

## A hidden hazard of rural living

Say “rural living,” and it summons up an image of ruddy-cheeked good health. Could it be that living in the country is actually hazardous to your health? “Could be,” says Dartmouth’s Timothy Lahey, M.D., “if you also happen to be infected with HIV.”

He and colleagues in the Section of Infectious Diseases identified two cohorts of HIV-positive patients in New England—317 in locales with a mean population of about 79,000 people (meeting the definition of urban set in 2004 by the federal government) and 327 in locales of less than 10,000 (areas considered rural). The two groups were followed from 1995 to 2005. All 644 patients were seen more than once in Dartmouth-Hitchcock clinics by clinicians in the same multidisciplinary group, which included infectious disease physicians and a full support staff of HIV-AIDS specialists.

**Adjustments:** Yet despite the fact that all received the same care, mortality was clearly higher in the rural group. Adjustments for age, sex, race, HIV risk factors, year of diagnosis, travel time, lack of insurance, and treatment regimen had no effect on the result. The investigators, who published their findings in *AIDS Research and Human Retroviruses*, are at a loss regarding the reasons why.

But they believe it’s reasons—plural—rather than a single explanation. Their data does help to separate the more likely from the less likely contributing causes. It is possible, for example, that living in a remote area might limit patients’ access to high-quality health care. Or that the stigma associated with AIDS might impel HIV-positive patients to seek a distant provider for privacy reasons. Some variables—such as frequency of appointments, patient migration patterns, and patient income—were not evaluated but might also play important roles.

However, Lahey suspects the urban-rural differential may not necessarily be disease-specific. He speculates that the same result might be found for any disease with high mortality and a complicated treatment regimen, such as cancer or heart disease. If that is the case, then identifying the exact causes of the increased mortality in rural HIV patients would make it possible to design appropriate interventions that might apply to a wide variety of diseases. In other words, says Lahey, his rural HIV patients may be like canaries in a coal mine in their vulnerability to poor health outcomes.

**Future studies:** Lahey also points out that “in New England, there are often vast differences between two communities that might both be considered ‘rural’ by the government criterion—such as the difference between Hanover, N.H., and Colebrook, N.H. It is very difficult to capture such differences in a study of this kind.” But, he says, there are more sophisticated tools—such as the Rural-Urban Commuting Area system, a 10-point scale—that the group may use in future studies to try to refine such distinctions.

**Lahey suspects the differential may not be disease-specific.**

ROGER P. SMITH, PH.D.



JON GILBERT FOX

**Brown, right—with O’Connor, left, and Malenka—created a risk-prediction tool.**

## Reducing risk in the CABG patch

One of the most common surgeries in the U.S. is a coronary artery bypass graft (CABG). If the arteries supplying the heart are blocked, healthy blood vessels can be harvested from elsewhere in the body and grafted onto the heart. But though half a million CABGs are performed each year, the procedure carries a risk of kidney failure. There have long been ways to predict renal failure in patients who already had kidney problems. Dartmouth researchers have now developed a way to predict post-CABG renal failure in patients whose kidneys were working just fine before surgery.

**Function:** “Three percent of [patients] with normal kidney function going into surgery are walking out with severe renal dysfunction,” explains Jeremiah Brown, Ph.D., lead author of the paper in *Circulation* that reported the method. “It’s a problem we need to address.”

Brown’s team—which included cardiologist David Malenka, M.D.; epidemiologist Gerald O’Connor, Ph.D., Sc.D.; and others—collected data on 11,301 patients. All had had CABGs between 2001 and 2005 at hospitals in the Northern New England Cardiovascular Disease Study Group, a consortium cofounded by O’Connor in 1987.

The new renal failure model calculates risk based on the sum of point values assigned to various patient characteristics. The team identified two key risk factors: congestive heart failure and the use during the CABG of an emergency intra-aortic balloon pump—a tiny balloon inserted in the aorta to help the heart pump blood. Other risk factors include being over 70 and female, having had a prior CABG, and having an elevated white-blood-cell count, diabetes, peripheral vascular disease, or hypertension. “The unfortunate issue,” says Brown, “is that very few of these variables are modifiable.”

Nevertheless the prediction tool is expected to help. “When we recognize that a patient is at increased risk for post-procedural renal dysfunction, there are a variety of changes we can make in their care to minimize that risk,” says Malenka, including carefully monitoring the patient’s kidneys after surgery.

AMANDA THORNTON