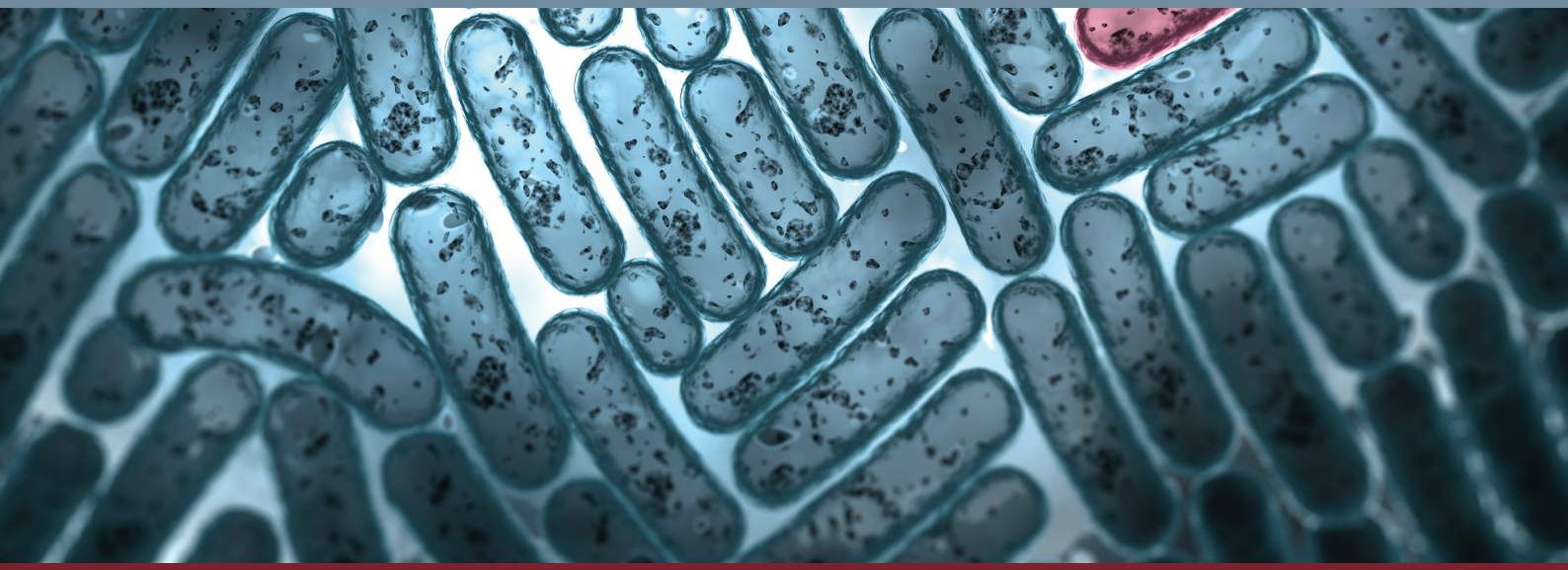
Australian Government
Department of Health
Department of Agriculture and Water Resources

IMPLEMENTATION PLAN
Australia's First National Antimicrobial Resistance Strategy 2015–2019



November 2016

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Implementation Plan: Australia's First National Antimicrobial Resistance Strategy 2015–2019

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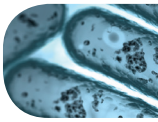


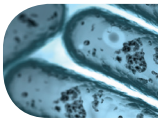
Foreword

Antimicrobial resistance is widely recognised as an important and complex issue. The World Health Organization describes antimicrobial resistance as one of the biggest threats to global health today and cautions that without immediate action we are heading towards a post-antibiotic era in which common infectious diseases can once again kill.

Australia's response recognises that antimicrobial resistance is a One Health issue which requires a co-ordinated response in all sectors where antimicrobials are used, including in the human health, animal health, food and agriculture sectors. Since the release of Australia's first *National Antimicrobial Resistance Strategy 2015–2019* in June 2015, the Australian Government Department of Health and Department of Agriculture and Water Resources have undertaken a consultation process with a wide range of organisations across these sectors to canvass the range of activities being undertaken to minimise the development of antimicrobial resistance and ensure the continued availability of effective antimicrobials.

This Implementation Plan outlines Focus Areas for activity, as well as specific actions being undertaken by the Australian Government, State and Territory Governments, non-government organisations, professional bodies and research organisations. The Plan incorporates activities being undertaken across various sectors to encourage and enable collaboration and information sharing. These activities contribute to the establishment of an evidence base and better target our efforts to address gaps and ensure appropriate policies and programs are in place to limit the development of antimicrobial resistance.

The Australian Government would like to thank stakeholder groups that have come together to support and provide input into this Implementation Plan, and for their continued support to progress implementation and reporting of these activities.



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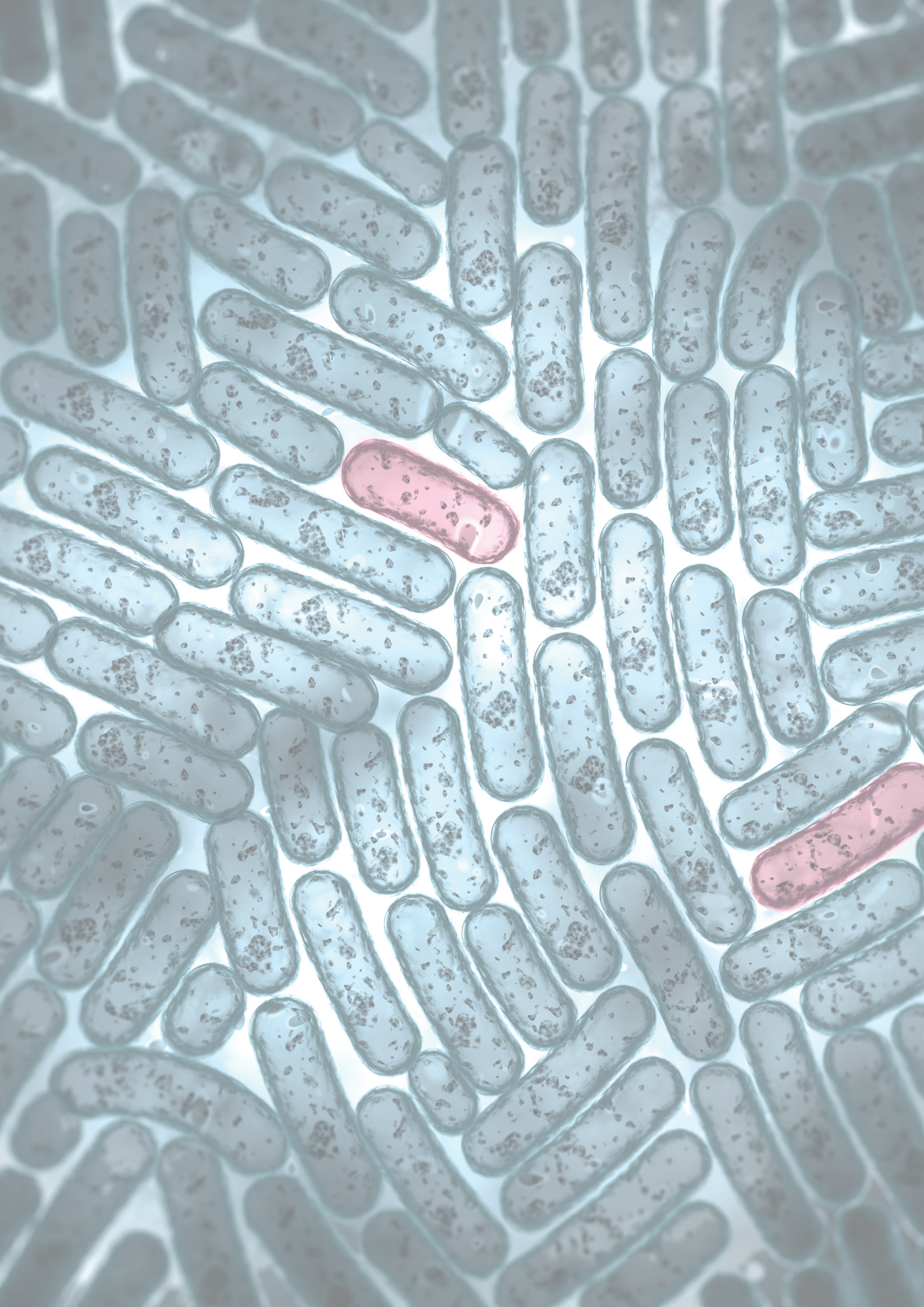
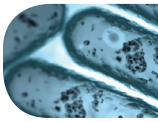




Background

In June 2015, the Australian Government released its first *National Antimicrobial Resistance Strategy 2015–2019* (the Strategy). The Strategy is aligned with the World Health Organization's *Global Action Plan on Antimicrobial Resistance* and sets the framework and direction for Australia's national response to antimicrobial resistance (AMR). The Strategy recognises that AMR is a significant global health priority, largely driven by the global inappropriate use of antibiotics in human health, agriculture and animal husbandry.

The Strategy supports a One Health approach by providing seven common objectives across human health, animal health and agricultural sectors which together support the overarching goal to minimise the development and spread of AMR and ensure the continued availability of effective antimicrobials:

1. Communication, education and training
2. Antimicrobial stewardship
3. Surveillance
4. Infection prevention and control
5. National research agenda
6. Strengthen international partnerships
7. Clear governance arrangements

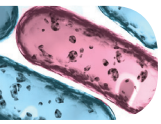
Translating the Strategy into action

In November 2015, the Australian Government Department of Health and the Department of Agriculture and Water Resources jointly convened a National AMR Forum with representatives from the human health, animal health and agriculture sectors, as well as government representatives and researchers to inform the implementation of the Strategy under a One Health framework. The National Forum promoted discussion on key areas for action, as well as identified activities being undertaken across Australia to respond to the growing threat of AMR.

Each objective under the Strategy is supported by Priority Areas for Action that outline high-level areas in which attention is required. In order to provide greater direction on which immediate actions need to be undertaken, the Australian Government in consultation with stakeholders has identified Focus Areas, as well as developed a stocktake of activities currently underway (refer Appendix A).

Vision → Goal → Objectives → Priority Areas for Action → Focus Areas → Activities

The activities outlined in Appendix A of the Implementation Plan (the Plan) were informed through consultations with a variety of stakeholder groups. Given the breadth of activities nominated, those included in the Implementation Plan are limited to those that that can provide benefits at a national level and align with the Priority Areas for Action detailed under each Objective in the Strategy. A gap analysis will be undertaken to identify further actions required to address the Focus Areas under each Objective.

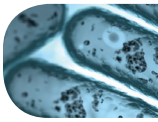


Purpose and scope

This Plan outlines Focus Areas, as well as specific actions being undertaken by the Australian Government, State and Territory Governments, non-government organisations, professional bodies and research organisations. The Plan incorporates activities being undertaken across various sectors to encourage and enable collaboration and information sharing. These activities contribute to the establishment of an evidence base, to better target our efforts, to address gaps and to ensure appropriate policies and programs are in place to limit the development of AMR. Aligning with the Strategy, the Plan focuses predominantly on bacterial resistance and the rapid development of resistance to antibiotics as an immediate priority.

This Implementation Plan outlines Focus Areas for activity which the Australian Government believes will have the greatest contribution to assist in the achievement of the seven objectives identified in the Strategy. Implementation of activities against Focus Areas will take a staged approach over the period 2015–2019. Updates to the Plan may be undertaken in response to emerging issues and/or as new evidence becomes available.

Updates to the activity tables at Appendix A will be undertaken on a biennial basis.



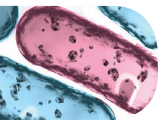
Governance

The development of the Plan was overseen by the AMR Prevention and Containment (AMRPC) Steering Group, which is led by the Secretaries of the Department of Health and Department of Agriculture and Water Resources and includes the Australian Government Chief Medical and Veterinary Officers as members. The Australian Strategic and Technical Advisory Group (ASTAG) on AMR provided expert guidance during the development of the Plan.

The Australian Government, through the AMRPC Steering Group, will oversee the delivery of the Implementation Plan and provide leadership and co-ordination on AMR. The AMRPC Steering Group will be responsible for monitoring the implementation of the Strategy and will review and report publically on progress on an annual basis.

The ASTAG will provide high quality, well considered strategic, technical, scientific and clinical advice to the AMRPC Steering Group and will be engaged in monitoring the progress of activities under the Plan.

The Department of Health and the Department of Agriculture and Water Resources will work together to support the AMRPC Steering Group, as well as liaise with stakeholders in their respective sectors to report against the activities articulated in Appendix A of the Implementation Plan. The achievement of One Health activities will require a concerted effort by both Departments.



Roles and responsibilities

The goal of the Strategy is to minimise the development and spread of AMR and ensure the continued availability of effective antimicrobials. The Strategy recognises that undertaking action to achieve this goal requires Australian Government, State and Territory Governments, non-government organisations, professional bodies and research organisations to work together.

Australian Government

Individual Australian Government departments and agencies will be accountable for the achievement of activities outlined in Appendix A for which they are the lead. Their responsibilities will include monitoring progress and contributing to the development of an annual progress report.

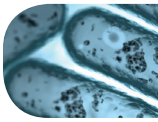
State and Territory Governments

While the Strategy is the responsibility of the Australian Government, the work of the State and Territory Governments is integral to achieving the overall vision of the Strategy. Each State and Territory Government has its own initiatives that complement the Strategy's vision.

ome state and territory activities are reflected in Appendix A. Individual State and Territory Governments will be accountable for the achievement of activities for which they are the lead organisation. Their responsibilities will include monitoring progress and contributing to the development of an annual progress report.

Non-Government Sector

The Government recognises the invaluable contribution made by the non-government sector including professional bodies and research organisations to address AMR in Australia. Many of these activities are captured in Appendix A. Individual organisations will be accountable for the achievement of activities for which they are the lead organisation. Their responsibilities will include monitoring progress and contributing to the development of an annual progress report.



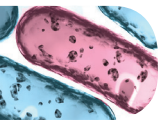
Reporting and monitoring

Reporting

A report on progress of implementing the Strategy will be developed by the AMRPC Steering Group in consultation with the ASTAG. The first annual progress report is anticipated to be released in October 2017. This will include updates on the progress of individual activities as well as an analysis of remaining gaps and overall progress towards achieving actions under each of the key Focus Areas.

Surveillance and monitoring

The Antimicrobial Use and Resistance in Australia (AURA) Report released in June 2016 established a baseline for AMR and antibiotic use in human health. Initially, data collections will be focussed on establishing baseline measurements against which future targets can be set. A monitoring plan will be developed in consultation with ASTAG and the AMRPC Steering Group to identify indicators and set targets to monitor progress against the Objectives of the National AMR Strategy across human health, animal health and agriculture.



Objective 1:

Increase awareness and understanding of AMR, its implications, and actions to combat it through effective communication, education and training.

Overview

Effective communication, education and training is crucial to raise awareness and understanding amongst prescribers and dispensers across human and animal health, consumers and the general public about what can be done to combat AMR and the importance of taking action now.

