non-Hispanic	1.322	1.065	1.642	0.011	0.608	0.425	0.868	0.006	0.541	0.347	0.845	0.007				
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	1.934	1.304	2.869	0.001	0.671	0.403	1.116	0.124	1.586	0.713	3.528	0.258	4.329	0.413	45.428	0.222
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.323	0.898	1.950	0.157	1.278	0.577	2.831	0.545	0.568	0.229	1.406	0.221	0.668	0.138	3.223	0.615
Urban	0.879	0.656	1.178	0.389	0.715	0.406	1.259	0.245	0.396	0.196	0.801	0.010	0.560	0.172	1.821	0.335

Shaded areas indicate variables that could not be modeled in the regression (e.g., only English speakers in the data for 2020-2021).

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Administrative Data Appendix Table 5.4.10. Multivariate logistic regression – Proportion with bronchodilators within 30 days (PCE2) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.370	0.225	0.610	0.000	0.202	0.098	0.420	0.000	0.218	0.103	0.463	0.000	0.167	0.023	1.195	0.075
Year 1 only	0.389	0.237	0.638	0.000	0.324	0.146	0.721	0.006	0.318	0.151	0.670	0.003	0.495	0.060	4.090	0.514
Year 2 only	0.611	0.409	0.910	0.015	0.622	0.320	1.208	0.161	0.513	0.248	1.063	0.072	1.276	0.224	7.255	0.784
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.134	0.930	1.382	0.213	1.385	0.985	1.948	0.061	1.277	0.860	1.898	0.225	0.868	0.344	2.191	0.764
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.119	0.855	1.465	0.412	1.216	0.728	2.030	0.455	0.906	0.555	1.480	0.694	1.682	0.552	5.128	0.360
100% or higher	1.201	0.855	1.685	0.291	0.974	0.578	1.642	0.922	0.794	0.477	1.322	0.375	0.644	0.200	2.070	0.460
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.756	0.619	0.923	0.006	0.542	0.380	0.773	0.001	0.912	0.609	1.366	0.655	0.693	0.269	1.782	0.446
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–				
Other language	2.290	0.698	7.515	0.172	1.975	0.244	15.98 0	0.524	0.180	0.010	3.095	0.237				
Race/Ethnicity																
Hispanic	0.681	0.291	1.594	0.375												
Black, non-Hispanic	1.634	1.237	2.157	0.001	0.695	0.460	1.052	0.086	0.970	0.578	1.628	0.908	0.388	0.088	1.714	0.212
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	1.363	0.892	2.081	0.152	1.096	0.568	2.114	0.784	1.292	0.567	2.945	0.542	0.457	0.075	2.774	0.394
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.134	0.757	1.698	0.543	0.594	0.261	1.355	0.216	0.452	0.195	1.050	0.065	0.046	0.005	0.443	0.008
Urban	1.379	1.005	1.892	0.047	0.760	0.394	1.466	0.413	0.651	0.330	1.287	0.217	0.291	0.034	2.485	0.259

Shaded areas indicate variables that could not be modeled in the regression (e.g., only English speakers in data for 2020-2021).

Administrative Data Appendix

Administrative Data Appendix Table 5.4.11. Multivariate logistic regression – Proportion with statin therapy (SPC1) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.741	0.511	1.075	0.114	0.409	0.291	0.576	0.000	0.354	0.247	0.506	0.000	0.232	0.145	0.372	0.000
Year 1 only	0.678	0.550	0.835	0.000	0.605	0.466	0.786	0.000	0.481	0.369	0.628	0.000	0.424	0.298	0.602	0.000
Year 2 only	0.630	0.510	0.780	0.000	0.516	0.393	0.676	0.000	0.474	0.363	0.619	0.000	0.485	0.345	0.682	0.000
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–		Ref.	–	–		Ref.	–	–		Ref.	–	–	
Year 2	1.285	1.190	1.388	0.000	1.103	0.988	1.232	0.081	1.148	1.011	1.303	0.033	1.124	0.944	1.339	0.189
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	0.950	0.864	1.044	0.288	1.018	0.885	1.172	0.799	1.060	0.910	1.235	0.453	1.051	0.854	1.293	0.638
100% or higher	1.028	0.917	1.152	0.637	1.019	0.870	1.193	0.817	1.125	0.954	1.325	0.161	1.112	0.895	1.382	0.337
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	1.251	1.157	1.352	0.000	1.268	1.130	1.423	0.000	1.506	1.323	1.715	0.000	1.263	1.054	1.513	0.012
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.093	0.841	1.422	0.506	1.062	0.706	1.596	0.774	1.015	0.671	1.538	0.942	5.201	1.226	22.06 8	0.025
Race/Ethnicity																
Hispanic	0.942	0.685	1.295	0.713	0.786	0.562	1.098	0.158	0.763	0.519	1.122	0.170	0.707	0.431	1.161	0.171
Black, non-Hispanic	0.602	0.548	0.661	0.000	0.889	0.765	1.033	0.126	0.818	0.688	0.973	0.023	0.951	0.751	1.206	0.680
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	0.921	0.791	1.072	0.290	0.962	0.805	1.150	0.672	1.100	0.910	1.329	0.326	1.219	0.929	1.599	0.152
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	0.991	0.834	1.177	0.914	0.626	0.487	0.804	0.000	1.223	0.909	1.647	0.184	0.939	0.605	1.456	0.779
Urban	1.004	0.881	1.143	0.958	0.698	0.574	0.848	0.000	0.990	0.796	1.231	0.928	0.714	0.514	0.993	0.045

Administrative Data Appendix

Administrative Data Appendix Table 5.4.12. Multivariate logistic regression – Proportion with statin adherence $\geq$ 80% (SPC2) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.743	0.467	1.181	0.209	0.538	0.336	0.862	0.010	0.593	0.366	0.961	0.034	0.788	0.396	1.567	0.497
Year 1 only	0.687	0.525	0.900	0.006	0.438	0.315	0.609	0.000	0.452	0.324	0.632	0.000	0.453	0.292	0.704	0.000
Year 2 only	0.745	0.567	0.981	0.036	0.622	0.438	0.882	0.008	0.509	0.367	0.707	0.000	0.847	0.568	1.262	0.415
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.110	1.015	1.213	0.022	1.198	1.059	1.355	0.004	1.213	1.060	1.387	0.005	0.829	0.697	0.986	0.034
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.018	0.911	1.137	0.752	0.989	0.846	1.156	0.889	1.092	0.928	1.284	0.289	1.067	0.870	1.310	0.533
100% or higher	1.047	0.919	1.193	0.491	1.299	1.086	1.554	0.004	1.148	0.966	1.365	0.117	1.506	1.211	1.871	0.000
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	1.069	0.976	1.171	0.153	1.019	0.893	1.162	0.780	1.036	0.900	1.193	0.621	1.248	1.041	1.496	0.017
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.589	1.173	2.154	0.003	2.343	1.391	3.946	0.001	0.841	0.549	1.289	0.427	0.512	0.250	1.050	0.068
Race/Ethnicity																
Hispanic	0.651	0.459	0.925	0.016	0.675	0.454	1.002	0.051	0.846	0.543	1.316	0.457	0.579	0.344	0.977	0.040
Black, non-Hispanic	0.543	0.484	0.609	0.000	0.598	0.505	0.710	0.000	0.455	0.376	0.551	0.000	0.726	0.570	0.926	0.010
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	0.856	0.722	1.016	0.076	0.846	0.694	1.031	0.097	0.985	0.810	1.197	0.880	0.930	0.721	1.200	0.577
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.324	1.088	1.613	0.005	0.847	0.644	1.115	0.236	0.754	0.555	1.024	0.071	0.680	0.447	1.034	0.071
Urban	0.929	0.803	1.075	0.324	0.801	0.654	0.979	0.031	0.862	0.679	1.093	0.221	0.627	0.454	0.867	0.005

Administrative Data Appendix

Administrative Data Appendix Table 5.4.13. Multivariate logistic regression – Proportion with diabetes with statin therapy (SPD1) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.290	0.184	0.457	0.000	0.351	0.232	0.533	0.000	0.495	0.353	0.695	0.000	0.192	0.120	0.306	0.000
Year 1 only	0.587	0.483	0.714	0.000	0.598	0.480	0.746	0.000	0.531	0.424	0.664	0.000	0.564	0.423	0.751	0.000
Year 2 only	0.482	0.392	0.592	0.000	0.549	0.425	0.708	0.000	0.463	0.357	0.601	0.000	0.588	0.436	0.791	0.000
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.208	1.143	1.278	0.000	1.171	1.074	1.277	0.000	1.197	1.088	1.317	0.000	1.060	0.936	1.199	0.359
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.028	0.963	1.098	0.405	1.103	0.994	1.224	0.065	1.108	0.988	1.242	0.080	0.823	0.712	0.950	0.008
100% or higher	1.048	0.965	1.138	0.264	1.115	0.992	1.254	0.068	1.045	0.926	1.179	0.474	0.956	0.819	1.116	0.566
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.983	0.929	1.040	0.556	0.959	0.879	1.045	0.336	1.071	0.973	1.179	0.161	1.192	1.053	1.348	0.005
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.749	1.445	2.117	0.000	1.786	1.367	2.333	0.000	1.406	1.063	1.859	0.017	1.548	1.040	2.304	0.031
Race/Ethnicity																
Hispanic	0.854	0.736	0.990	0.036	0.869	0.707	1.068	0.181	0.983	0.796	1.212	0.870	1.044	0.810	1.345	0.740
Black, non-Hispanic	0.819	0.766	0.877	0.000	0.922	0.823	1.032	0.157	0.802	0.707	0.911	0.001	0.964	0.822	1.130	0.649
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	1.141	1.026	1.268	0.015	1.003	0.879	1.144	0.970	1.127	0.982	1.293	0.090	1.260	1.051	1.511	0.013
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.109	0.976	1.261	0.114	0.799	0.648	0.984	0.035	0.962	0.761	1.216	0.747	0.973	0.714	1.327	0.863
Urban	1.243	1.128	1.370	0.000	0.993	0.846	1.165	0.932	0.976	0.815	1.168	0.789	1.012	0.799	1.282	0.921

Administrative Data Appendix

Administrative Data Appendix Table 5.4.14. Multivariate logistic regression – Proportion with diabetes with statin adherence $\geq$ 80% (SPD2) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.718	0.338	1.526	0.389	0.640	0.327	1.253	0.193	0.613	0.381	0.988	0.044	0.498	0.225	1.099	0.084
Year 1 only	0.350	0.258	0.475	0.000	0.423	0.305	0.587	0.000	0.356	0.256	0.495	0.000	0.413	0.277	0.615	0.000
Year 2 only	0.664	0.490	0.901	0.009	0.926	0.640	1.339	0.683	0.653	0.452	0.943	0.023	1.344	0.893	2.022	0.157
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.079	1.007	1.157	0.031	1.139	1.023	1.270	0.018	1.258	1.124	1.407	0.000	0.926	0.801	1.070	0.298
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.107	1.020	1.201	0.015	1.136	0.999	1.293	0.053	1.097	0.960	1.253	0.172	1.112	0.937	1.319	0.224
100% or higher	1.229	1.110	1.361	0.000	1.097	0.949	1.268	0.212	1.197	1.037	1.382	0.014	1.318	1.101	1.579	0.003
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.933	0.870	1.001	0.053	0.895	0.803	0.996	0.043	0.961	0.859	1.076	0.494	1.014	0.878	1.171	0.852
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.372	1.123	1.676	0.002	1.321	0.994	1.754	0.055	0.999	0.749	1.332	0.995	0.794	0.534	1.181	0.255
Race/Ethnicity																
Hispanic	0.506	0.420	0.609	0.000	0.519	0.401	0.674	0.000	0.701	0.550	0.893	0.004	0.582	0.435	0.778	0.000
Black, non-Hispanic	0.529	0.486	0.576	0.000	0.472	0.410	0.545	0.000	0.532	0.456	0.621	0.000	0.534	0.442	0.645	0.000
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	0.841	0.743	0.951	0.006	0.941	0.800	1.107	0.464	0.872	0.747	1.019	0.085	0.813	0.665	0.993	0.043
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.334	1.130	1.575	0.001	0.765	0.582	1.005	0.054	0.997	0.748	1.330	0.986	0.767	0.524	1.124	0.173
Urban	1.073	0.947	1.215	0.269	0.758	0.618	0.930	0.008	0.740	0.593	0.923	0.007	0.789	0.588	1.058	0.113

Administrative Data Appendix

Administrative Data Appendix Table 5.4.15. Multivariate logistic regression – Proportion with persistent asthma with asthma medication ratio ≥ 0.5 (AMR) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.534	0.412	0.693	0.000	0.484	0.366	0.640	0.000	0.536	0.405	0.709	0.000	0.596	0.421	0.844	0.004
Year 1 only	0.920	0.787	1.074	0.289	0.691	0.573	0.833	0.000	0.760	0.627	0.922	0.005	0.947	0.731	1.226	0.679
Year 2 only	0.737	0.607	0.895	0.002	0.582	0.451	0.752	0.000	0.777	0.626	0.964	0.022	0.540	0.402	0.726	0.000
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.126	1.060	1.197	0.000	0.992	0.906	1.086	0.865	1.093	0.996	1.200	0.061	0.975	0.860	1.107	0.699
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.245	1.159	1.337	0.000	1.252	1.123	1.395	0.000	1.266	1.136	1.410	0.000	1.171	1.010	1.357	0.037
100% or higher	1.325	1.207	1.454	0.000	1.231	1.083	1.399	0.001	1.236	1.092	1.399	0.001	1.202	1.026	1.408	0.023
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.748	0.701	0.798	0.000	0.712	0.647	0.783	0.000	0.757	0.686	0.836	0.000	0.808	0.709	0.921	0.001
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.405	1.094	1.804	0.008	1.142	0.798	1.635	0.469	1.477	1.034	2.110	0.032	2.170	1.104	4.268	0.025
Race/Ethnicity																
Hispanic	0.982	0.815	1.184	0.849	1.158	0.911	1.471	0.230	1.349	1.069	1.702	0.012	0.827	0.622	1.099	0.190
Black, non-Hispanic	0.736	0.684	0.791	0.000	0.793	0.707	0.889	0.000	0.652	0.580	0.733	0.000	0.687	0.589	0.801	0.000
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	1.012	0.889	1.152	0.855	1.321	1.115	1.565	0.001	1.089	0.924	1.285	0.309	1.473	1.160	1.870	0.001
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	1.202	1.041	1.388	0.012	1.140	0.917	1.419	0.238	0.922	0.735	1.155	0.478	0.831	0.619	1.114	0.216
Urban	1.064	0.960	1.180	0.237	1.034	0.886	1.207	0.670	1.039	0.883	1.224	0.643	1.092	0.876	1.362	0.434

Administrative Data Appendix

Administrative Data Appendix Table 5.4.16. Multivariate logistic regression – Proportion with multiple chronic conditions with follow-up within 7 days after ED visit (FMC) with primary care continuity in the first 2 years of HMP-MC enrollment, stratified by cohort year and adjusted for demographic characteristics

	2014-2015				2016-2017				2018-2019				2020-2021			
	aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value		aOR	95% CI	p-value	
Primary care in first 2 years																
No year	0.193	0.156	0.239	0.000	0.258	0.206	0.323	0.000	0.216	0.165	0.284	0.000	0.267	0.152	0.471	0.000
Year 1 only	0.367	0.323	0.419	0.000	0.428	0.365	0.501	0.000	0.443	0.376	0.521	0.000	0.360	0.253	0.512	0.000
Year 2 only	0.476	0.423	0.535	0.000	0.491	0.417	0.578	0.000	0.424	0.351	0.512	0.000	0.448	0.321	0.625	0.000
Both years	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year of HMP-MC enrollment																
Year 1	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Year 2	1.005	0.970	1.042	0.773	1.121	1.056	1.189	0.000	0.992	0.922	1.066	0.821	0.857	0.758	0.969	0.014
FPL at initial HMP-MC enrollment																
0%	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
1-99%	1.016	0.970	1.064	0.506	0.950	0.880	1.027	0.198	1.164	1.062	1.275	0.001	1.047	0.901	1.217	0.547
100% or higher	1.055	0.991	1.124	0.095	1.092	0.991	1.203	0.076	1.141	1.031	1.264	0.011	1.182	1.008	1.384	0.039
Sex																
Female	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Male	0.981	0.945	1.019	0.322	1.000	0.940	1.064	0.996	1.011	0.938	1.090	0.769	0.932	0.823	1.056	0.267
Preferred oral/written language																
English	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other language	1.179	1.004	1.385	0.044	1.515	1.149	1.997	0.003	0.719	0.544	0.949	0.020	1.024	0.565	1.855	0.939
Race/Ethnicity																
Hispanic	0.685	0.608	0.772	0.000	0.808	0.684	0.954	0.012	0.989	0.826	1.184	0.904	0.896	0.659	1.219	0.485
Black, non-Hispanic	0.756	0.723	0.789	0.000	0.796	0.738	0.857	0.000	0.754	0.687	0.828	0.000	0.860	0.738	1.001	0.052
White, non-Hispanic	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Other/Unknown	0.923	0.846	1.006	0.070	0.997	0.882	1.127	0.963	0.858	0.745	0.987	0.032	0.805	0.633	1.023	0.076
Urbanicity																
Rural	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–	Ref.	–	–	–
Suburban	0.919	0.846	0.999	0.047	0.848	0.741	0.971	0.017	0.877	0.748	1.030	0.109	1.172	0.868	1.581	0.301
Urban	1.114	1.043	1.190	0.001	1.040	0.937	1.154	0.463	1.134	0.997	1.291	0.057	1.441	1.136	1.828	0.003

Administrative Data Appendix

Administrative Data Appendix Table 5.4.17. Multivariate linear regression– difference in ED visit rate from enrollment Year 1 to Year 2 for specific chronic conditions*, adjusted for cohort year and demographic characteristics

	Asthma				COPD			
	Coefficient	95% CI		p-value	Coefficient	95% CI		p-value
Cohort year								
2014-2015	Ref.	–	–	–	Ref.	–	–	–
2016-2017	-2.066	-8.831	4.699	0.549	-6.013	-12.865	0.839	0.085
2018-2019	-15.575	-22.511	-8.639	0.000	-18.410	-26.063	-10.757	0.000
2020-2021	4.401	-3.750	12.552	0.290	-4.985	-15.139	5.170	0.336
FPL at initial HMP-MC enrollment								
0%	Ref.	–	–	–	Ref.	–	–	–
1-99%	5.444	-0.652	11.538	0.080	5.395	-1.184	11.974	0.108
100% or higher	-0.432	-7.730	6.866	0.908	4.102	-3.616	11.820	0.298
Sex								
Female	Ref.	–	–	–	Ref.	–	–	–
Male	-2.607	-8.017	2.803	0.345	-0.474	-5.809	4.862	0.862
Preferred oral/written language								
English	Ref.	–	–	–	Ref.	–	–	–
Other language	7.242	-14.197	28.681	0.508	8.768	-31.326	13.789	0.446
Race/Ethnicity								
Hispanic	Ref.	–	–	–	Ref.	–	–	–
Black, non-Hispanic	-4.416	-18.903	10.071	0.550	1.812	-19.639	23.263	0.868
White, non-Hispanic	2.144	-11.803	16.091	0.763	5.000	-15.679	25.680	0.636
Other/Unknown	5.551	-10.861	21.962	0.507	1.214	-21.660	24.088	0.917
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	–	–	–	Ref.	–	–	–
Suburban	4.797	-7.622	17.216	0.449	4.397	-7.014	15.807	0.450
Urban	2.683	-6.387	11.752	0.562	2.138	-6.542	10.818	0.629

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Administrative Data Appendix

Administrative Data Appendix Table 5.4.17. Multivariate linear regression– difference in ED visit rate from enrollment Year 1 to Year 2 for specific chronic conditions*, adjusted for cohort year and demographic characteristics *(continued)*

		CV				Diabetes			
	Coefficient	95% CI		p-value	Coefficient	95% CI		p-value	
Cohort year									
2014-2015	Ref.	–	–	–	Ref.	–	–	–	
2016-2017	-0.119	-8.243	8.005	0.977	-3.490	-8.409	1.429	0.164	
2018-2019	-8.259	-16.941	0.423	0.062	-14.016	-19.143	-8.888	0.000	
2020-2021	6.187	-4.388	16.762	0.252	-2.357	-8.441	3.726	0.448	
FPL at initial HMP-MC enrollment									
0%	Ref.	–	–	–	Ref.	–	–	–	
1-99%	3.553	-4.374	11.480	0.380	0.778	-3.724	5.279	0.735	
100% or higher	4.167	-4.751	13.086	0.360	3.566	-1.620	8.752	0.178	
Sex									
Female	Ref.	–	–	–	Ref.	–	–	–	
Male	7.464	0.949	13.979	0.025	-0.763	-4.533	3.007	0.692	
Preferred oral/written language									
English	Ref.	–	–	–	Ref.	–	–	–	
Other language	0.055	-22.254	22.365	0.996	10.076	-1.415	21.567	0.086	
Race/Ethnicity									
Hispanic	Ref.	–	–	–	Ref.	–	–	–	
Black, non-Hispanic	-2.972	-24.780	18.837	0.789	-2.537	-12.059	6.984	0.601	
White, non-Hispanic	-0.032	-20.991	20.927	0.998	0.919	-8.071	9.909	0.841	
Other/Unknown	3.731	-19.199	26.660	0.750	2.656	-7.594	12.916	0.612	
Urbanicity at initial HMP-MC enrollment									
Rural	Ref.	–	–	–	Ref.	–	–	–	
Suburban	-2.890	-17.527	11.747	0.699	-3.381	-12.391	5.629	0.462	
Urban	-6.703	-17.759	4.353	0.235	-10.055	-16.903	-3.206	0.004	

*Includes beneficiaries identified with asthma, COPD, CV, or diabetes in the first 12 months of HMP-MC enrollment

Administrative Data Appendix

Table 5.4.18. Unadjusted hospital admission rate (per 100,000 members) in first 2 years of HMP-MC enrollment, overall and by cohort year

	Unadjusted Admission Rate					
	Year 1	95% CI		Year 2	95% CI	
COPD or Asthma in Older Adults (NQF 0275)						
Overall	381.88	350.05	413.71	394.01	360.13	427.89
Cohort year						
2014-2015	444.49	396.30	492.69	489.07	432.61	545.53
2016-2017	405.82	334.57	477.07	408.89	338.45	479.33
2018-2019	327.61	250.97	404.27	271.33	203.03	339.64
2020-2021	191.02	130.52	251.52	204.52	144.54	264.50
Heart Failure (NQF 0277)						
Overall	121.85	109.95	133.75	165.13	148.76	181.51
Cohort year						
2014-2015	99.32	82.53	116.11	153.82	127.38	180.26
2016-2017	159.94	130.66	189.23	207.43	168.56	246.29
2018-2019	132.53	105.67	159.38	180.41	143.29	217.53
2020-2021	106.49	79.88	133.10	114.17	86.80	141.55
Diabetes Short-Term Complications (NQF 0272)						
Overall	216.24	193.32	239.16	189.54	168.45	210.64
Cohort year						
2014-2015	218.51	183.78	253.23	144.14	110.22	178.06
2016-2017	186.60	139.97	233.23	232.42	184.52	280.30
2018-2019	247.10	195.60	298.60	202.64	163.04	242.25
2020-2021	210.78	150.24	271.32	214.08	160.82	267.33

Administrative Data Appendix

Table 5.4.19. Unadjusted difference in hospital admission rate from enrollment year 1 to year 2, overall and by cohort year

	COPD or Asthma in Older Adults (NQF 0275)			Heart Failure (NQF 0277)			Diabetes Short-Term Complications (NQF 0272)		
	Mean	95% CI		Mean	95% CI		Mean	95% CI	
Overall	23.26	-15.05	61.57	43.29	26.16	60.42	-26.70	-46.56	-6.84
Cohort year									
2014-2015	54.85	-8.93	118.63	54.50	28.14	80.85	-74.36	-104.01	-44.72
2016-2017	15.61	-62.95	94.17	47.48	6.99	87.97	45.82	7.01	84.63
2018-2019	-45.77	-119.97	28.43	47.88	9.08	86.68	-44.46	-91.80	2.88
2020-2021	20.47	-55.76	96.70	7.68	-26.54	41.91	3.29	-48.48	55.07

Administrative Data Appendix

Administrative Data Appendix Table 5.4.20. Multivariate linear regression – Predicted difference in hospital admission rate from enrollment year 1 to year 2, adjusted for demographic characteristics

	COPD or Asthma in Older Adults (NQF 0275)				Heart Failure (NQF 0277)			
	Coefficient	95% CI		p-value	Coefficient	95% CI		p-value
Cohort year								
2014-2015	Ref.	—	—	—	Ref.	—	—	—
2016-2017	-44.583	-143.280	54.113	0.376	-8.619	-54.215	36.977	0.711
2018-2019	-103.321	-209.888	3.247	0.057	-6.433	-52.499	39.633	0.784
2020-2021	-34.610	-156.232	87.012	0.577	-47.795	-97.915	2.326	0.062
FPL at initial HMP-MC enrollment								
0%	Ref.	—	—	—	Ref.	—	—	—
1-99%	30.587	-60.882	122.055	0.512	-35.963	-76.451	4.525	0.082
100% or higher	-85.655	-192.786	21.476	0.117	-45.626	-93.800	2.549	0.063
Sex								
Female	Ref.	—	—	—	Ref.	—	—	—
Male	134.211	56.961	211.461	0.001	26.082	-8.608	60.772	0.141
Preferred oral/written language								
English	Ref.	—	—	—	Ref.	—	—	—
Other language	270.548	-3.561	544.657	0.053	60.826	-66.896	188.548	0.351
Race/Ethnicity								
Hispanic	Ref.	—	—	—	Ref.	—	—	—
Black, non-Hispanic	-76.709	-309.366	155.948	0.518	-5.177	-95.029	84.675	0.910
White, non-Hispanic	-127.851	-349.578	93.875	0.258	-79.114	-164.000	5.773	0.068
Other/Unknown	-82.269	-329.640	165.102	0.515	-14.486	-112.320	83.348	0.772
Urbanicity at initial HMP-MC enrollment								
Rural	Ref.	—	—	—	Ref.	—	—	—
Suburban	11.668	-163.225	186.560	0.896	36.817	-44.942	118.575	0.377
Urban	-58.292	-186.386	69.801	0.372	22.286	-37.962	82.533	0.468

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Administrative Data Appendix

Administrative Data Appendix Table 5.4.21. Multivariate linear regression – Predicted difference in hospital admission rate from enrollment year 1 to year 2, adjusted for demographic characteristics
(continued)

	Diabetes Short-Term Complications (NQF 0272)			
	Coefficient	95% CI		p-value
Cohort year				
2014-2015	Ref.	—	—	—
2016-2017	121.090	68.224	173.956	0.000
2018-2019	27.912	-25.500	81.323	0.306
2020-2021	73.629	15.517	131.742	0.013
FPL at initial HMP-MC enrollment				
0%	Ref.	—	—	—
1-99%	43.068	-3.876	90.012	0.072
100% or higher	43.340	-12.516	99.196	0.128
Sex				
Female	Ref.	—	—	—
Male	-23.220	-63.442	17.001	0.258
Preferred oral/written language				
English	Ref.	—	—	—
Other language	-1.278	-149.364	146.809	0.987
Race/Ethnicity				
Hispanic	Ref.	—	—	—
Black, non-Hispanic	6.849	-97.331	111.028	0.897
White, non-Hispanic	-22.403	-120.824	76.019	0.656
Other/Unknown	5.014	-108.420	118.447	0.931
Urbanicity at initial HMP-MC enrollment				
Rural	Ref.	—	—	—
Suburban	-87.730	-182.525	7.065	0.070
Urban	-17.156	-87.010	52.698	0.630

Beneficiary Survey Appendix

Introduction

The Beneficiary Survey Appendix includes additional tables related to the methods and results using beneficiary survey data.

