# Innovation Improving Antimicrobial Stewardship in Post-Acute and Long-Term Care

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## Background

Antibiotics are prescribed frequently in post-acute and long-term care (PALTC) facilities and can lead to adverse drug reactions, drug-drug interactions, and development of antibiotic resistance.[1] The Centers for Disease Control and Prevention (CDC) suggest monitoring antibiotic adverse drug events (AADE) as an appropriate patient outcome measure in antibiotic stewardship programs.[2] However, many nursing homes lack the tools needed to facilitate tracking these data. In Maryland nursing homes, as many as 56% of respondents report not knowing the type of AADE data collection tool is used and 27% use none.[3]

A benefit of antibiotic stewardship programs is to reduce potential harm to nursing home residents. Successful antibiotic stewardship programs should decrease AADEs by optimizing antibiotic use, but first they must be able to identify and track AADEs.

## Objectives

Our objective was to develop a standardized antibiotic adverse drug event (AADE) clinical decision support tool and workflow that could be embedded in PALTC electronic health records (EHRs).

## Quality Improvement Innovation

The Maryland Antimicrobial Stewardship Collaborative was funded by the CDC and the Maryland Department of Health, in part, to evaluate, recruit, and implement antibiotic stewardship initiatives across health settings, including PALTC. Strategies included development and dissemination of continuing education, clinical decision making tools, or patient education materials including the CDC's *Core Elements of Antibiotic Stewardship for Nursing Homes*.[4]

- The Maryland Antimicrobial Stewardship Collaborative , led by The Peter Lamy Center on Drug Therapy and Aging, University of Maryland, School of Pharmacy developed an AADE template
- Think Research – a digital healthcare solutions company, refined the AADE tool for integration as a prototype into an EHR
- Multiple interviews with key PALTC stakeholders helped to shape the components, style, format and flow of the AADE tool
- Interprofessional collaboration occurred with physicians, nurses, pharmacists, administrators, epidemiologists and infection control/quality assurance specialists
- The prototype was demonstrated at the Antimicrobial Stewardship Summit to prospective nursing home users in Maryland to gather feedback and recommendations for improvement
- Recommended changes were incorporated and reviewed with key stakeholders post Summit
- Proposed workflow integration (Figure 1) was developed

## Funding and Disclosures

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Dr. Zarowitz is a strategic advisor to Think Research, Toronto, Canada.

## Methods

- Common AADEs were characterized by signs and symptoms into gastrointestinal, renal, cardiovascular, hematologic, hepatic, skin, anaphylaxis, myositis/tendinitis, and neurologic AADEs, using the Tamma article as a point of reference.[5]
- Clinical algorithms were developed that identify antibiotics most commonly associated with signs and symptoms of AADE, median occurrence time post-antibiotic initiation, and suggested laboratory monitoring parameters (Figure 2).

**Figure 1: Proposed Antibiotic Adverse Drug Event Workflow**

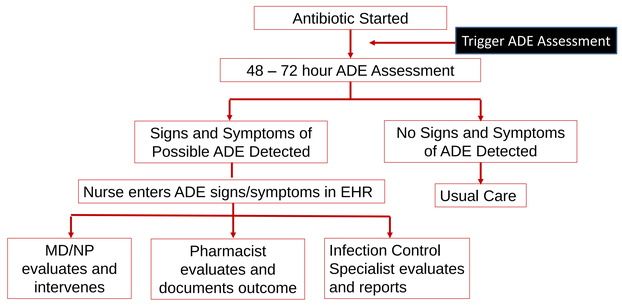
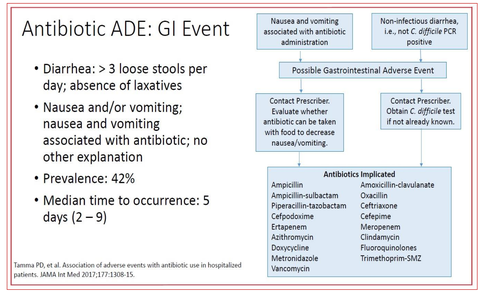



**Figure 2: Algorithms, Characteristics, and Causes of GI and Renal AADEs**




## Results

**Figure 3: Sample Components of the AADE Tool**

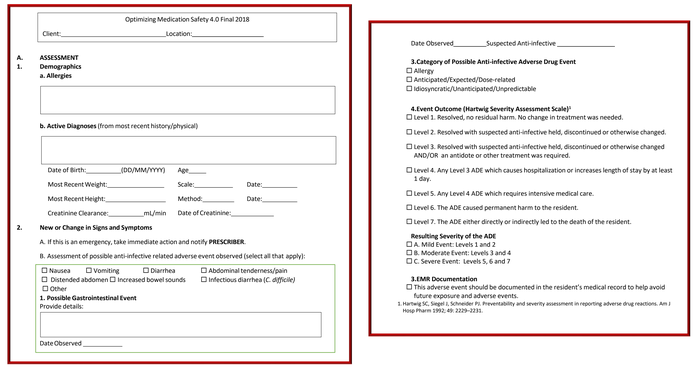
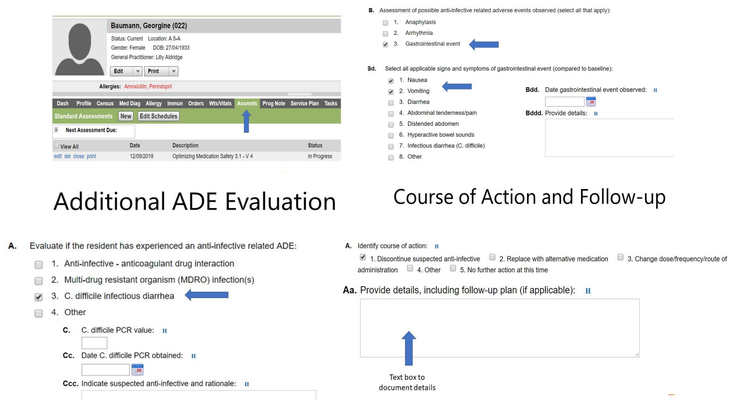



**Figure 4: EHR-Embedded AADE Prototype: Sample Screens**




- Employs exception-based logic to minimize documentation time
- Clinical evaluation and outcome assessed using Hartwig Severity Scale
- AADE drug, type, number, and outcome can be trended outcome metrics

## Conclusions

Through interprofessional collaboration, an AADE tool was developed and integrated as a prototype into an EHR that can facilitate identification, documentation, and trending of AADEs following further testing.

## References

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