In order to increase awareness and understanding of AMR and appropriate antibiotic use, we need to better understand the behavioural drivers amongst consumers, including health professionals, veterinarians, farmers, animal owners and the general public. Activities in this Plan include initiatives that are already underway to determine where we need to focus our attention and resources to strengthen education, training and support initiatives.

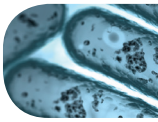
The Australian Government will develop a stakeholder engagement and communication plan and a One Health AMR website to better coordinate AMR-related activity, information and education resources both nationally and internationally, as well as facilitate collaboration and information sharing across sectors.

Priority Areas for Action

1.1 Strengthen consumer awareness initiatives to improve understanding of antimicrobial resistance and the importance of using antibiotics appropriately.

FOCUS AREAS:

- Identify and prioritise existing initiatives to improve consumer awareness and understanding about AMR and appropriate antibiotic use in all settings.
- Investigate and promote new initiatives to introduce AMR information and key messages to new consumer groups.
- Develop consistent and actionable consumer messages about AMR and appropriate antibiotic use for the One Health AMR website.
- Strengthen ways to engage with media organisations to support reporting about AMR.
- Identify and understand drivers of consumer decision making and antibiotic use and translate into resources for consumers.



1.2 Increase support for human and animal health professionals in reinforcing key messages with patients and clients.

FOCUS AREAS:

- Improve the evidence base to better understand the behavioural drivers for antibiotic use and AMR in human and veterinary health.
- Develop resources that promote and support appropriate antibiotic prescribing, particularly in primary health care and veterinary settings.
- Enhance availability of resources to assist all health professionals, particularly GPs and veterinarians, to reinforce key messages with consumers about appropriate antibiotic use and actions that can be taken to reduce AMR.

1.3 Strengthen communication and education initiatives for health professionals and health care team members.

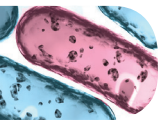
FOCUS AREAS:

- Strengthen communication and education initiatives for human and animal health professionals.
- Enhance the national coordination of, and participation in, Antibiotic Awareness Week to promote a greater understanding of AMR and the importance of responsible use of antibiotics across all sectors and the community.
- Improve health professionals' knowledge of antimicrobial stewardship (AMS) in accordance with relevant national standards.
- Improve awareness and knowledge among veterinary practitioners about AMR and the need for judicious use of antibiotics in animals.
- Ensure curriculum outcomes and competencies for AMR and AMS are emphasised and current in pre-registration training for health and veterinary professionals.
- Ensure that competencies for AMR and AMS are current and enforced in post registration training for health and veterinary professionals.

1.4 Develop a stakeholder engagement and communication plan to support whole-of-society awareness of, and participation in implementing the Strategy.

FOCUS AREAS:

- Develop a stakeholder engagement and communication plan to raise awareness of the actions that priority stakeholders can take to minimise the development and impacts of resistance.
- Develop a One Health AMR website to ensure access to reliable sources of information on antibiotics and AMR thus facilitating the coordination of AMR related activities.
- Promote Antibiotic Awareness Week to the community.



Objective 2:

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

Overview

Antimicrobial stewardship (AMS) is a key strategy in slowing the emergence of resistance. While AMS has become standard practice in hospital settings through the introduction of the National Health Care and Quality Services (NHCQS) Standards, more needs to be done to support stewardship in other settings.

For the human health sector, the initial focus is to identify, test and implement stewardship interventions in general practice. In animal health and agriculture, greater attention needs to be given to support best practice antimicrobial use by veterinarians.

Priority Areas for Action

2.1 Ensure that tailored, evidence-based antibiotic prescribing guidelines are available for all sectors.

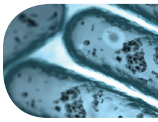
FOCUS AREAS:

- Ensure adequate access to *Therapeutic Guidelines: Antibiotic* to promote and support informed antibiotic prescribing across Australia.
- Ensure adequate access to, and implementation of, current infection-specific guidelines that support and enforce informed antibiotic prescribing across Australia.
- Develop and enforce veterinary antibiotic prescribing guidelines for all classes of animals in Australia.
- Ensure availability of evidence-based and best practice arrangements in AMS for the use of antibiotics in all classes of animals in Australia.

2.2 Ensure the availability of evidence-based, best-practice and nationally consistent approaches to AMS across human health and animal care settings.

FOCUS AREAS:

- Evaluate existing AMS measures to determine which new initiatives are required in other sectors.
- Build a strong evidence base to improve and promote AMS practices in human and animal health settings.
- Identify patterns of antibiotic prescribing and provide feedback to prescribers to improve AMS.
- Utilise Primary Health Networks to support and implement AMS in general practice.
- Develop and implement setting-specific AMS frameworks for all classes of animals in Australia.
- Ensure clinical software systems are optimised for AMS practices.
- Develop and implement an AMS program for veterinary settings.



2.3 Develop tailored, evidence-based resources to support the implementation of AMS programmes.

FOCUS AREAS:

- Promote use and further development of evidence-based resources to support AMS in human and animal settings where antibiotics are used.
- Encourage jurisdictions to develop and implement state specific initiatives to support AMS in human and animal health settings.
- Develop resources that support appropriate antibiotic use for surgical prophylaxis and consistency with national guidelines.
- Identify the barriers and enablers to AMS, in areas such as Residential Aged Care Facilities and Indigenous Health Care Organisations, to inform the development of resources for use in those settings.

2.4 Review existing accreditation and quality assurance programmes to ensure they appropriately support and encourage compliance with best practice AMS approaches.

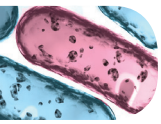
FOCUS AREAS:

- Identify and address the enablers and barriers to the implementation of national standards in human health settings.
- Update accreditation standards to better support adherence to AMS in livestock production systems.
- Investigate approaches to monitor compliance with best practice AMS.

2.5 Strengthen existing measures to better support appropriate and judicious use.

FOCUS AREAS:

- Promote the National Antimicrobial Prescribing Survey to measure appropriate antibiotic use.
- Ensure appropriate authority and restriction arrangements are in place for prescribing antimicrobials.
- Improve selection and targeted use of antibiotics in all classes of animals.
- Ensure prescribing and dispensing practices are aligned with national prescribing guidelines for antibiotic use in human and animal health.
- Review and enforce existing national regulations governing access to antibiotics to ensure they effectively support appropriate and judicious use.
- Build audit and feedback processes into existing frameworks in human and animal settings.



Objective 3:

Develop nationally coordinated One Health surveillance of AMR and antimicrobial usage.

Overview

Current gaps in surveillance coverage, jurisdictional differences in data collection, analysis and reporting, and the use of different diagnostic systems for undertaking susceptibility testing have resulted in a fragmented picture of AMR and usage in Australia.

Nationally harmonised and coordinated surveillance is essential to understand the magnitude, distribution and impact of resistant organisms and antimicrobial usage, identify emerging resistance and trends, and determine associations between usage and resistance. The Strategy outlines objectives to guide the development of national surveillance programs across human health, animal health and animal and agriculture sectors.

The *AURA 2016: first Australian report on antimicrobial use and resistance in human health* was released in June 2016 and these data will be used to identify and target action required to prevent the spread of AMR, including the review of existing policies and programmes to identify areas for improvement.

Priority Areas for Action

3.1 Establish the foundations for national One Health surveillance.

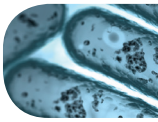
FOCUS AREAS:

- Continue the development of the national surveillance system for AMR and antimicrobial usage (AU) in human and animal health, which includes the coordination of existing discrete programmes and data collections.
- Encourage cross-sector collaboration, integration and sharing of expertise to improve national One Health surveillance data across all jurisdictions.
- Ensure laboratory capability and capacity where necessary to detect possible critical antimicrobial resistances.
- Improve understanding of antimicrobial use in all sectors and applications in food production to inform policy decision-making.

3.2 Agree the objectives of surveillance for each sector, ensuring they align with the overarching objectives for the national One Health surveillance system.

FOCUS AREAS:

- Define sector-specific objectives for surveillance and ensure they are operational, and that these are reviewed to ensure alignment with the overarching objectives of a national One Health surveillance system as outlined in the Strategy.



3.3 Develop lists of priority organisms and associated antimicrobials for national reporting.

FOCUS AREAS:

- Regularly review the current list of priority organisms and associated antimicrobials, and associated case definitions, for human and animal health surveillance.

3.4 Agree and implement a uniform standard for laboratory testing methods for antibacterial susceptibility.

FOCUS AREAS:

- Promote national consistency in antimicrobial susceptibility testing and reporting in human and animal health to support improved data comparability at the national level.

3.5 Improve human health surveillance.

FOCUS AREAS:

- Continue to improve existing human health AMR and AU surveillance data sources/programs which contribute to the national surveillance system.
- Test and improve the alert system to monitor and provide real-time alerts for confirmed critical antimicrobial resistances.
- Better coordinate surveillance and response to the emergence, and outbreaks, of multi-resistant organisms, particularly in community settings.
- Improve surveillance in hospitals by simplifying and standardising the collection and reporting of antimicrobial use.
- Explore capability for real-time aggregation, analysis and reporting of AMR and AU.
- Better understand geographic patterns of antimicrobial dispensing in human health and target interventions accordingly.
- Develop the use of genomic surveillance to better understand the spread of AMR.

3.6 Improve animal health and agriculture surveillance.

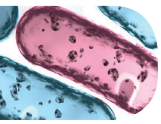
FOCUS AREAS:

- Describe antimicrobial use and undertake AMR monitoring in livestock and companion animal industries and identify opportunities for improved monitoring.

3.7 Investigate requirements for surveillance in food.

FOCUS AREAS:

- Analyse the relationship between environmental, animal, food and human isolates for emerging AMR organisms through the collection of surveillance data.
- Improve understanding of the extent to which resistant bacteria are present in the food chain, the extent of transmission of resistant organisms, and the risk this may pose to human health.



Objective 4:

Improve infection prevention and control measures across human health and animal care settings to help prevent infections and the spread of AMR.

Overview

Infection prevention and control (IPC) is critical in the management of all infectious organisms, but particularly so in reducing the spread of resistant organisms where there may be limited or no antimicrobial treatments available. Preventing infection and its spread reduces the need for antibiotics and the opportunity for organisms to develop resistance and share resistance genes.

Evidence-based IPC programmes are required across all sectors and settings, recognising that some settings pose a higher risk of infection than others. Over time, the availability of surveillance data, findings from research and the development of new technologies will inform new approaches and improvements in IPC.

Priority Areas for Action

4.1 Ensure the availability of evidence-based, best-practice and nationally consistent standards for IPC across human health and animal care settings.

FOCUS AREAS:

- Strengthen national evidence-based or best practice IPC standards for human health.
- Develop national IPC standards for different animal sectors.
- Facilitate access to, and dissemination of, national IPC guidelines for human and animal health through the One Health AMR website.

4.2 Review existing accreditation and quality assurance programmes to ensure they appropriately support and encourage compliance with best practice IPC measures.

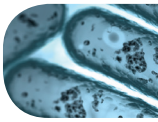
FOCUS AREAS:

- Update general practice accreditation standards to better support best practice IPC in human health and consider additional mechanisms to support and monitor compliance in this setting.
- Identify and address the enablers and barriers to the implementation of national standards in all acute and non-acute settings, including hospitals, general practice and residential aged care settings.
- Strengthen the capability of accreditation and quality assurance programmes to better support the implementation of national IPC guidelines in animal industries.
- Enhance the national hand hygiene approach to reduce healthcare associated infections and AMR.

4.3 Develop additional initiatives and resources to strengthen IPC in all human health care settings.

FOCUS AREAS:

- Adapt and extend existing IPC resources and initiatives to non-acute human health settings, in particular general practice, community health and residential and aged care settings.



- Strengthen consumer, health professional and other key stakeholder awareness of the importance of IPC in reducing AMR, in particular in general practice, community health and residential and aged care settings.
- Develop national resources in response to novel and emerging IPC and AMR needs, as necessary, for health care settings including acute care settings.
- Foster efforts to establish comprehensive and integrated national surveillance of healthcare-associated infections, including for resistant and non-resistant organisms, to inform IPC policy and guidelines.
- Establish a repository of key IPC resources and links on the One Health AMR website.

4.4 Further develop initiatives and resources to strengthen IPC in the livestock industry.

FOCUS AREAS:

- Increase key stakeholder engagement within the livestock industry regarding understanding of, and access to, IPC strategies to improve the health of livestock and reduce antimicrobial-based treatment interventions.
- Develop guidance to enhance whole-of-farm management of biosecurity risks.
- Develop IPC program and management resources suitable for livestock and other animal industries to assist producers and livestock workers.

4.5 Further develop resources to strengthen IPC in veterinary practice.

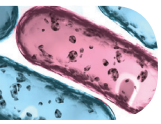
FOCUS AREAS:

- Implement and educate on national IPC guidelines for veterinary practices, their clients and other animal care settings.
- Establish a repository of veterinary IPC resources on the One Health AMR website.
- Consider strategies to increase IPC awareness among veterinarians and their clients.

4.6 Encourage continued increases in vaccination rates to prevent infections.

FOCUS AREAS:

- Enhance existing promotional campaigns and strategies to strengthen uptake of vaccination in both the human health and animal sectors.
- Implement new campaigns and strategies that demonstrate how immunisation against vaccine preventable diseases reduces antimicrobial use in both human and animal health sectors.
- Foster the development of new therapeutics to increase the uptake of vaccination and reduce antimicrobial use.



Objective 5:

Agree a national research agenda and promote investment in the discovery and development of new products and approaches to prevent, detect and contain AMR.

Overview

A strong research and development agenda is needed to advance the discovery of new therapies and diagnostic technologies to better prevent infectious disease, treat resistant infections and support the development, refinement and implementation of evidence-based practices to limit the emergence and spread of AMR.

Limited systematic coordination of research effort has contributed to gaps in our understanding of how AMR develops and spreads and how best to prevent and contain it. There is a wide range of research activities already underway, both nationally and internationally, and further work is required to better coordinate our research efforts to avoid duplication of effort, determine gaps, identify priorities, and inform future policy.

Priority Areas for Action

5.1 Identify current gaps and agree national research and development priorities.

FOCUS AREAS:

- Map research and development needs against current efforts to determine gaps in the evidence base.
- Identify where the greatest impacts can be achieved in AMR research and development.
- Develop an agreed list of research and development priorities.
- Determine surveillance needs and AMR prevalence, and improve knowledge about antimicrobial resistance genes to understand their significance and impact on animal and human health.

5.2 Coordinate national research activities and the sharing of information.

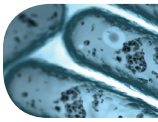
FOCUS AREAS:

- Develop a national mechanism for improved collaboration and information and data sharing to promote efficient use of resources and minimise duplication of effort within and between all sectors (One Health), including the Australian Government, State and Territory Governments, non-government organisations, professional bodies and research organisations.

5.3 Explore opportunities to increase support for research and development, including incentives for greater private sector investment.

FOCUS AREAS:

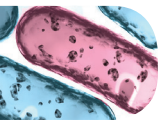
- Investigate how AMR-related research and development is funded, including examination of how relationships with private investors and the pharmaceutical industry can be developed or enhanced.



