

Geography is destiny in deaths from kidney failure, study shows

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This image shows a cross section of a kidney. Credit: Holly Fischer/Wikipedia

The notion that geography often shapes economic and political destiny has long informed the work of economists and political scholars. Now a study led by medical scientists at Johns Hopkins reveals how geography also appears to affect the very survival of people with end-stage kidney

disease in need of dialysis.

"If you are a person with kidney failure in Texas you're in trouble, but if you're in New England you're golden, and that's profoundly troubling because the quality of care shouldn't be predicated on your ZIP code," says senior investigator Mahmoud Malas, M.D., M.H.S., an associate professor of surgery at the Johns Hopkins University School of Medicine.

A report on the findings, published online June 24 in *JAMA Surgery*, maps out the geographic gaps in end-stage kidney care and—researchers believe for the first time—quantifies the difference in death risk stemming from such regional disparities.

Tracking nearly 465,000 people with end-stage [kidney disease](#) who started dialysis in the United States between 2006 and 2011, Malas and team found that the likelihood of getting the right kind of dialysis access ranged from 11 to 22 percent, depending on where a person lived, a disparity that added up to as much as 30 percent difference in risk of dying.

In addition, the analysis showed that no region met the target rate of treating at least half of its [patients](#) with the recommended form of dialysis, one done by creating a surgical access in the patient's arm by stitching an artery to a vein. This method, known as AV fistula, makes it far less likely that a patient will develop life-threatening bloodstream infections and blood clots.

Other forms of dialysis—those that involve accessing a patient's bloodstream through a catheter in the chest or via the abdomen—carry a notably higher risk of deadly complications, Malas and team say.

Dialysis is a life-sustaining therapy that cleans a person's blood once a

patient's kidneys can no longer do so. A decade-old initiative, Fistula First, developed by professional societies and federal agencies calls for at least half of all patients with kidney failure to get their first dialysis using this approach.

Overall, New England and the Pacific Northwest had the highest scores, with one in five patients getting fistula-based dialysis. Florida, Texas and Southern California had the lowest scores, with slightly more than one in nine patients receiving fistula-based treatment. Not surprisingly, the researchers note, mortality and survival followed the same geographic pattern, with patients in the high-scoring areas having a nearly 30 percent lower risk of dying, on average, compared with those in the bottom-scoring regions.

"Dialysis with an AV fistula is superior to other methods and offers a dramatic survival advantage," says lead author Devin Zarkowsky, M.D., who conducted the research as a surgery resident at Johns Hopkins and is now a chief resident at the Dartmouth-Hitchcock Medical Center in New Hampshire. "The fact that fewer than one in five people start dialysis with a fistula is a real public health concern."

People with end-stage kidney disease typically need dialysis three times a week. Because it takes between six and eight weeks for the AV fistula to heal and function well, it cannot be created on an emergency basis. This makes the timing of diagnosing end-stage kidney disease critical, the research team says. Once people get too sick and their kidneys start to shut down, the only way to initiate dialysis is to place a central venous catheter in the chest, a lifesaving emergency approach, but one that carries serious risk of infection and clotting.

"Survival in end-stage kidney disease depends on several factors, but we know dialysis access type is a key component in improving outcomes and reducing death risk," Malas says.

Indeed, a previous study led by Malas, also reported in *JAMA Surgery*, showed that [death risk](#) can be cut by 35 percent with the use of fistula-based dialysis, compared with central venous catheter in the chest.

In the current study, receiving care from a kidney specialist, or a nephrologist, was the most potent factor in getting the right type of treatment. Patients who were seeing a nephrologist were 11 times more likely to get fistula-based dialysis than those followed by a general practitioner. Nearly three-quarters of patients in top-performing New England were under the care of a nephrologist. By contrast, slightly more than half of patients in the low-performing areas had access to specialized care.

The findings, the team says, underscore well-established regional gaps in availability of medical specialists of all types. And although not part of the current study, the researchers add, economic disparities have been long shown to fuel inequality in care, with people in more affluent regions faring decidedly better.

The results, the researchers say, suggest that efforts to improve access and speed up referrals to specialty care in low-scoring regions could be a powerful catalyst to closing geographic gaps in care and survival.

Specifically, the researchers recommend that:

- Primary care clinicians should pay close attention to subtle, early signs of kidney disease, particularly among those with known risk factors such as family history, hypertension or diabetes, and recognize worsening disease early, before patients go into full-blown kidney failure.
- Primary care clinicians should refer promptly to a nephrologist all patients whose kidneys filter at a capacity of 35 percent or less.

- Nephrologists should refer patients with declining function to surgeons for the creation of AV fistula before their kidney function dips under 25 percent.
- Primary care doctors, kidney specialists and surgeons should improve communication and coordination of care to avoid delays in the creating fistulas.
- Clinicians should educate patients on the importance of getting the right kind of dialysis and dispel the persistent myth that starting dialysis signals end of life.

"It's not enough to tell a patient 'You have [kidney failure](#), and you need dialysis,'" Malas says. "We must do a better job explaining that [dialysis](#) is not the beginning of the end but a life-saving procedure and that its timing is critical."

Provided by Johns Hopkins University School of Medicine

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