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## Racial Disparities in Cardiac Care: Geography Matters

### Abstract

Racial disparities in health care have been well-documented, although the reasons for many of these disparities remain obscure. An intriguing possibility is that geographic factors—the places where certain groups live or obtain health care—contribute to racial disparities, especially in the use of new medical technologies. This Issue Brief examines racial disparities in the use of life-saving cardiac procedures and mortality after cardiac arrest, and considers how geographic differences in health care affect these disparities.

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# LDI *Issue Brief*

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Leonard Davis Institute of Health Economics

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## *Racial Disparities in Cardiac Care: Geography Matters*

Editor's note: Racial disparities in health care have been well-documented, although the reasons for many of these disparities remain obscure. An intriguing possibility is that geographic factors—the places where certain groups live or obtain health care—contribute to racial disparities, especially in the use of new medical technologies. This Issue Brief examines racial disparities in the use of life-saving cardiac procedures and mortality after cardiac arrest, and considers how geographic differences in health care affect these disparities.

*Internal cardiac  
defibrillators (ICDs) can  
improve survival after  
cardiac arrest, but they may  
be underused in black  
patients*

More than 340,000 cardiac arrests occur annually in the United States, and the vast majority of victims die before reaching a hospital. However, the outlook is improving for the 5%-15% of patients who survive to hospital discharge, as well as for the thousands of other patients with cardiac conditions that place them at high risk of cardiac arrest. Technological improvements in cardiac care have improved the long-term survival of these patients.

- In the past 15 years, the use of implantable cardioverter-defibrillators (ICDs) has grown dramatically. These devices are implanted under the skin and automatically shock the heart to convert irregular and potentially fatal heart rhythms back to normal. ICDs can improve survival after cardiac arrest, but white patients are much more likely to receive this technology than black patients.
- Innovative technologies such as ICDs may be especially prone to racial disparity because innovations may spread unevenly in their early phases of adoption. Some evidence suggests that a “racial innovation gap” exists in health care.
- Geography may also play a role. Black patients may be less likely to receive an ICD because they live in areas where technology of all kinds is underutilized, or receive care in settings where the adoption of the technology is delayed. The studies reported in this Issue Brief used a nationally representative sample of Medicare patients to begin to answer these questions.

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***National study of cardiac arrest survivors examines procedure use and long-term mortality***

Groeneveld and colleagues used Medicare administrative records from 1990-1999 to identify elderly black and white patients who had been admitted to hospitals with a cardiac arrest. They tracked all patients who survived to hospital discharge, identified cardiac procedures received, and assessed long-term mortality.

- The study included 5,948 elderly Medicare beneficiaries (5,429 white and 519 black) aged 66 or older. Patients were followed for a median of 4.8 years. By December 1999, 50% of the patients had died.
- About 14% of the group had received ICDs, and 12% had coronary revascularizations (angioplasty or bypass surgery).
- ICDs were associated with reduced long-term mortality among both blacks (50% reduction) and whites (47% reduction). In contrast, coronary revascularizations were associated with lower mortality among whites (48% risk reduction) but not among blacks.

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***Lower use of ICDs among black patients after cardiac arrest may explain their reduced long-term survival***

To understand the relationships among race, survival, and procedure use, Groeneveld and colleagues adjusted for many demographic, socioeconomic, and clinical factors that might account for racial disparities, such as age, sex, other clinical diagnoses, and hospital location.

- After adjusting for these factors, blacks aged 66-75 had a 30% greater likelihood of dying than their white counterparts.
- Although both blacks and whites benefited from ICD implantation, blacks were less likely to undergo the procedure. Blacks aged 66 to 74 years were 42% less likely to receive an ICD than whites of the same age. No racial differences were noted in procedure rates or survival among patients aged 75 years and older.
- These results suggest that 7% of the excess mortality in blacks is attributable to underuse of these life-saving procedures. If blacks received ICDs at the same rate as whites, 150 to 200 deaths among black survivors of cardiac arrest could be prevented annually.