- Explore opportunities to increase cross-disciplinary initiatives on AMR research.
- Investigate opportunities to increase support for national AMR research and development priorities.
- Increase support for priority and neglected research areas, such as companion animal research.

5.4 Explore opportunities to support the translation of promising research findings into new products, policies and approaches.

- The Focus Area has been sufficiently identified above via the Priority Area for Action.



Objective 6:

Strengthen international partnerships and collaboration on regional and global efforts to respond to AMR.

Overview

International collaboration on AMR is integral to ensure the efforts of individual countries is maximised.

Australia will continue to actively engage with other countries, particularly in the Asia–Pacific region, and multilateral organisations through strategic policy support, regulatory action and coordinated initiatives.

Priority Areas for Action

6.1 Active engagement with multilateral organisations and relevant forums to contribute to regional and global action on antimicrobial resistance.

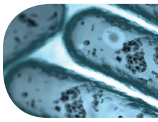
FOCUS AREAS:

- Participate in and contribute to the implementation of the World Health Organization (WHO) Global Action Plan on AMR.
- Participate in WHO, World Organisation for Animal Health (OIE), Food and Agriculture Organization of the United Nations (FAO), Codex and other international fora.
- Engage with global partners on AMR through high level international forums, such as the United Nations General Assembly, G20, G7 and the Asia–Pacific Economic Cooperation (APEC).
- Develop public and animal health curricula on AMR for use in developing countries, with a One Health emphasis.

6.2 Lead regional initiatives to increase capacity to respond to antimicrobial resistance.

FOCUS AREAS:

- Assist in the development of AMR strategies, tools and resources in the Asia and Pacific region.
- Support building and upskilling of capacity for diagnosis, reporting and response to AMR pathogens in particular in the Asia Pacific region.
- Support malaria and tuberculosis control efforts in the Asia and Pacific region.
- Support food safety initiatives in the region, recognising the importance of cross border trade and zoonotic disease.
- Contribute to the current knowledge and understanding of AMR in livestock in the region.



6.3 Learn from international best practice.

FOCUS AREAS:

- Engage with benchmarking countries to inform the local implementation of best practice in human and animal health surveillance, with a One Health approach.
- Establish international collaborations to inform national evidence based research and activity/ies.

6.4 Participate in international surveillance initiatives.

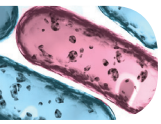
FOCUS AREAS:

- Contribute to global AMR and antibiotic use surveillance activities and AU monitoring activities.
- Enhance cross-border capacity to track emergence and spread of resistance internationally, with support for genomic based diagnostic capacity in the region.

6.5 Establish closer ties with international collaborations to link Australia's national research agenda with what is happening internationally.

FOCUS AREAS:

- Build relationships with international partners and identify international collaborative research and development priorities across all technology levels.
- Liaise with international health and animal research funding agencies to ensure better co-ordination of research funding efforts.
- Investigate options to collaborate and share information across international research networks.



Objective 7:

Establish and support clear governance arrangements at the local, jurisdictional, national and international levels to ensure leadership, engagement and accountability for actions to combat AMR.

Overview

Achievement of the Strategy objectives requires a coordinated effort from a wide range of implementation partners. Clear lines of responsibility and accountability at the international, national, jurisdictional and local levels are needed to support progress.

Australia will continue to support relevant multilateral organisations such as the World Health Organization (WHO), World Organisation for Animal Health (OIE) and Food and Agriculture Organization of the United Nations (FAO) to foster a global approach of responsibility and accountability on combatting AMR.

Priority Areas for Action

7.1 Identify, establish and maintain linkages between implementation partners across all sectors.

FOCUS AREAS:

- Continue to work with stakeholders throughout implementation of the National AMR Strategy.
- Establish linkages to support and promote collaboration with and between experts from across human health, animal health and agriculture.
- Establish systems to ensure consistent and uniform messages about AMR are disseminated.
- Encourage government and non-government stakeholders who use or depend upon antimicrobials to ensure their governance structures and management systems provide clear accountability and plans for minimising AMR.

7.2 Work with stakeholders to develop an Implementation Plan for the Strategy.

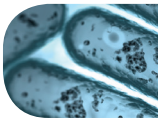
FOCUS AREAS:

- Bring together stakeholders to jointly develop an Implementation Plan that will detail specific actions under the Strategy and support improved coordination of effort and accountability for outcomes.

7.3 Establish baseline measures to inform monitoring and evaluation of the Strategy.

FOCUS AREAS:

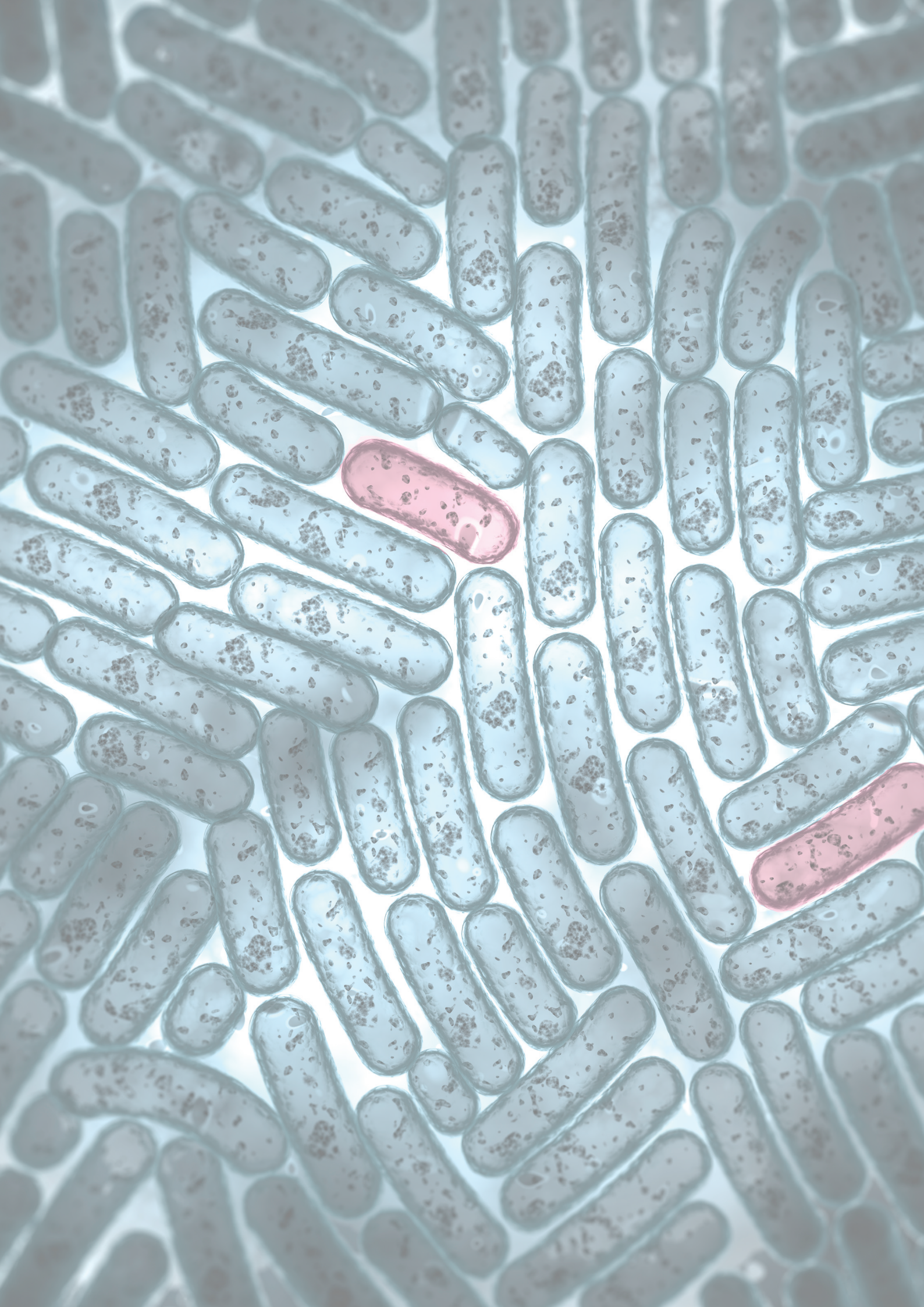
- Use data to establish a benchmark against which key actions under the Strategy can be measured.
- Publish national reports on AMR and antibiotic usage in human and animal health and agriculture.

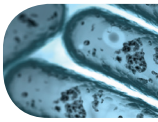


7.4 Review regulation (legislated and other) relevant to antimicrobial resistance and antibiotic usage.

FOCUS AREAS:

- Review current systems of regulation in Australia relevant to AMR and antibiotic usage to identify gaps and opportunities to more effectively limit the emergence of resistance.





APPENDIX A: STOCKTAKE OF ACTIVITIES

This stocktake of activities attempts to capture the huge effort and financial contribution being undertaken by a wide range of organisations and sectors. Whilst some activities may contribute towards the achievement of more than one Objective they have been listed under the Objective and Priority Area for Action to which they are expected to make the greatest contribution. Activities that are supported by Australian Government funding are denoted by an asterisk in the tables.

Table definitions

SECTOR

Each activity has been attributed to the relevant sector which it most relates to: One Health, human health, animal health or agriculture, which are defined as follows:

- The One Health concept recognises that human, animal and ecosystem health are inextricably linked, and achieving optimal health outcomes for people and animals requires joint effort of the human health, veterinary health, and environmental health communities.
- Human Health relates to initiatives aimed at improving our use of antibiotics in various settings including primary health care, secondary care, aged care as well as promoting informed use by consumers.
- Animal Health and Agriculture relates to initiatives aimed at improving animal health, welfare, biosecurity, and production outcomes associated with the threat of AMR.

ACTIVITY/IES

The activities under each Priority Area for Action cover a range of areas including research projects, pilot programmes, surveillance and communication activities, as well as the production of resources. Some activities are concerned with adapting and extending existing initiatives and programs, some focus on identifying gaps where action is yet to be undertaken, and others provide a necessary foundation for later work. Activities included in the Implementation Plan are expected to be undertaken within existing resources and do not commit Governments to additional funding.

LEAD ORGANISATION

The Implementation Plan identifies the lead organisation that will be responsible and accountable for progressing individual activities. This includes monitoring progress and contributing to the development of an annual report to be co-ordinated by the Department of Health and the Department of Agriculture and Water Resources.

TIMEFRAMES FOR COMPLETION

Timeframes for key milestones for each activity have been provided by the lead organisation and will inform reporting against progress.

OBJECTIVE 1: COMMUNICATION, EDUCATION AND TRAINING

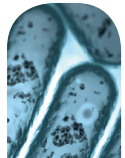
Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 1.1: Strengthen consumer awareness initiatives to improve understanding of antimicrobial resistance and the importance of using antibiotics appropriately.				
Human Health	**1.1.1**	Collaborate with NPS MedicineWise and aged care bodies to provide a suite of information on AMS and AMR for consumers accessible via the National Centre for AMS website.	National Centre for Antimicrobial Stewardship*	2016 onwards
	1.1.2	Launch the 'Join the Fight' Antibiotic Resistance Community Campaign using social media and digital advertising to reinforce key messages to encourage consumers to take responsibility to help fight antibiotic resistance.	NPS MedicineWise*	2012–17
	1.1.3	Review and update consumer information on healthdirect.gov.au and myagedcare.gov.au about antibiotics and antimicrobial resistance.	Australian Government Department of Health, Healthdirect Australia Ltd*	June 2016
	1.1.4	Undertake a pilot program to test health media (through television, pamphlets) in GP offices to inform and/or remind patients at point-of-care of AMR issues and the appropriate use of antibiotics principles.	Australian Government Department of Health with NPS MedicineWise and Tonic Health Media*	2016
Animal Health and Agriculture	**1.1.5**	Develop an AMR link within the ACT Veterinary Surgeons website for community and Veterinary Surgeon access to information on the *National Antimicrobial Resistance Strategy 2015–2019*.	ACT Veterinary Surgeons Board	March 2016
	1.1.6	Develop a fact sheet and website with information for Victorian veterinarians, veterinary students, animal health para-professionals, farmers and veterinary staff on risks associated with AMR.	Victorian Department of Economic Development, Jobs, Transport and Resources	June 2017
	1.1.7	Disseminate AMR information through the DEDJTR external website, communicate with producers at field days, link to from the Vet Board website, communicate internally with Animal Health staff, and communicate to students through the University of Melbourne Veterinary School.	Victorian Department of Economic Development, Jobs, Transport and Resources	December 2017
	1.1.8	Deliver a series of presentations to avian enthusiasts at various conventions and meetings (poultry, cagebirds, pigeons) on topics including biosecurity, proper management to reduce use of antimicrobials, withholding periods, and vaccinations.	The University of Queensland	Ongoing—as at 1 April 2016, presentations have been given in Brisbane (2), Nanango (1) and Bundaberg (1)

PRIORITY AREA FOR ACTION 1.2:

Increase support for human and animal health professionals in reinforcing key messages with patients and clients.

One Health	**1.2.1**	Provide animal and human health professionals a suite of tools and educational resources to reinforce key messages to consumers via formal training and provision of online consumer resources.	National Centre for Antimicrobial Stewardship*	2016 onwards
	1.2.2	Investigate multiple stakeholder perspectives about AMR (GPs, medical specialists, hospital doctors, dentists, veterinary professionals), to identify what they see as barriers to achieving effective management of AMR and identify future research needs and policy options.	University of Sydney (MBI)	December 2016
	1.2.3	Convene two Citizens' Juries to deliberate on the feasibility and fairness of introducing different mechanisms to change consumer and prescriber behaviour.	University of Sydney (MBI; CRE ID)	Apr 2017–Sep 2017: findings presented to key stakeholders and further actions implemented by end 2017
	1.2.4	Undertake research to determine dominant factors influencing decision-making about antibiotic use by GPs, community pharmacists and consumers in the Australian primary healthcare sector.	Queensland University of Technology (CRE-RHAI), Australian Centre for Health Services Innovation	June 2017
Human Health	**1.2.5**	a) Develop paper-based patient decision aids (PDAs) to support GPs to engage in shared decision making with patients on antibiotic use for sore throat, middle ear complaints and acute bronchitis. b) PDAs trialled with a community sample of parents for effect on anticipated future behaviour and process measures (acceptability of the PDAs). c) PDAs trialled in a random clinical trial with GPs with antibiotic dispensing rates as a principal outcome.	ACSQHC, Bond University *	a) PDAs completed November 2015 b) To be published late 2016 c) To be published late 2017
	1.2.6	Develop a general practice 'nudge' toolkit containing resources such as General Practice pledge certificates, counselling resources and accompanying leaflet holders, conversation tips for GPs, Antibiotic Symptomatic Management Pad, education and communication tools for waiting rooms including education cartoon and colouring activities for children.	NPS MedicineWise*	June 2016
	1.2.7	Develop information targeted at patients and their GPs regarding prudent use of antimicrobials in infections for patients with a diagnosis of multi-resistant organisms (and *C. difficile*).	ACT Health: Canberra Hospital & Health Services, Healthcare Associated Infection Standards Group	2017

*Denotes activity/ies for which the Australian Government has provided funding.



