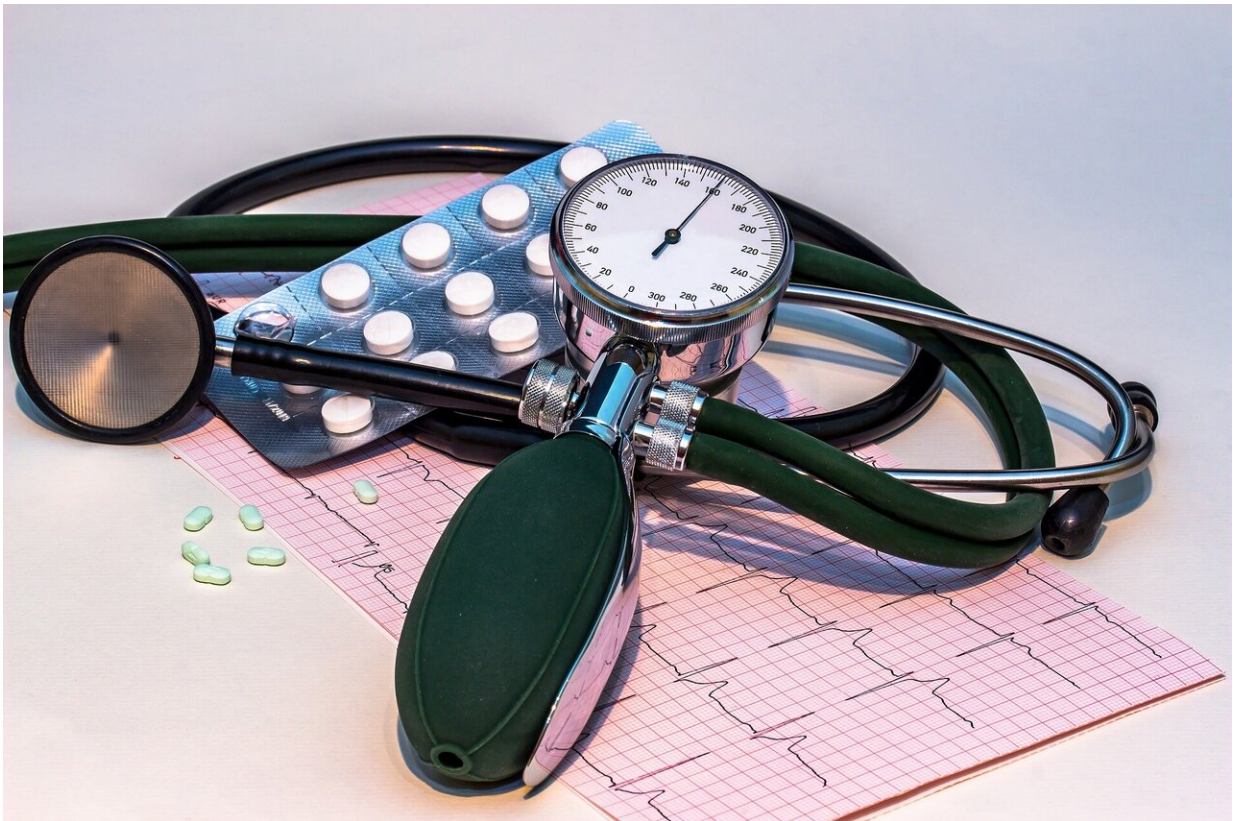


# Beyond borders: Preventing and treating high blood pressure in Haiti

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People living in Haiti have long been known for their resilience—through political turmoil, natural disasters, and harrowing poverty. Looming health problems also affect many of the 11 million

residents who call this Latin American country home. Almost [1 in 3](#) adults, including many under 30, in Port-au-Prince, Haiti's capital, have high blood pressure, or hypertension. Yet, few have resources to control it.

The result, this confluence of risks, has been concerning. Hypertension is the number one risk factor for [cardiovascular disease](#), the leading cause of preventable deaths in Haiti. The same is [true globally](#): In 2021, 10 million cardiovascular-related deaths were attributed to raised [systolic blood pressure](#).

As part of a global effort to reverse these trends, researchers established the population-based [Haiti Cardiovascular Disease \(CVD\) Cohort](#), an [observational study](#) of 3,000 people from Port-au-Prince. The study began in 2019 and is the first to chart cardiovascular [disease](#) in the country—its incidence, modifiable [risk factors](#), and complexities. Already, it is rendering critical insights that could lead to pivotal interventions.

The findings, the researchers explain, are designed to inform those next steps.

"You've got this early-onset hypertension epidemic that no one has treated," said Margaret McNairy, M.D., a senior investigator for the study and an associate professor of medicine at Weill Cornell Medicine Center for Global Health. "This is accelerating cardiovascular aging and resulting in premature, preventable cardiovascular disease, which is primarily heart failure."

McNairy noted that the number of 18-30-year-olds living with hypertension in Haiti is two to four times greater than the number of young Black adults living with hypertension in the United States. And while 97% of adults in Haiti have been screened for [high blood pressure](#),

only 13% of adults have it under control.

The study aims to change that. Participants share their medical history and undergo physical exams, health behavior surveys, laboratory tests, cardiac imaging, and have home health visits with community health workers. Additionally, samples of their blood, urine, and stool go into a biobank. Researchers can then analyze cardiovascular risk factors, events, and their association with the participants' socioeconomic lives and environment, such as their exposure to pollution, stress, or financial difficulty.

