Figure 1. Antimicrobial Stewardship Education and Poster Distribution

Methods. Awareness Week (AAW) was utilized as a platform to promote antimicrobial stewardship education “very” or “extremely” useful, and 43.6% reported they “always or sometimes” completed the survey, of which 97.5% had seen the visual aids, 70% had found the education “very” or “extremely” useful, and 43.6% reported they “always or sometimes” treated AS pre-AAW vs 15% post-AAW (p< 0.01). Conclusion. AS posters and education defining ASB significantly decreased the treatment of ASB. AAW education on ASB antimicrobial stewardship demonstrated a high value and shifted prescribing behavior to avoid antibiotic treatment of ASB. A similar approach to deliver provider education could serve as a valuable model to change provider AS practices for ASB.

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174. Development of a Machine Learning Prediction Model to Select Empirical Antibiotics in Patients with Clinically Suspected Urinary Tract Infection using Urine Culture Data

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Increasing antimicrobial resistance and the emergence of superbugs are problems globally. Inappropriate empiric antibiotic use would be a reason to cause antibiotic resistance. However, it has been a challenge to prescribe empiric antibiotics as it is difficult to identify the causative organism beforehand. In this study, we aimed to develop a prediction model to estimate the risk of antibiotics resistance using urine culture tests.

Methods. The study population included adult patients who had at least one of the results from a urine culture test and antibiotic susceptibility tests (from ampicillin, ceftriaxone, ciprofloxacin, gentamicin, levofloxacin, nitrofurantoin, tetracycline, trimethoprim/sulfamethoxazole) on admission to Ajou University Medical Center. Outcomes were defined as a resistant or intermediate susceptibility. Candidate predictors were diagnosis, prescription, visit, laboratory, procedures of the study population. We split data to 75:25 for training and test. Lasso logistic regression (LLR), extreme gradient boosting machine (XGB), Random Forest (RF) were used as model algorithms. The models were evaluated by an area under the curve of receiver operator characteristics curve (AUROC), precision-recall curve (AUPRC), and its calibration. All codes are available in https://github.com/ABMI/AbxBetterChoice

Results. Total 33 covariates were selected for final prediction models. The RF showed the highest AUROC in the ceftriaxone and tetracycline models (0.823, 0.626, respectively). The XGB presented the highest AUROC for ciprofloxacin and nitrofurantoin (0.731, 0.706, respectively). The AUROC of RF and the XGB were the same in an ampicillin model (0.633). For gentamicin, levofloxacin, and trimethoprim/sulfamethoxazole, the AUROC of LLR was the highest (0.731, 0.706, respectively). Among the models, the AUROC was the highest in the gentamicin model regardless of algorithms. All calibrations of the models were acceptable.

Table 1 Overall performance of antibiotics susceptibility test prediction model with three different machine-learning algorithms

| Antibiotics susceptibility tests | AMP | CRO | GEN | LVX | NIT | TET | TMP | SXT |
|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Overall performance             |     |     |     |     |
| Cases in test set (%)           | 3,610 | 782 | 4,160 | 782 | 507 | 1,479 | 0.554 | 3.684 |
| Accuracy (95% CI)               | 2,474 | 135 | 2,077 | 116 | 274 | 398 | 1,359 | 1,054 |
| Cohen’s kappa                   | (0.55) | (17.3) | (49.1) | (17.3) | (59.0) | (24.7) | (28.5) | (47.7) |
| Overall performance             |     |     |     |     |
| Lasso logistic regression       |     |     |     |     |
| AUROC                           | 0.628 | 0.758 | 0.729 | 0.838 | 0.631 | 0.669 | 0.623 | 0.615 |
| AUPRC                           | 0.707 | 0.503 | 0.722 | 0.992 | 0.663 | 0.469 | 0.398 | 0.580 |
| Calibration slope               | 1.002 | 1.042 | 0.988 | 1.052 | 1.328 | 0.987 | 0.987 | 0.988 |

Conclusion. We developed prediction models with competing performances of discrimination and calibration. It would contribute to the proper selection of empiric antibiotics susceptible to those causative pathogens in hospitalized patients with a clinically suspected urinary tract infection.

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175. Assessment of Institutional Uptake of Vancomycin AUC Monitoring One-Year Post Guideline Publication in Hospitals Across the United States

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. The aim of this study was to assess the institutional uptake of vancomycin AUC monitoring in hospitals across the United States.

Methods. We conducted a retrospective analysis of the U.S. Antimicrobial Stewardship Collaborative (USASC) database, a national, anonymous, voluntary reporting system. We included hospitals that reported at least one year of data from 2010-2018. Uptake was defined as the percentage of hospital years with reported vancomycin AUC monitoring. Hospitals were evaluated by patient capacity, AUC monitoring guidelines availability, and antimicrobial stewardship program availability.

Results. A total of 131 hospitals was included in the analysis. The uptake of vancomycin AUC monitoring was 26.0% in 2010 and increased to 81.7% in 2018. The uptake was significantly higher in hospitals with an AUC monitoring guideline (83.3% vs 56.1%, p< 0.01) and an antimicrobial stewardship program (92.4% vs 71.0%, p< 0.01). There was a positive correlation between hospital capacity and the uptake of vancomycin AUC monitoring (rs = 0.33, p< 0.01).

Conclusion. The uptake of vancomycin AUC monitoring has increased significantly across the United States since 2010. hospitals with an AUC monitoring guideline and an antimicrobial stewardship program had a higher uptake. Future studies should focus on identifying factors that contribute to the successful implementation of vancomycin AUC monitoring in hospitals.

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