Sector	Activity/ies		Lead Organisation	Timeframes for completion
Animal Health and Agriculture	**1.2.8**	Presentations to animal health professionals and producers within the feedlot and pig industries to improve their understanding of the global and national situation regarding antimicrobial resistance, and the importance of responsible use to the management of antimicrobial resistance as an industry.	Zoetis Australia	October 2016 and ongoing
	1.2.9	Communicate key messages through meetings, factsheets and social media to animal industries, farmers and veterinarians in Queensland about AMR and the use of antibiotics for farm animals and updates on AMR in line with the Queensland Biosecurity Act 2014 (effective on 1 July 2016).	Biosecurity Queensland, Queensland Government Department of Agriculture and Fisheries	Ongoing—progress report annually from December 2015
	1.2.10	Develop information for veterinarians, farmers and veterinary staff on risks associated with antimicrobial resistance.	Victorian Department of Economic Development, Jobs, Transport and Resources	June 2017
	1.2.11	Revise the ACT Veterinary Surgeons Standards Statement to incorporate information on AMR and the National AMR Strategy to guide the response to the threat of antibiotic misuse and resistance. This would be placed under the section of Guideline Documents with a link to the AMR website.	ACT Veterinary Surgeons Board	June 2016
PRIORITY AREA FOR ACTION 1.3: Strengthen communication and education initiatives for health professionals and health care team members.				
One Health	**1.3.1**	National coordination of Antibiotic Awareness Week, taking a One Health approach, through the Antibiotic Awareness Week Working Group. The Working Group provides a forum for advice and assistance on issues relating to national coordination of Antibiotic Awareness Week in Australia and enables information sharing and ensures consistent messages across sectors. Members include NPS MedicineWise, Australian Government Department of Health, Australian Government Department of Agriculture and Water Resources, the Australian Veterinary Association and state and territory health departments.	ACSQHC*	Annually in November
	1.3.2	Human health hospital focussed Antibiotic Awareness Week Campaign including resources to support hospitals in undertaking local Antibiotic Awareness Week events.	ACSQHC*	Annually in November
	1.3.3	Consumer and health professional Antibiotic Awareness Week campaign highlighting steps that health professionals and individuals can take to ensure they use antibiotics judiciously and appropriately.	NPS MedicineWise*	Annually in November

One Health	**1.3.4**	Undertake annual consumer campaigns for Antimicrobial Awareness Week, including release of information from the National Antimicrobial Prescribing Survey programs from a One Health perspective.	National Centre for Antimicrobial Stewardship*	2016 onwards
	1.3.5	Antimicrobial Awareness Week campaign focussing on AMS in companion animals.	National Centre for Antimicrobial Stewardship*	November 2016
	1.3.6	Participate in Antibiotic Awareness week through stakeholder promotion and Quality Standard article.	Australian Aged Care Quality Agency*	November 2016
	1.3.7	Provide training workshops and online educational activities to key health professionals: pharmacists, physicians, infection prevention nurses, general practice nurses, veterinarians, veterinary nurses on antimicrobial stewardship, AMR, antibiotic use.	National Centre for Antimicrobial Stewardship*	2016 onwards
Human Health	**1.3.8**	Assess the Australian National University Medical School curriculum to include lectures on antimicrobial resistance and antimicrobial stewardship.	ACT Health, Australian National University Medical School	Completed 2015
	1.3.9	Update *The Royal Australian College of General Practitioners (RACGP) Curriculum for Australian General Practice 2011*, including the quality use of medicines statement which specifically includes AMR.	The Royal Australian College of General Practitioners	July 2016
	1.3.10	Undertake research to determine the effectiveness of online and face-to-face training for early career GPs in communicating with patients about AMR and antibiotic use.	Change the Antibiotic Prescribing of General Practice (ChAP) Study, University of Queensland, funded by RACGP, Therapeutic Guidelines Ltd, Australian Government Department of Health, Bond University, Queensland University of Technology	June 2016
	1.3.11	Develop online training for GPs (including overseas trained), with different colleges' web-based learning sites, to communicate with patients on the benefits and harms of antibiotic use.	Funded by ACSQHC and supported by RACGP and other specialist colleges	December 2016
	1.3.12	Develop online competency training and assessment to ensure IPC practitioners are proficient in standardised surveillance methodology.	VICNISS Coordinating Centre	Training module available online since August 2015

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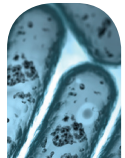


Sector	Activity/ies	Lead Organisation	Timeframes for completion
Human Health	**1.3.13** Health service organisations to support the inclusion of nurses on antimicrobial stewardship committees. Education to support enhanced knowledge and development of nurses, infection control practitioners and nurse practitioners in antimicrobial management and stewardship. A chapter on the roles of nurses, Infection Control Physicians and Nurse Practitioners will be included in the revision of Antimicrobial Stewardship in Australian Hospitals.	ACSQHC, Australian College for Infection Prevention and Control, National Centre for Antimicrobial Stewardship	2016–19
	1.3.14 Hold symposium on: *Antimicrobial Stewardship and Standards—the road to implementation*.	WA Health	Full day event completed 2014 and 2015
Animal Health and Agriculture	**1.3.15** Provide information to veterinary practitioners through the Australian Veterinary Association (Victorian Branch) and Veterinary Practitioners Registration Board of Victoria on the risks associated with AMR and the need for judicious antibiotic use via website information and a newsletter article.	Victorian Department of Economic Development, Jobs, Transport and Resources	December 2016

PRIORITY AREA FOR ACTION 1.4:

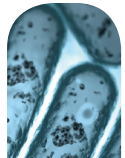
Develop a stakeholder engagement and communication plan to support whole-of-society awareness of, and participation in implementing the Strategy.

One Health	**1.4.1** Develop a One-Health website as a central repository for trusted information and resources related to antibiotic use and antimicrobial resistance.	Australian Government Department of Health with Australian Government Department of Agriculture and Water Resources*	June 2017
	1.4.2 Develop a stakeholder engagement and communication plan to support the implementation of the National AMR Strategy.	Australian Government Department of Health and Australian Government Department of Agriculture and Water Resources*	December 2016

OBJECTIVE 2: ANTIMICROBIAL STEWARDSHIP

Sector		Activity/ies	Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 2.1: Ensure that tailored, evidence-based antibiotic prescribing guidelines are available for all sectors.				
Human Health	**2.1.1**	Undertake a digital transformation programme to improve the usability of the Electronic Therapeutic Guidelines (eTG), including the development of a new version that is fully functional with mobile applications for Apple and Android devices.	Therapeutic Guidelines Ltd	March 2016
	2.1.2	Develop and trial of a mobile application to encourage compliance with electronic Therapeutic Guidelines (eTG) and local restricted antimicrobial policies, and encourage step down therapy.	Northern Territory Department of Health	Deployed across Top End Health Service (3 of 5 hospitals within NT) with high usage by prescribers
	2.1.3	Develop paediatric antibiotic guidelines for severe sepsis and septic shock.	The Children's Hospital at Westmead, University of Sydney (MBI), SW Health	July 2016: Guidelines disseminated across NSW health facilities
	2.1.4	ICU specific register of HAP/VAP and intra-abdominal sepsis to inform evidence based jurisdiction specific antimicrobial prescribing guidelines.	ACT Health	2016
	2.1.5	Undertake research to define risk factors to inform clear stratification for best practice prescribing for Hospital Acquired Pneumonia.	ACT Health	2016
Animal Health and Agriculture	**2.1.6**	Develop species-specific antibiotic guidelines for use by veterinarians and veterinary students in the clinical management of pigs, poultry, cattle, horses and sheep.	Australian Veterinary Association* and Animal Medicines Australia	May 2016–Jun 2018
PRIORITY AREA FOR ACTION 2.2: Ensure the availability of evidence-based, best-practice and nationally consistent approaches to AMS across human health and animal care settings.				
One Health	**2.2.1**	Identify and assess interventions to reduce AU in companion and production animals. Identify links between AU in animal production systems and development of resistance in bacterial species that may have implications for human and animal health.	National Centre for Antimicrobial Stewardship*	2020

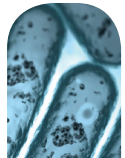
*Denotes activity/ies for which the Australian Government has provided funding.



Sector	Activity/ies		Lead Organisation	Timeframes for completion
Human Health	**2.2.2**	Examine existing models of AMS in rural and regional areas including telehealth and pharmacy led interventions to provide education and training resources, tools and remote support.	National Centre for Antimicrobial Stewardship*	2016–19
	2.2.3	Examine the role of nurses in AMS and identify education needs. Develop specific tools and resources to support nurses in this role.	National Centre for Antimicrobial Stewardship*	2016–19
	2.2.4	Support the use of appropriate, routine microbiological investigations for respiratory tract infections in aged care homes. Identify the opinions of health professionals, and residents and significant others, of antibiotic use for end-of-life respiratory tract infections in aged care homes, and determine their perceptions of AMS initiatives for end-of-life respiratory tract infections.	National Centre for Antimicrobial Stewardship*	2016–19
	2.2.5	Undertake an economic evaluation of AMS programmes in metropolitan Australian Hospitals to support policy decisions, and resource allocations.	Queensland University of Technology (CRE-RHAI)	December 2016
	2.2.6	Investigate the feasibility of rapid diagnostic targeting of transmissible AMR in bacteria in order to develop cheap rapid screening and diagnosis	University of Sydney, WIMR and MBI (CRE CI)	March 2017
	2.2.7	Produce resources to assist in informed prescribing of antibiotics to treat skin infections and upper respiratory tract infections commonly caused by bacteria.	NPS MedicineWise*	May 2016
	2.2.8	Undertake research to estimate of the absolute rate of antibiotic prescribing in primary care if guidelines are adhered to.	CREMARA, Bond University with BEACH	Mid-2016
	2.2.9	Modelling of the effects of AMS interventions on antibiotic prescribing in primary care to determine the most important interventions to roll out in any campaign.	CREMARA, Bond University*	Late 2017
	2.2.10	Report on the use of antibiotics to treat urinary tract infections in residential aged care facilities using Webster Care Medication Management Software.	NPS MedicineWise with WebsterCare*	Ongoing
	2.2.11	Feedback to GPs on antibiotic prescribing habits to assist GPs to reflect on own prescribing practices and allow comparison with peers through MedicineInsight.	NPS MedicineWise*	April 2016

Human Health	**2.2.12**	The National Antimicrobial Prescribing Survey program is already established and is working on additional programs with aged care, surgery and veterinarians. The aim of the program is to provide data for action for prescribers—includes user dashboard reports, benchmarking, and access to data for analysis.	National Centre for Antimicrobial Stewardship in collaboration with the ACSQHC *	Ongoing
	2.2.13	Design, trial and evaluate interventions to identify those that improve prescribing practice. Work with GPs to understand their attitudes and educational needs with regard to antibiotic prescribing. Utilise the Melbourne East Monash GP database (MAGNET) to look at patterns of AU and adherence to guidelines.	National Centre for Antimicrobial Stewardship with Department of General Practice at Monash University*	2018
Animal Health and Agriculture	**2.2.14**	Develop and pilot an AMS program appropriate for use in companion animal veterinary practices.	Australian Veterinary Association	Mar 2016–Dec 2017
	2.2.15	Survey attitudes to antimicrobial prescribing in companion and production animals. Develop and assess methods for monitoring AU in companion and production animals at the veterinary practice level.	National Centre for Antimicrobial Stewardship*	2019
	2.2.16	Investigate the relationship between use of diagnostic microbiology and antimicrobial prescribing/use in veterinary practices.	University of Sydney Clinical Schools, MBI	2016: Key stakeholders, procedures and infrastructure established 2017: preliminary data analysed and presented
	2.2.17	Develop and promote an AMS program that documents arrangements on feedlots to reduce antibiotic usage and ensure they are judiciously managed to minimise risk of AMR.	Meat & Livestock Australia	Progress report December 2016
	2.2.18	a) Engage the dairy industry supply chain in the adoption of the *Guide to Prudent Use of Antimicrobial Agents for Dairy Production*—dairy processors to review the monitoring of antimicrobial use and development of animal health assessment tool for farmers. b) Engagement of Cattle Medicine Chapter of Australian College of Veterinary Science.	Dairy Australia	a) December 2016 b) July 2015
	2.2.19	Framework for AMS implemented within each of the major chicken meat companies for internal reporting (reassess in 2017 for collating industry data)	Australian Chicken Meat Federation	December 2016

*Denotes activity/ies for which the Australian Government has provided funding.



Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 2.3:				
Develop tailored, evidence-based resources to support the implementation of AMS programmes.				
Human Health	**2.3.1**	Pilot a set of evidence-based interventions aimed at reducing GP antimicrobial prescribing rates for acute respiratory infections in general practice.	General Practitioner Antimicrobial Stewardship Programme Study, University of Queensland with Bond University and the Queensland University of Technology*	June 2016
	2.3.2	Update of the Antimicrobial Stewardship in Australian Hospitals publication to support informed antimicrobial prescribing and use. The revision will include chapters on AMS in general practice, aged care, private sector, dental practice, rural and remote sector and health services for Aboriginal and Torres Strait Islander peoples.	ACSQHC with the Antimicrobial Stewardship Advisory Committee*	Launch by December 2016
	2.3.3	Develop a range of resources to assist with the implementation of AMS programs in a range of settings.	ACSQHC *	June 2016
	2.3.4	Implement the Guidance AMS not for profit web-based tool to support AMS workflow in hospitals including an approval system to manage antimicrobial formulary and ward round tool with telehealth capabilities.	Guidance Group at the Royal Melbourne Hospital with the National Centre for Antimicrobial Stewardship	2016–18
	2.3.5	Develop a unique indications database to map to SnoMed CT. The intention is for all eHealth systems to use this infections indication list to support reporting and clinical research.	Guidance Group at the Royal Melbourne Hospital with the National Centre for Antimicrobial Stewardship	2016
	2.3.6	Resource on *Reporting of antibiotics: Enhancement of reporting or comments regarding the selection of antibiotics* produced.	Royal College of Pathologists of Australasia	Apr 2016–Apr 2018
	2.3.7	Resource on Keflex for prevention of UTIs: Long term low dose Keflex for prevention of UTIs produced.	Royal College of Pathologists of Australasia	Apr 2016–Apr 2017
	2.3.8	Resource on *Oral Antibiotic Treatment: Treatment with oral antibiotics for often colonized chronic vascular ulcers* produced.	Royal College of Pathologists of Australasia	Apr 2016–Apr 2017
	2.3.9	Resource on *Long Term Antibiotic Treatment: Long term antibiotic treatment for Lyme Disease and Chronic Fatigue Syndrome* produced.	Royal College of Pathologists of Australasia	Apr 2016–Oct 2017
	2.3.10	Develop a Western Australian AMS Policy which outlines mandatory requirements to ensure implementation of AMS programs in Western Australian Health healthcare facilities.	WA Health	AMS Operational Directive released September 2015. Ongoing monitoring and evaluation of policy planned.

