Implementation and Effectiveness of a Real-Time Computerized Physician Order Entry Conversational Tool for Antimicrobial Stewardship Interventions

Sameer Elsayed MD
London Health Sciences Centre, London, Canada
Western University, London, Canada
Disclosures

• No financial disclosures or conflicts of interest
Outline

- Background
- Objectives
- Methods
- Results
- Limitations
- Conclusions
Background

- Effective and timely communication is pivotal to successful stewardship interventions

- Prospective audit-and-feedback (PAF) is a widely practiced stewardship strategy
  - Face-to-Face communication with prescribers
  - Advantages: effective; flexible; educational
  - Disadvantages: time-consuming; labour-intensive; manual documentation

- More robust and practical tools for PAF and other ASP strategies are necessary
Background

• Recent advances in IT have fostered the development of novel electronic patient care tools

• Computerized prescriber order entry (CPOE) and alert-based clinical decision support systems (CDSS) are increasingly relied upon by clinicians

• Leveraging the power of IT systems with built-in CPOE and CDSS to support ASP activities is a potential alternative PAF strategy
Use of Computer Decision Support in an Antimicrobial Stewardship Program (ASP)


1Medical Informatics, Intermountain Healthcare; 2Biomedical Informatics, University of Utah; 3Pharmacy, Primary Children’s Medical Center; 4Clinical Epidemiology and Infectious Diseases, Intermountain Medical Center; 5Pharmacy, Intermountain Medical Center; 6Pediatric Infectious Diseases, University of Utah, Salt Lake City, Utah

Investigating the ways in which health information technology can promote antimicrobial stewardship: a conceptual overview

Abby King1, Kathrin M Cresswell1, Jamie J Coleman2, Sarah K Pontefract2, Ann Slee1, Robin Williams1 and Aziz Sheikh1

Bringing the “Power” to Cerner’s PowerChart for Antimicrobial Stewardship

Jason M. Pogue1, 2, Brian A. Potocki1, Michael Postelnicu1, Ryan P. Meyers1, David P. Tropiania1, Gregory A. Eschenauer1 and Keith S. Kappel2

1Department of Pharmacy Services, Sinai-Grace Hospital, Detroit Medical Center, and Wayne State University School of Medicine, Detroit, Michigan; 2Antimicrobial Management Program, UPenn Presbyterian Hospital, and University of Pittsburgh School of Pharmacy, Pennsylvania; 3Department of Pharmacy, Northwestern Memorial Hospital, Chicago, Illinois; 4Department of Pharmacy Services, Detroit Receiving Hospital, Detroit Medical Center, Department of Pharmacy, Detroit Medical Center; 5University of Michigan Health System and College of Pharmacy; and 6Infection Prevention, Antibiotic Stewardship Program, Detroit Medical Center and Wayne State University, Detroit, Michigan
Objectives

1. To share our experience with the implementation of a proof of concept real-time “Antimicrobial Stewardship Suggested Order“ CPOE conversational tool for audit-and-feedback interventions in a large tertiary care medical centre

2. To discuss the utility of real-time electronic tools for supporting institution-wide ASP initiatives
London Health Sciences Centre (LHSC)

- One of Canada’s Largest Academic Healthcare Institutions
  - 190 km southwest of Toronto
  - 2 Hospitals
  - Referral base > 1 million

- ASP established in 2012
  - Core strategies
    - Formulary restriction
    - PAF
  - Ancillary strategies
    - Drug-utilization audits
    - IV-to-oral conversion
    - Clinical practice guidelines
    - Education
    - Website
Enhanced Audit and Feedback Process

Diagram showing the process:

1. Physician Order
2. Pharmacist Review
3. Nursing
4. Medication Administration
5. Antimicrobial Stewardship Team

Steps:
- Electronic Suggest Order
- Education
- Real-Time Alert
- Message Centre Notification
- Formulary Restriction
- IV to Oral Stepdown
- Clinical Pathways

Process flow:
- Physician Order
- Pharmacist Review
- Nursing
- Medication Administration
- Antimicrobial Stewardship Team
Methods: Pilot Project

