A whole of system approach to Antimicrobial Stewardship

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- No declarations

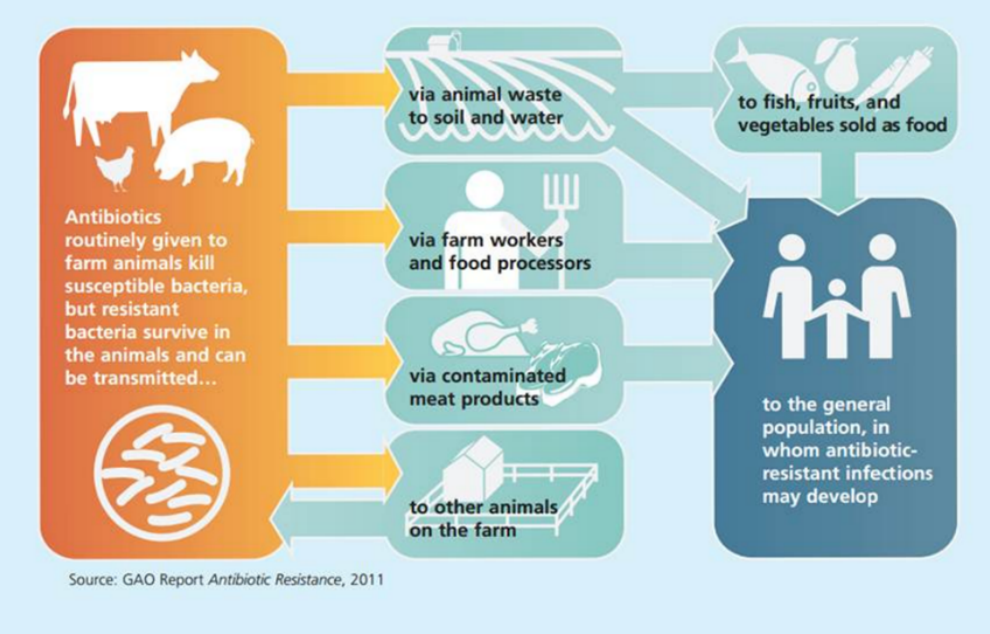
“Whole of system”

- Whole Ecosystem
  - One Health - Animal and Human
- Whole Healthcare system
  - Hospital and Community
- Whole ‘system’ within one healthcare institution
  - “Antibiotics are everyone’s business”

Ecosystem level

Animal world
veterinary, food agriculture

Human medicine



Healthcare system level

Community general practice

Residential aged care

Hospitals

Healthcare system level

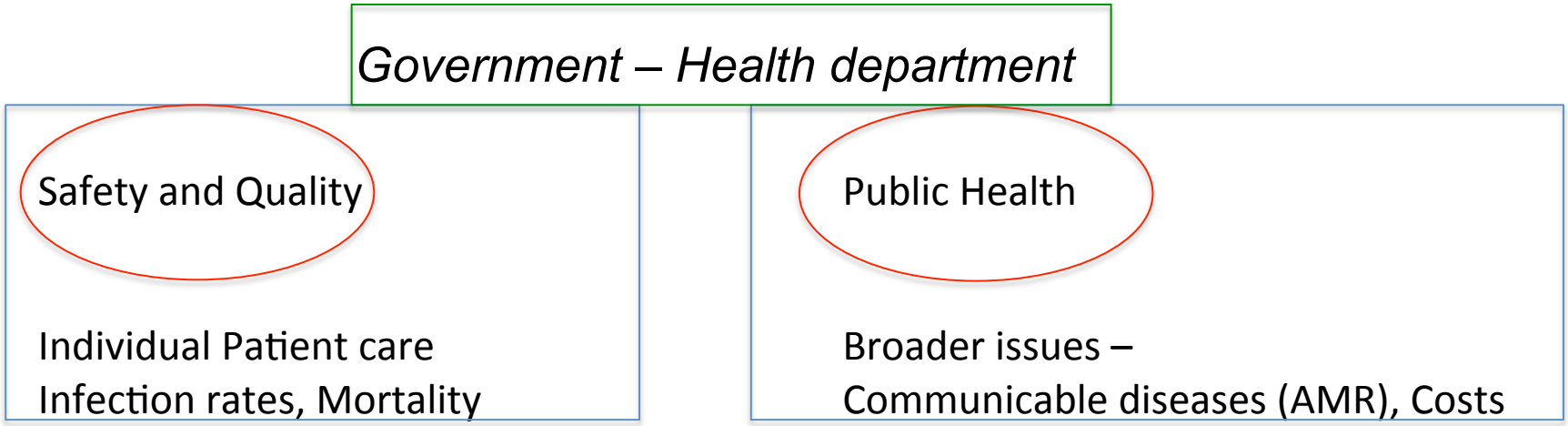
Antimicrobial stewardship =

Strategies to optimize the use of antimicrobials to:

*Improve **patient outcomes** - optimize prevention & treatment infections*

*Minimize impact on local **ecology** - limit antimicrobial resistance*

*Ensure **cost effective healthcare***



Institutional level

Medication safety
- pharmacists, doctors (physicians)

