Automated Infection Control Surveillance

Should Automated Surveillance Tools Be Adopted for Infection Control?

Technology Overview

Automated infection control surveillance technologies use hospital data to detect outbreaks in infections. Data are analyzed internally or by vendors and returned in retrospective reports and real-time alerts.

Key Facts:

- Electronic surveillance replaces the manual chart review process so that infection control practitioners (ICPs) can focus efforts on prevention. Traditional retrospective surveillance is labor-intensive and limited to 10% of patients at high risk of infection.

- Automated real-time surveillance alerts caregivers to potential infections and guides treatment selection. Traditionally, infection control specialists focus clinical guidance on select, high-risk patients.

- Traditional surveillance underreports infection rates by as much as 20% for some infection types.

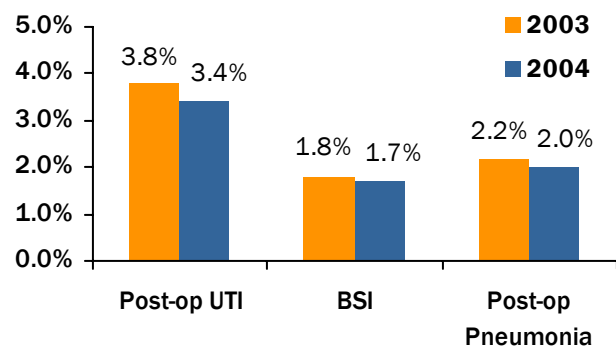- Infection tools are often combined with antibiotic guidance and other error-reduction applications.

Sg2 Position

Institutions with high-acuity case mixes and long-term care facilities should implement electronic surveillance as an extension of their infection control departments. Administrators should use the tools to comply with state-mandated reporting of infections and mitigate the impact of reduced reimbursement.

- Accurate awareness of the rate and cost of infections establishes a baseline for improvement.

- The value of electronic surveillance is the use of data to change treatment and prevention behavior. Time savings allow ICPs to shift their roles from individual case review to organizational consultant.

- Surveillance should be coupled with antibiotic and treatment guidance to maximize impacts.

- Administrative support for measuring performance is essential to drive a culture of prevention.
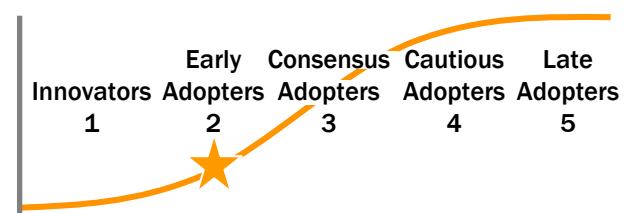
Burden of Hospital Acquired Infections

Percentage of Surgical/Central Venous Catheter Patients With Infection

Between 2003 and 2004, there was no significant change in UTI, BSI or postoperative pneumonia rates.

Source: National Healthcare Quality Report, Agency for Healthcare Research and Quality, 2006.

STEP™ Profile

| Innovators 1 | Early Adopters 2 | Consensus Adopters 3 | Cautious Adopters 4 | Late Adopters 5 |

- Most providers use a manual process for infection control that is often time-consuming.

- Electronic surveillance will be quickly adopted over the next 5 years as hospitals update the infection control process in response to quality and transparency initiatives.

See the Sg2 publication *Accelerate Smart Growth 2007* at www.sg2.com for more details on leveraging the advantages and disadvantages of each STEP Profile.

STEP = Sg2 Technology Evaluation and Planning.

UTI = urinary tract infection; BSI = bloodstream infection; CMS = Centers for Medicare & Medicaid Services.

Essential Intelligence

Regulatory Drivers	▪ As of 2006, 18 states have passed legislation requiring reporting of hospital-acquired infections (HAIs); Pennsylvania was the first state to mandate reporting.
	    ▪ California, Colorado, Florida, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Virginia
	▪ Thirteen states have bills or bills in progress mandating prevention of infections; Illinois is the first state to mandate screening for MRSA in ICU patients.
	▪ No standardization across states in collecting data and reporting infection rates.
	▪ Ultimately, federal law may mandate standardized HAI reporting requirements.
	    ▪ Currently, there is voluntary reporting to National Healthcare Safety Network (NHSN).

Reimbursement Drivers	▪ CMS will no longer reimburse for costs related to infections not present on admission. ▪ Catheter-associated UTIs, vascular-catheter–associated infections, mediastinitis ▪ In the future, CMS plans on adding other HAIs and medical errors to the list.
Next-Generation Technology	▪ Methods of detecting other patient harm (eg, falls, pressure ulcers, medical errors) ▪ Additional data sources (eg, physician notes, nursing care plans, inventory management) ▪ Integration of alerts with nurse and physician documentation systems
Cost	▪ About $60,000 to $300,000 annually ▪ One-time flat fee for implementation based on annual admission, bed size, services ▪ Recurring annual fee for subscriptions, support and education materials

