DUKE ANTIMICROBIAL STEWARDSHIP OUTREACH NETWORK (DASON)

Antimicrobial Stewardship News

Volume 3, Number 7, July 2015

ANTIMICROBIAL MEDICATION USE EVALUATIONS (MUE) FOR COMMUNITY HOSPITALS

What is it?

Definition: Antimicrobial MUE is a systematic analysis that focuses on evaluating and improving antimicrobial use processes. An antimicrobial MUE may be conducted to characterize and improve the use of a single antimicrobial agent or class, antimicrobial therapy for a specific infection, a single element of the antimicrobial use process (e.g. prescribing, preparation, dispensing, or administration), or to assess patient outcomes from antimicrobial therapy.

Rationale: Excessive, unnecessary, or inappropriate antimicrobial prescribing in healthcare facilities contributes to the development of bacterial resistance, increases the risk of adverse events and healthcare-associated infections, and increases hospital costs. Antimicrobial stewardship programs (ASPs) promote **"the four Ds" of appropriate antimicrobial therapy: use of the correct Drug, at the correct Dose, for the correct Duration, with De-escalation when appropriate.** Antimicrobial MUE is a critical, data-driven approach for determining where problems with use of antimicrobial agents may lie and how to address them. Its overall goals are optimize treatment outcome(s), reduce process variation, and/or minimize cost.

What's been done: ASPs use MUEs to inform their planning for new interventions, revise or streamline the formulary, develop or update institutional guidelines, or identify areas of focus.

Expected Benefits

- Establishes guidelines, or criteria, for appropriate antimicrobial use, strengthens existing guidelines, or informs revision to guidelines
- Evaluates the effectiveness of antimicrobial therapy for specific infectious disease states or syndromes
- Identifies problems related to antimicrobial use, such as: adverse drug reactions (e.g. allergic reactions); drug-drug, drug-food, drug-disease state interactions; Treatment failures; overuse or underuse of specific antimicrobial agents/classes at the facility, service line, or prescriber level; incorrect drug, dose, route, or duration of therapy; healthcare-associated infections, such as *C difficile* infection; antimicrobial resistance
- Analysis of both direct and indirect costs
- Identifies areas for future study, education, or intervention
- Informs plans for performance improvement and patient safety initiatives

Anticipated Challenges

- Lack of familiarity with the MUE process
- Insufficient staff or time for conducting, analyzing, and reporting the results of the MUE

DASON Recommendations for First Steps

- Steps to take **prior to** conducting the MUE:
    - Establish that a problem or opportunity for improvement related to antimicrobial therapy exists
        - Such a problem may be identified through examination of local aggregate antimicrobial use data, national, state, or facility-level quality indicators, prior MUEs, etc.
    - Obtain proper organizational authority to conduct the MUE
        - Authority may be granted by the Pharmacy and Therapeutics Committee, the pharmacy director, or the physician champion for antimicrobial stewardship, depending upon the local administrative or reporting structure.
    - Establish who will be responsible for designing, conducting, and reporting the results of the MUE
        - The antimicrobial stewardship pharmacist, or a designee thereof, will often assume this role
    - Define the process and outcomes measures, called "indicators," that will be used to evaluate a specific antimicrobial agent or class, or therapy for management of a specific infectious disease state or syndrome.
        - Indicators may be evidence-based criteria, guidelines, treatment protocols and/or standards of care from local or national resources.
    - Specify a time period and sample size for the MUE
        - The time period selected should ensure that there is enough information to accurately characterize the antimicrobial-related problem or fully answer the question posed, but should also limit the data collection burden as much as possible.