Methodology

Beneficiary Survey Appendix Table 1. Association between cohort and health burden category

	Cohort			<i>p-value</i> ¹	Total
	Cohort 1	Cohort 2	Cohort 3		
Health burden at baseline					
Substantial	19.3	16.9	14.2	<0.001	17.2
Moderate	13.0	12.0	15.0		13.3
Minimal	67.7	71.1	70.8		69.5

Unweighted column percentages

¹Pearson chi-square test

Beneficiary Survey Appendix Table 2. Association between health burden category and demographic characteristics

	Health burden at baseline			<i>p-value</i> ¹	Total
	Substantial	Moderate	Minimal		
Age at baseline survey					
19-34	20.3	37.1	43.5	<0.001	38.7
35-50	35.5	30.3	27.2		29.0
51-64	44.2	32.6	29.3		32.3
Sex					
Male	47.8	43.7	46.4	0.089	46.3
Female	52.2	56.4	53.6		53.7
Race/Ethnicity					
White, non-Hispanic	69.6	65.0	63.7	0.002	64.8
Black, non-Hispanic	15.9	18.1	19.6		18.8
Hispanic	4.0	5.4	4.8		4.8
Other	10.6	11.6	11.9		11.6
Income level					
0-35%	53.3	41.3	31.4	<0.001	36.5
36-99%	28.8	36.3	39.5		37.2
>=100%	18.0	22.4	29.1		26.3

Unweighted column percentages

¹Pearson chi-square test

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 3. Association between health burden category and administrative data

	Health burden at baseline			<i>p-value</i> ¹	Total
	Substantial	Moderate	Minimal		
Number of ED Visits					
0	50.9	55.7	71.1	<0.001	65.6
1-2	33.5	33.2	22.8		26.1
3+	15.6	11.1	6.1		8.4
Number of inpatient stays					
0	84.2	89.7	94.1	<0.001	91.8
1-2	14.0	9.8	5.7		7.7
3+	1.8	0.5	0.2		0.6
Any mental health diagnosis					
No	42.3	53.2	74.0	<0.001	65.8
Yes	57.7	46.9	26.0		34.3
Any substance use disorder diagnosis					
No	77.3	82.3	91.0	<0.001	87.4
Yes	22.7	17.8	9.1		12.6
Number of chronic medical conditions ²					
0	24.6	40.9	56.4	<0.001	48.8
1-2	43.6	42.3	35.5		37.8
3+	31.8	16.8	8.2		13.4
Disability/Condition-related benefit plan					
No	61.8	82.9	92.1	<0.001	85.7
Yes	38.2	17.1	7.9		14.3

Unweighted column percentages

¹Pearson chi-square test

²Chronic conditions include diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

Beneficiary Survey Appendix

Additional Results

Evaluation question 1.2: What is the association between beneficiary knowledge of the Healthy Behaviors Incentives program and efforts to maintain or improve health?

Updated results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 1.2.1. Multivariate linear regression analyses predicting relationship between knowledge of HRA incentive and healthy behavior score and self-efficacy score in 2021

	Healthy behavior score ¹		Self-efficacy score ²	
	Coefficient	95% CI	Coefficient	95% CI
HRA incentive knowledge	0.100*	[0.015, 0.185]	0.170*	[0.019, 0.321]
Age ⁴				
19-34	REF		REF	
35-50	-0.002	[-0.101, 0.098]	0.188*	[0.001, 0.375]
51-65	0.103*	[0.008, 0.199]	0.481***	[0.307, 0.655]
FPL ⁴				
0%	-0.087	[-0.178, 0.004]	-0.159*	[-0.314, -0.003]
0.1 to 99.99%	REF		REF	
100% or more	0.032	[-0.063, 0.127]	-0.041	[-0.204, 0.122]
Months enrolled in HMP-MC ⁴				
Less than 24 months	REF		REF	
24-47 months	0.050	[-0.041, 0.141]	-0.038	[-0.190, 0.115]
48+ months	0.011	[-0.057, 0.078]	-0.011	[-0.134, 0.112]
Urbanicity ⁴				
Urban	REF		REF	
Suburban	0.044	[-0.085, 0.173]	0.111	[-0.089, 0.311]
Rural	0.072	[-0.039, 0.183]	0.135	[-0.012, 0.281]
Gender ⁴				
Female	REF		REF	
Male	-0.048	[-0.128, 0.031]	-0.021	[-0.159, 0.117]
Non-binary, transgender, or other	--	--	--	--
Race/Ethnicity ⁴				
White, non-Hispanic	REF		REF	
Black, non-Hispanic	-0.024	[-0.126, 0.079]	0.261**	[0.075, 0.446]
Hispanic	0.012	[-0.167, 0.191]	-0.081	[-0.321, 0.160]
Arab, Chaldean, or Middle Eastern	0.035	[-0.134, 0.204]	0.501**	[0.173, 0.830]
Other, multi-racial, or not reported	0.053	[-0.096, 0.202]	0.045	[-0.258, 0.348]
Chronic condition ^{3,4}				
No chronic conditions	REF		REF	
Chronic condition	-0.032	[-0.114, 0.051]	-0.059	[-0.212, 0.093]
Help reading health materials ⁴				
Never	REF		REF	
Sometimes	-0.047	[-0.144, 0.051]	-0.485***	[-0.666, -0.304]
Often	-0.154	[-0.319, 0.011]	-0.071	[-0.421, 0.278]
Intercept	1.304***	[1.206, 1.402]	3.311***	[3.133, 3.490]

Multivariate linear regression results, *p<0.05, **p<0.01, ***p<0.001

¹Healthy behavior score is out of 2; respondent receives highest score for reporting that they consumed 3 or more servings of fruits and vegetables on 3 or more days in the past 7 days and that they exercised for 3 or more days in the past 7 days

²Self-efficacy score is out of 5; respondent receives highest score for reporting *always* in response to all five statements about self-efficacy in health care

³Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2021

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 1.2.2. Multivariate linear regression analyses predicting relationship between knowledge of waived copayments and healthy behavior score and self-efficacy score in 2021

	Healthy behavior score ¹		Self-efficacy score ²	
	Coefficient	95% CI	Coefficient	95% CI
Copay knowledge	0.029	[-0.058, 0.117]	0.086	[-0.083, 0.255]
Age ⁴				
19-34	REF		REF	
35-50	-0.002	[-0.102, 0.097]	0.188*	[0.000, 0.375]
51-65	0.105*	[0.010, 0.200]	0.483***	[0.311, 0.654]
FPL ⁴				
0%	-0.090	[-0.181, 0.001]	-0.164*	[-0.320, -0.008]
0.1 to 99.99%	REF		REF	
100% or more	0.038	[-0.057, 0.133]	-0.032	[-0.194, 0.131]
Months enrolled in HMP-MC ⁴				
Less than 24 months	REF		REF	
24-47 months	0.044	[-0.048, 0.136]	-0.048	[-0.202, 0.105]
48+ months	0.015	[-0.053, 0.082]	-0.006	[-0.128, 0.116]
Urbanicity ⁴				
Urban	REF		REF	
Suburban	0.051	[-0.082, 0.183]	0.123	[-0.082, 0.327]
Rural	0.074	[-0.037, 0.186]	0.139	[-0.006, 0.284]
Gender ⁴				
Female	REF		REF	
Male	-0.043	[-0.122, 0.036]	-0.011	[-0.149, 0.127]
Non-binary, transgender, or other	--	--	--	--
Race/Ethnicity ⁴				
White, non-Hispanic	REF		REF	
Black, non-Hispanic	-0.027	[-0.130, 0.077]	0.260**	[0.073, 0.447]
Hispanic	0.011	[-0.170, 0.191]	-0.080	[-0.319, 0.158]
Arab, Chaldean, or Middle Eastern	0.039	[-0.127, 0.204]	0.515**	[0.188, 0.841]
Other, multi-racial, or not reported	0.046	[-0.106, 0.198]	0.031	[-0.275, 0.336]
Chronic condition ^{3,4}				
No chronic conditions	REF		REF	
Chronic condition	-0.031	[-0.114, 0.052]	-0.059	[-0.210, 0.093]
Help reading health materials ⁴				
Never	REF		REF	
Sometimes	-0.047	[-0.145, 0.050]	-0.484***	[-0.665, -0.303]
Often	-0.167*	[-0.330, -0.004]	-0.091	[-0.446, 0.265]
Intercept	1.308***	[1.193, 1.423]	3.289***	[3.056, 3.522]

Multivariate linear regression results, *p<0.05, **p<0.01, ***p<0.001

¹Healthy behavior score is out of 2; respondent receives highest score for reporting that they consumed 3 or more servings of fruits and vegetables on 3 or more days in the past 7 days and that they exercised for 3 or more days in the past 7 days

²Self-efficacy score is out of 5; respondent receives highest score for reporting always in response to all five statements about self-efficacy in health care

³Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2021

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Evaluation question 1.3: Is HRA completion associated with improved health status and health behaviors?

Updated results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 1.3.1. Multivariate logistic regression analyses predicting relationship between PCP/HRA status and self-reported improvement in health in past year in 2021

	Physical health improvement		Mental health improvement		Oral health improvement		Any health improvement ¹	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
PCP/HRA status								
PCP visit and HRA	REF		REF		REF		REF	
PCP visit and no HRA	0.85	[0.64, 1.14]	0.94	[0.69, 1.28]	0.95	[0.67, 1.36]	0.90	[0.69, 1.17]
No PCP or no PCP visit	0.95	[0.68, 1.33]	1.13	[0.80, 1.58]	0.68	[0.45, 1.01]	0.84	[0.62, 1.14]
Age ³								
19-34	REF		REF		REF		REF	
35-50	0.55***	[0.40, 0.74]	0.58**	[0.42, 0.81]	0.62*	[0.42, 0.92]	0.49***	[0.37, 0.65]
51-65	0.64**	[0.46, 0.89]	0.51***	[0.35, 0.73]	0.42***	[0.29, 0.61]	0.44***	[0.33, 0.59]
FPL ³								
0%	1.05	[0.78, 1.41]	1.07	[0.79, 1.43]	1.23	[0.87, 1.74]	1.14	[0.87, 1.48]
0.1 to 99.99%	REF		REF		REF		REF	
100% or more	0.96	[0.70, 1.32]	0.64**	[0.47, 0.87]	1.09	[0.75, 1.59]	0.96	[0.73, 1.26]
Months enrolled in HMP-MC ³								
Less than 24 months	REF		REF		REF		REF	
24-47 months	0.84	[0.64, 1.11]	0.66**	[0.50, 0.87]	0.71*	[0.51, 0.97]	0.74*	[0.57, 0.95]
48+ months	0.84	[0.67, 1.06]	0.70**	[0.55, 0.89]	0.75*	[0.57, 1.00]	0.74**	[0.60, 0.91]
Rurality ³								
Urban	REF		REF		REF		REF	
Suburban	1.21	[0.73, 1.98]	1.02	[0.61, 1.70]	0.99	[0.62, 1.59]	1.21	[0.79, 1.83]
Rural	1.09	[0.79, 1.50]	0.81	[0.58, 1.13]	1.04	[0.67, 1.61]	1.04	[0.77, 1.40]
Gender ³								
Female	REF		REF		REF		REF	
Male	1.01	[0.78, 1.29]	0.95	[0.73, 1.23]	1.11	[0.83, 1.48]	1.06	[0.84, 1.33]
Non-binary, transgender, or other	--	--	--	--	--	--	--	--
Race/Ethnicity ³								
White, non-Hispanic	REF		REF		REF		REF	
Black, non-Hispanic	1.17	[0.84, 1.64]	1.27	[0.90, 1.80]	1.44	[0.95, 2.19]	1.24	[0.91, 1.68]
Hispanic	0.78	[0.48, 1.26]	1.15	[0.71, 1.87]	1.03	[0.57, 1.87]	0.82	[0.54, 1.26]

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Arab, Chaldean, or Middle Eastern	0.99	[0.60, 1.65]	0.81	[0.49, 1.34]	1.23	[0.72, 2.09]	0.78	[0.49, 1.24]
Other, multi-racial, or not reported	0.88	[0.56, 1.37]	0.89	[0.54, 1.49]	1.47	[0.84, 2.59]	0.83	[0.54, 1.27]
Chronic condition ^{2,3}								
No chronic conditions	REF		REF		REF		REF	
Chronic condition	1.15	[0.87, 1.51]	0.98	[0.73, 1.33]	0.75	[0.54, 1.04]	0.92	[0.71, 1.17]
Help reading health materials ³								
Never	REF		REF		REF		REF	
Sometimes	0.90	[0.65, 1.24]	0.87	[0.63, 1.21]	0.95	[0.67, 1.35]	0.86	[0.65, 1.15]
Often	1.12	[0.64, 1.95]	2.19**	[1.33, 3.61]	1.37	[0.69, 2.71]	1.23	[0.78, 1.95]
Intercept	0.55**	[0.38, 0.80]	0.61*	[0.41, 0.89]	0.30***	[0.19, 0.47]	1.56*	[1.11, 2.19]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Any health improvement in past year defined as reporting improved physical health, mental health, or oral health

²Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

³In 2021

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Beneficiary Survey Appendix Table 1.3.2. Multivariate linear regression analyses predicting relationship between PCP/HRA status and healthy behavior score and limiting unhealthy behavior score in 2021

	Healthy behavior score ¹		Limiting unhealthy behavior score ²	
	Coefficient	95% CI	Coefficient	95% CI
PCP/HRA status				
PCP visit and HRA	REF		REF	
PCP visit and no HRA	-0.157***	[-0.248, -0.066]	0.083	[-0.044, 0.210]
No PCP or no PCP visit ³	-0.081	[-0.183, 0.021]	-0.097	[-0.259, 0.065]
Age ⁵				
19-34	REF		REF	
35-50	0.001	[-0.097, 0.100]	-0.011	[-0.148, 0.127]
51-65	0.096*	[0.002, 0.191]	0.193*	[0.044, 0.342]
FPL ⁵				
0%	-0.094*	[-0.184, -0.004]	-0.166*	[-0.300, -0.031]
0.1 to 99.99%	REF		REF	
100% or more	0.030	[-0.064, 0.124]	0.062	[-0.067, 0.191]
Months enrolled in HMP-MC ⁵				
Less than 24 months	REF		REF	
24-47 months	0.051	[-0.040, 0.143]	-0.079	[-0.199, 0.041]
48+ months	0.009	[-0.059, 0.077]	0.024	[-0.080, 0.128]
Rurality ⁵				
Urban	REF		REF	
Suburban	0.043	[-0.090, 0.176]	-0.045	[-0.230, 0.139]
Rural	0.070	[-0.042, 0.183]	-0.006	[-0.139, 0.127]
Gender ⁵				
Female	REF		REF	
Male	-0.041	[-0.120, 0.037]	-0.219***	[-0.335, -0.102]
Non-binary, transgender, or other	--	--	--	--
Race/Ethnicity ⁵				
White, non-Hispanic	REF		REF	
Black, non-Hispanic	-0.041	[-0.142, 0.060]	-0.176*	[-0.337, -0.015]
Hispanic	0.014	[-0.171, 0.199]	-0.019	[-0.266, 0.228]
Arab, Chaldean, or Middle Eastern	0.042	[-0.125, 0.208]	0.484***	[0.287, 0.680]
Other, multi-racial, or not reported	0.037	[-0.111, 0.184]	0.120	[-0.092, 0.333]
Chronic condition ^{4,5}				
No chronic conditions	REF		REF	
Chronic condition	-0.044	[-0.130, 0.041]	-0.070	[-0.191, 0.052]
Help reading health materials ⁵				
Never	REF		REF	
Sometimes	-0.046	[-0.142, 0.049]	-0.159	[-0.319, 0.002]
Often	-0.158	[-0.316, 0.000]	-0.261*	[-0.492, -0.031]
Intercept	1.423***	[1.308, 1.538]	2.974***	[2.796, 3.152]

Multivariate linear regression results, *p<0.05, **p<0.01, ***p<0.001

¹Healthy behavior score is out of 2; respondent receives highest score for reporting that they consumed 3 or more servings of fruits and vegetables on 3 or more days in the past 7 days and that they exercised for 3 or more days in the past 7 days

²Limiting unhealthy behavior score is out of 4; respondent receives highest score for reporting that they consumed sugary drinks on 0-2 days in the past 7 days, consumed [5 for men/4 for women] alcoholic drinks on 0 days in the past 7 days, no smoking or use of tobacco, and never or rarely using drugs or medications other than as prescribed

³Respondents without PCP visit in past year were assumed to not have HRA in past year

⁴Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁵In 2021

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HRA completion at baseline, by level of health burden

Beneficiary Survey Appendix Table 1.3.3. Comparison of HRA completion at baseline HMV survey, by cohort and health burden at baseline HMV survey¹

	Documented HRA completion % [95% CI]	Reported HRA completion² % [95% CI]	Reported HRA-like interaction % [95% CI]	Any type of HRA activity % [95% CI]
Total	29.4 [28.2, 30.7]	47.6 [46.2, 49.0]	43.2 [41.7, 44.8]	70.1 [68.8, 71.4]
Cohort 1 (N=4108)	31.4 [29.7, 33.2]⁴	49.2 [47.3, 51.2]¹²	46.0 [44.0, 47.9]¹⁶	73.7 [71.9, 75.5]¹⁹
Substantial	35.3 [31.2, 39.6] ⁶	45.9 [41.5, 50.4]	54.4 [49.9, 58.9]	76.7 [72.4, 80.5]
Moderate	31.4 [26.6, 36.6] ⁸	46.0 [40.5, 51.5]	53.8 [48.3, 59.3] ¹⁷	77.3 [72.4, 81.6] ²⁰
Minimal	30.2 [28.0, 32.4] ¹⁰	51.4 [49.0, 53.9] ¹⁴	42.0 [39.6, 44.4] ¹⁸	72.1 [69.8, 74.3] ²¹
p-value ³	0.093	0.040	<0.001	0.048
Cohort 2 (N=2602)	31.0 [28.9, 33.3]⁵	43.4 [41.0, 45.8]^{12,13}	36.5 [34.2, 38.8]¹⁶	64.3 [61.8, 66.7]¹⁹
Substantial	27.3 [22.7, 32.6] ^{6,7}	49.9 [44.2, 55.7]	48.1 [40.9, 51.1]	69.9 [64.2, 75.0]
Moderate	30.6 [24.4, 37.6] ⁹	48.1 [40.8, 55.5]	34.3 [27.9, 41.3] ¹⁷	64.6 [57.0, 71.5] ²⁰
Minimal	32.1 [29.4, 34.9] ¹¹	40.7 [37.9, 43.6] ^{14,15}	34.1 [31.3, 36.9] ¹⁸	62.5 [59.5, 65.5] ²¹
p-value ³	0.320	0.010	<0.001	0.104
Cohort 3 (N=2607)	18.8 [17.1, 20.6]^{4,5}	48.0 [45.4, 50.7]¹³	Not asked	65.4 [63.1, 67.5]¹⁹
Substantial	19.3 [15.2, 24.2] ^{6,7}	53.7 [46.9, 60.3]		70.7 [64.8, 76.0]
Moderate	18.1 [14.0, 23.1] ^{8,9}	44.8 [38.0, 51.7]		65.8 [59.7, 71.4] ²⁰
Minimal	18.9 [16.9, 21.1] ^{10,11}	47.8 [44.5, 51.1] ¹⁵		64.4 [61.7, 67.1] ²¹
p-value ³	0.928	0.178		0.171

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Cohort 3 respondents were only asked about HRA completion if they reported having or being unsure if they had a PCP visit in last 12 months (N=1874)

³Pearson chi-square test comparing by health burden within Cohort

T-tests showed that documented HRA completion at baseline HMV survey was significantly different in:

⁴Cohort 1 vs. Cohort 3 (p<0.001) overall

⁵Cohort 2 vs. Cohort 3 (p<0.001) overall

⁶Cohort 1 vs. Cohort 2 (p=0.016) and Cohort 3 (p<.001) among those with substantial health burden at baseline

⁷Cohort 2 vs. Cohort 3 (p=0.019) among those with substantial health burden at baseline

⁸Cohort 1 vs. Cohort 3 (p<0.001) among those with moderate health burden at baseline

⁹Cohort 2 vs. Cohort 3 (p=0.002) among those with moderate health burden at baseline

¹⁰Cohort 1 vs. Cohort 3 (p<0.001) among those with minimal health burden at baseline

¹¹Cohort 2 vs. Cohort 3 (p<0.001) among those with minimal health burden at baseline

T-tests showed that reported HRA completion at baseline HMV survey was significantly different in:

¹²Cohort 1 vs. Cohort 2 (p<0.001) overall

¹³Cohort 2 vs. Cohort 3 (p=0.011) overall

¹⁴Cohort 1 vs. Cohort 2 (p<0.001) among those with minimal health burden at baseline

¹⁵Cohort 2 vs. Cohort 3 (p=0.002) among those with minimal health burden at baseline

T-tests showed that reported HRA-like interaction at baseline HMV survey was significantly different in:

¹⁶Cohort 1 vs. Cohort 2 (p<0.001) overall

¹⁷Cohort 1 vs. Cohort 2 (p<0.001) among those with moderate health burden at baseline

¹⁸Cohort 1 vs. Cohort 2 (p<0.001) among those with minimal health burden at baseline

T-tests showed that any type of HRA activity at baseline HMV survey was significantly different in:

¹⁹Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) overall

²⁰Cohort 1 vs. Cohort 2 (p=0.004) and Cohort 3 (p=0.002) among those with moderate health burden at baseline

²¹Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) among those with minimal health burden at baseline

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Beneficiary Survey Appendix Table 1.3.4. Multivariate logistic regression analyses predicting HRA completion at baseline HMV survey¹

	Documented HRA completion (N=8842)		Reported HRA completion (N=8124)		Reported HRA-like interaction (N=6292)		Any type of HRA activity (N=8842)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Survey cohort								
Cohort 1	1.93***	[1.67, 2.23]	1.04	[0.91, 1.20]	REF		1.42***	[1.24, 1.63]
Cohort 2	2.02***	[1.72, 2.36]	0.81**	[0.69, 0.94]	0.73***	[0.64, 0.84]	0.95	[0.82, 1.10]
Cohort 3	REF		REF		Not asked		REF	
Health burden ²								
Substantial	0.94	[0.79, 1.11]	0.85	[0.73, 1.00]	1.49***	[1.25, 1.78]	1.12	[0.93, 1.35]
Moderate	0.94	[0.78, 1.14]	0.87	[0.73, 1.04]	1.36**	[1.11, 1.66]	1.13	[0.94, 1.37]
Minimal	REF		REF		REF		REF	
Age category ²								
19-34	REF		REF		REF		REF	
35-50	1.26**	[1.08, 1.47]	1.19*	[1.03, 1.38]	1.63***	[1.38, 1.92]	1.38***	[1.18, 1.62]
51-64	2.03***	[1.75, 2.35]	1.51***	[1.31, 1.74]	1.78***	[1.52, 2.09]	2.11***	[1.81, 2.46]
Gender ²								
Male	REF		REF		REF		REF	
Female	1.06	[0.94, 1.20]	1.06	[0.94, 1.19]	1.08	[0.94, 1.23]	1.10	[0.97, 1.25]
Race/Ethnicity ²								
White, non-Hispanic	REF		REF		REF		REF	
Black, non-Hispanic	0.70***	[0.59, 0.82]	0.86*	[0.73, 1.00]	1.28**	[1.08, 1.52]	0.88	[0.75, 1.04]
Hispanic	0.68*	[0.50, 0.92]	0.82	[0.61, 1.10]	1.04	[0.73, 1.46]	0.80	[0.61, 1.05]
Other	0.82	[0.67, 1.00]	0.56***	[0.46, 0.67]	1.09	[0.88, 1.35]	0.78*	[0.64, 0.95]
FPL ²								
0-35%	REF		REF		REF		REF	
36-99%	0.89	[0.77, 1.02]	0.87*	[0.76, 0.99]	1.00	[0.86, 1.16]	1.03	[0.90, 1.19]
>=100%	0.96	[0.82, 1.12]	0.99	[0.85, 1.14]	1.00	[0.85, 1.17]	1.08	[0.92, 1.26]
Intercept	0.21***	[0.17, 0.25]	0.96	[0.80, 1.16]	0.49***	[0.40, 0.60]	1.43***	[1.20, 1.71]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²At baseline

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Health burden improvement over time, by HRA completion

Beneficiary Survey Appendix Table 1.3.5. Cohort 1 health burden improvement from 2016 to 2018, by HRA completion, among those who responded to surveys in 2016, 2017, and 2018

	Health burden improvement (2016-2018) ¹	
	Row n	Row % [95% CI]
Respondents with substantial or moderate health burden in 2016	782	51.2 [46.9, 55.5]
Ever had documented HRA completion ²		
Yes	366	49.5 [43.1, 55.9]
No	416	52.6 [46.7, 58.4]
p-value ³		0.483
Ever reported HRA completion ²		
Yes	573	49.0 [43.9, 54.0]
No	209	56.7 [48.5, 64.6]
p-value ³		0.113
Ever reported HRA-like interaction ²		
Yes	554	48.5 [43.4, 53.6]
No	228	57.6 [49.6, 65.2]
p-value ³		0.060

¹Health burden improvement from 2016 to 2018 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2016 were therefore excluded from this analysis

²Through 2018 survey completion

³Pearson chi-square test

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Table 1.3.6. Multivariate logistic regression analyses predicting relationship between HRA completion and health burden improvement from 2016 to 2018, Cohort 1

	Health burden improvement (2016-2018) ¹					
	Model 1 (N=773)		Model 2 (N=773)		Model 3 (N=773)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Ever had documented HRA completion ²	0.90	[0.63, 1.28]	-	-	-	-
Ever reported HRA completion ²	-	-	0.77	[0.52, 1.15]	-	-
Ever reported HRA-like interaction ²	-	-	-	-	0.73	[0.49, 1.07]
Age category ⁴						
19-34	REF		REF		REF	
35-50	0.67	[0.41, 1.09]	0.69	[0.42, 1.13]	0.68	[0.42, 1.11]
51-64	0.72	[0.44, 1.16]	0.74	[0.46, 1.20]	0.72	[0.45, 1.16]
Gender ⁴						
Male	REF		REF		REF	
Female	0.99	[0.69, 1.44]	1.02	[0.71, 1.48]	1.00	[0.69, 1.44]
Race/Ethnicity ⁴						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	1.71*	[1.09, 2.66]	1.73*	[1.11, 2.69]	1.71*	[1.10, 2.66]
Hispanic	1.36	[0.40, 4.61]	1.44	[0.42, 4.91]	1.31	[0.37, 4.64]
Other	0.77	[0.42, 1.41]	0.77	[0.42, 1.42]	0.78	[0.42, 1.43]
FPL ⁴						
0-35%	REF		REF		REF	
36-99%	1.53*	[1.03, 2.27]	1.50*	[1.01, 2.23]	1.52*	[1.03, 2.26]
>=100%	1.43	[0.90, 2.29]	1.43	[0.90, 2.28]	1.45	[0.90, 2.33]
Chronic condition ^{3,4}						
Yes	REF		REF		REF	
No	1.45	[0.89, 2.35]	1.45	[0.89, 2.36]	1.41	[0.86, 2.30]
Intercept	1.05	[0.60, 1.83]	1.16	[0.65, 2.06]	1.24	[0.68, 2.27]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Health burden improvement from 2016 to 2018 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2016 were therefore excluded from this analysis

²Through 2018 survey completion

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2016

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Beneficiary Survey Appendix Table 1.3.7. Cohort 1¹ and 2 health burden improvement from 2018 to 2021, by HRA completion, among those who responded to surveys in 2018 and 2021

	Health burden improvement (2018-2021) ²	
	Row n	Row % [95% CI]
Respondents with substantial or moderate health burden in 2018	347	48.3 [40.9, 55.7]
Ever had documented HRA completion ³		
Yes	201	49.3 [39.9, 58.8]
No	146	47.1 [35.8, 58.6]
p-value ⁴		0.768
Ever reported HRA completion ⁵		
Yes	253	49.2 [40.2, 58.2]
No	94	46.2 [33.7, 59.1]
p-value ⁴		0.706

¹Only includes respondents who were enrolled in HMP in 2018

²Health burden improvement from 2018 to 2021 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2018 were therefore excluded from this analysis

³Through 2021 survey completion

⁴Pearson chi-square test

⁵Ever reported HRA completion defined as reporting HRA completion in 2018 or 2021; In 2021, respondents were only asked about HRA completion if they reported having or being unsure if they had a PCP visit in last 12 months

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Beneficiary Survey Appendix Table 1.3.8. Multivariate logistic regression analyses predicting relationship between HRA completion and health burden improvement from 2018 to 2021, Cohort 1¹ and 2

	Health burden improvement (2018-2021) ²			
	Model 1 (N=337)		Model 2 (N=337)	
	aOR	95% CI	aOR	95% CI
Ever had documented HRA completion ³	0.93	[0.50, 1.73]	-	-
Ever reported HRA completion ⁴	-	-	1.08	[0.55, 2.11]
Age category ⁶				
19-34	REF		REF	
35-50	1.49	[0.70, 3.19]	1.49	[0.69, 3.18]
51-64	2.38*	[1.01, 5.62]	2.30	[0.99, 5.35]
Gender ⁶				
Male	REF		REF	
Female	0.53*	[0.28, 0.98]	0.53*	[0.28, 0.98]
Race/Ethnicity ⁶				
White, non-Hispanic	REF		REF	
Black, non-Hispanic	1.31	[0.55, 3.11]	1.31	[0.55, 3.12]
Hispanic	1.31	[0.32, 5.32]	1.32	[0.32, 5.48]
Other	0.80	[0.27, 2.36]	0.80	[0.27, 2.32]
FPL ⁶				
0-35%	REF		REF	
36-99%	1.37	[0.72, 2.62]	1.36	[0.71, 2.60]
>=100%	2.70*	[1.08, 6.73]	2.72*	[1.08, 6.82]
Chronic condition ^{5,6}				
Yes	REF		REF	
No	1.27	[0.58, 2.79]	1.30	[0.58, 2.89]
Intercept	0.68	[0.28, 1.64]	0.63	[0.24, 1.68]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Health burden improvement from 2018 to 2021 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2018 were therefore excluded from this analysis

³Through 2021 survey completion

⁴Ever reported HRA completion defined as reporting HRA completion in 2018 or 2021; In 2021, respondents were only asked about HRA completion if they reported having or being unsure if they had a PCP visit in last 12 months