Infection prevention
- ICPs, nurses, cleaners, (surgeons)

Within an institution

Lots of stakeholders with different perspectives, different drivers/priorities

Bed manager

Quality manager

AMS team

Perioperative physician

Charge nurse

ID physician

Ward pharmacist

Patient

Surgeon

Registrar

Nurse

Patient's family

Anaesthetist

Covering ward resident

Patient's workplace/ school

The challenge

- AMS doesn't fit neatly into one area
- Lots of stakeholders
  - People who don't normally interact, now need to
    - Vets/hospital doctors/GPs/nurses/pharmacists
- Antimicrobial use is very common
  - Part of everyday practice, people are attached to what they do
- We want to change their behaviour
  - That requires ongoing effort

We need our approach to be coherent, aligned, well thought out, practical, sustainable and its needs to lead to the changes that we want

‘Whole systems thinking’

- ‘Fragmented thinking’ created our problems

“You can’t solve problems with the same thinking that created those problems.” - Albert Einstein

- We need to look at the **interrelationships** between parts of a system rather than narrowly focusing on the parts themselves
- Incorporate a **range of perspectives**, conditions, connections and capabilities into a **dynamic analysis**
- Think in terms of relationships**,** connectedness, **context**
- Systems develop and **evolve**
  - requires understanding of renewal, change, transformation

Change our thinking and approach

Systems thinking

Big picture view - holistic

Context - what works in one place may not in others

Dynamic - be responsive, expect change over time

Systems approach

Involves every level, from senior management to front line staff

It is ongoing – part of daily practice, not a one-off activity

Reflect, adapt, innovate, be creative

Outline

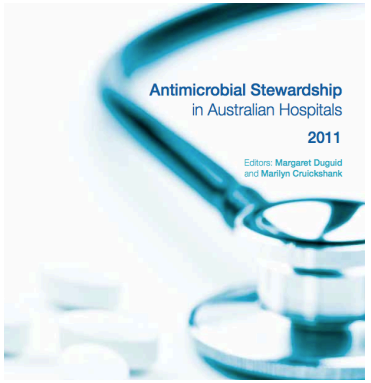
- i) ‘whole system’ approach to AMS from perspective of one healthcare institution
  - Organisation’s approach to AMS

- ii) ‘whole system’ approach to AMS from perspective of broader healthcare system (incorporating One health)
  - National strategy

Whole of system approach to AMS in a healthcare service

Establish Governance

Draft – update 2017
ACSQHC



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- Overall **accountability** for antimicrobial management lies with the organisation's management.

- Managers and Senior Clinicians are responsible for the antimicrobial stewardship (AMS) program, including:
  - ensuring that AMS resides within the organisation's **quality improvement and patient safety** governance structure
  - dedicating human, financial and information technology **resources**
  - ensuring ongoing **education and training** for staff

Make it a clear priority

The Structure and Plan

- Develop a shared vision and goals
  - ***To ensure better safer care***
- Establish a coordinating group - AMS committee
  - whole hospital activity, not ID owned, **broad representation**
- Build an AMS team
  - to do the day to day AMS activity
- Develop a plan
  - based on articulated goals, identify strategies to implement
- Decide what you will measure as indicators/ outcomes of interest
  - accountability

The Strategies

Think about how you are addressing;

- Knowledge
  - Provide Information, Education, Disseminate evidence
    - Explain what we should do – know what best practice looks like

- Attitudes
  - Create a culture that values judicious antibiotic use, values evidence based care, build awareness of AMR
    - Ensure we understand why – we want to comply

- External barriers/ enablers
  - Give people rules and tools to make it easy
    - Ensure they are able to do it, they know how

- Monitor and Reflect – feedback to drive improvement

The Actions

1. People - Education, Awareness, Capacity building
   - Explore their concerns (identify 'levers')
   - Perspectives of all stakeholders (Nurses, Pharma, HMOs, anaesthetist)

2. Practices - Implementation of AMS practices
   - Clear policies, Establish rules, Access to tools, Access to advice
   - Ensure it fits usual workflow for all stakeholders

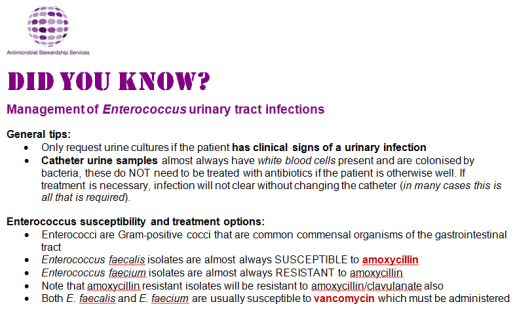
3. Progress – Monitoring, Surveillance
   - Feedback meaningful data to all key players
   - Reflect and Adapt

1. People - Education/ Awareness

- Do the leg work, turn up, smile
  - Unit meetings
  - Ask about what worries them
  - Buy the registrar a coffee and talk for twenty minutes

- Online education
  - most acceptable to VMOs/consultants
  - Short emailed vignettes – repeated, quiz, all staff

- Shared ‘multi-unit’ guidelines
  - Be the bridge, build trust, (be prepared to do the hard work)



DID YOU KNOW?