Human Health	**2.3.11**	Develop guidance to improve the appropriate prescribing of antimicrobials for surgical prophylaxis.	ACSQHC in conjunction with the Royal Australasian College of Surgeons and the National Centre for Antimicrobial Stewardship*	2016–18
Animal Health and Agriculture	**2.3.12**	Develop evidence-based resources to support the implementation of a chicken meat AMS (that can be easily tailored for other poultry meat industries e.g. turkey)	Australian Chicken Meat Federation	October 2016

PRIORITY AREA FOR ACTION 2.4:

Review existing accreditation and quality assurance programmes to ensure they appropriately support and encourage compliance with best practice AMS approaches.

Human Health	**2.4.1**	Update the *National Safety and Quality Health Service Standards, Standard 3: Preventing and controlling healthcare associated infections* to provide resources for additional settings such as hospitals and day procedure services, dental practices, community health services and small rural health services.	ACSQHC*	TBC
	2.4.2	Review of aged care standards and related documents to promote materials supporting AMS.	Australian Government Department of Health*	2016–18
	2.4.3	Develop AMS standards in Aged Care facilities for inclusion with accreditation and quality assurance programs.	National Centre for Antimicrobial Stewardship with ACSQHC and Australian Government Department of Health*	2016–18
	2.4.4	Review of the Royal Australian College of General Practitioners Standards for General Practice (4th Edition).	The Royal Australian College of General Practitioners	October 2017
Animal Health and Agriculture	**2.4.5**	Review and update the National Feedlot Accreditation Scheme to ensure that it appropriately supports and encourages feedlot compliance with relevant regulations and best practice arrangements in AMS on feedlots.	Meat & Livestock Australia	Progress report December 2016

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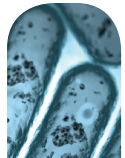

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 2.5: Strengthen existing measures to better support appropriate and judicious use.				
One Health	**2.5.1**	Continue to enhance Guidance AMS and National Antimicrobial Prescribing Survey to support and measure efficient and judicious antimicrobial use.	National Centre for Antimicrobial Stewardship*	2016–20
	2.5.2	Continue to fund the National Return of Unwanted Medicines Limited (NatRUM) which provides for the collection and environmentally friendly disposal of unwanted or unused medicines. Health care consumers are able to return their medicines to any pharmacy in Australia, free of charge, for disposal. This prevents medication misuse, reduces the risk of medicine related harm to children, and prevents environmental contamination by medicines, including antibiotics.	Australian Government Department of Health with National Return of Unwanted Medicines Ltd*	June 2018
Human Health	**2.5.3**	Ongoing implementation and review of the restricted antimicrobial policy and approval system in the Northern Territory (NT) which allocates all antimicrobials listed on the NT formulary into three categories: A—no approval required B—approval required within 48 hours of initiation C—approval required prior to initiation This approach encourages the use of narrow spectrum antimicrobials and allows for specialist input when broader spectrum or complex antimicrobials are required.	Northern Territory Department of Health	Ongoing—reviewed triennially or as new evidence becomes available
	2.5.4	Review the publication *Medical care of older persons in residential aged care facilities* (the Silver Book) to ensure it provides appropriate information on AMR.	The Royal Australian College of General Practitioners	2017
	2.5.5	Pilot an AMS program in residential aged care facilities which utilises a range of mechanisms to improve health outcomes of RACF residents. This pilot will be used to inform the transferability of the AMS program across aged care facilities and local health network providers.	Southern Adelaide Local Health Network (SALHN)	June 2017
Animal Health and Agriculture	**2.5.6**	Support mastitis prevention and control with guidance and tools for selective treatment of cows—revision of guidelines for dry-cow therapy.	Dairy Australia	June 2016

OBJECTIVE 3: SURVEILLANCE

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 3.1:				
Establish the foundations for national One Health surveillance.				
One Health	**3.1.1**	Extend National Antimicrobial Prescribing Survey into all sectors of human and animal health care including aged care, primary care and veterinarian, and enable combining of both prescribing and resistance data.	National Centre for Antimicrobial Stewardship*	2016–20
Human Health	**3.1.2**	Develop a national surveillance system for human health to build on existing programs and data collections at the state/territory level and the national level, as well as establish capacity for future integration with animal health and agricultural surveillance. The national surveillance system will collect, coordinate, analyse, and report AMR and AU surveillance data from multiples sources covering both hospital and community settings in partnership with existing programs. Further detail the on this activity is provided under 3.5.	ACSQHC through the AURA project*	June 2016: system established and first national report
Animal Health and Agriculture	**3.1.3**	Improve regular reporting of imports, exports and manufacture of active constituents in veterinary medicines.	Australian Pesticides and Veterinary Medicines Authority and the Australian Government Department of Agriculture and Water Resources*	2015–16 collection in Q1 2016–17
PRIORITY AREA FOR ACTION 3.2:				
Agree the objectives of surveillance for each sector, ensuring they align with the overarching objectives for the national One Health surveillance system.				
One Health	**3.2.1**	Develop audit tools together with each sector to ensure data is meaningful, encourage cross sector collaboration and encourage utilisation of unique indications dataset.	National Centre for Antimicrobial Stewardship*	2016–20
Human Health	**3.2.2**	Develop clear objectives for human health surveillance that will guide system development now and into the future, including system scope, priority areas, end uses of data, and appropriate reporting cycles.	National Centre for Epidemiology and Population Health and the Australian Government Department of Health	Completed November 2015

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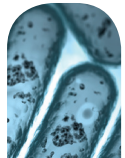

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Human Health	**3.2.3** Undertake research through the Australian National Healthcare Associated Infection Surveillance Program (PhD project) to provide recommendations for a national infection surveillance program, which may translate across to AMR surveillance.	Queensland University of Technology (CRE-RHAI)	July 2016
	3.2.4 Develop an ACT Health policy on surveillance and management of AMR through an ACT Health wide antimicrobial resistance interest group.	Canberra Hospital and Health Services, ACT Pathology	2017
PRIORITY AREA FOR ACTION 3.3: Develop lists of priority organisms and associated antimicrobials for national reporting.			
Human Health	**3.3.1** Develop and maintain a list of priority organisms and associated antimicrobials for reporting through the national human health surveillance system.	ACSQHC through the AURA project*	Annually, or more regularly as required
	3.3.2 Develop statewide service to provide genomic analysis of outbreaks of pathogens of public health significance.	University of Sydney (MBI), NSW Health Pathology (CRE ID)	June 2016: report on first projects Mar 2017: established architecture for networking of platforms with partners in other states June 2017: initial project outcomes communicated to key stakeholders
	3.3.3 Develop national network to provide genetic and genomic analysis of outbreaks of transmissible antibiotic resistance of major public health importance.	University of Sydney WIMR & MBI (CRE CI)	June 2016: first national meeting GN Sepsis outcomes program (GNSOP); publication of detailed genetic analysis of transmissible gene pool in *E. coli* & *K. pneumoniae* (Australian and international partners)

Human Health	**3.3.4**	Online publication of Tasmanian public hospital healthcare associated infection surveillance reports which provides data on priority organisms.	Public Health Services, Tasmania	Quarterly and annual reports produced
	3.3.5	Carbapenemase-producing *Enterobacteriaceae* (CPE) cases notifiable in Tasmania.	Public Health Services, Tasmania	Completed January 2016 Ongoing monitoring and reporting of data
PRIORITY AREA FOR ACTION 3.4:				
Agree and implement a uniform standard for laboratory testing methods for antibacterial susceptibility.				
Human Health	**3.4.1**	Establishment of a Working Group to characterise processes whereby jurisdictional public health agencies are involved in the surveillance and response to multi-resistant organisms, particularly in community settings, and the respective roles and coordination of public health, community and hospital-focussed agencies.	Communicable Disease Network Australia (CDNA) via a Multi-Resistant Organisms Working Group	2016–17
	3.4.2	Develop an approach and timeframes for achieving standardised definitions of 'resistance' for laboratories and agreed definition for data collection for key bacteria.	ACSQHC through the AURA project*	Completed December 2015
	3.4.3	Development of standards, quality systems and education tools on evidence-based best practice on indications for specimen collection and performing microbiology laboratory tests and result interpretation.	PathWest	Baseline monitoring system is currently being developed. Commence clinical collaboration for improvement in 2016.
Animal Health and Agriculture	**3.4.4**	Evaluation and adoption of Clinical and Laboratory Standards Institute disc diffusion methodology for veterinary bacterial pathogens and review options for improved organism identification.	NSW Department of Primary Industries	31 Dec 2016
PRIORITY AREA FOR ACTION 3.5:				
Improve human health surveillance.				
Human Health	**3.5.1**	Expand the National Antimicrobial Utilisation Surveillance Program (NAUSP) to provide a more representative data set, as well as enhance systems to improve hospital access to data and comparative analyses.	ACSQHC, in association with NAUSP*	June 2016

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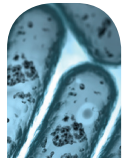

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Human Health	**3.5.2** Expand the Australian Group on AMR (AGAR) surveillance program to collect data from more sights and on additional priority organisms, to include *Pseudomonas aeruginosa*, and *Acinetobacter* species. Consider options for collection of data on *Streptococcus pneumoniae*.	ACSQHC, in association with AGAR*	December 2016
	3.5.3 Increase participation in the National Antimicrobial Prescribing Survey (NAPS) hospital survey and develop a surgical module to target surgical prophylaxis. Expand NAPS into residential aged care facilities (referred to as acNAPS) and build on the success of the 2015 pilot.	ACSQHC, in association with National Centre for Antimicrobial Stewardship*	May 2016
	3.5.4 Enhance data reported to the National Notifiable Disease Surveillance System (NNDSS) for tuberculosis, invasive pneumococcal disease, gonorrhoea and salmonella for regular reporting by the NNDSS to the national surveillance system.	Australian Government Department of Health*	2016–2017
	3.5.5 Expand the Queensland OrgTRX passive surveillance system to other interested states and territories. This system provides a 'data cube' and allows participants to generate cumulative antibiograms and investigate resistance trends.	ACSQHC, working with Queensland Health (OrgTRx) and other jurisdictions*	Progressive roll out from 2015
	3.5.6 Develop a web portal ("CARAlert") for confirming laboratories to enter information on critical antimicrobial resistances. This information is then reported via SMS or email to jurisdictional stakeholders to alert them to the emergence or spread of critical antimicrobial resistances. Referred to as "CARAlert".	ACSQHC through the AURA project*	Commenced in March 2016—alerts underway
	3.5.7 Develop a Unique Indications Database that provides a list of infections and indications for AU to support interoperability between IT systems (e.g. eHealth, NAPS).	Royal Melbourne Hospital at the Doherty Institute	2016–18

Human Health	**3.5.8**	Undertake a pilot study to assess the prevalence of common bacterial upper respiratory tract commensals and pathogens in the nose and throat swabs of general practice staff and patients attending the GP practice for consultation with non-infectious conditions; and the rate of antimicrobial resistance in organisms isolated to inform IPC practice in general practice settings. Determine the feasibility of using the Australian Sentinel Practice Research Network (ASPREN) surveillance system to contribute to national antibiotic resistance surveillance.	School of Population Health, the University of Queensland	Jan 2016: Pilot study complete July 2016: Pilot results available
	3.5.9	Develop a superbug analytics dashboard to provide a near real-time overview of AU and AMR in hospitals and in the community, to detect unusual antibiotic use, identify changing resistance patterns, and feedback on the impact of interventions or programs.	The Institute for Molecular Bioscience, University of Queensland	2018
	3.5.10	Include antibiotic dispensing trends in the Australian Atlas of Healthcare Variation to inform improvements to prescribing practices consistent with national guidelines. Recommendations in Atlas 1.0 included developing benchmarks for best practice prescribing; PBAC review use of topical quinolones; aligning AMS programs in GP with NARS for amoxicillin; and capacity for PHN and LHN to track and compare antimicrobial prescribing rates. The Commission is developing an implementation strategy inclusive of actions for the Australian Government Department of Health, PBAC, clinical colleges, PHN and LHN, and national boards and AHPRA.	ACSQHC*	Atlas successfully launched in November 2015. Implementation strategy will be presented to AHMAC in May 2016. Interactive web Atlas is currently being developed.
	3.5.11	Create a reference laboratory for carbapenem-resistant *Enterobacteriaceae* to enable rapid molecular characterisation, national data reporting and comparison.	PathWest; WA Health	Ongoing
PRIORITY AREA FOR ACTION 3.6: Improve animal health and agriculture surveillance.				
Animal Health and Agriculture	3.6.1	Investigate a surveillance model for AMR in the pig industry based on pig faeces at the time of slaughter that may also be applied to other major food industries in the future.	Australian Pork Limited*	August 2016
	3.6.2	Measure and assess antibiotic use in the meat and livestock industry through on-going monitoring and analysis of antibiotic treatment data from a (representative) sample of feedlots to improve judicious use.	Meat & Livestock Australia	Completed in late 2015

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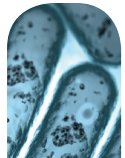

Sector	Activity/ies		Lead Organisation	Timeframes for completion
Animal Health and Agriculture	**3.6.3**	Develop and assess methods for monitoring antimicrobial usage in companion and production animals at the veterinary practice level.	National Centre for Antimicrobial Stewardship*	2020
	3.6.4	Undertake research project into multi-drug resistant pathogenic *E. coli* and methicillin resistant *Staphylococcus spp*. isolated from animal infections to determine their significance to animal and public health. This project will analyse the clinical data accompanying these isolates and prescribing practices for veterinarians to identify specific selection foci for resistant isolates and to investigate novel agents for their treatment.	The University of Adelaide with the Australian Research Council	Progress report December 2016
	3.6.5	Investigate AMR in *E. coli*, *Salmonella* and *Campylobacter* in backyard chickens to assess the health risk posed to humans and reduce the risk of onward transmission to humans.	The University of Queensland	Jan 2015–Jun 2015
	3.6.6	Undertake study on avian pathogenic *E. coli* in commercial broiler chickens in Southeast Queensland to determine AMR, virulence and investigate the risk of transmission of the disease to humans.	The University of Queensland	2012–16
	3.6.7	Determine antimicrobial susceptibility patterns in bacteria cultured from septicaemic neonatal foals and identification of geographic differences in those patterns, to provide recommendations on antimicrobial choice for front-line equine veterinarians.	The University of Queensland	2015–16
	3.6.8	Transverse and longitudinal evaluation of the prevalence of methicillin resistant *Staphylococcus spp*. carriage in dogs and cats in the greater Brisbane area.	The University of Queensland	2015–16 Study is on-going. 1st phase aimed to be finished by the end of 2016
	3.6.9	Undertake a pilot study to screen environmental samples (from vineyards and crops with high azole fungicide use) and clinical isolates of *Aspergillus fumigatus* for phenotypic resistance to azole drugs and perform molecular genotyping to determine if mutations are consistent with biocide induced resistance.	University of Sydney (MBI; CRE ID), contributing to a global study and analysis led by Imperial College, London	2016–17
	3.6.10	Industry workshop to develop and undertake a small pilot AMR surveillance project in the salmon industry, comparable to those undertaken in Australian livestock industries	Tasmanian Salmonid Growers Association	October 2017
	3.6.11	Undertake AMR surveillance project in the chicken meat industry to provide baseline information for future surveillance	Australian Chicken Meat Federation*	August 2017

PRIORITY AREA FOR ACTION 3.7:

Investigate requirements for surveillance in food.

