Visual Analytic Tools for Automated Measurement and Tracking of Durations of Therapy for Pneumonia, Urinary Tract Infections, and Skin and Soft Tissue Infections

BACKGROUND

- Antimicrobial stewardship includes measurement of the appropriate use of antimicrobials including duration of therapy.1
- The durations of therapy reportedly used in patient care for pneumonia, urinary tract infections (UTI), and skin and soft tissue infections (SSTI) routinely exceed the maximum durations supported by evidence and guidelines.2,4
- Optimizing duration of therapy to within recommended ranges would lead to significant reduction in total antibiotic use.5
- Measuring and tracking indication-specific duration of therapy for hospitalized patients is complex and labor intensive because patients receive multiple different antimicrobials sequentially and an antimicrobial course often spans both inpatient and outpatient settings.
- An automated tool capable of calculating duration for common infections would be valuable for antimicrobial stewardship programs to efficiently and reproducibly identify and track interventions.

METHODS

- We developed visual analytic tools that connected AU to corresponding patient-level indication and calculated duration of therapy.
- AU was abstracted from the Veterans Affairs Corporate Data Warehouse.
- The tools incorporated AU data for patients admitted to medical, surgical, and intensive care units.
- The tool was developed for pneumonia, UTI, and SSTI based on ICD-9-CM or ICD-10-CM admission and discharge diagnosis codes.
- Inpatient duration was calculated according the NHSN's AU Module. Each calendar day one or more antibiotics were administered counted as a day of therapy. Outpatient duration was calculated based on antimicrobial(s) prescribed at discharge and days supply.
- The tool is currently being piloted at 8 Veterans Affairs Medical Centers. Antimicrobial stewardship team members from each of the participating sites meet monthly via conference call as part of the Antimicrobial Use Learning Collaborative. Participants discuss usability of the tool, observations, and clinical applications.
- We report the mean durations of therapy for pneumonia, UTI, and SSTI via the visual analytic tools across Veterans Affairs Medical Centers specifically highlighting the 8 members of the Antimicrobial Use Learning Collaborative.

RESULTS

- Duration of therapy represents an opportunity for VA antimicrobial stewardship programs to reduce unnecessary antibiotic exposures.
- The tool provided an automated method to calculate durations of therapy allowing antimicrobial stewardship programs to efficiently and reproducibly identify and track interventions.
- Durations of therapy for pneumonia, urinary tract infections, and skin and soft tissue infections were variable and consistently in excess of evidence-based recommendations.
- Duration of therapy varies 1.5-2 fold across sites depending on the indication and year.
- Pneumonia: All 8 sites had a mean duration > 7 days in both 2015 and 2016. In 2015 and 2016 respectively, 5/8 (63%) and 6/8 (75%) sites had a mean treatment duration > 10 days. A > 2 day reduction in duration from 2015 to 2016 was observed at 2 sites.
- Urinary tract infections: All 8 sites had a mean treatment duration > 7 days in both 2015 and 2016. In both 2015 and 2016, 5/8 sites had a mean treatment duration > 10 days. One site observed a > 2 day decrease while 1 site observed an increase in duration from 2015 to 2016.
- Skin and soft tissue infections: All 8 sites had treatment durations > 10 days in both 2015 and 2016. A > 2 day increase in treatment duration from 2015 to 2016 was observed at 1 site with no notable changes at the other sites.

REFERENCES