⁵Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁶In 2018

Beneficiary Survey Appendix

Health behavior improvement over time, by HRA completion

Beneficiary Survey Appendix Table 1.3.9. Cohort 1¹ health behavior improvement from 2016 to 2018, by HRA completion, among those who responded to surveys in 2016, 2017, and 2018

	Improvement in one or more health behaviors (2016-2018) ¹	
	Row n	Row % [95% CI]
Total	1622	63.0 [60.0, 65.9]
Ever had documented HRA completion ²		
Yes	829	60.5 [56.1, 64.6]
No	793	65.3 [61.1, 69.2]
p-value ³		0.107
Ever reported HRA completion ²		
Yes	1261	62.3 [58.9, 65.7]
No	361	64.9 [58.8, 70.6]
p-value ³		0.466
Ever reported HRA-like interaction ²		
Yes	1106	62.6 [59.0, 66.1]
No	516	63.8 [58.5, 68.8]
p-value ³		0.713

¹Improvement in one or more health behaviors from 2016 to 2018 defined as reporting a reduction in the number of days with sugary beverage consumption, an increase in the number of days eating 3 or more servings of fruit or vegetables, an increase in the number of days exercise for at least 20 minutes, reduction in the number of days of alcohol consumption, or quitting smoking or using tobacco from 2016 to 2018

²Through 2018 survey completion

³Pearson chi-square test

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Table 1.3.10. Multivariate logistic regression analyses predicting relationship between HRA completion and health behavior improvement from 2016 to 2018, Cohort 1

	Improvement in one or more health behaviors (2016-2018) ¹					
	Model 1 (N=1603)		Model 2 (N=1603)		Model 3 (N=1603)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Ever had documented HRA completion ²	0.83	[0.64, 1.08]	-	-	-	-
Ever reported HRA completion ²	-	-	0.89	[0.66, 1.21]	-	-
Ever reported HRA-like interaction ²	-	-	-	-	0.93	[0.70, 1.23]
Age category ⁴						
19-34	REF		REF		REF	
35-50	1.28	[0.93, 1.78]	1.30	[0.94, 1.81]	1.30	[0.94, 1.80]
51-64	1.05	[0.77, 1.45]	1.06	[0.77, 1.45]	1.05	[0.76, 1.45]
Gender ⁴						
Male	REF		REF		REF	
Female	0.94	[0.72, 1.22]	0.96	[0.74, 1.25]	0.95	[0.73, 1.24]
Race/Ethnicity ⁴						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	0.95	[0.70, 1.29]	0.95	[0.70, 1.30]	0.95	[0.70, 1.30]
Hispanic	0.91	[0.32, 2.59]	0.91	[0.32, 2.53]	0.90	[0.32, 2.56]
Other	1.03	[0.67, 1.59]	1.04	[0.67, 1.60]	1.06	[0.69, 1.63]
FPL ⁴						
0-35%	REF		REF		REF	
36-99%	0.84	[0.63, 1.12]	0.84	[0.63, 1.11]	0.84	[0.63, 1.12]
>=100%	0.88	[0.64, 1.22]	0.87	[0.63, 1.20]	0.87	[0.63, 1.20]
Chronic condition ^{3,4}						
Yes	REF		REF		REF	
No	1.04	[0.78, 1.38]	1.06	[0.80, 1.40]	1.05	[0.79, 1.40]
Intercept	1.84**	[1.25, 2.72]	1.80**	[1.17, 2.77]	1.73**	[1.14, 2.63]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Improvement in one or more health behaviors from 2016 to 2018 defined as reporting a reduction in the number of days with sugary beverage consumption, an increase in the number of days eating 3 or more servings of fruit or vegetables, an increase in the number of days exercise for at least 20 minutes, reduction in the number of days of alcohol consumption, or quitting smoking or using tobacco from 2016 to 2018

²Through 2018 survey completion

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2016

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Beneficiary Survey Appendix Table 1.3.11. Cohort 1¹ and 2 health behavior improvement from 2018 to 2021, by HRA completion, among those who responded to surveys in 2018 and 2021

	Improvement in one or more health behaviors (2018-2021) ²	
	Row n	Row % [95% CI]
Total	1374	62.8 [59.1, 66.4]
Ever had documented HRA completion ³		
Yes	766	60.0 [54.9, 64.9]
No	608	65.6 [60.0, 70.7]
p-value ⁴		0.141
Ever reported HRA completion ⁵		
Yes	907	61.8 [57.2, 66.2]
No	467	64.4 [57.9, 70.4]
p-value ⁴		0.508

¹Only includes respondents who were enrolled in HMP in 2018

²Improvement in one or more health behaviors from 2018 to 2021 defined as reporting a reduction in the number of days with sugary beverage consumption, an increase in the number of days eating 3 or more servings of fruit or vegetables, an increase in the number of days exercise for at least 20 minutes, reduction in the number of days of alcohol consumption, or quitting smoking or using tobacco from 2018 to 2021

³Through 2021 survey completion

⁴Pearson chi-square test

⁵Ever reported HRA completion defined as reporting HRA completion in 2018 or 2021; In 2021, respondents were only asked about HRA completion if they reported having or being unsure if they had a PCP visit in last 12 months

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Beneficiary Survey Appendix Table 1.3.12. Multivariate logistic regression analyses predicting relationship between HRA completion and health behavior improvement from 2018 to 2021, Cohort 1¹ and 2

	Improvement in one or more health behaviors (2018-2021) ²			
	Model 1 (N=1347)		Model 2 (N=1347)	
	aOR	95% CI	aOR	95% CI
Ever had documented HRA completion ³	0.85	[0.61, 1.18]	-	-
Ever reported HRA completion ⁴	-	-	0.97	[0.68, 1.37]
Age category ⁶				
19-34	REF		REF	
35-50	0.62*	[0.42, 0.92]	0.62*	[0.42, 0.92]
51-64	0.77	[0.50, 1.20]	0.76	[0.49, 1.17]
Gender ⁶				
Male	REF		REF	
Female	1.04	[0.76, 1.44]	1.04	[0.76, 1.44]
Race/Ethnicity ⁶				
White, non-Hispanic	REF		REF	
Black, non-Hispanic	1.36	[0.91, 2.04]	1.37	[0.91, 2.06]
Hispanic	1.47	[0.66, 3.29]	1.48	[0.66, 3.34]
Other	1.55	[0.91, 2.65]	1.55	[0.90, 2.65]
FPL ⁶				
0-35%	REF		REF	
36-99%	0.95	[0.67, 1.36]	0.95	[0.67, 1.36]
>=100%	0.95	[0.65, 1.40]	0.94	[0.64, 1.38]
Chronic condition ^{5,6}				
Yes	REF		REF	
No	1.17	[0.82, 1.68]	1.19	[0.83, 1.70]
Intercept	1.88*	[1.14, 3.12]	1.77*	[1.04, 2.99]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Improvement in one or more health behaviors from 2018 to 2021 defined as reporting a reduction in the number of days with sugary beverage consumption, an increase in the number of days eating 3 or more servings of fruit or vegetables, an increase in the number of days exercise for at least 20 minutes, reduction in the number of days of alcohol consumption, or quitting smoking or using tobacco from 2018 to 2021

³Through 2021 survey completion

⁴Ever reported HRA completion defined as reporting HRA completion in 2018 or 2021; In 2021, respondents were only asked about HRA completion if they reported having or being unsure if they had a PCP visit in last 12 months

⁵Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁶In 2018

Beneficiary Survey Appendix

Evaluation question 2.1: Do beneficiaries understand cost-sharing and other consumer-oriented features of HMP coverage?

Additional results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 2.1.1 Multivariate logistic regression analyses predicting understanding of consumer-oriented features of HMP coverage in 2021

	I may get a payment reduction if I complete an HRA		I cannot be dropped from HMP for not paying my bill		There is a limit on the total amount I might have to pay		Some kinds of visits, tests, and medicines have no copays	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Age ²								
19-34	REF		REF		REF		REF	
35-50	0.96	[0.71, 1.31]	1.23	[0.87, 1.72]	0.94	[0.70, 1.27]	0.96	[0.70, 1.31]
51-65	1.17	[0.86, 1.59]	1.04	[0.74, 1.45]	1.25	[0.93, 1.69]	1.30	[0.92, 1.82]
FPL ²								
0%	0.81	[0.61, 1.09]	0.94	[0.70, 1.26]	0.79	[0.60, 1.04]	0.90	[0.67, 1.21]
0.1 to 99.99%	REF		REF		REF		REF	
100% or more	1.31	[0.99, 1.73]	0.80	[0.58, 1.11]	1.23	[0.93, 1.61]	1.06	[0.77, 1.44]
Months enrolled in HMP-MC ²								
Less than 24 months	REF		REF		REF		REF	
24-47 months	0.73*	[0.55, 0.96]	1.15	[0.85, 1.54]	1.07	[0.82, 1.39]	1.06	[0.80, 1.39]
48+ months	1.27*	[1.01, 1.59]	1.02	[0.80, 1.29]	1.47***	[1.19, 1.80]	1.19	[0.94, 1.51]
Rurality ²								
Urban	REF		REF		REF		REF	
Suburban	1.38	[0.90, 2.12]	0.80	[0.51, 1.25]	1.22	[0.81, 1.85]	1.02	[0.60, 1.73]
Rural	1.09	[0.79, 1.50]	0.91	[0.65, 1.28]	1.17	[0.88, 1.57]	0.98	[0.70, 1.38]
Gender ²								
Female	REF		REF		REF		REF	
Male	1.24	[0.97, 1.58]	0.99	[0.77, 1.28]	1.02	[0.81, 1.30]	0.79	[0.61, 1.02]
Non-binary, transgender, or other	--	--	--	--	--	--	--	--
Race/Ethnicity ²								
White, non-Hispanic	REF		REF		REF		REF	
Black, non-Hispanic	0.76	[0.53, 1.07]	0.63*	[0.44, 0.90]	0.81	[0.58, 1.13]	0.60**	[0.42, 0.85]
Hispanic	0.91	[0.56, 1.46]	0.61	[0.33, 1.11]	0.64	[0.39, 1.05]	0.76	[0.49, 1.19]
Arab, Chaldean, or Middle Eastern	0.90	[0.53, 1.54]	0.62	[0.36, 1.05]	0.98	[0.62, 1.57]	0.37***	[0.24, 0.58]
Other, multi-racial, or not reported	0.68	[0.44, 1.07]	1.27	[0.78, 2.08]	0.82	[0.54, 1.24]	1.06	[0.68, 1.65]
Chronic condition ^{1,2}								
No chronic conditions	REF		REF		REF		REF	
Chronic condition	1.05	[0.81, 1.36]	0.90	[0.69, 1.19]	0.95	[0.73, 1.22]	1.05	[0.80, 1.39]

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Help reading health materials ²								
Never	REF		REF		REF		REF	
Sometimes	0.87	[0.63, 1.21]	0.73*	[0.54, 0.99]	0.74*	[0.56, 0.98]	0.71*	[0.53, 0.97]
Often	0.37**	[0.20, 0.69]	0.32**	[0.16, 0.64]	0.66	[0.38, 1.15]	0.59*	[0.35, 0.99]
Intercept	0.37***	[0.27, 0.51]	0.34***	[0.24, 0.48]	0.43***	[0.32, 0.59]	4.18***	[3.00, 5.84]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

²In 2021

Beneficiary Survey Appendix

Evaluation question 5.1: Does HMP's facilitation of primary care access (e.g., through managed care PCP assignment) influence beneficiary engagement in health and maintenance or improvement in physical and mental health?

Updated results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 5.1.1. Multivariate logistic regression analyses predicting relationship between primary care barriers and fair or poor health status in 2021

	Fair/poor health status aOR	95% CI	Fair/poor mental health status aOR	95% CI	Fair/poor oral health status aOR	95% CI
Primary care barriers ¹						
Reported PCP barriers	1.75***	[1.28, 2.39]	2.02***	[1.49, 2.76]	1.47**	[1.10, 1.95]
Reported no PCP barriers	REF		REF		REF	
No PCP	1.11	[0.70, 1.77]	0.95	[0.59, 1.53]	1.14	[0.74, 1.76]
Age ³						
19-34	REF		REF		REF	
35-50	1.78***	[1.27, 2.49]	0.75	[0.54, 1.05]	1.68***	[1.25, 2.27]
51-65	1.51*	[1.08, 2.12]	0.36***	[0.25, 0.51]	1.32	[0.96, 1.81]
FPL ³						
0%	1.26	[0.93, 1.71]	1.59**	[1.17, 2.18]	1.33*	[1.01, 1.75]
0.1 to 99.99%	REF		REF		REF	
100% or more	0.93	[0.67, 1.30]	0.77	[0.54, 1.10]	0.99	[0.74, 1.32]
Months enrolled in HMP-MC ³						
Less than 24 months	REF		REF		REF	
24-47 months	0.99	[0.74, 1.32]	1.21	[0.88, 1.64]	0.94	[0.71, 1.23]
48+ months	1.01	[0.79, 1.28]	1.00	[0.76, 1.31]	1.16	[0.93, 1.44]
Rurality ³						
Urban	REF		REF		REF	
Suburban	1.36	[0.87, 2.12]	1.08	[0.68, 1.72]	1.67*	[1.11, 2.51]
Rural	1.03	[0.73, 1.47]	1.22	[0.83, 1.78]	0.94	[0.69, 1.29]
Gender ³						
Female	REF		REF		REF	
Male	0.75*	[0.57, 0.98]	0.66**	[0.50, 0.88]	1.14	[0.90, 1.46]
Non-binary, transgender, or other	--	--	--	--	--	--
Race/Ethnicity ³						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	1.04	[0.73, 1.49]	0.68*	[0.46, 0.99]	1.23	[0.90, 1.70]
Hispanic	0.91	[0.52, 1.60]	0.94	[0.56, 1.57]	1.06	[0.64, 1.76]
Arab, Chaldean, or Middle Eastern	0.73	[0.41, 1.28]	0.45*	[0.23, 0.89]	0.63	[0.36, 1.11]

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Other, multi-racial, or not reported	0.66	[0.42, 1.03]	0.81	[0.50, 1.29]	1.08	[0.68, 1.73]
Chronic condition ^{2,3}						
No chronic conditions	REF		REF		REF	
Chronic condition	2.48***	[1.85, 3.33]	1.52**	[1.12, 2.07]	1.49**	[1.15, 1.94]
Help reading health materials ³						
Never	REF		REF		REF	
Sometimes	1.59**	[1.17, 2.17]	1.43*	[1.02, 2.00]	1.25	[0.92, 1.70]
Often	3.26***	[1.98, 5.35]	3.19***	[1.88, 5.43]	2.49***	[1.55, 4.01]
Intercept	0.10***	[0.07, 0.15]	0.21***	[0.15, 0.31]	0.20***	[0.14, 0.29]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Primary care barriers defined as reporting any of the following: any difficulties getting care, any difficulties making a PCP appointment, or PCP sometimes or never responding within 24 hours

²Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

³In 2021

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.1.2. Multivariate logistic regression analyses predicting relationship between primary care barriers and 5 or more days of bad health in 2021

	5+ days physical health not good		5+ days mental health not good		5+ days health limited activities	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Primary care barriers ¹						
Reported PCP barriers	2.66***	[2.02, 3.52]	2.12***	[1.60, 2.80]	2.79***	[2.11, 3.69]
Reported no PCP barriers	REF		REF		REF	
No PCP	1.11	[0.71, 1.74]	1.22	[0.79, 1.89]	1.14	[0.78, 1.67]
Age ³						
19-34	REF		REF		REF	
35-50	1.27	[0.95, 1.71]	0.71*	[0.53, 0.96]	1.06	[0.79, 1.41]
51-65	1.23	[0.91, 1.67]	0.39***	[0.28, 0.54]	0.77	[0.56, 1.05]
FPL ³						
0%	1.23	[0.94, 1.60]	1.35*	[1.03, 1.77]	1.26	[0.96, 1.66]
0.1 to 99.99%	REF		REF		REF	
100% or more	0.79	[0.60, 1.05]	0.94	[0.68, 1.28]	0.82	[0.61, 1.11]
Months enrolled in HMP-MC ³						
Less than 24 months	REF		REF		REF	
24-47 months	1.03	[0.79, 1.32]	0.98	[0.75, 1.27]	0.91	[0.70, 1.17]
48+ months	0.77*	[0.62, 0.96]	0.80	[0.64, 1.00]	0.76*	[0.61, 0.95]
Rurality ³						
Urban	REF		REF		REF	
Suburban	1.30	[0.87, 1.95]	1.09	[0.72, 1.65]	1.28	[0.85, 1.94]
Rural	1.28	[0.96, 1.70]	1.37*	[1.02, 1.86]	1.21	[0.89, 1.64]
Gender ³						
Female	REF		REF		REF	
Male	0.67***	[0.53, 0.85]	0.55***	[0.43, 0.71]	0.61***	[0.48, 0.78]
Non-binary, transgender, or other	--	--	--	--	--	--
Race/Ethnicity ³						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	0.78	[0.56, 1.09]	0.54***	[0.39, 0.75]	0.76	[0.54, 1.06]
Hispanic	1.32	[0.84, 2.09]	0.96	[0.62, 1.49]	0.83	[0.53, 1.30]
Arab, Chaldean, or Middle Eastern	0.65	[0.40, 1.07]	0.53*	[0.31, 0.89]	0.60*	[0.36, 0.98]
Other, multi-racial, or not reported	0.97	[0.59, 1.60]	1.13	[0.70, 1.83]	0.99	[0.62, 1.57]
Chronic condition ^{2,3}						
No chronic conditions	REF		REF		REF	
Chronic condition	1.60***	[1.25, 2.06]	1.32*	[1.02, 1.72]	1.65***	[1.28, 2.14]
Help reading health materials ³						
Never	REF		REF		REF	

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Sometimes	1.10	[0.82, 1.46]	1.42*	[1.06, 1.92]	1.61***	[1.22, 2.13]
Often	1.89*	[1.15, 3.10]	1.72	[0.99, 2.98]	2.80***	[1.68, 4.67]
Intercept	0.31***	[0.22, 0.43]	0.50***	[0.35, 0.71]	0.32***	[0.23, 0.45]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Primary care barriers defined as reporting any of the following: any difficulties getting care, any difficulties making a PCP appointment, or PCP sometimes or never responding within 24 hours

²Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

³In 2021

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Beneficiary Survey Appendix Table 5.1.3. Multivariate logistic regression analyses predicting relationship between primary care barriers and self-reported improvement in health in past year in 2021

	Physical health improvement		Mental health improvement		Oral health improvement		Any health improvement ¹	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Primary care barriers ²								
Reported PCP barriers	0.77	[0.56, 1.07]	0.87	[0.62, 1.22]	0.67*	[0.45, 0.99]	0.69**	[0.52, 0.91]
Reported no PCP barriers	REF		REF		REF		REF	
No PCP	0.85	[0.55, 1.30]	1.20	[0.79, 1.84]	0.58*	[0.35, 0.96]	0.82	[0.57, 1.20]
Age ⁴								
19-34	REF		REF		REF		REF	
35-50	0.54***	[0.40, 0.73]	0.57**	[0.41, 0.80]	0.62*	[0.42, 0.93]	0.49***	[0.37, 0.64]
51-65	0.63**	[0.45, 0.88]	0.50***	[0.35, 0.72]	0.41***	[0.28, 0.61]	0.43***	[0.32, 0.58]
FPL ⁴								
0%	1.06	[0.79, 1.42]	1.08	[0.80, 1.44]	1.24	[0.88, 1.75]	1.15	[0.89, 1.50]
0.1 to 99.99%	REF		REF		REF		REF	
100% or more	0.97	[0.71, 1.33]	0.65**	[0.48, 0.88]	1.11	[0.77, 1.62]	0.98	[0.75, 1.29]
Months enrolled in HMP-MC ⁴								
Less than 24 months	REF		REF		REF		REF	
24-47 months	0.83	[0.63, 1.09]	0.65**	[0.49, 0.87]	0.70*	[0.51, 0.96]	0.73*	[0.56, 0.94]
48+ months	0.84	[0.67, 1.06]	0.71**	[0.56, 0.90]	0.74*	[0.57, 0.98]	0.74**	[0.60, 0.91]
Rurality ⁴								
Urban	REF		REF		REF		REF	
Suburban	1.20	[0.73, 1.97]	1.01	[0.60, 1.69]	0.98	[0.61, 1.56]	1.18	[0.78, 1.79]
Rural	1.09	[0.80, 1.50]	0.81	[0.58, 1.13]	1.06	[0.69, 1.64]	1.05	[0.78, 1.40]
Gender ⁴								
Female	REF		REF		REF		REF	
Male	1.00	[0.78, 1.28]	0.94	[0.73, 1.22]	1.07	[0.79, 1.43]	1.03	[0.82, 1.29]
Non-binary, transgender, or other	--	--	--	--	--	--	--	--
Race/Ethnicity ⁴								
White, non-Hispanic	REF		REF		REF		REF	
Black, non-Hispanic	1.19	[0.85, 1.67]	1.28	[0.90, 1.82]	1.44	[0.96, 2.16]	1.25	[0.92, 1.70]
Hispanic	0.81	[0.50, 1.30]	1.17	[0.72, 1.89]	1.09	[0.60, 1.97]	0.86	[0.57, 1.31]
Arab, Chaldean, or Middle Eastern	0.98	[0.59, 1.63]	0.81	[0.49, 1.33]	1.25	[0.74, 2.11]	0.78	[0.49, 1.24]
Other, multi-racial, or not reported	0.91	[0.58, 1.43]	0.91	[0.54, 1.51]	1.52	[0.87, 2.66]	0.86	[0.56, 1.32]
Chronic condition ^{3,4}								
No chronic conditions	REF		REF		REF		REF	

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Chronic condition	1.16	[0.88, 1.52]	0.98	[0.72, 1.31]	0.78	[0.56, 1.09]	0.94	[0.74, 1.20]
Help reading health materials ⁴								
Never	REF		REF		REF		REF	
Sometimes	0.91	[0.66, 1.25]	0.88	[0.63, 1.23]	0.97	[0.68, 1.38]	0.88	[0.66, 1.16]
Often	1.14	[0.66, 1.99]	2.16**	[1.31, 3.56]	1.44	[0.72, 2.87]	1.26	[0.79, 2.00]
Intercept	0.54***	[0.39, 0.75]	0.62**	[0.44, 0.86]	0.30***	[0.20, 0.44]	1.57**	[1.16, 2.12]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Any health improvement in past year defined as reporting improved physical health, mental health, or oral health

²Primary care barriers defined as reporting any of the following: any difficulties getting care, any difficulties making a PCP appointment, or PCP sometimes or never responding within 24 hours

³Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2021

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Beneficiary Survey Appendix Table 5.1.4. Multivariate linear regression predicting relationship between primary care barriers and self-efficacy score in 2021

	Self-efficacy score ¹	
	Coef.	95% CI
Primary care barriers ²		
Reported PCP barriers	-0.567***	[-0.741, -0.393]
No reported PCP barriers	REF	
No PCP	-0.157	[-0.368, 0.055]
Age ⁴		
19-34	REF	
35-50	0.160	[-0.020, 0.340]
51-65	0.449***	[0.276, 0.622]
FPL ⁴		
0%	-0.139	[-0.291, 0.013]
0.1 to 99.99%	REF	
100% or more	-0.009	[-0.166, 0.148]
Months enrolled in HMP-MC ⁴		
Less than 24 months	REF	
24-47 months	-0.058	[-0.211, 0.095]
48+ months	-0.007	[-0.125, 0.112]
Rurality ⁴		
Urban	REF	
Suburban	0.086	[-0.116, 0.287]
Rural	0.142	[-0.002, 0.286]
Gender ⁴		
Female	REF	
Male	-0.047	[-0.182, 0.087]
Non-binary, transgender, or other	--	--
Race/Ethnicity ⁴		
White, non-Hispanic	REF	
Black, non-Hispanic	0.254**	[0.073, 0.435]
Hispanic	-0.007	[-0.231, 0.218]
Arab, Chaldean, or Middle Eastern	0.509**	[0.186, 0.832]
Other, multi-racial, or not reported	0.081	[-0.236, 0.399]
Chronic condition ^{3,4}		
No chronic conditions	REF	
Chronic condition	-0.052	[-0.200, 0.097]
Help reading health materials ⁴		
Never	REF	
Sometimes	-0.455***	[-0.629, -0.281]
Often	-0.062	[-0.404, 0.280]
Intercept	3.496***	[3.315, 3.677]

Multivariate linear regression results, *p<0.05, **p<0.01, ***p<0.001

¹Self-efficacy score is out of 5; respondent receives highest score for reporting always in response to all five statements about self-efficacy in health care

²Primary care barriers defined as reporting any of the following: any difficulties getting care, any difficulties making a PCP appointment, or PCP sometimes or never responding within 24 hours

³Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2021

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Primary care experiences at baseline, by level of health burden

Beneficiary Survey Appendix Table 5.1.5. Comparison of primary care experiences at baseline HMV survey, by cohort and health burden at baseline HMV survey¹

	Has PCP	Saw PCP in past 12 months ²	Difficulty accessing primary care in past 12 months ³
	% [95% CI]	% [95% CI]	% [95% CI]
Total	90.0 [89.2, 90.8]	75.5 [74.2, 76.7]	8.7 [7.9, 9.5]
Cohort 1 (N=4108)	93.2 [92.1, 94.2]⁵	79.3 [77.6, 81.0]¹¹	7.8 [6.7, 8.9]¹⁵
Substantial	95.5 [92.9, 97.2] ⁷	87.7 [83.8, 90.8] ¹²	11.6 [9.0, 14.8]
Moderate	93.9 [90.0, 96.3] ⁸	84.7 [80.2, 88.4] ¹³	9.1 [6.5, 12.7] ¹⁶
Minimal	92.5 [91.1, 93.8] ⁹	76.0 [73.7, 78.1] ¹⁴	6.5 [5.3, 7.9] ¹⁷
p-value ⁴	0.117	<0.001	0.001
Cohort 2 (N=2602)	83.8 [81.7, 85.7]^{5,6}	69.9 [67.4, 72.2]¹¹	8.9 [7.5, 10.5]¹⁵
Substantial	88.0 [83.6, 91.3] ⁷	83.7 [79.0, 87.5]	12.2 [8.8, 16.6]
Moderate	80.5 [73.8, 85.8] ⁸	67.1 [59.3, 74.1] ¹³	12.7 [8.5, 18.6]
Minimal	83.4 [80.8, 85.8] ^{9,10}	67.1 [64.0, 70.0] ¹⁴	7.6 [6.0, 9.6] ¹⁷
p-value ⁴	0.100	<0.001	0.016
Cohort 3 (N=2607)	87.6 [86.0, 89.0]^{5,6}	69.3 [67.1, 71.4]¹¹	12.3 [10.7, 14.0]¹⁵
Substantial	89.1 [84.5, 92.5] ⁷	79.3 [73.8, 83.8] ¹²	13.5 [9.5, 18.9]
Moderate	87.4 [82.7, 91.0] ⁸	69.6 [63.5, 75.0] ¹³	19.1 [14.3, 24.9] ¹⁶
Minimal	87.3 [85.3, 89.0] ^{9,10}	67.4 [64.7, 69.9] ¹⁴	10.5 [8.8, 12.5] ¹⁷
p-value ⁴	0.727	0.001	0.002

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Respondents who reported not having a PCP were coded as not having seen PCP

³Among those who reported having a PCP

⁴Pearson chi-square test comparing by health burden within Cohort

T-tests showed that having a PCP at baseline was significantly different in:

⁵Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) overall

⁶Cohort 3 vs. Cohort 2 (p=0.003) overall

⁷Cohort 1 vs. Cohort 2 (p=0.001) and Cohort 3 (p=0.005) among those with substantial health burden at baseline

⁸Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p=0.013) among those with moderate health burden at baseline

⁹Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) among those with minimal health burden at baseline

¹⁰ Cohort 3 vs. Cohort 2 (p=0.015) among those with minimal health burden at baseline

T-tests showed that seeing a PCP in the past 12 months was significantly different in:

¹¹Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) overall

¹²Cohort 1 vs. Cohort 3 (p=0.006) among those with substantial health burden at baseline

¹³Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) among those with moderate health burden at baseline

¹⁴Cohort 1 vs. Cohort 2 (p<0.001) and Cohort 3 (p<0.001) among those with minimal health burden at baseline

T-tests showed that difficulty accessing primary care was significantly different in:

¹⁵Cohort 3 vs. Cohort 1 (p<0.001) and Cohort 2 (p=0.003) overall

¹⁶Cohort 1 vs. Cohort 3 (p=0.001) among those with moderate health burden at baseline

¹⁷Cohort 3 vs. Cohort 1 (p<0.001) and Cohort 2 (p=0.024) among those with minimal health burden at baseline

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Beneficiary Survey Appendix Table 5.1.6. Multivariate logistic regression analyses predicting primary care experiences at baseline HMP survey¹

