Antimicrobial stewardship on the move: Utilisation of electronic medication management prescribed data to inform a mobile antimicrobial stewardship application

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Agenda

1) Context – Antimicrobial Stewardship (AMS) at St Vincent’s Hospital

2) Design and development of clinical decision support rules within the electronic medication management system (eMMS) CSC MedChart® to support AMS activities

3) Utilisation of real-time electronic prescribing data to streamline the antimicrobial approval and monitoring process:
   • AMS assessment in the electronic medical record (eMR)
   • Mobile AMS application

4) Monitoring and reporting
1994: First formal AMS policy implemented 20 years ago


2005: eMMS - CSC MedChart® implemented.
   • Clinical decision support initiatives implemented over first four years.
   • eMMS interfaced to eMR (Emerging Systems – Web deLacy).

Despite our considerable experience with electronic medication management & AMS, an optimal and timely process for AMS approval and documentation has been elusive.
Harnessing technology to support AMS

• Use of e-AMS systems has been recommended by VIC and NSW health departments

• Increasing adoption of eMMS/eMRs has led to increasing opportunity / demand to integrate AMS initiatives

• **ACSQHC Antimicrobial Stewardship in Australian Hospitals 2011:**
  “Hospitals work toward implementing e-decision support systems to guide antimicrobial prescribing and integrating these systems with electronic health records, and electronic prescribing and medication management systems.”

  “It is important for sites planning to implement eMMS to integrally involve AMS in the planning & roll out of the system to ensure quality and safety standards are maintained”.

• **How to do this effectively?**
  “Electronic decision support must be integrated into the clinical workflow to be effective in a complex clinical domain such as antimicrobial prescribing”

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Same challenge, different continent:
An international perspective

**The “Epic” Challenge of Optimizing Antimicrobial Stewardship: The Role of Electronic Medical Records and Technology**

Ravina Kullar, Debra A. Goff, Lucas T Schulz, Barry C. Fox, and Warren E. Rose

“Currently, Epic “out of the box” is limited for ASPs, but with time and continued collaboration between ASPs and hospital IT in addition to Epic updates, its value to stewardship grows.”

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

Jason M. Pogue, Brian A. Potoski, Michael Postelnick, Ryan P. Mynatt, David P. Trupiano, Gregory A. Eschenauer, and Keith S. Kaye

“Although PowerChart has limited “out of the box” functionalities to optimise stewardship efforts, there are many potential utilities that can be developed”.

“Until Cerner prioritises development of functionality to identify patients in “real time” who can benefit from review and intervention by stewardship personnel, the need for third-party vendors outside of the Cerner system will continue.”

Exploring the options – choosing the path

### Lessons learnt

- Site Visits
- Review of existing AMS solutions
- Process map current workflow
- Define and compare functionality
- Decision & Proposal

### Implementation of Antimicrobial Stewardship (AMS) approval systems

#### Project Initiation Plan Version 1.0:

St Vincent’s Hospital, Sydney

AMS TOOLS COMPARISON

<table>
<thead>
<tr>
<th>Functionality</th>
<th>NSW HealthShare</th>
<th>HealthShare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatients</td>
<td>Use in outpatient?</td>
<td>Yes</td>
</tr>
<tr>
<td>Inpatients</td>
<td>Use in inpatient?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### Clinical Decision Support

- Provides logic/advisory TB/Antimicrobial
- Provides hypokalemia lookup to local hospital guidelines

- Provides CDS at point of prescribing (e.g. reminder page) for approved indications, recommended dose, frequency of administration
- Prompts for preferred pathology, allergy, other key approval request

- Provides CDS to allow checking at point of prescribing, patient allergies, drug allergy, contraindication, and other alerts

#### Approval Process - Communication/Feedback

- Approval number (reflects duration of approval) or tracking number generated once prescriber completes data entry

AMS tools: compares, registers, pharma, receives page, approves request for approval generated in AMS tool

- AMS, wireframe paper, and eAMS mobile interfaces are comparable and can be implemented at each hospital site

- Decision needed to ensure approval of number: “don’t feel we need a tracking number” (eAMS patient portal cannot backup a tracker number)

