Q: What is antimicrobial stewardship (AMS)?

- An AMS program is the combination of a range of complementary strategies and interventions that work together to encourage safe and effective use of antimicrobials, with the aim of improving patient safety and quality of care.
- Along with a comprehensive infection prevention and control program, AMS also aims to address the problem of antimicrobial resistance in health care settings.
- AMS has been defined by McDougall and Polk (2005) as “…an ongoing effort by a health care institution to optimise antimicrobial use among hospital patients in order to improve patient outcomes, promote cost effective therapy and reduce adverse sequelae of antimicrobial use (including antimicrobial resistance)“.

Q: Why is antimicrobial stewardship a core criterion and not developmental?

The NSQHS have been developed to address aspects of health care where there are gaps that exist between what happens, what should happen (according to evidence) and where evidence based strategies exist for improvement.

Bacterial resistance to currently available antibiotics is now becoming increasingly frequent in both hospital and community settings. It is estimated that 2 million patients acquire healthcare associated infections (HAI) each year in Europe, of which over half are drug resistant. Resistant bacteria dramatically decrease the chance of effectively treating infections and increase the risk of complications and death. Patients with infections due to resistant bacteria are at least twice as likely to die than patients with infections from non resistant organisms.

Unnecessary and inappropriate use of antibiotics is a major driver of the development of antimicrobial resistance. Hospitals in Australia have a higher rate of antimicrobial usage in comparison with hospitals in Northern Europe, and as many as 50% of antimicrobial courses prescribed in Australian hospitals are considered inappropriate. Effective AMS programs have been shown to reduce inappropriate antimicrobial use, improve patient outcomes and reduce antimicrobial resistance.
**Q: We are getting started on AMS and want to do a gap analysis. What are some things to be considered?**

Undertaking a gap analysis helps the organisation target areas for improvement. For AMS, consider:

- What governance arrangements are in place to support AMS?
- What policies, processes and resources are already in place that support or can support an AMS program?
- Who might be interested in working on an AMS program?
- What type of data is currently collected that can give information about antimicrobial resistance and usage? (Think broadly and consider data collected across the hospital – there may be departments or clinical units already collecting and analyzing data about infections, for example a surgical department may already be reviewing surgical site infection data and effectiveness of prophylaxis).
- What audits have been undertaken in the last twelve months that may have information about antimicrobial prescribing? (This could include audits undertaken by the pharmacy department on drug usage evaluation (DUE), medication safety, or documentation of allergies or indication in the medical record).
- What do we already know about resistance, and what type of infections do we see?
- What does all this tell us about our organisation – where are we performing well, and what needs to be done to enable improvement so that we can demonstrate safe practice?

Pages 10-12 of the book Antimicrobial Stewardship in Australian Hospitals (2011) outlines a suggested approach to setting up an AMS program, and includes further information about the steps that could be considered as part of a gap analysis for AMS.

**Q: How can the risk framework be applied to AMS?**

For AMS, risk can be considered in relation to the risk of harm from unwanted consequences of antimicrobial use. This can include:

- harm to individual patients through suboptimal treatment, subsequent infection with multiresistant bacteria, fungi or clostridium difficile and avoidable drug toxicity.
- harm to the broader population, through the emergence and spread of resistance, particularly if new agents are used indiscriminately.

As part of the risk assessment, consider:

- Who is at risk? (this could include patients who are immunosuppressed or elderly, patients in areas where multiple medications are used, or patients with allergies).
- What antimicrobial agents are being used? (do we use many newer agents, many broad spectrum agents, or many high cost agents).
- How can this agent cause harm (broad spectrum, high level of toxicity, new agent that should be reserved being used indiscriminately)?
- Why can it happen (frequent use, inappropriate monitoring, absence of prescribing guidelines and policy, absence of audit and feedback procedures, frequent use, inexperienced staff, inadequate education programs)?
• How likely is it to cause harm (for example, some agents are associated with higher risk of toxicity, others are associated with higher rates of resistance – consider local antibiograms to determine this).

• What are the potential consequences of inappropriate use (apart from resistance, consequences could also include complications from toxicity, recurrent infection and hospital care, increased length of stay, and increased mortality and morbidity).

Remember - undertaking a risk assessment and reviewing this in conjunction with the gap analysis will help an organisation to undertake a targeted "snap shot" audit of antimicrobial use in areas identified as potentially higher risk, to determine where to target interventions. For example – if the facility determines there is high use of broad spectrum antimicrobials this may not always be an issue. The key is to determine whether use of agents associated with higher rates of resistance or risk of toxicity is appropriate.

Further information regarding risk management is available at the following link: http://www.safetyandquality.gov.au/publications/risk-management-approach/

Q: We are currently writing our AMS program plan, but do not have an infectious diseases physician or microbiologist or pharmacist at our hospital - what can we do?

