Antimicrobial Stewardship Strategy:

Drug use evaluation/medication use evaluation

Audits of practice or prescribing. Can be used to identify target areas for antimicrobial stewardship programs and assess the effects of stewardship interventions or education.

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Priority Level: **B**

Difficulty Level: **2**

Program Stage:

- ✓ Early
- Intermediate
- Advanced

For more information on these criteria and how they were developed, please see the Antimicrobial Stewardship Strategy Criteria Reference Guide.

Description

This is an overview and not intended to be an all-inclusive summary. As a general principle, patients must be monitored by the health care team after changes to therapy resulting from recommendations made by the antimicrobial stewardship team.

As defined by the World Health Organization, "Drug use evaluation (DUE) is a system of ongoing, systematic criteria-based evaluation of drug use that will help ensure that medicines are used appropriately (at the individual patient level)."[1] Medication use evaluation (MUE) is similar to DUE, but it focuses on clinical outcomes and emphasizes improvements in medication use with a multidisciplinary approach.[1]

DUE is an important tool for antimicrobial stewardship. It can be used to identify and/or confirm suspected inappropriate prescribing, and it is the first step in addressing problems of inappropriate antimicrobial use by measuring the problem, analyzing it and understanding the underlying causes.

Audits of targeted antimicrobials or the management of specific infectious diseases can help identify areas that may require intervention and/or education to improve appropriate antimicrobial use.

Involvement of key prescribers and those with specialized expertise is necessary when developing evaluation criteria. This will help engage stakeholders, support acceptance of the data collected and increase interest in the results.

Examples of antimicrobial use evaluations could include:

- Prescriptions of selected agents (e.g., restricted antimicrobials, high-use antimicrobials, or broad-spectrum antimicrobials).
- Management of certain common infections.

- Assessment of compliance with institutional guidelines.

An essential component of DUE is dissemination of the results—to educate the necessary individuals and to incorporate the results into guidelines/policies.

Advantages

- Can help identify a focus for early antimicrobial stewardship interventions.
- Can be multidisciplinary in development and in addressing any prescribing issues that are identified.
- Provides "proof" of a problem, which can be helpful for implementing restrictive and persuasive interventions.
- Provides a systematic approach for follow-up auditing to determine whether education and/or interventions have resulted in the intended change.

Disadvantages

- Potentially labour-intensive.
- Reason for review can be seen as solely cost-driven.
- May be difficult to establish criteria for appropriate usage.
- System limitations in collection of drug-use data and clinical data.

Requirements

- Personnel to perform data collection, analysis and interpretation.
- Access to drug-use data and patient clinical data.
- Audit tools.
- Resources to disseminate and act on results, and to perform follow-up audits.

Associated Metrics

- Proportion of orders adherent to DUE criteria or guidelines.
- Practice change/improvements resulting from initiatives introduced based on the findings of the DUE.

References

1. Holloway K, Green T. Drugs and therapeutics committees—a practical guide [Internet]. Geneva, Switzerland: World Health Organization; 2003 [cited 2015 Oct 16]. 155 p. Chapter 6.5, Drug use evaluation (DUE) (drug utilization review); pp. 85–90. Available from: http://apps.who.int/medicinedocs/en/d/Js4882e/8.5.html#Js4882e.8.5

   Useful reference that outlines the steps in conducting a DUE and provides an example. Annex 6.2 provides a sample data collection tool for antimicrobials.

Additional Useful References

Select articles to provide supplemental information and insight into the strategy described and/or examples of how the strategy was applied; not a comprehensive reference list. URLs are provided when materials are freely available on the Internet.

