

The Senate

Finance and Public Administration
References Committee

Progress in the implementation of the
recommendations of the 1999 Joint Expert
Technical Advisory Committee on Antibiotic
Resistance

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43rd Parliament

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Recommendations

Recommendation 1

2.61 The committee recommends that the Commonwealth establish an independent body or national centre, to develop a strategy, report publicly on resistance data and measures taken to combat antimicrobial resistance and to manage the response to antimicrobial resistance in Australia.

Recommendation 2

2.62 The committee recommends that the independent body be resourced to implement a rigorous monitoring and reporting regime of antibiotic use in humans and animals and of multiple drug resistant infections in humans and animals.

Recommendation 3

3.75 The committee recommends that the voluntary reporting of the quantity of antimicrobials sold by volume be made mandatory for the registrants of antimicrobials.

Recommendation 4

3.77 The committee recommends that the Australian Pesticides and Veterinary Medicines Authority:

- publish, as a matter of priority, the antibiotic usage report for the period 2005–06 to 2009–10; and
- publish antibiotic usage reports on an annual basis and within 18 months of the end of the relevant financial year.

Recommendation 5

4.81 The committee recommends that the Australian Commission on Safety and Quality in Health Care consider mechanisms to improve coordination and tighten access to antimicrobials in healthcare services, particularly in relation to any new antimicrobials that become available.

Recommendation 6

4.83 The committee recommends that the Department of Health and Ageing investigate additional mechanisms to improve antibiotic stewardship in general practice.

Recommendation 7

4.86 The committee recommends that consideration be given to banning all antibiotics listed as 'critically important in human medicine' by the World Health Organisation for use in animals in Australia.

Recommendation 8

5.58 The committee recommends that Australian Commission on Safety and Quality in Health Care coordinate the development of a national system of enhanced infection control including minimum hospital inpatient infection control standards, and standards for community health practices and aged care facilities.

Recommendation 9

5.60 The committee further recommends that the Commonwealth consider further support for research and development in infection control in farmed animals with the goal of reducing the need for the use of antibiotics in agriculture, taking into account the costs and impacts of proposed measures on animal health and farming practices.

Recommendation 10

6.46 The committee recommends that the Commonwealth consider measures to support research into strategies to deal with antimicrobial resistance, including research into new antibiotics and consideration of antimicrobial resistance being designated a National Research Priority Area.

ABBREVIATIONS

ACMF	Australian Chicken Meat Federation
ACSQHC	Australian Commission on Safety and Quality in Health Care
AGAR	Australian Group on Antimicrobial Resistance
AHMC	Australian Health Ministers' Conference
AHPPC	Australian Health Protection Principal Committee
AIHW	Australian Institute of Health and Welfare
ALFA	Australian Lot Feeders' Association
AMR	Antimicrobial Resistance
AMRAC	Antimicrobial Resistance Advisory Committee
AMRPC	Antimicrobial Resistance Prevention and Containment
AMRSC	Antimicrobial Resistance Standing Committee
ANZFA	Australia and New Zealand Food Authority
APL	Australian Pork Limited
APVMA	Australian Pesticides and Veterinary Medicines Authority
ARTG	Australian Register of Therapeutic Goods
ASA	Australian Society for Antimicrobials
ASID	Australasian Society for Infectious Diseases
ASM	Australian Society for Microbiology
AVA	Australian Veterinary Association
BRD	Bovine Respiratory Disease
CHF	Consumers Health Forum
CHRISP	Centre for Healthcare Related Infection Surveillance and Prevention
CIJIG	Commonwealth Interdepartmental JETACAR Implementation Group
CIPARS	Canadian Integrated Program for Antimicrobial Resistance Surveillance
COAG	Council of Australian Governments
CRC	Cooperative Research Centre
DAFF	Department of Agriculture, Fisheries and Forestry
DoHA	Department of Health and Ageing
DUSC	Drug Utilisation Sub-Committee
EAGA	Expert Advisory Group on Antibiotics
EAGAR	Expert Advisory Group on Antimicrobial Resistance

ESBL	Extended Spectrum Betalactamase
FSANZ	Food Standards Australia New Zealand
HAI	Healthcare Associated Infection
IDSA	Infectious Diseases Society of America
JETACAR	Joint Expert Technical Advisory Committee on Antibiotic Resistance
HACCP	Hazard Analysis and Critical Control Points
MDR	Multiple Drug Resistance
MRL	Maximum Residue Limits
MRSA	Methicillin-resistant Staphylococcus Aureus
NARM	National Antimicrobial Residue Minimisation
NAUSP	National Antimicrobial Utilisation Surveillance Program
NDPSC	National Drugs and Poisons Schedule Committee
NHMRC	National Health and Medical Research Council
NHPA	National Health Performance Authority
NPS	National Prescribing Service
NSQHS	National Safety and Quality Health Service
PBAC	Pharmaceutical Benefits Advisory Committee
PBS	Pharmaceutical Benefits Scheme
PHAA	Public Health Association of Australia
PIP	Practice Incentives Program
PPP	Primary Production and Processing
PSA	Pharmaceutical Society of Australia
OIE	Office International des Epizooties
QHMAC	Queensland Hospitals Medicines Advisory Committee
RACGP	Royal Australian College of General Practitioners
STRAMA	Swedish Strategic Programme against Antibiotic Resistance
TB	Tuberculosis
TGA	Therapeutic Goods Administration
VRE	Vancomycin-resistant Enterococci
WPA	Working Party on Antibiotics
WHO	World Health Organisation

Chapter 1

Background to the inquiry

Terms of Reference

1.1 On 29 November 2012, the Senate referred the following matters to the Finance and Public Administration References Committee (the committee) for report by 21 March 2013:

Progress in the implementation of the recommendations of the 1999 Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), including:

- (a) examination of steps taken, their timeliness and effectiveness;
- (b) where and why failures have occurred;
- (c) implications of antimicrobial resistance on public health and the environment;
- (d) implications for ensuring transparency, accountability and effectiveness in future management of antimicrobial resistance; and
- (e) any other related matter.¹

1.2 The reporting date was subsequently extended to 7 June 2013.

Conduct of the inquiry

1.3 The committee invited submissions from interested organisations and individuals, and government bodies. The inquiry was also advertised on the committee's website.

1.4 The committee received 38 submissions. A list of individuals and organisations which made public submissions to the inquiry is at Appendix 1. The committee held one public hearing in Melbourne on 7 March 2013. A list of the witnesses who gave evidence at the public hearing is available at Appendix 2. Submissions, additional information and the Hansard transcript of evidence may be accessed through the committee's website at www.aph.gov.au/senate/fpa.

1.5 The committee thanks those organisations and individuals who made submissions and gave evidence at the public hearing.

Antimicrobial resistance

1.6 The development of antibiotics in the 20th Century was a significant step in improving healthcare and decreasing mortality rates. Antibiotics are part of a broader group of agents called antimicrobials, which include antivirals, antifungals, and antiprotozoals. Microbes that are resistant to antimicrobials have developed over time. Microbes can become resistant to antimicrobials by mutating or changing their genes

1 *Journals of the Senate*, No. 129, 29 November 2012, p. 3485.

or internal functions after being in contact with an antimicrobial agent. When microbes are exposed to an antimicrobial agent, occasionally a mutated microbe will survive, where its peers either die or are unable to reproduce. As the mutated microbe starts multiplying, a population of resistant microbes is produced. In some cases this resistance can be passed on to other microbes as indicated by National Prescribing Service (NPS) MedicineWise:

[B]acteria can also develop antibiotic resistance through contact with other bacteria. Resistant bacteria can pass their genes to other bacteria, forming a new antibiotic resistant 'strain' of the bacteria.²

1.7 The way antimicrobials are used is thought to have a significant impact on the development of antimicrobial resistance (AMR). The more antibiotics are used, the more chances bacteria have to become resistant to them. Common causes of increasing AMR identified by NPS MedicineWise include using antibiotics when they are not needed and not taking antibiotics at the correct doses and times.³

1.8 AMR is a world-wide concern with the World Health Organisation (WHO) in the late 1990s identifying AMR as a significant health issue.⁴ The WHO summarised the potential dangers of AMR as follows:

Now, at the dawn of a new millennium, humanity is faced with another crisis. Formerly curable diseases such as gonorrhoea and typhoid are rapidly becoming difficult to treat, while old killers such as tuberculosis and malaria are now arrayed in the increasingly impenetrable armour of antimicrobial resistance.⁵

Antimicrobial resistance in Australia

1.9 In the early 2000s it was noted that there was an increasing prevalence of resistant bacteria and that 'antibiotic resistance remains one of the most important emerging public health issues facing Australia'. At the same time, Australia was one of the highest users of antibiotics in the Western world with about 24 million prescriptions being provided annually.⁶

2 NPS MedicineWise, *Antibiotic resistance – what is it*, <http://www.nps.org.au/medicines/infections-and-infestations/antibiotic-medicines/antibiotics-for-respiratory-tract-infections/for-individuals/what-is-antibiotic-resistance>, (accessed 1 March 2013).

3 NPS MedicineWise, *Antibiotic resistance – what is it*, <http://www.nps.org.au/medicines/infections-and-infestations/antibiotic-medicines/antibiotics-for-respiratory-tract-infections/for-individuals/what-is-antibiotic-resistance>, (accessed 1 March 2013).

4 The Australia Institute, *Submission 13, Attachment 1*, p. 6.

5 World Health Organisation, World Health Report on Infectious Diseases 2000, *Overcoming Antimicrobial Resistance*, <http://www.who.int/infectious-disease-report/2000/index.html>, (accessed 26 February 2013).

6 National Summit on Antibiotic Resistance, Commitment and Communication, *CIJIG Communique*, July 2001, p. 2.

1.10 AMR has continued to increase dramatically both overseas and in Australia.⁷ Friends of the Earth Australia stated that:

The problem of antimicrobial resistance is now worse than ever, with superbugs – bacteria resistant to most antibiotics – spread throughout hospitals and communities around the world. The numbers of deaths caused by bacterial resistance to antimicrobials and antibiotics in hospitals continues to rise, with experts warning of a possible return to the pre-antibiotic era.⁸

1.11 A number of trends in the prevalence of AMR have been identified over the last decade. One has been the emergence of community-acquired resistant infections in addition to hospital-acquired resistant infections. The Australian Society for Infectious Diseases (ASID) stated:

Since the publication of the JETACAR report in 1999 rates of resistant bacterial infections [have] risen markedly and the dynamic had changed from being confined to hospital associated infections, to a real change in antibiotic resistance patterns in common community acquired infections. Today, it is a common event to see patients (including children) with resistant *Staphylococcus aureus* infections of the skin, bones and soft tissues, and resistant *Escherichia coli* infections of the urinary tract, gall bladder and bowel being sent to hospitals for intravenous therapy as there are now no effective oral antibiotics available.⁹

1.12 The Department of Health and Ageing (DoHA) also commented that data concerning resistance in community settings is limited and the problem is less than in hospitals. However, from the data that is available, resistant community-acquired infections have also increased.¹⁰

1.13 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials (ASA), also pointed to the emergence of multiresistance¹¹ and stated while this was a concern when the JETACAR report was released, multiresistance is now a daily issue for many specialists:

[W]hen the JETACAR was first formulated, we saw the future sceptre of multiresistance as something truly worrying that needed action, but it was mostly an abstract idea because we still had antibiotics for most situations... What I and a lot of our members have seen in the last decade is that the issue of untreatable infections is no longer an abstract notion; it is now a reality. It is a day-to-day issue for specialists in many medical

7 Australasian Society for Infectious Diseases, *Submission 18*, p. 2.

8 Friends of the Earth, *Submission 3*, p. 3.

9 Australasian Society for Infectious Diseases, *Submission 18*, p. 2; see also Professor M Lindsay Grayson, *Submission 19*, p. 2; Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 14.

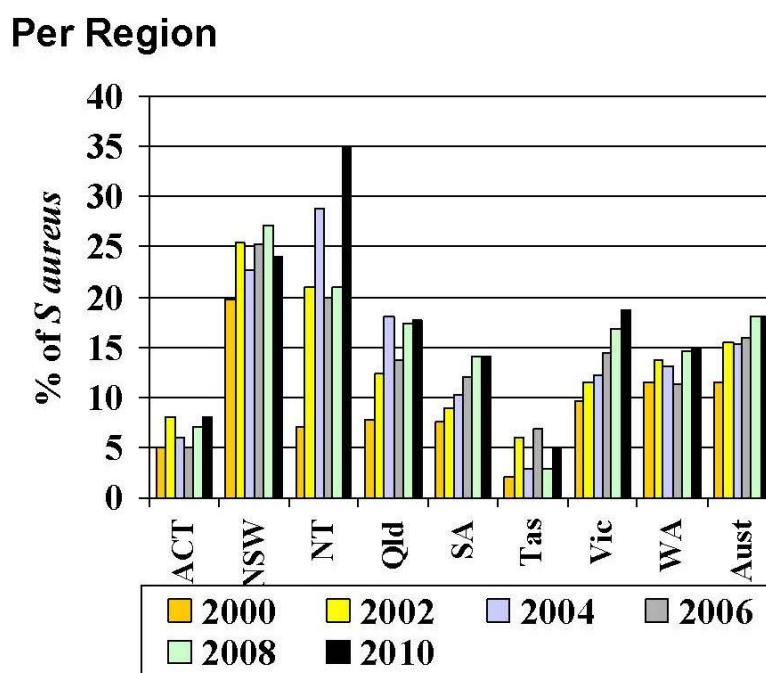
10 Department of Health and Ageing, *Answer to question on notice*, received 16 May 2013.

11 Multiresistant bacteria include: MRSA and Vancomycin-resistant enterococci (VRE). See Australia Society for Antimicrobials, *Submission 5*, pp 4–5.

practices... We are seeing them now in individual patients, many of whom will die of their infections, not through inadequate medical care but through unavailability of antibiotics. That is a poor scenario.¹²

1.14 The growth in AMR in Australia can be seen in currently available data on marker species such as Methicillin-Resistant Staphylococcus Aureus (MRSA) which shows increasing levels of resistance. As Figure 1.1 below shows, for Staphylococcus Aureus there have been high rates of resistance in NSW and the Northern Territory for a decade. In addition, the rates of resistance in Queensland, South Australia and Victoria have grown rapidly and doubled in a decade.

Figure 1.1: Percentage of Staphylococcus Aureus bacteria that are resistant



Source: Geoffrey Coombs, Julie Pearson, Graeme Nimmo, Keryn Christiansen, AGAR SAP10: Molecular Epidemiology of MRSA in the Australian Community, Australian Group on Antimicrobial Resistance, Antimicrobials, Brisbane, 2012, p. 1.

1.15 Professor Lindsay Grayson, infectious diseases physician, also pointed to resistance rates for urinary tract infections which have risen from five to 20 per cent in a five year period.¹³

1.16 The ASA added that for many bacterial pathogens, resistance to last-line antibiotics, such as carbapenems, fluoroquinolones, glycopeptides and third-generation cephalosporins, is now commonly found in Australian hospitals and, to an increasing extent, in the community.¹⁴ More concerning was Professor Grayson's

12 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38; see also Professor M Lindsay Grayson, *Submission 19*, p. 2.

13 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 8.

14 Australia Society for Antimicrobials, *Submission 5*, pp 4–5.

evidence that there are now occasional cases of totally resistant pathogens. These cases are expected to become more prevalent:

Current occasional cases of totally-resistant pathogens, which are impossible to cure with presently-available antibiotics, are almost certain to increase and are likely to become the norm in some sections of healthcare – especially areas with patients who are highly immunocompromised (e.g. transplantation medicine, hematology, neonatal medicine and intensive care medicine), since without effective antibiotics there are currently no other treatment options.¹⁵

Implications of antimicrobial resistance

1.17 The prevalence of AMR is increasing and the difficulties in managing it are growing. NPS MedicineWise stated that 'this potentially leads us to world wide crisis where antibiotics are no longer effective'.¹⁶ If this were to occur, the implications for public health would be profound. Gottlieb and Nimmo note that it 'would render many routine infections untreatable and would seriously affect current practice in surgery, intensive care, organ transplantation, neonatology and cancer services through major increases in morbidity and mortality'.¹⁷

1.18 The ASA also pointed to a potentially grim future where removing a burst appendix will become a dangerous operation and peri-partum infections and incurable tuberculosis will again become a reality. In addition, simple community-onset infections will be difficult to manage, and more likely to require hospitalisation, due to lack of available oral antibiotics.¹⁸ Empiric antibiotic choices in sepsis and for other infections will become complex and precarious.¹⁹

1.19 Not only will increasing AMR lead to increased morbidity and mortality, the health care sector will face increasing costs for treating patients and for implementing changes to patient management systems.²⁰

1.20 NPS MedicineWise pointed to a range of factors contributing to increased costs: illnesses caused by AMR bacteria are more difficult to treat and often result in complications and even death; patients stay infectious for longer; and antibiotics act on normal bacterial flora, which enables colonisation with resistant bacteria that can be carried and cause infection later. In addition, treatment may require second or

15 Professor M Lindsay Grayson, *Submission 19*, p. 2.

16 NPS MedicineWise, *Submission 30*, p. 1; see also Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9.

17 Gottlieb, T & Nimmo, GR, 'Antibiotic resistance is an emerging threat to public health: an urgent call for action at the Antimicrobial Resistance Summit 2011', *Medical Journal of Australia*, Vol. 194, no. 6, 21 March 2011, pp 281–83.

18 Australia Society for Antimicrobials, *Submission 5*, p. 5.

19 Australia Society for Antimicrobials, *Submission 5*, p. 5; see also Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

20 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9.

third-line antibiotics, which are more expensive and may be more toxic, causing serious adverse effects.²¹

1.21 Professor Grayson provided an illustration of changes to the way patients are managed:

For instance, when patients come in for prostate biopsies we now have to give them an infusion of antibiotics because the tablets we would have given them three years ago now do not work, and on numerous occasions we have had men come back the next day with bloodstream infections from a super-bug that was no longer sensitive to the tablets that we would have given them as part of the routine for that procedure.²²

1.22 The ASID noted that MRSA is now a growing problem in the community, especially in indigenous Australians, resulting in a significant increase in the burden of disease. This is seen in both general practice and hospital emergency departments and results in increased admissions and surgical procedures. Some strains possess a toxin that can cause serious disease and even death.²³

1.23 A further area of concern is the spread of AMR from returning travellers. Professor Grayson commented that:

In my own hospital now, anyone who has returned from one of a number of key countries—including Greece, India and China—and has a fever goes into isolation until we prove that they are not carrying a superbug. Five years ago or even two years ago we did not have to do that. Currently, about one third of return travellers from India are perfectly healthy in India but they are carrying a superbug in their faeces that if we found in Australia we would put them into strict isolation. So we are now having to install these strict measures.²⁴

1.24 Evaluation of the costs to economies of AMR has been undertaken overseas. In the European Union, about 25,000 patients die each year from infections caused by selected multidrug-resistant bacteria and the associated costs are estimated at about 1.5 billion euros per year. In the United States, infections with pathogens resistant to antimicrobials cost the healthcare system in excess of \$US20 billion per year and generate more than eight million additional hospital days. The annual societal costs exceed \$US35 billion.²⁵ While no evaluation of healthcare costs attributable to AMR has been undertaken in Australia, Professor Matthew Cooper estimated that the cost in

21 NPS MedicineWise, *Submission 30*, p. 1.

22 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 8.

23 Australia Society for Antimicrobials, *Submission 5*, pp 4–5.

24 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9.

25 World Health Organisation World Health Day Antimicrobial Resistance Technical Working Group, 'The WHO policy package to combat antimicrobial resistance', *Bulletin of the World Health Organisation*, 2011, 89, pp 390–392.

Australia may be around \$1 billion annually based on cost studies in the United States.²⁶

1.25 The committee also received evidence from practitioners with first-hand knowledge of the implications of AMR for patients. For example, Dr David Locke, President, ASID, pointed to the example of staph aureus (golden staph). This is the commonest cause of infections of the skin and the bones but it has progressively become more resistant to antibiotics. Now 25 to 30 per cent of severe staph aureus infections are resistant to all penicillins and the alternative drug has its own toxic side effects.²⁷

1.26 Professor Grayson also cited the recent case of a patient who had undergone a minor surgical procedure on their wrist. Following the development a super-bug diarrhoeal infection, the patient's colon was removed, 'so they went home with a colostomy bag after a minor surgical procedure, simply because they picked up a super-bug because of misuse of antibiotics'.²⁸ Professor Grayson added that physicians are 'returning to a pre-antibiotic approach to controlling infections such as removing the colon of someone who has got a bowel infection that could have been previously treated with antibiotics. We are returning to a pre-antibiotic era as we speak.'²⁹

Development of antimicrobial drugs

1.27 In addition to the increasing prevalence of AMR, a further matter of concern is the dwindling number of new antimicrobials that are being developed. The ASA commented that:

There are too few new antibiotics coming onto the market to deal with these bacteria and a dwindling pipeline of new antimicrobial agents. Hence we cannot rely on newer antibiotics filling the void.³⁰

1.28 The Public Health Association of Australia (PHAA) commented that since 1970 there have been only three new chemical classes of antibiotics developed for use for serious infections in humans – linezolid (2000) and daptomycin (2003) for systemic infections, and fidaxomicin (2012) for the treatment of gut infections caused by *Clostridium difficile*.³¹ NPS MedicineWise added that there is only one new antibiotic in the US Federal Drug Administration approval pipeline.³²

1.29 The decline in the development of new antibiotics has been attributed to a range of factors including government funding arrangements, profitability of drug

26 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 30.

27 Dr David Locke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 14.

28 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 8.

29 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9.

