Meeting the Challenge of Antimicrobial Stewardship in Australian Aged Care Homes

Associate Professor Kirsty Buising
National Centre for Antimicrobial Stewardship
On behalf of the Aged Care Stream
Overview of the problem

3000 aged care homes in Australia (growing), Serviced by GPs

High prevalence of antimicrobial use amongst residents in ACHs higher than comparable countries, significant scope to reduce

Inappropriate antibiotic use in ACHs is harmful to residents and to public health more broadly:

- Increases selection pressure for MDROs in that patient
- *C. difficile*, allergic reactions, other adverse medication events
- ACH acts as amplifier – spread MDROs between facilities
  - CPE outbreak in Victoria
- Direct harm to ALL residents in high use antibiotic ACHs
Table 3. Antibiotic-Related Adverse Outcomes Among Residents Living in Nursing Homes With Low, Medium, and High Antibiotic Use

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Antibiotic Use, No. (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (n = 33 822)</td>
<td>Medium (n = 31 425)</td>
<td>High (n = 24 943)</td>
<td></td>
</tr>
<tr>
<td><em>Clostridium difficile</em></td>
<td>274 (0.8)</td>
<td>268 (0.9)</td>
<td>221 (0.9)</td>
<td></td>
</tr>
<tr>
<td>Diarrhea or gastroenteritis</td>
<td>3347 (9.9)</td>
<td>3388 (10.8)</td>
<td>2889 (11.6)</td>
<td></td>
</tr>
<tr>
<td>Infection with antibiotic-resistant organism</td>
<td>412 (1.2)</td>
<td>431 (1.4)</td>
<td>319 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Antibiotic allergy</td>
<td>13 (0.0)</td>
<td>25 (0.1)</td>
<td>22 (0.1)</td>
<td></td>
</tr>
<tr>
<td>General adverse event from medication</td>
<td>96 (0.3)</td>
<td>124 (0.4)</td>
<td>88 (0.4)</td>
<td></td>
</tr>
<tr>
<td>Any antibiotic complication with or without potential for indirect harms to nonrecipients (primary composite outcome)</td>
<td>3869 (11.4)</td>
<td>3890 (12.4)</td>
<td>3311 (13.3)</td>
<td></td>
</tr>
<tr>
<td>Only antibiotic complications with potential for indirect harms to nonrecipients (secondary composite outcome)</td>
<td>3797 (11.2)</td>
<td>3801 (12.1)</td>
<td>3237 (13.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Residents with a do-not-hospitalize order were excluded from these analyses of adverse outcomes because they were not at risk of a hospitalization event.*

*b* Includes any of *C difficile*, diarrhea or gastroenteritis, antibiotic-resistant organisms, allergy, and general medication adverse events.

*c* Includes only *C difficile*, diarrhea or gastroenteritis, and antibiotic-resistant organisms.
CDC AMS Core Elements

We need AMS in aged care

What does this require?

Leadership commitment
Accountability
Drug expertise
Action
Tracking
Reporting
Education
What do we know about Australian ACH antibiotic use?

- Stuart et al
  - 2012, audited five ACH over 1 year,
    - 39% of prescriptions did not meet McGeer criteria for infection

- Pilot acNAPS 2015
  - 71 ACHs, mostly government run, Victorian
  - 11% prevalence of antimicrobial use, high rates inappropriate use – prompted need to look further.
  - This activity built trust, opportunity for collaboration
    - culture change to permit external auditors, in return provided assistance, tools
The Aged Care NAPS 2016 data collection has now closed. Thank you to all those facilities that participated. The results are currently being analysed and will be released early 2017.

