83. During A Million Patient-Days of Surveillance, Low Levels of Infection Prevention Staff Correlated with Higher Rates of Some Healthcare-Associated Infections

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Background. Reports regarding the correlations between infection preventionist (IP) staffing levels and healthcare-associated infections (HAI) are scarce, conflicting, and crucial for resource allocation and effort prioritization. We evaluated such correlations from January 1, 2012 to March 1, 2019 at a 528-bed teaching hospital in Rochester, NY; a period when IP staffing levels fluctuated but only CDI and CLABSI rates were significantly lower (P = 0.003 and 0.005, respectively). CLABSI SIR was 1.07 and 0.64 during periods of low and recommended IP levels, respectively. Correlations between HAI rates, SIR, and staffing levels were examined using Poisson and T-tests with the R statistical package.

Results. The average daily census of 451 resulted in 1.18 million total patient-days of surveillance. Periods of low and recommended IP levels occurred at similar seasons and for similar durations. There were fewer CDDI, CAUTI, CLABSI, and MRSA infections when IP staff were at recommended levels than when IP staff were at the lowest and only CDDI and CLABSI rates were significantly lower (P = 0.003 and 0.005, respectively). CLABSI SIR was 1.07 and 0.64 during periods of low and recommended staffing levels, respectively (P = 0.004). No significant differences occurred in SSI, either by type or by combined.

Conclusion. Hospitals often cannot achieve or maintain recommended IP staffing levels. Our findings suggest that, during critical personnel shortages, IP may have more impact by focusing on the types of HAI that correlated with preventionist staffing levels. This is among the largest such study to date, and uniquely includes the most impact by focusing on the types of HAI that correlated with preventionist staffing levels, respectively (P = 0.005, respectively).

85. Use of Dual Statistical Process Control Charts for Early Detection of Surgical Site Infection Outbreaks at a Community Hospital Network

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Background. We recently showed that the empirical use of a combination of 2 moving average (MA) statistical process control (SPC) charts was highly sensitive and specific for detecting potentially important increases in surgical site infection (SSI) rates. We performed this follow-up study to examine the performance of these same SPC charts when applied to known SSI outbreaks.

Methods. We retrospectively applied 2 MA SPC charts to all 30 SSI outbreaks investigated from 2007 to 2015 in a network of over 50 community hospitals. These outbreak events were detected via routine SSI surveillance activities that occurred in the network. We reviewed prior outbreak investigation documentation to determine the estimated time of outbreak onset and time of traditional surveillance outbreak detection. The first SPC chart utilized procedure-specific, composite SSI data from the hospital network for its baseline; the baseline for the second chart was calculated from SSI data from the outbreak hospital undergoing analysis. Both charts used rolling baseline windows but varied in baseline window size, rolling baseline lag, and outbreak detection criteria. Outbreak detection occurred when either chart had a data point above the upper control limit of 1 standard deviation. Time of SPC detection was compared with both time of outbreak onset and time of traditional surveillance detection.

Results. With the dual chart approach, SPC detected all 30 outbreaks, including detection of 25 outbreaks (83%) prior to their estimated onset (Figure 1). SPC detection occurred a median of 16 months (interquartile range, 12–21 months) prior to the date of traditional outbreak detection, which never occurred prior to outbreak onset. Both individual SPC charts exhibited at least 90% sensitivity in outbreak detection, but the dual chart approach showed superior sensitivity and speed of detection (Figure 2).

Conclusion. A strategy that employed optimized, dual MA SPC charts retrospectively detected all SSI outbreaks that occurred over 9 years in a network of community hospitals. SPC outbreak detection occurred earlier than traditional surveillance detection. These optimized SPC charts merit prospective study to evaluate their ability to promote early detection of SSI clusters in real-world scenarios.