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Final Copy of Case Study

Status:
Laureate

Year:
2013

Organization Name:
HCA Information Technology and Services

Organization URL:
www.hcahealthcare.com

Project Name:
Clinical Quality Improvement Research Database: Reduce MRSA

Please select the category in which you are submitting your entry:
Health

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

The HCA Clinical Quality Improvement Research Database was built to support a cluster-randomized trial of MRSA prevention strategies. The study, conducted exclusively at 43 HCA-affiliated hospitals across 16 states, concluded the use of antimicrobial soap and ointment on intensive care unit patients reduces bloodstream infections, including Methicillin-resistant Staphylococcus aureus (MRSA), by 44 percent. The study, known as Randomized Evaluation of Decolonization Versus Universal Clearance to Eliminate (REDUCE) MRSA, was a private/public partnership with investigators at Harvard and several other academic institutions, research programs at the Agency for Healthcare Research and Quality (AHRQ) and the Centers for Disease Control and Prevention (CDC). It involved nearly 75,000 patients and more than 280,000 patient days in 74 adult ICUs, and compared the results of three approaches in ICUs: screen all patients and isolate MRSA carriers; targeted decolonization after screening; universal decolonization. The HCA Clinical Quality Improvement Research Database involved a collaborative team of data architects, MEDITECH programming specialists, ETL data managers and clinical data analysts working together across the multi-year

study to manage data acquisition, storage and delivery of data to the research team. The database included standard process information captured on the host clinical information system (MEDITECH) used at a patient's bedside. The data architecture permitted utilization of previously defined data structures, reusability of collected data for other efforts, and flexibility to account for future enhancements and alternate clinical data sources. The MEDITECH data structure required substantial custom programming to produce daily extracts from laboratory, nursing, pharmacy, and materials management, including facility data definitions to interpret results. The ETL process managed data integrity validation. Based on the outcomes of the study, HCA is rolling out universal decolonization protocols for adult ICU. Implementation is expected to be completed at all HCA facilities in early 2013.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

Data collection began in July 2009 and was completed in October 2011. Another two-arm study based on these efforts was approved and is in progress. Active Bathing to Eliminate Infection (ABATE), funded by the National Institutes of Health (NIH), to investigate the impact of reducing healthcare associated infections (HAIs) outside the ICU where more than half of HAIs occur. Data will be collected from more than 50 HCA-Affiliated facilities and their adult noncritical care units. The lack of standardization in clinical information was a significant challenge for statistical analysts during the project. Standardization could be applied to nursing processes and pharmacy, while other data (billing and patient admissions) are standard across the enterprise, but laboratory data could not be standardized. Clinical subject matter experts within HCA were consulted to review practices at individual hospitals and assist the statistical analysts with explanations and translations of data across the time and geographic range. As a result, a broader familiarity with the dynamic properties of clinical data was developed within HCA. The complexity of patient health data was initially underestimated, and remains an area of development within the program. Another challenge during the development phase was the consideration of patient privacy associated with the exchange of clinical information, a unique issue within the broader concerns with data security. Patient identity masking was adapted over the course of the initial work to be programmatically included as part of the data transfer process. Lessons learned from this technology and the large files containing health information have been applied in later efforts.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

The initial 18-month study has concluded, but the Clinical Quality Improvement Research Database continues as a useful tool for other academic research initiatives. The top presentation at the October IDWeek 2012 was based on the outcomes of the initial study. A manuscript on the outcomes of the ICU infection prevention practices was published in the American Journal of Infection Control, 2012. Additional data analysis is ongoing to answer secondary outcomes of impact to blood culture contamination rates, urinary tract infections, emergence of resistance to the active ingredients in the antimicrobial soap and ointment, estimating failure of decolonization by days of product received, and cost analysis. The Clinical Quality Improvement Research Database