30 Australian Society for Antimicrobials, *Submission 5*, p. 5.

31 Public Health Association of Australia, *Submission 14*, p. 8.

32 NPS MedicineWise, *Submission 30*, p. 2.

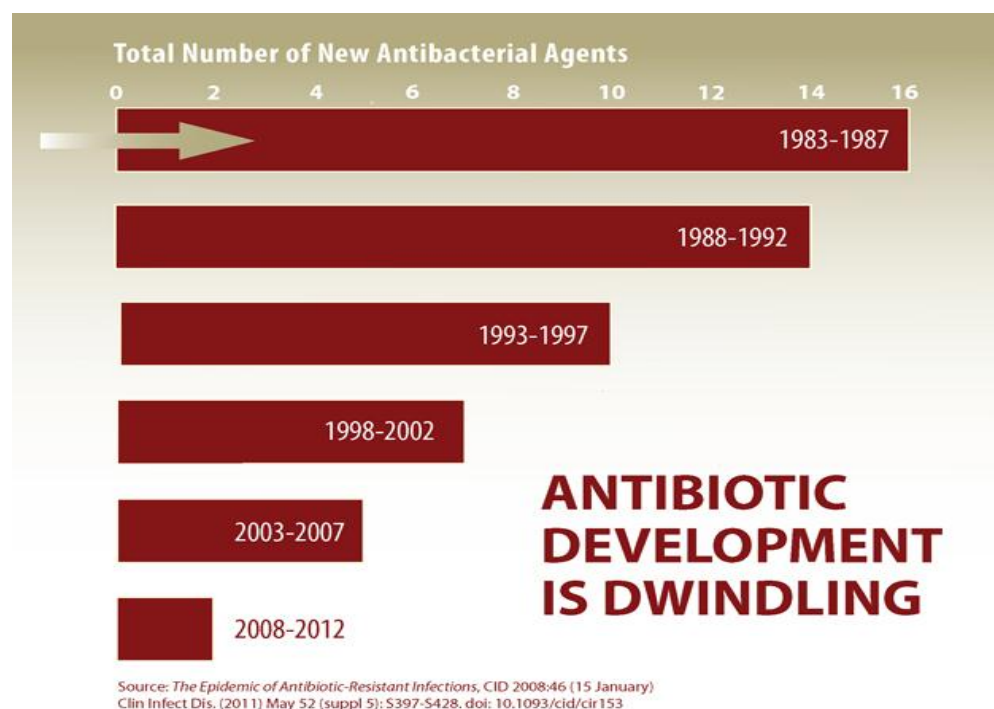
companies and diminishing research and development pipelines.³³ The PHAA indicated that there are no financial incentives for pharmaceutical companies to develop new antibiotics as companies work on a risk assessment of investment against profit and antimicrobial agents now have a low return. Any new drugs may only have a useful life of a few years due to the development of resistance. Furthermore, new antibiotics will be more expensive as companies build these factors into their costs.³⁴

1.30 The Consumers Health Forum of Australia (CHF) also noted the low levels of funding allocated by pharmaceutical companies for new antibiotic development:

It was recently estimated that major pharmaceutical companies allocate less than two per cent of their overall investments into antibiotics research, and it has been decades since a new class of antibiotics has been developed.³⁵

1.31 Figure 1.2 indicates the number of new antibacterial agents made available over recent periods.

Figure 1.2: Dwindling development of new antibacterial agents



Source: Centers for Disease Control and Prevention, *Mission Critical: Preventing Antibiotic Resistance*, <http://www.cdc.gov/features/antibioticresistance/charts.html#chartA>, (accessed 1 March 2013). *Research into new antibiotics*

1.32 The lack of new antibiotics is a major concern worldwide with scientists from the Infectious Diseases Society of America (IDSA) calling for the Congress and relevant US federal agencies to give clear guidance on design and implementation of

33 Australia Society for Antimicrobials, *Submission 5*, p. 5.

34 Public Health Association of Australia, *Submission 14*, p. 8.

35 Consumers Health Forum of Australia, *Submission 10*, p. 2.

necessary research on antibiotics.³⁶ In addition, the IDSA has proposed a new global research and development enterprise focussed on developing ten new antibiotics by 2020.³⁷

1.33 Research for the development of new antibiotics is discussed further in chapter 5.

Tackling antimicrobial resistance

1.34 As noted above, the WHO has identified AMR as a significant health issue. The WHO Global Strategy for the Containment of Antimicrobial Resistance provides a framework of interventions to slow the emergence and reduce the spread of antimicrobial resistant microorganisms through:

- reducing the disease burden and the spread of infection;
- improving access to appropriate antimicrobials;
- improving use of antimicrobials;
- strengthening health systems and their surveillance capabilities;
- enforcing regulations and legislation; and
- encouraging the development of appropriate new drugs and vaccines.³⁸

Overseas response

1.35 A number of countries, including the United States, Canada, France, Denmark and Japan, have established programs to address antibiotic resistance, covering issues including monitoring, regulation, education, and research and development.

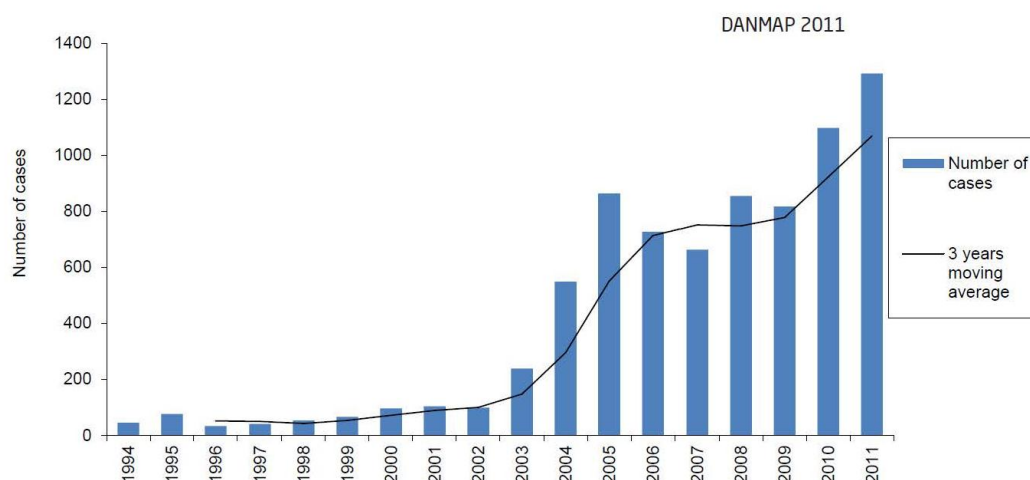
1.36 Canada for example, has a well-integrated system that includes quality surveillance.³⁹ Denmark is also considered by some to be making significant steps, establishing an integrated monitoring and research program in 1995. However, despite the implementation of this system, the number of cases of AMR in Denmark has grown over the past decade. A significant proportion of these cases can be attributed to community-acquired infections. Figure 1.3 shows the number of MSRA cases in Denmark between 1994 and 2011.

36 The Australia Institute, *Submission 13, attachment 1*, p. 27.

37 NPS MedicineWise, *Submission 30*, p. 3.

38 World Health Organisation, *WHO Global Strategy for the Containment of Antimicrobial Resistance*, 2001, pp 1–2.

39 Department of Primary Industries (NSW), *Submission 28*, p. 2.

Figure 1.3: Number of MSRA cases in Denmark

Source: DANMAP, *Selected graphs and figures*, 2011.

Response to AMR in Australia

1.37 The transfer of resistant bacteria from animals through the food chain gained attention in Australia in 1969, as a result of the United Kingdom's Swann report:⁴⁰

The Swan[n] Committee (1969) (which recommended separation between antibiotics used in humans from those used in animals) was established in response to the emergence of multidrug resistant salmonella in humans identical to strains causing problems in calves and the report from Japan (Watanabe, 1963) that resistance genes were carried on plasmids that could transfer from bacteria to bacteria.⁴¹

1.38 Following the Swann report, several countries, including Australia, took steps to limit or remove antibiotics such as penicillin from animal feeds.⁴² In the 1980s, the Working Party on Antibiotics (WPA) was established under the National Health and Medical Research Council (NHMRC). The WPA made recommendations on surveillance and provided advice on human implications of antibiotic use in animals to regulatory bodies responsible for regulating agricultural and veterinary chemicals. Responsibility for the WPA moved from the NHMRC to the Therapeutic Goods Administration (TGA) in 1997.⁴³

40 UK Joint Committee of the Houses of Parliament (1969), *Report on the Use of Antibiotics in Animal Husbandry and Veterinary Medicine*, Her Majesty's Stationary Office, London, November (reprinted 1971).

41 Professor Mary Barton, APVMA Science Fellows Symposium, *Antibiotic resistance in Australian animals in 2010 – what lies ahead?*, 19 April 2010, p. 1.

42 Professor Mary Barton, APVMA Science Fellows Symposium, *Antibiotic resistance in Australian animals in 2010 – what lies ahead?*, 19 April 2010, p. 1.

43 Professor John Turnidge, *Australian Government attempts at regulatory and other control of antimicrobial resistance*, Microbiology Australia, November 2007, p. 198; Professor Mary Barton, APVMA Science Fellows Symposium, *Antibiotic resistance in Australian animals in 2010 – what lies ahead?*, 19 April 2010, p. 1.

Joint Expert Technical Advisory Committee on Antibiotic Resistance

1.39 An association between a stockfeed antimicrobial (avoparcin) and resistant bacteria (Vancomycin-resistant enterococci) present in humans, gained attention in Europe in 1997. The association also became an important issue in Australia, as avoparcin was widely used in food-animal production in Australia.⁴⁴

1.40 To address the above concerns, the then Minister for Health and Family Services and the then Minister for Primary Industries and Energy established the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR) in December 1997.⁴⁵ Five specific terms of reference for JETACAR were agreed:

1. Examine the status of antibiotic resistance patterns in Australia in human and veterinary practice and in food producing animals.
2. Examine the full range of antibiotic usage patterns and control policies in Australia in all sectors, including health, veterinary and agricultural applications.
3. Identify priority medical problems arising from the use of antibiotics in livestock production.
4. Recommend a minimum set of criteria for assessing the potential human health impact prior to licensing of antibiotics for use in animals and agriculture, taking into account the likely benefits and potential adverse outcomes (informed by models in published scientific literature and relevant measures adopted in other countries).
5. Recommend antibiotic resistance management strategy/strategies.⁴⁶

1.41 JETACAR reported in 1999 and made 22 recommendations. The Government responded to the recommendations in 2000.

Structure of this report

1.42 The committee's review of the JETACAR recommendations and the Government response and implementation are canvassed in chapters 2 to 6 as follows:

- Chapter 2 – overview and main conclusions;
- Chapter 3 – AMR surveillance and monitoring;
- Chapter 4 – regulatory controls of antibiotics;
- Chapter 5 – infection prevention and hygiene; and
- Chapter 6 – education and research.

44 Professor John Turnidge, *Australian Government attempts at regulatory and other control of antimicrobial resistance*, Microbiology Australia, November 2007, p. 198.

45 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 3.

46 Joint Expert Advisory Committee on Antibiotic Resistance: *The use of antibiotics in food-producing animals: antibiotic-resistant bacteria in animals and humans*, p. 3.

Chapter 2

Overview of the implementation of JETACAR recommendations

2.1 This chapter outlines the work undertaken by JETACAR, the initial response to its recommendations and whether the recommendations still remain relevant today. The effectiveness of the implementation of the JETACAR recommendations relating to coordination and resourcing are included in this chapter. The remaining recommendations are covered in more detail in the following chapters.

The JETACAR recommendations and initial response

2.2 JETACAR was established by the Commonwealth to review the link between the use of antibiotics in food-producing animals and the emergence and selection of antibiotic resistant bacteria and their spread to humans.¹ JETACAR brought together human, veterinary and food interests.

2.3 The 1999 JETACAR report noted that the committee had considered the whole area of antibiotic resistance and its importance in human and veterinary medicine. The committee concluded that there was evidence for:

- the emergence of resistant bacteria in humans and animals following antibiotic use;
- the spread of resistant animal bacteria to humans;
- the transfer of antibiotic resistance genes from animal bacteria to human pathogens; and
- resistant strains of animal bacteria causing human disease.²

2.4 JETACAR reported that the ongoing emergence of antibiotic resistant bacteria is causing essential, life-saving antibiotics to be less effective. As a result, there are fewer alternative treatments and sometimes more toxic and costly antibiotics must be used instead.³ The JETACAR report proposed that Australia adopt an antibiotic resistance management program that focussed simultaneously on both humans and animals. The proposed program was a coordinated multidisciplinary approach with five key elements, as follows:

- regulatory controls (recommendations 1–9);
- monitoring and surveillance (recommendations 10–11);

1 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 2.

2 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotic-resistant bacteria in animals and humans*, p. xxiv.

3 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotic-resistant bacteria in animals and humans*, p. 1.

- infection prevention strategies and hygienic measures (recommendations 12–14);
- education (recommendations 15–17); and
- further research (recommendations 18).

2.5 The JETACAR report stated that 'all five elements of the program must be implemented together if there is to be any chance of reversing the trend to increasing antibiotic resistance'.⁴

2.6 JETACAR also made recommendations in relation to communication (recommendations 19–20) and coordination of resistance management (recommendations 11–22).

The Government response to JETACAR and subsequent actions

2.7 The Government responded to the JETACAR report in 2000 largely supporting the intent of the recommendations and acknowledged the threat from antibiotic resistant organisms to the health and economic prosperity of the Australian population.⁵

2.8 In responding to the JETACAR report, the Government accepted nine recommendations, did not express an opinion on one recommendation and offered qualifying words for the remaining recommendations, often agreeing with the intent and principles of those recommendations.⁶ To implement its response, the Government stated that it would establish:

- an Expert Advisory Group on Antibiotics (EAGA), under the auspices of the NHMRC, to provide continuing advice on antibiotic resistance and related matters; and
- an Interdepartmental JETACAR Implementation Group to oversee and coordinate the continuing Government response to the JETACAR, to respond to the policy advice received from the EAGA, and to seek funding for implementation purposes.⁷

2.9 The expert advisory group was formed as the Expert Advisory Group on Antimicrobial Resistance (EAGAR). It was responsible for providing independent

4 Joint Expert Advisory Committee on Antibiotic Resistance (JETACAR), *The use of antibiotics in food-producing animals: antibiotic-resistance bacteria in animals and humans*, October 1999, p. xxiv.

5 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 1.

6 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 54.

7 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 1.

scientific and policy advice on AMR issues and worked closely with the CIJIG to develop and implement the national AMR management program. EAGAR also provided advice to the regulatory bodies, Australian Pesticides and Veterinary Medicines Authority (APVMA) and the TGA. EAGAR reported through the implementation group to ministers and the NHMRC.⁸ EAGAR was disbanded in 2007.

2.10 The Commonwealth Interdepartmental JETACAR Implementation Group (CIJIG) was established in November 2000 to facilitate the planning, development, coordination and implementation of the antimicrobial risk management program as proposed by JETACAR. The CIJIG was also to incorporate advice from EAGAR. The CIJIG was jointly chaired by the Department of Health and Ageing (DoHA) and Department of Agriculture, Fisheries and Forestry (DAFF). In 2003, the CIJIG progress report provided information on actions taken in response to the JETACAR recommendations.⁹ The CIJIG was disbanded in 2004.

2.11 The following table provides a summary of the significant elements relevant to AMR issues following the Government response to JETACAR to 2013:

8 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 10.

9 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 2, CIJIG, Progress Report*.

Table 2.1: Summary of significant elements relevant to addressing AMR

Date	Significant element	Role/Outputs/Comments
2000 – 2002	Australian Health Ministers' Conference – JETACAR Taskforce	<ul style="list-style-type: none"> oversaw activities arising from the JETACAR report provided conduit for human health related issues to Health Ministers
2000 – 2004	CIJIG (Commonwealth Interdepartmental JETACAR Implementation Group)	<ul style="list-style-type: none"> responsible for promoting implementation of JETACAR recommendations reported through the Australian Health Ministers' Conference JETACAR Taskforce
Apr 2001	Australian Infection Control Association – National Surveillance of Healthcare Associated Infection in Australia	<ul style="list-style-type: none"> report developed in response to JETACAR study of surveillance activities, policies and programs across Australia
May 2001	National Summit on Antibiotic Resistance	<ul style="list-style-type: none"> involved participants from human health, food and primary industries proposed priorities for national action
2001	National consultation on antibiotic resistance surveillance	<ul style="list-style-type: none"> part of the post-JETACAR Report consultation workshops and focus groups involved all states and territories seeking input to a antibiotic resistance surveillance plan
2003	Strategy for Antimicrobial Resistance Surveillance in Australia	<ul style="list-style-type: none"> published in Communicable Diseases Intelligence journal proposed a comprehensive strategy to address JETACAR recommendations relating to surveillance
2001 – 2007	EAGAR (Expert Advisory Group on Antimicrobial Resistance)	<ul style="list-style-type: none"> role of expert advisory group under the oversight of the NHMRC produced outlines of a comprehensive set of projects to address JETACAR recommendations
Aug 2006	EAGAR Comprehensive Integrated Surveillance Program to Improve Australia's Response to Antimicrobial Resistance	<ul style="list-style-type: none"> contained the outlines for nine projects that would address surveillance of antimicrobial resistance and antibiotic use
2010 – 2012	NHMRC AMRAC (Anti Microbial Resistance Advisory Committee)	<ul style="list-style-type: none"> established by NHMRC in 2010 AMRAC's term expired on 30 June 2012
Feb 2011	Antimicrobial Resistance Summit – A call to urgent action	<ul style="list-style-type: none"> jointly convened by the ASID and the ASA a proposed plan of action was published in the Australian Medical Association journal
2012 – ongoing	AMRSC (Antimicrobial Resistance Standing Committee)	<ul style="list-style-type: none"> established in the review of committee structures under the COAG Standing Council on Health

Source: Department of Health and Ageing and portfolio bodies joint submission, Submission 32, Attachment 3.

2.12 AMRSC was established in mid 2012 to advise the Australian Health Protection Principal Committee (AHPPC) on matters relating to AMR; provide expert advice and assistance on issues relating to AMR; and recommend national priorities relating to AMR for action. AMRSC has both government members (including DoHA, DAFF and APVMA) and non-government members (including the ASA and NPS MedicineWise). AMRSC is to develop a national strategy to minimise AMR.¹⁰ A study, *The Surveillance and Reporting of Antimicrobial Resistance and Antibiotic Usage in Australia: A National Study*, was commissioned to provide an evidence base for AMRSC's work plan.¹¹ AMRSC was funded through the Australian Commission on Safety and Quality in Health Care (ACSQHC) until 30 June 2013.

2.13 In addition, in February 2013, DoHA and DAFF agreed to establish strengthened governance arrangements for the oversight and coordination of Australia's efforts to prevent and contain AMR. The Australian Antimicrobial Resistance Prevention and Containment Steering Group (AMRPC Steering Group) will consist of the Secretaries of each department, as well as the Commonwealth Chief Medical Officer and the Commonwealth Chief Veterinary Officer. It will provide governance to oversee the development and implementation of a coherent national framework for current and future work related to AMR.¹²

Implementation of JETACAR recommendations

2.14 DoHA noted that AMR is an important global public health priority and argued that significant progress had been made in responding to the challenge of AMR since the JETACAR recommendations were made. Professor Chris Baggoley, Chief Medical Officer, DoHA, stated that AMR continued to be a priority of the department and its portfolio agencies.¹³ Professor Baggoley added:

Certainly it is fair to say that not all recommendations have been enacted. But it is important to understand also that the government in its response to JETACAR accepted unequivocally nine, I think, of the 22 recommendations, and for the remainder it either reserved or did not express an opinion on one, and offered qualifying words for the others, either agreeing with the intent, the concept, the principles, the development, or 'agreed but'.¹⁴

10 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 21–23.

11 Senate Community Affairs Legislation Committee, Supplementary Estimates 2012–13, *Answer to question on notice No. E12-218*, Department of Health and Ageing.

12 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 1; AMRPC Steering Committee, Terms of Reference, tabled by the Department of Health and Ageing at hearing 7 March 2013.

13 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 49.

14 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 54.

2.15 In addition, DoHA noted that 'in some instances priorities for action may no longer directly align with the JETACAR recommendations'.¹⁵

2.16 DAFF also argued that substantial progress had been made in implementing the JETACAR recommendations:

Many of the recommendations of the JETACAR Report involving DAFF have been and continue to be implemented. These include enhanced antibiotic assessment processes, adopting a conservative approach to antibiotic registration, progress in moving towards harmonised control of use legislation between the various jurisdictions, surveillance activities, proactive approaches to education and awareness of antimicrobial (AMR) resistance issues and influencing research and development organisations to have a focus on AMR reducing activities.¹⁶

2.17 DAFF noted that ongoing attention to the management of AMR risks is needed and that this will increasingly require a collaborative approach involving a range of stakeholders.¹⁷

2.18 Submitters agreed that some progress has been made in implementing a range of JETACAR recommendations. Goat Veterinary Consultancies, for example, stated that the 'Australian Government response to the JETACAR review was very thorough and many actions were promised. Most, but not all, have been completed in the intervening years'.¹⁸ The ASA provided details of the initiatives undertaken through the CIJIG and EAGAR including the review of all antimicrobials in the human, veterinary and agricultural sectors by the National Drugs and Poisons Scheduling Committee. As a result, all but one class of antimicrobials remained or were converted to prescription only by medical practitioner or veterinarian.¹⁹

2.19 The ASID also noted that the ACSQHC was addressing improvements to infection control programs and that they are now mandated in all healthcare facilities through accreditation standards. State-based healthcare associated infection surveillance programs have also been developed across the country and are collecting a substantial volume of data. ASCQHC has also funded the National Hand Hygiene Initiative for healthcare facilities and infection control indicators are published on the MyHospitals website. ASID went on to comment that:

Similarly, the ACQSHC has adopted antibiotic stewardship as a major part of their hospital infection program and the presence of an effective stewardship program is now a mandatory part of achieving satisfactory

15 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 2.