AMS Pharmacy systems: choose paper, eAMS mobile, and the user-friendly interface is the key characteristic

- To be developed - not currently available via MedChart, MedView, or E-NOTE
- Requests to AMS require approval process
- Notification when not possible – suggested work around has future AMS Pharmacy position on morning list and paper form, and phone / email prompt to consult as required

AMS current interface: MDL can be used to manually enter data into assessments for patients with visits at available in MedChart
Implementation of AMS Approval Systems Project

Aims:

• Efficiency in work practice
• Streamlined communication
• Effective monitoring and reporting

Key Strategies:

• Clinical Decision Support – further improve and align with AMS activities
• Management tool and mobile app utilising e-Prescribing data

Evaluation and Research:

• Partnered with Centre for Health Systems Safety and Research (CHSSR)
• Quantitative and qualitative components
Incorporation of AMS guidelines into Clinical Decision Support

Point-of-care, one-click policy conformant order sentence (quick list)
eMM order generates electronic AMS assessment
Magic happens here: Seamless link between eMM order and AMS assessment

Clever concepts:

- Assessment only created for NEW orders – not for edited orders
- Automatically completes assessment for orders where:
  - Doctor ceases order
  - Prescribed course is complete (e.g. stat orders once given, 7 day course once finished).
  - Patient is discharged

Removes impost to manually “complete” / “remove” assessments → saves time & streamlines workflow.
e-Management Tool: AMS work list

Use to filter results by ward, patient name, indication etc.
Example: type in "ICU" and then press TAB to only see antimicrobials prescribed in ICU

Clears filter

Indication - Doctor's comments when MedChart rule fired and text in the qualifier of order.

Sort any of the columns by clicking on the heading

All CURRENT antimicrobials will have status = "Incomplete"
Once the order has CEASED / course completed, the status will automatically be changed to "Complete" and will not appear in this view. These can still be viewed by selecting "completed" from status drop down menu
Reporting functionality

- Data from AMS assessment can be exported, reporting capabilities are endless!
Meeting reporting needs

ACSQHC Antimicrobial Stewardship Initiative Program

National Safety and Quality in Healthcare Service Standards

CEC QUAH Program

NSW TAG Quality Use of Medicine Indicators

SHPA Practice Standards

National Antimicrobial Prescribing Survey

National Antimicrobial Utilisation and Surveillance Program (NAUSP)
Mobile application

• Differences in work practices & business requirements required an innovative, customisable & clinician friendly solution.

• Facilitated by existing mobile access to clinical information systems and growing recognition of the value of mobile apps in healthcare settings.

• One size fits approach with flexibility to be purpose built for individuals.

• Mobile and convenient access → promote prospective review and feedback.
Mobile AMS app: Screen summary
Filter screen

- **Micro/AMS registrar**
  - Specialty
  - “Red” (unreviewed) + “Orange” referred to AMS reg by Pharmacist
    - Prescribed in ICU
    - Expiring soon

- **9N (Geris) Ward Pharmacist**
  - “Orange” + prescribed for patients on geriatric ward
  - All restricted antimicrobials for a particular patient

- **Junior Medical Officer - Cardiology**
  - Patients admitted under AMO
  - Prescribed by a specialty
Assessment screen

- **Drug Name**: Linezolid
- **Dose**: 2mg/1mL Injection
- **Duration**: 4 weeks
- **Prescribed By**: Jamie Sedlack
- **Prescribed On/At**: 7 Jan 2014 16:41
- **Indication**: Pseudomonas (Cs) every 2/52 or sig changes in Cr (Qualifier) 20/02 (Pharm)
- **Pharmacy Review Comments**: Lorem ipsum dolor sit amet
- **Micro / AMS / ID / TDM Review Comments**: Lorem ipsum dolor sit amet

**Approval Status**
- Approved - by Pharmacist

**Interventions**
- Imaging reviewed, TDM
Conclusions

• Integration of AMS within an eMMS/eMR promotes:
  o Increased efficiencies in work practice
  o Streamlined communication
  o More accurate monitoring and reporting of AMS activities

• A mobile app is an innovative way to engage all stakeholders, whilst the mobility and convenient access will promote prospective review and feedback.
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Questions?

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