Strength in numbers? The limits of big data

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The National Cancer Database (NCDB), a program jointly financed by the American College of Surgeons Commission on Cancer and the American Cancer Society, has since its inception in 1988 accrued more than 34 million records from hospital cancer registries within the United States. Centers involved in the database are all accredited by the Commission on Cancer and range from small, community-based hospitals to National Cancer Institute–designated Comprehensive Cancer Centers. As such, although it is not a strictly population-based database, it does represent treatment patterns in institutions that have met the Commission on Cancer's requirements for standards of cancer care and data reporting.¹

A large number of researchers have put this sizable database to use, with more than 400 publications arising from the NCDB since 1988. Lung cancer has been the focus of a small percentage of these articles, with a total of 9 studies arising from the NCDB from 1990 to 2012. Most of these articles served to describe the overall patterns of surgical care for lung cancer,^{2,3} although other groups used the database to look at treatment of specific subsets of lung cancer⁴ or to ask questions about how treatment is impacted at certain facilities.⁵

In this issue of the *Journal*, McMurry and colleagues⁶ use the information within the NCDB to examine the trends of care for patients with stage I non–small cell lung cancer. They have determined that through the 15-year period from 1998 to 2012, the number of diagnoses of stage I non–small cell lung cancer increased, but the percentage of those patients undergoing what is considered the current standard of care decreased from 55% to 50%. During this same period, there was an increase in the number of patients undergoing sublobar resections, as well as an increase in the number of patients receiving stereotactic radiation treatment.

This article serves as an explicit demonstration of trends that are likely familiar to most of the thoracic surgery audience. Stereotactic radiation and sublobar resections are becoming more common. An optimist would view these trends as evidence that we are treating more patients who would not have been candidates for lobectomy, and that these complementary technologies are allowing more patients to receive local care for their tumor. A pessimist

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Central Message

Although large database analyses can accurately describe the state of current practice, they are limited in their ability to help determine what the standard of care should be going forward.

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would say that the field is drifting away from a proven treatment in favor of technically easier techniques that have not truly demonstrated noninferiority.

McMurry and colleagues⁶ are careful to point out that we cannot determine from this data the reasons that we are observing these changes is the pattern of care. Unfortunately, one of the major limitations of database analysis is that although correlations can be drawn, causality is impossible to determine. Without knowing what has driven these changes, it is hard to know what impact they will have on patient care, and how these trends will evolve in the future.

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