Regionalization and Its Alternatives

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KEYWORDS

- Regionalization • Centralization • Surgical oncology
- Volume-outcomes relationship

KEY POINTS

- The volume–outcomes relationship demonstrates improved outcomes in complex surgical oncology in high-volume hospitals with high-volume surgeons.
- Mortality was the most well-studied outcome, leading to controversy, and subsequent studies examining both short- and long-term patient outcomes.
- Regionalization has broad implications for nearly all stakeholders, requiring thoughtful implementation.

INTRODUCTION

Although Luft and colleagues[1] published their landmark article in 1979 documenting substantially lower mortality rates at hospitals with higher procedure volumes, it was not until 2 decades later that the concept of the volume–outcomes relationship really caught the attention of stakeholders. In 1999, Birkmeyer and colleagues[2] reinvigorated the discussion regarding the volume–outcomes relationship in cancer, when they used Medicare claims to examine 7229 patients who underwent pancreaticoduodenectomy (Whipple procedure) from 1992 to 1995 and documented substantially lower in-hospital mortality among patients treated at hospitals that performed more than 5 procedures per year compared with lower volume hospitals. Numerous studies followed examining the volume–outcomes relationship, not only for pancreatic resections, but for a wide array of cancer procedures.

These studies led to calls for regionalization of complex surgical procedures in an effort to improve outcomes on a population level. (The terms regionalization and centralization have both been used to describe the population-level consolidation of procedures at high-volume hospitals. For the purposes of this article, we

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use the term regionalization.) Foremost, the Leapfrog Group, which was founded in 2000 by large employers and other purchasers as a national nonprofit organization focused on improving quality and safety in American health care, established a list of Leapfrog Index Procedures.[3] This list called for regionalization of certain complex procedures, including pancreaticoduodenectomy, to hospitals performing at least a minimum number of cases per year. These recommendations were based on evidence supporting a substantial volume–outcomes relationship for these specific procedures. Subsequent studies have shown extensive regionalization of these procedures in the United States, presumably in part owing to the Leapfrog group's efforts, with concomitant improvements in perioperative mortality.[4]

Over the past 2 decades, the volume–outcomes relationship has been studied for practically every procedure. For some procedures, the volume–outcomes relationship is clear and for other procedures, it is subtle or disputable, because capturing outcomes less discrete than in-hospital mortality can be challenging. Other methodologic issues have also arisen, including debates over appropriate risk adjustment, whether surgeon volume or hospital volume is the critical factor, how to define high volume, and the role of clustering.[5] Despite these issues, the underlying concept that greater surgeon and institutional experience leads to better outcomes has become widely accepted.

The improved outcomes with regionalization, however, come at a cost. Regionalization of cancer surgery has downstream consequences for patients, providers, hospitals, and communities. These consequences include changes in access to care for patients, economic impacts for hospitals and communities, and disruption of the coordination of multidisciplinary care. These downstream consequences are only partially understood, and ways to mitigate the negative impacts of regionalization or to provide alternatives to regionalization continue to be studied.

CONTENT

The Theory

Although no one theory could explain the volume–outcomes relationship, Luft and colleagues[6] argued that the true mechanism behind the volume–outcomes relationship is likely a combination of the practice makes perfect and the selective referral patterns theories. The first theory suggests that, by funneling all patients to 1 hospital, the hospital will improve to have the best outcomes owing to shear numbers of procedures. The second theory posits that providers refer patients to the hospitals and/or surgeons who have the best outcomes based on prior personal experiences. This theory weights a particular center's experience, quality, and their relationship with referring physicians. These complex theories underlie health system and health policy debates about surgeon training and learning curves, work force projections and subspecialization, and the development of centralized centers to care for patients with particular diseases.[6]

The Evidence

The volume–outcomes relationship has been studied for just about every cancer procedure, with varying levels of evidence to support the relationship. **Table 1**. In 2000, the Institute of Medicine held a workshop addressing the volume–outcomes relationship in cancer. The group concluded that the "evidence is compelling . . . for a strong positive association between the volume of certain types of cancer care and better outcomes" and that short term outcomes, such as 30-day mortality and hospital