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Hospitals Reimbursements Based on Illness of Patients Are Susceptible to Bias Due to Intensity of Care

Study in BMJ shows flaws in commonly used strategies for risk adjustment

Lebanon, N.H. (February 21, 2013) – Common methods designed to enable apples-to-apples comparisons of the performance of doctors and hospitals and fairly credit providers for treating patients who are sicker than average may themselves be biased, because they make some patient populations appear to be sicker than others when they are not, according to a [new study](#) by Dartmouth researchers.

In a series of papers, the latest of which was published today in *BMJ*, a research team led by the [Dartmouth Atlas Project](#) and [The Dartmouth Institute for Health Policy & Clinical Practice](#) raises significant questions about the “risk adjustment” that Medicare and others apply to insurance claims data in an effort to make fair comparisons about performance, spending, resource use, and mortality rates among regions and hospitals. The research team also included members from the Department of Economics at Dartmouth College, the London School of Economics and Political Science, and the New College in Oxford.

Virtually all risk adjustment strategies allow for differences in age and sex, and some include race. Most risk adjustment methods now in use in the United States, the United Kingdom, and a number of European countries also include diagnoses recorded in large administrative databases, such as Medicare’s claims data files. These diagnoses are used to determine the degree of illness of a population of patients. Payments, mortality rates, performance measures (such as hospital readmission rates), and determinations of the comparative effectiveness of treatments are adjusted based on this degree of illness.

This diagnoses-based risk adjustment method is used to adjust payments to the more than 2,000 Medicare Advantage health plans, which are private plans that provide Medicare to nearly 14 million beneficiaries through health maintenance organizations or preferred provider organizations instead of traditional fee-for-service Medicare.

The problem, researchers say, is that the number of diagnoses listed in the claims data isn’t determined on the basis of illness alone. It is also determined by how many visits patients make to their physicians, how many referrals they receive, and how many diagnostic tests and imaging exams they undergo. This intensity of resource use varies widely by region and health care system, depending on the supply of services.

“In a nutshell, the more you look, the more you find, and the more you find, the more you get paid,” said John Wennberg, MD, MPH, lead author, founder and director emeritus of The Dartmouth Institute for Health Policy & Clinical Practice, and the Peggy Y. Thomson Professor Emeritus for the Evaluative

Clinical Sciences. “What we find is that more visits lead to more diagnoses, even when health status is similar, and these additional diagnoses make the patient population appear sicker than they are.”

When adjustment for “illness” is made using these diagnoses, regions and hospitals with more physician visits, referrals, tests, and imaging appear to have patients that are sicker than those with lower use. As a consequence, when adjustments are made to payments, these regions and providers get more money than regions and providers with fewer diagnoses. Moreover, the prediction of the death rates among these populations will be understated.

The researchers conclude that “our study points to the importance of developing risk adjustment methods that better explain variation in age, sex, and race mortality rates and suggests that these will be found by using data that are clearly independent of the effects of supply.”

The study presents findings of research based on Medicare claims data that shows that the standard methods of risk adjustment distort mortality rates when adjusted for illness and spending in regions with low and high rates of physician visits, resulting in implausible outcomes. It concludes that regions where patients see doctors more frequently have patients that appear to be, but are not, sicker than other regions. It suggests that adjusting the data based on a region’s rate of patient visits to physicians provides a truer picture of the patient population.

This article is the third in a series from researchers at The Dartmouth Institute for Clinical Practice & Health Policy that raises questions about risk adjustment methods. The previous articles are:

- “[Geographic Variation in Diagnosis Frequency and Risk of Death Among Medicare Beneficiaries](#),” in the March 16, 2011, edition of the *Journal of the American Medical Association*. This article demonstrated, paradoxically, that due to bias in risk adjustment, Medicare beneficiaries living in regions with more diagnoses of chronic illness had lower case fatality rates than those living in regions with low visit rates, even though the overall population-based mortality rates were similar.
- “[Regional Variations in Diagnostic Practices](#),” in the July 1, 2010, edition of the *New England Journal of Medicine*. This research showed that Medicare patients who migrated from regions with low use of medical resources to higher intensity regions became “sicker,” according to their claims data diagnoses, while those who migrated in the opposite direction became relatively healthier, even though mortality after migration was similar.

The *BMJ* study, “Observational Intensity Bias Associated with Illness Adjustment: Cross-Sectional Analysis of Insurance Claims,” can be found at www.bmj.com/cgi/doi/10.1136/bmj.f549. Additional authors include Douglas O. Staiger, PhD; Sandra M. Sharp, MS; Daniel J. Gottlieb, MS; Gwyn Bevan, MA; Klim McPherson, PhD, MA; and H. Gilbert Welch, MD, MPH.

The Dartmouth Atlas Project is located at The Dartmouth Institute for Health Policy & Clinical Practice and principally funded by the Robert Wood Johnson Foundation. To learn more, visit www.dartmouthatlas.org.

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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 information and analysis about national, regional, and local markets, as well as hospitals and their affiliated physicians. This research has helped policymakers, the media, health care analysts and others improve their understanding of our health care system and forms the foundation for many of the ongoing efforts to improve health and health systems across America.