

Presentation Type:

Poster Presentation

Whole-Genome Sequencing for Investigation of Possible Hospital Transmission of Tuberculosis

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Background: Whole-genome sequencing (WGS) is increasingly used in epidemiological investigations of infectious diseases. We describe the use of WGS to identify drug-resistance variants of tuberculosis (TB) and to determine potential transmission between patients at an academic medical center. **Methods:** Chart review and interviews of patients and healthcare workers along with WGS of *M. tuberculosis* isolates from the patients. **Clinical information:** In June 2019, patient A, a 20-year-old college student born in the United States was admitted with massive hemoptysis. The patient was identified as having active, cavitary TB that was acid-fast smear positive, and the mycobacterial culture grew *M. tuberculosis*. Patient B, a 40-year-old foreign-born patient with advanced lung cancer was acid-fast smear negative, but mycobacterial cultures were positive for *M. tuberculosis*. The 2 patients had overlapping stays in the medical intensive care unit. There was concern that patient B had acquired TB during her stay in the hospital from patient A, who was highly infectious. WGS showed that the mycobacterial isolates from the 2 patients were unrelated. Patient A was a student at a college campus where the state health department had previously issued a health advisory concerning active pulmonary TB in a student; and 7 additional TB cases were subsequently identified through contact investigation. Patient A denied any contact with other persons who were part of the outbreak and had not been included in the contact investigations of any of the cases. Of the 8 outbreak cases, 6 had been seen at our institution and had isolates available for testing. WGS showed that these 6 isolates matched patient A, establishing that she was part of the college

outbreak. **Conclusions:** WGS was useful in establishing the source of *M. tuberculosis* infection in a patient who did not have known exposure to TB and in demonstrating that transmission of TB did not occur in the hospital.

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You Cannot Manage What You Cannot Measure—Developing Central Sterilizing Performance Metrics

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Background: Metrics are critical to healthcare, particularly in areas that are highly process oriented. Our hospital's central sterilizing department functions on standardized processes that have almost no industry specific measurements. Furthermore, the department had no formal internal method for process performance evaluation. A multiphase 6 Sigma DMAIC project was initiated in February 2019 in the central sterilizing department, with 'phase 1' being the development of performance metrics to evaluate current state and track future improvement. **Methods:** A DMAIC team was formed and completed a data inventory that included identifying all existing data sources pertaining to central sterilizing. Sources identified as reliable included count of daily surgical cases, counts of defects based on surgical services communication logs, number of surgical trays processed in the central sterilizing department, and the number of unsterile trays in the department at the start of each 7:00 A.M. shift. **Results:** A multidisciplinary team including surgeons and senior leadership formed the DMAIC team. Using identified data sources and input from frontline staff

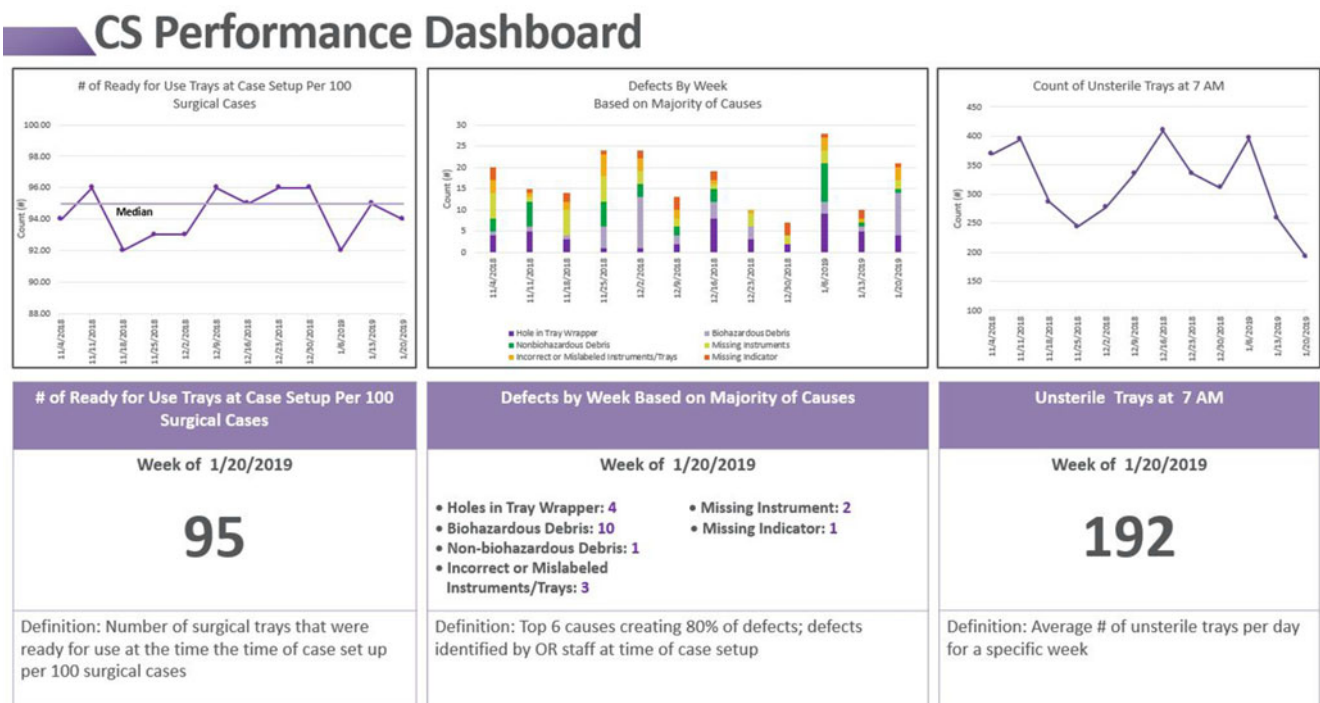


Fig. 1.