Please select your module below

Hospital

Residential Aged Care

Veterinary

www.naps.org.au
<table>
<thead>
<tr>
<th>State</th>
<th>No. facilit.</th>
<th>No. of beds audited</th>
<th>Prevalence of antimicrobial use</th>
<th>Prevalence of infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>35</td>
<td>1619</td>
<td>209 (12.9%)</td>
<td>62 (3.8%)</td>
</tr>
<tr>
<td>QLD</td>
<td>23</td>
<td>2007</td>
<td>248 (12.4%)</td>
<td>48 (2.4%)</td>
</tr>
<tr>
<td>SA</td>
<td>7</td>
<td>587</td>
<td>81 (13.8%)</td>
<td>21 (3.6%)</td>
</tr>
<tr>
<td>TAS</td>
<td>10</td>
<td>570</td>
<td>47 (8.2%)</td>
<td>8 (1.4%)</td>
</tr>
<tr>
<td>VIC</td>
<td>166</td>
<td>7454</td>
<td>569 (7.6%)</td>
<td>223 (3.0%)</td>
</tr>
<tr>
<td>WA</td>
<td>15</td>
<td>1210</td>
<td>146 (12.1%)</td>
<td>55 (4.5%)</td>
</tr>
<tr>
<td>Major Cities</td>
<td>74</td>
<td>5934</td>
<td>623 (10.5%)</td>
<td>184 (3.1%)</td>
</tr>
<tr>
<td>Inner regional</td>
<td>104</td>
<td>5085</td>
<td>432 (8.5%)</td>
<td>145 (2.9%)</td>
</tr>
<tr>
<td>Outer regional</td>
<td>61</td>
<td>2206</td>
<td>213 (9.7%)</td>
<td>68 (3.1%)</td>
</tr>
<tr>
<td>Remote</td>
<td>9</td>
<td>154</td>
<td>26 (19.0%)</td>
<td>17 (12.4%)</td>
</tr>
<tr>
<td>Very remote</td>
<td>3</td>
<td>68</td>
<td>6 (8.8%)</td>
<td>3 (4.4%)</td>
</tr>
<tr>
<td>Not for profit</td>
<td>76</td>
<td>6070</td>
<td>660 (10.9%)</td>
<td>166 (2.7%)</td>
</tr>
<tr>
<td>Government</td>
<td>157</td>
<td>5712</td>
<td>531 (9.3%)</td>
<td>204 (3.6%)</td>
</tr>
<tr>
<td>Private</td>
<td>18</td>
<td>1665</td>
<td>109 (6.5%)</td>
<td>47 (2.8%)</td>
</tr>
</tbody>
</table>

| National aggregate | 251 | 13447 | 1300 (9.7%) | 417 (3.1%) |

2016 acNAPS survey
13,447 residents
251 facilities
Comparing data

Australia acNAPS 2016
Infection prevalence 3.1%
Antimicrobial use prevalence
  9.7% including topical antimicrobials
  7.1% excluding topical antimicrobials

European HALT 2013
Infection prevalence 3.4%
Antimicrobial use prevalence
  4.4% excluding topical antimicrobials
Cephalexin most commonly prescribed antimicrobial
<table>
<thead>
<tr>
<th>Treatment Indications</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pneumonia (chest infection, LRTI)</td>
<td>16.6%</td>
</tr>
<tr>
<td>2 Urinary tract infection (UTI): Cystitis</td>
<td>14.5%</td>
</tr>
<tr>
<td>3 Other - Skin, Soft Tissue or Mucosal</td>
<td>14.4%</td>
</tr>
<tr>
<td>4 Wound infection: non-surgical</td>
<td>6.8%</td>
</tr>
<tr>
<td>5 Cellulitis</td>
<td>6.1%</td>
</tr>
<tr>
<td>6 Indication unknown</td>
<td>5.7%</td>
</tr>
<tr>
<td>7 Conjunctivitis</td>
<td>4.3%</td>
</tr>
<tr>
<td>8 Bronchitis</td>
<td>2.4%</td>
</tr>
<tr>
<td>9 Catheter associated UTI</td>
<td>2.3%</td>
</tr>
<tr>
<td>10 Asymptomatic bacteriuria</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prophylaxis Indications</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Urinary tract infection (UTI): Cystitis</td>
<td>30.4%</td>
</tr>
<tr>
<td>2 Asymptomatic bacteriuria</td>
<td>9.9%</td>
</tr>
<tr>
<td>3 Other - Skin, Soft Tissue or Mucosal</td>
<td>9.9%</td>
</tr>
<tr>
<td>4 Other - Urinary Tract</td>
<td>6.7%</td>
</tr>
<tr>
<td>5 Other - Medical Prophylaxis</td>
<td>6.7%</td>
</tr>
<tr>
<td>6 Indication Unknown</td>
<td>3.7%</td>
</tr>
<tr>
<td>7 Conjunctivitis</td>
<td>2.5%</td>
</tr>
<tr>
<td>8 Medical prophylaxis</td>
<td>2.5%</td>
</tr>
<tr>
<td>9 Influenza</td>
<td>2.2%</td>
</tr>
<tr>
<td>10 Catheter associated UTI</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
Results from AC-NAPS

Key areas for improvement:

• Inadequate documentation and plans for review
  – 22.1% of prescriptions - no documented indication
  – 49.9% of prescriptions - no documented review or stop date.