Management of *Enterococcus* urinary tract infections

General tips:

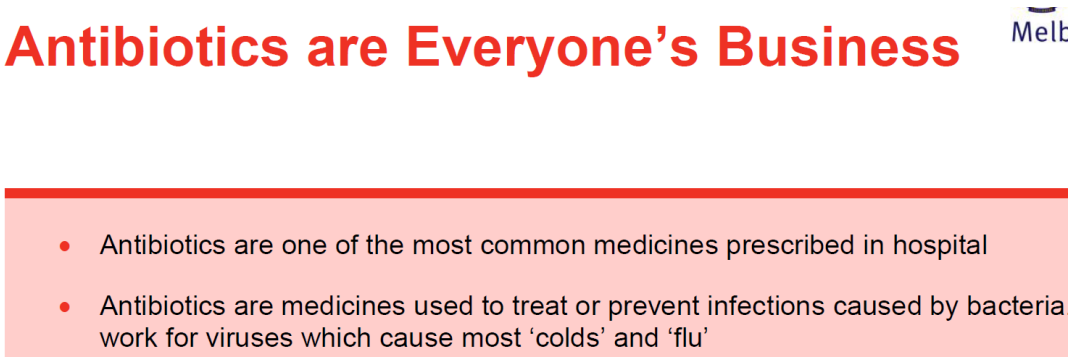
- Only request urine cultures if the patient **has clinical signs of a urinary infection**
- **Catheter urine samples** almost always have *white blood cells* present and are colonised by bacteria, these do NOT need to be treated with antibiotics if the patient is otherwise well. If treatment is necessary, infection will not clear without changing the catheter (*in many cases this is all that is required*).

Enterococcus susceptibility and treatment options:

- Enterococci are Gram-positive cocci that are common commensal organisms of the gastrointestinal tract
- *Enterococcus faecalis* isolates are almost always SUSCEPTIBLE to **amoxycillin**
- *Enterococcus faecium* isolates are almost always RESISTANT to amoxycillin
- Note that amoxycillin resistant isolates will be resistant to amoxycillin/clavulanate also
- Both *E. faecalis* and *E. faecium* are usually susceptible to **vancomycin** which must be administered

People – Build capacity

- Capacity build amongst your staff
  - Empower pharmacists/ nurses/ HMOs - don't bypass them
  - You don't need to be an AMS expert to practice AMS
  - Give them language to use, create champions
  - Simple clear interventions they can make, questions to ask
  - They will be there (on the ward round) when you are not!