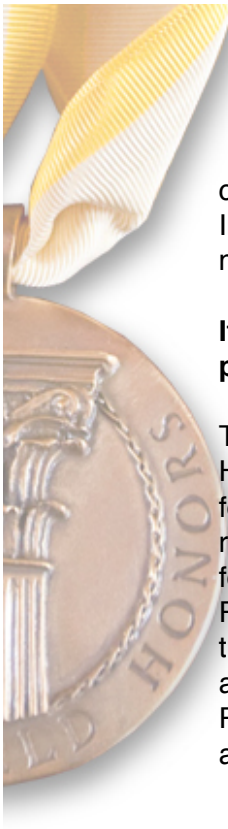
continues to develop and serve as a premier repository for clinical research. The database makes clinical, financial, supply and admission/discharge information available for robust analysis of outcomes and costs. HCA has recently added facilities with new host clinical systems as data sources: MEDITECH 6.0 and Epic. Under initial requirements to remain source system agnostic, this data is now being added to the Clinical Quality Improvement Research Database and integrated within the repository.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

Investigators found universal decolonization reduced the number of patients harboring MRSA by 37 percent. Patients harboring MRSA are not sick because of it, but they are at risk for later illness and for spreading it to others. All bloodstream infections decreased by 44 percent. The researchers noted that this trial took place in HCA facilities, mostly in community hospitals, rather than academic institutions and was conducted by hospital personnel rather than specially trained research staff. Therefore, unlike some clinical studies, these results are likely to be applicable to nearly all U.S. hospitals. Institutional knowledge gained during the collaborative efforts of the REDUCE MRSA research and the continued development of the Clinical Quality Improvement Research Database has fundamentally increased HCA's ability to utilize clinical data in the support of patient care. In addition to successful attestation of 134 HCA facilities under the CMS Meaningful Use Program, new efforts focused on clinical dashboards, health information exchange and clinical data marts continue to benefit from this seminal work.

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here. (In 300 words or less.)

HCA and its research partners planned the study to impact clinical practice at the bedside. The easy-to-use solutions evaluated during the study helps clinicians protect patients from MRSA and other drug-resistant infections that are known to be deadly for patients in healthcare settings. The ultimate goal of this effort was to prevent infections and save patients' lives. Investigators found that using universal decolonization reduced the number of ICU patients carrying MRSA by 37 percent in the universal decolonization group, compared to no change among patients who were screened and isolated. Bloodstream infection due to all causes in the universal decolonization intervention group decreased to 3.6 cases per 1,000 patient days in the hospital, down from the previous rate of 6.1. All bloodstream infections decreased by 44 percent. Patients harboring MRSA are not sick because of it, but they are at risk for later illness and for spreading it to others. The researchers noted that this trial took place in HCA facilities, mostly in community hospitals, rather than academic institutions and was conducted by hospital personnel rather than specially trained research staff. Therefore, unlike some clinical studies, these results are likely to be applicable to nearly all U.S. hospitals. Based on the outcomes of the study, HCA is rolling out universal decolonization protocols for adult ICU. Implementation is expected to be completed at all HCA facilities in early 2013. Broader availability of clinical data has been made possible by the push toward electronic health records at many healthcare institutions, as mandated by compliance with federal law. The multi-disciplinary team of clinical and technical



contributors involved in the planning and development of the HCA Clinical Quality Improvement Research Database was absolutely essential and could be used as a model for others institutions.

If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

The successful partnership between HCA IT&S, the clinical/business leadership within HCA Clinical Services Group, and our affiliated hospitals, created an environment which fostered a shared commitment among these public/private sector partnerships in clinical research. The HCA Clinical Quality Improvement Research Database serves as the foundation for continued work with our Academic Research Consortium (Harvard Clinical Research Institute (HCRI), Cardialysis, the Cardiovascular Research Foundation (CRF), the Duke Clinical Research Institute (DCRI), with advisory participation of the U.S. Food and Drug Administration (FDA), research programs at the Agency for Healthcare Research and Quality (AHRQ), the Centers for Disease Control and Prevention (CDC), as well as the National Institutes of Health (NIH).