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***Second, larger, study analyzes ICD racial disparity over time, and assesses geographic factors***

To determine whether the racial disparity in ICDs improved over time, and whether geographic factors contributed to the disparity, Groeneveld and colleagues again used Medicare claims data to track the use of ICDs from 1990 to 2000.

- The researchers identified all Medicare beneficiaries with an admitting, primary or secondary diagnosis of cardiac arrest, ventricular fibrillation, or ventricular tachycardia. These were the only diagnoses for which Medicare would pay for ICD implantation during the years of the study. The study included 570,575 elderly patients (519,604 white and 50,971 black) meeting these broad criteria.
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- The researchers compared counties with greater and less than 10% black populations to determine whether racial disparities could be explained by geographic differences in the availability of the technology. They also evaluated whether racial disparities differed between academic and non-academic hospitals.
  - Over the 11-year period, 5.3% of the patients received ICDs within 90 days of hospital admission. The use of ICDs grew over the decade. In academic centers, the rate of ICD implantation rose from 2% in 1990 to 13% in 2000; in non-academic centers, the rate increased from 2% in 1990 to 10% in 2000. Substantial differences in ICD implantation rates among white and black patients were apparent throughout these 11 years. In 2000, the final year of the study, 11% of white patients received ICDs, compared with 6% of black patients.

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***Racial disparity in ICD use improves, but is not eliminated, throughout the 1990s, as geographic variations decrease***

The researchers found that rates of ICD implants converged for blacks and whites during the 1990s, although a significant disparity remained.

- After adjusting for demographic, clinical, and hospital factors, blacks were significantly less likely to receive an ICD throughout the 1990s, although the disparity decreased in later periods. In the years 1990-1992, blacks were 48% less likely to receive an ICD than whites; by 1999-2000, the disparity had improved, but blacks were still 31% less likely to receive an ICD than whites.
- The racial disparity in ICD use was present in both academic and non-academic hospitals. However, the improvement over time was entirely due to decreased disparities in non-academic hospitals.
- Geographic variations in care improved over the decade. Patients hospitalized in counties with greater than 10% black population in 1990 were 19% to 23% less likely to receive an ICD than patients in counties with smaller black populations. By 2000, however, implantation rates in counties with higher or lower black populations were roughly the same.
- The results indicate that reductions in geographic variations in procedure use explained about 20% of the improvement in racial disparity over the 11-year time period.

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***POLICY IMPLICATIONS***

These studies suggest that racial disparities in ICD use contribute to excess mortality in elderly black patients. A closer look at ICD implantation reveals an improvement in racial disparity from 1990 to 2000, but elderly blacks remain much less likely to receive an ICD, even after adjusting for many demographic and clinical differences between black and white patients.

- These findings indicate that substantial increases in the rate of ICD use among blacks are necessary to achieve racial equity in the care of patients with cardiac arrhythmias.

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## **POLICY IMPLICATIONS**

*Continued*

- Recent evidence confirms that ICDs can also improve survival in selected patients with congestive heart failure who have never had a cardiac arrest or irregular heart rhythm. This evidence, combined with Medicare's decision to expand coverage of the device to the 500,000 beneficiaries who meet the new clinical criteria, is likely to lead to substantial increases in utilization. Addressing racial disparity in ICD use becomes even more imperative as the life-saving potential of these devices is more fully understood.
- Geographic differences in health care contribute to health disparities. ICDs were used at different rates in different localities, with delays in use more likely in areas with larger black populations. Policies designed to reduce geographic variation in health care by rewarding high-quality care may have the added benefit of reducing racial disparities.
- Future research should focus on the factors that influence the use of new technology by physicians and hospitals that care for large numbers of minority patients.

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*This Issue Brief is based on the following articles: P.W. Groeneveld, P.A. Heidenreich, A.M. Garber. Trends in implantable cardioverter-defibrillator racial disparity. Journal of the American College of Cardiology, January 2005, vol. 45, pp. 72-78; P.W. Groeneveld, P.A. Heidenreich, A.M. Garber. Racial disparity in cardiac procedures and mortality among long-term survivors of cardiac arrest. Circulation, July 2003, vol. 108, pp. 286-291.*

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