	Has PCP (N=8842)		Saw PCP in past 12 months (N=8829)		Difficulty accessing primary care in past 12 months (N=8009)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Survey cohort						
Cohort 1	1.87***	[1.49, 2.36]	1.62***	[1.39, 1.89]	0.62***	[0.49, 0.77]
Cohort 2	0.74**	[0.60, 0.91]	1.06	[0.90, 1.24]	0.70**	[0.55, 0.90]
Cohort 3	REF		REF		REF	
Health burden ²						
Substantial	1.21	[0.90, 1.63]	1.90***	[1.50, 2.40]	1.82***	[1.40, 2.38]
Moderate	0.95	[0.71, 1.28]	1.31*	[1.06, 1.62]	1.65***	[1.25, 2.17]
Minimal	REF		REF		REF	
Age category ²						
19-34	REF		REF		REF	
35-50	1.86***	[1.46, 2.37]	1.61***	[1.35, 1.91]	1.00	[0.77, 1.29]
51-64	2.95***	[2.28, 3.81]	2.89***	[2.41, 3.46]	0.73*	[0.56, 0.94]
Gender ²						
Male	REF		REF		REF	
Female	1.23*	[1.02, 1.50]	1.20*	[1.04, 1.38]	1.24	[1.00, 1.53]
Race/Ethnicity ²						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	0.55***	[0.43, 0.70]	0.71***	[0.59, 0.84]	0.86	[0.66, 1.13]
Hispanic	0.57**	[0.39, 0.83]	0.66**	[0.50, 0.88]	1.94**	[1.28, 2.92]
Other	0.74*	[0.55, 1.00]	0.78*	[0.63, 0.97]	1.43*	[1.01, 2.03]
FPL ²						
0-35%	REF		REF		REF	
36-99%	1.36**	[1.09, 1.70]	1.28**	[1.09, 1.51]	0.82	[0.64, 1.04]
>=100%	1.28*	[1.00, 1.64]	1.15	[0.97, 1.36]	1.18	[0.92, 1.52]
Intercept	4.93***	[3.79, 6.43]	1.35**	[1.12, 1.64]	0.11***	[0.08, 0.14]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMP survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²At baseline

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Primary care experiences over time, by level of health burden

Table 5.1.7. Cohort 1¹ primary care experiences over time, by level of health burden at baseline (2016), among those who responded to surveys in 2016, 2017, and 2018 (N=1536)

	2016 % [95% CI]	2017 % [95% CI]	p-value ²	2018 % [95% CI]	p-value ³
Has PCP					
Total	96.0 [94.6, 97.1]	94.5 [92.7, 95.9]	0.089	94.3 [92.6, 95.7]	0.086
Health burden (2016)					
Substantial	97.9 [95.9, 98.9]	95.2 [90.3, 97.7]	--	95.6 [91.4, 97.8]	--
Moderate	95.8 [91.5, 98.0]	97.6 [91.4, 99.4]	0.437	93.1 [86.7, 96.5]	0.327
Minimal	95.4 [93.4, 96.8]	93.7 [91.3, 95.5]	0.140	94.4 [92.2, 96.1]	0.432
p-value ⁴	0.186	0.277		0.664	
Saw PCP in past 12 months					
Total	82.9 [80.3, 85.3]	81.9 [79.1, 84.3]	0.443	80.0 [77.2, 82.6]	0.070
Health burden (2016)					
Substantial	90.1 [84.2, 93.9]	89.8 [84.4, 93.5]	0.927	87.3 [81.4, 91.5]	0.390
Moderate	89.0 [82.8, 93.2]	89.8 [83.4, 93.9]	0.803	81.5 [73.2, 87.7]	0.101
Minimal	80.0 [76.5, 83.1]	78.5 [74.9, 81.7]	0.387	78.1 [74.5, 81.3]	0.329
p-value ⁴	0.001	<0.001		0.031	
Difficulty accessing primary care in past 12 months⁵					
Total	7.5 [6.0, 9.4]	10.2 [8.4, 12.3]	0.016	9.5 [7.7, 11.6]	0.126
Health burden (2016)					
Substantial	12.3 [8.4, 17.7]	12.7 [8.7, 18.2]	0.961	12.1 [8.4, 17.2]	0.976
Moderate	10.3 [5.8, 17.7]	11.4 [6.6, 19.0]	0.743	9.7 [5.5, 16.6]	0.876
Minimal	5.7 [4.0, 7.9]	9.4 [7.3, 12.0]	0.006	8.6 [6.5, 11.3]	0.057
p-value ⁴	0.008	0.423		0.358	

¹Only includes respondents who were enrolled in HMP in 2016, 2017, and 2018

²Unadjusted mixed effects logistic regression, 2017 compared to 2016, for each row; -- indicate we were not able to conduct significance testing for this subgroup

³Unadjusted mixed effects logistic regression, 2018 compared to 2016, for each row; -- indicate we were not able to conduct significance testing for this subgroup

⁴Pearson chi-square test comparing by health burden within survey year

⁵Among those who reported having a PCP

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Beneficiary Survey Appendix Table 5.1.8. Cohort 1¹ and 2 primary care experiences over time, by level of health burden in 2018, among those who responded to surveys in 2018 and 2021 (N=1374)

	2018 % [95% CI]	2021 % [95% CI]	p-value ²
Has PCP			
Total	87.6 [84.4, 90.2]	93.1 [90.9, 94.8]	<0.001
Health burden (2018)			
Substantial	94.3 [86.8, 97.7]	96.4 [90.3, 98.7]	0.514
Moderate	84.5 [74.8, 90.9]	93.6 [85.4, 97.3]	0.156
Minimal	86.7 [82.7, 89.9]	93.2 [90.7, 95.0]	<0.001
p-value ³	0.157	0.560	
Saw PCP in past 12 months			
Total	71.8 [67.8, 75.4]	75.4 [71.7, 78.7]	0.113
Health burden (2018)			
Substantial	88.4 [88.0, 93.5]	89.3 [82.2, 93.8]	0.816
Moderate	75.3 [65.1, 83.3]	77.2 [65.8, 85.7]	0.745
Minimal	68.2 [63.4, 72.7]	73.3 [68.8, 77.3]	0.064
p-value ³	0.001	0.016	
Difficulty accessing primary care in past 12 months⁴			
Total	10.9 [8.4, 14.2]	11.0 [8.7, 13.8]	0.973
Health burden (2018)			
Substantial	11.6 [6.4, 20.1]	12.7 [7.7, 20.3]	0.804
Moderate	11.9 [6.0, 22.2]	16.2 [9.2, 27.0]	0.706
Minimal	10.3 [7.3, 14.3]	10.1 [7.5, 13.5]	0.889
p-value ³	0.880	0.221	

¹Excludes respondents who were not enrolled in HMP in 2018

²Unadjusted mixed effects logistic regression, 2021 compared to 2018, for each row

³Pearson chi-square test comparing by health burden within survey year

⁴Among those who reported having a PCP

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Beneficiary Survey Appendix Table 5.1.9. Cohort 1 primary care experiences, by level of health burden at baseline (2016), among respondents at each survey (2016, 2017, 2018, 2021)

	2016 (N=4108) % [95% CI]	2017¹ (N=2393) % [95% CI]	2018¹ (N=1622) % [95% CI]	2021 (N=806) % [95% CI]
Substantial				
Has PCP	95.5 [92.9, 97.2]	95.6 [92.7, 97.4]	95.5 [91.4, 97.7]	93.4 [83.9, 97.5]
Saw PCP in past 12 months	87.7 [83.8, 90.8]	87.6 [82.9, 91.2]	87.5 [81.7, 91.6]	83.9 [73.6, 90.7]
Difficulty accessing primary care in past 12 months ²	11.6 [9.0, 14.8]	11.6 [8.6, 15.5]	11.7 [8.1, 16.7]	18.3 [9.7, 31.8]
Moderate				
Has PCP	93.9 [90.0, 96.3]	96.2 [91.0, 98.5]	93.8 [88.0, 96.9]	96.4 [90.0, 98.8]
Saw PCP in past 12 months	84.7 [80.2, 88.4]	88.2 [82.7, 92.1]	83.2 [75.6, 88.8]	81.2 [69.0, 89.4]
Difficulty accessing primary care in past 12 months ²	9.1 [6.5, 12.7]	11.9 [7.7, 17.9]	10.4 [6.0, 17.4]	16.7 [9.3, 28.0]
Minimal				
Has PCP	92.5 [91.1, 93.8]	92.9 [90.7, 94.6]	94.0 [91.8, 95.6]	92.6 [88.5, 95.3]
Saw PCP in past 12 months	76.0 [73.7, 78.1]	76.4 [73.3, 79.3]	77.2 [73.7, 80.4]	71.4 [65.4, 76.7]
Difficulty accessing primary care in past 12 months ²	6.5 [5.3, 7.9]	9.9 [8.0, 12.2]	8.5 [6.5, 11.1]	7.9 [5.3, 11.8]

¹Only includes respondents who were enrolled in HMP at time of survey

²Among those who reported having a PCP

Beneficiary Survey Appendix Table 5.1.10. Cohort 2 primary care experiences, by level of health burden at baseline (2018), among all respondents at each survey (2018, 2021)

	2018 (N=2602) % [95% CI]	2021 (N=669) % [95% CI]
Substantial		
Has PCP	88.0 [83.6, 91.3]	95.1 [84.2, 98.6]
Saw PCP in past 12 months	83.7 [79.0, 87.5]	86.3 [74.7, 93.1]
Difficulty accessing primary care in past 12 months ¹	12.2 [8.8, 16.6]	8.6 [3.7, 18.4]
Moderate		
Has PCP	80.5 [73.8, 85.8]	88.5 [72.9, 95.6]
Saw PCP in past 12 months	67.1 [59.3, 74.1]	71.5 [55.3, 83.6]
Difficulty accessing primary care in past 12 months ¹	12.7 [8.5, 18.6]	26.2 [13.6, 44.4]
Minimal		
Has PCP	83.4 [80.8, 85.8]	90.4 [85.7, 93.7]
Saw PCP in past 12 months	67.1 [64.0, 70.0]	74.3 [68.1, 79.7]
Difficulty accessing primary care in past 12 months ¹	7.6 [6.0, 9.6]	12.0 [7.8, 17.9]

¹Among those who reported having a PCP

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Health burden improvement over time, by primary care experiences

Beneficiary Survey Appendix Table 5.1.11. Cohort 1 health burden improvement from 2016 to 2018, by primary care experiences from 2016 to 2018, among those who responded to surveys in 2016, 2017, and 2018

	Health burden improvement (2016-2018) ¹	
	Row n	Row % [95% CI]
Total	782	51.2 [46.9, 55.5]
Consistently had PCP ^{2,3}		
Yes	411	50.2 [44.2, 56.1]
No	68	64.4 [49.4, 77.0]
p-value ⁴		0.081
Regularly saw PCP ^{2,5}		
Yes	344	47.5 [41.0, 54.1]
No	135	62.7 [52.5, 71.8]
p-value ⁴		0.014
Difficulty accessing primary care ^{6,7}		
Yes	157	45.9 [36.6, 55.4]
No	620	52.6 [47.7, 57.5]
p-value ⁴		0.217

¹Health burden improvement from 2016 to 2018 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2016 were therefore excluded from this analysis

²Only includes respondents who were enrolled in HMP in 2017 and 2018

³Consistently had PCP defined as reporting having a PCP in 2016, 2017, and 2018

⁴Pearson chi-square test

⁵Regularly saw PCP defined as reporting having a PCP visit in the past year in 2016, 2017, and 2018

⁶Includes respondents not enrolled in HMP in 2017 and/or 2018

⁷Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2016, 2017, or 2018 among those who reported having a PCP in 2016, 2017, or 2018

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Beneficiary Survey Appendix Table 5.1.12. Cohort 1¹ and 2 health burden improvement from 2018 to 2021, by primary care experiences from 2018 to 2021, among those who responded to surveys in 2018 and 2021

	Health burden improvement (2018-2021) ²	
	Row n	Row % [95% CI]
Total	347	48.3 [40.9, 55.7]
Consistently had PCP ³		
Yes	305	48.2 [40.4, 56.1]
No	42	48.8 [29.1, 68.9]
p-value ⁴		0.958
Regularly saw PCP ⁵		
Yes	266	43.1 [35.3, 51.3]
No	81	61.5 [46.3, 74.7]
p-value ⁴		0.036
Difficulty accessing primary care ⁶		
Yes	59	47.3 [31.3, 63.9]
No	251	48.2 [39.4, 57.1]
p-value ⁴		0.929

¹Only includes respondents who were enrolled in HMP in 2018

²Health burden improvement from 2018 to 2021 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2018 were therefore excluded from this analysis

³Consistently had PCP defined as reporting having a PCP in 2018 and 2021

⁴Pearson chi-square test

⁵Regularly saw PCP defined as reporting having a PCP visit in the past year in 2018 and 2021

⁶Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2018 or 2021 among those who reported having a PCP in 2018 or 2021

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Beneficiary Survey Appendix Table 5.1.13. Multivariate logistic regression analyses predicting relationship between primary care experiences and health burden improvement from 2018 to 2021, Cohort 1¹ and 2

	Health burden improvement (2018-2021) ²					
	Model 1 (N=337)		Model 2 (N=337)		Model 3 (N=302)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Consistently had PCP ³	1.02	[0.37, 2.82]	-	-	-	-
Regularly saw PCP ⁴	-	-	0.45*	[0.20, 0.98]	-	-
Difficulty accessing primary care ⁵	-	-	-	-	1.34	[0.57, 3.18]
Age ⁷						
19-34	REF		REF		REF	
35-50	1.49	[0.69, 3.19]	1.59	[0.74, 3.41]	1.92	[0.87, 4.24]
51-64	2.34*	[1.01, 5.42]	2.34*	[1.04, 5.30]	3.01*	[1.25, 7.24]
Gender ⁷						
Male	REF		REF		REF	
Female	0.53*	[0.28, 0.98]	0.58	[0.31, 1.06]	0.50*	[0.26, 0.96]
Race/Ethnicity ⁷						
White, non-Hispanic	REF		REF		REF	
Black, non-Hispanic	1.31	[0.56, 3.07]	1.26	[0.53, 3.00]	1.16	[0.49, 2.75]
Hispanic	1.31	[0.31, 5.45]	1.02	[0.25, 4.13]	0.93	[0.16, 5.34]
Other	0.80	[0.28, 2.30]	0.67	[0.25, 1.81]	0.76	[0.22, 2.58]
FPL ⁷						
0-35%	REF		REF		REF	
36-99%	1.37	[0.72, 2.59]	1.52	[0.80, 2.88]	1.53	[0.77, 3.01]
≥100%	2.70*	[1.08, 6.76]	3.11*	[1.27, 7.64]	3.08*	[1.14, 8.36]
Chronic condition ^{6,7}						
Yes	REF		REF		REF	
No	1.29	[0.58, 2.86]	0.93	[0.40, 2.16]	0.97	[0.40, 2.35]
Intercept	0.65	[0.18, 2.31]	1.16	[0.44, 3.12]	0.54	[0.22, 1.29]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Health burden improvement from 2018 to 2021 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2018 were therefore excluded from this analysis

³Consistently had PCP defined as reporting having a PCP in 2018 and 2021

⁴Regularly saw PCP defined as reporting having a PCP visit in the past year in 2018 and 2021

⁵Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2018 or 2021 among those who reported having a PCP in 2018 or 2021

⁶Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁷In 2018

Beneficiary Survey Appendix

Self-efficacy in health care, by level of health burden and primary care experiences

Beneficiary Survey Appendix Table 5.1.14. Cohort 1, 2, and 3 responses about self-efficacy in 2021, by level of health burden in 2021 (N=4082)

	<i>I always know when I need to go to the doctor</i>	<i>I always keep my appointments</i>	<i>I always know how to prevent problems with my health</i>	<i>I am always able to follow my doctor's treatment advice</i>	<i>I always bring a list of questions or concerns to appointments</i>
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]
Total	77.5 [75.1, 79.6]	82.0 [79.9, 83.9]	52.5 [49.8, 55.2]	82.0 [79.7, 84.1]	49.4 [46.7, 52.1]
Health burden (2021)					
Substantial	68.3 [61.3, 74.5]	70.5 [63.5, 76.7]	37.9 [31.3, 45.0]	71.9 [64.8, 78.0]	53.3 [46.2, 60.2]
Moderate	70.3 [63.7, 76.2]	72.1 [65.7, 77.7]	42.8 [36.1, 49.8]	75.6 [68.6, 81.4]	46.5 [39.7, 53.6]
Minimal	80.3 [77.6, 82.8]	85.9 [83.6, 87.9]	56.9 [53.7, 60.1]	85.2 [82.5, 87.5]	48.9 [45.6, 52.2]
p-value ¹	0.002	<0.001	<0.001	<0.001	0.232

¹Pearson chi-square test

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.1.15. Cohort 1¹ and 2 responses about self-efficacy in 2021, by primary care experiences from 2018 to 2021 (N=1374)

	I <i>always</i> know when I need to go to the doctor	I <i>always</i> keep my appointments	I <i>always</i> know how to prevent problems with my health	I am <i>always</i> able to follow my doctor's treatment advice	I <i>always</i> bring a list of questions or concerns to appointments
	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]
Total	78.6 [75.2, 81.6]	82.2 [79.1, 84.9]	53.1 [49.2, 56.9]	80.8 [77.4, 83.8]	48.5 [44.7, 52.3]
Consistently had PCP²					
Yes	80.4 [76.9, 83.6]	82.0 [78.5, 84.9]	52.5 [48.4, 56.6]	80.9 [77.3, 84.2]	49.2 [45.0, 53.3]
No	69.0 [58.7, 77.7]	83.1 [75.1, 89.0]	56.0 [45.5, 65.9]	80.1 [70.3, 87.2]	45.1 [35.2, 55.5]
p-value ³	0.014	0.762	0.542	0.851	0.481
Regularly saw PCP⁴					
Yes	81.6 [77.6, 85.1]	83.4 [79.6, 86.6]	49.9 [45.4, 54.4]	79.6 [75.4, 83.2]	51.9 [47.4, 56.4]
No	74.0 [67.8, 79.4]	80.3 [74.8, 84.9]	57.8 [51.1, 64.2]	82.6 [76.5, 87.4]	43.5 [36.9, 50.2]
p-value ³	0.024	0.321	0.055	0.384	0.041
Difficulty accessing primary care⁵					
Yes	67.3 [57.3, 75.9]	69.2 [59.7, 77.3]	48.4 [38.6, 58.4]	72.0 [62.3, 80.0]	50.0 [40.1, 59.8]
No	82.8 [79.0, 85.9]	85.1 [81.6, 88.0]	52.8 [48.3, 57.2]	82.7 [78.7, 86.0]	49.8 [45.3, 54.2]
p-value ³	<0.001	<0.001	0.436	0.017	0.976

¹Only includes respondents who were enrolled in HMP in 2018

²Consistently had PCP defined as reporting having a PCP in 2018 and 2021

³Pearson chi-square test

⁴Regularly saw PCP defined as reporting having a PCP visit in the past year in 2018 and 2021

⁵Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2018 or 2021 among those who reported having a PCP in 2018 or 2021

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.1.16. Multivariate logistic regression analyses predicting relationship between consistently had PCP from 2018 to 2021 and responses about self-efficacy in 2021, Cohorts 1¹ and 2

	<i>I always know when to go to the doctor</i> (N=1345)		<i>I always keep my appointments</i> (N=1345)		<i>I always know how to prevent problems with my health</i> (N=1344)		<i>I am always able to follow my doctor's treatment advice</i> (N=1338)		<i>I always bring a list of questions or concerns to appointments</i> (N=1346)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Consistently had PCP ²	1.74*	[1.03, 2.93]	0.78	[0.44, 1.39]	0.84	[0.52, 1.36]	0.94	[0.50, 1.74]	1.17	[0.74, 1.83]
Age ⁴										
19-34	REF		REF		REF		REF		REF	
35-50	1.27	[0.79, 2.04]	1.22	[0.76, 1.98]	1.15	[0.78, 1.69]	0.84	[0.51, 1.41]	1.01	[0.69, 1.48]
51-64	2.06**	[1.26, 3.36]	2.68**	[1.46, 4.92]	1.52*	[1.02, 2.28]	1.37	[0.80, 2.34]	1.48	[0.98, 2.22]
Gender ⁴										
Male	REF		REF		REF		REF		REF	
Female	1.07	[0.73, 1.58]	1.05	[0.70, 1.58]	0.97	[0.71, 1.33]	0.91	[0.60, 1.39]	1.30	[0.95, 1.78]
Race/Ethnicity ⁴										
White, non-Hispanic	REF		REF		REF		REF		REF	
Black, non-Hispanic	1.73*	[1.03, 2.91]	0.59*	[0.37, 0.94]	1.34	[0.90, 2.01]	1.51	[0.87, 2.60]	1.36	[0.92, 2.02]
Hispanic	0.65	[0.26, 1.62]	0.74	[0.28, 1.96]	0.55	[0.25, 1.21]	2.58	[0.91, 7.30]	0.99	[0.44, 2.21]
Other	0.72	[0.40, 1.31]	0.61	[0.32, 1.13]	1.55	[0.93, 2.58]	1.22	[0.59, 2.52]	1.23	[0.74, 2.04]
FPL ⁴										
0-35%	REF		REF		REF		REF		REF	
36-99%	1.69*	[1.08, 2.65]	1.02	[0.64, 1.62]	1.18	[0.83, 1.68]	1.46	[0.86, 2.46]	0.99	[0.70, 1.40]
>=100%	1.09	[0.68, 1.75]	1.43	[0.85, 2.40]	1.01	[0.69, 1.50]	1.42	[0.86, 2.34]	1.17	[0.80, 1.72]
Chronic condition ^{3,4}										
Yes	REF		REF		REF		REF		REF	
No	0.97	[0.63, 1.49]	0.94	[0.59, 1.49]	0.94	[0.66, 1.33]	0.99	[0.62, 1.60]	0.80	[0.57, 1.13]
Intercept	1.46	[0.72, 2.95]	5.35***	[2.63, 10.89]	0.98	[0.53, 1.81]	3.48**	[1.55, 7.82]	0.63	[0.36, 1.10]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Consistently had PCP defined as reporting having a PCP in 2018 and 2021

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2018

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.1.17. Multivariate logistic regression analyses predicting relationship between regularly saw PCP from 2018 to 2021 and responses about self-efficacy in 2021, Cohorts 1¹ and 2

	<i>I always know when to go to the doctor</i> (N=1345)		<i>I always keep my appointments</i> (N=1345)		<i>I always know how to prevent problems with my health</i> (N=1344)		<i>I am always able to follow my doctor's treatment advice</i> (N=1338)		<i>I always bring a list of questions or concerns to appointments</i> (N=1346)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Regularly saw PCP ²	1.44	[0.96, 2.16]	1.14	[0.74, 1.74]	0.64*	[0.45, 0.90]	0.73	[0.46, 1.18]	1.34	[0.95, 1.88]
Age ⁴										
19-34	REF		REF		REF		REF		REF	
35-50	1.28	[0.79, 2.05]	1.20	[0.74, 1.96]	1.18	[0.79, 1.74]	0.86	[0.51, 1.44]	1.00	[0.68, 1.46]
51-64	2.08**	[1.26, 3.43]	2.58**	[1.41, 4.72]	1.59*	[1.07, 2.38]	1.42	[0.83, 2.43]	1.44	[0.96, 2.17]
Gender ⁴										
Male	REF		REF		REF		REF		REF	
Female	1.05	[0.72, 1.54]	1.05	[0.69, 1.58]	0.99	[0.72, 1.36]	0.93	[0.61, 1.41]	1.28	[0.94, 1.75]
Race/Ethnicity ⁴										
White, non-Hispanic	REF		REF		REF		REF		REF	
Black, non-Hispanic	1.70*	[1.01, 2.87]	0.60*	[0.37, 0.96]	1.33	[0.89, 1.98]	1.49	[0.86, 2.57]	1.37	[0.92, 2.03]
Hispanic	0.63	[0.26, 1.54]	0.79	[0.30, 2.09]	0.52	[0.23, 1.17]	2.46	[0.87, 6.95]	1.01	[0.45, 2.27]
Other	0.70	[0.39, 1.25]	0.60	[0.32, 1.12]	1.60	[0.95, 2.69]	1.24	[0.60, 2.58]	1.20	[0.73, 2.00]
FPL ⁴										
0-35%	REF		REF		REF		REF		REF	
36-99%	1.67*	[1.06, 2.61]	0.98	[0.62, 1.56]	1.25	[0.88, 1.78]	1.52	[0.89, 2.59]	0.96	[0.68, 1.35]
>=100%	1.08	[0.68, 1.72]	1.37	[0.81, 2.30]	1.08	[0.73, 1.59]	1.49	[0.91, 2.44]	1.13	[0.77, 1.66]
Chronic condition ^{3,4}										
Yes	REF		REF		REF		REF		REF	
No	1.01	[0.66, 1.56]	0.99	[0.63, 1.56]	0.85	[0.60, 1.21]	0.92	[0.57, 1.49]	0.85	[0.60, 1.21]
Intercept	1.86*	[1.04, 3.33]	4.06***	[2.29, 7.21]	1.09	[0.66, 1.80]	3.96***	[2.01, 7.78]	0.60*	[0.37, 0.99]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Regularly saw PCP defined as reporting having a PCP visit in the past year in 2018 and 2021

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2018

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.1.18. Multivariate logistic regression analyses predicting relationship between difficulty accessing primary care from 2018 to 2021 and responses about self-efficacy in 2021, Cohorts 1¹ and 2

	<i>I always know when to go to the doctor</i> (N=1195)		<i>I always keep my appointments</i> (N=1196)		<i>I always know how to prevent problems with my health</i> (N=1195)		<i>I am always able to follow my doctor's treatment advice</i> (N=1192)		<i>I always bring a list of questions or concerns to appointments</i> (N=1196)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Difficulty accessing primary care ²	0.40***	[0.25, 0.66]	0.42***	[0.26, 0.70]	0.79	[0.51, 1.23]	0.58*	[0.34, 0.97]	1.02	[0.66, 1.59]
Age ⁴										
19-34	REF		REF		REF		REF		REF	
35-50	1.40	[0.84, 2.31]	1.12	[0.66, 1.88]	1.26	[0.84, 1.90]	0.90	[0.53, 1.55]	0.83	[0.55, 1.25]
51-64	2.34**	[1.35, 4.05]	2.80**	[1.42, 5.52]	1.66*	[1.07, 2.57]	1.37	[0.78, 2.40]	1.37	[0.89, 2.12]
Gender ⁴										
Male	REF		REF		REF		REF		REF	
Female	1.08	[0.72, 1.62]	1.11	[0.71, 1.73]	1.06	[0.76, 1.48]	0.91	[0.58, 1.43]	1.17	[0.84, 1.63]
Race/Ethnicity ⁴										
White, non-Hispanic	REF		REF		REF		REF		REF	
Black, non-Hispanic	1.79	[0.99, 3.24]	0.66	[0.39, 1.12]	1.65*	[1.06, 2.55]	1.78	[0.95, 3.32]	1.27	[0.83, 1.94]
Hispanic	0.91	[0.30, 2.74]	1.14	[0.36, 3.62]	1.26	[0.55, 2.87]	2.31	[0.74, 7.22]	1.01	[0.43, 2.36]
Other	0.61	[0.33, 1.14]	0.74	[0.37, 1.49]	1.58	[0.91, 2.76]	1.24	[0.56, 2.73]	1.07	[0.62, 1.84]
FPL ⁴										
0-35%	REF		REF		REF		REF		REF	
36-99%	1.70*	[1.04, 2.79]	1.23	[0.75, 2.02]	1.19	[0.82, 1.73]	1.51	[0.85, 2.68]	1.09	[0.76, 1.59]
>=100%	1.14	[0.69, 1.90]	1.62	[0.90, 2.89]	1.14	[0.76, 1.72]	1.49	[0.87, 2.57]	1.12	[0.75, 1.67]
Chronic condition ^{3,4}										
Yes	REF		REF		REF		REF		REF	
No	0.99	[0.62, 1.56]	0.89	[0.54, 1.45]	0.99	[0.69, 1.43]	0.93	[0.56, 1.53]	0.79	[0.55, 1.14]
Intercept	2.79***	[1.60, 4.88]	4.61***	[2.52, 8.43]	0.68	[0.42, 1.10]	3.47***	[1.94, 6.22]	0.87	[0.54, 1.42]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Difficulty accessing primary care defined as reporting any difficulty accessing primary care in 2018 or 2021 among those who reported having a PCP in 2018 or 2021

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2018

Beneficiary Survey Appendix

Evaluation question 5.2: What factors influence beneficiaries' decisions about seeking care in the emergency department?