One Health	**3.7.2**	Development of standardised antibiotic susceptibility reporting profiles completed for MRSA, VRE, CRE and *C.difficile*.	PathWest	Completed
	3.7.3	Undertake surveillance of faecal specimen from livestock production groups to understand the impact of AU on AMR in animals.	National Centre for Antimicrobial Stewardship*	2020
Human Health	**3.7.4**	To undertake a review of the scientific literature to determine the extent to which AMR is present in food, the extent to which food is a route of transmission of AMR, and identify gaps to inform decision making about the extent of surveillance required and future work.	Australian Government Department of Health*	2016–17
Animal Health and Agriculture	**3.7.5**	Ongoing monitoring through the Imported Food Inspection Scheme of antimicrobial residues in imported seafood that is from aquaculture or has been farmed. A bi-annual report will be produced on where residues have been detected that exceed the maximum limits contained within the Australia New Zealand Food Standards Code. Provides six-monthly inspection data reports and monthly failing food reports. A revised screen of antimicrobial chemicals will be developed based on those considered to be of importance to human health medicine and where concerns have been raised relating to high usage, which will then be used to monitor compliance with the maximum residue limits.	Australian Government Department of Agriculture and Water Resources*	Report covering January to June of each year released in November. Report covering July to December of each year released in May. Expected revision and amendment of screening for antimicrobial chemicals 2nd quarter of 2016.

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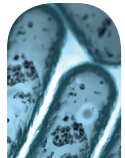

OBJECTIVE 4: INFECTION PREVENTION AND CONTROL

Sector		Activity/ies	Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 4.1: Ensure the availability of evidence-based, best-practice and nationally consistent standards for IPC across human health and animal care settings.				
Human Health	**4.1.1**	Review of the *Australian Guidelines for Prevention and Control of Infection in Healthcare (2010)* to identify gaps against the evidence base and any necessary revisions.	National Health and Medical Research Council*	December 2015
	4.1.2	Review of the *Recommendations for the control of multi-drug resistant gram-negatives: Carbapenemase Producing Enterobacteriaceae*. Supplementary resources to be made available following the release of the Guide.	ACSQHC*	July 2016 December 2016
	4.1.3	Formation of CRE Action Team in the ACT (CREATE) working group to monitor CRE and use available data to inform ACT Infection Prevention and Control Unit and AMS strategies.	CREATE working group, ACT Health	Ongoing from 2015
	4.1.4	Develop guidelines for health services and residential care facilities on IPC strategies for carbapenemase-producing *Enterobacteriaceae*.	Victorian Department of Health and Human Services	Health service guideline completed December 2015. Residential care facility specific guideline TBC
	4.1.5	Review and update state-wide multi-resistant organism guideline and trigger response tools	Queensland Health	Reviewed September 2014 and November 2014
	4.1.6	Develop state-wide infection control alerts policy and procedure.	Public Health Services, Tasmania	November 2015
	4.1.7	Develop state policies for the management of carbapenemase-producing *Enterobacteriaceae*.	CREATE working group, ACT Health	June 2016
	4.1.8	Develop state guidelines on management of patients infected or colonised with multidrug-resistant Gram-negative microorganisms.	SA Health	Mid-2016

Human Health	**4.1.9**	Implement a national approach to increase hand hygiene compliance rates in all sectors and among all professional groups under the National Hand Hygiene Initiative. HHA has developed additional online learning packages; auditing can now be undertaken online. A new benchmark for hand hygiene compliance for all professional groups and individual moments has been agreed to by AHMAC.	ACSQHC with Hand Hygiene Australia (HHA)*	Ongoing 2017
	4.1.9	Implement a national approach to increase hand hygiene compliance rates in all sectors and among all professional groups under the National Hand Hygiene Initiative. HHA has developed additional online learning packages; auditing can now be undertaken online. A new benchmark for hand hygiene compliance for all professional groups and individual moments has been agreed to by AHMAC.	ACSQHC with Hand Hygiene Australia (HHA)*	Ongoing 2017
Animal Health and Agriculture	**4.1.10**	Develop and promulgate veterinary IPC guidelines.	Zoetis Australia	December 2016
	4.1.11	Participate in Biosecurity Queensland [Ministerial] Advisory Committee to develop biosecurity guidelines. These guidelines stress that antimicrobials should not be used to replace management strategies and should only be administered under veterinary guidance.	The University of Queensland	These meetings were held between November 2015 & February 2016. A submission is now before Parliament.

PRIORITY AREA FOR ACTION 4.2:

Review existing accreditation and quality assurance programmes to ensure they appropriately support and encourage compliance with best practice IPC measures.

Human Health	**4.2.1**	Update of *The Royal Australian College of General Practitioners Standards for General Practice (4th Edition)*, which includes information on IPC (GP Module, Standard 2).	The Royal Australian College of General Practitioners	October 2017
	4.2.2	Update the *National Safety and Quality Health Service Standards, Standard 3: Preventing and controlling healthcare associated infections*.	ACSQHC*	Anticipated for release in mid-2017
	4.2.3	Undertake a research project to understand the impact and effect of introducing National Healthcare Standards (in particular Standard 3) in Australian hospitals.	Queensland University of Technology (CRE-RHAI)	December 2017

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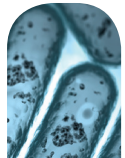

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Animal Health and Agriculture	**4.2.4** Review and update the National Feedlot Accreditation Scheme to ensure that it appropriately supports and encourages feedlot compliance with best practice IPC practices on feedlots.	Meat & Livestock Australia	December 2016
PRIORITY AREA FOR ACTION 4.3: Develop additional initiatives and resources to strengthen IPC in all human health care settings.			
Human Health	**4.3.1** Research effective approaches to cleaning in hospitals through a randomised controlled trial of a novel cleaning bundle intervention to improve cleaning performance and reduce risk of infection in Australian hospitals. The findings will inform the implementation of a cleaning policy for IPC in a range of Australian hospital contexts.	Queensland University of Technology (CRE-RHAI)	2016–17
	4.3.2 Assess patients' understanding and expectations of clinicians' IPC behaviours and identify their potential contributions to protecting themselves and other patients from MRO acquisition and transmission Use video reflexive ethnography to identify potential strategies to improve communication about IPC between clinicians' and patients and develop a collaborative approach to reducing pathogen transmission	University of Sydney (MBI) with University of Tasmania (Sydney) campus (CRE ID)	Project and interpretation of data completed Jul–Sep 2016. Plan for production of videos in 2017.
	4.3.3 Use video reflexive ethnography in settings with high prevalence of MRSA and other MROs to video clinicians day-to-day clinical activities, have them review clips, identify, discuss and reflect on otherwise unrecognized risks of potential pathogen transmission and devise strategies to minimise them.	University of Sydney (MBI) with University of Tasmania (Sydney) campus (CRE ID)	Project complete December 2016 2017: work with NSW health for state implementation & ACSQHC for national implementation of outcomes
	4.3.4 Review and maintain the evidence based I-CARE intervention bundle to assist facilities to decrease the incidence of bloodstream infections associated with intravascular devices.	Queensland Health	Last reviewed January 2015
	4.3.5 Produce YouTube videos demonstrating the correct use of personal protective equipment for standard and transmission based precautions.	Public Health Services, Tasmania	Completed November 2015

Human Health	**4.3.6**	Implementation of an automated surveillance technology (AST) system for IPC programs in all WA public hospitals AST will provide automatic real-time interface with hospital systems including iPharmacy that will strengthen IPC programs with improved tracking of patients with MROs and assist hospital AMS programs.	WA Health	2015: Project funding approved. 2016: Tender and selection process of preferred provider followed by implementation of AST.
	4.3.7	Surveillance of healthcare-associated infections caused by MRSA, VRE and *C.difficile* to inform evidence-based IPC MRO policy in WA and reports to key stakeholders, WAMRO and HICWA groups.	WA Health	2016: introduced process to monitor CRE HAIs
	4.3.8	Ongoing revision and maintenance of the electronic micro-alert system that flags patients with MROs on hospital patient management systems.	WA Health	The MAG group (sub-committee of WAMRO) has been formed to oversee the micro-alert system and ensure functionality of the system is maintained.
	4.3.9	Implementation of new IT platform for blood stream infections database surveillance and Infection Prevention Control Unit surveillance integrating AMS and Micro data.	ACT Health	2016
	4.3.10	Develop a system for integration of information on infection control related incidents contained in the state Safety Learning System with information on the incidence of healthcare related infection available in the state infection control information management system.	SA Health	2017
	4.3.11	Redevelop the existing state-wide infection control information management system into the new state electronic patient administration system (EPAS) with potential for improved identification of patients with risk factors for multi-resistant organism carriage.	SA Health	2018
	4.3.12	Linkage of data concerning infections in ICUs and processes for reducing infection transmission in Australian ICUs to determine risk factors for infections in ICU patients.	VICNISS Coordinating Centre	Ongoing

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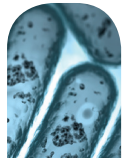

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Human Health	**4.3.13** Undertake surveillance of anterior nasal and throat swabs in general practice staff and community members to define rates of transmission in staff and community members attending the practice for consultation with non-infectious complaints. As part of the GAPS study there is surveillance of: 1) anterior nasal and throat swabs in general practice staff and patients (to define rates of transmission between the two); and 2) of patients attending GPs with non-infectious complaints via ASPReN (feasibility study)	School of Population Health, the University of Queensland	30 June 2016—Completed
	4.3.14 a) Enhanced capacity for outbreak detection and source tracking, resulting in improved infection control. b) Development of species-specific bioinformatics pipelines to allow detailed outbreak investigation.	Microbiological Diagnostic Unit Public Health Laboratory	a) Aug 2015: 'Inhouse' bioinformatics pipeline developed and implemented b) October 2017
	4.3.15 Use whole genome sequencing to determine environmental reservoirs in hospital sink and drainage systems as a potential source of an outbreak of carbapenemase-producing *Enterobacteriaceae* in patients to inform infection control strategies.	University of Sydney Clinical School, Universities of Oxford and University of Virginia School of Medicine, USA	2016: isolates sequenced 2017: results published; infection control actions defined and implemented
	4.3.16 Provide up to date guidance on the management of patients with MRSA and VRE in rural hospitals and non-acute healthcare settings.	Public Health Services, Tasmania	June 2016
	4.3.17 Develop a comprehensive nationwide sepsis registry in Emergency Departments (e.g. via the Australian Sepsis Network), beginning with NSW State registry linked to CEC, in order to improve a prior diagnosis of life-threatening sepsis.	University of Sydney WIMR & MBI (CRE CI)	June 2016: first publications Mar 2017: NSW Sepsis Registry (linked to NSW Health CEC) Mar 2018: National Sepsis Registry

Human Health	**4.3.18**	Implement a diagnostic tool suitable for use in ED within 6 hours of arrival that predicts mortality risk and improves accuracy of diagnostic algorithms.	University of Sydney WIMR & MBI (CRE CI)	Sept 2016: first publications Mar 2017: multicentre observational (validation) trial Mar 2018: interventional trials

PRIORITY AREA FOR ACTION 4.4:

Further develop initiatives and resources to strengthen IPC in the livestock industry.

Animal Health and Agriculture	**4.4.1**	Research and develop evidence-based infection prevention and control measures for adoption into industry standards for managing infectious cattle diseases, including bovine respiratory disease, on feedlots.	Meat & Livestock Australia	Progress report December 2016
	4.4.2	Provide workshops and resources on reducing stress through cattle acclimation techniques and improved remote diagnostic technology for more accurate and earlier detection of sick cattle.	Meat & Livestock Australia	Progress report December 2016
	4.4.3	Develop and deliver a range of extension activities and resources to enhance whole farm planning and biosecurity risks to reduce the incidence of infectious diseases and requirements for antibiotic use.	Dairy Australia	June 2017
	4.4.4	Delivery of extension and farmer education on calf husbandry—ongoing "Rearing Healthy Calves" workshops and training in calf husbandry, promoting recommended practices including: improved colostrum feeding, use of vaccines, and use of electrolytes as alternatives to antibiotics.	Dairy Australia	December 2016
	4.4.5	Research the role of probiotics for reducing dependence on antibiotics in pigs and develop an evidence base for surveillance and response programs for key biosecurity threats.	University of Technology Sydney	Progress Report December 2016
	4.4.6	Develop peptide antimicrobials that will selectively target pathogenic *E. coli* in piglets, including ceftiofur-resistant isolates to reduce the current levels of antibiotics used by the Australian Pork Industry.	Commonwealth Scientific and Industrial Research Organisation*	2017: Proof-of-concept.

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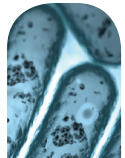

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Animal Health and Agriculture	**4.4.7** a) Undertake research to determine disinfectant susceptibilities of *E. coli* from domestic (significantly disinfectant-exposed) and feral (not disinfectant-exposed) pigs. b) Undertake research to identify genes responsible for resistance to aminoglycosides and third generation cephalosporins (both classes of antimicrobial used in humans) in pig isolates.	University of Sydney (Faculty of Veterinary Sciences; MBI) Funding: Pork CRC	a) Complete b) Completion and analysis early 2017.
PRIORITY AREA FOR ACTION 4.5: Further develop resources to strengthen IPC in veterinary practice.			
Animal Health and Agriculture	**4.5.1** Determine correlations between genotypic biocide (disinfectant) resistance found in *Staphylococcus* isolates from animals and phenotypic expression of these genes i.e. are our current infection control practices likely to be effective given the biocide resistance of these organisms.	University of Sydney (Faculty of Veterinary Science, MBI)	July 2016: expts completed Oct 2016: Incorporate relevant findings into AIDAP guidelines Mar–Jul 2017: pub data in peer-reviewed journal.
	4.5.2 Determine the level of carriage of MDR *Staphylococcus* species in dogs admitted for standard surgical procedures and review the outcomes of surgical intervention in those with and without MDR Staphs to determine risk factors.	University of Sydney (Faculty of Veterinary Science, MBI)	July 2016: expts completed Oct 2016: findings incorporated into AIDAP Practical Infection Control Guidelines for veterinary practices Mar–Jul 2017: publication in peer-reviewed journal

PRIORITY AREA FOR ACTION 4.6:

Encourage continued increases in vaccination rates to prevent infections.