16 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 2.

17 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 2.

18 Goat Veterinary Consultancies, *Submission 33*, pp 1–2.

19 Australian Society for Antimicrobials, *Submission 5*, p. 3.

accreditation. The efficacy of this initiative in reducing antimicrobial usage and consequently resistance is as yet unknown.²⁰

2.20 Evidence was also provided that, following JETACAR, there was improved engagement across relevant groups and experts, such as the medical and animal agricultural communities, through bodies such as EAGAR. Professor Rood, Past President, Australian Society for Microbiology, commented that EAGAR was a very representative body.²¹ The Cattle Council of Australia and Sheepmeat Council of Australia also noted improved collaboration:

The result of improved understanding of antibiotics resistance issues, behaviours and communication since the JETACAR report have led to the medical and animal agriculture communities having a better understanding of each other's position and a respect not previously experienced. A recent 'debate' in the Medical Journal of Australia, presented a 'yes' and 'no' case for the significance of use of antibiotics in animal agriculture to resistance in human infections. The two positions, one written by a human infectious diseases expert and the other written by a veterinary pharmacologist, when directed to the effectiveness of control exerted in Australian agriculture, were not far apart.²²

Concerns about the implementation of JETACAR

2.21 While some significant outcomes were achieved following the JETACAR report, submitters and witnesses also pointed to considerable flaws in the implementation of the recommendations. In particular, it was argued that key recommendations have not been actioned. Professor Peter Collignon, infectious disease physician and a member of JETACAR, stated that while there had been many very good recommendations 'a lot of them have been done only partially or not at all'.²³ As a consequence, Professor Collignon commented that 'what we have now more than 10 years later is much better data showing how this problem is getting worse'.²⁴

2.22 Professor Cooper stated that he was of the view that 'it is clear that most of the recommendations have been minimally implemented or been given voluntary status'.²⁵ The ASA provided the committee with a list of recommendations which it considered had been only partially addressed or not at all. These included:

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- 20 Australasian Society for Infectious Diseases, *Submission 18*, p. 3; see also Australian Society for Antimicrobials, *Submission 5*, p. 3.
 - 21 Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 46.
 - 22 Cattle Council of Australia and Sheepmeat Council of Australia, *Submission 16*, p. 4.
 - 23 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, pp 31–32; see also The Royal Australian College of Physicians, *submission 37*, p. 2; Consumers Health Forum of Australia, *Submission 10*, p. 1.
 - 24 Professor Peter Collignon, *Submission 34*, p. 3.
 - 25 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 27.

- an initiative to have formal resistance risk assessment as part of the registration of new antimicrobials and extension of their indication, similar to the process introduced by the APVMA, was commenced by the Therapeutic Goods Administration, but never completed;
- a review of streptogramin (virginiamycin) use in the food animal sector was completed and recommendations were made for restricted use. The proposals were then the subject of appeal by the sponsor. The Administrative Appeals Tribunal heard the appeal, and set aside the decision. The agent remains on the market under its pre-JETACAR license;
- attempts were made to harmonise veterinary prescribing legislation across states by the Primary Industries Standing Committee, but met with only partial success. The recommendation to make it an offence to prescribe and/or use a veterinary chemical product contrary to a label constraint was not implemented;
- the proposal for comprehensive antimicrobial resistance and usage surveillance across all sectors was developed by EAGAR but this was never released;
- there was no implementation of coordinated policies to minimise the use of antibiotics in humans and animals, and no licensing and monitoring process for antimicrobial importers;
- the requirement for the TGA to provide resistance rate data in the human product label was not followed up, largely due to the lack of comprehensive national resistance surveillance; and
- an attempt to establish a targeted antimicrobial resistance management research agenda by the NHMRC was unsuccessful.²⁶

Reasons for the failure to implement the JETACAR recommendations

2.23 The committee considered whether the lack of progress could be a result of the JETACAR recommendations being flawed or no longer relevant. However, this appears not to be the case with many witnesses and submitters noting the continuing relevance of the JETACAR recommendations.²⁷ For example, Professor Grayson submitted that:

The report was a national and international milestone in terms of its vision. ...Unfortunately barely any of the 22 JETACAR recommendations have been implemented during the past 13 years, yet they remain just as relevant to finding a solution in 2013 as they were in 1999.²⁸

26 Australian Society for Antimicrobials, *Submission 5*, pp 3–4.

27 Professor Peter Collignon, *Submission 34*, p. 3; Ms Kerrie Tucker, Research Fellow, The Australia Institute, *Committee Hansard*, 7 March 2013, p. 3.

28 Professor M Lindsay Grayson, *Submission 19*, pp 1–2.

2.24 Professor Grayson went on to state that, in fact, the report was 'too far ahead of its time and as a consequence it did not result in policy change:

The JETACAR report was too far ahead of its time. It really did not resonate with people. It had a lot of foresight in identifying what was going to become a problem, but it did not translate into genuine awareness in the community and among policy makers as to the fact that an ounce of prevention was worth a lot of cure. I think that underappreciation was one thing.²⁹

2.25 The ASA stated that JETACAR was a 'blueprint for tackling antibiotic resistance which is still relevant and even more cogent today'. The ASA noted that its recommendations were in line with those of the World Health Organisation and programs of other developed countries in Europe and North America.³⁰ Indeed, the committee was informed that Canada was initially inspired by the JETACAR report to conduct its own review. The NSW Government Department of Primary Industries stated that, as a result, Canada now has a well-integrated system, that includes quality surveillance:

A comparison of implementation of JETACAR with the equivalent program in Canada is worth noting. The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) evolved from a review by the Canadian Government similar in nature to JETACAR. The Canadian review was in fact subsequent to and inspired by JETACAR. In contrast to the JETACAR implementation, the Canadian response was well funded, well resourced, and well managed by an identifiable team of professionals having a strong overarching (truly integrated) understanding of antimicrobial resistance and antimicrobial use in animals, food and man. As a result, the Canadians have produced good quality surveillance that has provided critically important intelligence used to improve both human and animal health.³¹

Lack of a coordinated response

2.26 Witnesses were critical of the lack of commitment to AMR issues by governments.³² Professor Grayson stated:

The reality is that both state and federal governments of all persuasions have not taken the issues of emerging resistance seriously enough or have not understood the fact that it really is here, it is present and it is happening now.³³

29 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 12.

30 Australian Society for Antimicrobials, *Submission 5*, p. 3.

31 Department of Primary Industries (NSW), *Submission 28*, p. 2.

32 Friends of the Earth Australia, *Submission 3*, p. 16; see also Professor M Lindsay Grayson, *Submission 19*, p. 4; Ms Kerrie Tucker, Research Fellow, The Australia Institute, *Committee Hansard*, 7 March 2013, pp 1, 4.

33 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 8.

2.27 Submitters noted that JETACAR concluded that coordination across government, human medicine, veterinary medicine and the animal food production sectors was required to address AMR and made recommendations accordingly. The JETACAR report also encouraged the appropriate resourcing of the actions to implement the recommendations.³⁴

2.28 In its response, the Government supported the general concepts and intent of recommendations relating to coordination and resourcing while taking a slightly different path to implementation. The Government created EAGAR with a balance of expertise reflecting human and veterinary usage of antibiotics.³⁵ The CIJIG was also created. However, as noted above, the CIJIG was disbanded in 2004 and EAGAR was disbanded in 2007. Other bodies created included the Expert Panel on Health Advice under the NHMRC. This operated from 2008 to mid 2009.³⁶ In 2010, the NHMRC established the Anti Microbial Resistance Advisory Committee (AMRAC) to provide advice to the Chief Executive Officer of NHMRC on issues relating to antimicrobial resistance. AMRAC's term expired on 30 June 2012.³⁷

2.29 Evidence provided to the committee suggests that initially there was a coordinated response to the JETACAR recommendations. The Australia Institute noted that, following JETACAR, the EAGAR and CIJIG had been established. However, both those bodies were disbanded by 2007 and submitters argued that, as a result, no coordinated approach existed to address AMR.³⁸

2.30 Professor Cooper also commented on the fragmented approach to the implementation of the JETACAR recommendations and stated 'unfortunately responsibilities for prioritisation and implementation of the 22 JETACAR recommendations concerned dozens of departments and governmental agencies. This meant that no one agency, or minister was responsible or accountable.'³⁹

34 See Recommendations 21 and 22. Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, pp xxxiii–xxxv.

35 The terms of reference required EAGAR to provide expert advice to Commonwealth, state and territory governments on a range of matters including measures to reduce the risks of antibiotic resistance, surveillance of AMR, monitoring of antibiotic use and education strategies. EAGAR provided advice to regulatory bodies, AVPMA and TGA, on matters relating to AMR when requested. EAGAR was to be provided with an operating budget for three years by the Government and secretariat support by the Office of the National Health and Medical Research Council (NHMRC).

36 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 20–21 and *Attachment 3*.

37 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 21.

38 Ms Kerrie Tucker, Research Fellow, The Australia Institute, *Committee Hansard*, 7 March 2013, pp 1, 4.

39 Professor Matthew Cooper, *Submission 23*, p. 1.

2.31 Specifically in relation to EAGAR, Professor Rood, Australian Society for Microbiology, noted that as EAGAR had been established under the NHMRC, its focus shifted over time:

...where it went wrong...is where EAGAR was located within the NHMRC. It was a problem. Gradually, as EAGAR developed its brief it became more regulatory in nature and more risk assessment-type in nature. I will stand corrected on this by others who are more knowledgeable than me: I think that probably did not sit well within the framework of the National Health and Medical Research Council at the time. There was a lack of will—I am not sure where that good will came from—to really push this to the next level. That is the point where I think it fell over.⁴⁰

2.32 A more critical view of the lack of implementation of a coordinated approach was provided by Professor Mary Barton. Professor Barton stated that DoHA was 'totally unresponsive and disinterested for all the time EAGAR was active'. In relation to CIJIG, Professor Barton commented that it 'rarely met and did nothing' and concluded that 'any actions arising from JETACAR were carried largely by EAGAR with cooperation from APVMA, the then [National Drugs and Poisons Schedule Committee] and TGA'.⁴¹

2.33 In response to the lack of coordination in addressing AMR, other organisations have sought tackle AMR issues. For example, the ASA and ASID convened the Antimicrobial Resistance Summit in February 2011. The aim of the Summit was to update the work generated in the first JETACAR report, and with discussion and consensus, to help determine future strategies for control. The ASA commented that the meeting was organised as a result of concern that 'the important recommendations of JETACAR had failed to be implemented and by the recognition of increasing antimicrobial use and spread of antimicrobial resistance worldwide and in Australia, affecting the medical, veterinary and agricultural sectors'. In addition, it was recognised that 'unlike other countries, Australia had no overall coordinated approach to this major problem, and that the response to this threat was disparate, under resourced and therefore likely to be ineffective'.⁴²

2.34 The Summit made recommendations in five main areas including surveillance, education and stewardship. The Summit concluded that:

The threat to multiresistant bacteria is a critical public health issue that requires a coordinated, multifaceted response.⁴³

40 Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 46.

41 Professor Mary Barton, *Submission 7*, p. 6.

42 Australasian Society for Infectious Diseases, *Submission 18*, p. 2.

43 Gottlieb, T and Nimmo GR, 'Antibiotic resistance is an emerging threat to public health: an urgent call to action at the Antimicrobial Resistance Summit 2011', *MJA*, Vol 194, No. 6, 21 March 2011, p. 283.

2.35 The Australia Institute also commented that Australia performed poorly in relation to the factors identified by the WHO as contributing to AMR. The factors include:

...inadequate national commitment to a comprehensive and coordinated response; ill-defined accountability and insufficient engagement of communities; weak or absent surveillance and monitoring systems; potentially inappropriate and irrational use of medicines, including in animal husbandry; a need for improvement in infection prevention and control practices, as well as insufficient research and development on new products.⁴⁴

National management body

2.36 The Summit proposed the establishment of national AMR management body comprising a wide range of stakeholders. The role of the body would include implementing a comprehensive approach to monitoring, research and upgrading of the current regulatory system applying to antibiotics.⁴⁵

2.37 The PHAA argued that an Australian Centre for Disease Control should be established along similar lines to the Canadian centre, suggesting that it:

- be adequately resourced to examine and define the underlying epidemiology of antibiotic resistant organisms
- be adequately resourced to examine and define best-practice control and prevention interventions in hospitals and other healthcare settings and the community.⁴⁶

2.38 The ASA favoured a body similar to the Swedish Strategic Programme against Antibiotic Resistance (STRAMA). This body advises the Swedish Institute for Infectious Diseases Control in:

- matters regarding antibiotic use and containment of antibiotic resistance; and
- facilitating an interdisciplinary and locally approved working model, ensuring involvement by concerned authorities, counties, municipalities and non-profit organizations.

2.39 The ASA concluded that 'any such authority should extend beyond an advisory role to governments, and instead would formally co-ordinate and fund the multiple strategies required to control antibiotic resistance in both the health and non-human sectors and help develop public policy and enable information sharing'.⁴⁷

2.40 A key aspect of any national system would be to ensure that it is implemented through a whole of government response with the states and territories, because of the shared responsibilities for health. Professor Grayson commented that the national

44 The Australia Institute, *Submission 13, Attachment 1*, p. 3.

45 Australian Society for Antimicrobials, *Submission 5*, p. 11.

46 Public Health Association of Australia, *Submission 14*, p. 5.

47 Australian Society for Antimicrobials, *Submission 5*, p. 11.

system for hand hygiene that had been rolled out through the ACSQHC may be a good example to follow. Professor Grayson noted that there is now 'a greater sense of collaboration between the jurisdictions and federal bodies'.⁴⁸

Response to concerns

2.41 DoHA provided additional information on the disbanding of EAGAR and CIJIG and recent initiatives in providing a more coordinated approach to addressing AMR in Australia.

2.42 DoHA indicated that EAGAR and CIJIG had been wound up 'as they had essentially done their job and as a result of other emerging health protection priorities'. The work of the original committees was not handed on and DoHA stated that it had been able to use ongoing expert committees such as the Communicable Disease Network Australia and the Public Health Laboratory Network for advice on AMR related matters when required.⁴⁹

2.43 In relation to animal health, AVPMA considers AMR when evaluating applications for the registration of new antibiotics and major extensions of use for existing antibiotics. APVMA also collects voluntarily supplied information from registrants on the quantity of veterinary antimicrobial products sold in Australia.⁵⁰

2.44 Two bodies have recently been established: the AMRSC in April 2012; and, AMRPC Steering Group in February 2013 (see paragraphs 2.12 –2.13 above). DAFF stated that 'while this group is still in the early stages of its work, its formation is viewed as a key initiative in the Australian context'.⁵¹ In relation to the Steering Group, Professor Baggoley commented:

This initiative will allow us to connect all the dots from a national policy perspective and address the full spectrum of AMR issues that impact on human and animal health and agriculture.⁵²

2.45 The Royal Australasian College of Physicians and the ASA supported the establishment of AMRSC.⁵³ The ASA stated that it 'finally provides a great opportunity to bring together the many segments of this mosaic and to co-ordinate a plan for action and a co-ordinated national response' to AMR.⁵⁴ The ASA concluded:

48 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 12.

49 Senate Community Affairs Legislation Committee, Budget Estimates 2012–13, *Answer to question on notice No. E12-277, Department of Health and Ageing*.

50 Senate Community Affairs Legislation Committee, Budget Estimates 2012–13, *Answer to question on notice No. E12-277, Department of Health and Ageing*.

51 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 2.

52 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2012, p. 50.

53 Royal Australasian College of Physicians, *Submission 37*, p. 1.

54 Australian Society for Antimicrobials, *Submission 5*, p. 2.

The establishment of the AMRSC must provide the impetus and guidance for a co-ordinated approach to address antimicrobial resistance in humans and animals. The establishment of the AMRSC is an early, but very positive step. We need it to continue to fulfil its promise by being provided with sufficient ongoing funding and authority.⁵⁵

2.46 ASID commented that the establishment of AMRSC has begun to address AMR. However, a substantial increase in resources is urgently required to coordinate and implement the coordinated approach envisaged by the Antimicrobial Resistance Summit.⁵⁶

2.47 Professor Grayson commented that the Steering Group is 'an incredibly welcome development'. However, he went on to comment that in the past, similar committees have been formed but no real action has been undertaken and that we need to be sure that they are there to make sure things get done, not to just talk about doing them.⁵⁷

Conclusions

2.48 The evidence provided to the committee points to continued growth in the prevalence of AMR in human medicine. Of deep concern are the trends in the growth of resistant infections in not only hospital settings, but also in the community. There is also ample evidence that multiresistance is emerging as a significant problem and that resistance is now been found to 'last-line' antibiotics. The Australian community could face the prospect of returning to a pre-antibiotic era where minor, common infections lead to significant adverse health outcomes. In addition, governments face increased healthcare costs with patients needing longer hospitalisation and more expensive medications and hospitals needing to implement more expensive patient management programs and infection control programs.

2.49 The committee considers that the recommendations put forward by JETACAR remain highly relevant. Although there have been some important changes and additions to the AMR landscape since JETACAR, in many cases these changes only increase the importance and urgency of the pursuing the core themes of the JETACAR recommendations.

2.50 Unfortunately, it appears that the preventative measures recommended by JETACAR were not sufficiently implemented. The committee notes the comments made by Professor Grayson in this regard:

I think a number of things have changed since the JETACAR report. In many ways the cat is now out of the bag. The JETACAR report was excellent and, as I have put in my submission, was really a milestone, but

55 Australian Society for Antimicrobials, *Submission 5*, p. 10.

56 Australasian Society for Infectious Diseases, *Submission 18*, p. 5.

57 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 12.

many of the things that it was predicting were going to happen in terms of emergence of resistance are now happening.⁵⁸

2.51 The evidence received during the inquiry pointed to a promising initial response to the recommendations, in particular the establishment of the JETACAR-related bodies EAGER and CIJIG. However, both these bodies had been disbanded by 2007 with the result that the JETACAR recommendations were only implemented in part. The committee notes DoHA's comments that these bodies had 'essentially done their job'. However, the committee is not convinced that this is a sufficient explanation. The committee addresses specific issues in implementing the JETACAR recommendations in the following chapters.

2.52 The committee acknowledges that AMR matters, following the disbanding of the JETACAR related bodies, continued to be addressed by DoHA with advice from bodies such as Communicable Disease Network Australia and the Public Health Laboratory Network and that APVMA continued its work in relation to animal health. However, given that AMR was recognised by the WHO as a significant health issue in the late 1990s as well as the far-sighted and ground breaking work of JETACAR, the committee considers that the apparent lack of commitment to a response to AMR in Australia to date is of significant concern.

2.53 The committee acknowledges the establishment of the AMRSC in mid 2012 and the AMRPC Steering Group in February 2013. It was explained to the committee that AMRSC 'provides the science and the clinical expertise understanding policy and governance, and the [Steering Group] really looks to policy and governance understanding science and clinical'.⁵⁹

2.54 First, in relation to AMRSC, its purpose is to develop a national strategy to minimise AMR. The national strategy is to encompass most of the matters identified in evidence to the committee as being critically important for a comprehensive and coordinated response to AMR. However, the committee notes that the AMRSC's work focusses on human health and does not encompass animal health. The reporting pathway for AMRSC is essentially health focussed, that is it will report to the AHPPC which is a committee of the Health Ministers Advisory Council. The Advisory Council reports to the Council of Australian Governments (COAG) Standing Council on Health. From the evidence received, it is clear that addressing only part of antibiotic use is not a sufficiently comprehensive approach to AMR prevention and containment.

2.55 Initially, funding for AMRSC was provided until 30 June 2013. DoHA has indicated AMRSC will continue its role including providing advice to AHPPC and advice to the Steering Group to inform the development of the national AMR strategy.

2.56 In relation to the AMRPC Steering Group, the committee notes that its role is to oversee the development and implementation of a coherent national framework for

58 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 8.

59 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 56.

current and future work related to AMR. The terms of reference are extensive and wide ranging. The membership consists of the secretaries of DoHA and DAFF and the Chief Medical Officer and the Chief Veterinary Officer, thus bring together human and animal health. It is to meet at least four times per year.

2.57 The Budget 2013–14 Portfolio Budget Statement for the Department of Health and Ageing states that:

The Australian Government will develop a *National Antimicrobial Resistance (AMR) Prevention and Containment Strategy* for Australia, to provide national and international leadership on this significant global health priority. The Strategy will also coordinate Australia's efforts across human and animal health to reduce, monitor and respond to AMR. The Government will expand surveillance of AMR and antibiotic usage; implement infection prevention and control activities to reduce the spread of infection in general and of resistant infections in particular; and implement antimicrobial stewardship programs to provide a systematic approach to optimising the use of antibiotics in primary health care, residential aged care facilities and hospitals.⁶⁰

2.58 The Steering Group will oversee the development of the National Antimicrobial Resistance Prevention and Containment Strategy. The committee welcomes the focus being given to the development of a Strategy, but is concerned that there appears to be no publicly available information on the time table for finalisation of the Strategy.

2.59 The committee believes that the risk is not simply ongoing increases in AMR. Rather, it is that the focus of establishing an AMR strategy will be diverted through yet another set of committees. The evidence provided by DoHA on 27 significant elements relevant to addressing antimicrobial resistance issues between 1998 and 2013 is a case in point.⁶¹ The committee notes that the list of significant elements, only contained tasks, roles and outputs and lacked information on outcomes and evaluation of the almost 15 years of actions. In particular, the committee notes that in 2003 the *Strategy for Antimicrobial Resistance Surveillance in Australia* was developed by EAGAR but it appears that it has not been fully implemented.