Updated results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 5.2.1. Multivariate logistic regression predicting relationship between primary care barriers and ED visit without attempted PCP contact in 2021

	Did not try to contact PCP before ED visit aOR	95% CI
Primary care barriers ¹		
Reported PCP barriers	0.49**	[0.29, 0.80]
Reported no PCP barriers	REF	
Any difficulties accessing prescription meds ²	0.83	[0.49, 1.43]
Age ⁴		
19-34	REF	
35-50	0.99	[0.58, 1.68]
51-65	0.76	[0.43, 1.35]
FPL ⁴		
0%	1.31	[0.78, 2.22]
0.1 to 99.99%	REF	
100% or more	1.26	[0.72, 2.20]
Months enrolled in HMP-MC ⁴		
Less than 24 months	REF	
24-47 months	1.62	[0.97, 2.72]
48+ months	1.14	[0.75, 1.73]
Rurality ⁴		
Urban	REF	
Suburban	0.83	[0.39, 1.77]
Rural	0.52	[0.25, 1.05]
Gender ⁴		
Female	REF	
Male	0.95	[0.61, 1.48]
Non-binary, transgender, or other	--	--
Race/Ethnicity ⁴		
White, non-Hispanic	REF	
Black, non-Hispanic	0.94	[0.50, 1.78]
Hispanic	1.25	[0.45, 3.48]
Arab, Chaldean, or Middle Eastern	0.54	[0.22, 1.30]
Other, multi-racial, or not reported	0.65	[0.30, 1.44]
Chronic condition ^{3,4}		
No chronic conditions	REF	
Chronic condition	0.55*	[0.34, 0.89]
Help reading health materials ⁴		
Never	REF	
Sometimes	1.03	[0.60, 1.78]
Often	1.19	[0.41, 3.44]
Intercept	6.05***	[2.84, 12.92]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Primary care barriers defined as reporting any of the following: any difficulties getting care, any difficulties making a PCP appointment, or PCP sometimes or never responding within 24 hours

²Any difficulties accessing prescription medications defined as reporting any of the following: being charged more than expected, delaying or avoiding picking up a prescription due to costs, taking less than instructed or skipping doses to make meds last, missing doses due to not getting refill in time, or stopping taking meds or taking a different dose without talking to doctor

Beneficiary Survey Appendix

³Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2021

Beneficiary Survey Appendix

Unmet healthcare needs in past 12 months at baseline, by level of health burden

Beneficiary Survey Appendix Table 5.2.2. Comparison of unmet healthcare needs in past 12 months at baseline HMV survey, by cohort and health burden at baseline HMV survey¹

	Unmet healthcare needs in past 12 months % [95% CI]
Total	17.9 [16.7, 19.1]
Cohort 1 (N=4108)	15.6 [14.3, 17.1]²
Substantial	27.0 [23.1, 31.3]
Moderate	19.3 [15.3, 24.0] ³
Minimal	11.5 [10.0, 13.1] ⁴
p-value ⁵	<0.001
Cohort 2 (N=2602)	23.3 [21.3, 25.4]²
Substantial	33.7 [28.4, 39.4]
Moderate	36.8 [29.7, 44.4] ³
Minimal	18.2 [16.0, 20.6] ⁴
p-value ⁵	<0.001

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018

T-tests showed that having unmet healthcare needs in the past 12 months at baseline was significantly different in:

²Cohort 1 vs. Cohort 2 overall (p<0.001)

³Cohort 1 vs. Cohort 2 for those with moderate health burden at baseline (p<0.001)

⁴Cohort 1 vs. Cohort 2 for those with minimal health burden at baseline (p<0.001)

⁵Pearson chi-square test comparing by health burden within Cohort

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.2.3. Multivariate logistic regression predicting unmet healthcare needs in past 12 months at baseline HMOV survey¹

	Unmet healthcare needs in past 12 months (N=6275)	
	aOR	95% CI
Survey cohort		
Cohort 1	REF	
Cohort 2	1.68***	[1.41, 1.99]
Health burden ²		
Substantial	2.74***	[2.21, 3.40]
Moderate	2.18***	[1.71, 2.77]
Minimal	REF	
Age category ²		
19-34	REF	
35-50	0.97	[0.79, 1.20]
51-64	0.89	[0.72, 1.10]
Gender ²		
Male	REF	
Female	1.07	[0.90, 1.27]
Race/Ethnicity ²		
White, non-Hispanic	REF	
Black, non-Hispanic	0.83	[0.66, 1.04]
Hispanic	1.37	[0.87, 2.16]
Other	1.04	[0.79, 1.38]
FPL ²		
0-35%	REF	
36-99%	1.03	[0.85, 1.25]
≥100%	1.10	[0.89, 1.35]
Intercept	0.13***	[0.10, 0.16]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMOV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018

²At baseline

Beneficiary Survey Appendix

Unmet healthcare needs over time, by level of health burden

Beneficiary Survey Appendix Table 5.2.4. Cohort 1¹ unmet healthcare needs in past 12 months over time, by level of health burden at baseline (2016), among those who responded to surveys in 2016, 2017, and 2018 (N=1536)

	Unmet healthcare needs in past 12 months				
	2016 % [95% CI]	2017 % [95% CI]	p-value ²	2018 % [95% CI]	p-value ³
Total	15.1 [13.0, 17.5]	20.8 [18.4, 23.4]	<0.001	22.6 [20.1, 25.4]	<0.001
Health burden (2016)					
Substantial	25.8 [19.8, 32.9]	33.3 [26.7, 40.7]	0.081	36.2 [29.4, 43.6]	0.014
Moderate	17.8 [12.4, 25.0]	27.5 [20.4, 36.0]	0.046	19.2 [13.4, 26.6]	0.757
Minimal	11.6 [9.3, 14.4]	16.3 [13.7, 19.3]	0.005	19.7 [16.7, 23.0]	<0.001
p-value ⁴	<0.001	<0.001		<0.001	

¹Only includes respondents who were enrolled in HMP in 2016, 2017, and 2018

²Unadjusted mixed effects logistic regression, 2017 compared to 2016, for each row

³Unadjusted mixed effects logistic regression, 2018 compared to 2016, for each row

⁴Pearson chi-square test comparing by health burden within survey year

Beneficiary Survey Appendix Table 5.2.5. Cohort 1 unmet healthcare needs in past 12 months, by level of health burden at baseline (2016), among respondents at each survey (2016, 2017, 2018)

	Unmet healthcare needs in past 12 months					
	2016 (N=4084) % [95% CI]		2017 ¹ (N=2393) % [95% CI]		2018 ¹ (N=1622) % [95% CI]	
Total	4084	15.6 [14.3, 17.1]	2388	21.2 [19.2, 23.3]	1622	22.4 [20.0, 25.1]
Health burden (2016)						
Substantial	756	27.0 [23.1, 31.3]	467	33.9 [28.6, 39.5]	283	35.0 [28.4, 42.3]
Moderate	507	19.3 [15.3, 24.0]	289	25.8 [20.2, 32.4]	212	20.0 [14.2, 27.2]
Minimal	2645	11.5 [10.0, 13.1]	1525	16.5 [14.4, 18.9]	1053	19.4 [16.5, 22.6]

¹Excludes respondents who were not enrolled in HMP at time of survey

Beneficiary Survey Appendix

Reported ED use in past 12 months at baseline, by level of health burden

Beneficiary Survey Appendix Table 5.2.6. Multivariate logistic regression predicting reported ED visit in past 12 months at baseline HMV survey¹, among those who reported having a PCP

	ED Visit in past 12 months ² (N=7992)	
	aOR	95% CI
Survey cohort		
Cohort 1	1.19*	[1.03, 1.37]
Cohort 2	1.27**	[1.08, 1.48]
Cohort 3	REF	
Health burden ³		
Substantial	3.36***	[2.83, 3.98]
Moderate	2.17***	[1.80, 2.61]
Minimal	REF	
Age category ³		
19-34	REF	
35-50	0.91	[0.77, 1.06]
51-64	0.61***	[0.52, 0.71]
Gender ³		
Male	REF	
Female	1.17*	[1.02, 1.33]
Race/Ethnicity ³		
White, non-Hispanic	REF	
Black, non-Hispanic	1.39***	[1.18, 1.64]
Hispanic	1.14	[0.82, 1.58]
Other	1.01	[0.83, 1.24]
FPL ³		
0-35%	REF	
36-99%	0.85*	[0.73, 0.98]
≥100%	0.91	[0.78, 1.06]
Intercept	0.38***	[0.31, 0.45]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Among those who reported having a PCP

³At baseline

Beneficiary Survey Appendix

Reported ED use in past 12 months, by difficulty accessing primary care, unmet healthcare needs, and health burden

Beneficiary Survey Appendix Table 5.2.7. Multivariate logistic regression analyses predicting relationship between difficulty accessing primary care and unmet healthcare needs in past 12 months and reported ED visit in past 12 months in 2018, among any respondent enrolled in HMP who reported a PCP in 2018, Cohort 1¹ and 2

	Reported ED visit in past 12 months (2018) ²			
	Model 1 (N=3564)		Model 2 (N=3564)	
	aOR	95% CI	aOR	95% CI
Difficulty accessing primary care in past 12 months ³	1.25	[0.90, 1.76]	-	-
Unmet health care needs in past 12 months ³	-	-	1.34*	[1.06, 1.71]
Months enrolled in HMP ³	0.99**	[0.98, 0.99]	0.99**	[0.98, 1.00]
Health burden ³				
Substantial	3.80***	[2.92, 4.96]	3.69***	[2.83, 4.82]
Moderate	2.54***	[1.91, 3.38]	2.49***	[1.86, 3.33]
Minimal	REF		1.00	
Age category ³				
19-34	REF		1.00	
35-50	0.77*	[0.60, 0.99]	0.76*	[0.60, 0.98]
51-64	0.74*	[0.58, 0.94]	0.73*	[0.57, 0.93]
Gender ³				
Male	REF		1.00	
Female	1.03	[0.85, 1.26]	1.02	[0.84, 1.25]
Race/Ethnicity ³				
White, non-Hispanic	REF		1.00	
Black, non-Hispanic	1.57***	[1.23, 2.01]	1.61***	[1.26, 2.06]
Hispanic	0.98	[0.62, 1.53]	0.99	[0.63, 1.55]
Other	1.05	[0.75, 1.48]	1.05	[0.75, 1.48]
FPL ³				
0-35%	REF		1.00	
36-99%	0.76*	[0.61, 0.95]	0.76*	[0.61, 0.95]
>=100%	0.89	[0.69, 1.15]	0.89	[0.69, 1.14]
Intercept	0.61**	[0.45, 0.84]	0.59**	[0.43, 0.81]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Among those who reported having a PCP

³In 2018

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.2.8. Multivariate logistic regression predicting relationship between difficulty accessing primary care in past 12 months and reported ED visit in past 12 months in 2021, among any respondent enrolled in HMP who reported a PCP in 2021, Cohorts 1¹, 2, and 3

	Reported ED visit in past 12 months (2021) ² (N=3508)	
	aOR	95% CI
Difficulty accessing primary care in past 12 months ³	1.33	[0.89, 1.98]
Months enrolled in HMP ³	1.00*	[0.99, 1.00]
Health burden ³		
Substantial	3.15***	[2.23, 4.44]
Moderate	1.88***	[1.35, 2.61]
Minimal	1.00	
Age category ³		
19-34	1.00	
35-50	1.13	[0.82, 1.55]
51-64	0.75	[0.55, 1.03]
Gender ³		
Male	1.00	
Female	1.18	[0.91, 1.52]
Race/Ethnicity ³		
White, non-Hispanic	1.00	
Black, non-Hispanic	1.40*	[1.01, 1.94]
Hispanic	1.23	[0.77, 1.98]
Other	1.32	[0.90, 1.93]
FPL category ³		
0-35%	1.00	
36-99%	0.74*	[0.55, 0.99]
>=100%	0.86	[0.64, 1.16]
Intercept	0.41***	[0.29, 0.60]

Each column is a unique logistic regression, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Among those who reported having a PCP

³In 2021

Beneficiary Survey Appendix

Reported PCP contact prior to ED visit in past 12 months at baseline, by level of health burden

Beneficiary Survey Appendix Table 5.2.9. Multivariate logistic regression predicting attempted PCP contact prior to ED visit in past 12 months at baseline HMV survey¹, among those who reported having a PCP

	Attempted PCP contact prior to ED visit in past 12 months ² (N=2804)	
	aOR	95% CI
Survey cohort		
Cohort 1	1.38*	[1.08, 1.78]
Cohort 2	1.11	[0.82, 1.48]
Cohort 3	REF	
Health burden ³		
Substantial	1.52**	[1.16, 1.98]
Moderate	1.18	[0.86, 1.60]
Minimal	REF	
Age category ³		
19-34	REF	
35-50	1.13	[0.86, 1.48]
51-64	1.37*	[1.04, 1.82]
Gender ³		
Male	REF	
Female	1.44**	[1.15, 1.80]
Race/Ethnicity ³		
White, non-Hispanic	REF	
Black, non-Hispanic	0.95	[0.71, 1.26]
Hispanic	0.85	[0.49, 1.48]
Other	1.03	[0.74, 1.45]
FPL ³		
0-35%	REF	
36-99%	1.13	[0.87, 1.45]
>=100%	1.24	[0.94, 1.63]
Intercept	0.17***	[0.12, 0.24]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²Among those who reported having a PCP and an ED visit in the past 12 months

³At baseline

Beneficiary Survey Appendix

Reported PCP contact prior to ED visit in past 12 months, by difficulty accessing primary care, unmet healthcare needs, and health burden

Beneficiary Survey Appendix Table 5.2.10. ED visit without attempted PCP contact in past 12 months¹, by difficulty accessing primary care, unmet healthcare needs, and health burden, among any respondent enrolled in HMP who reported having a PCP at the time of each survey (2016, 2017, 2018, 2021)

	ED visit without attempted PCP contact in past 12 months			
	2016 (N=1386) % [95% CI]	2017 (N=737) % [95% CI]	2018 (N=1276) % [95% CI]	2021 (N=1166) % [95% CI]
Total	71.5 [68.5, 74.3]	79.9 [76.1, 83.2]	77.9 [74.8, 80.8]	77.8 [73.5, 81.6]
Difficulty accessing primary care in past 12 months				
Yes	70.4 [61.2, 78.3]	73.9 [62.8, 82.5]	59.6 [48.1, 70.2]	58.8 [44.9, 71.4]
No	71.6 [68.4, 74.6]	80.8 [76.8, 84.3]	80.3 [77.2, 83.1]	81.3 [77.2, 84.8]
p-value ¹	0.780	0.168	<0.001	<0.001
Unmet healthcare needs in past 12 months				
Yes	64.9 [57.5, 71.6]	76.2 [68.1, 82.7]	76.0 [70.0, 81.2]	Not asked
No	73.2 [69.9, 76.3]	81.2 [76.9, 84.8]	78.6 [74.9, 82.0]	
p-value ¹	0.029	0.225	0.435	
Health burden				
Substantial	64.1 [57.8, 69.9]	79.6 [72.1, 85.5]	76.7 [70.8, 81.8]	74.6 [64.6, 82.5]
Moderate	73.5 [66.1, 79.8]	81.0 [72.0, 87.6]	73.3 [65.2, 80.1]	77.5 [66.9, 85.4]
Minimal	75.5 [71.5, 79.0]	79.7 [74.3, 84.2]	79.7 [75.2, 83.6]	78.8 [73.0, 83.6]
p-value ¹	0.004	0.956	0.276	0.712

¹Pearson chi-square test comparing by variable within year

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 5.2.11. Representative beneficiary quotes from responses to open-ended questions from the 2021 HMV survey about reasons for ED use (including contacting or not contacting their PCP prior to an ED visit)

Symptoms Suggesting a Medical Emergency – Similarities between those who did vs. did not contact their PCP before going to the ED

Contacted PCP	Did not contact PCP
I had some chest pain. I called [PCP office] and they recommended that I go into the ER. – Male, 62 years, Cohort 3	I was having chest pains, and I thought I was having a heart attack so I went to the hospital. – Male, 51 years, Cohort 1
I had numbness and lower back pain...the receptionist felt like I was having a stroke. I was told that I was unable to get an appt with my family doctor and to go to the ER. – Female, 52 years, Cohort 3	No, because they thought I was having a stroke so... I didn't have time to talk to them. – Male, 42 years, Cohort 2
I believe I had a seizure...the PCP's office just told me to go in. – Female, 63 years, Cohort 2	I had a seizure, and I had to get to the hospital as quick as I could. – Male, 21 years, Cohort 3
I was feeling really suicidal and they suggested to go to the ER vs. coming into the office, since they said the ER could help me better. – Female, 25 years, Cohort 3	It was a mental health crisis, so I ended up going...It was a night when I went and I didn't want to wait til the morning, it was a spur of the moment issue. – Male, 31 years, Cohort 3
I was having mental problems. And it was actually my PCP who recommended that I go to the ER. – Male, 20 years, Cohort 3	I was having a panic attack and I didn't know what was going on, so I went straight to emergency – Female, 25 years, Cohort 3
Oh I did [call the PCP], absolutely. And I got scolded. I got a concussion, waited til the morning cause they were closed the day before and they told me to go to the ER immediately, and to not drive. – Female, 59 years, Cohort 1	No because it was a hand trauma. I was bit by my dog, my finger was dislocated and broken. It was literally an emergency. – Female, 61 years, Cohort 3
What happened is I fell, and I called up the nurse line to see if I should go to the hospital. And she went over some questions with me and she said 'Based on your answers, I say yes you should probably go to the ER just to make sure that you're alright.' – Male, 39 years, Cohort 1	I knew my finger was broke and I needed immediate attention, because I fell down and I was running with my dog and really hurt myself. – Female, 32 years, Cohort 1
I had fell down my stairs and they didn't have any open appts. – Female, 49 years, Cohort 3	I was not able to move. My husband called 911. I wasn't... I pinched a nerve and couldn't move from the floor. – Female, 41 years, Cohort 3
I couldn't get in for an appointment for two weeks and I had a little bit of a slip and fall on these dang walnuts. Took out my hip a little bit. – Male, 64 years, Cohort 3	I wasn't near [the PCP office] and I had an ankle injury, a severe ankle injury. So I needed to go immediately. – Female, 54 years, Cohort 3
I was pregnant and I had bleeding going on. And I had been trying to get in and nobody was calling me back, so we went to the ER. – Female, 26 years, Cohort 3	My water broke, so we just went to the hospital. – Female, 41 years, Cohort 3

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I have cancer and I'm taking chemo at night. I called and talked to the nurse. She told me not to play around with my symptoms so I just went in. – Female, 62 years, Cohort 1	Because I see a specialist, I have leukemia, so I had to be admitted through ER for a blood-platelet transfusion. – Female, 56 years, Cohort 3
I have a form of breast cancer, and I got a severe infection and the medicine shut my kidneys down. [The PCP] said to go in – Female, 53 years, Cohort 3	I actually am prone to infections because I've had MRSA in the past, and I had an abscess that was getting really bad and I didn't have time to contact my doctor I just had to go to the ER. – Female, 20 years, Cohort 3

COVID Testing

<i>Contacted PCP</i>	<i>Did not contact PCP</i>
But [PCP office] wasn't open to do COVID tests, so I had to go to the emergency room. – Female, 32 years, Cohort 3	I just went to the one who I thought would give me a COVID test as soon as possible and so I went to the ER. – Female, 20 years, Cohort 3 Because they told us for COVID testing that if you do it at the emergency room it goes faster, like you get the results faster. – Female, 42 years, Cohort 2 I just needed a rapid COVID test. It was really late at night. My mom was immunocompromised so I couldn't wait for the doctor. – Female, 27 years, Cohort 3 I was just suspected of COVID, so I was looking for a rapid test for work. – Male, 35 years, Cohort 2

COVID Illness

<i>Contacted PCP</i>	<i>Did not contact PCP</i>
I had COVID... I was sick for 4 days and my daughter called my doctor for me because I was so terrible, and he said 'Please yes go to the emergency room.' – Female, 63 years, Cohort 3	My daughter and son-in-law and I all got out of quarantine at the same time and they said "Mom we don't like how you're breathing." And they had me take my oxygen level and my oxygen level was low and so they said "Mom you have to get to the ER." – Female, 59 years, Cohort 2
I was just having trouble. My chest tightened, I didn't know if it was from COVID or what, and they told me to go to the ER. – Female, 57 years, Cohort 2	I went in 'cause I couldn't breathe, so I had a friend who took me into the ER closest to me and I ended up with COVID. – Female, 25 years, Cohort 3
I went to the ER because I had a fever. And I called my PCP and they said they thought I had COVID-19 and they said to not come in, and to go to ER. – Female, 61 years, Cohort 3	I had COVID so no, I went straight to the ER. I didn't want to cause any exposures so I went directly since it was me and my small toddler. – Female, 29 years, Cohort 3

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Inadequate Response by PCP

<i>Contacted PCP</i>
I had called and got an appointment April 1st, and this was in January, and I had extreme bladder pain. – Female, 63 years, Cohort 3
I left them a couple voicemails and didn't get a response. I ended up having a panic attack and had to call an ambulance, 'cause I was home alone. – Female, 28 years, Cohort 1
I had a kidney infection. I was in a lot of pain, and I called the doctor's office and I talked with them during the day. They told me they would send me some medicine, but the medicine didn't come and I called back to the office and no one answered, so I just went to the hospital. – Female, 45 years, Cohort 3
I had CDIF. And nobody would test me for it. They just kept telling me take this med, take this med, take this med, and none of them was working. I kept telling them what was going on but nobody listened. – Female, 33 years, Cohort 3
I tore the cartilage in my left shoulder... it was a Saturday, so I went to the ER and they wanted me to get a hold of my PCP as soon as I could Monday morning. So I did that. And then I didn't hear back from anyone. I called Monday, I called Tuesday, and I called Wednesday, and I was just in excruciating pain. – Female, 46 years, Cohort 3

Easier to go to the ED

<i>Did not contact PCP</i>
I just went to the hospital because I had an infected toenail, and the PCP is farther from me than the ER. – Male, 20 years, Cohort 3
I literally live outside of an ER. So, when something happened, it was easier to walk two doors down and go to the ER. My PCP is 45 minutes away and the ER is a block away. It was more of a timing issue I guess. – Male, 40 years, Cohort 3
I was down close to the ER anyway, so it was easier than waiting for the doctor's office to schedule an appointment. – Male, 38 years, Cohort 2
[The PCP] hadn't talked to me in a long time, and I was not happy with her. So I went straight to the ER. – Female, 62 years, Cohort 2
[The PCP office] is always very busy and they usually schedule virtual appointments and I feel like nothing gets done in those virtual appts because they just guess what's going on. – Female, 21 years, Cohort 3
Those people [PCP office] were very rude and I didn't want to talk to them anymore. – Female, 20 years, Cohort 3

Beneficiary Survey Appendix

Evaluation question 6.1: What impact has HMP had on beneficiaries' levels of employment and ability to work?

Additional results from Interim Evaluation Report (including chronic condition)

Beneficiary Survey Appendix Table 6.1.1. Multivariate logistic regression predicting employment in 2021

	Employed/Self-employed (2021)	
	aOR	95% CI
Age ²		
19-34	REF	
35-50	0.87	[0.65, 1.16]
51-65	0.47***	[0.34, 0.63]
FPL ²		
0%	0.44***	[0.34, 0.58]
0.1 to 99.99%	REF	
100% or more	1.28	[0.96, 1.72]
Months enrolled in HMP-MC ²		
Less than 24 months	REF	
24-47 months	1.06	[0.81, 1.39]
48+ months	1.01	[0.81, 1.25]
Rurality ²		
Urban	REF	
Suburban	0.58**	[0.39, 0.87]
Rural	0.79	[0.59, 1.06]
Gender ²		
Female	REF	
Male	1.10	[0.87, 1.39]
Non-binary, transgender, or other	0.59	[0.16, 2.15]
Race/Ethnicity ²		
White, non-Hispanic	REF	
Black, non-Hispanic	1.11	[0.80, 1.55]
Hispanic	0.82	[0.52, 1.29]
Arab, Chaldean, or Middle Eastern	0.80	[0.49, 1.30]
Other, multi-racial, or not reported	0.81	[0.53, 1.22]
Chronic condition ^{1,2}		
No chronic conditions	REF	
Chronic condition	0.88	[0.69, 1.13]
Intercept	2.75***	[2.02, 3.74]

Multivariate logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Derived from administrative claims data from past 12 months; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

²In 2021

Beneficiary Survey Appendix

Employment at baseline, by level of health burden

Beneficiary Survey Appendix Table 6.1.2. Multivariate logistic regression predicting employment status at baseline HMV survey¹

	Employed/self-employed (N=8836)	
	aOR	95% CI
Survey cohort		
Cohort 1	0.74***	[0.64, 0.86]
Cohort 2	1.00	[0.86, 1.17]
Cohort 3	REF	
Health burden ²		
Substantial	0.26***	[0.22, 0.31]
Moderate	0.68***	[0.57, 0.82]
Minimal	REF	
Age category ²		
19-34	REF	
35-50	0.88	[0.75, 1.04]
51-64	0.45***	[0.39, 0.53]
Gender ²		
Male	REF	
Female	1.04	[0.91, 1.18]
Race/Ethnicity ²		
White, non-Hispanic	REF	
Black, non-Hispanic	1.06	[0.90, 1.25]
Hispanic	1.02	[0.76, 1.37]
Other	0.88	[0.71, 1.08]
FPL ²		
0-35%	REF	
36-99%	3.41***	[2.96, 3.93]
≥100%	4.11***	[3.52, 4.80]
Intercept	1.13	[0.94, 1.36]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Baseline HMV survey collected 12-24 months after initial HMP-MC enrollment; Cohort 1 = 2016, Cohort 2 = 2018, Cohort 3 = 2021

²At baseline

Beneficiary Survey Appendix

Changes in employment over time, by level of health burden

Beneficiary Survey Appendix Table 6.1.3. Cohort 1¹ employment over time, by level of health burden at baseline (2016), among those who responded to surveys in 2016, 2017, and 2018 (N=2608)

Employed/Self-employed					
	2016 % [95% CI]	2017 % [95% CI]	p-value ²	2018 % [95% CI]	p-value ³
Total	48.2 [45.9, 50.4]	57.9 [55.6, 60.1]	<0.001	58.5 [56.1, 60.7]	<0.001
Health burden (2016)					
Substantial	18.9 [15.2, 23.3]	28.8 [24.1, 34.0]	<0.001	32.2 [27.2, 37.5]	<0.001
Moderate	43.1 [36.5, 49.8]	53.9 [47.1, 60.6]	0.001	54.1 [47.3, 60.7]	0.001
Minimal	57.9 [54.9, 60.7]	67.5 [64.7, 70.2]	<0.001	67.5 [64.7, 70.2]	<0.001
p-value ⁴	<0.001	<0.001		<0.001	

¹Includes respondents not enrolled in HMP in 2017 and/or 2018

²Unadjusted mixed effects logistic regression, 2017 compared to 2016, for each row

³Unadjusted mixed effects logistic regression, 2018 compared to 2016, for each row

⁴Pearson chi-square test comparing by health burden within survey year

Beneficiary Survey Appendix Table 6.1.4. Cohort 1¹ and 2 employment over time, by level of health burden in 2018, among those who responded to surveys in 2018 and 2021 (N=1374)

Employed/Self-employed			
	2018 % [95% CI]	2021 % [95% CI]	p-value ²
Total	59.9 [56.1, 63.5]	60.0 [56.2, 63.7]	0.952
Health burden (2018)			
Substantial	36.2 [27.4, 46.1]	46.2 [36.4, 56.2]	0.101
Moderate	58.3 [47.8, 68.1]	59.3 [48.8, 69.0]	0.866
Minimal	64.0 [59.5, 68.3]	63.1 [58.6, 67.4]	0.737
p-value ³	<0.001	0.017	

¹Only includes respondents who were enrolled in HMP in 2018

²Unadjusted mixed effects logistic regression, 2021 compared to 2018, for each row

³Pearson chi-square test comparing by health burden within survey year

Beneficiary Survey Appendix Table 6.1.5. Cohort 1 employment, by level of health burden at baseline (2016), among all respondents at each survey (2016, 2017, 2018, 2021)

Employed/Self-employed				
	2016 (N=4108) % [95% CI]	2017 ¹ (N=3100) % [95% CI]	2018 ¹ (N=2608) % [95% CI]	2021 (N=806) % [95% CI]
Total	48.3 [46.4, 50.1]	57.1 [55.0, 59.3]	58.5 [56.1, 60.7]	60.3 [55.4, 65.0]
Health burden (2016)				
Substantial	19.1 [15.9, 22.7]	27.9 [23.6, 32.7]	32.2 [27.2, 37.5]	51.1 [39.4, 62.6]
Moderate	44.3 [38.9, 49.9]	54.7 [48.4, 60.9]	54.1 [47.3, 60.7]	58.2 [44.7, 70.5]
Minimal	58.0 [55.5, 60.4]	67.4 [64.7, 70.0]	67.5 [64.7, 70.2]	62.5 [56.5, 68.1]

¹Includes respondents not enrolled in HMP at time of survey

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Beneficiary Survey Appendix Table 6.1.6. Cohort 2 employment, by level of health burden at baseline (2018), among all respondents at each survey (2018, 2021)

	Employed/Self-employed	
	2018	2021
	(N=2602) % [95% CI]	(N=669) % [95% CI]
Total	55.8 [53.4, 58.1]	59.2 [53.9, 64.3]
Health burden (2018)		
Substantial	28.8 [24.0, 34.2]	44.2 [31.0, 58.2]
Moderate	50.2 [42.8, 57.6]	64.2 [49.8, 76.3]
Minimal	63.6 [60.6, 66.5]	60.6 [54.1, 66.7]

Changes in employment over time for those unemployed at baseline, by level of health burden

Beneficiary Survey Appendix Table 6.1.7. Cohort 1¹ employment gain over time, by level of health burden at baseline (2016), among those unemployed at baseline (2016) who responded to surveys in 2016, 2017, and 2018

