AMS on the move: use of electronic medication management prescribed data to inform a mobile application

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CEC AMS Forum
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Agenda

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

2) Development of AMS clinical decision support rules within the electronic medication management system (eMMS)

3) Use 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
Context: AMS at St Vincent’s Hospital

1994: First formal AMS policy implemented 20 years ago

2003: Antimicrobial restriction classification:
  • “Traffic light System” (red/orange/green)

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

An international perspective

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

“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

“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

Assessed our business requirements & explored available options:

• ACSQHC guide “Antimicrobial Stewardship in Australian Hospitals”
• Site visits to other organisations
• Participated in webinars to assess suitability of existing standalone eAMS programs at our organisation.
• Aware of interstate experiences when an eMMS implemented after an eAMS system → led to site de-commissioning eAMS system as doctors refused to dual entry
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

### Integrated References

- **On screen view of restriction status**
- **Clinical Decision Support**
- **Duration**
- **Dose, Route, Frequency,**

#### Point-of-care, one-click policy conformant order sentence (quick list)

<table>
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<th>Scheduled</th>
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<th>Stat</th>
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<td>Azithromycin 500mg Infusion</td>
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<td>Severe sexually acquired pelvic inflammatory disease (PID) (7 days)</td>
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<td>Meropenem Injection</td>
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<td>29/08/2014</td>
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**Restriction Status:**
- **Red** - requires Antibiotic Stewardship review
- **Orange** - requires Antibiotic Stewardship review

- **Pharmacy Review** (Dr TESTING ONLY Sandhu, 29/08/2014)
- **Red** - requires approval by Antimicrobial Stewardship Registrar/Consultant
- 500mg - 1 gram dose. Reconstitute 500mg in 10mL Water for injection (WFI) and give as slow IV injection over 3 to 5 mins OR Infuse in 50-200mL of infusion fluid and give over 15-30 mins (Dose for gram-infuse in 100mL (4CH 5th Edn) For extended infusions, reconstitute and dilute with sodium only (Tissel 16th Edn)
eMM order generates electronic AMS assessment
Link between eMM order and AMS assessment

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

**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.

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.

**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
Mobile AMS app: Filter screen

- **Specialty**
  - “Red” (unreviewed) + “Orange” referred 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

- **Micro/AMS registrar**
  - All reviewed antimicrobials for a particular patient

- **Approval Status**
  - Pharmacist referral to...

- **AMO**
  - All

- **Ward**
  - All

- **Specialty**
  - All

- **Drug Name**

- **Prescribed By**

- **MRN**

- **Patient Surname**

- **Approvals Expiring Soon**
  - OFF

- **My Patient List**
  - OFF

- **Starred**
  - OFF

- **Updated by Me**
  - OFF
Mobile AMS app: Assessment screen

- **Drug Name:** Linezolid
- **Dose:** 2mg/1mL Injection
- **Duration:** 4 weeks
- **Prescribed By:** Jamie Ehrlich
- **Prescribed On/At:** 7 Jan 2014 16:41
- **Indication:** pseudomonas (Cfs) 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
- **Approved Until:**
- **Interventions:**
  - Imaging reviewed, TDM
  - Prescribing team contacted
  - Micro / Pathology results
  - Imaging reviewed
  - TDM
  - Advice provided (eg: alternative treatment, dose, duration)
  - Recommended ID consultation

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**Approval Status**

- All
- Approved - by Pharmacist
- Approved - by AMS registrar / consultant
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.
Acknowledgements

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Questions?

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