• Recent implementation of an IT-developed multi-phasic, real-time conversational CPOE tool for supporting stewardship interventions
  – Alert-based pop-up reminders
    • Text-based Communications
    • Outcomes
    • Prescriptions (inpatient and at discharge)
    • Alerts remain active until acknowledged

• Tool designed to facilitate remote PAF interventions on hospital inpatients
Antimicrobial Stewardship Suggested Order
Proposing Interventions
Ordering Physician

- Order
- Proposal

*Physician name
Elsayed, Sameer

*Order Date/Time
2017/05/03 0845

*Communication type
- Pharmacy Authorized
- Pharmacist Suggestion
- Signed Paper Order
- Fax
- Electronic
- Phone with Readback
- Verbal with Readback

OK
Cancel
Ordering Physician

- Order
- Proposal

*Physician name
Test, Doc (Physician)

*Order Date/Time
2017/05/09 1017

*Communication type
- Verbal with Readback
- Phone with Readback
- Medical Directive
- Initiate Orders
- Signed Paper Order
- Conditional
- Non Provider
- Fax
- Electronic
### Approvals

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Order/Plan Name</th>
<th>Details</th>
<th>Order Comment</th>
<th>Originator Name</th>
<th>Create Date</th>
<th>Update Date</th>
<th>Status</th>
<th>Order Action</th>
<th>Stop Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCDFG, PowerChart</td>
<td>Antimicrobial...</td>
<td>Order amoxicil...</td>
<td>Dhawi, Rita</td>
<td>2019/04/10 21:13</td>
<td>2019/04/10 21:13</td>
<td>Pending</td>
<td>Order</td>
<td>2019/04/10</td>
<td></td>
</tr>
</tbody>
</table>

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Proposed Order Reminder

Please remind the MRP and/or the members of their service of the proposed orders in the chart.

If you are the MRP or a member of their service, please review and respond to the Proposed order by Accepting it, Accepting with Modify, or Rejecting it.
Real-Time Notifications
Methods

- **Site:** London Health Sciences Centre

- **Population:** Adult patients admitted to Medicine, Internal Medicine/Medicine subspecialties services, Critical Care, and General Surgery/Surgical specialties
  - Those requiring interventions beyond routine PAF rounds
  - Excluded patients followed by the ID Service

- **Period:** January 1, 2018 to December 31, 2018

- **Tool:** Antimicrobial Stewardship Suggested Order

- **IT System:** Cerner Millennium PowerChart EHR (Lenexa, KS, USA)

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Measurements

1. Nature of stewardship intervention
2. Acceptance rate of intervention
   a. Full (complete)
   b. Partial
   c. None (rejected or ignored)
# Stewardship Interventions

<table>
<thead>
<tr>
<th>Change in agent</th>
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<tbody>
<tr>
<td>Dose modification</td>
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<tr>
<td>Drug discontinuation</td>
</tr>
<tr>
<td>Proposed additional diagnostic tests</td>
</tr>
<tr>
<td>Referral to Infectious Diseases</td>
</tr>
</tbody>
</table>

*Includes narrowing or broadening spectrum, and alternatives for allergy or ADR*
Results: Interventions
(n=80)

- De-escalation or Dose Modification: 51
- ID Consult: 25
- Escalation: 3
- Diagnostic Testing: 1
Adoption of Recommendations

- Full: 90%
- Partial: 2.5%
- Rejected: 7.5%
Limitations

• Small number of interventions
  – Complemented face-to-face PAF activities

• CDSS not integrated into EMR

• Manual tracking of unacknowledged interventions
  – Retrieval through IT
  – Message Centre notification link update required

• Narrow scope of clinical services covered

• Provider experience not evaluated
Conclusions

• Real-time alert-based CPOE conversational tools are effective
  – Easy to use
  – Promote judicious antimicrobial use
  – May eliminate the need for manual documentation

• Prescriber education may be incorporated into interventions

• Institution-wide expansion should be considered
  – Working with IT to optimize module
Thank you!

Acknowledgements
Rita Dhami Pharm D
Pam Andress - IT

sameer.elsayed@lhsc.on.ca
www.lhsc.on.ca
www.uwo.ca