2.60 The committee considers that an urgent, comprehensive and robust national strategy that is specifically focused on timelines and outcomes, is needed to address AMR. The committee therefore believes that an independent, national body should be established to deliver the national AMR resistance strategy. Such a body should seek to draw and coordinate officials and experts from State and Commonwealth Governments. In this way human, animal and animal-derived AMR issues can be addressed in a consistent manner and programs effectively coordinated and delivered. Such a body should have the authority and capacity to collect and analyse data on

60 Department of Health and Ageing, *Portfolio Budget Statement, Agency Resources and Planned Performance 2013–14*, p. 23.

61 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 3*.

AMR and be suitably resourced. In addition, an independent body with clear accountability and reporting requirements will encourage a continued focus on tackling AMR issues.

Recommendation 1

2.61 The committee recommends that the Commonwealth establish an independent body or national centre, to develop a strategy, report publicly on resistance data and measures taken to combat antimicrobial resistance and to manage the response to antimicrobial resistance in Australia.

Recommendation 2

2.62 The committee recommends that the independent body be resourced to implement a rigorous monitoring and reporting regime of antibiotic use in humans and animals and of multiple drug resistant infections in humans and animals.

Chapter 3

AMR monitoring and surveillance

3.1 This chapter addresses the effectiveness of the implementation of the JETACAR recommendations relating to monitoring and surveillance.

Implementation of the JETACAR recommendations

3.2 JETACAR made two recommendations (10 and 11) relating to surveillance and monitoring on AMR. The JETACAR report stated that to facilitate management of bacterial antibiotic resistance:

...an internationally acceptable and scientifically defensible Australian continuous surveillance program is essential to survey the prevalence of resistant bacteria in:

- human pathogens
- potential pathogens with major resistances carried by humans
- veterinary pathogens
- food-chain indicator organisms
- environmental organisms
- other areas of antibiotic usage.¹

3.3 JETACAR found that, while systems for resistance surveillance in humans were found to be well established in Australia, there was no similar system of surveillance for animals. The lack of reliable data on antibiotic usage, including monitoring of import volumes and individual consultation, prescription and dispensing data for both human and animal antibiotic uses was also identified. In addition, JETACAR recommended the full audit of antibiotic usage, including distribution and end-use, so that all areas of antibiotic use could be adequately monitored.²

The Government response

3.4 The Government stated in its response to JETACAR that, in relation to recommendation 10, it supported the overall concept of improving the surveillance of antibiotic resistant bacteria and resistance to genes across the food chain and in human medicine. However, the Government emphasised the importance of further investigations to determine the most appropriate and cost-effective option for national integration of animal and human surveillance data. The Government indicated that a scoping and feasibility study would be undertaken to 'determine the way forward'.³

1 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotic-resistance bacteria in animal and humans*. 1999, p. xxviii.

2 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotic-resistance bacteria in animal and humans*. 1999, p. xxix.

3 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 17.

3.5 In relation to recommendation 11, the Government responded that it supported the principles of accountability and audit trail, but that this recommendation overlapped with recommendation 3 (licensing of imports of antibiotics for any purpose other than individual human patient use). The Government stated that if proposals under the response to recommendation 3 are successful, it considered that recommendation 11, for the most part, will be addressed.⁴ Discussion relating to recommendation 3 is provided in chapter 4 of this report.

Actions since JETACAR and current arrangements

3.6 The 2003 Commonwealth Interdepartmental JETACAR Implementation Group (CIJIG) progress report stated that, in response to JETACAR's recommendation for a surveillance system (recommendation 10), a strategy for AMR surveillance in Australia was being finalised. The strategy and associated action plans were to encompass surveillance activities in humans (including antibiotic usage and health care acquired infections), animals and animal-derived foods.⁵

3.7 A *Strategy for Antimicrobial Resistance Surveillance in Australia* encompassing humans, animals and animal-derived foods, was released in September 2003.⁶ The Strategy stressed the importance of national surveillance and coordinated cross-sectoral approach and the need for on-going evaluation to monitor progress against the Strategy.⁷

3.8 In response to the Strategy, the EAGAR commissioned an examination of further AMR surveillance in Australia. In 2006, the report to EAGAR – *A Comprehensive Integrated Surveillance Program to Improve Australia's Response to Antimicrobial Resistance* – was published and included recommendations.⁸

3.9 The Australia Institute commented that neither the Strategy nor the strategy contained in the report to EAGAR 'appears to have been actioned in any meaningful way'.⁹ DoHA stated that the Strategy 'was never permanently deactivated'. The Commonwealth's response to AMR has evolved and consists of support for a number of initiatives.¹⁰

4 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 18–19.

5 CIJIG Progress Report, March 2004, pp 2–3.

6 Department of Agriculture, Fisheries and Forestry, *Submission 12*, pp 5–6.

7 The Australia Institute, *Submission 13*, p. 12.

8 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 6.

9 The Australia Institute, *Submission 13*, p. 3.

10 Senate Community Affairs Legislation Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. E12-014, Department of Health and Ageing*.

Current arrangements

3.10 DoHA indicated that there are currently several ways in which AMR surveillance and monitoring are being addressed, including:

- National monitoring and surveillance – the AHPPC and its sub-committees undertake public health surveillance. The AMRSC will advise on AMR matters and is reviewing surveillance activity to inform the development of a nationally consistent approach. The Australian Group on Antimicrobial Resistance (AGAR) collects, analyses and reports trends in the level of AMR in community and hospital settings. The National Antimicrobial Utilisation Surveillance Program (NAUSP) collects, analyses and reports on trends on antimicrobial use in Australia hospitals.
- Monitoring antibiotic usage – data on community dispensed prescriptions is collected by the Drug Utilisation Sub-Committee (DUSC) of the Pharmaceutical Benefits Advisory Committee.
- Hospital level reporting – the National Health Performance Authority (NHPA) is required to report publicly on hospitals to improve accountability, transparency and local performance. Data on hospital acquired infections is collected by states and territories under their infection surveillance regimes. This data has been provided to the Australian Institute of Health and Welfare (AIHW) for some years for use in national reports.
- ACSQHC is developing a standard, hospital-level cumulative antibiogram for local surveillance of antimicrobial resistance. Standardisation of laboratory reporting has been developed as a best practice health information standard for structured microbiology requests and reports.¹¹

3.11 In addition to the surveillance and monitoring identified by DoHA, DAFF advised that it is currently keeping a watching brief on AMR surveillance in bacteria of animal origin domestically and internationally. DAFF also noted surveillance and monitoring activities which had previously been undertaken including a pilot AMR surveillance program in 2003–04. This found that overall prevalence of resistance to important antimicrobials among key indicator organisms found in the gut of food producing animals was low.¹²

Industry response

3.12 Industry groups also provided information on actions they had taken regarding AMR. For example, the Australian Lot Feeders' Association (AFLA) noted that surveys are conducted on cattle at the time of slaughter, at abattoirs and on retail products. The National Residue Survey shows that 99.99 per cent of beef samples tested for antibiotics are compliant with Australian legislated standards.¹³ ALFA also

11 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 8–14.

12 Department of Agriculture, Fisheries and Forestry, *Submission 12*, pp 6–7.

13 Australian Lot Feeders' Association, *Submission 11*, pp 1, 5.

commented that 'antibiotics are used both judiciously and responsibly within the cattle feedlot sector' and indicated that:

- the APVMA requires that all antibiotics used in the cattle feedlot industry must be prescribed by, and their use overseen by, qualified veterinarians;
- beef export markets are too valuable to lose due to antibiotic residues in beef; and
- it is requirement of the National Feedlot Accreditation Scheme that antibiotics are administered by trained and competent staff with records maintained to trace treated livestock. Feedlots are third party audited against the program on an annual basis.¹⁴

3.13 The Cattle Council of Australia and the Sheepmeat Council of Australia also commented that the industry had established a number of on-farm assurance programs to minimise the risk associated with the management and administration of livestock chemicals and treatments. In addition, the National Antimicrobial Residue Minimisation (NARM) testing program includes education of producers about antimicrobial residue, sampling and analysis of slaughtered animals, and compliance with Maximum Residue Limits.¹⁵ A research project on AMR in red meat production in Australia is being funded by Meat and Livestock Australia.¹⁶ Australian Pork Limited also informed the committee of a recent Australian wide survey of antibiotic usage in the pig industry:

This Australia-wide, transparent survey involved the majority of Australia's specialist pig veterinarians, was both comprehensive and confidential, and confirmed that resistance in broad spectrum cephalosporins such as ceftiofur is currently at negligible levels within the pig industry i.e. there is widespread reliance on other drugs, rated to be of low importance in the context of human health. This project has also shown that Australian pigs do not carry plasmid-mediated E. coli resistance genes of public health significance.¹⁷

3.14 The Australian Chicken Meat Federation (ACMF) supported monitoring and surveillance of AMR and suggested that the frequency of monitoring and surveillance should be proportional to the level of risk or the expected rate of change of resistance.¹⁸ The Animal Health Alliance informed the committee that it would support a whole of government, multi-sector surveillance and monitoring initiative based on a risk/benefit approach and submitted that:

The Alliance is prepared to consider in such an initiative, to offer company global expertise and knowledge to ensure success of such a program.

14 Australian Lot Feeders' Association, *Submission 11*, p. 5.

15 Cattle Council of Australia and the Sheepmeat Council of Australia, *Submission 16*, p. 4.

16 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 6.

17 Australian Pork Limited, *Submission 27*, p. 3.

18 Australian Chicken Meat Federation, *Submission 24*, p. 3.

Alliance member companies have or are at present undertaking surveillance and/or sensitivity surveys and similarly support professional bodies that undertake similar initiatives.¹⁹

Concerns about the implementation of the recommendations

3.15 The importance of a comprehensive surveillance and monitoring regime for both humans and animals was highlighted by submitters.²⁰ Without adequate surveillance and monitoring AMR cannot be addressed in an effective manner through focussed interventions and evidence-based decision making. Submitters also commented on the need to ensure that all sectors, including the agricultural sector, are included in a comprehensive surveillance system.²¹

3.16 It was noted by The Australia Institute that JETACAR had stipulated that 'for effective action and development of strategies to deal with AMR, there has to be comprehensive monitoring of both usage and resistance patterns and argued that interpretation of resistance trends was difficult in the absence of reliable data on use of antibiotics'. Further, the World Health Organisation also sees surveillance as a 'fundamental requirement' for any control of AMR.²²

3.17 While both DoHA and DAFF outlined the ways in which surveillance and monitoring are being addressed, witnesses questioned the effectiveness of these activities. In particular, they pointed to a lack of timely and comprehensive data on AMR and antimicrobial usage to create an evidence base for policy development. The PHAA, for example, submitted that there are still significant gaps in the surveillance of AMR and antibiotic usage by both humans and animals.²³

3.18 The following discussion canvasses concerns raised about current surveillance and monitoring activities of both AMR and antibiotic usage in human medicine, animal medicine and fresh food imports and whether the current arrangements are sufficiently comprehensive and integrated.

Human medicine

3.19 In relation to surveillance activities in human medicine, submitters acknowledged that some data on the prevalence of AMR is available from the activities currently being undertaken. However, the information collected is far from comprehensive and is not collected in a coordinated manner. In addition, Professor Cooper commented that the information is not reported in a timely way.²⁴

19 Animal Health Alliance (Australia) Ltd, *Submission 1*, p. 3.

20 See for example, Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9; Australasian Society for Infectious Diseases, *Submission 18*, p. 5.

21 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38.

22 The Australia Institute, *Submission 13*, p. 11.

23 Public Health Association of Australia, *Submission 14*, p. 6.

24 Professor Matthew Cooper, *Submission 23*, p. 1.

3.20 Professor Baggoley, DoHA, noted that the states and territories have primary responsibility for the surveillance and management of infections in hospitals, and for public health infection control. The Commonwealth has a similar responsibility in the areas of aged care and general practice.²⁵

3.21 State and territory government have established programs for monitoring AMR including:

- Healthcare Infection Surveillance in Western Australia;
- the Centre for Healthcare Related Infection Surveillance and Prevention (CHRISP) in Queensland;
- the Victorian Nosocomial Infection Surveillance System; and
- the Tasmanian Infection Prevention and Control Unit.²⁶

3.22 Other organisations such as the Australian Group on Antimicrobial Resistance (AGAR) also undertake surveillance activities. AGAR provides prevalence data on important antimicrobial resistance pathogens in Australian hospitals and the community. AGAR publishes surveys, for example, the rates of MRSA and Vancomycin resistance in *Enterococci faecium* in Australia.²⁷ While AGAR is sponsored by DoHA, Professor Cooper noted that its resources are limited and therefore surveillance activities are not comprehensive:

I applaud institutes such as AGAR. It should be made clear that these are run through medical societies and scientific societies and they are minimally resourced. They have very little funding and it is, if you like, done as a side job. They are limited in scope and reach. They will track MRSA or enterobacteriaceae but they do not have the resources or reach to then look at the whole incidence. We have a lot of other resistant bacteria—gonorrhoea, *C. diff* and others.²⁸

3.23 The ASA commented that the extent of AMR in Australia remains poorly defined and noted that the current systems of data collection and collation vary between states and territories with limited coordination at a national level. The ASA also concurred with Professor Cooper that surveillance for AMR is currently restricted to planned surveillance studies (active or targeted surveillance) of a narrow range of organisms.²⁹

25 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 49.

26 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 49.

27 <http://www.agargroup.org/publications>; <http://www.agargroup.org/surveys> (accessed 4 April 2013).

28 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 27; see also Professor Mary Barton, *Submission 7*, p. 3.

29 Australian Society for Antimicrobials, *Submission 5*, pp 7–8.

Antibiotic usage

3.24 It was also noted that in addition to measuring AMR, it is important to understand antibiotic usage. Dr Lynn Weekes, NPS MedicineWise, commented that work in Europe has been undertaken to link surveillance data for AMR with antibiotic usage and added 'they have been able to show across countries that if you lower usage you also tend to have less resistance'. Dr Weekes added:

Being able to show people that you can make a difference by using antibiotics differently has been very convincing for practitioners. They have also been able to implement things like indicators for appropriate prescribing as part of a mixed payment system in some countries, particularly the UK, where the payment for general practitioners is linked with some quality outcomes. Those might include how they prescribe antibiotics, for example.³⁰

3.25 The ASA acknowledged that there is a national program for tracking antibiotics in hospitals – NAUSP funded by the South Australian Department of Health. However, the ASA asserted that this data is poor and data for antimicrobial usage outside hospitals is limited:

Surveillance for antimicrobial use is patchy; data are available from a sample of large hospitals in the National Antibiotic Utilisation Surveillance Project. Currently, the NAUSP program is the only nationwide systematic surveillance of antibiotic usage, but it is based on voluntary and imperfect data submitted from major hospitals, representing about 50% of Australian tertiary referral beds. Community utilisation data are very limited.³¹

3.26 A second antimicrobial consumption surveillance program is undertaken in Queensland through CHRISP. Data is collected on antimicrobial dispensing from all public hospitals in Queensland and provided on a quarterly basis to the Queensland drug committee (QHMAC).³²

3.27 The ASID noted that there are other programs collecting prescribing data from general practice and antibiotics funded by the Pharmaceutical Benefits Scheme. However, 'there is no comprehensive surveillance program that links prescribing of antimicrobials to the prescriber'.³³ The ASA further commented that the ACSQHC, AGAR, and NAUSP surveillance are involved in human health leaving gaps in data related to surveillance of antimicrobial use and resistance in food-producing animals, and in related studies of antibiotic resistant organisms in humans and animals and data on antibiotic use outside of large hospitals.³⁴

30 Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 24.

31 Australian Society for Antimicrobials, *Submission 5*, p. 8.

32 Australasian Society for Infectious Diseases, *Submission 18*, p. 4.

33 Australasian Society for Infectious Diseases, *Submission 18*, p. 4.

34 Australian Society for Antimicrobials, *Submission 5*, p. 3.

Animal medicine

3.28 JETACAR found that AMR could be spread by consumption of animal products contaminated with a resistant bacterial strain, or via close contact with animals. Dr David Looke, President, ASID, provided the example of MRSA in animals. He stated that 'we think that a lot of MRSA spreads around in veterinary practices and then comes back to humans, but it probably got to the veterinary practices from humans at the start'.³⁵

Surveillance of AMR

3.29 The importance of surveillance of AMR in agriculture was highlighted by submitters. This was illustrated by Professor Collignon who commented that, in developed countries like Australia, Salmonella and Campylobacter are effectively only transmitted to humans from food animals. Thus, if there is resistance, it is caused by what is happening in other sectors.³⁶

3.30 While the importance of surveillance in animals was emphasised by submitters, they were critical of the systems currently in place in Australia which do not provide comprehensive data on AMR or use of antibiotics in the agricultural sector.³⁷ Professor Grayson indicated that the lack of monitoring and surveillance for bacteria relevant to human health in animals means that there is a lack of understanding of the nature and scale of the AMR problem:

In agriculture currently there is very limited surveillance for any of the bugs that are relevant to human health. As with surveillance, if we ask: 'How big is the problem?' At the moment we have a bit of an idea for humans and not much of an idea for Australian agriculture. By inference because most of us are healthy we think it is pretty good, but there have been some worrying signs from imports.³⁸

3.31 DAFF stated that there are significant amounts of data on resistance levels in animal pathogens. However, variations in sampling and interpretation methods in agricultural surveillance activities hampers use of the data:

Comparing data to look for trends in resistance in animal pathogens has however overall proven to be problematic for reasons including differing sampling points along the animal-food supply chain, differing laboratory testing/interpretation methods, and the intermittent nature of studies into particular bacteria. These issues are acknowledged by the World Organisation for Animal Health (OIE) which is working to provide solutions to these problems. This is also one of the reasons why standardised and integrated ongoing surveillance and monitoring systems

35 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 18.

36 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 31.

37 See for example, Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

38 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

are advocated. These issues also mean that comparisons against resistance trends in the same bacteria in humans are difficult.³⁹

3.32 DAFF also noted that it undertook a Pilot Surveillance Program for Antimicrobial Resistance in Bacteria of Animal Origin. The data collection took place in 2003–04 with the results published in 2007.⁴⁰ Industry groups indicated that the survey showed low proportions of resistant bacteria and that resistance to "critically important" human medicine antibiotics was non-existent or low in bacteria isolated from food-producing animals.⁴¹ ALFA also informed the committee that:

DoHA, at the instigation of the Food Regulation Standing Committee, commissioned Food Science Australia to survey the presence of antimicrobial resistant bacteria in beef mince at retail. The report was released in 2009. In the survey, testing of bacteria isolated from foods indicated that overall resistance to the majority of antibiotics was low. When compared to reports from other countries, Australia has a very low prevalence of bacteria that are resistant to antibiotics on these foods, particularly those "critically important" for human medicine.⁴²

3.33 Surveys, research and other input into animal origin AMR has also been recently undertaken by some state and territory governments and universities.⁴³

3.34 The Victorian Government commented that in response to the JETACAR report, pilot surveys of AMR in animals and meat products were conducted by the Commonwealth. While these studies provided details of the prevalence of resistant bacteria in various food producing species and their products, they did not specifically investigate the impact of using antimicrobial products for production purposes. The Victorian Government stated that these surveys should be repeated at more regular intervals to identify trends in the development of resistance and concluded:

With concrete scientific information about the impact of use of antimicrobials in Australia, medical and veterinary professionals are much more likely to change their approach to management of disease and dispensing of antimicrobials.⁴⁴

3.35 Professor Barton also commented on the pilot studies conducted by DAFF and Food Standards Australia New Zealand (FSANZ) and indicated that they were limited in scope and were finalised some time ago:

39 Department of Agriculture, Fisheries and Forestry, *Answer to question on notice No. 4*, 20 March 2013.

40 Department of Agriculture, Fisheries and Forestry, *Submission 12*, pp 6–7.

41 Australia Lot Feeder's Association, *Submission 11*, p. 2; Joint submission by the Cattle Council of Australia and the Sheepmeat Council of Australia, *Submission 16*, p. 5.

42 Australian Lot Feeders' Association, *Submission 11*, p. 3.

43 Senate Rural and Regional Affairs and Transport Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. 22, Department of Agriculture, Fisheries and Forestry*.

44 Victorian Government, *Submission 36*, p. 3.

DAFF conducted a very limited pilot study of antimicrobial resistance in carcass isolates of E coli and enterococci – 150 isolates each from cattle, pigs and chickens; 150 isolates of campylobacter from chickens were also tested. This was completed in 2004 and there has been nothing since. FSANZ conducted an even smaller pilot study of antimicrobial resistance in some isolates from foods. The situation is a total disgrace and Australian Health and Agriculture authorities should hang their heads in shame.⁴⁵

3.36 A slightly different view in relation to surveillance in the agricultural sector was provided by Professor Cooper. He commented that it would be very costly to monitor the food animal supply chain for AMR. As the link between AMR in animals and human health has been so clearly established, monitoring AMR in the food chain may not be the best value for money. Professor Cooper argued instead for greater monitoring of antibiotic usage.

