

EDITORIAL

In the Beginning There Was...Heat

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In 2003, the General Assembly of the Commonwealth of Pennsylvania mandated that the Pennsylvania Healthcare Cost Containment Council (PHC4; the state's healthcare oversight agency) publicly disclose all hospital-acquired infections (hereafter referred to "healthcare-associated infections" [HAIs], in accordance with usage in the infection control community) occurring at 13 anatomical sites, as well as HAIs occurring at multiple anatomical sites. The tale of Pennsylvania's experiment is now known as much for its bold first steps as for the controversy surrounding them. The experience in Pennsylvania is at once groundbreaking and cautionary.

As part of the PHC4's legislative reauthorization in August 2003, the PHC4 moved to implement the mandate barely 4 months after it was approved. Hospitals in the state were made aware of the requirements in mid-November 2003, with the implementation date looming 6 weeks away on January 1, 2004. The mandate challenged long-established infection control practices regarding surveillance and reporting, but there was so little time for hospitals to ready themselves that there was little chance that they could be in compliance by the implementation date. The agency sought from the outset to minimize the burden on hospitals by having them identify HAIs through a review of administrative billing data; presumably, this would eliminate the need for additional resources or effort, if the administrative data could be relied upon. Thus, the new requirement to collect and report HAI data has been appended to an existing PHC4-mandated process of hospital-performance reporting that began in the late 1980s and relies on the abstraction of key clinical findings from medical records for the purpose of risk adjustment and analysis of coded administrative billing data.

The state hospital association subsequently challenged the mandate and, in an agreement facilitated by the Governor's Office of Healthcare Reform, the PHC4 agreed to initially accept hospital reports of central line-associated bloodstream infection, ventilator-associated pneumonia, catheter-associated urinary tract infection, and surgical-site infection related to the circulatory system and to orthopedic and neurosurgical procedures. The requirement to report all HAIs at the 13

anatomical sites was retained, and implementation of this requirement was scheduled to occur in all Pennsylvania hospitals by January 1, 2006. The PHC4 also agreed to accept data from hospitals using their current surveillance practices in the first 2 calendar quarters of implementation. An advisory panel of infection control professionals, epidemiologists, and medical record abstraction and coding experts was convened by the PHC4 to provide advice on the HAI and procedure codes. The panel also advocated the use of device-based denominators and the reporting of device-based rates, neither of which were addressed in the mandate.

Although Pennsylvania was the second state to establish mandatory public disclosure of HAIs, it was the first to collect and report on the aggregate performance of its hospitals. PHC4 obtained its first HAI data from hospitals in June 2004, which were based on traditional surveillance by infection control professionals as well as coded data obtained from hospital chart abstraction. PHC4 has used the latter to estimate the burden of disease. The first public report of the data was made to a business luncheon in Pittsburgh in October 2004.¹ The report called attention to the fact that the hospitals reported 2,300 HAIs in the first quarter of 2004 whereas the coded data suggested as many as 56,000 HAIs for the same period. PHC4 subsequently published 2 reports in 2005 that are now posted on the PHC4 Web site (available at: <http://www.phc4.org>).^{2,3} The first of these, a research brief entitled "Hospital-Acquired Infections in Pennsylvania," was published in July 2005 and reported data for 2004, the first full year of the mandate.² In that report, 11,668 HAIs were identified by hospitals through traditional surveillance methods in the categories agreed upon in the negotiations. To nobody's surprise, catheter-associated urinary tract infections were most common, followed by central line-associated blood stream infections, cases of ventilator-associated pneumonia, and surgical-site infections. During the same year, more than 115,000 HAIs were documented in coded billing data. Analysis of the coded billing data revealed 10-fold more UTIs and more than 20-fold more pneumonia episodes than were recorded during surveillance. The authors of the research brief

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concluded that hospitals were probably underreporting the number of HAIs.

All 3 PHC4 reports have drawn attention to the discordance between the number of HAIs reported by hospitals and the number that have been billed for. The assumption has been that, if treatment for an HAI is billed as such, then the infection should be reported and disclosed. This assumption is fair enough, but were all of the infections that were treated and billed as such acquired in the hospital? Do billing codes distinguish between community-acquired infection and HAI? In fact, a small fraction of Pennsylvania's hospitals reported no HAIs at all. The nonreporting hospitals notwithstanding, the reports beg for answers as to why nearly 10-fold more HAIs appeared in coded billing data than were identified by traditional infection control surveillance methods used by professionals.

In this issue of the journal, Sherman and colleagues⁴ use a prospective cross-sectional analysis to examine the utility of administrative data as a surveillance tool in the process of public reporting of HAIs. Their research was conducted in Pennsylvania during the first 9 months after implementation of the statewide reporting process. The findings are noteworthy, and the report furthers the science associated with this controversial subject.