Human Health	**4.6.1**	Review of the National Immunisation Program (NIP) and where appropriate include the addition of new vaccines and extended cohorts.	Australian Government Department of Health*	Ongoing
	4.6.2	Undertake pilot of pharmacist-led workforce immunisation to improve vaccination rates for: influenza; measles, mumps, and rubella (MMR); and diphtheria, tetanus and pertussis (DTPa) amongst the health workforce. This activity also supports compliance against standards in preventing and controlling healthcare associated infections.	Northern Territory Department of Health	Pilot to be completed in September 2016
	4.6.3	Develop cytokines as novel adjuvants and therapeutics to improve vaccine use for maintaining poultry health.	Commonwealth Scientific and Industrial Research Organisation*	2016: Proof-of-concept for out lead candidate (Interferon–lambda)
Animal Health and Agriculture	**4.6.4**	Undertake research to prove the efficacy of a potential new two-in-one vaccine to increase the ease and reliability of vaccination against infectious feedlot disease, e.g. bovine respiratory virus, in feedlot cattle.	Meat & Livestock Australia	Initial pen trials completed in 2015. Vaccine likely to become commercially available in 5–7 years.
	4.6.5	Undertake research to measure the impact and best methods of vaccinating cattle against infectious feedlot disease, e.g. bovine respiratory virus, prior to entering the feedlot.	Meat & Livestock Australia	Progress report December 2016

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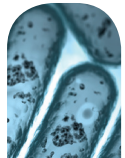

OBJECTIVE 5: NATIONAL RESEARCH AGENDA

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 5.1: Identify current gaps and agree national research and development priorities.				
One Health	**5.1.1**	Work with research bodies and other relevant stakeholders to develop an approach to identifying future research priorities.	Australian Government Department of Health*	Late 2016
Human Health	**5.1.2**	Undertake research to understand and quantify the economic burden associated with AMR in the Australian community to inform the design of efficient AMR initiatives.	Queensland University of Technology (CRE-RHAI)	May 2017
PRIORITY AREA FOR ACTION 5.2: Coordinate national research activities and the sharing of information.				
Human Health	**5.2.1**	Establish AMR research collaborations with University of Queensland, Queensland University of Technology, Bond University, ACSQHC, The Royal Australian College of General Practitioners, Australian Government Department of Health with the aim to link content experts with implementation experts. Sharing of tools, resources and co-supervisory roles for PhD students across institutions.	National Centre for Antimicrobial Stewardship*	2016–20
	5.2.2	Continue Research Roundtable meetings for AMR to establish and encourage collaboration among researchers and stakeholders involved in AMR in general practice in Australia. This collaborative approach should assist in reducing duplications of efforts and provision of complementary expertise to areas of focus on research.	Bond University with Queensland University of Technology, National Centre for Antimicrobial Stewardship, ACSQHC, The Royal Australian College of General Practitioners, Australian Government Department of Health	Next meeting March 2017

PRIORITY AREA FOR ACTION 5.3:

Explore opportunities to increase support for research and development, including incentives for greater private sector investment.

One Health	**5.3.1**	Undertake research to correlate mobile antimicrobial resistant genetic elements from human hospital isolates and those from animals subjected to intensive farming practices.	University of Sydney Clinical School (MBI), University of Technology, Elizabeth Macarthur Research Institute as part of the Australian centre for genomic epidemiological microbiology (ausgem)	May 2016: data and isolate retrieval Dec 2016: Isolates sequenced 2017: Data analysed and published
Human Health	**5.3.2**	Support Product Development Partnership to bring new drugs and diagnostic tests to market, including clinical trials of new treatments, including for drug-sensitive and multi-drug resistant tuberculosis and malaria.	Australian Government Department of Foreign Affairs and Trade*	Funding over three years (2015 –17) for the TB Alliance, Medicines for Malaria Venture (MMV) and the Foundation for Innovative New Diagnostics (FIND)
	5.3.3	Treating Infection—new antibiotics and antifungals: undertake an open access screening initiative to validate those with novel antimicrobial properties.	The Community for Open Antimicrobial Drug Discovery, University of Queensland	2020
	5.3.4	Develop new antimicrobials for use against multi-drug resistant strains of *Mycobacterium tuberculosis* which will include: a) Development of synthetic analogues of lead compounds targeting cell wall synthesis with higher potency against M. tuberculosis. b) Identification of novel anti-tuberculosis agents from marine extracts c) Identification of novel targets for anti-mycobacterial drugs.	University of Sydney (Chemistry, Infectious Diseases & Immunology) and Centenary Institute and CRE in Tuberculosis Control; University of Queensland	a) Dec 2017: complete preclinical studies of efficacy of compounds in animal models of tuberculosis b) Dec 2017: Purification of bioactive marine compounds and preclinical assessment of *in vivo* potency in animal models c) Identify new targets by end of 2017, then continue chemical modification to optimise potency.

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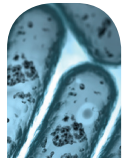

Sector	Activity/ies	Lead Organisation	Timeframes for completion
Human Health	**5.3.5** Develop therapeutic strategies suitable for national / international trials to ecolonize antibiotic resistance from the human gut.	University of Sydney WIMR & MBI (CRE Critical Infection)	June 2016: first *in vivo* publications; June 2017: human pilot studies; June 2018: RCT planning
	5.3.6 Investigate the impact of commonly used antibiotics in critically ill patients in terms of development of antibiotic resistance and disturbance of the gut microflora.	University of Sydney WIMR & MBI (CRE CI)	March 2017
	5.3.7 Investigate the feasibility of rapid diagnostic targeting of transmissible AMR in bacteria in order to develop cheap rapid screening and diagnosis.	University of Sydney WIMR & MBI (CRE CI)	March 2017
	5.3.8 Research to quantify the risk of oral vancomcyin therapy for VRE acquisition in CDI patients.	ACT Health: Canberra Hospital & Health Services, Antimicrobial Stewardship Program	2017
	5.3.9 Systematic review of the harms of macrolides prescribed for any indication.	CREMARA, Bond University*	Late 2016
	5.3.10 a) Develop synthetic analogues of lead compounds targeting cell wall synthesis with higher potency against Mycobacterium tuberculosis. b) Identify novel anti-tuberculosis agents from natural product (marine extracts). c) Discover novel targets for anti-mycobacterial drugs.	University of Sydney (Chemistry, Infectious Diseases & Immunology) and Centenary Institute and CRE in Tuberculosis Control; University of Queensland	a) Preclinical studies in animal models of tuberculosis end 2017. b) Purification of bioactive marine compounds and determination of chemical structure end 2016; preclinical assessment of *in vivo* potency in animal models end 2017. c) Identify new targets by end 2017, then continue chemical modification to optimise potency.

PRIORITY AREA FOR ACTION 5.4:

Explore opportunities to support the translation of promising research findings into new products, policies and approaches.

Human Health	**5.4.1**	Collaborate research across relevant government departments to identify effective treatments and nudges for improving antibiotic use in Australia.	Australian Government Department of Health, with the Behavioural Economics Team Australia*	2016–18
	5.4.2	Development and screening of novel drugs that target a unique biochemical pathway in mycobacteria that is involved in cell wall biosynthesis and drug metabolism.	Commonwealth Scientific and Industrial Research Organisation*	2016: Proof-of-concept—screen potential antimicrobial candidates.
Animal Health and Agriculture	**5.4.3**	Identification of new and effective antimicrobials for sustainable use in intensively finished cattle. The identification of suitable compounds will facilitate the segregated use of specific classes of antimicrobials in either animals or humans, but not both.	The University of Queensland	Pilot study completed 2015

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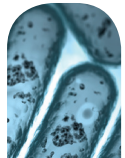

OBJECTIVE 6: INTERNATIONAL PARTNERSHIPS

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 6.1: Active engagement with multilateral organisations and relevant forums to contribute to regional and global action on antimicrobial resistance.				
One Health	**6.1.1**	Financial contribution to the World Health Organization towards the implementation of activities under the Global Action Plan on AMR.	Australian Government Department of Health*	Report due June 2016
	6.1.2	Align Australia's activities under the National AMR Implementation Plan with the Global Action Plan on AMR, where appropriate.	Australian Government Department of Health and the Department of Agriculture and Water Resources*	June 2016
	6.1.3	Attend WHO meetings on the Global Action Plan to inform Australia's policy position and provide updates to international partners on progress.	Australian Government Department of Health*	2016–19
	6.1.4	Participation in the WHO Advisory group on Integrated Surveillance of AMR (AGISAR) to support the adoption of the WHO Global Action Plan on AMR and review progress from AGISAR pilot projects.	ACT Pathology	2019
	6.1.5	Contribute to preparations for the United Nations High Level Meeting on AMR.	Australian Government Department of Health, Australian Government Department of Agriculture and Water Resources*	September 2016
	6.1.6	Contribute to G20 preparations, including discussions relating to AMR and the health agenda	Australian Government Department of Health*	2016
	6.1.7	Participate in the ministerial-level Alliance of Champions against AMR.	Australian Government Department of Health*	2016–19
	6.1.8	a) Participation in the Tokyo Meeting of Health Ministers on AMR in Asia and Bi-regional Technical Consultation on AMR. b) Contribution to progressing implementation of meeting outcomes, including development of the Asia–Pacific One Health Initiative on AMR.	Australian Government Department of Health, Australian Government Department of Agriculture and Water Resources*	a) April 2016 b) Ongoing
	6.1.9	Participation in Codex, OIE, and FAO fora.	Australian Government Departments of Agriculture and Water Resources and Health*	July 2016
	6.1.10	Participate in the Global Health Security Agenda (GHSA) Action Package on AMR, including attendance at relevant GHSA meetings.	Australian Government Department of Health, Australian Government Department of Agriculture and Water Resources*	Ongoing

Human Health	**6.1.11**	High level meeting on antimicrobial resistance to be convened at the United Nations General Assembly in 2016.	Health Ministers*	September 2016
	6.1.12	Undertake research into Plasmodium parasites to: • understand how they become resistant to drugs using genomics and molecular markers; • define methodologies for surveillance in resource-poor countries. Conduct clinical antimalarial trials to inform policy.	Menzies School of Health Research	1. Derivation of Markers of Chloroquine Resistance P. vivax 2019 2. Testing new drugs for mdr Plasmodia Ongoing 3. Mapping CQR P. vivax across Asia Pacific Ongoing 4. Antimalarial Clinical Trials Ongoing
	6.1.13	Collate and map antimalarial resistance data from the Asia Pacific through engagement with the WorldWide Antimalarial Resistance Network Pool clinical data on antimalarial drug resistance and assess optimal dosing strategies for antimalarial policy	Menzies School of Health Research	Ongoing
	6.1.14	Participation in Asia–Pacific Economic Cooperation (APEC) Food Safety Cooperation Forum (FSCF) workshop on *Coordinated Research Initiative for the Implementation of Antimicrobial Resistance Control Strategies*.	Food Standards Australia New Zealand	Completed 30 October 2015
Animal Health and Agriculture	**6.1.15**	Attend OIE meetings and provide updates to international partners on progress.	Australian Government Department of Agriculture and Water Resources*	Ongoing
	6.1.16	Develop curricula and teaching methods that include improvements in AMR awareness and mitigation in veterinary schools in developing countries.	The University of Queensland	2015–16
	6.1.17	Increasing awareness of antimicrobial usage and antimicrobial resistance in pig producers and pig veterinarians through presentations delivered to pork industry and veterinary organisations at a variety of conferences and meetings in Australia and the Philippines.	The University of Queensland	Ongoing 2016–17

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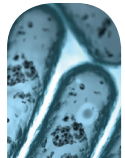

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 6.2: Lead regional initiatives to increase capacity to respond to antimicrobial resistance.				
Human Health	**6.2.1**	Work with the World Health Organization to undertake an AMS gap analysis in the Asia Pacific Region	National Centre for Antimicrobial Stewardship*	September 2016
	6.2.2	Collaborate with World Health Organization to develop a strategy to address gaps identified in Asia Pacific region through the development of specific tools and resources. Provision of NAPS tools to New Zealand and support NZ AMS researchers	National Centre for Antimicrobial Stewardship*	2016–20
	6.2.3	Provide NAPS tools to New Zealand and support New Zealand AMS researchers.	National Centre for Antimicrobial Stewardship*	2016–20
	6.2.4	Expansion of *Therapeutic Guidelines for Developing Countries, Guidelines in the Pacific and the Visiting Editor Program*.	Therapeutic Guidelines Ltd and TGL Foundation	2016–19
	6.2.5	Coordination of the annual Western Pacific Regional Antibiotic Awareness Week, including the development of resources to build capacity in developing countries in the Western-Pacific region.	NPS MedicineWise	Annually in November
	6.2.6	Define and monitor antimicrobial resistance in *B. pseudomallei* in endemic areas of Australia and Southeast Asia, using this information to inform treatment protocols that reduce the incidence of new antimicrobial resistance.	Menzies School of Health Research	Ongoing
	6.2.7	Submit isolates of Extensively Drug-Resistant Tuberculosis (XDR TB) from Malaysia to Singapore for whole genome sequencing to test for multidrug resistance. This work will then enable mapping of multidrug resistant isolates throughout Asia.	Menzies School of Health Research	Ongoing

Human Health	**6.2.8**	Undertake research to improve understanding of the molecular epidemiology of multi-drug resistant (MDR) strains of *M. tuberculosis* in our Australia and region. This activity aims to: a) Define the frequency and genetic causes of drug resistant strains of M. tuberculosis in high-burden countries in our region. b) Examine the evolution of MDR in *M. tuberculosis* by whole genome sequencing.	University of Sydney (MBI, CIDM), CRE in Tuberculosis Control and National TB Program in Vietnam	a) Frequency of MDR (end 2016) and genetic causes (end 2017) of MDR strains in Vietnam. b) WGS of MDR strains from Australia and high burden countries (end 2017)
	6.2.9	ndertake research to improve understanding of *Staphylococcus aureus* and Gram negative antimicrobial susceptibility in Asia and the Pacific region.	Menzies School of Health Research	Ongoing
	6.2.10	Undertake International diplomatic engagement in regional and multilateral fora to catalyse regional collaboration to achieve the goal of an Asia Pacific free of malaria by 2030. This includes our support for the work of the Asia Pacific Leaders Malaria Alliance (APLMA) as a regionally owned partnership, and implementation of the APLMA Malaria Elimination Roadmap.	Australian Government Department of Foreign Affairs and Trade*	Ongoing diplomatic engagement to support East Asia Summit commitments to malaria elimination
	6.2.11	Support scale up responses to key challenges in combating malaria in Asia and the Pacific through the Regional Malaria and Other Communicable Disease Threats Trust Fund.	Australian Government Department of Foreign Affairs and Trade*	2014–17
	6.2.12	Develop linkages with the National Paediatric Hospital in Hanoi to assist in development of an AMS and Infection Prevention Control program.	The Children's Hospital at Westmead and University of Sydney (MBI)	Nov 2015: visit to Hanoi with ongoing collaboration Dec 2016: evaluate progress
Animal Health and Agriculture	**6.2.13**	Undertake a survey of pork product integrity in Laos PDR, Vietnam and China to determine prevalence of antibiotic residues and extent of AMR to identify the risk drivers for inappropriate usage of antibiotics and factors leading to increases in AMR.	Commonwealth Scientific and Industrial Research Organisation*	Project commencement is scheduled for mid-2016

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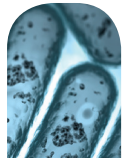

Sector	Activity/ies	Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 6.3:			
Learn from international best practice.			
Human Health	**6.3.1** Collaboration with Clinical Laboratory Integration in Health Care, US Centres for Disease Control, Evidence Based Laboratory Medicine initiatives and similar bodies, to develop a coalition of interested parties to share expertise, insights, experiential learning of evidence in practice.	PathWest	Data pre and post analytical issues presented at Symposium at CDC in Atlanta in October 2015. Report on diagnostics in Clostridium difficile due for publication late 2016.
	6.3.2 Benchmarking of AMR and AU use in Australia with model countries including Nordic countries and the Netherlands through the AURA Surveillance System.	ACSQHC, through AURA reporting*	Ongoing
PRIORITY AREA FOR ACTION 6.4:			
Participate in international surveillance initiatives.			
Human Health	**6.4.1** Contribute data from Australia on AMR and AU to the WHO Global AMR Surveillance System (GLASS), to inform global surveillance reports developed by WHO.	Department of Health with ACSQHC*	Expected to commence 2016–17
	6.4.2 Strengthen International genomics based comparisons of AMR bacteria.	Microbiological Diagnostic Unit Public Health Laboratory	April 2016: Initiated contribution to international genomic datasets (GenomeTrackr)
	6.4.3 Establish collaborative links with other agencies performing genomics-based AMR surveillance (Public Health England; CDC; Public Health Agency of Canada)	Microbiological Diagnostic Unit Public Health Laboratory (MDU PHL)	Visit to Public Health England in March 2016. Comparison of AMR genomics activities at MDU PHL with international agencies reported by Dec 2016.