What we do need to know is what antibiotics are being used where and to what degree. That could be traced through the suppliers, the department or the APVMA. We need to know exactly how much is being used and where. That information is available—it just needs to be reported more accurately and more clearly.⁴⁶

Antibiotic usage

3.37 APVMA commented that there is no mandatory mechanism or legal framework to collect detailed information on the use of antibiotics in animals in Australia. However, a program which collects information from registrants of antimicrobials on the quantity of antimicrobials sold by volume has been established by APVMA. APVMA stated that 'it is reasonable to assume that there is a close relationship between the quantities of antimicrobials sold and amounts used in animals'.⁴⁷ While the program is voluntary, APVMA stated that compliance with the request has been high.⁴⁸ APVMA's first report on the quantity of antibacterial products sold for veterinary use in Australia for the period July 1999 to July 2002, was published in 2003. Due to resource constraints there was a gap in the collection of data. The next report, to be published this year, will cover the period July 2005 to June 2010.⁴⁹ The Animal Health Alliance noted that it had worked with the APVMA to draft and refine the code of practice on the collection of animal antimicrobial supply data and that its member companies voluntarily offered data to APVMA for the above survey.⁵⁰

45 Professor Mary Barton, *Submission 7*, pp 3–4.

46 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 28.

47 Australian Pesticides and Veterinary Medicines Authority, *Submission 29*, p. 5.

48 Department of Agriculture, Fisheries and Forestry, *Answer to question on notice No. 1 and No. 2*, 20 March 2013.

49 Department of Agriculture, Fisheries and Forestry, *Answer to questions on notice No. 1 and No. 2*, 20 March 2013.

50 Animal Health Alliance (Australia) Ltd, *Submission 1*, p. 2.

3.38 Submitters noted that the APVMA program is voluntary and that data has not been provided in a timely manner. Professor Cooper stated that 'in fact, when we tried to get more information we were referred back to a report from 2001 which stated that 233 tonnes of antibiotics were used in the food chain'.⁵¹

3.39 The lack of timely data in relation to antibiotic usage in animals was also raised by Professor Collignon. He argued that key data should be readily available so that health professionals are informed about antibiotic usage in animals:

We need this data available in a timely fashion and in a transparent way so that people other than just the people involved can see this data. People like me, for instance, need to know what antibiotics are used in the agricultural sector and how. Are they using third-generation cephalosporins? Are they using carbapenems? And in what volumes?⁵²

3.40 Professor Collignon suggested that it should be possible to access the relevant data through import information. Drugs that are imported have conditions of importing that include the provision of information on the quantity of drugs imported; the intended use, whether it is human or agricultural; and, if it is agricultural, whether it is going to be put into feed or is going to be used as a veterinary product under prescription from a veterinary practitioner. He concluded that 'we already have in place a system that can be easily used with little expense'.⁵³

3.41 DAFF acknowledged that Australia has no mandatory mechanism or legal framework to collect detailed information on the usage in different animal species. DAFF commented that the collection of such data would be complicated as the label restraints for use of many registered antibiotics include more than one species. DAFF reiterated that it is reasonable to assume that there is a close relationship between the quantities of antimicrobials sold and amounts used in animals.⁵⁴

3.42 Not all industry groups were supportive of wider or more intensive surveillance in the agricultural sector. The Australian Chicken Meat Federation stated that, while it supported the concept of monitoring and surveillance of antimicrobial resistance, there are very low levels of resistance in poultry. The Federation stated that 'resistance to all agents other than streptomycin is currently low or absent and multiple resistance is also present at a low frequency. There is also a trend for progressively reduced levels of resistance in the time period from 2001 to 2009'.⁵⁵ The Federation considered that the frequency of monitoring and surveillance should be in proportion to the level of risk or the expected rate of change of resistance:

51 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 28.

52 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 32

53 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 33.

54 Department of Agriculture, Fisheries and Forestry, *Answer to question on notice No. 1 and No. 2*, 20 March 2013.

55 Australian Chicken Meat Federation, *Submission 24*, p. 7.

In view of the low resistance status of bacteria isolated from poultry and the judicious use of antimicrobial agents (which are selected from a small group with an average age in excess of 50 years) a surveillance frequency of once every 5+ years is probably sufficient to pick up any changes, especially considering there is an annual survey of resistance in *Salmonella* isolates that could act as a sentinel to identify any significant changes.⁵⁶

Fresh food imports including seafood

3.43 Witnesses commented on the agricultural use of antibiotics in many parts of Europe, India and Asia and the potential risk that imported food poses for increasing the prevalence of AMR in Australia. Professor Grayson stated that 'many imported products (especially meat and seafood) are at increased risk of containing multi-drug resistant pathogens and high concentrations of antibiotic residues'.⁵⁷ Concerns focussed on the unrestricted use of a wide range of antibiotics including some which are banned for use by the agricultural sector in Australia. Professor Grayson, for example, commented:

We have seen—last year, I think—Customs take aside or block an importation of seafood from Vietnam where the levels of antibiotic residues in that seafood were above acceptable limits. If I was prescribing to you the antibiotic they were talking about, Senator, I would have to call Canberra to get permission to use that drug, yet in a foreign country it was just being fed to the seafood to make it grow faster.⁵⁸

3.44 Professor Collignon also voiced concern about the use of certain drugs in overseas agricultural practices which may have significant adverse health outcomes for humans:

We find that there are chloramphenicol residues in the food...That is a drug, for instance, that we do not give to people anymore because it causes a condition called aplastic anaemia. It is uncommon; one in 30,000 to 50,000 people who are given a prescription would get that, and I would presume that if you have trace amounts in foods it may be one in 100,000 or one in 200,000. But if we find, for instance—which we did about 10 years ago—that a few per cent of the imported shrimp or prawns have this in them, that is a major issue given that so many people are exposed to it and they could potentially end up with this life-threatening complication when, from my point of view, they should not be at risk of this at all...⁵⁹

3.45 All imported food products must comply with Australian Food Standards Code including the level of antibiotic residues known as the Maximum Residue Limits (MRL). Detections of drugs, for example veterinary drugs, or any kind of

56 Australian Chicken Meat Federation, *Submission 24*, pp 3, 7.

57 Professor M Lindsay Grayson, *Submission 19*, p. 2.

58 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

59 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 35.

chemical in an imported food product that is not allowed under the code means that the product can be rejected.⁶⁰

3.46 Testing is conducted at the border with the imported food program jointly run by FSANZ and DAFF. FSANZ provides advice on the type of risk category for particular products and DAFF decides on whether or not they will stop and test the product.⁶¹ In the case of imported raw seafood, five per cent is tested for antibiotic residue with prawns being tested for nitrofurans and for fluoroquinolones, and fish being tested for malachite green and fluoroquinolones.⁶²

3.47 FSANZ provided information on the testing of imported fresh seafood consignments in 2012:

During 2012, 341 tests for antibiotics—we are talking about antibiotic residues, not AMR—were applied to 194 imported seafood consignments; 187 passed. That is a pass rate of 96.4 per cent. The failures were for residues of malachite green and fluoroquinolones. These chemicals are not permitted in the food standards code in Australia under Australian law. Those consignments originated from Vietnam.⁶³

3.48 Submitters raised concerns with the testing regime for imported food products, particularly seafood. Goat Veterinary Consultancies argued that there needs to be more frequent, and more comprehensive, testing for antibiotic residues in produce from countries considered high risk. For example, for the period January 2012 to June 2012 the compliance for chemical testing for food products imported from China published by DAFF indicated that most tests were undertaken for pesticides and none for some common antibiotics including streptomycin and tetracycline.⁶⁴

3.49 Professor Collignon also commented on the lack of testing for resistant microbes in imported food. He noted that this type of testing has been undertaken overseas and resistant microbes have been found in food products.⁶⁵ Professor Collignon added:

We know that, in other countries, including the US—so not even developing countries but developed countries—a lot of people are carrying resistant bacteria which are clearly derived from poultry. The Netherlands is another example. For us to allow those foods to come into the country,

60 Dr Paul Brent, Chief Scientist, Food Standards Australia New Zealand, *Committee Hansard*, 7 March 2013, p. 53.

61 Dr Paul Brent, Chief Scientist, Food Standards Australia New Zealand, *Committee Hansard*, 7 March 2013, pp 52, 53.

62 Dr Mark Schipp, Australian Chief Veterinary Officer, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 7 March 2013, p. 66.

63 Dr Paul Brent, Chief Scientist, Food Standards Australia New Zealand, *Committee Hansard*, 7 March 2013, p. 52.

64 Goat Veterinary Consultancies, *Submission 33*, p. 3.

65 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 36.

when we stop our farmers from doing that, quite rightly, and then to just say, 'You can bring it in and it'll have superbugs, but we'll never know because we'll never test,' is, to me, negligent from a public health point of view.⁶⁶

3.50 FSANZ indicated that some limited surveillance work was undertaken in 2008 around actual AMR in some foodstuffs and added that as far as it was concerned, FSANZ tests 'for residues and not for the AMR'.⁶⁷ DoHA noted that in 2010, at the request of DAFF, FSANZ had undertaken a risk assessment of apples from New Zealand harvested from trees potentially treated with an antimicrobial to control fire blight. It was concluded that there was negligible increased risk to Australian consumers from potential exposure to AMR organisms.⁶⁸

3.51 A further matter raised by Professor Collignon is that the basis for current import restrictions on fresh chicken, beef and pork is based on agricultural quarantine and virus issues, rather than public health. He stated that, as a result, import restrictions may be removed in the future because there are no longer quarantine concerns when consideration should also be given to AMR issues:

On fresh meat, you are right: we do not import fresh chicken, fresh beef or fresh pork, but the reason for that has got nothing to do with human health. It is to do with agricultural quarantine and viruses, some of which are, at least from my perspective, obscure. What worries me is that, unless public health is an issue with this as well, we will find suddenly that there is a vaccine for virus X in chickens or something, and they will say, 'The reason you've got your quarantine is irrelevant now because this virus no longer exists.'⁶⁹

3.52 The impact of the importation of contaminated food on improvements in surveillance and antibiotic control in Australia was highlighted by Professor Grayson. He argued that efforts by Australian regulators and industry may be undermined by importation of contaminated food products. Professor Grayson concluded:

Thus, a greatly enhanced surveillance system of imported foods for both multi-drug resistant bacteria and antibiotic residues is required by the relevant national authority. Given the current potentially deteriorating situation regarding food safety and monitoring in many of the countries presently exporting products to Australia, the establishment of an effective thorough import screening program should now be considered a high priority.⁷⁰

66 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 36.

67 Dr Paul Brent, Chief Scientist, Food Standards Australia New Zealand, *Committee Hansard*, 7 March 2013, p. 52.

68 Senate Community Affairs Legislation Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. E12-222, Department of Health and Ageing*.

69 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 36.

70 Professor M Lindsay Grayson, *Submission 19*, pp 2–3.

3.53 However, while concerns regarding importation and public health are entirely valid, the committee is not of the view to recommend particular trade measures. Furthermore, it is critical that any proposed measures regarding food importation not constitute further trade barriers.

The need for a comprehensive and integrated system

3.54 The evidence received by the committee argued strongly for a comprehensive and systematic approach to monitoring and surveillance and noted that Australia is lagging behind overseas efforts to contain AMR.⁷¹ The Australia Institute argued that:

It is of great concern that, despite the calls of the WHO and various other expert groups, so many years have passed and Australia still does not have a national comprehensive surveillance system of the use of and resistance to antimicrobials.⁷²

3.55 Support for a national approach was received from other submitters including Professor Grayson who emphasised that there is a need for a 'standard system that applies fairly and equally right across the country. The issues of state boundaries do not stop bugs so it needs to be national system.'⁷³ It was argued that without a national approach, health planners are unable to define the size of the problem, identify trends and to make evidence-based decisions.⁷⁴ The Australia Institute added its view:

There were pilot studies established for surveillance. There has been an ongoing surveillance effort, particularly in human medicine since JETACAR, but the problem is that it is not a comprehensive national body of data that is brought together in a way that is meaningful in terms of creating an evidence base for regulators.⁷⁵

3.56 Both Professor Cooper and Professor Collignon pointed to existing data which could be accessed for surveillance purposes. Professor Cooper noted that all major hospitals have pathology laboratories undertaking tests for AMR, the results of which could be included in a national reporting system.⁷⁶ Professor Collignon added that, in relation to AMR in the community, pathology laboratory systems around Australia are the repository of tens of millions of results every year. By using these results, in a real-time way, trends could be identified.⁷⁷

71 See for example: Australian Society for Antimicrobials, *Submission 5*, p. 11; Animal Health Alliance (Australia) Ltd, *Submission 1*, p. 3; Australian Veterinary Association, *Submission 35*, p. 12.

72 The Australia Institute, *Submission 13*, p. 3.

73 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

74 See for example: Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9; Dr David Locke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 14.

75 Ms Kerrie Tucker, Research Fellow, The Australia Institute, *Committee Hansard*, 7 March 2013, p. 3.

76 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 27.

77 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 36.

3.57 Witnesses also pointed to the outcome of the Antimicrobial Resistance Summit held in 2011. The Summit brought together an interdisciplinary group of experts from the medical, veterinary, agricultural, infection control and public health sectors to establish priorities and a joint action plan. The Summit made the following recommendations in relation ARM surveillance and antibiotic usage surveillance:

- AMR surveillance
 - a comprehensive national surveillance system encompassing both passive and targeted components should be developed to monitor how much resistance is present, in which bacteria and where. This should include medical (hospital and community) and veterinary areas, as well as agriculture (including imported food);
 - priority should be given to staphylococci and E. coli, which have the greatest impact on human health (emerging resistance in E. coli and other Gram-negative bacteria poses a major new threat); and
 - methods used in resistance testing should be standardised wherever possible to enable comparison and pooling of data.
- Antibiotic usage surveillance
 - A comprehensive national monitoring and audit system covering all areas of antibiotic usage should be established. This should include comprehensive surveillance of hospital usage (eg, by expanding the National Antimicrobial Utilisation Surveillance Program), representative sampling of community prescribing, and collating distribution data from agricultural antibiotic suppliers.
 - Data on the appropriateness of usage should also be evaluated (using point-prevalence surveys comparing diagnosis with prescription).
 - Voluntary identification of hospitals in surveillance programs is recommended to encourage benchmarking and transparency.⁷⁸

3.58 In response to concerns about surveillance activities, DoHA commented that 'we are strengthening our coordination and oversight of AMR issues within health'. DoHA went on to note that the AMRSC was established in April 2012. Part of its work to develop a national strategy to minimise AMR involves a comprehensive national AMR and usage surveillance system. Its first priority was the production of the Surveillance and Reporting of Antimicrobial Resistance and Antibiotic Usage in Australia: A National Study Report. This is being finalised and will inform the

78 Australian Society for Antimicrobials, *Submission 5*, p. 6.

development of a nationally coordinated approach to surveillance and reporting on AMR and antibiotic use in Australia.⁷⁹

3.59 The ASA noted that the review of surveillance options commissioned by AMRSC 'may result in new opportunities in surveillance, data collection and interpretation'.⁸⁰ Dr Looke, a member of AMRSC, commented that AMRSC was a 'great start' to the creation of a national surveillance system. However, he went on to state that members were not full-time and further expertise is needed to address surveillance matters. Dr Looke also noted that AMRSC has decided to address AMR in human medicine first, and to address issues in the agricultural sector later.⁸¹

3.60 However, other witnesses argued that these bodies did not constitute an integrated and coordinated approach to surveillance. In relation to AMRSC, Associate Professor Gottlieb commented that it needed to be 'enhanced in many ways' and that there is inadequate funding for surveillance.⁸² The PHAA argued that the steps being taken to address the gaps in surveillance are ad-hoc and that 'the government should be establishing an oversight system to deal with research, surveillance, implementation and independent advice for government'.⁸³

3.61 In addition to AMRSC, the AMRPC Steering Group consisting of the secretaries of DoHA and DAFF was established in February 2013. The Steering Group will, in part 'guide the development of a more integrated surveillance national system for AMR and antibiotic usage. This will improve understanding of the type, number and nature of the use of antibiotics for animals and humans, and the processes in place to monitor and report on their use'.⁸⁴

3.62 DoHA commented that the involvement of the secretaries of both DoHA and DAFF on the steering committee was 'something new'. Benefits arise from their connections to other bodies and will enable them not only to have linkage across the Commonwealth Government but also with the states and territories.⁸⁵

79 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 50; see also Department of Health Ageing and portfolio bodies joint submission, *Submission 32*, pp 21–23; The Australia Institute, *Submission 13*, Appendix A.

80 Australian Society for Antimicrobials, *Submission 5*, p. 8.

81 Dr David Looke, President, Australasian Society of Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 16.

82 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38.

83 Public Health Association of Australia, *Submission 14*, p. 6.

84 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, pp 51, 56.

85 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 56.

Conclusions

3.63 While DoHA and DAFF have argued that progress has been made and activities are underway in relation to AMR monitoring and surveillance, the committee considers that the weight of evidence makes clear that there have been significant failures and many lost opportunities since JETACAR reported.

3.64 In particular, the committee points to the ineffective implementation of the strategy for surveillance developed by EAGAR, the lack of a body to coordinate surveillance across both human health and the animal health sector, and imported food products. This not only applies to AMR but also to usage of antibiotics and the level of residues in food products. The committee also notes that where there have been successes it has often been through efforts of others, such as the AGAR.

3.65 Elsewhere in the world well resourced, integrated, regular and systematic monitoring and surveillance systems have been put in place. These have been linked to evaluation programs. As a consequence, the effects of reduced antibiotic usage in Europe and Scandinavia have appeared in trends of falling AMR.

3.66 Expert witnesses identified some of the essential elements that should be included in an Australia monitoring and surveillance system that covers humans, animals and key components of the fresh food supply chain, including imported fresh foods.

3.67 The committee notes that the AMRPC Steering Group is to develop a national framework for current and future work related to AMR including development of 'a more integrated surveillance system'. The AMRSC has also been tasked with coordinating a comprehensive national antimicrobial resistance and usage surveillance system.⁸⁶ The committee notes that the 2013–14 budget identifies a deliverable described as:

Development of a national approach to reporting and surveillance of antibiotic usage, antimicrobial resistance and health care associated infections across Australia.

Coordination of surveillance through the collection and analysis of data on antimicrobial resistance from a nation-wide network of state-based surveillance systems.⁸⁷

3.68 While the above actions and funding are welcome developments, the committee considers that there is an urgent need for a concerted, coordinated and adequately resourced effort to improve surveillance and monitoring in Australia. As noted earlier in this chapter, the work of the AMRSC to date has only addressed human medicine and not animals. This is particularly significant given the evidence received about the poor surveillance in the food-animal sector.

86 Senate Community Affairs Legislation Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. E12–218, Department of Health and Ageing*.

87 Australian Commission on Safety and Quality in Health Care, *Agency Budget Statement – Budgeted Financial Statement*, 14 May 2013, p. 278.

3.69 Other countries have established effective monitoring and surveillance systems and witnesses have indicated that with judicious use of the building blocks already in place, it can be done in a cost effective manner.

3.70 The committee therefore supports the establishment of a national AMR and antimicrobial use surveillance and monitoring system under the control of the national independent body already recommended by the committee. In this way, the trends identified can be addressed through the national body to improve the way in which AMR is managed by both medical practitioners and the food-animal production sector.

3.71 The monitoring and surveillance system should encompass the following features:

- cover key human health pathogen marker species and their relevant antimicrobial;
- cover humans, animals and key components of the fresh food supply chain;
- be systematic and undertaken with sufficient regularity to allow identification of trends;
- have appropriate linkages between resistance data and other parameters, including, but not limited to antibiotic usage rates to allow causes of trends to be assessed; and
- where possible, bring together and integrate information from existing laboratories and data collection facilities.

3.72 The committee further considers that appropriate funding should be provided by the Commonwealth, state and territory governments to ensure that a comprehensive monitoring and surveillance system is implemented as soon as practicable.

3.73 The committee has also noted the evidence in relation to the lack of data available on the usage of antibiotics in animals. The committee considers that, given the importance of comprehensive information to inform decision making in relation to AMR, that this issue needs to be addressed urgently. In particular, the committee considers that the current voluntary reporting program run by APVMA should be made mandatory.

3.74 In addition, the committee noted the delays in providing information on antibiotic usage by APVMA. The most recent report available is for the years 1999–2000 to 2001–02. APVMA indicated that the report for 2005–06 to 2009–10 was to be published in 2012. However, in information provided at the Additional Estimates February 2013, it was stated that draft report 'is undergoing quality control checking' and was expected to be ready for publication in the coming months.⁸⁸

88 Senate Rural and Regional Affairs and Transport Legislation Committee, Additional Estimates 2012–13, *Answer to questions on notice No. 41, Department of Agriculture, Fisheries and Forestry*.

Recommendation 3

3.75 The committee recommends that the voluntary reporting of the quantity of antimicrobials sold by volume be made mandatory for the registrants of antimicrobials.

3.76 In addition, while submitters point to low levels of AMR in bacteria isolated in food-producing animals, the committee recommends that monitoring should be undertaken on a regular basis and be published in a timely way.

Recommendation 4

3.77 The committee recommends that the Australian Pesticides and Veterinary Medicines Authority:

- **publish, as a matter of priority, the antibiotic usage report for the period 2005–06 to 2009–10; and**
- **publish antibiotic usage reports on an annual basis and within 18 months of the end of the relevant financial year.**

3.78 The committee received disturbing evidence of the risks associated with imported food products which contain antimicrobial residues and AMR bacteria. With increasing global food production and supply systems, there is the potential for much greater quantities of food being imported with antimicrobial residues and AMR bacteria.

3.79 The committee acknowledges that imported foods must comply with Australia Food Standards and that testing programs for antimicrobial residues in imported foods are in place.

Chapter 4

Regulatory controls of antimicrobials

4.1 This chapter addresses the effectiveness of the implementation of the JETACAR recommendations relating to regulatory control of antimicrobials. The chapter summarises the Government response to the JETACAR report and a 2003 progress report on the implementation of the recommendations. The evidence received by the committee regarding concerns about the implementation of regulatory controls on the use of antimicrobials is covered, including use in animals, use for growth promotion, off-label usage, and use in plant health.

