184. Implementation and Evaluation of an Electronic Antimicrobial Prior Authorization Approval Process at a Large Academic Medical Center

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Background. Prior authorization (PA) of antimicrobial agents is recommended by CDC as a core antimicrobial stewardship (AMS) intervention and has been a cornerstone of the Hospital of the University of Pennsylvania (HUP) AMS program since its inception. Previously, prescribers called the PA pager, waited for a callback, discussed the case with the AMS team, and received approval or an alternative recommendation. The objective of this study was to implement a new electronic prior authorization approval platform within existing clinical decision support software (CDSS) and evaluate its utilization.

Methods. Electronic PA was introduced to HUP prescribers in January 2017. At the point of order entry for a restricted agent, an approver's name is a required field. In the CDSS, the request is initiated by selecting the patient and indication for use. The next screen displays additional risk factors to select and auto-populates the patient's current and historic cultures. The requestor selects the relevant cultures and desired antimicrobial(s), enters contact information, and submits the request. Review and approval by AMS team are completed in the CDSS, often without requiring a phone call. Pharmacy views a log of requests to determine whether the name given on the order as approver is true. Process metrics were evaluated using a retrospective cohort study from January 2017 through December 2017.

Results. There were 437 unique users of the PA system. Uptake over time is displayed in Figure 1. 1,934 unique patients had 3,329 requests submitted. The most frequent indications were for prophylaxis, other, and pneumonia. Levofloxacin was most commonly requested (36.76%, 1,297 of 3,528), followed by meropenem, caspofungin, and fluconazole. 88.7% (2,952 of 3,329) of overall requests approved. The frequency of PA requests by hour is presented in Figure 2. During AMS hours, the median time to response was 18 (8–42) minutes. 18.4% (649 of 3,528) of requests were submitted during off hours.

Figure 1. Cumulative total of new requestors

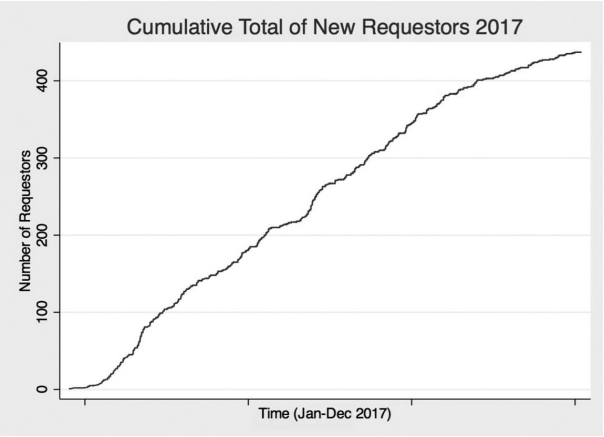
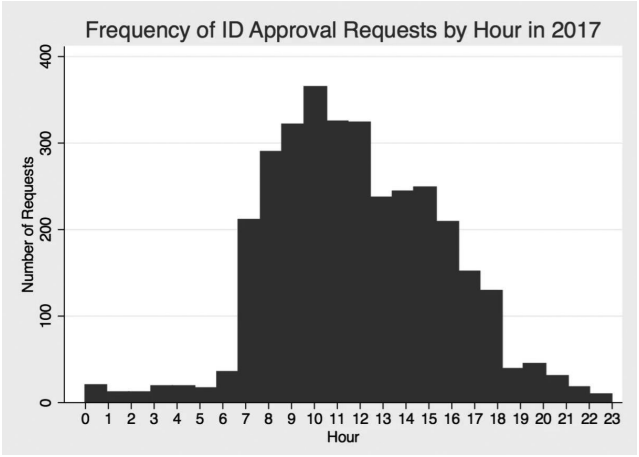


Figure 2. Frequency of PA requests by hour



Conclusion. Based on user uptake and response times, electronic PA was successfully implemented at HUP. Software to facilitate PA shows promise to assist in facilitating PA and tracking relevant process metrics.