- Shah PJ, Ryzner KL. Evaluating the appropriate use of piperacillin/tazobactam in a community health system: a retrospective chart review. P T. 2013;38(8):462–83. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3814439/
- Raveh D, Muallem-Zilcha E, Greenberg A, Wiener-Well Y, Schlesinger Y, Yinnon AM. Prospective drug utilization evaluation of three broad-spectrum antimicrobials: cefepime, piperacillin-tazobactam and meropenem. QJM. 2006;99(6):397–406. Available from: http://qjmed.oxfordjournals.org/content/99/6/397.long

  An example of a DUE to assess the appropriateness of use of select antimicrobials based on local guidelines before and after an educational intervention.
- Antoine TL, Curtis AB, Blumberg HM, Desilva K, Fransua M, Gould CV, et al. Knowledge, attitudes, and behaviors regarding piperacillin-tazobactam prescribing practices: results from a multicenter study. Infect Control Hosp Epidemiol. 2006;27(11):1274–7.
- Samilski JA, Lau TT, Elbe DH, Aulakh AK, Lun EM. Drug use evaluation of moxifloxacin (Avelox) using a hand-held electronic device at a Canadian teaching hospital. P T. 2012;37(5):291-9. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3411225/
- Dalen DM, Zvonar RK, Jessamine PG. An evaluation of the management of asymptomatic catheter-associated bacteriuria and candiduria at The Ottawa Hospital. Can J Infect Dis Med Microbiol. 2005;16(3):166–70. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2095023/

Tools and Resources

- Australian Commission on Safety and Quality in Health Care. Antibiotic audit tool [Internet]. Sydney, Australia: Australian Commission on Safety and Quality in Health Care; c2015 [cited 2015 Sep 24]. Available from: http://www.safetyandquality.gov.au/wp-content/uploads/2012/02/5.1-WA-Tag-antibiotic-audit-data-form.pdf
- Start smart—then focus. Appendix 1. Resource materials: examples of audit tools, review stickers and drug charts [Internet]. London: Public Health England; 2015 [cited 2015 Sep 24]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/417041/Revised_SSTF_Tools_Annex_FINAL.pdf

  Contains examples of audit forms/tools.
- Centers for Disease Control and Prevention. Implementation resources [Internet]. Atlanta, GA: Centers for Disease Control and Prevention; 2015 Jul 23 [cited 2015 Sep 21]. Available from: http://www.cdc.gov/getsmart/healthcare/implementation.html.

Refer to "Assessment tools for antibiotic use" under CDC Implementation Resources.

Contains examples of antibiotic audit forms to assess the appropriateness of antibiotics for urinary tract infections, community acquired pneumonia, resistant Gram-positive infections and inpatient antibiotics.

- Canadian Society of Hospital Pharmacists. Drug use evaluation services: guidelines [Internet]. Ottawa, ON: Canadian Society of Hospital Pharmacists; 2014 [cited 2015 Sep 23]. Available from: http://www.cshp.ca/productsServices/officialPublications/type_e.asp

  Guidelines to assist in developing or enhancing DUE services, conducting DUE projects and using the results of DUE to guide and inform practice.

  Freely available to Canadian Society of Hospital Pharmacists members.

Samples/Examples

- Example 1: Lower Mainland Pharmacy Services, BC- Carbapenem Assessment Tool (sample DUE data collection form)
- Example 2: Markham Stouffville Hospital Corporation - 2011 Presentation to Surgery Department - Results of Antibiotic Usage Audit

These documents have been generously shared by various health care institutions to help others develop and build their antimicrobial stewardship programs. We recommend crediting an institution when adopting a specific tool/form/pathway in its original form.

Examples that contain clinical or therapeutic recommendations may not necessarily be consistent with published guidelines, or be appropriate or directly applicable to other institutions. All examples should be considered in the context of the institution's population, setting and local antibiogram.

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Links with Other Strategies

DUEs/MUEs can be used to assess the need for/impact of education and stewardship interventions; they have links with many strategies.

- Surgical antibiotic prophylaxis optimization

Disclaimer

Citation

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For further information

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Example 1: Lower Mainland Pharmacy Services, BC - Carbapenem Assessment Tool (sample DUE data collection form)

CARBAPENEM (CBP) ASSESSMENT TOOL FOR LOWER MAINLAND PHARMACY SERVICES
Vancouver General Hospital

Date _____ Pt MRN _____ Pharmacist _____
Prescriber_____ Prescriber Service_____ Type of patient: ☐ ICU ☐ Medical ☐ Surgical ☐ Outpt

1. INITIAL DRUG REGIMEN
☐ Imipenem ☐ Meropenem ☐ Ertapenem ☐ 0.25g ☐ 0.5g ☐ 1.0g ☐ 1.5g ☐ 2g ☐___mg/kg
☐ Q6H ☐ Q8H ☐ Q12H ☐ Q24H Start date _____ Stop date _____ *Duration (days) ____