• Prolonged duration of prescriptions
  - 23.3% of prescriptions had been prescribed for longer than six months

• High rate of use for prophylaxis
  – 21.7% of prescriptions were for prophylaxis

• Treatment despite not meeting objective infection criteria
  - 32.4% of prescriptions were for residents with no signs/symptoms of infection in the 1 week prior to the start date – i.e. likely “colonisation”
    • If signs/symptoms present, 67.2% did not meet the McGeer et al criteria
  – ? Drivers - clinical uncertainty, atypical presentations, to avoid hospital
    • “just in case”, perception that antibiotics “do no harm”

• High rates of topical antimicrobial use
  – High use chloramphenicol eye drops, clotrimazole cream
Possible actions

- Implement key elements of safe prescribing
  - Documentation, Clearly define intended durations
- Address role of Prophylaxis (especially urine)
  - Question its place, regular review periods
- UTIs, RTIs and Skin/soft tissue infections
  - Implement Clinical pathways, point of care guidelines, educate staff
- Assist in Diagnosis
  - Examine impact of rapid tests
- Asymptomatic bacterial colonisation common
  - Improve interpretation of microbiology results (skin, urine, sputum)
- Advance Care Plans (ACPs) and next-of-kin
  - Include discussion of antibiotic use
NCAS Phd Projects

Optimising Antimicrobial Use for RTIs

• Examine impact of routine diagnostic resp multiplex PCR for viral respiratory pathogens on AB use

Antibiotic use at end of life in Aged Care Homes

• Examine optimal prescribing at end of life
  • Perceived symptom relief and/or life-prolongation
  • Potential harms: quality-of-life, side effects
  • What do patients and family really want?
Microbiology Fact Sheet

This Fact Sheet is intended as a guide only and does not equate to expert opinion. Interpretation of results should always be taken in context with the patient’s current condition and clinical review.

Urine MC&S — interpretation of results

- Urine microscopy, culture and susceptibility (MC&S) testing is used to detect a urinary tract infection (UTI):
  - In the lower parts of the urinary tract (the bladder), this infection is called cystitis.
  - In the upper part of the urinary tract (the kidneys), this infection is called pyelonephritis.
- Sometimes bacteria are found in urine samples without an infection being present; this is asymptomatic bacteriuria. Up to 25% of elderly women have this and treatment is generally not recommended.

Microscopy

- If there is a high white cell, polymorph or pus cell count (>40 x 10^9/L) ++ or +++ in urine, this suggests an infection is more likely to be present.
- If squamous epithelial cells are present >10 x 10^9/L, ++ or ++++, this suggests contamination from the skin and the urine specimen is not a good sample.

Culture

- If there is a colony count of >10^9/L, ++ or ++++ of a bacteria, this is more likely to be a true infection.
- Growth of more than one bacteria species is uncommon and suggests possible contamination (especially in non-catheter specimens).
- Common bacteria likely to cause UTIs include: Escherichia coli, Proteus, Klebsiella, Enterococcus and Staphylococcus saprophyticus.

Susceptibility

- If the patient is taking an antibiotic to which the bacteria is reported as resistant (R) or intermediate (I), then this treatment may need to be changed to an antibiotic that is reported as susceptible (S).
- If there is more than one antibiotic to which the bacteria are reported as susceptible (S), the patient should be prescribed the one with the narrowest spectrum.

Note:

- Dipsticks: dipsticks alone are not reliable in the diagnosis of a UTI, a urine sample should be sent for culture for confirmation where ever possible.
- Catheter specimens: samples taken through a urinary catheter are almost always colonised by bacteria, these do not need to be treated if the patient is otherwise well.
- Whether or not antibiotics are given, it is important to remember that infection will not clear without changing the catheter and in many cases this is all that is required; antibiotics may then be avoided.

Sputum MC&S — interpretation of results

- Sputum microscopy, culture and susceptibility (MC&S) is used in the detection of a lower respiratory tract infection, usually pneumonia (infection in the lungs).
- A healthy respiratory tract has a mixture of different bacteria which are harmless and do not require treatment; this is called colonisation.
- It is important to consider carefully the likely significance of culture results from sputum to avoid overtreatment patients with antibiotics; there is no need to treat everything that is cultured.

Microscopy

- If sputum is described as purulent or mucopurulent, or there is a high white cell, polymorph or pus cell count ++ or +++, this suggests that a bacterial infection is more likely to be present.
- If squamous epithelial cells are present ++ or +++, this suggests the scene is saliva rather than sputum and is not a good sample.
- If ++ or +++ Gram negative or Gram positive bacteria are seen on microscopy, there is more likely to be a true infection.