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185. Implementation of a Clinical Decision Support System (CDSS) for Ordering Antimicrobials in a Veterans Affairs Medical Center (VAMC): Results From a Pilot Quality Improvement (QI) Project

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Background. When used as antimicrobial stewardship (AS) tool, CDSS built into electronic health record systems (EHRs) have been associated with more appropriate antimicrobial (AM) use. This QI project aimed to determine the perception toward, acceptance and utilization of an AM-CDSS by internal medicine providers at the Houston VAMC.

Methods. From October 2017 to March 2018 (pilot period), ID pharmacists trained members of two to four general medicine inpatient teams/month in the use of the AM-CDSS and provided surveys to be completed during the first (pre) and last week (post) of a 1-month rotation. Surveys focused on the provider's prescribing patterns, self-perception of infectious diseases knowledge, as well as provider's awareness, perception of utility, ease of use of the AM-CDSS, and its impact on prescribing patterns. A retrospective chart review was conducted to compare the appropriateness, route and duration of AMs ordered and not ordered through the AM-CDSS. For this comparison, patients were randomly selected from patients with same discharge ID diagnosis matched 1:1 each month.

Results. Through the pilot period, the AM-CDSS had a continual rate of increased usage of 4.4 AM orders/month. A total of 113 surveys were collected (63 pre-AM-CDSS and 50 post-AM-CDSS). Eighty percent of respondents reported having used the AM-CDSS, and 76% reported wanting to continue to use the AM-CDSS. The most common reasons cited for using it were to confirm their AM approach and to practice up-to-date evidence-based medicine. Thirty percent stated that it was hard to locate within the EHR. A total of 120 AM orders (AM-CDSS = 60 and non-AM-CDSS = 60) were reviewed for appropriateness. The most common indications for the orders were CAP (34.2%) and UTI (33.3%). AM-CDSS orders were more likely to be appropriate (83.3 vs. 50%, $P = 0.0002$) and to include oral AMs (58 vs. 13.6%, $P < 0.0001$) than non-AM-CDSS orders. There was a not significant shorter duration of therapy in the AM-CDSS group (8.7 vs. 9.4d, $P = 0.46$).

Conclusion. Most providers perceived the AM-CDSS as useful and easy to use. The use of the AM-CDSS was associated with more appropriate AM use and more frequent selection of appropriate oral AMs. When feasible, AS programs with trainees should consider including easily accessible AM-CDSS in their EHR.

Disclosures. **All authors:** No reported disclosures.

186. Effective Antimicrobial StewaRdship StrategIES (ARIES): Cluster-Randomized Trial of a Clinical Decision Support System to Supplement Antibiotic Prospective Review and Feedback

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Background. Prospective review and feedback (PRF) of antibiotic prescriptions is a tenet of antimicrobial stewardship (ASP), but labour intensive. Clinical Decision Support Systems (CDSS) have the potential to automate some of this work. We hypothesised that increasing prescriber engagement with the CDSS would reduce the requirement for PRF by the ASP team and improve prescribing behaviour without causing harm

Methods. A parallel-group, 1:1 block-cluster randomized, cross-over study was conducted in 32 medical and surgical wards from March 2017 to August 2017.

Participants in Arm A were allocated to voluntary use of CDSS by the clinician at first prescription of piperacillin–tazobactam or a carbapenem, while in Arm B, CDSS use was compulsory. PRF continued for both arms.

Results. Six hundred fourty-one and 616 participants were included in Arms A and B, respectively. At baseline, Charlson's co-morbidity and APACHE II scores were comparable. Initial antibiotic prescriptions were similar, and the majority were for respiratory (67.0% vs. 68.2%) or urinary (17% vs. 19.6%) infections.