Animal Health and Agriculture	**6.4.4**	Investigate antimicrobial resistance in bacteria associated with porcine respiratory disease in Australia and the Philippines.	The University of Queensland	Completed May 2016
PRIORITY AREA FOR ACTION 6.5: **Establish closer ties with international collaborations to link Australia's national research agenda with what is happening internationally.**				
Human Health	**6.5.1**	Under the Chemical Biological and Radiological Memorandum of Understanding—Medical Countermeasures Consortium Antimicrobial Resistance task R&D is being undertaken in the following areas: 1. Antimicrobial Target Discovery 2. Mechanisms of Resistance / Persistence 3. Immunomodulation. 4. Novel Antimicrobial Approaches 5. Mathematical Modelling and Systems 6. Multi drug resistant Klebsiella medical countermeasures and models 7. AMR diagnostics	Defence Science and Technology Laboratory, United Kingdom in partnership with US, Canadian & Australian—Defence and Health Departments	2–5 years
	6.5.2	Build on relationships with the US National Institutes of Health, the UK Medical Research Council and the Canadian Institutes of Health Research to optimise how research is funded and utilised.	The National Health and Medical Research Council*	Ongoing

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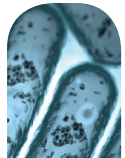

OBJECTIVE 7: GOVERNANCE

Sector	Activity/ies		Lead Organisation	Timeframes for completion
PRIORITY AREA FOR ACTION 7.1: Identify, establish and maintain linkages between implementation partners across all sectors.				
One Health	**7.1.1**	The Australian Strategic and Technical Advisory Group (ASTAG) on AMR to provide ongoing expert advice on current and emerging issues, research priorities and implementation approaches to support the National AMR Strategy.	ASTAG is co-chaired by the Australian Government Chief Veterinary Officer and Australian Government Chief Medical Officer*	Ongoing
	7.1.2	The Antimicrobial Resistance Prevention and Containment (AMPRC) Steering Group to provide leadership on AMR and oversee the development and implementation of the National AMR Strategy.	The AMRPC Steering group is co-chaired by the Secretary of the Australian Government Department of Health and the Secretary of the Australian Government Department of Agriculture and Water Resources*	Ongoing
	7.1.3	Work collaboratively with stakeholders to review activities and monitor progress under the Implementation Plan.	AMPRC Steering Group*	Ongoing
	7.1.4	Build on relationships with current stakeholders across animal and human health (ACSQHC, Commonwealth Government, expert bodies such as Colleges, Universities) and establish networks with similar research groups across Australia to ensure consistent and uniform messages.	NCAS with: University of Queensland (CRE-REDUCE), Queensland University of Technology (CRE-RHAI), Bond University (CREMARA), ACSQHC, RACGP, Australian Government Department of Health*	2016
PRIORITY AREA FOR ACTION 7.2: Work with stakeholders to develop an Implementation Plan for the Strategy.				
One Health	**7.2.1**	Convene a National AMR Stakeholder Forum to consult with stakeholders from across various sectors on the development of an Implementation Plan for the National AMR Strategy.	Australian Government Department of Health and Australian Government Department of Agriculture and Water Resources*	Completed 17 November 2015
Animal Health and Agriculture	**7.2.2**	Conduct a One Health antimicrobial resistance workshop for relevant agencies in New South Wales.	NSW Department of Primary Industries	30 November 2016

PRIORITY AREA FOR ACTION 7.3:				
Establish baseline measures to inform monitoring and evaluation of the Strategy.				
One Health	**7.3.1**	Work with the Australian Strategic and Technical Advisory Group on AMR to identify indicators and set targets to monitor progress against the Objective of the National AMR Strategy.	AMRPC Steering Group*	June 2017
Human Health	**7.3.2**	Publish a National Report to provide a comprehensive picture of antimicrobial resistance, antimicrobial use and appropriateness of prescribing in Australia (hospital and community), and set a baseline for monitoring over time.	ACSQHC*	June 2016
PRIORITY AREA FOR ACTION 7.4:				
Review regulation (legislated and other) relevant to antimicrobial resistance and antibiotic usage.				
One Health	**7.4.1**	Codex Alimentarius—review of practices and guidelines relating to antimicrobial resistance and identify major capacity development gaps and other challenges in implementation.	Australian Government Departments of Agriculture and Water Resources and Health*	July 2016

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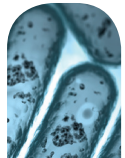
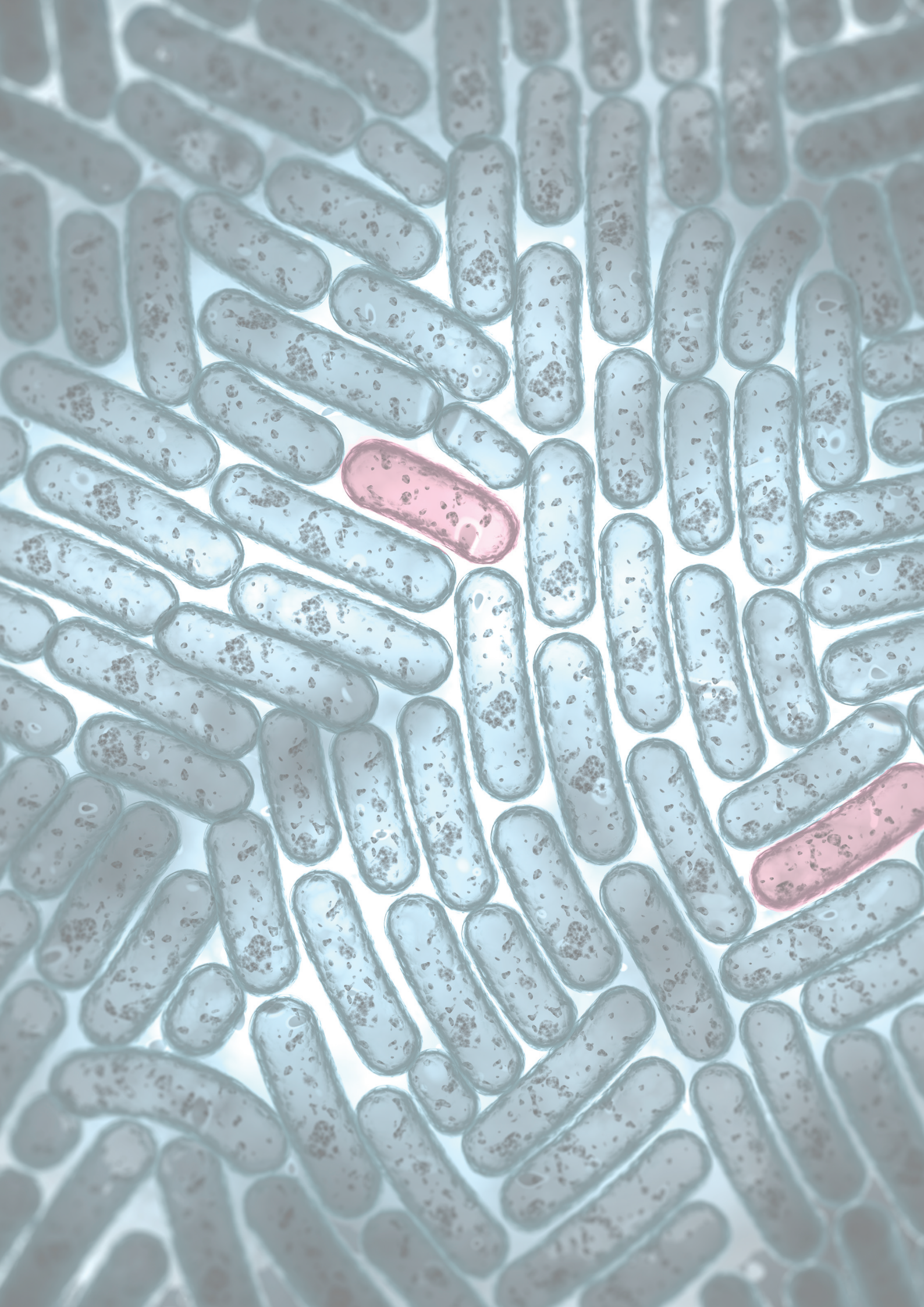
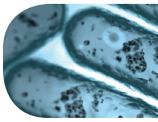
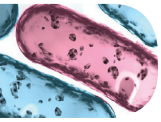




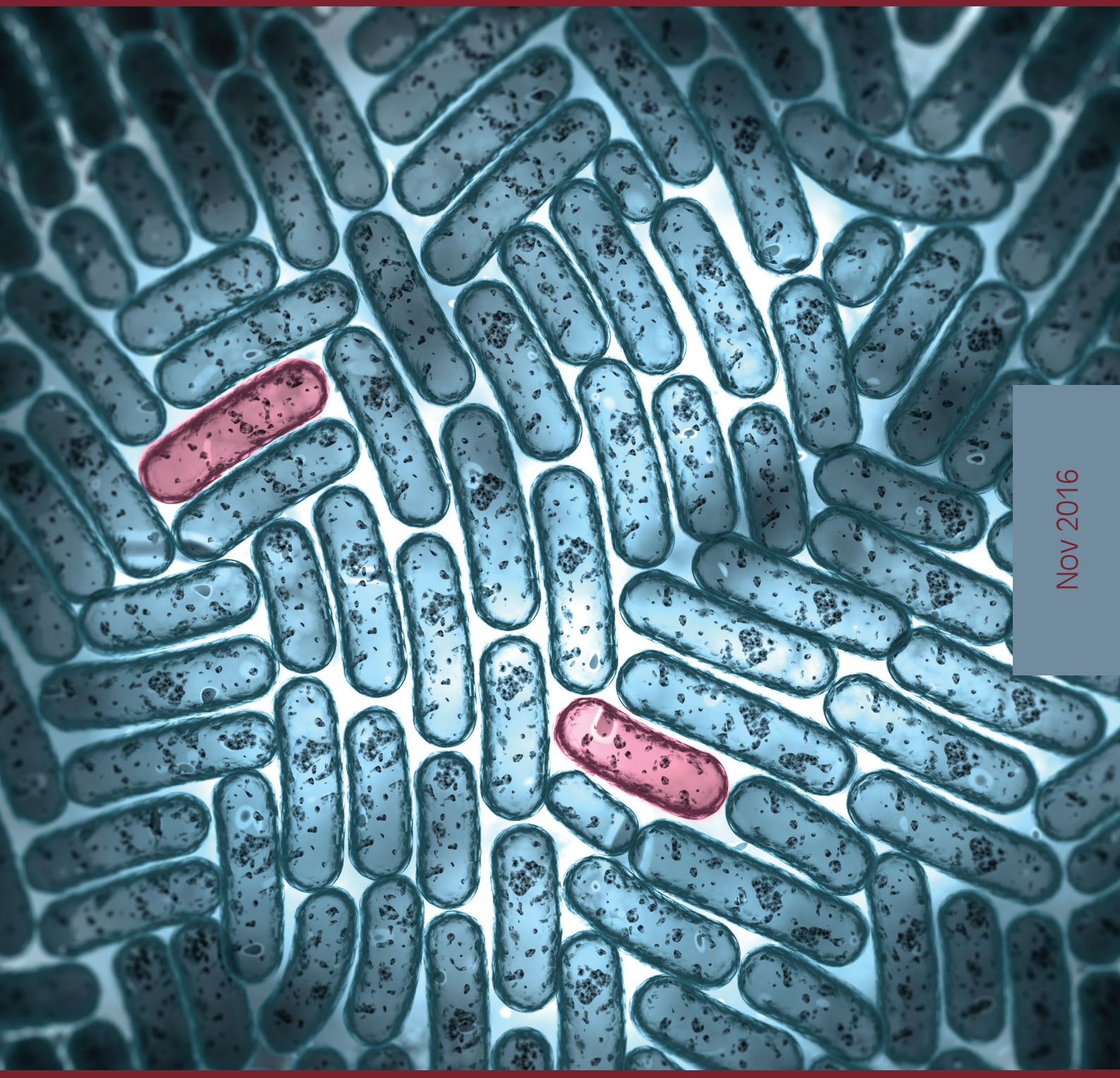


Acronyms and abbreviations

AAW	Antibiotic Awareness Week
ACT	Australian Capital Territory
ACSQHC	Australian Commission on Safety and Quality in Health Care
AMR	Antimicrobial resistance
AMRPC	Antimicrobial Resistance Prevention and Containment Steering Group
AMS	Antimicrobial stewardship
ASTAG	Australian Strategic and Technical Advisory Group on antimicrobial resistance
AURA	Antimicrobial Use and Resistance in Australia
BEACH	Bettering the Evaluation and Care of Health
CARs	Critical antimicrobial resistances
CDI	*Clostridium difficile* infection
CDC	Centres for Disease Control and Prevention
CRE	Carbapenem-resistant Enterobacteriaceae
CRE CI	Centre for Research Excellence Critical Infection
CRE ID	Centre for Research Excellence in Protecting the Public from Emerging infectious Diseases
CREMARA	Centre for Research Excellence in Minimising Antibiotic Resistance from Acute Respiratory Infections
CRE-REDUCE	Centre for Research Excellence for Redefining Antimicrobial Use to Reduce Resistance
CRE-RHAI	Centre of Research Excellence in Reducing Healthcare Associated Infections
FAO	Food and Agriculture Organization
GP	General practitioner
HAI	Healthcare associated infection
HAP	Hospital acquired pneumonia
ICU	Intensive care unit
IT	Information technology
LHN	Local Hospital Network
MDR	Multidrug resistance
MRSA	Methicillin-resistant Staphylococcus aureus
MRO	Multi-resistant organism
NSQHS	National Safety and Quality Health Service
NAUSP	National Antimicrobial Utilisation Surveillance Program
NCAS	National Centre for Antimicrobial Stewardship
NEPSS	National Enteric Pathogens Surveillance System



NHMRC	National Health and Medical Research Council
NSW	New South Wales
OIE	World Organisation for Animal Health
PBAC	Pharmaceutical Benefits Advisory Committee
PDA	Patient decision aid
PHN	Primary Health Network
RACGP	The Royal Australian College of General Practitioners
SA	South Australia
SAB	Staphylococcus aureus bacteraemia
WHA	World Health Assembly
WHO	World Health Organization



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