	Gained employment			
	2017		2018	
	Row n	Row % [95% CI]	Row n	Row % [95% CI]
Total	1295	30.8 [27.6, 34.1]	1297	34.3 [31.1, 37.7]
Health burden at baseline (2016)				
Substantial	388	16.9 [12.6, 22.2]	388	22.0 [17.1, 27.7]
Moderate	176	30.0 [22.1, 39.3]	176	31.2 [23.4, 40.3]
Minimal	663	39.0 [34.4, 43.8]	665	42.5 [37.9, 47.3]
p-value ²		<0.001		<0.001

¹Includes respondents not enrolled in HMP in 2017 and/or 2018

²Pearson chi-square test within survey year

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 6.1.8. Multivariate logistic regression predicting relationship between change in health burden from 2016 to 2018 and employment gain in 2018, among those who were unemployed at baseline (2016), Cohort 1¹

	Gained employment (2018) (N=539)	
	aOR	95% CI
Change in health burden (2016-2018) ²		
Health burden stayed the same/worsened	REF	
Health burden improved	4.13***	[2.33, 7.31]
Age ⁴		
19-34	REF	
35-50	0.43*	[0.22, 0.84]
51-64	0.14***	[0.07, 0.30]
Gender ⁴		
Male	REF	
Female	1.04	[0.60, 1.81]
Race/Ethnicity ⁴		
White, non-Hispanic	REF	
Black, non-Hispanic	0.88	[0.39, 1.98]
Hispanic	2.10	[0.59, 7.50]
Other	1.86	[0.78, 4.40]
FPL ⁴		
0-35%	REF	
36-99%	1.59	[0.85, 2.97]
>=100%	0.96	[0.39, 2.36]
Region ⁴		
UP/Northwest/Northeast	REF	
West/East Central/East	0.73	[0.33, 1.63]
South Central/Southwest/Southeast	0.49	[0.19, 1.25]
Detroit Metro	0.44	[0.18, 1.11]
Chronic condition ^{3,4}		
Yes	REF	
No	1.87	[0.96, 3.65]
Intercept	0.47	[0.18, 1.26]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Includes respondents not enrolled in HMP in 2018

²Health burden improvement from 2016 to 2018 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2016 were therefore excluded from this analysis

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2016

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 6.1.9. Cohort 1¹ and 2 employment gain in 2021, by level of health burden in 2018, among those unemployed in 2018 who responded to surveys in 2018 and 2021

	Gained employment (2021)	
	Row n	Row % [95% CI]
Total	525	34.7 [29.1, 40.8]
Health burden in 2018		
Substantial	104	30.7 [19.8, 44.3]
Moderate	76	39.7 [25.9, 55.3]
Minimal	317	36.6 [29.3, 44.6]
p-value ²		0.658

¹Only includes respondents who were enrolled in HMP in 2018

²Pearson chi-square test within survey year

Beneficiary Survey Appendix

Beneficiary Survey Appendix Table 6.1.10. Multivariate logistic regression predicting relationship between change in health burden from 2018 to 2021 and employment gain in 2021, among those who were unemployed in 2018, Cohorts 1¹ and 2

	Gained employment (2021) (N=175)	
	aOR	95% CI
Change in health burden (2018-2021) ²		
Health burden stayed the same/worsened	REF	
Health burden improved	2.24	[0.79, 6.37]
Age ⁴		
19-34	REF	
35-50	0.52	[0.15, 1.81]
51-64	0.06***	[0.02, 0.22]
Gender ⁴		
Male	REF	
Female	0.65	[0.25, 1.66]
Race/Ethnicity ⁴		
White, non-Hispanic	REF	
Black, non-Hispanic	1.19	[0.29, 4.82]
Hispanic	0.24	[0.01, 4.54]
Other	0.17*	[0.04, 0.78]
FPL ⁴		
0-35%	REF	
36-99%	3.35*	[1.23, 9.10]
>=100%	0.56	[0.15, 2.10]
Region ⁴		
UP/Northwest/Northeast	REF	
West/East Central/East	0.93	[0.18, 4.71]
South Central/Southwest/Southeast	1.46	[0.26, 8.33]
Detroit Metro	2.87	[0.49, 16.91]
Chronic condition ^{3,4}		
Yes	REF	
No	0.69	[0.20, 2.37]
Intercept	0.77	[0.14, 4.33]

Logistic regression results, *p<0.05, **p<0.01, ***p<0.001

¹Only includes respondents who were enrolled in HMP in 2018

²Health burden improvement from 2018 to 2021 defined as moving from moderate to minimal or moving from substantial to moderate or minimal; those with minimal health burden in 2018 were therefore excluded from this analysis

³Derived from administrative claims data; includes diabetes, heart disease, stroke, arthritis (osteoarthritis or rheumatoid arthritis), chronic obstructive pulmonary disease, asthma, hypertension, and cancer

⁴In 2018

Credit Report Data Appendix

Introduction

The Credit Report Data Appendix includes additional tables related to the methods and results using credit report data.

Methodology

Linkage to consumer credit report data

We extracted data from the State of Michigan's Enterprise Data Warehouse to identify all beneficiaries who enrolled in HMP at any point between April 2014 and December 2020. These individuals were then linked to their credit reports at one of the three large U.S. credit agencies using name, most recent address, and social security number (SSN). All direct identifiers (name, address, and SSN) were removed from the dataset by the credit agency prior to delivery of the data back to the HMP evaluation team, and all subsequent analyses were done using a de-identified study ID created specifically for the purpose of the data linkage. The crosswalk file linking study ID and patient identifiers was permanently deleted in April 2024 as required by the data use agreement with the credit agency.

To mask the identity of HMP beneficiaries, the file sent to the credit agency also included 205,706 individuals randomly selected from the Michigan Care Improvement Registry (MCIR), another state health care database. The MCIR database includes any Michigan residents who have received a vaccine, and contains names and addresses; SSNs were randomly generated for these individuals as well. SSNs for the MCIR population were generated as follows: an SSN has three components, AAA-GG-SSSS. AAA is the area code, GG is the group code, and SSSS is the serial number. The generated SSNs were created by sampling randomly from the area codes in the HMP data and combining each area code with a randomly generated group code where the sampling is capped to be less than the maximum even-numbered group code observed in the HMP data in the associated area. The last four digits (SSSS) were generated at random. Constructing randomly generated SSNs in this way assured that the generated numbers correspond to real individuals. The order of the MCIR names within the dataset were then randomized to ensure that the identities of HMP beneficiaries were masked and not identifiable by the credit agency.

Imputed income

Imputed income was calculated by the credit agency using a proprietary imputation algorithm validated against income tax filings for a subset of individuals in the credit agency's database. All three inclusion criteria (state of residence, age, and imputed income) for the comparison sample were obtained in the data period January 2014.

Selection of non-expansion states

Thirteen non-expansion states were identified and included (AL, FL, GA, KS, MO, MS, NC, SC, SD, TN, TX, WI, WY). Non-expansion states were identified and chosen in August 2021.¹ At that time, Missouri voters had approved a ballot measure to expand Medicaid, but the expansion had not yet been implemented. Enrollment in Missouri did not begin until August 2021, with coverage retroactive to July 2021. Since that time, South Dakota and North Carolina have also approved, but not yet implemented, Medicaid expansion.

¹Kaiser Family Foundation. [Status of State Medicaid Expansion Decisions: Interactive Map](#).

Credit Report Data Appendix

Credit data covariates

Credit Report Data Appendix Table 1 presents the full set of available credit data covariates as of January 2014 for the comparison group and HMP beneficiaries, including rates of missing or unknown information for each variable.

Credit Report Data Appendix Table 1. Credit data covariates with all categories including unknown values

	Comparison sample	HMP beneficiaries 2014 - 2017
Total	1,000,000 (100.0)	934,726 (100.0)
Unmatched	0 (0)	115,398 (12.4)
Sex		
Female	474,466 (47.5)	401,078 (42.9)
Male	449,668 (45.0)	368,856 (39.5)
Unknown	75,866 (7.6)	49,394 (5.3)
Marital status		
Married	402,343 (40.2)	329,813 (35.3)
Single	276,607 (27.7)	244,196 (26.1)
Unknown	321,050 (32.1)	245,319 (26.3)
Education level		
Less than High School Diploma	205,618 (20.6)	98,483 (10.5)
High School Diploma	300,550 (30.1)	246,297 (26.4)
Some College	226,522 (22.7)	233,607 (25.0)
Bachelor Degree	80,054 (8.0)	74,906 (8.0)
Graduate Degree	33,373 (3.3)	36,596 (3.9)
Unknown	153,883 (15.4)	129,439 (13.9)
Homeowner		
Yes	235,019 (23.5)	270,095 (28.9)
Unknown	764,981 (76.5)	549,233 (58.8)
Renter		
Yes	98,071 (9.8)	80,152 (8.6)
Unknown	901,929 (90.2)	739,176 (79.1)

Notes: This table provides the percentages for all values of the displayed covariates in the period January 2014. These numbers include individuals subsequently excluded for having missing observations in other periods or a deceased flag in the data. This is the period from which the comparison sample is drawn, so there are no unmatched observations in the comparison group in this period. Unmatched observations in this period among HMP beneficiaries are missing all covariate values.

Credit Report Data Appendix

Comparison of excluded vs. included individuals

Credit Report Data Appendix Table 2 compares observable characteristics for HMP beneficiaries who matched into any period of the credit data compared to those who did not. Compared to those who matched, those who went completely unmatched were more likely to be male, slightly older at the time of enrollment, have lower average percentage FPL, longer average time enrolled in HMP. They had similar average number of annual ED visits and inpatient admissions, but overall higher numbers of chronic condition body system flags.

Credit Report Data Appendix Table 2. Comparison of matched and unmatched HMP enrollees

	Unmatched	Matched	All
N (%)	85,481 (9.2)	849,245 (90.9)	934,726 (100.0)
Female gender (N, %)	34,744 (40.7)	446,373 (52.6)	481,117 (51.5)
Age at first enrollment (mean, SD)	45 (10.2)	41 (10.3)	41 (10.3)
Percentage of federal poverty limit (mean, SD)	19.6 (32.5)	32.2 (36.8)	31.1 (36.6)
Years of HMP enrollment (mean, SD)	3.5 (2.3)	2.9 (2.0)	2.9 (2.1)
ED visits per year (mean, SD)	3.3 (23.8)	3.4 (25.1)	3.4 (25.0)
Inpatient admissions per year (mean, SD)	0.8 (5.3)	0.5 (4.3)	0.6 (4.4)
Number of chronic conditions by body system (mean, SD)	5.5 (3.9)	4.9 (3.7)	5.0 (3.7)

Notes: This table compares HMP beneficiaries who went matched vs. unmatched in the credit data. The categorical variables Total N and Female gender report totals and percentages, while the remainder of the variables report means and standard deviations. Average percentage of the federal poverty limit (FPL) is averaged across all half-year observations in which an individual's FPL was reported. Total years of HMP enrollment was calculated by summing up the total number of months an individual was enrolled in HMP between April 2014 and June 2021, and then dividing by 12. ED visits and inpatient admissions per year were calculated by summing the total number of ED visits between April 2014 and June 2021, and dividing by the total number of years of enrollment. Number of chronic conditions by body system was calculated by summing the number of body system (out of 21) in which an individual had a chronic condition flag at any point in their enrollment between April 2014 and June 2021.

Credit Report Data Appendix

Credit Report Data Appendix Table 3 compares individuals among both the HMP beneficiaries and the comparison sample who were excluded for being deceased at any point during the study period or for having partially missing credit data, i.e., being present in the credit data for ≥ 1 periods, but lacking credit data for all periods of data. Note that this table excludes the 85,481 HMP beneficiaries who did not match into the credit data in any period.

Among both HMP beneficiaries and the comparison sample, excluded individuals were more likely to be male, more likely to be single, less educated, and less likely to be homeowners. In terms of outcomes, excluded individuals had less debt in collections, higher rates of subprime credit score, and much lower rates of bankruptcy (as declaring bankruptcy by definition creates a credit history).

Credit Report Data Appendix Table 3. Comparison of included vs. excluded individuals

	HMP beneficiaries		Comparison sample	
	Included	Excluded	Included	Excluded
Total (N)	704,216 (100.0)	145,029 (100.0)	723,217 (100.0)	276,783 (100.0)
Covariates, N (%)				
Missing Jan 2014 data	0 (0.0)	29,917 (20.6)	0 (0.0)	0 (0.0)
Female	365,044 (51.8)	36,034 (24.9)	373,652 (51.7)	100,814 (36.4)
Missing gender	40,953 (5.8)	8,441 (5.8)	50,974 (7.1)	24,892 (9.0)
Married	291,159 (41.4)	38,654 (26.7)	294,662 (40.7)	107,681 (38.9)
Missing marital status	211,952 (30.1)	33,367 (23.0)	232,002 (32.1)	89,048 (32.2)
Some college or more	307,147 (43.6)	37,962 (26.2)	258,491 (35.7)	81,458 (29.4)
Missing education level	105,858 (15.0)	23,581 (16.3)	108,069 (14.9)	45,814 (16.6)
Homeowner	243,483 (34.6)	26,612 (23.1)	182,609 (25.3)	52,410 (18.9)
Renter	67,809 (9.6)	12,343 (10.7)	73,159 (10.1)	24,912 (9.0)
Outcomes				
Medical debt in collections, \$ (SE)	\$678 (3527.3)	\$639 (3396.9)	\$1,390 (6175.7)	\$955 (5010.3)
Non-medical debt in collections, \$ (SE)	\$842 (4817.9)	\$570 (2046.3)	\$934 (2671.4)	\$491 (2067.0)
Subprime credit score (< 600), (%)	55.8%	64.9%	67.5%	74.2%
Bankruptcy in past 2 years, (%)	2.5%	0.5%	1.8%	0.2%

Notes: This table compares covariates and primary outcomes for HMP beneficiaries and the comparison sample who were included in the analytic cohort vs excluded due to being deceased during the study period or for having missing outcomes during the study period. Note that the HMP beneficiaries listed here do not include the 85,481 beneficiaries who did not match into the the credit data in any period. Covariates listed here are taken from the January 2014 credit data; only excluded HMP beneficiaries could be missing outcomes in the January 2014 period, as the comparison sample was identified based on January 2014 data. Outcomes listed here are averaged across all available time periods.

Choice of synthetic control method for analysis

Much of the prior literature examining the impact of Medicaid expansion on patient outcomes has used difference-in-differences (DiD) regression models, which compare changes in outcomes for a treated group versus a comparison group over time. This method requires a key assumption, often referred to as the “parallel trends” assumption, that in the absence of the treatment, outcomes for the treatment group would have changed at the same rate as outcomes in the comparison group. While the parallel trends assumption can never be fully proven in empirical work, a common method of providing evidence for the parallel trends assumption is to compare the trends in key outcomes for the treatment and control groups prior to the onset of treatment. In preliminary analyses of our data, we found that for most of our outcomes, these trends were statistically

Credit Report Data Appendix

different in non-linear ways, making it therefore impossible to implement a DiD analysis for our data. We therefore instead implemented a synthetic control analysis as described in the text of the report.

Counts for baseline and all subgroup analyses

Credit Report Data Appendix Table 4. Population counts for baseline and all subgroup analyses

	Comparison group	2014 cohort	2015 cohort	2016 cohort	2017 cohort
Total N	723,217	334,574	167,006	114,081	88,555
Primary low-bias subgroup (No ED/admissions in period of enrollment)	723,217	295,734	144,134	99,458	76,929
Primary high-bias subgroup (ED/admission in period of enrollment)	723,217	38,840	22,872	14,623	11,626
Secondary low-bias subgroup (No medical debt in collections prior to enrollment)	349,116 (2014) 301,385 (2015) 264,431 (2016) 236,529 (2017)	190,682	87,667	54,149	39,234
Secondary high-bias subgroup (Medical debt in collections prior to enrollment)	374,101 (2014) 421,832 (2015) 458,786 (2016) 486,688 (2017)	143,892	79,339	59,932	49,321
No other coverage subgroup	723,217	175,289	98,086	56,197	42,136
No new bankruptcies subgroup	680,895	303,402	151,901	103,515	80,101

Notes: This table reports N's for the baseline analysis and all subgroup analyses. Note that for all subgroup analyses except the subgroups based on pre-existing medical debt in collections, the total N for the comparison group is the same for each enrollment cohort analysis. For the subgroups based on pre-existing medical debt in collections, the total number of people in the comparison group varied for each enrollment cohort.

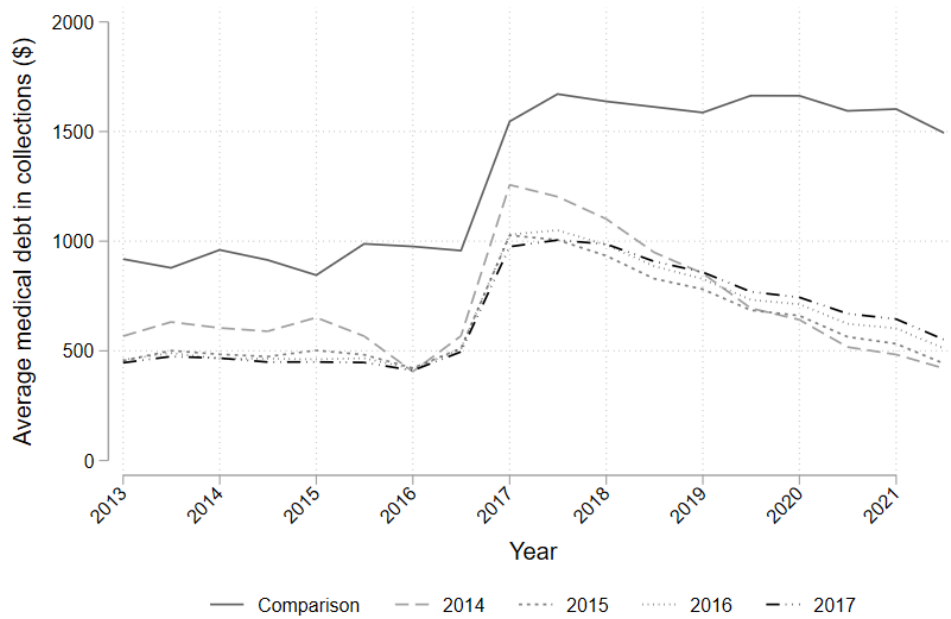
Credit Report Data Appendix

Additional Results

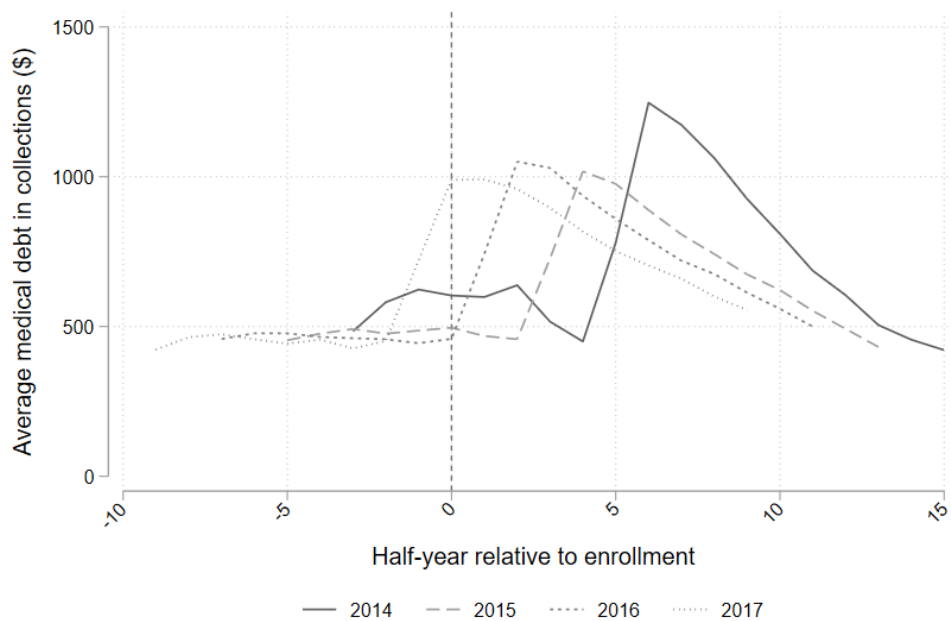
Evaluation question 6.2: How is HMP enrollment related to individual beneficiaries' financial outcomes during and after HMP enrollment?

Descriptive figures for outcomes by comparison and treatment groups

Credit Report Data Appendix Figure 6.2.1. Medical debt in collections (\$) over time

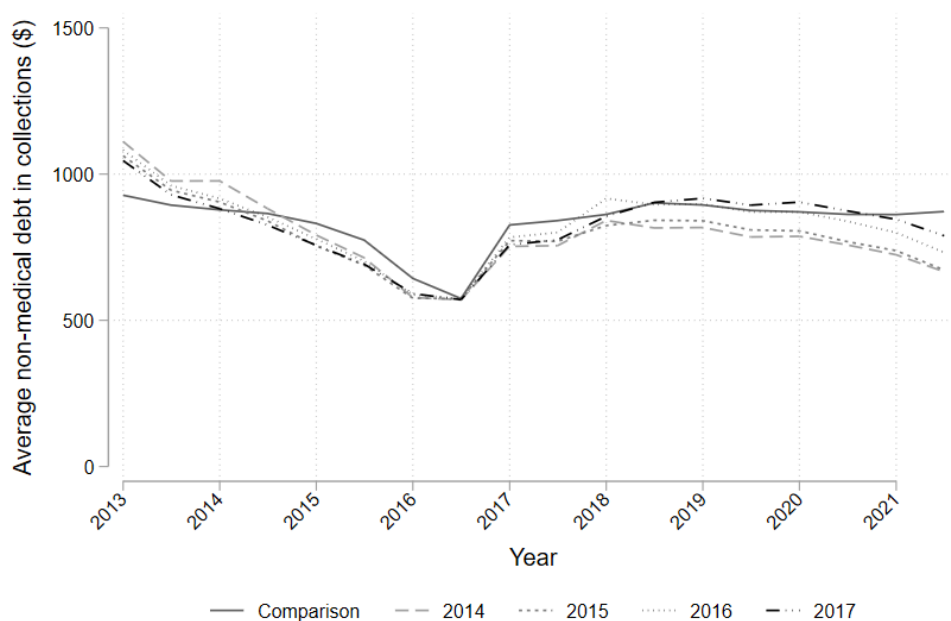


Credit Report Data Appendix Figure 6.2.2. Medical debt in collections (\$) before and after HMP enrollment

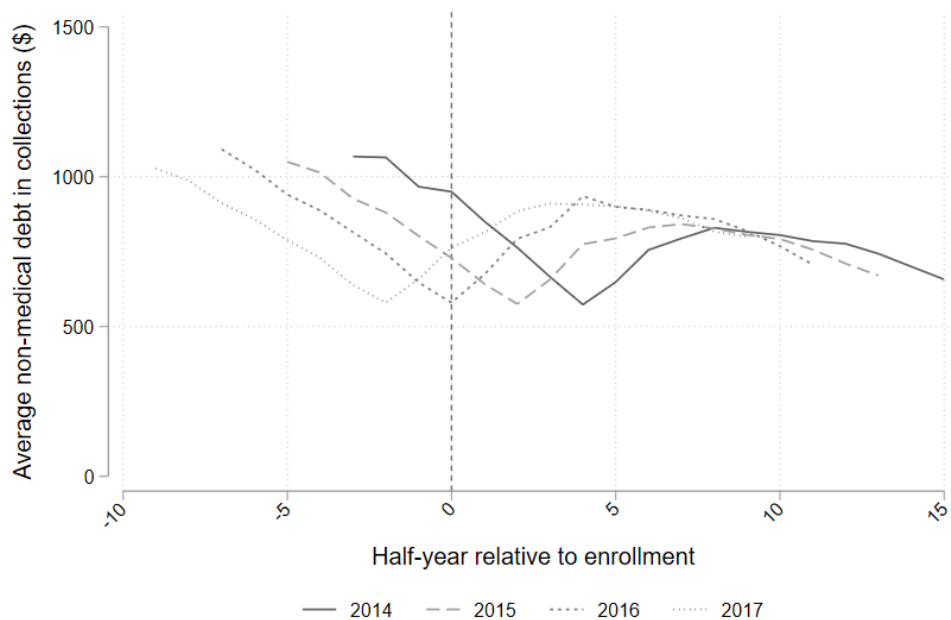


Credit Report Data Appendix

Credit Report Data Appendix Figure 6.2.3. Non-medical debt in collections (\$) over time

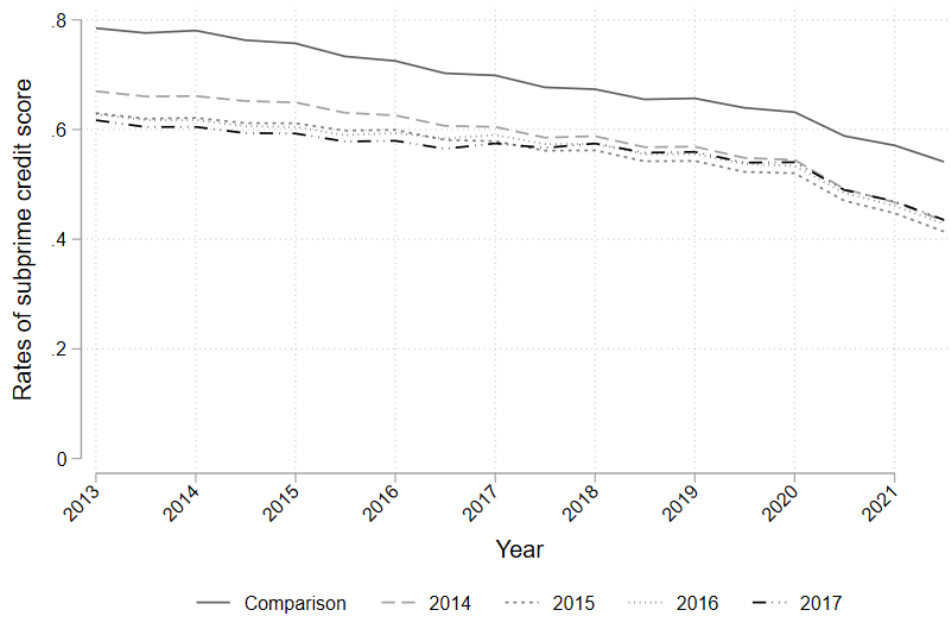


Credit Report Data Appendix Figure 6.2.4. Non-medical debt in collections (\$) before and after HMP enrollment

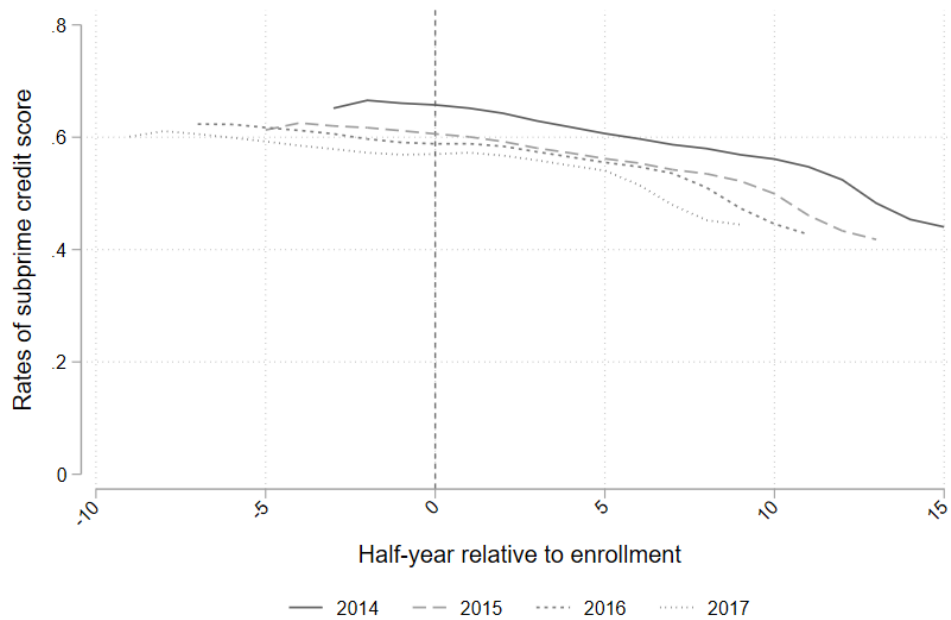


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Credit Report Data Appendix Figure 6.2.5. Subprime credit score (rate) over time