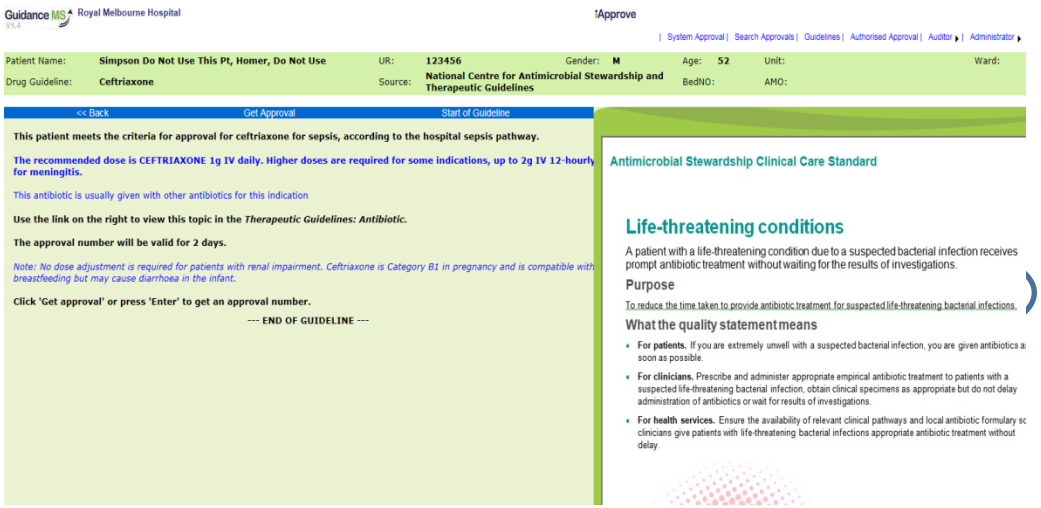
2. Practices - Implementation of AMS

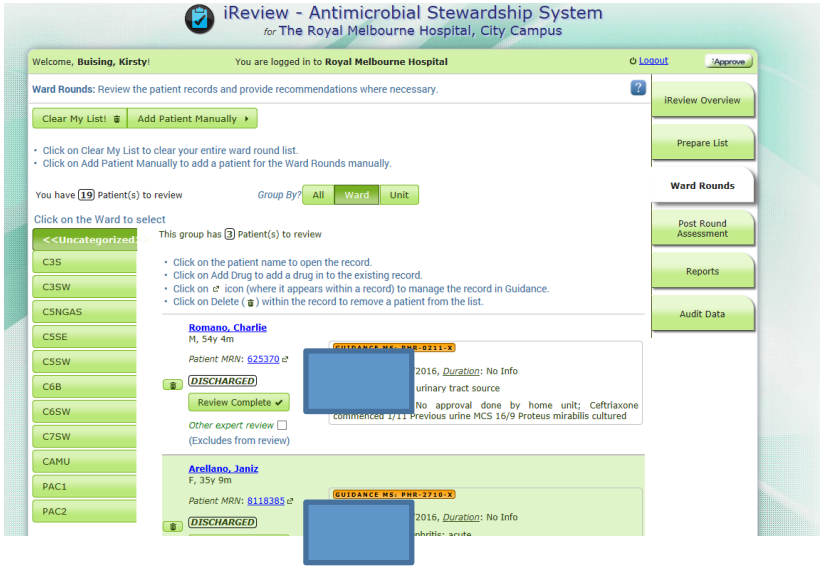
- Make it easy
  - **Clear <u>Rules</u>**
    - **Policies** in place
    - **Procedures** are clear – e.g; regular post prescription review
  - **Provide <u>Tools</u>**
    - Ensuring access to information, procedure fits workflow
  - **<u>Restrictions</u>** - Pre prescription approval very effective
  - **<u>Persuasion</u>** - Ensuring access to ID experts, discussion/ advice

Watch what staff do, how they do it, listen to why they do it
Understand organisational change

This is the way we do business,
it isnt just a 'project' for one unit, one drug, or one condition

Implement AMS Tools





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GUIDANCE

>65 hospitals, 4 states

>10 years

All hospital types

- private (Epworth, Ramsay)
- rural (several sites)

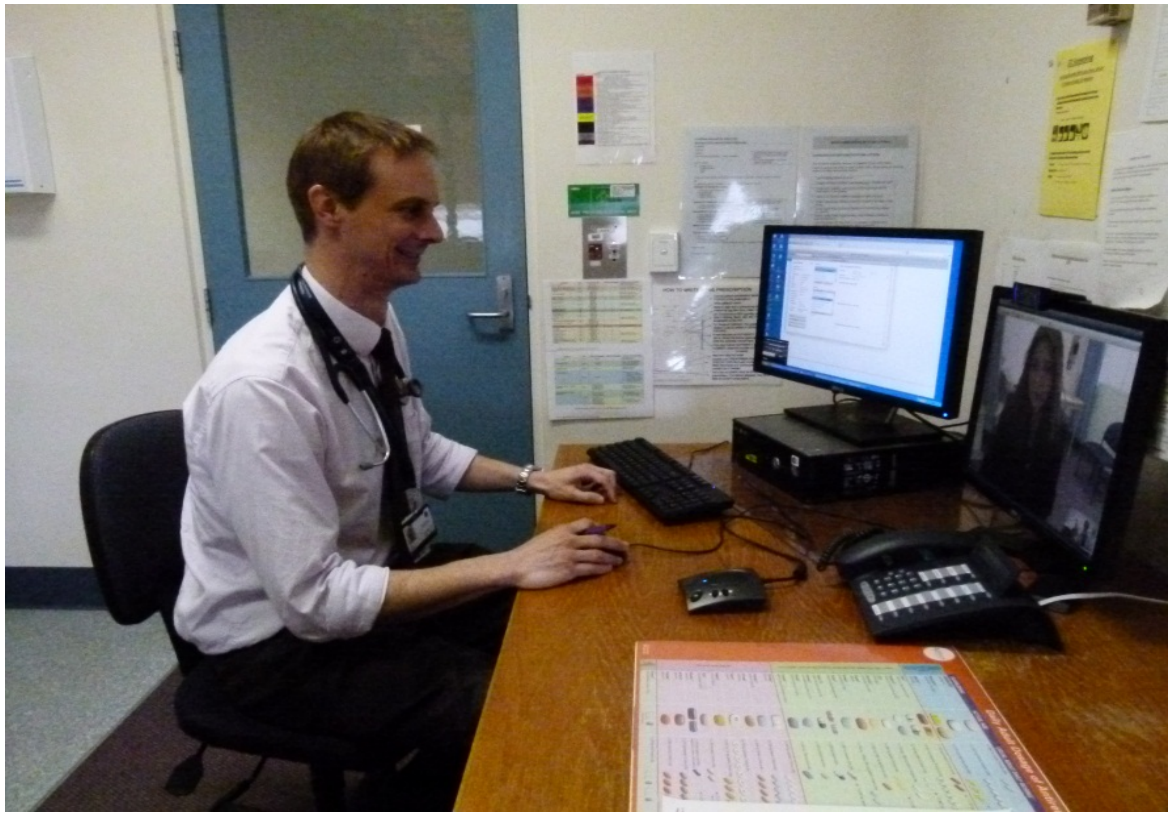
Full cycle

- Approvals
- Post prescription review
- Auditing
- Decision support

Meeting new challenges

EMM Integration

Implement AMS Clinical support



AMS programs without access to ID experts – can “set people up to fail”