and leadership, official metric definitions were created. Weekly defect rates were chosen as a measurement and translated into the number of ready-for-use surgical trays at the time of case setup for every 100 surgical cases. Data from November 2018 through January 20, 2019, demonstrated the mean ready-for-use surgical trays at the time of case setup: for every 100 surgical cases, 96 the surgical trays was ready for use. Further analysis of the data over time demonstrated that variability was out of control. Defects were stratified into 12 categories. Moreover, 6 defects were creating 80% of the issues in trays not being ready: 'hole in wrapper,' 'biohazardous debris,' 'nonbiohazardous debris,' 'missing instrument,' 'incorrect/mislabeled instrument trays,' and 'missing indicators.' Results for unsterile trays at 7:00 A.M. showed that, on average, the central sterilizing department had 100 or more trays at the start of each 7:00 A.M. shift. **Conclusions:** Without a formal method for data collection, defined metrics, and ongoing analysis, evaluation of performance is based on anecdotal conclusions resulting in missed opportunities for improvement and, subsequently, opportunities for improved patient safety. Regularly published visible dashboards provide a true picture of performance, allowing staff to identify unwanted variation and to put interventions in place so that future variation is better controlled and or prevented. Additionally, having solid metrics, even when no industry ones exist, aid in measuring the effectiveness of improvement efforts, such as the DMAIC project, as they move into subsequent phases.

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Measuring Implementation of Antibiotic Stewardship in Critical Access Hospitals Using the NHSN Annual Facility Survey

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Background: Critical access hospitals (CAHs) serving rural communities have numerous limitations regarding resources, infrastructure, and staffing to support antibiotic stewardship programs (ASPs) and related quality improvement activities. The Federal Office of Rural Health Policy (FORHP) established the Medicare Beneficiary Quality Improvement Project (MBQIP) to provide CAHs with specialized technical assistance in quality improvement data collection and reporting to drive improvements in the quality of care and to reduce barriers to establishing ASPs. In 2016, FORHP developed an antibiotic stewardship process measure in partnership with the CDC to assess progress on implementing ASPs and to optimize hospital quality improvement practices related to antibiotic use. This is the first measure to be successfully implemented and reported at a national level to improve the judicious use of antibiotics in hospitals. **Methods:** A process measure was developed to assess adherence to the 7 core elements of a successful hospital ASP (ie, leadership, accountability, drug expertise, action, tracking, reporting, and education), as defined by CDC guidelines. Implementation was accomplished through CAH participation in the NHSN Annual Facility Survey (AFS). Responses were analyzed to assess fidelity to each core element, to

identify trends, and to benchmark measure reporting among 1,350 CAHs across the United States. Responses were mapped to 7 core element categories, and the total number of positive responses were matched to each core element for a specific survey year to track progress. Overall, the measure assessed progress in meeting all 7 core elements, as well as program robustness in the number of actions implemented and the amount of data tracked and reported at each hospital. NHSN reports were generated to tailor technical assistance activities and to assist hospitals with measure uptake and reporting. **Results:** CAH participation in the NHSN significantly increased from 2014 to 2018 (83% response rate). From 2014 through 2018, reporting of the new antibiotic stewardship measure consistently increased. CAHs that met all core elements increased from 18% (2014) to 73% (2018). Performance-based benchmarks enabled hospital comparisons and the establishment of reporting goals. **Conclusions:** This study highlights viable approaches to measuring antibiotic stewardship at a national level to drive improvements in care at hospitals of any size. The implementation of the antibiotic stewardship measure across CAHs demonstrates the impact of federal programs like MBQIP for hospitals that are building capacity for quality improvement. For the first time, CAHs were able to measure and compare their implementation of ASPs to other hospitals at the state and national level.

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Risk Estimate of Duodenoscope-Associated Infections in The Netherlands

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Background: The likelihood of endoscopy-associated infections (EAls) is often referenced from a paper published in 1993 by Kimmery et al¹ in which a risk of 1 exogenous infection for every 1.8 million endoscopies (0.00006%) is proclaimed. Even though Ofstead et al² pointed out in 2013 that this was at least an underestimation by 6-fold because of erroneous assumptions and mathematical errors, the original calculation is still often referred to. In the past decade, multiple outbreaks of multidrug-resistant microorganisms (MDROs) related to contaminated duodenoscopes have been reported worldwide. This leads to the assumption that the former risk calculation is indeed incorrect. **Objective:** We calculated the duodenoscope-associated infection (DAI) risk for the Dutch ERCP practice. **Methods:** We searched and consolidated all Dutch patients reported in the literature to have suffered from a clinical infection linked to a contaminated duodenoscope between 2008 and 2018. From a national database, the number of ERCPs performed per year in The Netherlands were retrieved. Actual numbers were available from 2012 to 2018. Numbers from 2008 to 2011 were estimated and assumed to be equal to 2012. **Results:** In 2008–2018, 3 MDRO outbreaks in Dutch hospitals were reported in the literature, with 21 patients suffering from a clinical infection based on a microorganism proven to be transmitted by a duodenoscope. In that period, ~203,500 ERCP procedures