4.2 Underlying the discussion and debate on regulatory controls is that resistance levels are driven up by increased usage of antimicrobials. In addition, as noted by Dr David Looke, reducing antimicrobial usage is one of the most effective ways to bring resistance rates down:

[W]e need to somehow reduce the volume of antibiotics being used, and that occurs across the human sector as well as the animal and agriculture sectors. If you look at the one thing that has been proven to reduce the move towards worsening resistance it is reducing the amount of antibiotic pressure. So I think we need to try to do that across all areas. What we would like to see is that antibiotics are only ever used when they are really necessary.¹

Implementation of the JETACAR recommendations

4.3 JETACAR recommendations 1–9 focussed on the management of antibiotic 'load' and exposure in human and veterinary medicine through regulatory controls over registration of antibiotics, imports and end-use regulations. JETACAR stated that it was 'important that the regulatory processes for antibiotics be identical or very similar for human and veterinary drugs and that microbial resistance safety is formally assessed as part of the evaluation of antibiotics for human as well as for animal use'.²

The Government response

4.4 In its response, the Government indicated that it accepted or supported six recommendations and began implementing or referring those recommendations. The response also indicated that the Government accepted the intent of three recommendations and offered qualified support, but took a different implementation path to that specified by the JETACAR recommendations, as follows:

- recommendation 3 (licencing importers) – the Government accepted the need for a stronger audit trail for importers to end users, but was not convinced that licencing was appropriate and opted for a reporting and audit scheme instead;

1 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

2 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, pp xxv–xxvii.

- recommendation 5 (defining threshold/trigger rates of resistance for antibiotics in animals) – the Government agreed with the intent of the recommendation but opted for five yearly reporting of resistance data associated with antibiotic use in animals, rather than putting resistance prevalence information in product data; and
- recommendation 6 (all antibiotics for use in humans and animals be S4 prescription only drugs) – the Government accepted the concept of the recommendation, however, it indicated that there may be a need for exemptions where the risk is low or acceptable. The need to take into account existing industry codes of practice in implementing control of in-feed and drinking water use of antibiotics was also noted.³

Actions since JETACAR and current arrangements

4.5 In March 2003, the CIJIG released a progress report on the implementation of JETACAR. In relation to regulatory controls, the progress report noted that recommendations were being implemented, for example, the three reviews of growth promotants suggested under recommendation 2 had been initiated and activities were underway to improve national data on antibiotic prescribing in response to recommendation 3. In relation to recommendation 6, consideration of inclusion of antimicrobials for S4 scheduling was being undertaken.⁴

4.6 DAFF stated that APVMA had fulfilled all of its obligations in relation to the relevant regulatory control recommendations.⁵ Actions included the completion of the review of virginiamycin and negotiation with the Australian Veterinary Association for a code of practice on the prudent use of antimicrobials.⁶

4.7 In relation to human medicine, DoHA set out the key regulatory mechanisms that are currently in place in Australia, which include:

- prohibition of the importation of antibiotic substances unless permission has been granted by the Department, in accordance with Regulation 5A of the Customs (Prohibited Imports) Regulations 1956;
- the scheduling of the majority of antibiotics as prescription only medicines, which places controls on their supply and use where there is a potential risk to public health and safety, including from resistant strains of microorganisms; and

3 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, pp 9–16.

4 Commonwealth Interdepartmental JETACAR Implementation Group, *Progress Report*, March 2003, pp 2–4.

5 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 3.

6 Ms Kareena Arthy, Chief Executive Officer, Australian Pesticides and Veterinary Medicines Authority, *Committee Hansard*, 7 March 2013, p. 63.

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- that any product for which therapeutic claims are made must be listed, registered or included in the Australian Register of Therapeutic Goods (ARTG) before it can be supplied in Australia.⁷

4.8 DoHA noted the recent accreditation change for hospitals which require them to have antibiotic stewardship programs in place. The ACSQHC has undertaken work on the implementation of Standard 3 of the National Safety and Quality Health Service (NSQHS) Standards, "Preventing and Controlling Healthcare Associated Infection". The standard aims to ensure appropriate prescribing of antimicrobials by requiring the implementation of antimicrobial stewardship programs to influence prescribing and use of antimicrobials.

4.9 The Government has also utilised the Pharmaceutical Benefits Scheme (PBS) as a mechanism to ensure that the approvals for antibiotics subsidised under this scheme encourage judicious and appropriate use. In addition, general practices have been encouraged to achieve accreditation against the Royal Australian College of General Practitioners (RACGP) standards for general practices. The standards include a requirement that practices have systems in place that minimise the risk of healthcare associated infections.⁸

Industry actions

4.10 Industry groups provided information on regulatory controls in the agricultural sector. The Veterinary Manufacturers and Distributors Association noted that it had engaged with the APVMA and contributed to the management of AMR issues associated with JETACAR initiatives.⁹ The Animal Health Alliance informed the committee that:

The Alliance and its member companies have actively engaged with government and federal regulators – particularly Australian Pesticides and Veterinary Medicines Authority (APVMA) – in the regulatory activities initiated out of the JETACAR report recommendations. The Alliance has always supported risk based regulatory decisions made on the latest scientific information.¹⁰

4.11 The ACMF emphasised to the committee that it does not support the use of antibiotics for growth promotion in chickens. The ACMF supported the classification of all antibacterial agents as prescription only.¹¹

4.12 In relation to JETACAR recommendation 3 – a stronger audit trail for antibiotics from the importer to the end-user – industry now has record keeping

7 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 4–8.

8 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 4–8; see also Australia Society for Antimicrobials, *Submission 5*, p. 3.

9 Veterinary Manufacturers and Distributors Association, *Submission 2*, p. 1.

10 Animal Health Alliance (Australia) Ltd, *Submission 1*, p. 2.

11 Australian Chicken Meat Federation, *Submission 24*, pp 2–3.

requirements embedded within assurance programs.¹² Australian Pork Limited (APL) also outlined the measures its industry has put in place to manage antibiotics including that control of antibiotics on farms is handled through herd health programs, supported by Standard Operating Procedures and competent staff. The states and territories also regulate competency requirements for staff. Additionally, relevant herds must also have an approved medications list signed by a veterinarian that includes:

- descriptions of clinical signs of diseases and the medications to use;
- any in-feed medications used; and
- dose rate to apply and if used as label or off-label.¹³

4.13 Professor Cooper, also pointed to the success of self-regulation in relation to use of third-generation cephalosporin antibiotics in chickens. Third generation cephalosporin antibiotics are important antibiotics for human medicine, as they are very broad in their activity and very safe to use.¹⁴ Professor Cooper stated:

[I]ndustry should be applauded for selfregulation here; the Australian Poultry Industry decided not to use a third-generation drug called cephalosporin in chickens. As a result, the level of drug resistance in human infections is 3% in Australia, compared to more than 50% in countries that use the drugs.¹⁵

4.14 The ALFA also informed the committee that antibiotics have been used by livestock industries to treat sickness for over 50 years, noting that resistance issues in human health were a more recent phenomenon. ALFA also submitted to the committee that:

The use of antibiotics in the cattle feedlot industry is extremely low with only 1-3% of cattle treated in any one year. This is because antibiotics are overwhelmingly used only after infection is detected. i.e. as per their use in human medicine. Notably, they are not used for growth promotion purposes.

Whilst the food safety regulator, Food Standards Australia and New Zealand has determined that microbial loads are low in the red meat supply chain, the cattle feedlot sector has introduced a number of best management practices to reduce such loads further so that cattle health is improved and the requirement for antibiotics reduced.¹⁶

12 Joint submission by Cattle Council of Australia and Sheepmeat Council of Australia, *Submission 16*, p. 7.

13 Australian Pork Limited, *Submission 27*, p. 4.

14 Associate Professor Thomas Gottlieb, *Committee Hansard*, 7 March 2013, p. 40.

15 Professor Matthew Cooper, *Submission 23*, p. 6.

16 Australian Lot Feeders' Association, *Submission 11*, p. 1.

Concerns about the implementation of the recommendations

4.15 In contrast to the views of DAFF and DoHA, witnesses questioned the effectiveness of regulatory arrangements to manage AMR in Australia. The concerns covered issues relating to use of antimicrobials including use in animals, use for growth promotion, off-label usage, use in plant health and non-clinical use of metal based antimicrobials. In addition, the lack of a cohesive and integrated approach was also raised in relation to regulatory controls.

Antibiotic stewardship

4.16 Overuse of antibiotics in Australia remains a challenge to manage, despite recent progress, with NPS MedicineWise stating that 'every unnecessary antibiotic prescribed contributes to resistance'.¹⁷ Antibiotic stewardship aims to ensure that antibiotics are only prescribed when they are required.

4.17 As stated above, ACSQHC has worked to implement standard 3 of NSQHS Standards. As a consequence, all hospitals and healthcare facilities must have a stewardship program in place in order to be accredited. Professor Baggoley, commented that the NSQHS Standards are now mandated for over 1,500 hospitals and health services. Professor Baggoley concluded:

I believe this approach gives us a very strong foundation in moving forward with our efforts for the prevention and containment of antimicrobial resistance in Australia and provides an excellent opportunity for Australia to further expand and strengthen its response to this continually evolving global health challenge.¹⁸

4.18 The Royal Australasian College of Physicians also supported the implementation of stewardship programs in hospitals.¹⁹ Dr David Looke, commented that the adoption of standard 3 was a significant step forward.²⁰ However, the ASID also stated that 'the efficacy of this initiative in reducing antimicrobial usage and consequently resistance is as yet unknown'.²¹

4.19 Another submitter who sounded a note of caution was Associate Professor Gottlieb. He noted the development of stewardship programs but voiced concern with the effectiveness of their implementation:

I fear that the problem is that there is a lot of lip service by administrations in hospitals regarding microbial stewardship. They see it written down on paper as a mandated thing they have to do, but they find ways of just

17 NPS MedicineWise, *Submission 30*, p. 1.

18 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 51.

19 The Royal Australasian College of Physicians, *Submission 37*, p. 2.

20 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

21 Australasian Society for Infectious Diseases, *Submission 18*, p. 3.

looking like things are being done rather than committing funds to it, because you do need to put funds into this.²²

4.20 Concerns about the implementation of Standard 3 and the issue of incentives to encourage implementation are discussed in Chapter 6.

4.21 A further issue raised by submitters was that current stewardship programs do not address prescribing of antibiotics by general practitioners.²³ Dr Looke commented:

One of the biggest challenges is going to be to move that out into the community and into community practice, because most people get their antibiotics prescribed by people who are private businessmen in their own practices, and these are in general practice and specialist medical centres. Of course, the types of stewardship programs that are being mandated through accreditation have really no impact on that area.²⁴

4.22 Dr Looke went on to comment that the National Prescribing Service has committed to an ongoing program addressing antibiotic prescribing. For example, in 2012 it focused on prescribing for respiratory infections.²⁵ NPS MedicineWise also submitted that there needs to be a consistent and concerted effort to ensure practitioners better adhere to best practice guidelines for these medicines.²⁶

4.23 Extension of antibiotic stewardship beyond healthcare institutions to community care, long-term care facilities and non-medical antibiotic use was recommended by the Antimicrobial Resistance Summit 2011.²⁷

4.24 Prescribing practices in the community are addressed further in Chapter 5 in the discussion on education.

Antibiotics usage in animals

4.25 JETACAR noted the benefits of antibiotic use in animals, including economic benefits. However, the use of antibiotics in food-producing animals can result in resistant bacteria in food-producing animals that can then cause resistant infections in humans. It is also possible but yet to be established that antibiotic residues coming through the food supply could increase resistance when consumed.²⁸ JETACAR's

22 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 42.

23 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15; Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 42; Australian Society for Antimicrobials, *Submission 5*, pp 6–7.

24 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

25 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

26 NPS MedicineWise, *Submission 30*, p. 1.

27 Australian Society for Antimicrobials, *Submission 5*, pp 6–7.

28 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, pp xviii–xx.

recommendations included the review of the use of antibiotics as growth promotants and prohibition of off-label use of veterinary chemicals including antibiotics.

4.26 Dr Mark Shipp, DAFF, indicated that antimicrobials have a variety of uses in agriculture and noted that they are used in animals under regulatory controls to underpin animal health, animal production and animal welfare. The health and productivity of farm animals are improved by the responsible use of antimicrobial agents including antibiotics. The productivity of livestock industries in Australia is important to ensuring a plentiful, affordable and safe food supply. Antimicrobials are also essential in veterinary medicine for pets.²⁹

4.27 While the importance of the use of antimicrobials for animal health, production and welfare is recognised, the impact of antibiotic use in the food chain on human health also needs to be considered. Professor Collignon stated that 'there is good evidence that these resistant bacteria that develop in food animals come through the food chain, are carried by people and then they cause serious infections in people'. He pointed to the Netherlands where currently between 25–50 per cent of the *E. coli* superbug (which is resistant to all third generation cephalosporins) is causing serious disease including blood stream infections in people and appears to be derived in large part from poultry sources.³⁰

4.28 In relation to the control of antibiotic usage in animals, submitters pointed to the success in Australia of minimising resistance to fluoroquinolone. Use of fluoroquinolone is banned for use in food animals in Australia. Its use in human medicine is also restricted. It was noted that even though Australians use large quantities of antibiotics, Australia has one of lowest fluoroquinolone resistance rates in the world in humans as well as almost no resistance in food animals.³¹

4.29 Submitters argued that these examples pointed to the importance of the implementation of the JETACAR recommendations relating to antibiotic use in animals to minimise the development of resistant bacteria in humans. Submitters considered that further regulation of antibiotic use in animals is required. Professor Collignon, for example, commented that 'antibiotics are used in food animals in ways that are not used in humans and that most physicians and people in the community would regard as "abuse" of antibiotics and very poor practice'.³²

4.30 Professor Cooper added his view on the need to implement stricter controls on the use of antibiotics in the food chain:

29 Dr Mark Shipp, Australian Chief Veterinary Officer, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 7 March 2013, p. 63.

30 Professor Peter Collignon, *Submission 34*, p. 2.

31 Public Health Association of Australia, *Submission 14*, p. 10; Australian Veterinary Association, *Submission 35*, p. 6; Dr Gregory Crocetti, Friends of the Earth, *Committee Hansard*, 7 March 2013, p. 3; Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 39; Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 32.

32 Professor Peter Collignon, *Submission 34*, p. 2.

The Australian Dept. of Health and Ageing notes that 'Australia's food supply is one of the safest and cleanest in the world'. We are lucky in Australia in that we enjoy access to a high standard of healthcare. Whilst it is inhumane to withhold antibiotics for veterinary care of sick animals, Australia needs to think carefully about our attitude to risk and antibiotic use. With superbugs appearing more often in hospitals and causing more deaths, what risks are we prepared to take with human health if we continue to use antibiotics as growth promoters in animals?³³

4.31 Professor Grayson, also noted the need for better regulation in the agricultural sector and commented:

I think for human use we have a pretty tight system—it can always be improved—but in agriculture it is still not tight enough; it is not defined. We have rules and we have regulations: 'You will do this or you won't do that,' but they are not policed or checked. So there needs to be a surveillance program about drug use in agriculture, as there is to some degree in humans.³⁴

4.32 The following discussion addresses significant matters raised in relation to the use of antibiotics in the food chain: the use of antibiotics as growth promotants; use in intensive farming; off-label use of antibiotics; and use of 'critically important' antibiotics.

Antibiotic growth promotants

4.33 Antibiotics are used as growth promotants in food animals to destroy or inhibit bacteria. They are administered at a low, sub therapeutic dose. The use of antibiotics for growth promotion has arisen as more intensive farming methods have been developed. Infectious agents reduce the yield of farmed food animals and sub therapeutic doses of antibiotics are fed to animals to control these agents.

4.34 JETACAR noted that with advances in animal husbandry, genetics, disease control and nutrition, antibiotic growth promotants are only one means of improving productivity. JETACAR recommended that in-feed antibiotics should not be used in food producing animals for growth promotant purposes unless they meet certain requirements (recommendation 1). In addition, JETACAR recommended the review of three classes of antibiotics used as growth promotants and that those which failed the review process be phased out of use for this purpose. JETACAR also recommended (Recommendation 13) the development of alternatives to antibiotic growth promoters such as vaccination and improvements in feed formulation and hygiene.³⁵

33 Professor Matthew Cooper, *Submission 23*, p. 6.

34 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 10.

35 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, pp xxvii, xxvi–xxvi, xxix.

4.35 Professor Collignon was also of the view that the use of antibiotics as growth promotants is now less important for growth promotion for animals than antibiotic use for this purpose when discovered in the 1950s:

What is interesting is that after use of these antibiotics for 50 years for that purpose in animals, if you look at the data now from big poultry producers in the US, the Danish data that the WHO reviewed and others, it shows that if you use routine antibiotics for either prevention or growth promotion in animals reared under reasonable and good conditions it does not make the animals grow faster.³⁶

4.36 Professor Barton commented that no new growth promotants have been registered since JETACAR reported. However, a number of antibiotics continue to be registered and used in the food producing industry as growth promotants including some macrolides such as kitasamycin and tylosin. In addition, most antimicrobial growth promotants are now available as prescription only. However, Professor Barton went on to comment that 'the use pattern is still that of growth promotant use i.e. used for extensive periods of time or even the whole life of the animal' and that the use of macrolides will facilitate the growth in resistance.³⁷

4.37 In addition there were concerns that the benefits of using antibiotics in animals had not been evaluated in the context of the risks. Professor Grayson commented:

A lot of the intensive farming practices, whether it is chickens or pork, should be reassessed. We should ask: 'What is the risk-benefit for that? If we manage them in a slightly different way, would we need antibiotics?'

If you look back through human health the key things that improved our lives were not actually antibiotics; they were clean water, appropriate housing and reduction of overcrowding. I think we have forgotten those three rules when it comes to agriculture in the drive to try to produce food at a slightly cheaper price. We need to ask people now, 'Would you rather good quality food'—which most Australian food is—'and pay slightly more or would you rather slightly cheaper but at a risk-benefit ratio?' At the moment we do not know what that ratio is and I think we need to define it better.³⁸

4.38 Submitters supported the cessation of the use of antibiotics for growth promotion. The Australian Veterinary Association, for example, stated:

Sub-therapeutic use of antimicrobials is a strong driver of the emergence of antimicrobial resistant bacteria and antimicrobial growth promotant use should cease as soon as practicable.³⁹

4.39 Professor Collignon noted that there has been wide-spread support for the banning of antibiotic usage as growth promotants and some governments have taken

36 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, pp 33–34.

37 Professor Mary Barton, *Submission 7*, p. 1.

38 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 11.

39 Australian Veterinary Association, *Submission 35*, p. 14.

this action. However, some pharmaceutical companies have responded to these moves by redefining the word 'therapeutic' so that this term now also encompasses the routine use of antibiotics as prevention or prophylaxis. Professor Collignon went on to state:

This is also often just continuing to use the same antibiotics in the same doses as they were previously used when it was called "growth promotion". I think this is an abuse of the term "therapeutic" and is designed to just mislead governments, farmers and consumers. The JETACAR report defined these terms and made it clear that if antibiotics were given in the same way as "growth promoters" that that practice is inappropriate and needs proper regulatory evaluation. Yet this "prophylactic" practice seems to continue in Australia and internationally.⁴⁰

4.40 DAFF provided information on 'prophylactic use' and 'therapeutic use' and stated that the boundary between the two is 'not always clear'. Applications to change from use as a growth promotant 'would receive careful scrutiny to ensure that it did not infringe on the policy set out in the [JETACAR] recommendation' (recommendation 1). DAFF went on to comment that an application of this type was 'unlikely'.⁴¹

4.41 The Animal Health Alliance, which represents animal health product manufacturers, stated that it has worked cooperatively with APVMA to deliver improvements recommended by JETACAR including:

That the use of antibiotic growth promotants in food-producing animals should not be used unless they:

- are of demonstrable efficacy in livestock production under Australian farming conditions;
- are rarely or never used as systemic therapeutic agents in humans and animals, or are not considered critical therapy for human use; and
- are not likely to impair the efficacy of any other prescribed therapeutic antibiotic or antibiotics for animal or human infections through the development of resistant strains of organisms.⁴²

4.42 Industry groups also responded to concerns about the use of antibiotics for growth in food animals. The ACMF, for example, commented:

While ACMF supports the use of evidence in decision making, in recognition and appreciation of consumer concerns, the ACMF antibiotic policy does not support the use of antibiotics for growth promotion of chickens.⁴³

40 Professor Peter Collignon, *Submission 34*, p. 2.

41 Senate Rural and Regional Affairs and Transport Legislation Committee, Budget Estimates 2012–13, *Answer to question on notice No. 272, Department of Agriculture, Fisheries and Forestry*.