ID experts can’t be everywhere, but technology enables broader access

Explore new models of care so expert advice is available

3. Progress - Surveillance

- Must be **meaningful** and actionable
  - Lots of audits done that go nowhere
  - Must get help to interpret data
  - Pull out one or two key messages/ actions

- **Communicate information** and **Propose action** in response
- E.g; Cellulitis audit
  - what error is being made, which units, what patient group, what drug,
  - ***what will we do about it?***

PDSA Quality improvement cycle: Plan Do Study **Act**

Progress – surveillance be responsive

- Liaise closely with infection prevention
- If outbreaks/ issues occur, adapt in a timely way
- Great opportunity to engage, build rapport

Cardiothoracic surgery antibiotic prophylaxis recommendations

Patient Group	Antibiotics	Peri-op dosing	Post-op dosing	Duration for CAGS
Low risk of methicillin resistant *Staphylococcus*	Cephazolin	2g IV (3g if >120kg) bolus 15-60 minutes before incision*	2g IV 8-hourly (1g 8-hourly if eGFR < 60mL/min)	3 doses post-op
10th May - 30th June 2017 During investigations of Pseudomonas sternal wound infection cluster	***add*** Ceftazidime	1g IV bolus 15-60 minutes before incision*	1g IV 8-hourly (1g 12-hourly if eGFR < 60mL/min)	3 doses post-op (2 doses post-op if eGFR < 60mL/min)
High risk of methicillin resistant *Staphylococcus* • *MRSA colonisation / previous infection* • *Current hospitalisation > 5 days* • *Valve re-operation* • *Urgent re-operation* *(return to theatre or early revision)*	Cephazolin	2g IV (3g if >120kg) bolus 15-60 minutes before incision*	2g IV 8-hourly (1g 8-hourly if eGFR < 60mL/min)	3 doses post-op
	and Vancomycin	1.5g IV (2g if >120kg) starting infusion 30-120 minutes before incision	1.5g IV 12-hourly (2g if > 120kg)	1 dose post-op if eGFR > 60mL/min
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Whole of system approach to AMS at a National level

Australia's First National Strategy to address Antimicrobial Resistance

Objective One
Increase awareness and understanding of antimicrobial resistance, its implications and actions to combat it, through effective communication, education, and training

Objective Two
Implement effective antimicrobial stewardship practices across human health and animal care settings to ensure the appropriate and judicious prescribing, dispensing and administering of antimicrobials

Objective Three
Develop nationally coordinated One Health surveillance of antimicrobial resistance and antimicrobial usage

Objective Four
Improve infection prevention and control measures across human health and animal care settings to help prevent infections and the spread of resistance

Objective Five
Agree a national research agenda and promote investment in the discovery and development of new products and approaches to prevent, detect and contain antimicrobial resistance

Objective Six
Strengthen international partnerships and collaboration on regional and global efforts to respond to antimicrobial resistance

Objective Seven
Establish and support clear governance arrangements at the local, jurisdictional, national and international levels to ensure leadership, engagement and accountability for actions to combat antimicrobial resistance

National level

1. Education
2. Implement AMS practices
3. Surveillance
4. Work with Infection prevention
5. Research
6. Policy / Governance
7. International partnerships

