



Conversion of a Complex Legacy Antimicrobial Stewardship Clinical Decision Support System into Epic

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Introduction

- Computer-based antimicrobial monitoring (CBAM) was a rules-based informatics program developed at Mayo Clinic in the 1980s¹
- In January 2015, Mayo Clinic announced selection of Epic as its partner for a single, integrated electronic health record (EHR)
- Epic's Bugsy application provides functionality for infection control and antimicrobial stewardship
- Minimum functionality requirements of CBAM such as rule interaction (e.g. dismiss/defer) and complexity were unable to be replicated due to constraints by Epic's Bugsy application
- Development of a custom prototype was piloted during the MN go-live and successful. Iterative enhancements were made throughout the project and full-scale conversion was completed by RST go-live

Methods



Results

- A total of 75 converged rules were scoped for implementation by the WI Go-Live. Of the 75, 17 were unable to be replicated by the original date, but were subsequently completed by the RST Go-Live
- False positives and usability issues characterized the RST Go-Live and optimization persisted until project closure on Jan 1, 2019
- Despite challenges, existing prototype is markedly improved from earlier versions and has served to inform Epic on multiple areas for future development
- Estimated effort for each rule ranged between 5 to 30 hours (average: 18.58)

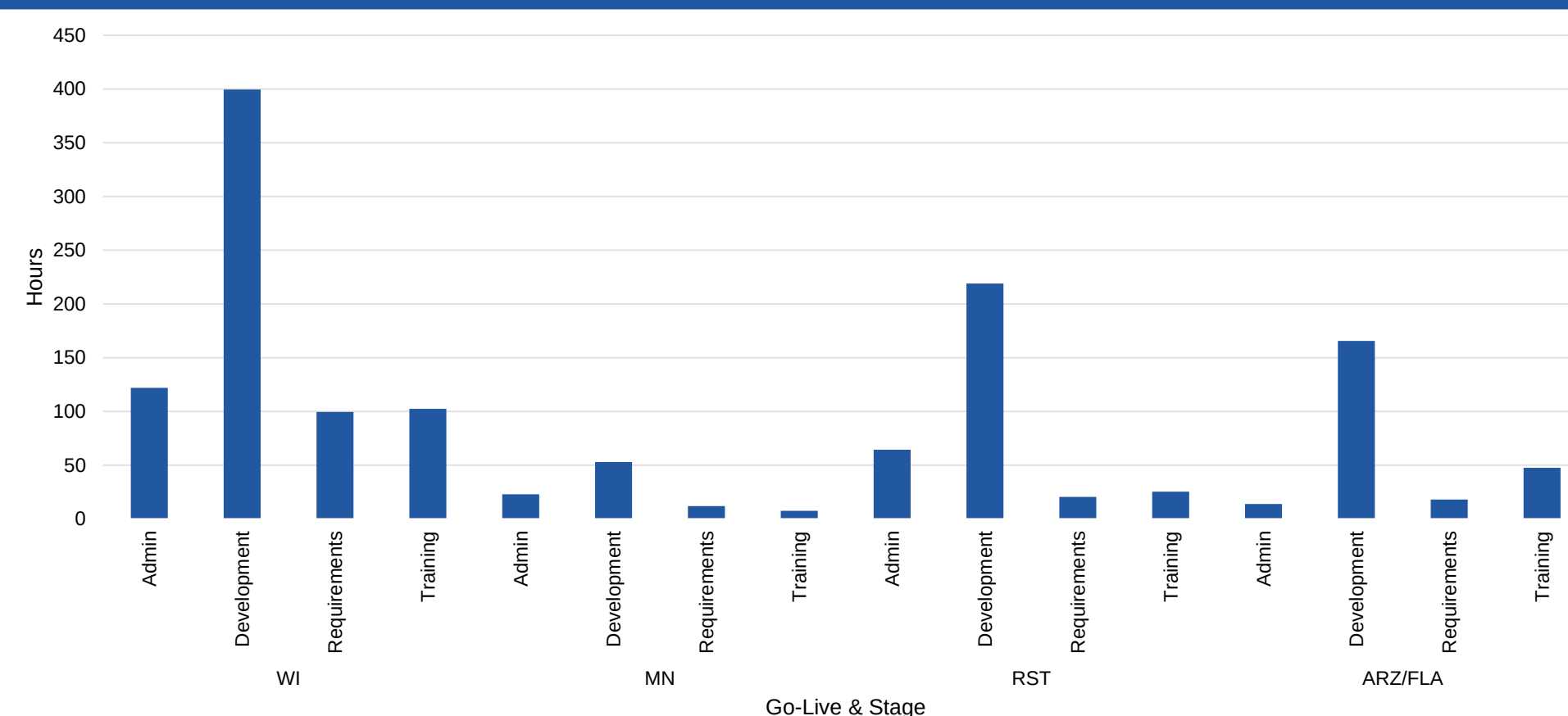
Effort by Stage

Stage	Number of Hours
Requirements	150
Development	837
Administrative	223.5
Training	183
Total	1393.5

Maintenance & Complexity

Measure	Pre-RST	Post-RST
# of hours	1148.5	245
# of days	1056	154
Hours per 100 days	108.8	159.1

Effort by Go-Live & Stage



Discussion

- Ideal project analysts should have knowledge of Boolean logic, interfaces, informatics, and experience in infectious disease practice
- The number of shared records, primarily microbiology, creates a favorable and synergistic relationship between infection control and antimicrobial stewardship
- Resourcing for project fluctuated between 0.5 – 2 FTEs across four individuals
- Agile approach to implementation was critical given the limitations of the EHR
- Future plans include exploring application of artificial intelligence to further optimize the rules

Conclusions

- Synergistic for analysts to work on both infection control and antimicrobial stewardship
- Most challenging barriers were 1) inability to interact with rules, 2) lack of relative properties for rule creation, and 3) display of triggering orders
- Knowledge of lab information systems (LIS), interface configuration, and microbiology is important given the dependency of the Bugsy application on discrete microbiology results

References

- Wilson JW, Oyen LJ, Ou NN, et al. Hospital rules-based system: the next generation of medical informatics for patient safety. Am J Health Syst Pharm. 2005 Mar 1;62(5):499-505. PubMed PMID: 15745913. JW,