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.

Description

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).” Medication use evaluation (MUE) is similar to DUE, but it focuses on clinical outcomes and emphasizes improvements in medication use with a multidisciplinary approach.

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


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.


  An example of a DUE to assess the appropriateness of use of select antimicrobials based on local guidelines before and after an educational intervention.


Tools and Resources


  Contains examples of audit forms/tools.

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.


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
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Citation


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For further information


Email: asp@oahpp.ca

Public Health Ontario acknowledges the financial support of the Ontario Government.
Example 1: Lower Mainland Pharmacy Services, BC - Carbapenem Assessment Tool (sample DUE data collection form)

<table>
<thead>
<tr>
<th>CARBAPENEM (CBP) ASSESSMENT TOOL FOR LOWER MAINLAND PHARMACY SERVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>1. INITIAL DRUG REGIMEN</td>
</tr>
<tr>
<td>Imipenem</td>
</tr>
<tr>
<td>G6H</td>
</tr>
<tr>
<td>2. TYPE OF INFECTION</td>
</tr>
<tr>
<td>CNS</td>
</tr>
<tr>
<td>Febrile Neutropenia</td>
</tr>
<tr>
<td>Osteomyelitis</td>
</tr>
<tr>
<td>3. WHEN KNOWN, INDICATE REPORTED PATHOGEN</td>
</tr>
<tr>
<td>No pathogen isolated</td>
</tr>
<tr>
<td>S.aureus</td>
</tr>
<tr>
<td>Serratia</td>
</tr>
<tr>
<td>4. WHEN KNOWN, INDICATE IF CBP IS BEING USED FOR THE FOLLOWING P&amp;T APPROVED INDICATIONS:</td>
</tr>
<tr>
<td>D&amp;T Approved Indications</td>
</tr>
<tr>
<td>Imipenem</td>
</tr>
<tr>
<td>Febrile Neutropenia</td>
</tr>
<tr>
<td>Meropenem</td>
</tr>
<tr>
<td>CNS</td>
</tr>
<tr>
<td>Ertapenem</td>
</tr>
<tr>
<td>5. TYPE OF THERAPY</td>
</tr>
<tr>
<td>Empiric (Go to Question 6a)</td>
</tr>
<tr>
<td>PPO or treatment protocol</td>
</tr>
<tr>
<td>6. ASSESSMENT, RECOMMENDATION, AND OUTCOME (FORM IS COMPLETE WHEN CARBAPENEM STOPPED)</td>
</tr>
<tr>
<td><strong>Pharmacist’s Assessment</strong></td>
</tr>
<tr>
<td>BEFORE C&amp;S RESULTS</td>
</tr>
<tr>
<td>a) Can empiric therapy be narrowed before C&amp;S results?</td>
</tr>
<tr>
<td>Continue same therapy</td>
</tr>
<tr>
<td>Change dose to</td>
</tr>
<tr>
<td>Change therapy to:</td>
</tr>
<tr>
<td>Pip/tazo</td>
</tr>
<tr>
<td>Ceftaz</td>
</tr>
<tr>
<td>Metro</td>
</tr>
<tr>
<td>ID consult suggested</td>
</tr>
<tr>
<td>FOLLOWING C&amp;S RESULTS</td>
</tr>
<tr>
<td>b) Is narrowing of therapy possible following C&amp;S results?</td>
</tr>
<tr>
<td>Continue same therapy</td>
</tr>
<tr>
<td>Change dose to</td>
</tr>
<tr>
<td>Change therapy to:</td>
</tr>
<tr>
<td>Pip/tazo</td>
</tr>
<tr>
<td>Ceftaz</td>
</tr>
<tr>
<td>Metro</td>
</tr>
<tr>
<td>ID consult suggested</td>
</tr>
<tr>
<td>DURATION/STEPDOWN</td>
</tr>
<tr>
<td>c) Does planned stop date require modification or is IV/PO stepdown possible?</td>
</tr>
<tr>
<td>No change in planned duration</td>
</tr>
<tr>
<td>Change in duration</td>
</tr>
<tr>
<td>IV-PO stepdown to</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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

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Antimicrobial Stewardship Strategy:

Drug use evaluation/medication use evaluation

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

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Outline

• What is Antimicrobial Stewardship
• Review of MSH Antiograms
• Discussion of how program currently works and what needs to change to make it work better
• Review of Antibiotic Usage Audit
• Discussion of antibiotic choices and durations for certain indications

Antimicrobial Stewardship Program

Presentation to Surgery Department
August 17, 2011

Antibiotic Stewardship

• Appropriate selection, dosing, route, and duration of antimicrobial therapy to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use
  • toxicity
  • selection of pathogenic organisms (such as C. diff)
  • emergence of resistance
• Team approach: ID physician, MRP, pharmacist, infection control...

MSH Antiograms

• E. coli and P. mirabilis
  » Cefazolin vs Ciprofloxicin. General trend is that susceptibility to Ciprofloxacin is decreasing.
    » E. coli = 83% vs 89%, P. mirabilis = 81% vs 94%
  » Cutoff for being able to reliably use an agent is 60%.
• P. aeruginosa
  » Ciprofloxacin susceptibility = 71%

Cefoxitin alone for GI Coverage

• B. fragilis resistance reported up to 18% (Canadian data)
• B. thetaiotaomicron resistance reported up to 27% (US data)
• Cefoxitin is also an excellent inducer of AmpC beta-lactamases and these enzymes persist after removal of cefoxitin which may change resistance of microflora in an institution

Antimicrobial Stewardship

• Our Process
  » Focus on antibiotic selection (antibiotic resistance patterns: narrowest spectrum)
  » Duration of therapy
Example 2: Markham Stouffville Hospital Corporation - 2011 Presentation to Surgery Department - Results of Antibiotic Usage Audit (continued)

Antibiotic Usage

Antibiotic Regimens Usage by Indication (March - May 2011, n = 70)

Antibiotic Choices

- Limit use of ciprofloxacin
  - increasing resistance of Enterobacteriacea
  - Possible increased incidence of C. diff infection compared to ceftazolin
- Avoid use of cefoxitin

Antibiotic Duration

- Duration of antibiotic exposure has a direct impact on:
  - Development of resistance
  - Risk of developing C. diff infection
  - Shortening an antibiotic course by even a day can make a difference

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**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

**Duration of Therapy**

- 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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