Culture

- If there is a colony count of >10^9/L, ++ or ++++, this is more likely to be a true infection.
- “Mixed upper respiratory tract flora” is normal and does not usually need treatment.
- Common bacteria likely to cause pneumonias include: Streptococcus pneumoniae, Haemophilus Influenza and Moraxella catarrhalis.

Susceptibility

- If the patient is taking an antibiotic to which the bacteria are reported as resistant (R) or intermediate (I), then this treatment may need to be changed to an antibiotic to which the bacteria is reported as susceptible (S).
- If there is more than one antibiotic reported as susceptible (S), the patient should be prescribed the one with the narrowest spectrum.

Note:

- Staphylococcus aureus: in sputum usually reflects colonisation. They do not normally need treatment if the patient is otherwise well, although may cause a pneumonia following influenza, respiratory burns or respiratory abscesses with sepsicaemia; these patients are often extremely unwell.
- Gram-negative bacilli: (e.g. Escherichia coli, Pseudomonas aeruginosa) in sputum usually reflects colonisation and often seen in those who have taken recent antibiotics. They do not normally need treatment if the patient is otherwise well, although they may cause a lung infection, especially in people with a chronic lung disease, so careful clinical judgement is required.
Australia

No specific guidelines for AMS in RACFs

Chapter: AMS in Aged Care Services

ETA Early 2017
Accreditation standards in aged care

• Consultation on new National Standards for aged care is occurring now - DRAFT

Organisations are expected to adopt measures to minimise AMR such as:
• increasing awareness within the organisation about AMR
• administering antibiotics appropriately (which can minimise the length of time antibiotics are required)
• adopting care strategies to minimise the need for antibiotics (such as measures to reduce the risk of urinary tract infections or treat minor skin infections).
CDC AMS Core elements

- Leadership commitment ?? accreditation
- Accountability ? accreditation
- Action - Implement policy / practice to improve antimicrobial use
  eg: improve documentation
- Tracking - Monitor process / outcome measures of antibiotic use in
  your ACH eg: acNAPS, C diff, MRSA / CPE
- Reporting - Provide regular feedback on antibiotic use and
  resistance to staff. eg: acNAPS
- Education – can be coordinated, externally supported
- Drug expertise – can be coordinated, externally supported

NCAS and VICNISS have an extended role in supporting ACHs - Already highly utilized –
provision of expert advice, education, guide actions (policy, practice)
## Questions - CDC

<table>
<thead>
<tr>
<th>Element</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership support</td>
<td>Can your ACH demonstrate leadership support for AMS?</td>
</tr>
<tr>
<td>Accountability</td>
<td>Has your ACH identified a lead for AMS activities?</td>
</tr>
<tr>
<td>Drug expertise</td>
<td>Does your ACH have access to individuals with AMS expertise?</td>
</tr>
<tr>
<td>Action</td>
<td>Does your ACH have policies to improve AM prescribing/use? Has your ACH implemented practices to improve AM use? Does your consultant pharmacist support AMS activities?</td>
</tr>
<tr>
<td>Tracking</td>
<td>Does your ACH monitor one or more measures of AM use? Does your ACH monitor one or more outcomes of AM use?</td>
</tr>
<tr>
<td>Reporting</td>
<td>Does your ACH provide ACH-specific reports on AM use and outcomes with clinical providers and nursing staff?</td>
</tr>
<tr>
<td>Education</td>
<td>Does your ACH provide educational resources and materials about AM resistance and opportunity for improvement?</td>
</tr>
</tbody>
</table>
What might the accreditation standards look like?

- AMS policies and procedures
- Antimicrobial prescribing restrictions
- ACH specific antimicrobial guidelines
- Access to QUM/on-site infection prevention staff
- Access to education for nurses targeted for ACH
- Antimicrobial prescribing surveillance and effective feedback to prescribers

Do these standards apply to the ACH or to the prescribers (GPs)?
How do we effectively influence the decision maker?
How do we equip the workforce in ACH to implement AMS?
Aged Care Stream

- Thanks to ACSQHC for supporting the project
- Thanks to all the ACH staff who collected data
- Thanks to jurisdictional reps for promoting acNAPS

- Email: support@naps.org.au
- AC-NAPS: www.naps.org.au
- NCAS: https://www.ncas-australia.org
- Twitter: NCAS_Aus

Aged Care/AC-NAPS team
A Prof Rhonda Stuart, Dr David Kong, A Prof Caroline Marshall, A Prof Kirsty Buising, Prof Karin Thursky, Dr Noleen Bennett: Infection Control Consultant (ACNAPS lead)
Dr Rod James: Microbiologist   VICNISS: A Prof Leon Worth, Dr Ann Bull
PhD fellow: Lesley Dowson