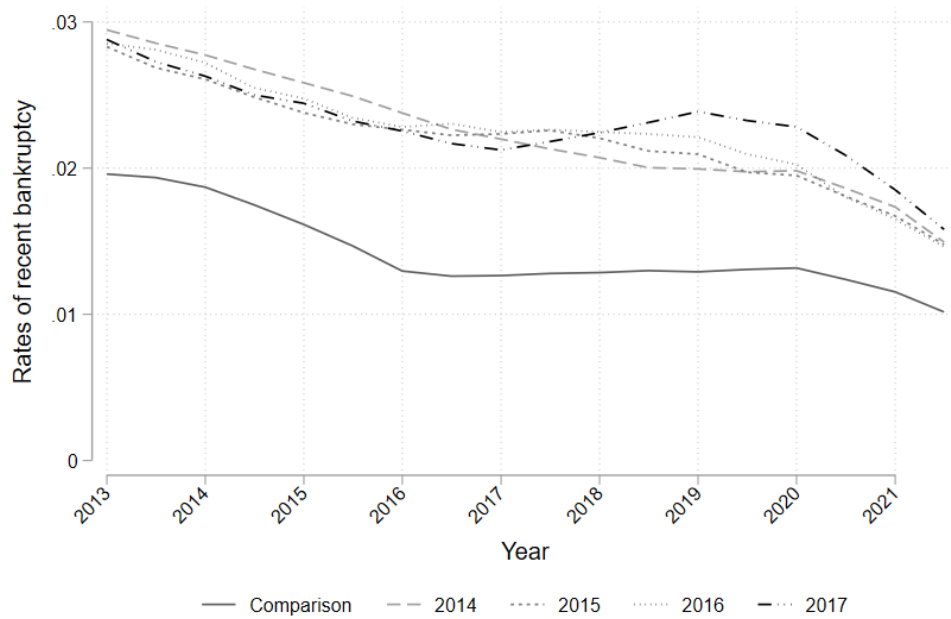


Credit Report Data Appendix Figure 6.2.6. Subprime credit score (rate) before and after HMP enrollment

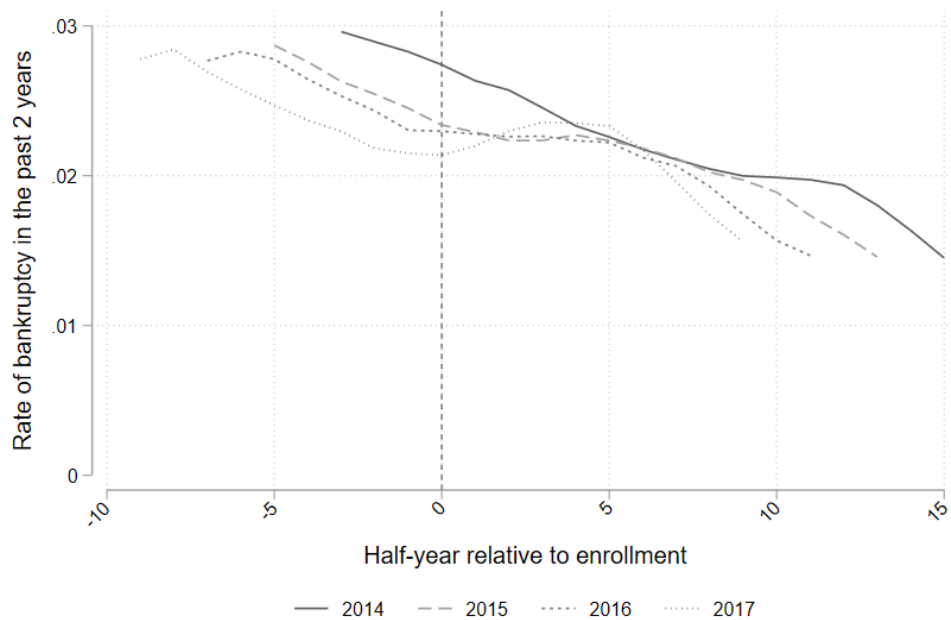


Credit Report Data Appendix

Credit Report Data Appendix Figure 6.2.7. Bankruptcy in the past 2 years over time



Credit Report Data Appendix Figure 6.2.8. Bankruptcy in the past 2 years before and after HMP enrollment



Descriptive outcomes pre- and post-enrollment by enrollment cohort

Credit Report Data Appendix Table 6.2.9. Pre and post-enrollment outcomes for each enrollment cohort and comparison group

	2014 cohort		Comparison group		2015 cohort		Comparison group		2016 cohort		Comparison group		2017 cohort		Comparison group	
	Pre-2014	Post-2014	Pre-2014	Post-2014	Pre-2015	Post-2015	Pre-2015	Post-2015	Pre-2016	Post-2016	Pre-2016	Post-2016	Pre-2017	Post-2017	Pre-2017	Post-2017
Medical debt in collections, \$ (SE)	\$579 (3265.6)	\$738 (3620.1)	\$912 (4301.0)	\$1,524 (6590.4)	\$476 (2914.9)	\$716 (3511.7)	\$914 (4461.4)	\$1,617 (6832.3)	\$461 (3232.1)	\$831 (4201.2)	\$951 (4600.0)	\$1,732 (7176.4)	\$516 (2920.1)	\$811 (3845.2)	\$1,040 (4919.7)	\$1,731 (7182.1)
Non-medical debt in collections, \$ (SE)	\$1,041 (3895.2)	\$783 (5886.6)	\$991 (3322.1)	\$920 (2447.8)	\$922 (3503.2)	\$794 (2268.6)	\$976 (3315.5)	\$922 (2315.0)	\$869 (3538.7)	\$896 (7684.1)	\$927 (3202.9)	\$968 (2252.2)	\$813 (3247.5)	\$945 (2509.6)	\$897 (3018.5)	\$975 (2298.2)
Subprime credit score (< 600), (%)	63.5%	55.3%	74.9%	65.4%	59.3%	51.9%	74.3%	64.3%	58.6%	52.6%	73.2%	63.3%	56.9%	52.2%	72.2%	62.2%
Bankruptcy in past 2 years, (%)	3.2%	2.4%	2.5%	1.6%	2.9%	2.3%	2.4%	1.5%	2.9%	2.3%	2.2%	1.5%	2.8%	2.4%	2.1%	1.5%

Notes: This table shows descriptive unadjusted outcomes for all enrollment cohorts and for their comparison groups pre and post-enrollment. Note that the comparison sample is the same for each enrollment cohort, but the time periods defined as pre- and post-periods change depending on which enrollment cohort it is being compared to. So, for the 2014 enrollment cohort, average pre-enrollment outcomes for the comparison group are defined as pre-2014, and average post-enrollment outcomes are defined as post-2014. Each enrollment cohort's last pre-period observation is the January observation in the year in which they enrolled, and the July observation from that year is omitted.

BRFSS Appendix

Introduction

The BRFSS Appendix includes additional tables related to the methods and results using BRFSS data.

Methodology

Target and comparison populations

BRFSS Appendix Table 1. Baseline sample characteristics, 2013 BRFSS low-income adult respondents ages 18 to 64 in Michigan and comparison states

Characteristics		Michigan % (95% CI)	Other Medicaid expansion states % (95% CI)	Non-expansion states % (95% CI)
N		984	14,742	13,405
Age	18-29	23.85 (20.09, 28.07)	20.31 (18.83, 21.88)	17.49 (16.09, 18.97)
	30-39	20.02 (16.76, 23.73)	24.29 (22.87, 25.77)	24.81 (23.22, 26.48)
	50-64	56.13 (51.85, 60.32)	55.40 (53.65, 57.13)	57.70 (55.86, 59.52)
Gender	Male	44.46 (40.21, 48.79)	45.20 (43.43, 46.98)	43.46 (41.60, 45.34)
	Female	55.54 (51.21, 59.79)	54.80 (53.02, 56.57)	56.54 (54.66, 58.40)
Race/ ethnicity	White non-Hispanic	73.36 (69.29, 77.08)	53.67 (52.03, 55.31)	40.26 (38.71, 41.83)
	Black non-Hispanic	17.74 (14.50, 21.51)	14.08 (12.98, 15.26)	21.55 (20.21, 22.96)
	Hispanic	4.51 (2.92, 6.92)	23.72 (22.04, 25.49)	33.34 (31.57, 35.17)
	Other	4.38 (3.10, 6.16)	8.52 (7.70, 9.42)	4.84 (4.06, 5.76)
Marital status	Married/coupled	59.44 (55.83, 62.96)	61.31 (59.83, 62.77)	67.29 (65.82, 68.73)
Education	No school	0 (0.00, 0.00)	0.65 (0.29, 1.44)	0.76 (0.33, 1.72)
	Less than high school	22.94 (18.91, 27.54)	28.77 (26.96, 30.66)	32.39 (30.54, 34.29)
	High school/GED	36.25 (32.44, 40.24)	35.52 (34.00, 37.07)	34.04 (32.36, 35.77)
	Some college	34.23 (30.39, 38.28)	26.82 (25.40, 28.29)	25.24 (23.81, 26.72)
	College graduate	6.59 (5.27, 8.21)	8.24 (7.51, 9.03)	7.57 (6.79, 8.43)
Annual household income	< \$10,000	18.55 (15.59, 21.92)	17.23 (16.09, 18.43)	16.67 (15.51, 17.91)
	\$10,000 to < \$15,000	17.46	17.18	18.20

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		(14.56, 20.80)	(15.91, 18.54)	(16.83, 19.66)
	\$15,000 to < \$20,000	23.62 (20.16, 27.48)	24.35 (22.80, 25.96)	24.36 (22.88, 25.90)
	\$20,000 to < \$25,000	20.70 (17.37, 24.48)	21.08 (19.67, 22.56)	21.39 (19.81, 23.07)
	\$25,000 to < \$35,000	15.74 (12.86, 19.13)	14.97 (13.75, 16.27)	15.94 (14.53, 17.47)
	\$35,000 to < \$50,000	3.49 (2.10, 5.75)	5.10 (4.32, 6.01)	3.31 (2.65, 4.13)
	\$50,000 to < \$75,000	0.44 (0.12, 1.53)	0.01 (0.01, 0.16)	0.12 (0.01, 0.27)
Employment status	Employed	32.64 (28.77, 36.76)	36.63 (34.95, 38.35)	38.39 (36.54, 40.27)
Sampling mode	Cell phone sample	28.55 (26.44, 30.75)	28.16 (27.25, 29.09)	35.16 (34.17, 36.15)

BRFSS Appendix

BRFSS Appendix Table 2. Baseline sample characteristics, 2019 BRFSS low-income adult respondents ages 18 to 64 in Michigan and comparison states

Characteristics		Michigan % (95% CI)	Other Medicaid expansion states % (95% CI)	Non-expansion states % (95% CI)
N		423	7,236	4,906
Age	18-29	11.96 (8.48, 16.62)	13.38 (11.92, 14.99)	14.65 (12.58, 17.00)
	30-39	21.36 (16.57, 27.08)	25.34 (23.53, 27.24)	25.13 (22.64, 27.80)
	50-64	66.68 (60.60, 72.25)	61.28 (59.22, 63.30)	60.21 (57.20, 63.15)
Gender	Male	43.62 (37.32, 50.13)	45.50 (43.47, 47.54)	41.35 (38.39, 44.37)
	Female	56.38 (49.87, 62.68)	54.50 (47.54, 56.53)	58.65 (55.63, 61.61)
Race/Ethnicity	White non-Hispanic	72.64 (66.74, 77.84)	50.89 (49.00, 52.77)	39.96 (37.56, 42.41)
	Black non-Hispanic	13.63 (9.63, 18.94)	12.46 (11.06, 14.00)	16.30 (14.56, 18.20)
	Hispanic	7.68 (4.62, 12.50)	26.72 (25.08, 28.43)	37.49 (34.50, 40.59)
	Other	6.05 (3.80, 9.52)	9.93 (8.81, 11.18)	6.25 (4.68, 8.29)
Marital status	Married/coupled	78.09 (73.75, 81.89)	80.92 (79.57, 82.19)	83.74 (85.06)
Education	No school	0 (0.00, 0.00)	0.74 (0.39, 1.37)	0.49 (0.27, 0.91)
	Less than high school	20.60 (14.87, 27.82)	29.82 (27.85, 31.87)	34.20 (31.15, 37.40)
	High school/GED	36.45 (30.90, 42.38)	35.91 (34.09, 37.78)	33.18 (30.59, 35.87)
	Some college	28.81 (23.72, 34.50)	24.08 (22.48, 25.76)	22.88 (20.55, 25.40)
	College graduate	14.15 (11.03, 17.96)	9.45 (8.57, 10.41)	9.24 (7.79, 10.94)
Annual household income	< \$10,000	14.92 (11.00, 19.95)	13.59 (12.36, 14.92)	13.23 (11.39, 15.33)
	\$10,000 to < \$15,000	12.16 (8.50, 17.10)	11.82 (10.63, 13.14)	12.77 (10.81, 15.03)
	\$15,000 to < \$20,000	17.82 (13.51, 23.14)	21.76 (20.13, 23.48)	22.74 (20.37, 25.31)
	\$20,000 to < \$25,000	33.56 (27.91, 39.73)	31.66 (29.80, 33.58)	33.45 (30.67, 36.34)
	\$25,000 to < \$35,000	14.04 (10.28, 18.88)	14.63 (13.30, 16.07)	14.16 (11.73, 17.00)
	\$35,000 to < \$50,000	3.80 (2.14, 6.65)	6.27 (5.11, 7.66)	3.52 (2.68, 4.61)
	\$50,000 to < \$75,000	3.69 (1.69, 7.88)	0.27 (0.15, 0.48)	0.12 (0.00, 0.34)
Employment status	Employed	33.76 (28.32, 39.67)	34.85 (32.91, 36.84)	35.73 (32.81, 38.76)
Sampling mode	Cell phone sample	59.33 (55.75, 62.82)	65.59 (64.44, 66.73)	71.67 (70.23, 73.05)

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BRFSS Appendix Table 3. Baseline sample characteristics, 2020 BRFSS low-income adult respondents ages 18 to 64 in Michigan and comparison states

Characteristics		Michigan % (95% CI)	Other Medicaid expansion states % (95% CI)	Non-expansion states % (95% CI)
N		259	6,431	4,220
Age	18-29	16.82 (11.40, 24.13)	13.59 (12.10, 15.23)	14.37 (12.13, 16.93)
	30-39	24.86 (18.89, 31.97)	26.06 (23.87, 28.38)	23.57 (21.02, 26.33)
	50-64	58.32 (50.75, 65.51)	60.35 (57.98, 62.67)	62.06 (58.86, 65.16)
Gender	Male	42.86 (35.43, 50.64)	42.49 (40.28, 44.73)	43.29 (40.25, 46.39)
	Female	57.14 (49.36, 64.57)	57.51 (55.27, 59.72)	56.71 (53.61, 59.75)
Race/Ethnicity	White non-Hispanic	68.53 (60.89, 75.28)	52.76 (50.64, 54.87)	38.58 (36.06, 41.17)
	Black non-Hispanic	15.93 (10.50, 23.44)	12.17 (10.83, 13.65)	18.38 (16.26, 20.71)
	Hispanic	7.64 (4.42, 12.88)	25.92 (23.82, 28.14)	37.82 (34.83, 40.90)
	Other	7.90 (4.95, 12.37)	9.15 (8.11, 10.31)	5.22 (4.06, 6.70)
Marital status	Married/coupled	78.39 (73.52, 82.58)	82.44 (81.16, 83.65)	84.09 (82.68, 85.41)
Education	No school	0.00 (0.00, 0.00)	0.71 (0.34, 1.47)	1.18 (0.51, 2.73)
	Less than high school	22.58 (15.88, 31.08)	27.69 (25.30, 30.21)	29.88 (26.79, 33.15)
	High school/GED	33.20 (26.38, 40.81)	34.69 (32.70, 36.73)	36.29 (33.24, 39.45)
	Some college	34.25 (27.42, 41.80)	27.03 (25.12, 29.03)	24.90 (22.41, 27.57)
	College graduate	9.96 (6.93, 14.12)	9.88 (8.90, 10.96)	7.76 (6.61, 9.09)
Annual household income	< \$10,000	9.13 (5.97, 13.72)	12.46 (11.21, 13.84)	14.13 (11.98, 16.61)
	\$10,000 to < \$15,000	12.76 (8.80, 18.16)	11.22 (10.06, 12.50)	12.44 (10.73, 14.37)
	\$15,000 to < \$20,000	20.74 (14.62, 28.57)	22.76 (20.98, 24.64)	24.30 (21.64, 27.16)
	\$20,000 to < \$25,000	34.06 (27.16, 41.72)	34.21 (31.96, 36.54)	30.24 (27.44, 33.20)
	\$25,000 to < \$35,000	13.52 (8.74, 20.33)	14.36 (12.65, 16.26)	15.10 (12.64, 17.95)
	\$35,000 to < \$50,000	9.25 (5.65, 14.77)	4.70 (3.80, 5.80)	3.61 (2.76, 4.72)
	\$50,000 to < \$75,000	0.54 (0.18, 1.64)	0.28 (0.16, 0.51)	0.18 (0.01, 0.57)
Employment status	Employed	26.21 (20.06, 33.46)	32.69 (30.68, 34.76)	31.39 (28.48, 34.46)
Sampling mode	Cell phone sample	68.36 (63.67, 72.70)	69.98 (68.75, 71.18)	71.33 (69.77, 72.85)

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BRFSS Appendix Table 4. Baseline sample characteristics, 2021 BRFSS low-income adult respondents ages 18 to 64 in Michigan and comparison states

Characteristics		Michigan % (95% CI)	Other Medicaid expansion states % (95% CI)	Non-expansion states % (95% CI)
N		267	5,609	3,187
Age	18-29	10.29 (5.87, 17.43)	13.22 (11.48, 15.18)	15.29 (12.43, 18.66)
	30-39	29.25 (22.80, 36.66)	28.83 (26.43, 31.35)	25.27 (22.15, 28.66)
	50-64	60.46 (52.67, 67.75)	57.95 (55.40, 60.46)	59.44 (55.74, 63.05)
Gender	Male	49.63 (41.99, 57.28)	46.36 (43.74, 49.00)	42.39 (38.88, 45.97)
	Female	50.37 (42.72, 58.01)	53.64 (51.00, 56.26)	57.61 (54.03, 61.12)
Race/Ethnicity	White non-Hispanic	65.21 (57.95, 71.84)	51.73 (49.43, 54.03)	39.65 (36.84, 42.54)
	Black non-Hispanic	17.20 (12.14, 23.79)	10.02 (8.73, 11.48)	18.55 (16.36, 20.96)
	Hispanic	11.47 (7.17, 17.87)	29.02 (26.64, 31.53)	35.75 (32.17, 39.49)
	Other	6.12 (3.80, 9.69)	9.22 (8.22, 10.34)	6.05 (4.57, 7.96)
Marital status	Married/coupled	84.13 (80.41, 87.25)	87.12 (85.93, 88.22)	86.92 (85.40, 88.30)
Education	No school	0.00 (0.00, 0.00)	0.47 (0.26, 0.86)	0.84 (0.20, 3.42)
	Less than high school	23.06 (16.12, 31.85)	27.67 (24.94, 30.58)	30.97 (27.31, 34.88)
	High school/GED	34.73 (27.81, 42.37)	36.08 (33.72, 38.51)	32.97 (29.74, 36.37)
	Some college	30.25 (23.89, 37.47)	25.45 (23.60, 27.40)	26.30 (23.43, 29.39)
	College graduate	11.96 (8.66, 16.30)	10.33 (9.32, 11.42)	8.92 (7.52, 10.56)
Annual household income	< \$10,000	11.07 (7.05, 16.96)	9.31 (8.08, 10.71)	9.62 (7.92, 11.65)
	\$10,000 to < \$15,000	9.02 (5.95, 13.46)	8.79 (7.77, 9.92)	11.23 (9.27, 13.55)
	\$15,000 to < \$20,000	10.02 (6.17, 15.87)	14.85 (13.20, 16.68)	14.84 (12.67, 17.31)
	\$20,000 to < \$25,000	21.89 (16.45, 28.52)	21.96 (20.11, 23.93)	21.24 (18.21, 24.61)
	\$25,000 to < \$35,000	36.77 (29.55, 44.65)	32.69 (30.14, 35.33)	31.98 (28.45, 35.74)
	\$35,000 to < \$50,000	11.22 (7.47, 16.52)	11.96 (10.09, 14.11)	10.78 (8.42, 13.71)
	\$50,000 to < \$75,000	0.00 (0.00, 0.00)	0.44 (0.31, 0.63)	0.30 (0.14, 0.65)
Employment status	Employed	33.95 (26.85, 41.85)	36.26 (33.66, 38.94)	33.28 (29.79, 36.95)
Sampling mode	Cell phone sample	69.56 (65.38, 73.44)	76.67 (75.44, 77.86)	73.56 (71.90, 75.16)

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BRFSS Appendix Table 5. Baseline sample characteristics, 2022 BRFSS low-income adult respondents ages 18 to 64 in Michigan and comparison states

Characteristics		Michigan % (95% CI)	Other Medicaid expansion states % (95% CI)	Non-expansion states % (95% CI)
N		231	4,849	2,982
Age	18-29	14.47 (8.06, 24.61)	13.68 (11.46, 16.24)	14.25 (11.31, 17.80)
	30-39	27.76 (21.14, 35.52)	28.11 (25.94, 30.40)	29.94 (26.86, 33.22)
	50-64	57.77 (48.96, 66.12)	58.21 (55.55, 60.82)	55.81 (52.21, 59.34)
Gender	Male	41.06 (32.94, 49.70)	43.29 (40.75, 45.85)	42.31 (38.84, 45.86)
	Female	58.94 (50.30, 67.06)	56.71 (54.15, 59.25)	57.69 (54.14, 61.16)
Race/Ethnicity	White non-Hispanic	64.64 (55.48, 72.83)	45.89 (43.46, 48.34)	39.89 (36.99, 42.86)
	Black non-Hispanic	9.33 (5.84, 14.58)	10.56 (8.58, 12.93)	16.92 (14.95, 19.08)
	Hispanic	8.42 (4.31, 15.81)	30.64 (28.50, 32.87)	36.61 (33.32, 40.04)
	Other	17.62 (11.11, 26.79)	12.91 (11.32, 14.69)	6.58 (4.90, 8.78)
Marital status	Married/coupled	80.29 (72.63, 86.22)	88.98 (87.96, 89.92)	88.27 (86.84, 89.56)
Education	No school	0.00 (0.00, 0.00)	0.64 (0.36, 1.14)	1.05 (0.46, 2.38)
	Less than high school	18.15 (11.03, 28.41)	28.07 (25.67, 30.60)	28.89 (25.70, 32.30)
	High school/GED	40.87 (32.90, 49.36)	35.82 (33.39, 38.33)	33.99 (31.00, 37.10)
	Some college	29.92 (22.85, 38.10)	25.47 (23.07, 28.04)	25.28 (22.21, 28.61)
	College graduate	11.06 (8.02, 15.07)	9.99 (8.90, 11.20)	10.80 (8.98, 12.93)
Annual household income	< \$10,000	8.77 (5.56, 13.57)	11.40 (9.85, 13.17)	11.80 (9.69, 14.28)
	\$10,000 to < \$15,000	7.84 (5.43, 11.18)	6.94 (5.91, 8.12)	7.60 (5.96, 9.65)
	\$15,000 to < \$20,000	13.80 (9.60, 19.44)	13.44 (11.84, 15.23)	16.98 (14.55, 19.71)
	\$20,000 to < \$25,000	26.70 (19.27, 35.74)	22.94 (20.73, 25.30)	23.31 (20.23, 26.69)
	\$25,000 to < \$35,000	27.63 (20.68, 35.85)	33.74 (31.20, 36.38)	30.29 (27.38, 33.37)
	\$35,000 to < \$50,000	12.05 (6.91, 20.18)	10.50 (9.13, 12.04)	9.85 (8.10, 11.94)
	\$50,000 to < \$75,000	3.21 (1.15, 8.65)	1.04 (0.61, 1.76)	0.17 (0.01, 0.41)
Employment status	Employed	33.98 (26.52, 42.32)	36.86 (34.43, 39.36)	37.90 (34.36, 41.56)
Sampling mode	Cell phone sample	65.42 (58.90, 71.41)	80.55 (79.13, 81.90)	78.53 (76.87, 80.11)

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Additional Results

Evaluation question 1.1: How has the health and healthy behavior engagement among Michigan adults changed since introduction of HMP and its Healthy Behaviors Incentives Program?

BRFSS Appendix Table 1.1.1. Pre/Post changes in health and health behavior outcomes among low-income adults ages 18 to 64 in Michigan before and after the Healthy Behaviors Incentives Program implementation in 2014

Outcome	Years	Pre-Post change ¹ (95% CI)	<i>p</i> value
Excellent/very good health	2022 vs. 2013	3.42 (-4.12, 10.95)	0.37
Number of days with poor physical health in past 30 days	2022 vs. 2013	-1.78 (-3.63, 0.07)	0.06
Number of days with poor mental health in past 30 days	2022 vs. 2013	-0.55 (-2.47, 1.36)	0.57
Functional limitations due to poor physical or mental health (number of days per month)	2022 vs. 2013	0.80 (-2.19, 3.78)	0.60
Quit smoking in past year	2020 vs. 2013	-3.00 (-18.81, 12.81)	0.71
Current smoker	2022 vs. 2013	-8.42 (-16.74, -0.10)	0.05
Binge drinking ²	2022 vs. 2013	-0.16 (-7.36, 7.05)	0.97
Heavy drinking	2022 vs. 2013	-1.34 (-4.47, 1.78)	0.40
Any physical activity	2022 vs. 2013	-0.80 (-9.45, 7.84)	0.86
Physical activity - min/week	2019 vs. 2013	54.27 (-20.65, 129.20)	0.16
Fruit intake - times per day	2019 vs. 2013	0.05 (-0.06, 0.16)	0.37
Vegetable intake - times per day	2019 vs. 2013	-0.04 (-0.10, 0.02)	0.16
Had a routine checkup in past year	2022 vs. 2013	19.35 (11.16, 27.55)	< 0.001
Ever had blood cholesterol screening	2021 vs. 2013	7.89 (2.58, 13.20)	0.004
Ever received a HIV test	2022 vs. 2013	-5.98 (-15.73, 3.77)	0.23
Received a HIV test in past year	2022 vs. 2013	-2.79 (-8.30, 2.71)	0.32
Colorectal cancer screening ³	2022 vs. 2012	11.36 (-2.55, 25.26)	0.11
Mammogram screening ⁴	2022 vs. 2012	8.29 (-7.77, 24.36)	0.31
Cervical cancer screening ⁵	2020 vs. 2012	0.10 (-10.35, 10.54)	0.99
Had a flu shot in past year	2022 vs. 2013	9.02 (-0.46, 18.50)	0.06

¹Post-regression average marginal effects were used to estimate the pre to post changes in outcomes using regression estimates from the difference-in-differences models with 2013 or 2012 designated as the pre-period year and either 2019, 2020, 2021, or 2022 designated as the final post-period year, depending on data availability of the variable.

²Binge drinking was defined as males having five or more drinks on one occasion, females having four or more drinks on one occasion in the past 30 days.

³Colorectal screening was recommended for individuals aged 50-75 years. Respondents were considered adherent to colorectal cancer screening guidelines if they had a stool test in the last year, sigmoidoscopy in the last 5 years, or colonoscopy in the last 10 years.

⁴Mammogram screening was recommended for women aged 50-75 years. Women were considered adherent to mammogram screening if they received a mammogram in the last 2 years.

⁵Cervical screening was recommended for women 21-65 years old. However, due to age coding in BRFSS, we applied the guidelines to women aged 25-65 years old. Women under age 30 were considered adherent to cervical cancer screening guidelines if they received a pap smear in the last 3 years. Women aged 30-65 years old were considered adherent to cervical cancer screening guidelines if they received a pap smear in the last 5 years. The BRFSS cervical cancer screening questions changed in 2022 and are no longer comparable, so estimates after 2020 are omitted.

