A Visual Analytics Antibiogram Dashboard as Part of a Comprehensive Approach to Perioperative Antibiotic Administration

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Background: Many hospitals routinely perform antimicrobial susceptibility testing for bacterial pathogens; the results are often organized into a summary table, or antibiogram, which may be used by clinicians as a reference guide to antimicrobial resistance patterns. Antibiograms lend information that can be used to raise awareness of resistance problems, support the use of optimal empiric therapy, and identify opportunities to reduce inappropriate antibiotic usage. At many hospitals, antibiograms are static documents that are generated from laboratory data and distributed to house staff once per year. Pediatric anesthesiologists are often tasked with administering perioperative antibiotics either for prophylaxis or to treat an active systemic infection.

Objectives: To develop a secure, Web-based, institution-specific, user-friendly visual analytics antibiogram dashboard using EHR data in near real-time that can be accessed in the operating room setting using the anesthesia information management system computer workstation.

Methods: We created a visual analytics antibiogram dashboard using both SQL queries of our EHR database and enterprise analytical software to track bacterial pathogens and their antimicrobial sensitivity at The Children’s Hospital of Philadelphia. The antibiogram dashboard provides a user interface to explore our hospital’s laboratory EHR data in near-real time and facilitates the rapid assessment of susceptibilities and resistances of microorganisms of interest to various antibiotics.

Results: A visual analytics antibiogram dashboard specific to our institution was designed and implemented as described in the methods. The dashboard allows the user to display up-to-date, hospital-specific antibiotic sensitivity data for a particular organism using a variety of filters and drop down menus.

Conclusion: Pediatric anesthesiologists are often given the task of administering perioperative antibiotic prophylaxis. While infectious disease specialists usually guide the antibiotic choices and dosages, there remains a dearth of information at the time of antibiotic administration in the operating room regarding the susceptibility of organisms to the chosen antibiotic.
medication. This data and dashboard will be an integral part of a project to optimize perioperative antibiotic treatment based on our hospital's EHR data.