There are many things that a hospital can do to commence a stewardship program, even when there are no onsite specialist clinical staff. They include:

• Establishing a governance structure to support stewardship
• Developing a policy to guide prescribing consistent with the most current version of Therapeutic Guidelines: Antibiotic.
• Involving clinicians in policy development to help obtain “buy in”.
• Informing clinicians of the policy and making sure it is accessible
• Ensuring clinicians can access Therapeutic Guidelines: Antibiotic
• Ensuring resistance data is reviewed by committees responsible for infection prevention and control
• Establishing a structure to identify and review adverse events/incidents related to antimicrobial prescribing

The strategies above could be considered sufficient to start a program during 2013. However, stewardship programs are expected to evolve over time, and the involvement of both a pharmacist and an ID physician and/or microbiologist are considered essential to effective programs. Facilities should plan strategies for either specialist involvement in the management of the AMS program, either onsite, or through network /district or hospital governance group arrangements

Q: We have nurse practitioners at our hospital. Does an AMS program and the prescribing policy apply to them?

Yes. A prescriber refers to any clinician who has the authority to prescribe antimicrobial agents. This may include nurses, dentists, medical practitioners, and podiatrists.
Q: Most of our patients are transferred from an acute care hospital to our facility. We very rarely prescribe antibiotics, but patients have often started therapy prior to being transferred here. Do we need to have an AMS program?

Yes.

The Standards apply to all hospitals in Australia. The Antimicrobial Stewardship (AMS) Criterion is a core criterion, so a program should be in place at these sites.

Remember that the intent of this criterion is to promote appropriate prescribing and use of antimicrobials, so this applies to all facilities that prescribe, dispense or administer antibiotics to patients. You may find it useful to look at the following documents which provide some suggested actions:

- The Standard 3: Safety and Quality Improvement Guide - provides options for implementing AMS programs in different facilities including small rural hospitals as well as general guidance on strategies to employ when developing and implementing an AMS program.
- There is also the small hospital's guide on the Commission's website designed to provide guidance for small hospitals NSQHS Standards Guide for Small Hospitals http://www.safetyandquality.gov.au/publications/nsqhs-standards-guide-for-small-hospitals/
- The Antimicrobial Stewardship in Australian Hospitals publication provides in depth guidance on setting up a program. It also provide examples of tools and resources from Australian hospitals http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/book/
- The Commission’s Antimicrobial Stewardship webpage and the Antibiotic Awareness Week webpage have useful resources, including a presentation that outlines the scope of the problem of antibiotic resistance http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/antibiotic-awareness-week-2013/
- You should also consider resources that may be available from your State or Territory Health Department, Local Health Network, or Private Hospital Governance group.

Q. We are a private hospital providing specialist services, and have access to infectious diseases and microbiology services. We are currently developing our AMS policy and formulary, and would like to adapt one of the formulary examples provided in the Commission’s publication the book Antimicrobial Stewardship in Australian Hospitals (2011). What sort of things should we consider when we develop the formulary?

It is important to remember that AMS programs and the policies and processes supporting the program will need to be tailored to reflect the clinical context. Examples of a formulary from other organisations can provide a useful starting point for discussion at an individual facility, however a number of factors should be considered:
• the organisation should consider governance arrangements for AMS and which group or committee will be responsible for managing the formulary. The committee responsible for drugs and therapeutics in the organisation would be an appropriate committee, with advice from microbiology and infectious diseases services.

• the local formulary guidelines should be consistent with recommendations in the current Therapeutic Guidelines: Antibiotic.

• the formulary for each individual facility should also be based on local antimicrobial resistance patterns, and informed by local microbiologic information (see page 32 of Antimicrobial Stewardship in Australian Hospitals 2011).

• restricted agents would be determined through consideration of local resistance patterns, the clinical case-mix, as well as factors associated with specific agents - for example if the agent is broad spectrum or associated with high risk of resistance, has a high risk of adverse outcomes for patients, or is a newer agent.

• the prescribing policy should include information about the formulary and how it is to be used. As part of the ongoing review and maintenance of the formulary, the organisation should consider ways it will monitor and review antimicrobial resistance patterns and usage (criterion 3.14.3), to determine if any changes should be made to restriction/approval processes for individual agents

• Chapter 2 of the Commission publication, Antimicrobial Stewardship in Australian Hospitals (2011) provides more information regarding formularies and antimicrobial approval systems.

Q: We do not have a pharmacist on site – how can I monitor antimicrobial usage?

Methods of monitoring usage should be relevant to the size and complexity of the facility. Examples could include:

• reviewing the list of stock ordered and used each month, as well as reviewing monthly expenditure of antimicrobials (the supplying pharmacy should be able to provide usage reports).

• Monitoring antimicrobial usage in a high risk area, in relation to a specific procedure, clinical condition, or of high risk or broad spectrum antimicrobials and later generation antimicrobials (e.g. 3rd and 4th generation cephalosporin and quinolones),

• using indicators from Quality Use of Medicines Indicators for Australian Hospitals.

• participate in reviews and monitoring processes regarding antimicrobial usage and resistance conducted by your local health network, private hospital group, state or territory health or medication safety unit.

Q: The criterion says we have to monitor rates of antimicrobial resistance – what should we monitor?

Methods of monitoring resistance should be relevant to the facility and could include:

• Review of SAB rates (i.e. data collected for the “Myhospitals” website).