CDSS recommendations were provided to 20.6% of participants in Arm A and 99.4% in Arm B ($P < 0.01$). Arm B adopted a higher number of CDSS antibiotic de-escalation (1.1% vs. 2.6%), dose optimization (9.7% vs. 30.7%), antibiotic optimization (8.9% vs. 31.3%), and duration setting recommendations (10.9% vs. 50%). The proportion of participants receiving PRF recommendations were not, however, significantly different between arms (8% vs. 11.5%, $P = 0.13$). The types of PRF recommendations and prescriber acceptance rates were also similar. The duration of antibiotic use was significantly shorter when prescribers were compelled to use the CDSS (daily defined doses ≤3: 71.8% in Arm B, 64.9% in Arm A, $P < 0.01$). There was no evidence of harm from the CDSS, with similar 30-day mortality (HR 0.87, 95% CI 0.67–1.12), 30-day re-infection (20.6% vs. 23.1%, $P = 0.29$) and 30-day re-admission rates (14.4% vs. 14.1%, $P = 0.91$). The median length of hospital admission was also similar (15 IQR 5–64 vs. 15, IQR 4–70 days).

Conclusion. Compulsory use of a CDSS at antibiotic prescription did not reduce the requirement for PRF, but limited the duration of antibiotic courses, without compromising clinical outcomes

Disclosures. **All authors:** No reported disclosures.

187. Comparison of Active Versus Passive Strategies in Improving Compliance to Antimicrobial Stewardship Interventions

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Background. In Singapore General Hospital, the use of the Computerized Decision Support System (CDSS) is mandatory when antibiotics audited by the hospital antimicrobial stewardship program (ASP) are prescribed. It was envisioned that CDSS could, in part, replace the need for ASP review via prospective audit-feedback (PAF). However, quality of CDSS use is prescriber-dependent, and inappropriate use (diagnosis selected is incongruent with antibiotic indication specified in patient notes) was observed. We investigated the role of prescriber enablement and engagement as strategies to improve CDSS appropriateness rates (CAR).

Methods. A series of interventions was rolled-out in January 2018. Intervention 1 (I1) was implemented hospital wide—an expanded repertoire of antibiotic guidelines, display of CDSS selected diagnosis on the hospital's electronic medical record, education and publicity via mass emails. Intervention 2 (I2) involved conducting additional roadshows but only in selected clinical departments (one major medical and two major surgical departments). CAR (prospectively evaluated by ASP team) 3-months pre- and post-implementation of these interventions were compared using interrupted time-series analysis. Its potential impact on ASP manpower in place of PAF (30 minutes/case) was estimated.

Results. An average of 1,043 antibiotic courses, piperacillin–tazobactam (75.7%) as the most common, was prescribed with CDSS per month. Unspecified sepsis (51.5%) was the most common indication. Departments with I1 alone had mediocre improvement in CAR [66.8% ($n = 1,699$) vs. 68.9% ($n = 1,760$), $P = 0.10$], while departments that received a combination of I1 and I2 saw greater improvement in CAR, with a trend toward statistical significance [60.4% ($n = 354$) vs. 68.3% ($n = 393$), $P = 0.07$]. Improvement in CAR was most apparent in the surgical departments (50.6% vs. 59.4%, $P = 0.09$). This absolute increment in CAR meant manpower savings of 6.5 hours/month, and could potentially reach 41 hours/month had both interventions been implemented and similar results achieved hospital-wide.

Conclusion. Active prescriber engagement is pivotal in effectively obtaining buy-in to and success of ASP strategies.

Disclosures. **All authors:** No reported disclosures.

188. A Novel Inpatient Antibiotic Stewardship Assistance Program (ASAP) Using Real-Time Electronic Health Record Data, Prediction Modeling and Epidemiologic Data to Provide Personalized Empiric Antibiotic Recommendations