42 Animal Health Alliance (Australia) Ltd, *Submission 1*, p. 2.

43 Australian Chicken Meat Federation Ltd, *Submission 24*, p. 2.

4.43 APL stated that since JETACAR reported 'no evidence has emerged showing that antibiotic effectiveness in humans has been undermined as a result of any antibiotic prescribed in the pork industry'. The APL added:

Antibiotics are not used in the Australian pork industry for growth promotant purposes. Antibiotics are only used for either prophylactic use (to prevent a disease from occurring) or therapeutic use (to treat a disease once it has occurred). For this reason, antibiotic usage in the Australian pig herd is markedly less than many of our international trading partners, including the USA, Japan, Spain and many other industrialised nations.⁴⁴

4.44 The APL went on to state that the aim of the industry is to minimise the use of antibiotics through vaccines and better management of animals.⁴⁵

4.45 Professor Barton also commented on the steps taken by the pig industry:

The pig industry has clearly taken antimicrobial resistance very seriously and the Pork CRC has a strategy to reduce antimicrobial use by 50% in 5 years. Unfortunately the other industries do not recognise a problem and so antimicrobial resistance is a low priority or seen as a public health issue that is not their responsibility.⁴⁶

Intensive farming

4.46 In addition to growth promotion, other agricultural uses of antibiotics can also drive the development of AMR. In particular, the preventative uses in intensive farming were raised. Friends of the Earth Australia stated that sub-therapeutic doses of antibiotics are used to maintain animal health of livestock in the intensive farming sector. Friends of the Earth Australia argued for a ban on non-therapeutic use of antibiotics in agriculture.⁴⁷

4.47 Professor Collignon also pointed to the changes in antibiotic usage in Holland, where significant improvements have been seen, without adverse effects in industry profitability:

Holland, for instance, has done that. Antibiotics are used in people in the Netherlands at around the lowest rate in the world. It is half of what we use in defined daily doses per person. But they perversely had the highest use of antibiotics in the EU, so their vets were out of sync with human medicine. ...What is interesting is that my understanding from hearing somebody from there a couple of weeks ago is that they have decreased the volumes by 70 per cent without any evidence that this has hugely disadvantaged the animal production sector in a global sense. Exactly the same happened in Denmark...There has been a decrease overall of about 50 per cent in the

44 Australian Pork Limited, *Submission 27*, p. 2.

45 Australian Pork Limited, *Submission 27*, p. 3.

46 Professor Mary Barton, *Submission 7*, p. 4.

47 Friends of the Earth Australia, *Submission 3*, pp 4–5.

total amount of antibiotics used in that country, and they are still producing more pork; they are still one of the biggest pork exporters in the world.⁴⁸

4.48 Some positive steps are being taken to find innovative ways to produce food without using antibiotics, including other ways of preventing infections. Dr Looke informed the committee that successful outcomes have been achieved in aquaculture and the chicken industry:

I know from personally speaking to people that there is now a lot of commitment in agriculture to try to work out how to do food production without antibiotics. I note that there was some work done in aquaculture, with trying to do prawn farming without adding antimicrobials, and it was quite successful. There has been work in [the] chicken industry with breeding different types of chicken stock that are resistant to the common infections that spread through the high-intensity chicken breeding industries and they do need to put antibiotics in the feed and the water for those types of things.⁴⁹

4.49 Dr Looke concluded that innovation and ways of preventing infections should be promoted. This may mean research into vaccine development or ways of preventing the common infections.⁵⁰ Alternatives to antibiotics in intensive farming are also discussed further in chapter 5.

Off-label use of antimicrobials

4.50 JETACAR recommended that off-label use of a veterinary chemical product be made an offence. 'Off-label' use is defined in the JETACAR report as 'a use practised by, or prescribed by, a registered veterinarian where the label directions...are varied. For example, use on a different species...or by varying the dose regime'.⁵¹ The ASA noted that this recommendation was not implemented.⁵²

4.51 Currently, legal limits have been placed on the 'off-label' prescribing of drugs by veterinarians under national control-of-use principles adopted by most states and territories. These limits generally include:

- a ban on the use of unregistered products, to treat food-producing animals, with the exception of single animals;
- a limitation on off-label use, prescribing or authorising for food-producing animals of drugs and other veterinary chemicals unless they are already registered in at least one major food producing species;

48 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, pp 34–35.

49 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

50 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

51 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, p. 221.

52 Australia Society for Antimicrobials, *Submission 5*, p. 4.

- a ban on use (or prescription/authorisation) contrary to any instructions under a 'Restraint(s)' heading on a product label;
- a requirement to ensure all treated animals are adequately identified, sufficient to last until the expiry of any relevant withholding period; and
- a ban on formulating, dispensing or using a veterinary chemical, registered for oral or external use, as an injection.⁵³

4.52 DAFF noted that there is no general APVMA risk assessment covering off-label use of antibiotics in veterinary practice, as it is seldom possible to foresee all off-label uses. The APVMA may decide, following its risk assessment for an individual antibiotic product or a specific active constituent, to impose conditions of use that may include controls on off-label use. Conditions of use specified on a product label by the APVMA form part of the state/territory control-of-use regime. When the APVMA determines that off-label use of a product should be restricted, specific label instructions are included under a 'RESTRAINT' heading, for example: 'RESTRAINT: Not for use in food producing animals'. Restraints are enforceable under state/territory control-of-use legislation.⁵⁴

4.53 Professor Barton described the controls currently in place in the Australian agricultural sector as 'very disappointing in that the lowest common denominator approach was finally used to get all the States and Territories on board'.⁵⁵ Professor Collignon also commented that the implementation of the recommendation relating to off-label use as being 'very slow and poorly done'.⁵⁶ Significant gaps in the implementation of the recommendation were also identified relating to restrictions on prescribing, prescribing for domestic animals and dispensing by compounding pharmacies.⁵⁷

4.54 Professor Collignon also commented that since JETACAR, there have been new developments such as the development of the World Health Organisation list of 'critically important' antibiotics. Professor Collignon stated that community based epidemics of fluoroquinolone resistant *E. coli* infections and Extended Spectrum Betalactamase (ESBL) *E. coli* infections have occurred and that they are clearly related in part to the use of certain 'critically important' antibiotics in food animals especially in poultry.⁵⁸

4.55 Professors Barton and Collignon both pointed to the use of ceftiofur as an example of poor implementation of the JETACAR recommendations. EAGAR had

53 Professor Matthew Cooper, *Submission 23*, p. 14.

54 Senate Rural and Regional Affairs and Transport Legislation Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. 250, Department of Agriculture, Fisheries and Forestry*.

55 Professor Mary Barton, *Submission 7*, p. 3.

56 Professor Peter Collignon, *Submission 34*, Appendix, pp 3–4.

57 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38; Professor Mary Barton, *Submission 7*, p. 3.

58 Professor Peter Collignon, *Submission 34*, p. 3.

recommended that a label restraint be put on ceftiofur, however, according to Professor Collignon this recommendation was ignored by the APVMA.⁵⁹ Professor Barton stated that this 'critically important antimicrobial' is now used in a wide range of animal species including pigs and poultry when it is only registered very specifically for treatment of respiratory disease and foot infections in cattle. It is also used for a wider range of conditions in cattle too.⁶⁰

4.56 The Australia Institute also noted Professor Collignon's comments in relation to ceftiofur and stated that third generation cephalosporins such as ceftiofur are currently used in food animals being registered for cattle use and used off-label for pigs. Further:

Professor Peter Collignon from the Australian National University has recently argued that he is not convinced by claims made by the poultry and cattle farming sector that the use of ceftiofur is minimal. He cites as reasons for his scepticism the lack of any rigorous surveillance and monitoring of use and resistance, as well as the fact that advertisements in trade magazines continue to promote inappropriate use of ceftiofur. A study in 2009 showed a quarter of Australian pig herds were given ceftiofur for treatment of diarrhoea.⁶¹

4.57 Professor Cooper expressed concern that third-generation or fourth-generation cephalosporins may be being used in veterinary medicine. While Professor Cooper did not have any direct evidence that these antibiotics are being used in animals, he argued that they should be taken off the schedule of veterinary use because of their extreme value in human medicine.⁶²

4.58 The APVMA commented that the veterinary use of third generation cephalosporins is 'severely restricted'. Ceftiofur is the only veterinary medicine registered from this group and is available only on veterinary prescription. APVMA stated that it must be used according to 'strict restraints' including for individual animal treatment only.⁶³

4.59 However, Professor Barton noted that jurisdictions vary in what veterinarians are allowed to prescribe with some allowing a wide discretion for veterinarians:

In some jurisdictions veterinarians can prescribe and dispense whatever antimicrobials they like provided the use is not specifically prohibited. Provided an antimicrobial is registered for use in one livestock species in most situations vets can use that antimicrobial in all livestock species, even if it is not registered for use in that species.⁶⁴

59 Professor Peter Collignon, *Submission 34*, Appendix, pp 3–4.

60 Professor Mary Barton, *Submission 7*, p. 3.

61 The Australia Institute, *Submission 13*, pp 17–18.

62 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, p. 29.

63 Australian Pesticides and Veterinary Medicine Authority, *Submission 29*, p. 3.

64 Professor Mary Barton, *Submission 7*, p. 3.

4.60 Professor Cooper also indicated that veterinarians are allowed by law to 'off-label' with veterinarians permitted to exercise professional judgement in the off-label use or supply of most drugs or other veterinary medicines. He noted that this gives veterinarians access to beneficial drugs which may be registered for human use or which have limited registration for veterinary use.⁶⁵

4.61 Off-label use of antimicrobials in aquaculture was another issue raised in evidence. In this case, evidence for the resistance to several important antibiotics has been found. The Australian Institute commented:

[A]ssessment of the occurrence of resistance to antimicrobials in bacteria from aquaculture species and environments in Australia found resistance to a number of antimicrobials, including ampicillin, amoxicillin, cephalixin and erythromycin, oxytetracycline, tetracycline, nalidixic acid and sulphonamides. Multiple resistance was also observed.

These findings indicate that, even though no antibiotics are registered for use in aquaculture, there has been significant off-label use. This has potential implications for human health when fish are eaten and farm run-offs contaminate the environment.⁶⁶

4.62 In relation to domestic animals, Professor Barton commented that antimicrobials can be used off-label with no constraints at all in cats, dogs and horses.

4.63 A further concern raised by Professor Barton related to compounding pharmacies. These have only emerged since JETACAR. The APVMA has no control over them so that can legally formulate what they like, for example fluoroquinolones, which are used in horses. Professor Barton went on to state that that formulation is 'eminently suitable for use in other livestock species and in aquaculture. It is clear that from time to time vets illegally dispense some antimicrobials and the "free" availability from compounding pharmacies makes illicit use much easier'.⁶⁷

4.64 DAFF indicated that proposed harmonisation of state and territory veterinary prescribing and compounding rights is an element of the current COAG reforms for a single national framework for the regulation of agricultural chemicals and veterinary medicines. DAFF, in partnership with the states and territories is developing models under this proposed framework for delivery to COAG by the end of 2012.⁶⁸

Use of 'critically important' antibiotics

4.65 The concept of critically important antibiotics has been established. These critically important antibiotics provide a specific treatment, or one of a limited number of treatments, for serious disease. Some antibiotics are considered to be critically important for use in humans and others were considered critical only for use in animals, and some are considered to be critical for both humans and animals. The

65 Professor Matthew Cooper, *Submission 23*, p. 14.

66 The Australia Institute, *Submission 13, Attachment 1*, p. 22.

67 Professor Mary Barton, *Submission 7*, p. 3.

68 Senate Community Affairs Legislation Committee, Budget Estimates 2012–13, *Answer to question on notice No. E12–280, Department of Health and Ageing*.

antibiotics considered critically important for both humans and animals were considered to be priorities for resistance surveillance and for implementation of appropriate management measures to maintain the efficacy of the drugs.⁶⁹

4.66 DAFF provided the following information on the antibiotics used in animals in Australia, including domestic pets, which are listed as 'critically important in human medicine' by the WHO:

Table 4.1: Antibiotics on the WHO 'critically important in human medicine' used in animals in Australia

Antibiotic class	Active constituent
Aminoglycosides	Gentamycin
	Streptomycin
	Framycetin sulphate

Source: Senate Rural and Regional Affairs and Transport Legislation Committee, Budget Estimates 2012–13, Answer to question on notice No. 269, Department of Agriculture, Fisheries and Forestry.

4.67 Professor Collignon commented that while fluoroquinolones have been banned, much better regulation of drugs defined as 'critically important' for human health by the WHO is required. He stated that:

In my view, we need to ensure that these drugs are not used in food animals at all or if they are under much stricter controls than appear currently to be the case. This is very important for poultry, as poultry seems from international studies to be a disproportionate contributor to the carriage of resistant bacteria by people compared to other foods.⁷⁰

4.68 Professor Grayson also commented that at the moment, Australia is not adhering to the WHO critical antibiotic list. Although most are banned in agriculture use, Professor Grayson stated that:

We are pretty good but we are not right there, and I think we should be there. If we are going to achieve world-best practice we should be adhering to a very thoroughly researched document like that and saying: 'The drugs we're going to use in agriculture will be only those that are deemed to be suitable.'⁷¹

Plant health

4.69 The committee was also informed of the use of antibiotics in plant health programs. In the USA about five per cent of antibiotics are used in plant health applications.⁷² While a smaller part of the overall potential for causing resistance, it

69 Australia Lot Feeders' Association, *Submission 11*, p. 3; Joint submission by Cattle Council of Australia and Sheepmeat Council of Australia, *Submission 16*, p. 3.

70 Professor Peter Collignon, *Submission 34*, p. 3.

71 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 11.

72 Goat Vet Consultancies, *Submission 33*, pp 3–4.

was suggested to the committee that plant health applications should also be considered for better regulation:

Bee antibiotic use and honey residues are areas which are grey and not transparent. Plant Health Australia is responsible for bee health policy due to the importance of bees to plant fertilisation, but the APVMA have bees using veterinary medicines.⁷³

4.70 Other areas of concern relating to plant health, included ethanol production and other fermentation processes. Goat Vet Consultancies pointed to a lack of regulation for such activities:

Ethanol production industry overseas (and possible other fermentation industries) also use antibiotics and such use is not regulated either by APVMA as they do not register antibiotics used in manufacturing. In Australia, the responsibility for regulating the use of antibiotics in fermentation is uncertain as is the presence of antibiotic residue in fermentation by-products that are used for livestock feed. Currently there are no national standards for livestock feeds, although they have been in committee for a couple of years.⁷⁴

4.71 The committee notes that in 2010, FSANZ undertook a risk assessment of imported apples from New Zealand harvested from trees potentially treated with an antimicrobial to control fire blight. It was concluded that there was negligible increased risk to Australian consumers from potential exposure to AMR organisms.⁷⁵

Integration of regulatory arrangements

4.72 Submitters commented that effective and complementary regulation across human medicine, veterinary medicine and the agricultural sector is required to reduce indiscriminate use of antibiotics and to keep levels of AMR low in both humans and animals.

4.73 While it was noted by Associate Professor Gottlieb that goodwill and interest exists in reducing use of antibiotics, this was not enough: interest 'quickly dissipates when they are faced with day-to-day realities and individual patients, and antibiotics use often goes unchecked'. Associate Professor Gottlieb went on to comment that not only is education required but also 'true regulation of antibiotic use because goodwill and interest alone will not suffice'.⁷⁶ He also added:

Ultimately, we feel that regulation is very important. Antibiotics need to be restricted, how they are used needs to be better controlled, and I fear that we particularly need to focus on non-medical use. I do not have the evidence of how much use there is—that is not my area—but I see some articles suggesting that it is substantial in other areas such as agriculture and

73 Goat Vet Consultancies, *Submission 33*, p 3.

74 Goat Vet Consultancies, *Submission 33*, pp 3–4.

75 Senate Community Affairs Legislation Committee, Supplementary Budget Estimates 2012–13, *Answer to question on notice No. E12–222, Department of Health and Ageing*.

76 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38.

that we need to tightly regulate antibiotic use. There is so much evidence about how much resistance is coming across the food chain and we cannot ignore it.⁷⁷

4.74 Submitters also called for the regulation of antibiotics in the human and animal sectors to be brought together or, at least, that mechanisms be put in place to ensure coordination.⁷⁸ Associate Professor Gottlieb commented:

...regulation of how antibiotics are approved and used should be across human and other sectors. This could be done as one body. I cannot see why antimicrobials should be split apart between different interested groups.⁷⁹

4.75 Dr Looke supported the creation of a central agency to coordinate drug usage. In addition, a central agency could distribute information as new trial evidence and new data becomes available. This would enable listings on the PBS to be updated:

I think that all the agents that are used, right across, from human and veterinary medicine to agricultural use, all need to be in the same basket, so that we say: 'We have this drug. It is inappropriate to use this in animal medicine because you have got this instead, which is a different group of drugs, which we know, from evidence, does not promote resistance that can come through the food chain into humans.' We need to have that sort of overview of it. And then the PBS needs to reflect that.⁸⁰

4.76 Dr Looke also argued that the creation of central agency would overcome the problem of relying on submissions by the original sponsor of a drug to trigger a review. He pointed to the European approach where agents are only licensed for a limited period of time. Once this has expired, new trial information, new data and new indications are submitted. These submissions may be made by people other than the original submitter.⁸¹

4.77 In this regard, Dr Looke noted some approvals go back to the 1960s and have never been reviewed by the TGA even though it may be of benefit to have greater restrictions placed on the use of some antimicrobials. Dr Looke commented:

Our whole formula of antibiotics were approved by the TGA, often back in the 1960s, and have never been reviewed and gone through and looked at

77 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 42.

78 Centre for Research Excellence in Minimising Antibiotic Resistance in Acute Respiratory Infections, *Submission 4*, p. 1; Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 16.

79 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 38; see also Centre for Research Excellence in Minimising Antibiotic Resistance in Acute Respiratory Infections, *Submission 4*, p. 1; Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 16.

80 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 16.

81 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 17.

again, simply because it is just too difficult, with the way the current system is set up, to go back and redo things without sponsors wanting to fund them. Of course, most antibiotics now are cheap drugs made by generic companies that are not going to go and fund that type of relook when the answer might be that the drugs should be more restricted in their use.⁸²

4.78 The Antimicrobial Resistance Summit held in 2011 made recommendations in relation to regulation:

- resistance risk assessments should be part of the regulatory process for bringing new antibiotics to market for both humans and animals.
- the Pharmaceutical Benefits Advisory Committee should consider resistance in the criteria for inclusion or restriction of antibiotics on the Pharmaceutical Benefits Scheme.
- strategies should be implemented to enable 'fast-tracking' of important new antimicrobials through the regulatory approval system.
- strategies should be implemented to enable the registration of 'orphan' non-commercial drugs that have the potential to improve patient outcomes and reduce disease burden.
- adopting an antibiotic importance rating system as regulatory policy should be considered.⁸³

Conclusions

4.79 The committee acknowledges that there are regulatory arrangements in place that control the use of antimicrobials. In particular, the committee notes the implementation of standard 3 of the NSQHS Standards which encourages appropriate use of antimicrobials in healthcare services. Healthcare services must have in place antimicrobial stewardship programs, monitor antimicrobial usage and resistance, and act to improve antimicrobial stewardship. The committee considers that this is an important step in reducing the overall use of antibiotics in Australia.

4.80 However, the committee also received comments in evidence that stewardship programs are not implemented thoroughly in certain circumstances. The committee considers that consideration needs to be given to further reform and coordination of use and access to antimicrobials in hospitals. In particular, access to and use of any new antibiotics which become available should be safeguarded for the future.

Recommendation 5

4.81 The committee recommends that the Australian Commission on Safety and Quality in Health Care consider mechanisms to improve coordination and tighten access to antimicrobials in healthcare services, particularly in relation to any new antimicrobials that become available.

82 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 16.

83 Australia Society for Antimicrobials, *Submission 5*, p. 3.

4.82 The committee considers it may be possible that more attention needs to be paid to the prescribing practices of general practitioners. While much can be done through targeted education programs (which are discussed in chapter 6), the committee considers that other avenues should be explored to encourage better antibiotic stewardship by general practitioners.

Recommendation 6

4.83 The committee recommends that the Department of Health and Ageing investigate additional mechanisms to improve antibiotic stewardship in general practice.

4.84 In relation to concern with current regulatory arrangements for animal health, submitters were concerned that:

- Australia does not adhere fully to the WHO list of critically important antibiotics that should not be used in animals;
- although no longer described as 'growth promotion', the same type of antibiotic usage was thought to be occurring in food animals; and
- the emerging issue of the use of antimicrobials for plant health creates another potential path for the spread of AMR.

4.85 The committee considers that Australia should strictly adhere to WHO list of critically important antibiotics that should not be used in animals. This would not only address a significant concern about the use of these drugs but also enhance Australia's international leadership on AMR.

Recommendation 7

4.86 The committee recommends that consideration be given to banning all antibiotics listed as 'critically important in human medicine' by the World Health Organisation for use in animals in Australia.

4.87 The committee is particularly concerned about the weaknesses in the current regulations relating to the off-label use of antimicrobials in animals as well as the non-therapeutic use of antimicrobials in intensive agriculture and aquaculture.

4.88 Off-label use of antibiotics may be wide-spread. Submitters noted that JETACAR recommended that off-label use of antibiotics in animals be made an offence. However, off-label use is allowed in certain circumstances under state and territory legislation. Of particular concern was the use of third-generation cephalosporins. The committee notes that proposals for the harmonisation of state and territory prescribing and compounding rights is an element of the Council of Australian Governments' reforms for a single national framework for the regulation of agricultural chemicals and veterinary medicines.

4.89 There are moves overseas to ban the use of antibiotics as growth promotants. The evidence received by the committee indicates that the benefits of antibiotics as growth promotants is not as significant as it once was. Some industry groups have indicated that this practice is no longer undertaken in their industry. These industries are to be commended. However, it appears that other industries continue to use

antibiotics to improve growth in food animals. The committee considers that appropriate cost-benefit analysis should be undertaken to determine whether there are net benefits in allowing the practice to continue, given the costs and disadvantages arising from AMR. The cost-benefit analysis should be completed by a suitably independent body as an input into revised regulations for non-therapeutic use of antimicrobials in agriculture and aquaculture.

4.90 In addition, it was suggested to the committee that pharmaceutical companies may be seeking to redefine the term 'therapeutic' to include the routine use of antibiotics in disease prevention. While no evidence was provided that this had occurred in a widespread fashion, the committee notes that JETACAR considered that if antibiotics are given in the same way as growth promoters, proper regulatory evaluation should be undertaken.

4.91 The committee did not receive any evidence on the extent to which antibiotics are used for either prophylactic use (to prevent disease) or therapeutic use (to treat disease once it has occurred). The committee considers that more investigation of use of antibiotics for prophylactic use or therapeutic use is required.