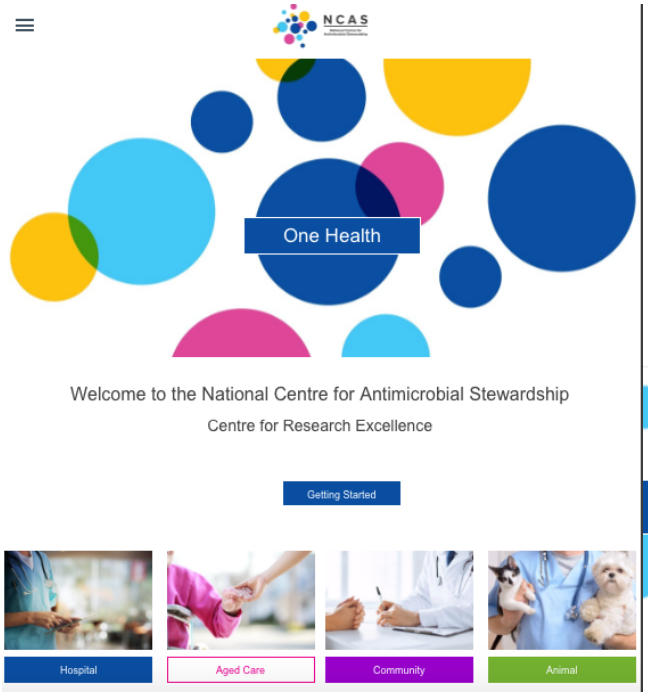
1. Education

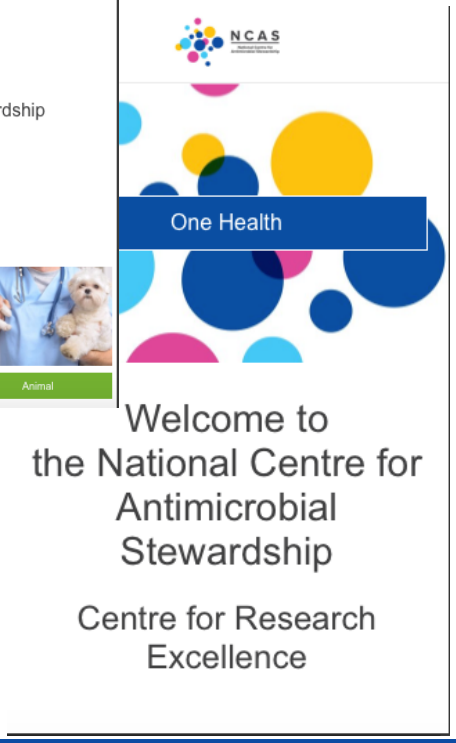
Capacity building

National Centre for Antibiotic Stewardship activity:

- Advanced Infection control & AMS - ID micro trainees/ consultants
  - Bi annually – since 2011 (ASID endorsed)
- AMS for nurses and ICPs
  - Melbourne and Sydney - since 2012 (ACIPC endorsed)
- AMS for pharmacists
  - Melbourne - since 2014 (SHPA endorsed)
- AMS in rural/regional hospitals
  - Benella - since 2016 (RICPRAC endorsed)

2. Implement AMS Activities Resources





Clostridium difficile management pathway (adult)

Surname: _____
Given Names: _____
UR number: _____
Date of Birth: _____

Recognise	**Does this patient have suspected C difficile infection?** Symptoms might include diarrhoea, fever.
Pathology tests	□ Send stool for C difficile testing □ Collect FBC, EUC, CRP, LFTs, glucose, If severe, add lactate
1. Infection control	□ Isolate the patient and use contact precautions upon recognition of diarrhoea
2. Assess Severity	Assess vital signs, Signs of severe CDI include: □ Requiring ICU care, haemodynamic instability OR □ severe abdominal pain, peritonitis OR □ Ileus/ toxic megacolon OR □ serum white cell count >15 x 10^9/L OR □ serum Lactate >2mmol/L OR □ acute renal failure Creatinine increase 50% from baseline OR □ serum albumin low <25mg/L OR □ fever >38.5C Consider need for fluid resuscitation if BP<100mmHg or lactate >2mmol/L - See sepsis pathway **Call a MET if patient meets MET call criteria at any stage**
3. Review all antibiotics	□ Cease all other systemic antibiotics if possible. If not possible, discuss with the antimicrobial stewardship team or VIDS to see if lower risk alternatives are an option (e.g. ciprofloxacin or ceftriaxone, may be higher risk than doxycycline or penicillin).

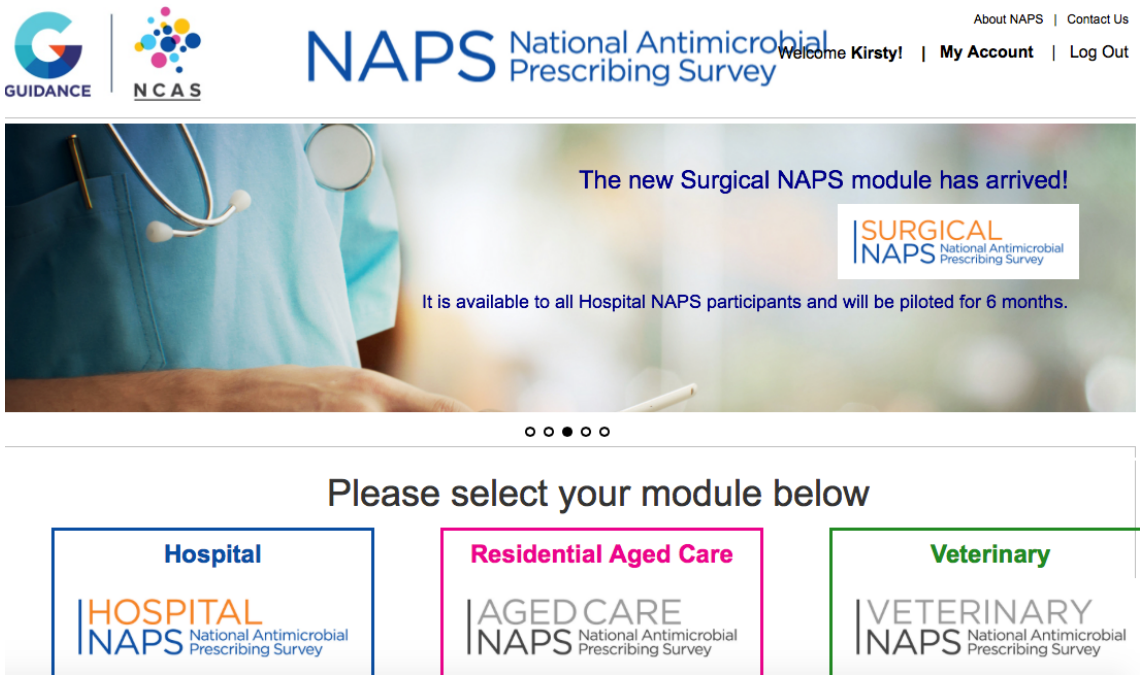
Urine MC&S - *interpretation of results*

Fact Sheet - for hospitals and acute care facilities

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.