2. TYPE OF INFECTION
☐ CNS ☐ Febrile Neutropenia ☐ CAP ☐ HAP ☐ VAP ☐ Cystic Fibrosis
☐ Intraabdominal Infection ☐ Urinary Tract Infection ☐ Pyelonephritis ☐ Skin Soft Tissue
☐ Osteomyelitis ☐ Sepsis ☐ Other _____

3. WHEN KNOWN, INDICATE REPORTED PATHOGEN
☐ **No pathogen isolated** ☐ **C&S not done**
☐ S.aureus ☐ S.epi ☐ MRSA ☐ Strep ☐ Enterococcus ☐ H.flu ☐ E.coli ☐ Kleb ☐ ESBL ☐ Proteus
☐ Serratia ☐ Enterobacter ☐ Citrobacter ☐ Pseudomonas ☐ Acinetobacter ☐ Other_____

4. WHEN KNOWN, INDICATE IF CBP IS BEING USED FOR THE FOLLOWING P&T APPROVED INDICATIONS:

	D&T Approved Indications	If CBP used for non-approved indication and narrowing is not possible (Q. 6a&b), indicate why alternate antibiotic cannot be used
Imipenem	☐ Multi-resistant pathogen ☐ Previous treatment failure ☐ Febrile Neutropenia ☐ Allergy/intolerance _____	
Meropenem	☐ As per imipenem indications above. ☐ CNS ☐ Febrile Neutropenia ☐ Cystic Fibrosis ☐ Pediatrics	
Ertapenem	☐ As per imipenem, but for outpatient use	

5. TYPE OF THERAPY
☐ Empiric (Go to Question 6a) ☐ Directed "therapy initiated after reported C&S" (Go to Question 6b)
☐ PPO or treatment protocol ☐ ID consult

6. ASSESSMENT, RECOMMENDATION, AND OUTCOME (FORM IS COMPLETE WHEN CARBAPENEM STOPPED)

Pharmacist's Assessment	Pharmacist's Recommendation	MD Response to Recommendation	*Stop Date OR Date of Change	Final Regimen if Different from the Initial or Recommended Treatments
BEFORE C&S RESULTS **a) Can empiric therapy be narrowed before C&S results?**	☐ Continue same therapy ☐ Change dose to _____ ☐ Change therapy to: ☐ Pip/tazo ☐ Ceftriaxone ☐ Ceftaz ☐ Cipro ☐ Clinda ☐ Metro ☐ Other _____ ☐ ID consult suggested	☐ MD accepted ☐ MD declined ☐ Already changed by team ☐ ID consult accepted		
FOLLOWING C&S RESULTS **b) Is narrowing of therapy possible following C&S results?**	☐ Continue same therapy ☐ Change dose to _____ ☐ Change therapy to: ☐ Pip/tazo ☐ Ceftriaxone ☐ Ceftaz ☐ Cipro ☐ Clinda ☐ Metro ☐ Other _____ ☐ ID consult suggested	☐ MD accepted ☐ MD declined ☐ Already changed by team ☐ ID consult accepted		
DURATION/STEPDOWN **c) Does planned stop date require modification or is IV:PO stepdown possible?**	☐ No change in planned duration ☐ Change in duration ☐ IV:PO stepdown to _____	☐ MD accepted ☐ MD declined ☐ Already changed by team		

*** PLEASE COMPLETE TOTAL "DURATION OF THERAPY" AT TOP OF FORM. FORM IS COMPLETE. (19OCT11)**

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Vancouver Acute Pharmaceutical Sciences - Clinical Services Unit

