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Dartmouth Atlas Project Finds Substantial Variation in Joint Replacement Surgery

Hip, knee and shoulder replacements are rising significantly for Medicare patients; Rates among regions vary by 10 times for shoulders, four times for hip and knees

Lebanon, N.H. (April 15, 2010) – The rate of hip, knee, and shoulder replacements for Medicare patients is growing rapidly, and there is widespread variation in how likely patients are to undergo this surgery, depending on where they live and their race, according to a new report from the Dartmouth Atlas Project.

This new analysis of Medicare data found a 15 percent increase in the overall rate of hip replacement, a 48 percent increase in the overall rate of knee replacement and a 67 percent increase in the overall rate of shoulder replacement from 2000-2001 to 2005-2006. Meanwhile, the rate of shoulder replacement was 10 times higher in some regions than others during 2005-2006, and the rates of hip and knee replacements were four times higher.

Researchers said the patterns suggest both overuse and underuse of these procedures. Some patients who could benefit from joint replacement may not be offered the procedure, while others may be receiving a procedure that they might choose to forego if they had received balanced information on risks and benefits.

“A likely interpretation is that the decision to undergo surgery is being influenced more by physician judgments than by the preferences and values of individual patients,” said Elliott S. Fisher, M.D., M.P.H., lead author and principal investigator for the Dartmouth Atlas Project and director for population health and policy at the Dartmouth Institute for Health Policy and Clinical Practice. “Another explanation might be that patients in some geographical areas do not have adequate access to joint replacement.”

“These findings highlight the need for improved physician and patient education and the use of shared decision-making to determine whether a patient should undergo joint replacement,” said John-Erik Bell, M.D., co-author and orthopaedic surgeon at Dartmouth-Hitchcock Medical Center.

Once considered surgical breakthroughs, hip, knee and shoulder replacements have become routine procedures. As the population ages and people expect to live longer and more active lives, demand for joint replacement is likely to continue to grow.

“Part of the increase in rates of the procedures is the result of a growing need for revision surgeries as older prosthetics begin to malfunction or wear out, requiring replacement. As more

patients who undergo joint replacement live longer, the need for revision replacement to repair aging and deteriorating prosthetics will likely continue to rise,” said Ivan M. Tomek, M.D., FRCS(C), co-author and orthopaedic surgeon at Dartmouth-Hitchcock Medical Center.

Regional variation in hip replacement

There was marked variation in the rate of hip replacement during the five years of the study period. In 2000-2001, Alexandria, La., had the lowest rate of hip replacement, at 1.2 per 1,000 beneficiaries. The rate in Boulder, Colo., was more than five times higher, at 6.7 per 1,000. In 2005-2006, Bryan, Texas, had the nation’s lowest rate at 1.8 per 1,000, and Ogden, Utah, had the highest rate at 7.2 per 1,000.

Extensive variation was apparent even within individual states. For example, in 2000-2001, rates of hip replacement in California ranged from 2.5 per 1,000 in San Jose to 5.7 per 1,000 in Salinas. In 2005-2006, the variation in California was even wider, from a low of 2.7 per 1,000 in Los Angeles to a high of 6.7 per 1,000 in San Luis Obispo.

There was significant variation within smaller states as well. In 2000-2001, rates in Iowa were as low as 3.4 per 1,000 in Dubuque and as high as 6.3 per 1,000 in Sioux City. As in California, the gap grew over the next five years, from a low of 3.5 per 1,000 in Cedar Rapids, to a high of 7.1 per 1,000 in Sioux City.

Regional variation in knee replacement

Rates of knee replacement also varied widely. In 2000-01, Honolulu had the lowest rate, at 2.5 per 1,000 Medicare beneficiaries. Elyria, Ohio had the highest rate, at 10.5 per 1,000. In 2005-2006, Manhattan had the lowest rate at 4.0 per 1,000, while Lincoln, Neb., had the highest rate at 15.7 per 1,000.

Again, this variation existed both nationally and within individual states. In 2000-2001, Florida surgeons performed 3.6 procedures per 1,000 beneficiaries in Miami, but 8.0 per 1,000 in Fort Myers. Similar variation was still evident in 2005-2006. Rates in both Miami and Fort Myers increased, but the difference between the two grew even larger, with the rate in Miami rising to 5.2 per 1,000 and the rate in Fort Myers increasing to 12.1 per 1,000.

Regional variation in shoulder replacement

Rates of shoulder replacement were much lower than rates of hip and knee replacement, but the use of the procedure still varied widely by region and within states. In 2000-2001, the lowest rate of shoulder replacement was found in Lexington, Ky., at 0.2 per 1,000 Medicare beneficiaries. The highest was found in Fort Collins, Colo., at 1.8 per 1,000. In 2005-2006, Syracuse, N.Y., had the lowest rate at 0.3 per 1,000 beneficiaries; the rate in Provo, Utah, was ten times higher at 3.0 per 1,000.

In Virginia, 2000-2001 rates of shoulder replacement varied more than threefold, from 0.2 per 1,000 Medicare beneficiaries in Arlington to 0.9 per 1,000 in Richmond. In 2005-2006, variation remained high, with the lowest rate in the state at 0.7 per 1,000 beneficiaries in Arlington and the highest at 1.3 per 1,000 in Newport News.

Differences in joint replacement by race

It is well documented that black patients are less likely than white patients to undergo hip or knee replacement, and Dartmouth Atlas data from Medicare enrollees in 2000-2001 and 2005-2006 show that differences persist. For example, the 2000-2001 rate of knee replacement among black Medicare beneficiaries was 4.0 per 1,000; for all other enrollees, it was 6.1 per 1,000. Both rates increased by a similar degree over the next five years, but the disparity remained, with black enrollees undergoing knee replacement at a rate of 5.6 per 1,000 in 2005-2006, compared to a rate of 9.1 per 1,000 for all other beneficiaries.

“The Dartmouth Atlas findings underscore the importance of taking an active, informed role in the decision-making process,” said Risa Lavizzo-Mourey, M.D., M.B.A., president and CEO of the Robert Wood Johnson Foundation, which principally funds the Dartmouth Atlas Project. “When patients work with their doctors to understand and make informed choices about managing their health, they can have better outcomes.”

The researchers examined the rates of hip, knee and shoulder replacements within each of the 306 hospital referral regions (HRRs) in the United States. These rates include both primary and revision replacements. After determining the crude rates of joint replacement within each HRR during each of the years in the analysis, adjustments were made for differences in age, sex and race across regions.

The Dartmouth Atlas Project is run by the Dartmouth Institute for Health Policy and Clinical Practice. A link to the full study can be found at www.dartmouthatlas.org.

About the Dartmouth Atlas Project

For more than 20 years, the Dartmouth Atlas Project has documented glaring variations in how medical resources are distributed and used in the United States. The project uses Medicare data to provide comprehensive information and analysis about national, regional, and local markets, as well as individual hospitals and their affiliated physicians. These reports, used by policymakers, the media, health care analysts and others, have radically changed our understanding of the efficiency and effectiveness of our health care system.

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