"Nobody else is looking at this," said Vanessa Rouzier, M.D., a senior GHESKIO study investigator and assistant professor of pediatrics in medicine at Weill Cornell Medicine. "The study enables us to have data that is otherwise nonexistent."

## **A heart disease epidemic with surprises**

As the study progresses, researchers are finding that [heart disease](#) looks different in Haiti compared to the United States and from existing modeling estimates for other low-income countries. For example, approximately 12% of study participants have heart failure, which is 18 times higher than current estimates and five times higher than in the U.S. Conversely, less than 2% of adults in Port-au-Prince are affected by ischemic heart disease, which researchers predicted would be the leading cause of death.

McNairy explained that prior estimates of cardiovascular disease subtypes in Haiti came from modeling estimates from other countries where it's more common for people to die from heart attacks and stroke. By understanding these differences, researchers will be better equipped to address underlying risks. For now, McNairy said, one thing is clear: "In countries like Haiti, which still have extreme poverty, heart disease

looks like a different epidemic."

Some of the risk factors driving disease in Haiti are also different. One of the goals of the Haiti CVD Cohort was to identify poverty-related risk factors that disproportionately affect residents and are associated with early-onset heart disease—and that could be addressed through future interventions. Pollution and [food insecurity](#) have already emerged as two.

The research showed, for example, that [more than 70%](#) of adults living in Port-au-Prince have detectable levels of lead in their blood compared to 1% of people living in the U.S. No level of lead exposure is considered safe, but 42% of adults in the study with detectable lead levels had elevated amounts.

The researchers also found that adults in Port-au-Prince with the highest blood lead levels also had higher blood pressure levels—an average 2 mm Hg higher—compared to those with smaller amounts. The researchers did not identify sources of lead exposure in the study, but predict that common sources came from water or lead in soil, paint, cookware, or gasoline.

Additionally, [more than 80%](#) of participants in the study, many of whom earn less than \$1 a day, struggle with having enough to eat. As a result, nutritious foods like fruits and vegetables, which are more expensive, are often [limited](#) and replaced with foods high in sugar, salt, and oil, which can contribute to hypertension and [obesity](#), both risk factors for heart disease.

Figuring out how to get better care to residents, McNairy said, is key. "If we can intervene earlier in the life course, it's all about prevention and then treatment."

## **Bringing hypertension care to communities**

In response, through a small pilot study, community health workers stopped by to see 100 participants with uncontrolled hypertension every few months. They often met in backyard courtyards of communities. In this safe and convenient space, they provided blood pressure readings, treatment, and health education to participants and their families.

After six months, 72 of the 100 people in the pilot study had gotten their blood pressure under control. "We provided education," Rouzier said. "It sounds simple, but it made a huge difference."

Now, based on their findings, the researchers are studying other ways to personalize cardiovascular disease risk screenings, prevention, and treatment. They are doing this in collaboration with the Haitian College of Cardiology, the Ministry of Health, and local physicians and public health experts.

"Sometimes an intervention is not always one-size-fits-all, so keeping in mind the environment in which hypertension needs to be addressed is important," said Makeda Williams, Ph.D., M.P.H., the global health program director for NHLBI, who works closely with the Center for Translation Research and Implementation Science (CTRIS).

## **Investing in local cardiovascular disease research**

The pooled cohort equation (PCE) is one example of a tailored risk-prediction tool being studied by researchers in Haiti. This online calculator uses criteria, such as a person's cholesterol, blood pressure, and blood sugar, to estimate their 10-year risk for developing atherosclerosis, a narrowing or hardening of the arteries. Physicians in the U.S. use the PCE to quickly calculate cardiovascular disease risks for

adults ages 40 and older. If they see a patient has moderate to elevated risks, they can discuss options for prevention and treatment.

In Haiti, the PCE would need to be updated to include predicting risks for complications from hypertension, including heart failure, as opposed to events like heart attacks, that result from limited or blocked blood flow. Risk factors such as poverty, lack of social support, lead exposure, and other social determinants of health, would also be more predictive of heart disease for Haitian adults, compared to risk factors like diabetes and smoking, that are more common in the U.S.

"You want to make sure that these interventions, medications, and strategies are applicable to the populations that they are being used in," said Mary Masterson, Ph.D., a program director within the CTRIS Implementation Science branch focused on global and domestic health disparities research. She explains cardiovascular disease treatment guidelines in the U.S. don't always transfer to other settings.

The Haiti CVD Cohort researchers have also been studying how combining medication for high blood pressure and cholesterol into one pill, called a polypill, could help adults with elevated risks better access treatment. An initial [review](#) found this approach, if implemented with other preventive efforts, could reduce one-third—148,000—of the number of cardiovascular events in Haiti within five years.

To translate these findings into practice, the researchers started the Cardiovascular Disease Implementation Network, an extension of the Haiti CVD Cohort. Some doctors immediately began ordering lab tests to screen patients for elevated lead exposure. Others have participated in training for advanced cardiac imaging to better detect risks for heart problems, including [heart failure](#).

This approach expands and leverages successful research networks

created 40 years ago to prevent and treat HIV. In the 1980s, about 8% of people living in Haiti were affected by HIV. Today, it's less than 2%.

The researchers underscored that while the two conditions are different, the scientific approach to understanding the disease burden and designing evidence-based interventions for local implementation are nearly identical.

"We're doing this to change lives," McNairy said. "We hope that we're not just a model for Haiti, but that Haiti is a model for understanding the larger, global picture."

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