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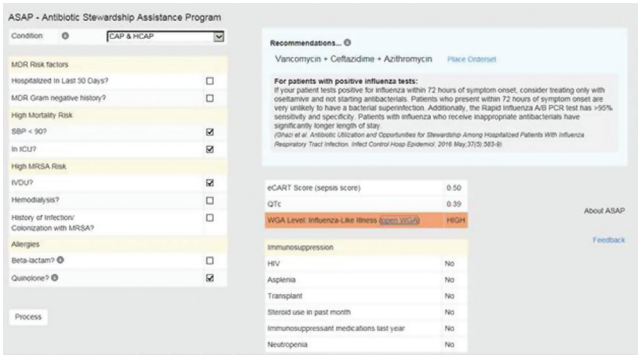
Background. Antibiotic prescribing varies amongst clinicians, which can result in inappropriate or overuse. Inappropriate antibiotics can increase the risk of adverse drug events and multi-drug-resistant organisms (MDRO). Decreasing variability and increasing alignment with guideline-based therapy may improve antimicrobial stewardship and outcomes.

Methods. We developed a point of care stewardship tool embedded in the electronic health record (EHR) that provides empiric antibiotic recommendations for four syndromes, urinary tract infection (UTI), abdominal biliary infection (ABI), pneumonia, and cellulitis. We identified key variables that alter antibiotic selection or need for infectious disease (ID) consultation such as allergy history, immunosuppression and risk factors for MDRO, and mortality. We created algorithms of preferred empiric antibiotic choices based on national and hospital guidelines using these risk factors. We used a weighted incidence syndromic combined antibiogram (WISCA) prediction model to recommend ID consultation when likelihood of coverage was below a defined threshold. We also incorporated a home-grown epidemiologic tool that takes real-time data from outpatient clinics on incidence of influenza-like-illness (ILI) to recommend influenza PCR testing during periods of high ILI risk. Data on risk factors and WISCA variables including demographics, allergy history, ICD10 codes, vitals, laboratories, and microbiology results were extracted in real-time from the EHR and sent via URL into a web server which has an embedded Windows ASP.NET C# web site and an SQL server database. The web server was then embedded back into the EHR. This tool stores recommendations into the database for stewardship auditing.

Results. Thirteen key and 20 WISCA variables are extracted from the EHR in real-time. There are eight distinct antibiotic recommendations for UTI and ABI, 12 for cellulitis, and 40 for pneumonia. An illustration of the ASAP tool is shown in Figure 1.

Conclusion. ASAP is an HER-embedded platform that provides clinicians access to personalized antibiotic prescribing tied to best practices and optimal stewardship initiatives. Future work will look into the tool's effect on variation in care, antibiotic prescribing, and outcomes.

Figure 1:



Disclosures. **All authors:** No reported disclosures.

189. Evaluating the Impact of Mandatory Indications on Antibiotic Utilization: A Retrospective Study

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Background. Mandatory indications for antimicrobial agents are recommended by a number of organizations to act as a force function, requiring prescribers to provide a reason for prescribing at the time of order entry. We evaluated the impact of introducing a mandatory indication field into electronic order entry for selected antibiotics on utilization of antibiotics at a large community hospital in the context of an established antimicrobial stewardship program.

Methods. A descriptive analysis of the mandatory indication fields for the study antibiotics (intravenous and enteral clindamycin, ciprofloxacin, metronidazole, moxifloxacin, and vancomycin) for adult patients 18 years and above for 1-year (December 1, 2015–November 30, 2016) postimplementation was conducted. An independent *t*-test was used to measure the primary outcome of change in drug utilization of study and control antibiotics before (6 months pre) and after (12 months post) the initiation of mandatory indications. Drug utilization was calculated as days of therapy (DOT)/1,000 patient-days for both the study and control antibiotics individually and as a group. Oral amoxicillin/clavulanate and intravenous piperacillin/tazobactam orders which have no mandatory indications were used to examine any associated shifts in antibiotic utilization.

Results. A total of 8,399 orders were evaluated in the 1-year post-implementation period; of which, 4,572 were for study antibiotics. The preset mandatory indications were selected 30–55% of the time. For the primary outcome, there was a statistically significant decrease in DOT/1,000 patient-days for study antibiotics as a group pre- and postintervention (mean 100 vs. 82, $P = 0.024$) as but not individually. However, there was a statistically significant increase in DOT/1,000 patient-days for the control