COMMENTARY

Use of Electronic Surveillance to Drive Improvement in Hospital Infection Rates

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(See the article by Palumbo et al, on pages 105–111.)

The article by Palumbo et al[1] in this issue of *Infection Control and Hospital Epidemiology* demonstrates that catheter-associated urinary tract infection (CAUTI) rates declined over a 2-year period among Pennsylvania hospitals with "qualified" electronic surveillance systems but remained unchanged among hospitals with manual surveillance. Significantly, the authors report that the staff in hospitals with electronic surveillance spent the same amount of time on education as their counterparts in hospitals conducting manual surveillance. These findings provide timely evidence to support the idea that electronic surveillance can improve patient outcomes without adding undue burden to infection control departments by forcing them to reallocate quality improvement resources to perform data entry and analysis.

Although the article by Palumbo and colleagues does not evaluate the mechanisms by which staff in hospitals with an electronic surveillance system improved hospital CAUTI rates, there remains little doubt that electronic surveillance data influence behavior that can reduce healthcare-acquired infections. For example, staff benefit from added efficiency, in part by automating data collection (including aggregating multiple data sources) and by generating data reports that help them recognize infections and infection patterns. Ideally, these reports efficiently provide both just-in-time and longitudinal data that infection preventionists can monitor and incorporate into audit and feedback, education, and other clinical quality improvement tactics that affect care delivery and ultimately decrease infection rates, such as those for CAUTI.

However, the use of electronic surveillance remains controversial within hospitals and other healthcare settings, largely because of concern about allocating sufficient resources. Many infection preventionists fear that the significant investment required to adopt new technology—money, training, and staff—may demand a shift in focus from quality improvement to data entry activities, negating any net benefit. Increasingly scarce hospital resources further exacerbate infection preventionists' fears that electronic surveillance will divert the amount of time they spend at computers from clinical activities on the hospital floor, resulting in a frustrating divide between the infection control department and the clinicians providing direct patient care. Although an increased time investment is needed early in the implementation of a new electronic surveillance system, Palumbo and colleagues found that staff ultimately spent the same amount of time on education, regardless of the use of electronic or manual surveillance. This provides reassurance that information systems that provide actionable information to inform quality improvement can be worthwhile to implement. Furthermore, these results inform the business case for electronic surveillance, an important consideration for accelerated hospital adoption.

As infection control departments increasingly transition from manual to electronic surveillance for healthcare-acquired infections, we have new opportunities to use data-driven methods to improve infection rates. At the facility level, hospitals will be able to aggregate data from a variety of sources to gain a more comprehensive understanding of successes and opportunities and to set longitudinal goals. Evidence from other settings suggests that using healthcare data to benchmark and set performance goals may be associated with greater improvement.[2] For example, a national analysis by Baier et al[3] from 2008 shows that, among nursing homes selecting performance goals, the facilities that selected the most aggressive goals—aspiring to the largest gains over their baseline performance—demonstrated the most improvement. With more widespread systematic data collection and aggregation, infection preventionists will be able to use data-driven methodologies, such as Achievable Benchmarks of Care,[4] to select goals based on the achievements of their high-performing peers.

At the state and national levels, hospitals may use electronic

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surveillance to automatically populate databases used for public reporting—for example, by linking their electronic surveillance systems to the Centers for Disease Control and Prevention's (CDC's) National Health Safety Network (NHSN; http://www.cdc.gov/nhsn/). Policy makers increasingly advocate for publishing such data, believing that public transparency can help focus provider efforts while facilitating consumer-driven choice and encouraging competition among providers. By encouraging internal institutional reflection and through market forces, policy makers hope to catalyze overall performance improvement. Additionally, beginning in 2013 the Centers for Medicare & Medicaid Services (CMS) will incorporate methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia and *Clostridium difficile* infection (CDI) rates into its hospital inpatient prospective payment system.[5] Ideally, the use of centralized systems such as the NHSN increases our ability to standardize definitions, improving our ability to make valid, direct comparisons while providing new benchmarks and insight into overall performance.

As we expand our use of data from electronic surveillance systems and other databases such as the NHSN, we must translate these abundant data sources into meaningful and actionable information. This involves validating data and risk-adjusting outcome measures, where applicable, to account for patient case mix and between-facility differences. To do so, we need to ensure that our data capture sufficient demographics and facility characteristics, including process data. For example, hospitals use a variety of *C. difficile* testing methods, with sensitivities ranging from 40% to 96%.[6-8] The NHSN does not currently capture these methods or take them into account when calculating CDI rates, which means that facilities may appear to have high rates (worse performance) if they use a test with a higher sensitivity. We recommend that the CDC address such differences before the CMS's planned incorporation of MRSA bacteremia and CDI rates into hospital payment.

Ultimately, timely, accurate data provide a powerful source of information that can highlight opportunities to improve patient care and inform the tools we use to accelerate improvement. In describing the Pennsylvania hospitals' improvement and educational activities, the analysis by Palumbo and colleagues hints at both the potential in electronic data surveillance and the need to further elucidate how, specifically, "qualified" electronic surveillance systems are associated with improvement (ie, which system components and resultant staff processes improve infection rates). This information will, in turn, help infection control departments best advocate for the institutional support they need to adopt electronic surveillance while retaining their much-needed focus on applied quality improvement.

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