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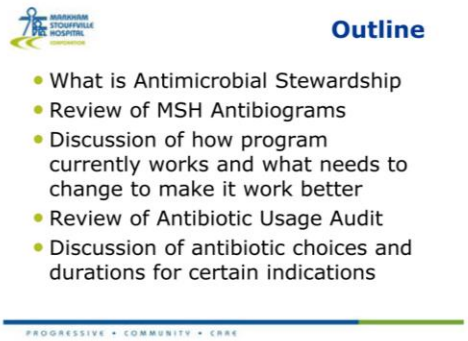
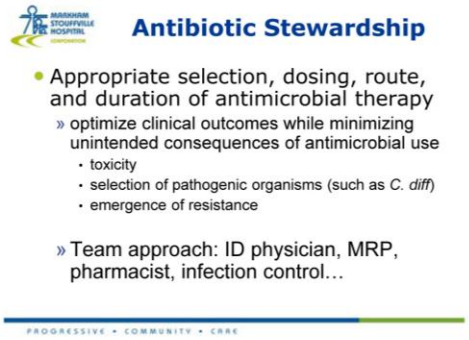
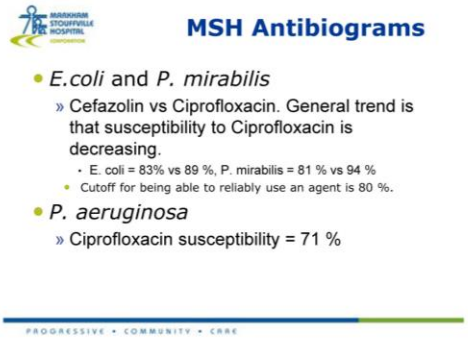
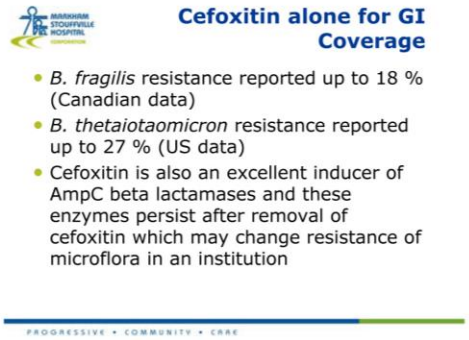
Example 2: Markham Stouffville Hospital Corporation - 2011 Presentation to Surgery Department - Results of Antibiotic Usage Audit

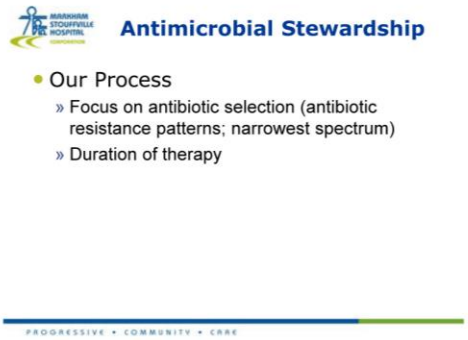
12/15/2015











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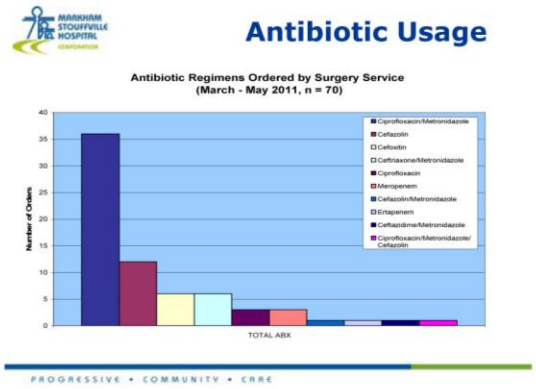