Sherman et al.⁴ found that targeted active surveillance by a trained professional identified most of the HAIs at their hospital. Targeted surveillance and administrative data had similar sensitivities for identifying HAIs. However, administrative data did not reliably identify the most common HAIs. Only 10% of infections identified solely by administrative data were true HAIs. The remaining 90% of cases lacked a laboratory-confirmed diagnosis of infection (37% of infections), lacked an exposure to a device or procedure (35%), or were community acquired (29%). In contrast, most of the HAIs that were missed because of surveillance error were overlooked because the patient was located in a nontargeted area of the hospital, which suggests that a broader surveillance net cast by trained professionals would have identified the remainder.

The authors correctly note that billing codes do not effectively distinguish between community-acquired infections and HAIs and were not designed to do so.⁴ The use of a billing function as the sole means to identify HAI is clearly fraught with hazard, as the 22% positive predictive value of administrative data indicates. Although there are numerous caveats to the report, including the nature of the hospital, the focus on a select group of diseases, and the generalizability of the experience, the report nonetheless raises serious questions about the effectiveness of administrative data as a primary surveillance tool for HAIs.

In a sense, the question that Sherman et al.⁴ attempt to answer is whether there were 11,668 or 115,000 HAIs in Pennsylvania in 2004. Their study does not settle the issue, but the findings suggest that analysis of administrative data will not answer the question. Given the poor positive pre-

dictive value of the administrative data, it appears that the enormous gap between the number of infections identified by these different methods could be due to the deficiencies of the data for accurately identifying HAI.

The development of public reporting processes for health-care outcomes appears to occur in stages. In the beginning, opposition to the idea of such a process must be overcome, and methods for public reporting, even if initially imperfect, must be established. The process in Pennsylvania was bound to capture less than a full picture of HAIs in its first year. Several factors built into the process militated against complete reporting of HAIs in 2004, even by hospitals with the best of intentions: hospitals were notified of the reporting requirement just weeks before it was implemented; the list of HAIs to be reported in the first year was established nearly 3 months after the beginning of the reporting period; some hospitals were given generous latitude during the first 2 reporting quarters to submit data "as is" (ie, targeted surveillance data rather than hospital-wide data were permitted during the first 2 quarters of 2004); and finally, as demonstrated by Sherman et al.,⁴ use of administrative data is apparently inadequate as a primary tool to identify HAIs. None of the factors just cited excuse the hospitals that chose not to report HAIs in 2004, but they do provide important lessons about implementation of a public disclosure process for HAI and what to expect in the early returns.

The beginning phase of public reporting should give way to refinement as analyses, such as that performed by Sherman et al.,⁴ validate or refute the early methods. If this is not, as Churchill put it, "the end of the beginning" but, rather, the beginning of refinement, then their work at least points us in the right direction. Finally, we should strive for a stage (although one is seldom fully realized) on which all of the stakeholders are in possession of information that improves health-care professional performance, consumer decision making, and patient outcomes.

The disclosure and reporting process for HAIs will move forward in Pennsylvania and other states. Infection control professionals must move forward and lead more effectively, devise better infection prevention strategies, and create and execute a research agenda that maximizes the value of our limited resources. As we study the methods of public reporting, we must clearly communicate to other stakeholders that our intentions are to better understand the magnitude of the problem and the tools that offer solutions. The existence of the problem is not at issue. The Healthcare Infection Control Practices Advisory Committee (HICPAC) and others have advocated that public reporting should be studied to refine and improve on these early efforts. The commitment of resources and the consequences of the findings are too important not to perform such studies. The light that public disclosure shines on healthcare practices is brightened by methodological studies, such as that conducted by Sherman and colleagues.⁴ As important as the scientific observations are, their most important

contribution may have been to increase the quality of discourse on this subject and, in so doing, to introduce light where heretofore there has been mostly heat.

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REFERENCES

1. Glover L. Pa. hospitals underreport infection rates. *Pittsburgh Business Times*. October 1, 2004.
2. Pennsylvania Health Care Cost Containment Council (PHC4). Hospital-acquired infections in Pennsylvania. *PHC4 Research Briefs* 2005; 5:1-4.
3. Pennsylvania Health Care Cost Containment Council (PHC4). Reducing hospital-acquired infections: the business case. *PHC4 Research Briefs* 2005; 6:1-4.
4. Sherman ER, Heydon KH, St. John KH, et al. Administrative data fail to identify accurately cases of healthcare-associated infection. *Infect Control Hosp Epidemiol* 2006; 27:332-337 (in this issue).