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BRFSS Appendix Table 1.1.2. Difference-in-Difference analysis comparing low-income adults ages 18 to 64 in Michigan to low-income adults ages 18 to 64 in other Medicaid expansion states and non-expansion states before and after HMP implementation in 2014⁹

Outcome	Year	Michigan	Other Medicaid expansion states	Non-expansion states	Difference-in-Difference (DID) ¹			
		% / # of days/ minutes per week / times per day (95% CI)	% / # of days/ minutes per week / times per day (95% CI)	% / # of days/ minutes per week / times per day (95% CI)	DID (95% CI) - Other Medicaid expansion states	p value	DID (95% CI) - Non expansion states	p value
Excellent/very good health %	2013	69.95 (66.38, 73.51)	67.96 (66.46, 69.46)	66.54 (64.94, 68.15)	NA	NA	NA	NA
	2014	72.98 (68.13, 77.83)	68.48 (67.14, 69.83)	65.99 (64.30, 67.68)	NA	NA	NA	NA
	2015	64.19 (58.94, 69.44)	68.38 (66.77, 70.00)	66.94 (64.94, 68.95)	-6.18 (-12.90, 0.54)	0.07	-6.16 (-13.00, 0.69)	0.08
	2016	67.65 (62.88, 72.41)	68.07 (66.49, 69.66)	67.19 (65.08, 69.30)	-2.41 (-8.75, 3.93)	0.46	-2.94 (-9.46, 3.57)	0.38
	2017	67.45 (62.35, 72.56)	64.89 (63.25, 66.53)	66.98 (64.47, 69.49)	0.57 (-6.04, 7.19)	0.87	-2.93 (-9.84, 3.97)	0.41
	2018	66.51 (60.84, 72.19)	65.81 (64.10, 67.52)	64.99 (62.48, 67.51)	-1.28 (-8.36, 5.79)	0.72	-1.88 (-9.22, 5.45)	0.62
	2019	63.44 (57.74, 69.14)	64.65 (62.79, 66.51)	63.37 (60.67, 66.06)	-3.20 (-10.33, 3.94)	0.38	-3.33 (-10.75, 4.09)	0.38
	2020	75.80 (69.33, 82.27)	73.37 (71.56, 75.19)	73.64 (70.91, 76.37)	0.44 (-7.31, 8.19)	0.91	-1.24 (-9.28, 6.79)	0.76
	2021	73.11 (66.52, 79.70)	73.67 (71.70, 75.64)	69.74 (66.39, 73.09)	-2.54 (-10.43, 5.35)	0.53	-0.03 (-8.39, 8.33)	> 0.99
	2022	73.36 (66.72, 80.00)	69.46 (67.14, 71.79)	67.30 (64.37, 70.23)	1.91 (-6.12, 9.94)	0.64	2.66 (-5.58, 10.90)	0.53
Number of days with poor physical health in past 30 days	2013	7.41 (6.28, 8.55)	6.68 (6.28, 7.07)	6.31 (5.87, 6.76)	NA	NA	NA	NA
	2014	6.57 (5.20, 7.93)	6.47 (6.07, 6.87)	5.94 (5.48, 6.41)	NA	NA	NA	NA
	2015	7.45 (6.10, 8.81)	6.30 (5.88, 6.71)	5.99 (5.45, 6.54)	0.42 (-1.44, 2.28)	0.66	0.36 (-1.55, 2.26)	0.71
	2016	7.71 (6.04, 9.38)	7.01 (6.50, 7.52)	6.41 (5.82, 7.00)	-0.04 (-2.15, 2.08)	0.97	0.20 (-1.96, 2.35)	0.86
	2017	6.64 (5.40, 7.89)	6.68 (6.27, 7.10)	5.92 (5.11, 6.72)	-0.78 (-2.55, 1.00)	0.39	-0.38 (-2.30, 1.55)	0.70
	2018	6.68 (5.43, 7.93)	7.17 (6.62, 7.72)	6.74 (6.08, 7.41)	-1.23 (-3.05, 0.60)	0.19	-1.16 (-3.04, 0.71)	0.22
	2019	7.63 (6.14, 9.12)	7.27 (6.71, 7.83)	6.06 (5.41, 6.72)	-0.38 (-2.37, 1.61)	0.71	0.46 (-1.58, 2.50)	0.66
	2020	5.96 (4.42, 7.50)	5.61 (5.13, 6.09)	5.02 (4.28, 5.76)	-0.38 (-2.40, 1.63)	0.71	-0.16 (-2.27, 1.94)	0.88
	2021	4.80 (3.51, 6.10)	5.54 (4.98, 6.10)	5.52 (4.79, 6.24)	-1.47 (-3.32, 0.39)	0.12	-1.81 (-3.74, 0.11)	0.07
	2022	5.64 (4.18, 7.10)	6.54 (5.91, 7.18)	6.15 (5.28, 7.02)	-1.64 (-3.64, 0.36)	0.11	-1.61 (-3.71, 0.48)	0.13
Number of days with poor mental health in past 30 days	2013	7.06 (6.11, 8.02)	7.05 (6.54, 7.56)	6.01 (5.58, 6.43)	NA	NA	NA	NA
	2014	8.22 (6.73, 9.72)	6.36 (6.02, 6.70)	5.94 (5.50, 6.38)	NA	NA	NA	NA
	2015	7.41 (6.01, 8.81)	6.24 (5.82, 6.66)	5.47 (5.04, 5.91)	1.15 (-0.67, 2.98)	0.22	0.88 (-0.93, 2.68)	0.34

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	2016	7.29 (5.93, 8.64)	6.16 (5.74, 6.58)	5.08 (4.60, 5.56)	1.11 (-0.67, 2.90)	0.22	1.15 (-0.63, 2.93)	0.21
	2017	7.48 (5.92, 9.04)	6.42 (6.03, 6.82)	5.17 (4.64, 5.70)	1.04 (-0.90, 2.98)	0.29	1.25 (-0.69, 3.20)	0.21
	2018	7.93 (6.46, 9.39)	6.25 (5.81, 6.69)	6.64 (5.87, 7.41)	1.66 (-0.21, 3.54)	0.08	0.23 (-1.74, 2.19)	0.82
	2019	7.30 (5.70, 8.90)	6.73 (6.25, 7.21)	5.82 (5.22, 6.43)	0.56 (-1.43, 2.55)	0.58	0.42 (-1.58, 2.42)	0.68
	2020	7.65 (5.68, 9.62)	6.58 (6.07, 7.09)	5.79 (5.01, 6.58)	1.05 (-1.25, 3.36)	0.37	0.80 (-1.56, 3.17)	0.51
	2021	6.95 (5.35, 8.55)	6.52 (5.99, 7.04)	6.58 (5.68, 7.47)	0.41 (-1.59, 2.42)	0.69	-0.69 (-2.80, 1.42)	0.52
	2022	6.51 (4.84, 8.17)	5.86 (5.35, 6.36)	7.23 (6.29, 8.16)	0.64 (-1.41, 2.69)	0.54	-1.78 (-3.95, 0.40)	0.11
Functional limitations due to poor physical or mental health (# of days per month)	2013	7.95 (6.66, 9.25)	7.39 (6.89, 7.90)	7.77 (7.22, 8.31)	NA	NA	NA	NA
	2014	7.64 (6.20, 9.09)	7.62 (7.05, 8.19)	7.44 (6.86, 8.03)	NA	NA	NA	NA
	2015	8.94 (7.38, 10.49)	6.97 (6.47, 7.47)	7.54 (6.82, 8.26)	1.41 (-0.74, 3.55)	0.20	1.21 (-1.01, 3.43)	0.29
	2016	7.35 (5.65, 9.05)	7.75 (7.16, 8.34)	8.52 (7.69, 9.35)	-0.96 (-3.24, 1.32)	0.41	-1.36 (-3.72, 1.00)	0.26
	2017	8.56 (6.58, 10.54)	8.37 (7.83, 8.91)	7.34 (6.45, 8.22)	-0.37 (-2.85, 2.10)	0.77	1.04 (-1.55, 3.62)	0.43
	2018	7.94 (6.38, 9.52)	8.56 (7.76, 9.37)	8.53 (7.70, 9.36)	-1.17 (-3.43, 1.07)	0.31	-0.77 (-3.04, 1.50)	0.51
	2019	8.55 (6.77, 10.33)	9.14 (8.39, 9.89)	8.46 (7.53, 9.39)	-1.16 (-3.53, 1.22)	0.34	-0.10 (-2.55, 2.36)	0.94
	2020	8.98 (6.28, 11.69)	8.74 (8.04, 9.44)	7.68 (6.57, 8.78)	-0.31 (-3.43, 2.80)	0.84	1.12 (-2.13, 4.37)	0.50
	2021	8.80 (6.41, 11.19)	8.77 (7.88, 9.67)	8.81 (7.03, 10.58)	-0.53 (-3.44, 2.38)	0.72	-0.19 (-3.49, 3.11)	0.91
	2022	8.75 (6.05, 11.44)	7.59 (6.90, 8.28)	7.89 (6.87, 8.92)	0.60 (-2.51, 3.70)	0.71	0.67 (-2.54, 3.88)	0.68
Quit smoking in past year % ²	2013	63.80 (56.92, 70.68)	63.55 (60.95, 66.14)	65.52 (62.66, 68.38)	NA	NA	NA	NA
	2014	58.48 (48.31, 68.64)	63.14 (60.33, 65.94)	68.39 (65.14, 71.64)	NA	NA	NA	NA
	2015	66.50 (57.52, 75.49)	61.60 (58.55, 64.66)	63.86 (59.83, 67.89)	4.64 (-7.36, 16.64)	0.45	4.36 (-7.98, 16.71)	0.49
	2016	62.49 (53.38, 71.61)	60.92 (57.68, 64.16)	65.72 (61.61, 69.84)	1.32 (-10.84, 13.47)	0.83	-1.51 (-13.98, 10.96)	0.81
	2017	64.72 (55.89, 73.56)	59.72 (56.41, 63.04)	61.38 (56.20, 66.57)	4.75 (-7.22, 16.71)	0.44	5.06 (-7.60, 17.73)	0.43
	2018	65.50 (56.03, 74.98)	57.81 (54.38, 61.25)	61.20 (55.84, 66.57)	7.44 (-5.04, 19.91)	0.24	6.02 (-7.17, 19.22)	0.37
	2019	61.63 (50.15, 73.10)	61.46 (57.82, 65.10)	62.88 (57.89, 67.87)	-0.09 (-14.20, 14.01)	0.99	0.47 (-14.10, 15.03)	0.95
	2020	60.80 (46.57, 75.04)	54.70 (50.55, 58.85)	56.38 (50.77, 61.99)	5.84 (-10.71, 22.39)	0.49	6.14 (-10.88, 23.16)	0.48
Binge drinking ³ %	2013	13.66 (10.80, 16.52)	15.21 (13.70, 16.71)	11.63 (10.46, 12.80)	NA	NA	NA	NA
	2014	18.21 (13.20, 23.21)	13.48 (12.29, 14.66)	12.25 (10.95, 13.55)	NA	NA	NA	NA
	2015	10.96 (7.23, 14.70)	13.22 (11.82, 14.61)	10.69 (9.27, 12.11)	-0.71 (-5.84, 4.43)	0.79	-1.76 (-6.81, 3.29)	0.50
	2016	16.90 (12.57, 21.23)	13.32 (11.98, 14.67)	11.70 (9.94, 13.46)	5.12 (-0.45, 10.69)	0.07	3.16 (-2.44, 8.77)	0.27

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	2017	12.89 (8.94, 16.84)	13.09 (11.74, 14.44)	12.66 (10.77, 14.56)	1.35 (-3.93, 6.63)	0.62	-1.80 (-7.17, 3.56)	0.51
	2018	18.01 (13.33, 22.69)	12.22 (10.90, 13.55)	12.84 (10.98, 14.69)	7.33 (1.49, 13.18)	0.01	3.14 (-2.77, 9.05)	0.30
	2019	9.06 (5.65, 12.48)	12.84 (11.35, 14.33)	14.32 (11.59, 17.04)	-2.23 (-7.16, 2.70)	0.38	-7.28 (-12.64, -1.93)	0.01
	2020	13.32 (6.92, 19.72)	12.38 (10.84, 13.92)	11.56 (9.26, 13.87)	2.48 (-4.85, 9.81)	0.51	-0.28 (-7.75, 7.19)	0.94
	2021	13.81 (8.06, 19.56)	11.42 (9.73, 13.12)	11.24 (8.63, 13.86)	3.93 (-2.88, 10.74)	0.26	0.53 (-6.50, 7.57)	0.88
	2022	13.50 (6.89, 20.12)	13.64 (11.12, 16.16)	13.72 (10.67, 16.76)	1.41 (-6.37, 9.19)	0.72	-2.24 (-10.15, 5.67)	0.58
Any physical activity %	2013	68.17 (64.12, 72.23)	65.27 (63.54, 67.00)	60.59 (58.68, 62.50)	NA	NA	NA	NA
	2014	63.15 (57.72, 68.57)	66.54 (65.05, 68.03)	62.49 (60.65, 64.33)	NA	NA	NA	NA
	2015	64.32 (58.28, 70.36)	65.85 (64.01, 67.69)	62.30 (60.01, 64.59)	-4.44 (-12.14, 3.26)	0.26	-5.57 (-13.43, 2.30)	0.17
	2016	68.35 (63.50, 73.20)	65.23 (63.52, 66.95)	60.05 (57.51, 62.59)	0.21 (-6.56, 6.98)	0.95	0.72 (-6.36, 7.79)	0.84
	2017	64.62 (59.13, 70.12)	64.10 (62.23, 65.97)	59.85 (56.83, 62.87)	-2.38 (-9.67, 4.90)	0.52	-2.82 (-10.52, 4.89)	0.47
	2018	65.92 (60.37, 71.47)	62.88 (61.01, 64.75)	61.78 (58.88, 64.68)	0.14 (-7.19, 7.46)	0.97	-3.45 (-11.15, 4.25)	0.38
	2019	60.83 (54.57, 67.09)	60.41 (58.35, 62.48)	62.40 (59.44, 65.35)	-2.49 (-10.42, 5.44)	0.54	-9.15 (-17.39, -0.90)	0.03
	2020	69.67 (62.39, 76.96)	62.62 (60.44, 64.79)	57.94 (54.75, 61.13)	4.15 (-4.64, 12.93)	0.36	4.15 (-4.98, 13.27)	0.37
	2021	62.14 (54.81, 69.47)	64.37 (61.91, 66.84)	63.40 (59.70, 67.10)	-5.13 (-14.03, 3.76)	0.26	-8.84 (-18.20, 0.51)	0.06
	2022	67.37 (59.73, 75.01)	64.17 (61.53, 66.81)	65.25 (61.99, 68.50)	0.30 (-8.91, 9.50)	0.95	-5.46 (-14.90, 3.97)	0.26
Physical activity - min/week ⁴	2013	254.00 (221.30, 286.71)	221.20 (209.26, 233.15)	207.61 (195.45, 219.77)	NA	NA	NA	NA
	2015	274.97 (223.07, 326.88)	245.97 (230.45, 261.49)	204.39 (190.85, 217.93)	-3.80 (-68.24, 60.64)	0.91	24.19 (-39.82, 88.19)	0.46
	2017	265.20 (207.06, 323.34)	241.92 (226.75, 257.10)	207.01 (188.21, 225.81)	-9.53 (-79.02, 59.97)	0.79	11.79 (-58.56, 82.15)	0.74
	2019	308.28 (240.89, 375.67)	242.76 (225.59, 259.94)	238.12 (218.38, 258.87)	32.72 (-45.13, 110.56)	0.41	23.76 (-54.94, 102.47)	0.55
Vegetable intake - times per day ⁴	2013	0.35 (0.32, 0.39)	0.34 (0.33, 0.36)	0.35 (0.34, 0.37)	NA	NA	NA	NA
	2015	0.36 (0.31, 0.41)	0.36 (0.34, 0.38)	0.35 (0.33, 0.37)	-0.01 (-0.07, 0.05)	0.74	0.01 (-0.05, 0.07)	0.77
	2017	0.34 (0.29, 0.38)	0.34 (0.32, 0.35)	0.36 (0.34, 0.39)	-0.01 (-0.07, 0.05)	0.78	-0.02 (-0.09, 0.04)	0.49
	2019	0.31 (0.27, 0.36)	0.33 (0.31, 0.35)	0.37 (0.33, 0.40)	-0.03 (-0.09, 0.03)	0.35	-0.05 (-0.12, 0.01)	0.12
Had a routine checkup in past year %	2013	61.04 (56.80, 65.28)	58.58 (56.82, 60.34)	61.32 (59.50, 63.14)	NA	NA	NA	NA
	2014	68.36 (63.13, 73.59)	61.48 (59.86, 63.11)	60.66 (58.78, 62.53)	NA	NA	NA	NA
	2015	76.57 (71.42, 81.71)	64.25 (62.44, 66.06)	61.21 (58.96, 63.47)	9.86 (2.73, 16.99)	0.007	15.64 (8.37, 22.91)	<0.001
	2016	66.97 (61.83, 72.12)	64.93 (63.17, 66.69)	62.24 (59.66, 64.82)	-0.41 (-7.53, 6.70)	0.91	5.02 (-2.36, 12.40)	0.18

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	2017	69.53 (64.06, 75.01)	65.92 (64.18, 67.65)	63.58 (60.73, 66.42)	1.16 (-6.19, 8.51)	0.76	6.24 (-1.46, 13.95)	0.11
	2018	76.62 (71.33, 81.90)	73.56 (71.87, 75.25)	71.13 (68.44, 73.82)	0.60 (-6.60, 7.80)	0.87	5.78 (-1.74, 13.29)	0.13
	2019	73.61 (67.58, 79.65)	72.43 (70.51, 74.36)	70.00 (67.22, 72.78)	-1.27 (-9.10, 6.55)	0.75	3.90 (-4.19, 11.99)	0.35
	2020	77.10 (70.27, 83.93)	71.58 (69.42, 73.75)	67.69 (64.54, 70.84)	3.06 (-5.44, 11.57)	0.48	9.70 (0.88, 18.52)	0.03
	2021	80.78 (74.80, 86.77)	70.34 (67.87, 72.80)	66.53 (62.69, 70.38)	7.99 (0.06, 15.93)	0.05	14.54 (6.06, 23.01)	0.001
	2022	80.39 (73.37, 87.40)	72.10 (69.79, 74.40)	68.21 (64.79, 71.63)	5.83 (-2.86, 14.53)	0.19	12.47 (3.40, 21.53)	0.007
Ever had blood cholesterol screening ⁵ %	2013	87.22 (83.36, 91.08)	80.55 (78.31, 82.79)	83.98 (82.19, 85.78)	NA	NA	NA	NA
	2015	90.54 (86.31, 94.76)	83.96 (82.27, 85.65)	79.93 (77.44, 82.43)	-0.09 (-6.46, 6.28)	0.98	7.37 (0.87 13.86)	0.03
	2017	96.47 (93.58, 99.37)	91.35 (89.91, 92.78)	93.95 (92.34, 95.57)	-1.54 (-7.05, 3.97)	0.58	-0.71 (-6.11, 4.68)	0.80
	2019	91.87 (87.33, 96.41)	92.96 (91.49, 94.43)	92.50 (90.16, 94.83)	-7.76 (-14.29, -1.22)	0.02	-3.86 (-10.51, 2.79)	0.26
	2021	95.11 (91.46, 98.75)	89.54 (87.20, 91.88)	91.84 (88.71, 94.96)	-1.10 (-7.31, 5.12)	0.73	0.04 (-6.38, 6.45)	0.99
Ever received an HIV test %	2013	46.25 (42.17, 50.34)	44.71 (42.94, 46.48)	50.07 (48.13, 52.01)	NA	NA	NA	NA
	2014	53.42 (47.97, 58.86)	43.64 (42.01, 45.28)	48.74 (46.82, 50.66)	NA	NA	NA	NA
	2015	49.82 (43.67, 55.97)	43.58 (41.63, 45.54)	49.45 (47.06, 51.85)	4.69 (-3.15, 12.53)	0.24	4.18 (-3.82, 12.18)	0.31
	2016	48.12 (42.86, 53.39)	44.62 (42.73, 46.52)	47.88 (45.34, 50.41)	1.96 (-5.19, 9.11)	0.59	4.06 (-3.32, 11.45)	0.28
	2017	53.20 (47.39, 59.02)	45.62 (43.61, 47.63)	49.45 (46.35, 52.74)	6.04 (-1.56, 13.63)	0.12	7.48 (-0.55, 15.50)	0.07
	2018	51.53 (45.46, 57.60)	44.37 (42.38, 46.37)	49.34 (46.26, 52.41)	5.61 (-2.18, 13.40)	0.16	6.01 (-2.16, 14.18)	0.15
	2019	47.52 (41.32, 53.73)	46.31 (44.22, 48.41)	56.82 (53.66, 59.97)	-0.34 (-8.25, 7.58)	0.93	-5.47 (-13.77, 2.82)	0.20
	2020	45.50 (37.44, 53.55)	42.70 (40.34, 45.05)	51.77 (48.47, 55.08)	1.25 (-8.25, 10.75)	0.80	-2.46 (-12.27, 7.35)	0.62
	2021	51.75 (43.73, 59.77)	43.86 (41.08, 46.63)	44.85 (41.06, 48.64)	6.35 (-3.23, 15.94)	0.19	10.72 (0.76, 20.68)	0.04
	2022	40.27 (31.42, 49.12)	42.55 (39.68, 45.43)	44.05 (40.37, 47.72)	-3.82 (-14.14, 6.49)	0.47	0.04 (-10.55, 10.64)	0.99
Received an HIV test in past year %	2013	11.23 (8.28, 14.18)	13.60 (12.22, 14.98)	15.50 (13.98, 17.03)	NA	NA	NA	NA
	2014	15.87 (11.33, 20.42)	13.87 (12.63, 15.10)	15.96 (14.48, 17.45)	NA	NA	NA	NA
	2015	16.27 (11.06, 21.47)	14.22 (12.77, 15.67)	17.86 (15.89, 19.83)	4.41 (-1.90, 10.72)	0.17	2.67 (-3.81, 9.15)	0.42
	2016	9.35 (6.25, 12.45)	11.88 (10.63, 13.14)	15.28 (13.32, 17.24)	-0.17 (-4.84, 4.50)	0.94	-1.66 (-6.61, 3.29)	0.51
	2017	13.69 (8.98, 18.41)	13.02 (11.64, 14.41)	17.53 (14.92, 20.14)	3.04 (-2.86, 8.93)	0.31	0.44 (-5.89, 6.77)	0.89
	2018	12.27 (7.09, 17.46)	13.47 (12.02, 14.93)	15.53 (13.31, 17.75)	1.17 (-5.13, 7.46)	0.72	1.02 (-5.89, 7.56)	0.76
	2019	11.04 (6.30, 15.78)	14.36 (12.79, 15.94)	19.37 (16.64, 22.10)	-0.95 (-6.91, 5.01)	0.75	-4.06 (10.45, 2.34)	0.21
	2020	14.35 (7.33, 21.36)	11.40 (9.83, 12.97)	14.19 (11.57, 16.81)	5.32 (-2.58, 13.21)	0.19	4.43 (-3.77, 12.62)	0.29

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	2021	13.84 (7.64, 20.03)	9.79 (8.28, 11.30)	12.46 (9.38, 15.53)	6.42 (-0.74, 13.58)	0.08	5.65 (-2.02, 13.32)	0.15
	2022	8.44 (3.79, 13.09)	11.28 (9.30, 13.27)	12.22 (9.57, 14.86)	-0.48 (-6.49, 5.54)	0.88	0.49 (-5.80, 6.79)	0.88
Colorectal cancer screening ⁶ %	2012	52.69 (46.16, 59.21)	48.96 (46.63, 51.30)	41.03 (38.06, 44.01)	NA	NA	NA	NA
	2014	53.37 (45.45, 61.30)	49.67 (47.19, 52.15)	46.12 (43.14, 49.09)	NA	NA	NA	NA
	2016	50.84 (42.67, 59.01)	50.59 (47.81, 53.37)	48.90 (44.81, 52.99)	-3.47 (-14.54, 7.60)	0.54	-9.71 (-21.33, 1.91)	0.10
	2018	68.95 (60.83, 77.06)	55.46 (52.52, 58.39)	51.74 (47.36, 56.12)	9.77 (-1.30, 20.84)	0.08	5.55 (-6.13, 17.23)	0.35
	2020	64.76 (51.51, 78.00)	60.89 (57.74, 64.04)	59.42 (54.87, 63.97)	0.15 (-15.13, 15.42)	0.99	-6.31 (-22.05, 9.42)	0.43
	2022	64.04 (51.77, 76.32)	54.18 (48.66, 59.70)	54.84 (49.58, 60.10)	6.15 (-9.00, 21.29)	0.43	-2.45 (-17.61, 12.72)	0.75
Mammogram screening ⁷ %	2012	68.11 (61.05, 75.18)	65.07 (62.44, 67.69)	60.71 (56.64, 64.77)	NA	NA	NA	NA
	2014	73.41 (64.67, 82.14)	66.33 (63.42, 69.24)	66.40 (62.89, 69.91)	NA	NA	NA	NA
	2016	69.70 (58.73, 80.67)	68.47 (65.19, 71.76)	67.41 (62.17, 72.65)	-1.82 (-15.53, 11.88)	0.79	-5.12 (-19.76, 9.52)	0.49
	2018	82.07 (73.67, 90.47)	68.43 (64.30, 72.55)	69.44 (64.65, 74.23)	10.60 (-1.42, 22.61)	0.08	5.23 (-7.42, 17.78)	0.42
	2020	75.01 (62.12, 87.90)	70.37 (66.60, 74.14)	68.30 (62.97, 73.63)	1.59 (-13.81, 16.99)	0.84	-0.70 (-16.85, 15.46)	0.93
	2022	76.41 (61.98, 90.84)	65.62 (59.08, 72.16)	63.23 (56.12, 70.35)	7.74 (-9.81, 25.28)	0.39	5.77 (-12.27, 23.80)	0.53
Cervical cancer screening ⁸ %	2012	80.29 (75.56, 85.02)	80.50 (78.96, 82.05)	80.39 (78.33, 82.45)	NA	NA	NA	NA
	2014	79.52 (73.38, 85.65)	81.80 (80.16, 83.43)	79.11 (76.87, 81.36)	NA	NA	NA	NA
	2016	81.57 (75.88, 87.27)	81.02 (79.11, 82.93)	79.46 (76.60, 82.33)	0.76 (-7.04, 8.56)	0.85	2.22 (-5.98, 10.42)	0.60
	2018	87.48 (81.74, 93.22)	81.74 (79.52, 83.95)	75.18 (70.57, 79.79)	5.95 (-1.96, 13.87)	0.14	12.40 (3.42, 21.39)	0.007
	2020	80.39 (71.08, 89.70)	76.41 (72.03, 80.79)	77.56 (72.89, 82.23)	4.19 (-7.24, 15.62)	0.47	2.93 (-8.70, 14.56)	0.62
Had a flu shot in past year %	2013	28.57 (24.65, 32.50)	31.10 (29.41, 32.79)	28.65 (26.86, 30.45)	NA	NA	NA	NA
	2014	29.06 (23.99, 34.12)	32.00 (30.50, 33.51)	28.07 (26.33, 29.81)	NA	NA	NA	NA
	2015	27.97 (22.22, 33.72)	33.62 (31.80, 35.44)	29.27 (27.11, 31.44)	-3.13 (-10.52, 4.26)	0.41	-1.23 (-8.74, 6.28)	0.75
	2016	25.46 (20.83, 30.09)	31.71 (29.99, 33.43)	27.08 (24.73, 29.43)	-3.73 (-10.26, 2.81)	0.26	-1.54 (-8.29, 5.22)	0.66
	2017	33.73 (28.22, 39.24)	34.30 (32.36, 36.24)	31.98 (28.96, 35.00)	1.96 (-5.28, 9.19)	0.60	1.83 (-5.79, 9.46)	0.64
	2018	22.70 (17.85, 27.55)	28.85 (27.02, 30.68)	21.01 (18.86, 23.16)	-3.62 (-10.34, 3.10)	0.29	1.78 (-5.07, 8.62)	0.61
	2019	29.78 (23.89, 35.66)	32.38 (30.47, 34.28)	31.12 (27.98, 34.25)	-0.07 (-7.59, 7.44)	0.99	-1.26 (-9.20, 6.68)	0.76
	2020	39.11 (31.01, 47.21)	35.17 (32.79, 37.55)	30.25 (27.30, 33.20)	6.46 (-3.00, 15.93)	0.18	8.94 (-0.70, 18.59)	0.07
	2021	34.71 (27.05, 42.37)	32.59 (30.26, 34.92)	26.89 (23.67, 30.12)	4.64 (-4.44, 13.72)	0.32	7.90 (-1.47, 17.27)	0.10

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	2022	37.59 (28.96, 46.22)	32.94 (30.15, 35.73)	26.84 (23.67, 30.00)	7.17 (-2.85, 17.20)	0.16	10.80 (0.68, 20.99)	0.04
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¹Difference-in-differences analyses included an interaction term between group (three-level state categories: MI vs. other Medicaid expansion states and MI vs. non-expansion states) and year, controlling for age, gender, race/ethnicity, marital status, education, income, employment status, cell phone sample status, and state fixed effects. Each outcome was included as the dependent variable in separate regression models. Post-regression average marginal effects were used to estimate the difference-in-differences comparing Michigan with the comparison state groups, with 2013 or 2012 designated as the pre-period year and either 2019, 2020, 2021, or 2022 designated as the final post-period year, depending on data availability of the variable.

²Michigan did not participate in the smoking cessation module in 2021 and 2022. Data for these years are not presented.

³Binge drinking was defined as males having five or more drinks on one occasion, females having four or more drinks on one occasion in the past 30 days.

⁴Question was asked every odd numbered year. Data only available up to 2019.

⁵Question was asked every odd numbered year.

⁶Colorectal screening was recommended for individuals aged 50-75 years. Respondents were considered adherent to colorectal cancer screening guidelines if they had a stool test in the last year, sigmoidoscopy in the last 5 years, or colonoscopy in the last 10 years. Question was asked every even numbered year in Michigan.

⁷Mammogram screening was recommended for women aged 50-75 years. Women were considered adherent to mammogram screening if they received a mammogram in the last 2 years. Question was asked every even numbered year in Michigan.

⁸Cervical screening was recommended for women 21-65 years old. However, due to age coding in BRFSS, we applied the guidelines to women aged 25-65 years old. Women under age 30 were considered adherent to cervical cancer screening guidelines if they received a pap smear in the last 3 years. Women aged 30-65 years old were considered adherent to cervical cancer screening guidelines if they received a pap smear in the last 5 years. The BRFSS cervical cancer screening questions changed in 2022 and are no longer comparable, so estimates after 2020 are omitted. Question was asked every even numbered year.

⁹The following variables from Appendix 1.1.1. were excluded from this table due to a lack of parallel trends between 2011 and 2013: current smoker, heavy drinking, and fruit intake. Violation of the parallel trends assumption was defined as a p value of < 0.05 from a Wald test for parallel trends.