- Steps to take **during** the MUE:
    - Identify patients for whom the antimicrobial agent or class has been prescribed for the specified time period
        - If the number of patients identified is large (> 50), consider taking a systematic random sample, or conduct a point prevalence study
    - Design a data collection tool
        - Use a spreadsheet to facilitate data entry, analysis, and reporting
    - Collect data in a standardized way
    - Evaluate level of achievement of pre-defined process and outcomes measures (indicators)
    - Compose the MUE report (See **Appendix** for a description of key elements of a formal MUE report)

- Steps to take **once the MUE findings are known**:
    - Disseminate/report findings to the proper individuals and/or committees
    - Develop and implement plans for improvement of the medication-use process based on

MUE findings, if indicated
    - Incorporate improvements into local criteria, guidelines, treatment protocols, and standards of care, when indicated.
    - Make a plan to assess the effectiveness of actions taken, and document changes
    - Repeat the cycle of planning, evaluating, and taking action for ongoing improvement in medication-use processes
    - Regularly assess the effectiveness of the MUE process itself and make needed improvements.

Resources for Further Reading

- The American Society of Health-Systems Pharmacists. ASHP guidelines on medication use evaluation. Am J Health-Syst Pharm. 1996; 53: 1953-5.
    - General guidelines on how to perform an MUE.

- Fanikos J et al. Medication Use Evaluation: Pharmacist Rubric for Performance Improvement. Pharmacotherapy 2014;34(12 Pt 2):5S–13S.
    - Discussion of use of MUE for performance improvement initiatives.

- Donohoe K, Vaughan LM, Patel J, Clare LM. Medication use evaluation (MUE): A review of current literature and how-to guide for preceptors and pharmacy students. Currents in Pharmacy Teaching and Learning 2014; 6(5):699-705.
    - Practical guide for conducting an MUE.

DASON has a tutorial on Antimicrobial MUE Primer posted on the "members only" section of their website. https://dasonmembers.medicine.duke.edu/wysiwyg/downloads/MUEPrimerDASONv06-8-15FINAL_(2).pdf

References

- VA Medication Use Toolkit (Accessed December 16, 2014) http://www.pbm.va.gov/PBM/vacenterformedicationsafety/tools/MUEToolkit.pdf
- World Health Organization. Drug and Therapeutics Committees – A Practical Guide (Accessed December 16, 2014) http://apps.who.int/medicinedocs/en/d/Js4882e/8.5.html#Js4882e.8.5

Appendix. Key Elements of a Formal Medication Use Evaluation Report

The following describes the key elements of a formal MUE report. Talk with your DASON liaison pharmacist for specific example reports or example presentation slides.

Objective(s): This section states the writer's intent to characterize the use of a single medication or therapeutic class, medication therapy for a specific disease state or condition, an element of the medication use process (prescribing, preparation, dispensing or administration) or specific outcomes from medication therapy at the hospital or health-system involved.

Background and Rationale: This section states the rationale for the MUE, reviews any known performance history, or identifies events or medication usage that prompted the MUE. Often, this includes a review of FDA-approved indications, clinical research data on medication efficacy or safety, institutional history, and/or previously developed local guidelines for use.

Criteria for Evaluation: This section defines the performance criteria or indicators being used for the evaluation and cites the source of these criteria. This section also defines a threshold of acceptable performance.

Methods: This section defines in detail the design of the MUE, the data collected to evaluate the MUE criteria, how and when the information was obtained, how patients for review were identified, who among them will be included or excluded in the analysis, and a description of statistical analyses.

Results: This section includes the number of charts reviewed, the number of charts included in the MUE, prescriber and prescription characteristics, description of the patient population, measures of efficacy, safety, and tolerability, whether the medication therapy was appropriately monitored, and clinical outcomes. Comparative cost estimates are frequently included. Usually, results are presented in outline format and/or through charts and graphs.

Conclusions: This section draws conclusions from the results of the analysis. It also aims to answer the question posed that prompted the MUE, if able, and identifies any surprising findings or area for further investigation.

Limitations: This section identifies unexpected hindrances to data collection or challenges in the process of analysis, and whether there was incomplete or unobtainable information.

Recommendations: This section identifies what interventions can be made to improve the medication use process and suggests what specific actions should be taken as a result of the MUE. Also, it should propose a plan for reassessment of performance and a reasonable time frame in which to determine if the intervention was successful. These recommendations can then be delivered back to administrators or committees who can make decisions on what individuals will be involved in implementing them.