- Only send a urine sample for microscopy, culture and susceptibility (MC&S) if the patient has **clinical symptoms and signs** of a urinary tract infection (UTI). 'Smelly' urine or 'cloudy-looking' urine is not a good sign for UTI.
- ***Urine 'Dipstick'*** tests are not reliable enough to make a diagnosis of UTI, a urine sample should be sent for M,C&S wherever possible.
- Always provide **accurate clinical notes** on the request slip to help the laboratory interpret the results and issue an appropriate report.
- ***Asymptomatic bacteriuria*** is when bacteria are cultured from a urine sample in the absence of other clinical symptoms or signs of infection. *This can be found in up to 25% of elderly women.* Antibiotic treatment is usually **NOT** recommended (*exceptions include pregnant women and those undergoing urological surgical procedures*).
- ***Catheter urine samples*** almost always have *white blood cells* present and will grow bacteria *(most urinary catheters become colonised by bacteria).* Treatment is **NOT** required if the patient is otherwise well.
- If a catheterised patient is unwell and antibiotic treatment is necessary, then **the urinary catheter should always be changed**. Infection will not clear without changing the catheter. *In many cases, a change of catheter may be all that is required.* Antibiotic treatment without removing the catheter may result in infection with highly resistant bacteria

3. Surveillance- audits



Common tools
Clear definitions
Trained auditors
Comparable information

4. Work with Infection prevention

Already doing infection surveillance

Counting infections (hospital, community)

Documenting isolates (pathogen resistance profiles)

Need to align with data on antimicrobial use and clinical outcome

- *How are the patients being managed? their outcomes?*

Eg; Don't just count CREs, look at how those patients are being treated

5. Research – Implementation

Data collected within everyday workflow

ensure it is robust, meaningful data

Document changes with interventions over time

- Antimicrobial use
  - Volume = Ecologic pressure (antimicrobials), Appropriateness
- Antimicrobial resistance

  Organisms (prevalence, resistance)
- Clinical management of Infection

  Treatment used, clinical outcomes (mortality, LOS)
- Infections rates

  HAI infection events, pathogen transmission dynamics

Data linkage where possible

6. Policy / Governance

Policies will drive change – very powerful!

Australia in 2009, 80 hospitals audited

9 had AMS Programs, 19 had partial activity

Chen et al J Pharm Res 2010

Since 2013, all must have AMS programs

BUT

Sites will do the 'bare minimum'

and

Accreditors may not be able to judge efficacy well

so be prescriptive!

Hospital Accreditation: AMS

3.15 The health service organisation has an antimicrobial stewardship program that:

- includes an antimicrobial stewardship policy
- provides access to, and promotes the use of, current, evidence-based Australian therapeutic guidelines and resources on antimicrobial prescribing
- has an antimicrobial formulary that includes restriction rules and approval processes
- incorporates recommendations and principles from the Antimicrobial Stewardship Clinical Care Standard

3.16 The AMS program will:

- review antimicrobial prescribing and use
- use surveillance data on antimicrobial resistance and usage to support appropriate prescribing
- evaluate performance of the program, identify areas for improvement, and take action to improve the appropriateness of antimicrobial prescribing
- report to clinicians and the highest level of governance in relation to compliance with the antimicrobial stewardship policy

DRAFT 2017, ACSQHC
New National Standards

Clinical Care Standards

Clinician Fact Sheet:

Antimicrobial Stewardship

The goal of the Antimicrobial Stewardship Clinical Care Standard is to ensure that a patient with a bacterial infection receives optimal treatment with antibiotics. This means that patients are offered the right antibiotic to treat their condition, the right dose, the right route, at the right time and for the right duration. This should be based on accurate assessment and timely review as to lessen the risk of adverse effects and reduce the emergence of antibiotic resistance.

UNDER THIS CLINICAL CARE STANDARD

- A patient with a life-threatening condition due to a suspected bacterial infection receives prompt antibiotic treatment without waiting for the results of investigations.
- A patient with a suspected bacterial infection has samples taken for microbiology testing as clinically indicated, preferably before starting antibiotic treatment.
- A patient with a suspected infection, and/or their carer, receives information on their health condition and treatment options in a format and language that they can understand.
- When a patient is prescribed antibiotics, whether empirical or directed, this is done in accordance with the current version of the *Therapeutic Guidelines* (or local antibiotic formulary). This is also guided by the patient's clinical condition and/or the results of microbiology testing.
- When a patient is prescribed antibiotics, information about when, how and for how long to take them, as well as potential side effects and a review plan, is discussed with the patient and/or their carer.
- When a patient is prescribed antibiotics, the reason, drug name, dose, route of administration, intended duration and review plan is documented in the patient's health record.
- A patient who is treated with broad-spectrum antibiotics has the treatment reviewed and, if indicated, switched to treatment with a narrow-spectrum antibiotic. This is guided by the patient's clinical condition and the results of microbiology tests.
- If investigations are conducted for a suspected bacterial infection, the responsible clinician reviews these results in a timely manner (within 24 hours of results being available) and antibiotic therapy is adjusted taking into account the patient's clinical condition and investigation results.
- If a patient having surgery requires prophylactic antibiotics, the prescription is made in accordance with the current *Therapeutic Guidelines* (or local antibiotic formulary), and takes into consideration the patient's clinical condition.