Vendor Landscape

	Cardinal Health MedMined™	Premier SafetySurveillor™	TheraDoc®
Product Description	Service provides automated infection reporting through Data Mining Surveillance® with Nosocomial Infection Marker (NIM)™*.	Software fires alerts for high-risk patients; CDC guidelines are used to confirm infection.	Platform uses real-time alerts and knowledge for supporting clinical decisions; added functionality monitors and measures progress of intervention.
Source Data	Lab, ADT, pharmacy	Lab, ADT, pharmacy, surgical	Lab, ADT, pharmacy, radiology, surgical, vitals
Implementation Time	Short	Short	Medium
Financial Reporting	X		
Automated Infection Identification	X		
Use of CDC Guidelines†		X	X
Real-Time Clinical Support			X

*NIM has significantly higher sensitivity than detection by chart review and ICU detection by NNIS techniques.
†Productivity benefits may be limited by state requirements for reporting based on CDC guidelines.
ADT = admission, discharge, transfer; CDC = Centers for Disease Control and Prevention; ICU = intensive care unit;
MRSA = methicillin-resistant *Staphylococcus aureus*; NNIS = National Nosocomial Infections Surveillance System.

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Impact

Clinical Impact

- Reduces length of stay and mortality rates for infection due to medical care, which results in an average 9.58 extra days and 4.3% attributable mortality rate
- Improves measurement accuracy of the burden of infection and creates more comprehensive identification of infections with electronic surveillance
  - Pennsylvania hospitals using electronic surveillance systems reported higher infection rates than the statewide average (31.4 vs 12.2 infections per 1,000 cases).
  - A large New Jersey hospital realized higher antibiotic-resistant *S aureus* rates than expected after combing infection surveillance with a pharmacy application (60% vs 40% before implementation).
- Increases measurement of UTIs and less acute cases that were previously excluded from surveillance initiatives
- Reduces hospital infection rates by leveraging awareness to improve prevention:
  - Decreased HAIs at a 156-bed community hospital by 19%
  - Decreased UTI infections at a large hospital in Pennsylvania by 55% to 60%
  - Decreased nosocomial infection rates by 13% at a 172-bed regional hospital in Washington
  - Reduced infection rate of ventilator-associated pneumonia (VAP) from 5.3% to 0% by establishing hospital-wide VAP team to create preventive protocol for high-risk patients, along with staff education and participation in daily rounds to review patient status

Operational Impact

- Reduces ICP time reviewing charts
  - Surveillance for surgical infections require 60% less time than traditional methods.
  - ICPs experienced a 20% to 40% increase in productive time spent in patient units for observation and follow up.
  - ICP interaction with staff on hospital floors increased from 2 to 3 times a week to daily.
  - Additional freed time is used to expand prevention programs and improve infection control processes.
- Expands depth and scope of reporting
  - Production of daily, monthly and quarterly infection reports are by caregiver and by unit.
  - Creation of clinical teams serve to implement process improvements using data from reports.
- Supports collaboration across all staff using defined goals and quantitative reports
  - Infection control department distributes automated reports to staff at all levels.
  - Reports engage employees to be more aware of infections (eg, housekeeping personnel are alerted to patient rooms that need cleaning with different reagents).

Financial Impact

- Effective October 2008, CMS will eliminate higher payments for HAIs.
- Reduces added cost of care, which averages $39,000 per infection due to medical care
- Decreases cost of care with infection control and antimicrobial management tools
  - $1 million saved in a year due to pharmacy electronic surveillance decreasing overall hospital antibiotic expenditures by 20% to 25%
  - More than $1 million saved by decreasing UTIs by 55% to 60%
  - $576,000 saved by decreasing infection rate by 13% at a regional hospital in Washington that was previously experiencing a loss of $9,544 per patient with infection over a 15-month period
  - Cost savings of $82,000 at a large hospital in Alabama after decreasing infection rates by 7%
  - $618,000 saved at a large academic hospital—$3 for every dollar spent on infection control surveillance—by reducing rates from 5.8% to 5% over 6 months

Sources: PA Health Care Cost Containment Council. Available at http://www.phc4.org/reports/hai/05/nr111406.htm; Zhan C et al. Excess length of stay, charges and mortality attributable to medical injuries during hospitalization. *JAMA*. 2003;290(14):1868–1874.

Strategic Considerations

❑ Collaborate with administration for support in implementing these technologies to drive cultural change.
  ❑ Leverage an infection control measurement program to drive an overall culture of quality and transparency.
  ❑ Prepare staff for future quality measurement initiatives beyond infection as the technology becomes available and regulations expand.
  ❑ Include ICPs in administration activities to increase frequency and visibility of infection measurement.
  ❑ Focus on collaboratively reducing overall hospital infection numbers.
  ❑ Use reduction targets to drive compliance with "basic" prevention protocols such as hand washing.
❑ Participate in the development of state reporting requirements to reduce disruptive potential.
❑ Incentivize all staff members using measured infection rates to create a culture of prevention.
❑ Choose an infection control product that will support your institution's laboratory, ADT, pharmacy, surgical and radiology information technology infrastructure.

Literature Review

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