Electronic Antimicrobial Stewardship: Reducing Incidence of Drug-Resistant Infections and Associated Costs

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BACKGROUND
In January 2015 an Antimicrobial Stewardship Program was implemented at Health Quest’s flagship hospital; Vassar Brothers Medical Center (VBMC) a 365 bed facility in Poughkeepsie, NY.

REJECTED ANTIBIOTICS:
- AZTREONAM
- CEFEPIME HCl
- DAPTOMYCIN
- ERTAPENEM
- MICAFUNGIN
- SODIUM
- VORICONAZOLE

Careful regulation of the aforementioned antimicrobials was enacted to minimize the risk of furthering development of resistant genotypes among microbes, which are already widely refractory to treatment.

Under the “Electronic Antimicrobial Stewardship Program” ED and admitting providers face particular restriction in antimicrobial prescribing duration:
- Patients initiated on any of the restricted intravenous (IV) antimicrobials are limited to a single-dose or 24 hour treatment while culture and sensitivity results are pending.
- When pharmacy orders are placed for any of the targeted antimicrobials a referral is automatically generated prompting consult to an infectious disease, hem/oncology or intensivist specialist. Following careful review of culture and sensitivity findings this specialist then rules on which intervention will be most appropriate in treating the current infection.

Specialists were divided into groups with variant prescriptive capabilities:
- Hematologists and oncologists were given Level 2 clearance to prescribe Cefepime and Aztreonam beyond the first 24 hour dose.
- Pulmonologists and critical care intensivists (Level 3) were enabled to prescribe subsequent doses for the two aforementioned agents as well as Meropenem.
- Infectious disease specialists were afforded unlimited prescribing capabilities of all antimicrobials targeted in this intervention.

RESULTS
Retrospective analysis of population data related to these targeted antimicrobials revealed statistically significant results.
- Total number of patients being treated by infectious disease specialists increased 21.25% (p= 0.05-0.02) between 2014 and 2015.
- Number of orders for targeted antimicrobials placed by infectious disease specialists increased by 19.87% (p=0.05-0.02).
- Total number of patients being treated with targeted antimicrobials decreased by 12.4% (p=0.01-0.005).
- VBMC spending on antimicrobials also declined by 22.2% resulting in a $293,527.14 financial savings in 2015 when compared with 2014 data.

METHODS
- Population data was garnered from EMR recording of patient financial identification numbers which were subsequently cross-correlated with the providers prescribing targeted antimicrobials.
- Fiscal data was derived from historical pharmacy financial spending records and isolated for targeted antimicrobials.
- Results listed above were sorted for 2014 (pre-intervention) and 2015 (post-implementation) annual reporting.

CONCLUSIONS
Health Quest’s “Electronic Antimicrobial Stewardship Program” via acute-care EMR (Electronic Medical Record) re-programming has resulted in:
- Enhanced therapeutic longevity of new-generation antimicrobial agents,
- Improved, more specialized patient care practices,
- Limited contributions to the progression of multiple-drug resistance and nosocomial infections,
- $293,527.14 in financial savings within the first year of program enactment.