More information on the Clinical Care Standards program is available from the Australian Commission on Safety and Quality in Health Care website at **www.safetyandquality.gov.au/ccs.**

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Life threatening sepsis – urgent Rx

Samples taken for micro Ix

Information provided about Dx

Prescribe c/w guidelines

Communicate plan – duration, SEs

Documentation is clear

Review results of micro Ix

De-escalate narrow spectrum

Surgical prophylaxis c/w guideline

7. International engagement

Key issues:

- Lack of clinician capacity/ expertise
  Eg; clinical pharmacists
- Lack of training
  Eg; advanced AMS training
- Lack of rational prescribing guidelines
- Need for guidance on appropriate use of tests
- Lack of meaningful interpretation of data
- Absence of resources/ tools
  Eg; medication chart

- Pharma incentives to prescribers
- Over the counter access/ poor regulation
- Lack of diagnostic tests
- Poor access to medicines, drug costs
- Counterfeit medications

Engage, Mentor
Disseminate learning
Collaborate, Share
Advocacy

Conclusion: Systems approach

In an institution, consider:

i) People (Education)
- Address Knowledge, Attitude

ii) Practices (Implementing strategies)
- Address External barriers and enablers
- Rules - policies/ procedures
- Tools - understand the day to day activities
- Restrictive and Persuasive strategies

iii) Progress (Surveillance)
- should be monitored in a meaningful way

Involve all stakeholders
Be adaptive, creative, always evolving

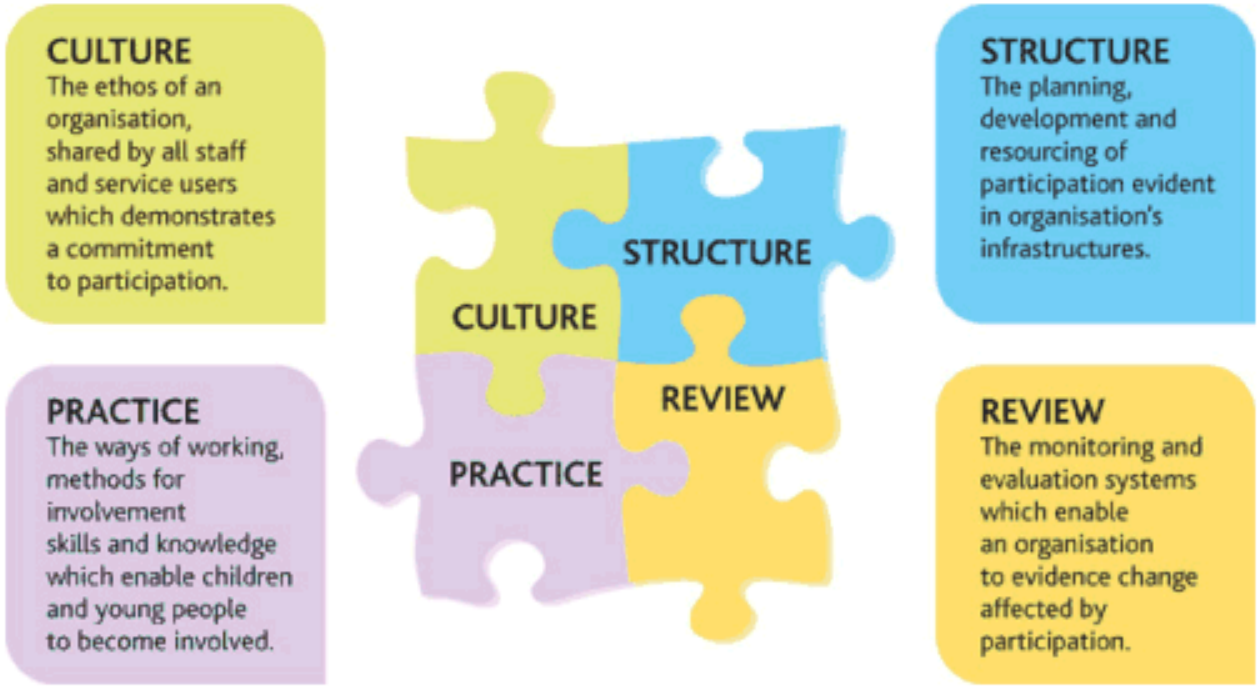
At a broader national healthcare system level it considers;

- Coordinating the institution level AMS work
  - Education
  - Implementing AMS practices
  - Surveillance

- Aligning this with
  - Infection prevention activities
  - Research esp funding Implementation research
  - Policy/ governance requirements
  - International engagement

  Thinking about stakeholders beyond the institution

Thankyou



Questions?