• Reviewing other infection rates such as MRSA, hospital identified Clostridium difficile, or surgical site infections and urinary catheter infections and resistance patterns.

• conducting targeted surveillance where appropriate for infectious agents such as multiresistant organisms

• working with medical microbiologists to provide an annual antibiogram
• participate in reviews and monitoring processes regarding antimicrobial resistance conducted by your local health network, private hospital group, or state or territory health department

Q: What measures can I use to determine effectiveness of the AMS program?

Action 3.14.4 requires that action be taken to improve the effectiveness of antimicrobial stewardship. Monitoring usage and resistance will enable the effectiveness of the program to be assessed and actions to improve effectiveness to be prioritised. Additional effectiveness measures will depend on the size and complexity of your facility, but could include one or more of the following:

• audit prescribing and review if accords with guidelines - you could choose to audit one antimicrobial agent, or one patient population, or a common clinical condition e.g. urinary tract infections.
• audit documentation of indication and stop or review date for antimicrobial use in the medical record/medication chart (check with the pharmacist to determine if this type of auditing is already undertaken as part of their routine audit and monitoring).
• audit appropriateness and timeliness of therapy for a given infection (for example time to treatment of sepsis with antimicrobials)
• record and monitor advice acceptance rates of prescribing advice provided by pharmacists, or prescribing rates of concordance with susceptibility
• record and monitor attendance or participation of prescribers and clinicians at orientation, training and education programs on AMR and AMS.
• audit cost savings in relation to antimicrobial stewardship programs, remember that the objective of AMS is to optimise antimicrobial therapy not save money.
• review incidents, adverse events and near misses related to antimicrobial prescribing

It is important that action is taken to improve effectiveness of the AMS program, and this will form part of the quality improvement cycle. Review the results of audits to determine priority areas and what actions can be take to improve. For example, if attendance and participation in education on AMR is low, the organisation needs to consider why this is the case, the barriers to education participation, and the ways in which participation can be encouraged. Providing feedback to prescribers, clinicians and relevant committees and governance groups on the results of audit and monitoring activity is one action that can improve effectiveness and assist with targeting initiatives to improve prescribing such as an IV to oral switch program, de-escalating therapy. Involving prescribers in review of results and development of strategies to improve effectiveness may also influence the impact of strategies.

The organization could also consider options for benchmarking in relation to antimicrobial use. Benchmarking may be able to be undertaking through programs such as the National Antimicrobial Usage Surveillance Program (NAUSP), at a local health network level, or through a private hospital group. Remember, however, when comparing data between clinical areas or facilities that it is important to be sure that the same definitions are used, and that everyone collecting data has a shared understanding of what these are.

Participating in Antibiotic Awareness Week during November each year to promote the Stewardship program may be another way to demonstrate that action is being taken to improve the effectiveness of the program. More information about antibiotic awareness week is available on the Commission website. The Commission's


**Q. How many medication charts do I need to review to ensure the program is effective?**

Unfortunately there is no set number - the scope of monitoring will depend on the scope of services offered, the associated risks, and the results of your first audits.

Review your gap analysis and risk assessment to determine priority areas, and undertake a “snap shot” audit or survey to determine if further information or analysis is needed in a particular area. Remember also to identify data and monitoring activity that is already collected in relation to antimicrobial use. For example, it is likely the organisation, regardless of size, monitors incidents related to medication safety (such as incidents and adverse events related to toxicity of antimicrobials, allergic reactions, or delayed or missed therapy). This data could be used as a starting point to determine if action is required in those areas.


**Q: What resources are available to assist organisations get started on Stewardship?**

- The Commission publication “Antimicrobial Stewardship in Australian Hospitals” can be accessed at the Commission website. It brings together the evidence around AMS and provides guidance that can be considered in all types of health care organisations. The guidance provided may need to be adapted to the local context.
- The HAI website of the Commission ([http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/resource-materials/](http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/resource-materials/)) includes examples of resources that have been used in Australian hospitals to support stewardship programs. These include examples of:
Committee terms of reference
- Restricted antimicrobial policies and forms
- Clinical Prescribing guidelines including hospital and community acquired pneumonia
- Surgical prophylaxis guidelines
- Empiric treatment of Sepsis
- Guides for IV to oral switch (including pocket guide)
- Audit tools
- Communication tools

- The Commission website also has links to a number of external websites which provide further information about stewardship programs.
- An additional resource is the “OSSIE toolkit for the implementation of The Australian Guidelines for the Prevention of Infection in Health Care 2010”, which provides a framework for implementing improvement, as well as a number of tools that can be used to help plan, implement and evaluate interventions
- There is also the small hospital's guide on the Commission's website designed to provide guidance for small hospitals NSQHS Standards Guide for Small Hospitals
- Flexible arrangements are in place for antimicrobial stewardship in Standard 3, actions 3.14.1 – 3.14.4, for organisations with less than 50 beds and for 2013 only
- The Commission's Antibiotic Awareness Week webpage also has some useful resources, including a presentation that outlines the scope of the problem of antibiotic resistance
- You should also consider resources that may be available from your State or Territory Health Department, Local health network or Governance group.