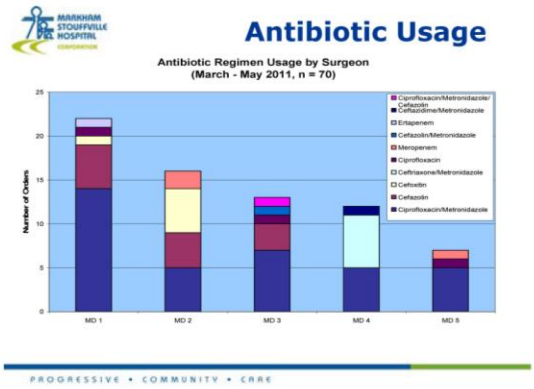

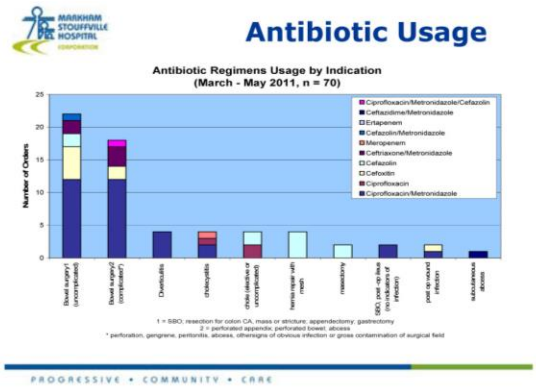

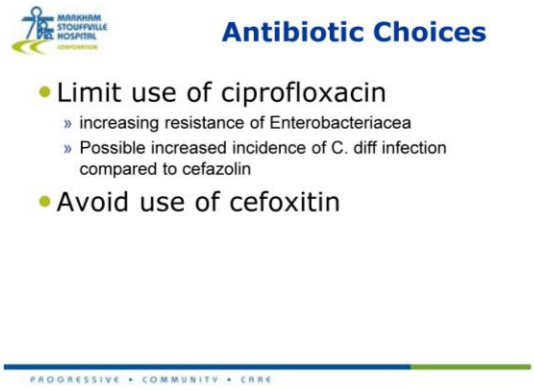

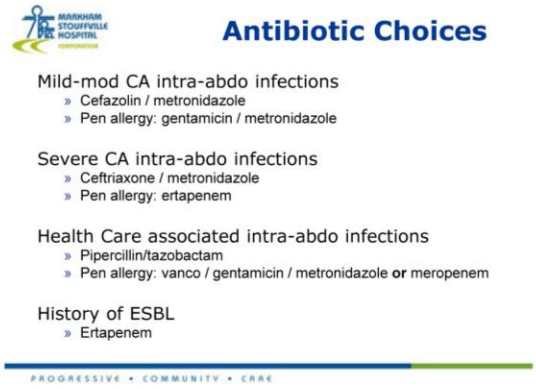

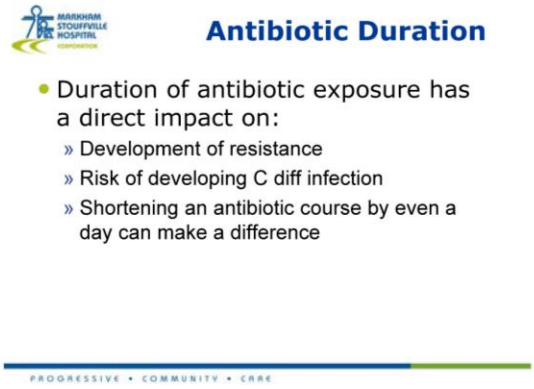

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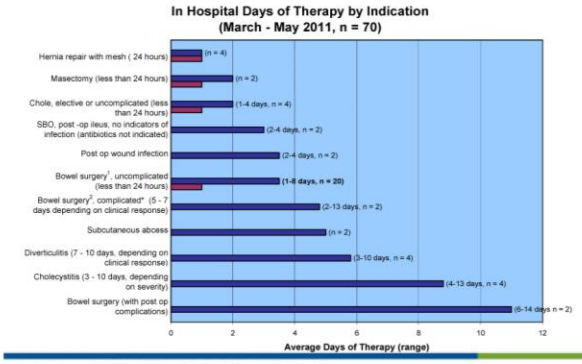
Example 2: Markham Stouffville Hospital Corporation - 2011 Presentation to Surgery Department - Results of Antibiotic Usage Audit (continued)

Duration of Therapy



PROGRESSIVE • COMMUNITY • CARE

Antibiotic Duration

Uncomplicated intra-abdo infections (non-perforated appendicitis or simple cholecystitis or elective / uncomplicated bowel resections)

» 1 dose preop, no doses post op

Upper GI perf (sx within 24 hrs) or traumatic bowel perf (sx within 12 hrs)

» < 24 hours post op

PROGRESSIVE • COMMUNITY • CARE

Antibiotic Duration

- Most patients with complicated intra-abdo infections require therapy for 3-7 days after source control
  - » Prolonged courses (> 7 days) should be avoided unless source control incomplete

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Questions/Suggestions?

PROGRESSIVE • COMMUNITY • CARE

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