Fact sheet:
U-M Health System programs offering circulatory support technology

The new U-M Center for Circulatory Support builds on over 20 years of U-M experience in this field.

In that time, nearly 400 U-M heart patients have been treated on an emergency basis using ECMO, or extracorporeal membrane oxygenation, a technology perfected at the U-M and now in use worldwide for short-term support.

For heart patients, ECMO brings the blood from the heart out of the body and into a pumping machine that can also oxygenate blood before it returns to the body. The U-M's first pediatric ECMO cardiac patient was treated in 1981, and the first adult cardiac patient in 1985. ECMO is also used to oxygenate the blood of patients whose lungs have failed, but whose hearts are intact. ECMO pioneer Robert Bartlett, M.D., professor of surgery and chief of surgical critical care at the U-M, is a key participant in the new Center for Circulatory Support.

In addition to ECMO, nearly 170 other U-M patients have been treated in the last decade using other devices that provide emergency or long-term circulatory support. Over 100 adult U-M patients have received the implantable HeartMate device, either in clinical trials or since the device was approved by the FDA in 1998. HeartMates are pumps that surgeons place in the patient's abdomen and connect to the heart. They take over for the left ventricle, the heart chamber that pumps blood to the body. The device is powered by a battery worn on the patient's belt, enabling patients to return home and resume many daily activities.

The HeartMates is used in patients who are waiting for a heart transplant, as a "bridge" to transplant, and in patients who don't qualify for the transplant list, as a "destination" therapy. Based on successful studies done at U-M and elsewhere, Medicare and other insurers now cover them. And doctors and nurses from hospitals nationwide come to the U-M to be trained in HeartMate care.

Recently, the U-M became one of only 10 centers in the nation to test the next-generation HeartMate device, called HeartMate II. Four of the 25 Americans who received the HeartMate II in this nationwide pilot study were U-M patients. The device is much smaller than the original HeartMate and can therefore be implanted in teenagers and smaller adults.

Dozens more U-M patients of all ages have had their lives sustained by the Thoratec Ventricular Assist Device, which is used in intensive-care units as a temporary bridge to transplant or recovery.

Another 12 U-M patients have been treated using the TandemHeart pVAD device and the U-M was one of the leading centers in clinical testing of this device. Approved by the FDA in 2003, the TandemHeart device does not require open-chest surgery to help support blood circulation. Rather, it is connected to the patient's heart through a tiny incision in the thigh, and a thin tube that snakes up into the heart. The procedure can be done by interventional cardiologists in the same kind of facility where heart catheterizations and angioplasties are performed. Often, patients will go on to further treatment after being stabilized while on the TandemHeart.

Another device that is deployed in the same minimally invasive way, the Orqis cardiac recovery system, is currently in clinical trials at U-M and seven other centers. It pushes blood that has already been pumped by a weak heart but needs a boost to reach the rest of the body. Mauro Moscucci, M.D., director of interventional cardiology at the U-M, is part of the team that is helping to found the new center. He anticipates that more circulatory support devices that don't require open-chest surgery will be available for testing and use soon.

For both adults and young patients, U-M offers the DeBakey VAD, a miniature device that is available for children waiting for a transplant through a humanitarian exemption from the FDA, and is in clinical trials for adults. Two years ago, U-M doctors implanted the first DeBakey VAD in an American child, under a special FDA exemption. Pediatric cardiac surgeon Eric Devaney, M.D., of the Michigan Congenital Heart Center, led the surgical team and has implanted two other patients.