4.92 The lack of integration between the regulations relating to the use of antimicrobials by humans and animals was a significant issue in this inquiry. As Professor Grayson noted 'agriculture and human health are linked. The bugs are the same. They do not care whether it is a cow or a human; it is just a different species.'⁸⁴ The committee considers that integrated regulations for AMR should also have a particular focus on ensuring human and animal medicine are both addressed in a consistent and complimentary fashion.

4.93 During the inquiry the committee also heard a range of other suggestions for better regulation. The committee considers that the following points are worthy of further consideration in developing an integrated AMR regulatory system:

- changing the arrangements for reviews of licences for antimicrobials so that the license can be time-limited and reviews can be triggered by means other than a submission by the original sponsor;
- requiring resistance risk assessments for bringing new antibiotics to market for both humans and animals;
- enabling 'fast-tracking' of important new antimicrobials through the regulatory approval system;
- enabling the registration of 'orphan' non-commercial drugs that have the potential to improve patient outcomes and reduce disease burden;
- using antibiotic importance ratings; and
- implementing resistance criteria for inclusion of antimicrobials in the Pharmaceutical Benefits Scheme.

84 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 9.

Chapter 5

Infection prevention strategies and hygiene measures

5.1 This chapter addresses the effectiveness of the implementation of the JETACAR recommendations relating to regulatory control of antimicrobials. The WHO identified poor infection prevention and control practices as one of the six underlying factors that drive AMR.¹ The actions taken since JETACAR are summarised, along with current arrangements. While a range of activities are underway the committee heard concerns about issues including: whether sufficient effort is being put into alternatives to antibiotics, lack of single patient rooms in hospitals, the need for further work on the hand hygiene program and non-clinical use of power antimicrobials, such as nano-silver. The chapter concludes with a discussion on ways to ensure appropriate hospital responses to AMR.

Implementation of the JETACAR recommendations

5.2 JETACAR commented that the overall bacterial 'load' to humans is reduced if high standards of hygiene are maintained in the food supply, and precautionary measures are taken to reduce contamination of humans with animal bacteria. JETACAR recommended (recommendation 12) that food safety procedures be implemented as a means of reducing the contamination of food products with foodborne organisms, including antibiotic resistant organisms, and that these programs also address on-farm infection control.

5.3 In relation to food-producing animals, JETACAR commented that the need for antibiotics will be reduced if disease is reduced through improved veterinary care and animal husbandry. JETACAR recommended (recommendation 13) that cost-effective non-antibiotic methods to increase productivity and prevent disease should be developed by intensive animal industries.

5.4 JETACAR also noted that a nationally coordinated system of human infection control practice and outbreak management is also required. JETACAR recommended that DoHA examine current surveillance activities for hospital-acquired (nosocomial) infections and that it work with stakeholders (including the states and territories) to further develop a comprehensive and standardised national system for monitoring nosocomial infections (recommendation 14). This would facilitate improvements in infection control and hygiene measures and development of national standards and guidelines for both surveillance and infection control in healthcare settings.²

The Government response

5.5 The Government supported recommendation 12 including the role of industry based codes of practice in addressing identified risk factors in food animal production

1 The Australia Institute, *Submission 13, Attachment 1*, p. 7.

2 Joint Expert Advisory Committee on Antibiotic Resistance, *The use of antibiotics in food-producing animals: antibiotics-resistant bacteria in animals and humans*, 1999, pp xxix–xxx.

systems. It was also noted that the Australia and New Zealand Food Authority (ANZFA) and other bodies were already progressing relevant strategies and policies.³

5.6 In relation to recommendation 13, the Government response noted that the Government encouraged research and development activities through established research and development corporations to develop cost effective and safe food animal production systems. Further research efforts to help decrease food animal industry dependence on antibiotic use would be encouraged. The Government indicated in its response to recommendation 14, that it was already taking action, pointing to the initiation of a national scoping study to examine existing surveillance of nosocomial infections in Australia. The study was intended to provide vital information for future national planning of nosocomial surveillance. Findings from the scoping study would be referred to the DoHA and DAFF and to the Working Party on Antibiotics or its successor.⁴

The CIJIG progress report

5.7 In March 2003, the CIJIG released a progress report on the implementation of the JETACAR recommendations. In relation to infection prevention strategies and hygiene measures, the progress report noted that for recommendations 12 and 13:

- actions to examine and improve existing procedures and industry based quality assurance to reduce microbial contamination in the production chain were continuing;
- meat hygiene standards had been developed with implementation to be undertaken the Australian Quarantine Inspection Service and states and territories;
- FSANZ had assumed responsibility for primary production and processing standards for Australia; and
- EAGAR had published outputs from a workshop on priorities for antimicrobial research in epidemiology, human health impacts and interventions to limit the emergence and spread of antimicrobial resistance.⁵

Actions since the CIJIG progress report

5.8 The DoHA submission noted that a range of measures had been funded to address recommendations 12 to 14, including the development of national infection control guidelines and programs to specifically monitor healthcare-acquired infections.⁶ These include:

3 ANZFA is now Food Standards Australia New Zealand.

4 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, pp 21–24.

5 Commonwealth Interdepartmental JETACAR Implementation Group, *Progress Report*, March 2003, p. 5.

6 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 14.

- Monitoring healthcare associated infections – a National Surveillance of Healthcare Associated Infection in Australia study was conducted and provided to the then Australian Council for Safety and Quality in Healthcare. This resulted in a national strategy to address healthcare associated infections, which contained nine recommendations endorsed by all Health Ministers in 2003.⁷

In July 2004 the Australian Council for Safety and Quality in Health Care's Health Care Associated Infections Advisory Committee reported that a national snapshot was being developed to draw together all work being undertaken in the jurisdictions on healthcare associated infections.⁸

- Safety and quality in healthcare – Standard 3 of the National Safety and Quality Health Service Standards, 'Preventing and Controlling Health Care Associated Infection' is being implemented. Standard 3 ensures that health services take active steps in relation to governance and systems for infection prevention, control and surveillance; infection prevention and control strategies; managing patients with infections or colonisations; antimicrobial stewardship; cleaning, disinfection and sterilisation; and communication with patients and carers.⁹
- Infection prevention and control guidelines – The Australian Guidelines for the Prevention and Control of Infection in Healthcare were released by the NHMRC in October 2010. The guidelines aim to establish a nationally accepted approach to infection prevention and control and provide an evidence base on which healthcare workers and healthcare facilities can develop detailed protocols and processes for infection prevention and control.¹⁰

Therapeutic guidelines for antibiotics are produced by the Antibiotic Expert Group of Therapeutic Guidelines Limited, which is an independent non-for-profit organisation. The purpose of the guidelines is to provide prescribers with clear, practical, succinct and up-to-date therapeutic information for a range of diseases. The guidelines were updated in 2010.¹¹

- Food safety – in July 2008, all jurisdictions signed up to a Food Regulation Agreement aimed at providing safe food controls for the purpose of protecting

7 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 16.

8 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 16–17.

9 Professor Debora Picone, Chief Executive Officer, Australian Commission of Safety and Quality in Health Care, *Committee Hansard*, 7 March 2013, p. 55.

10 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 15.

11 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 16.

public health and safety. The agreement and introduction of the food standards code addresses JETACAR recommendation 12.¹²

FSANZ now has oversight of Maximum Residue Limits for pesticides in imported food. FSANZ provides risk assessment advice to DAFF for food imports that represent a medium of high food safety risk.¹³

5.9 In addition, DoHA indicated that to reflect the new opportunities for national coordination and improvement, two new priority areas, including 'nationally coordinated action to address health care associated infection and antimicrobial resistance', have been added to the ACSQHC's 2013–16 work plan. This will be funded through joint arrangements with the Commonwealth, states and territories. DoHA stated that this priority builds on the success of the Commission's existing healthcare associated infection (HAI) program to address AMR and HAI, to identify, assess and communicate current and emerging threats to human health posed by infectious diseases. The Commission is proposing to coordinate national action to address HAI and AMR in alignment with initiatives under development by the Australian Health Protection Principal Committee. This provides an integrative approach to the prevention of AMR and HAI through coordination of national activities such as surveillance, response to emerging health threats, scientific opinions, scientific and technical assistance, collection of data and identification of emerging health threats, and provision of public information.¹⁴

Industry actions

5.10 Industry associations provided information on actions that industry has undertaken to address the JETACAR recommendations, including projects on pre-weaning techniques, low stress stock handling methods, commingling methods, promotion of direct consignments, methods for the introduction of cattle to grain, vaccines, animal health diagnostics, cost-effective animal husbandry that focusses on disease prevention, and simple treatments. The Hazard Analysis Critical Control Points (HACCP)-based food safety procedure has been implemented and evaluated. Advice is also given to farmers with strict program requirements for use of livestock treatment according to label and veterinary directions.¹⁵ The Australia Lot Feeders' Association also informed the committee that:

A number of vaccines have become available since 2000, and are being used commercially, for the control of bovine respiratory disease (BRD) in feedlot cattle. These include Rhinogard® for control of bovine herpesvirus, Pestigard® for control of bovine pestivirus, and Bovilis Mh® for control of *Mannheimia haemolytica*, an important secondary bacterial infection agent

12 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 14.

13 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 14.

14 Department of Health and Ageing, *Additional Information*, received 16 May 2013.

15 Australian Lot Feeders' Association, *Submission 11*, p. 8; Joint submission by the Cattle Council of Australia and the Sheepmeat Council of Australia, *Submission 16*, pp 7–8; Australian Pork Limited, *Submission 27*, pp 4–6.

in cases of BRD. The viral infections are important precursors to bacterial infections, so they are relevant in the context of reducing the need for antibiotic use.¹⁶

5.11 The ACMF submitted to the committee that the Australian chicken industry has taken AMR very seriously and achieved very low rates of resistance when compared to other countries. The ACMF argued that the low resistance rates have been achieved through 'a combination of high levels of bird health associated with infection prevention programs (including continuous attention to biosecurity and the use of vaccination), highly nutritious diets, cutting edge genetic selection and high standards of bird husbandry'.¹⁷

5.12 The ACMF noted that in a five year period it had spent 10.5 per cent of its total budget on projects aimed at developing alternatives to antibiotics. The ACMF also stated that the chicken meat industry had worked closely with FSANZ in the development and implementation of the Primary Production and Processing (PPP) Standard for Poultry Meat. The PPP Standard aims to strengthen food safety and traceability throughout the food supply chain from paddock to plate. The standard introduces new legal safeguards for growing live poultry and requires poultry growers to identify and control food safety hazards associated with poultry growing.¹⁸

Concerns about the implementation of the recommendations

5.13 Submitters raised concerns about infection prevention programs, particularly in hospitals settings such as hygiene measures, alternatives to the use of antibiotics in the food production sector and non-clinical use of antibiotics.

Infection prevention in human health

5.14 Infection prevention is crucial to decreasing the use of antibiotics, particularly in hospitals. Professor Cooper provided evidence on outcomes when infection prevention and control is poor. He pointed to countries where clinical practices are inconsistent and overburdened, causing the problem of infection to be significantly larger. Professor Cooper noted that a three year study in four Mexican public hospital intensive care units revealed device associated nosocomial infection rates of 24.4 per cent. However, where hospitals have implemented programs with a focus on prevention and control of infections, there has been a decline in the incidence of hospital acquired infections.¹⁹

5.15 Professor Grayson pointed to the example of golden staph which developed as a problem in the early 1980s. He suggested that the lack of effective infection control measures at that time has resulted in golden staph becoming a major health issue. He stated:

16 Australian Lot Feeders' Association, *Submission 11*, p. 4.

17 Australian Chicken Meat Federation, *Submission 24*, pp 1, 6–7.

18 Australian Chicken Meat Federation, *Submission 24*, p. 7.

19 Professor Matthew Cooper, *Submission 23*, pp 3–4.

The attitude was it was too hard and after a couple of years everyone gave up and said, 'We'll just have to live with it.' It is now our No. 1 pathogen 20 years later. We did not do anything about it and it is now a key issue in our healthcare system which has cost us enormously, whereas a few preventative measures at the start would not have stopped it but would have slowed it up so that it was containable and manageable. I suppose that is what I am talking about here. We are not going to stop the emergence of resistance. It is about Darwinian selection, which is that, while you have an antibiotic, bugs will learn to become resistant to it. It is about controlling it in a way such that we can continue our healthcare systems and standards of living.²⁰

5.16 In recognition of the need for infection prevention and control, standard 3 of the National Safety and Quality Health Service Standards now applies to every hospital and day procedure centre in Australia. In part, standard 3 requires systems for infection prevention, control and surveillance, including infection prevention and control strategies, managing patients with infections or colonisations, antimicrobial stewardship, cleaning, disinfection and sterilisation of hospitals. Professor Debora Picone, Chief Executive Officer, ACSQHC, commented that the changes in relation to infection control are significant.²¹

5.17 Witnesses agreed that some progress had been made in relation to infection prevention. Dr Looke, suggested that ACSQHC had made good progress on infection control to date.²² However, NPS MedicineWise supported the need for better management of infection control procedures.²³ Professor Collignon also commented that, in his view, infection control in hospitals is less than optimal, particularly for areas such as hand hygiene.²⁴

5.18 Professor Grayson argued that there should be a greatly enhanced focus on infection control measures to limit the transmission of superbugs, particularly for hospital in-patients. He stated that crucial steps include:

- further improvements hand hygiene among healthcare workers;
- establishing a national standard for hospital cleaning, including better training of cleaners; and
- establishing national standards for insertion and maintenance of invasive devices.²⁵

20 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 12.

21 Professor Debora Picone, Chief Executive Officer, ACSQHC, *Committee Hansard*, 7 March 2013, p. 55.

22 Dr David Looke, President, Australasian Society for Infection Diseases, *Committee Hansard*, 7 March 2013, p. 15.

23 NPS MedicineWise, *Submission 30*, p. 3.

24 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 31.

25 Professor M Lindsay Grayson, *Submission 19*, p. 2.

5.19 Dr Looke considered that further research is required to identify new ways of managing or preventing infections that are 'innovative and lateral'. He recommended that incentives should be given to academic centres to undertake this research. Dr Looke further stated 'this is something that will stand the country in great stead. We have always punched above our weight in doing things like that.'²⁶

Hand hygiene

5.20 In March 2008, Austin Health, Victoria, was contracted by the ACSQHC to deliver the National Hand Hygiene Initiative. The Director of Hand Hygiene Australia, Professor Grayson, informed the committee that prior to the initiative there was a great deal of variation in how hand hygiene was managed across hospitals. The initiative has delivered improvements in hygiene through standardised arrangements:

By way of example, each hospital had its own attitudes and personalities thinking about different systems for hand hygiene. My own hospital had a different system. Now we have one system that is in almost 700 hospitals around Australia with reporting three times a year and all using a standardised measure and tools using validated assessors so that when a hospital gets a bad result they do not say, 'You didn't score us properly.' They accept that it was scored properly and that they have a problem.²⁷

5.21 DoHA commented that in 2011 the National Hand Hygiene Initiative was awarded a WHO 'Centre of Excellence Award', one of only four sites worldwide to receive such an honour. In 2012 over 90 per cent of public hospitals and over 50 per cent of private hospitals contributed data to the initiative. Compliance has risen from 64 per cent when data was first collected in 2009 to 73 per cent in 2012. DoHA indicated that the future direction of the hand hygiene initiative is to focus on:

- national hand hygiene data standardisation and validity;
- national hand hygiene database, analysis and efficiency;
- national hand hygiene education resources and credentialing;
- private sector hand hygiene support and coordination; and
- research and development.²⁸

5.22 The Pharmaceutical Society of Australia (PSA) informed the committee of its Self Care program, aimed at providing reliable health information to Australians. The information provided includes simple hand and body hygiene advice in an easy to read fact card. Along with Friends of the Earth Australia, the PSA discourages the use of antibacterial and antimicrobial hand wash lotions and cleaning products unless advised to do so by a health professional:

26 Dr David Looke, President, Australasian Society for Infection Diseases, *Committee Hansard*, 7 March 2013, p. 14.

27 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 12.

28 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 20.

If used frequently, many of these products can contribute to the development of resistant bacteria. In most situations, washing with plain non-bactericidal soap/detergent, rinsing with running water and thorough drying is effective cleaning and is cheaper.²⁹

5.23 The importance of hand hygiene was also noted for people working with animals, including pigs, raw seafood, and raw meat.³⁰ The potential risks for the community associated with the use of antibiotics in imported ornamental fish were also brought to the committee's attention.³¹

Single patient rooms

5.24 Another issue highlighted by Professor Grayson was increased infection transmission problems arising from having multi-patient rooms in hospitals. Antibiotics were used to combat the resulting increases in infections when more patients were put into large rooms. Professor Grayson argued that it may be appropriate to reduce the transmission of infections by having single patient rooms:

Why were you going to get sick in the first place? Was it because in the hospital there were four of you in a room potentially spreading germs between the four of you? Should we be moving to single rooms and being separated from each other, which was the situation before antibiotics were invented? Fairfield Hospital and other isolation hospitals all had single rooms because they did not have antibiotics. They separated a sick person from another. It is not rocket science. In a way we have become lazy or dependent on antibiotics and said: 'With antibiotics we do not need to worry about that. We can put people together and we will get around the problem by giving them antibiotics.' I do not think we can afford to do that any more.³²

5.25 DoHA commented that research in the UK has shown that improved designs in National Health Service buildings can have a significant impact on the control of infection in clinical areas and help to reduce the more than £1 billion annual cost burden of healthcare associated infections. A number of recently designed Australian hospitals (for example, the new Royal Perth Hospital and the Royal Adelaide Hospital) have incorporated these key principles in their designs such that they each have about 80 per cent single rooms, each with their own bathroom, to avoid sharing of toilet facilities.³³

29 Pharmaceutical Society of Australia, *Submission 31, Attachment 1*, pp 2–3.

30 The Australia Institute, *Submission 13, Attachment 1*, p. 25. Australian Pork Limited, *Submission 27*, p. 11; Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 14; Dr Bob Biddle, Assistant Secretary, Animals Health Policy, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 7 March 2013, p. 64.

31 Pine Creek Fish Hatchery, *Submission 9, Attachment 2*, p. 1.

32 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 11.

33 Department of Health and Ageing, *Answer to question on notice No. 2*, received 16 May 2013.

Aged care

5.26 Submitters and witnesses indicated that AMR was also a problem in aged care facilities.³⁴ In response to committee questions on the impact that AMR is having in the aged care sector, NPS MedicineWise indicated that while some projects had been undertaken in Victoria, there was little specific information available.³⁵ DoHA advised the committee that the Australian Government has responsibility for the surveillance and management of infection in aged care.³⁶

5.27 The committee notes that the *Quality of Care Principles 1997* require an 'an effective infection control program' to be implemented.³⁷ The relevant aged care standards provide further detail on policies, practices and considerations required of an effective infection control program, under standard 4.³⁸ However these standards and the related guidelines do not explicitly cover AMR.

5.28 Professor Rood called for an integrated response to AMR that covers all sectors, including aged care. The ASID/ASA antimicrobial resistance summit in 2011 recommended that 'national evidence-based standards for multi-resistant organism control in aged care facilities should be developed, implemented and robustly enforced and monitored.'³⁹

Incentives

5.29 In order to ensure that hospitals make every effort to decrease AMR rates, Professor Cooper suggested that incentives be provided to hospitals. He noted a program in the United Kingdom in which hospital chief executive officer bonuses were linked to performance on AMR. As a result, year-on-year reductions in MRSA incidence rates have been reported from the late 2000s.⁴⁰

5.30 NPS MedicineWise supported using incentives in hospitals as long as the incentives were carefully thought out so that unintended consequences were avoided:

34 See for example Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 45; Public Health Association of Australia, *Submission 14*, p. 4.

35 Dr Philippa Binns, Clinical Adviser, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 25.

36 Professor Chris Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 49.

37 *Quality of Care Principles 1997*, p. 22.

38 *Standards and Guidelines for Residential Aged Care Services Manual*, <http://www.health.gov.au/internet/publications/publishing.nsf/Content/ageing-manuals-sgr-sgrindex.htm~ageing-manuals-sgr-sgrindex-2.htm> and *Standard 4 – Physical Environment and Safety Systems*, <http://www.health.gov.au/internet/publications/publishing.nsf/Content/ageing-manuals-sgr-sgrindex.htm~ageing-manuals-sgr-sgrindex3.htm~ageing-manuals-sgr-sgrindex3-4.htm>, (accessed 16 May 2013).

39 Australia Society for Antimicrobials, *Submission 5*, p. 7.

40 Professor Matthew Cooper, *Submission 23*, p. 1; see also Professor Matthew Cooper, 7 March 2013, p. 28.

I think you have to be very sure you have the right indicator and the right incentive, that you are measuring the right thing. If you are not, of course, you have unintended consequences. If you get the measure right it can be very powerful. It is a very powerful signal that you care about it... So it can be very useful in that way. It focuses people's mind on that particular issue.⁴¹

5.31 The importance of carefully selecting the incentives was highlighted by data from the United Kingdom in which the rates of targeted AMR fell, while rates for other types of AMR rose:

Based on results from a selection of hospitals across England, the report indicates that there have been large reductions in both MRSA and *C. difficile* rates since the last survey was conducted in 2006. *C. difficile* infections fell from 2% of patients becoming infected in 2006 to 0.4% in the 2012 report. MRSA fell even more sharply, from 1.8% of patients affected to less than 0.1%.

However, infections with other organisms, such as *E. coli* and salmonella, are increasing.⁴²

5.32 Dr Jenny Firman, DoHA, indicated that some incentives already exist in the Australian healthcare system in relation to prescribing in general practice. While there are a small percentage of prescriptions are private prescriptions, it is simpler and cheaper for patients to use the Pharmaceutical Benefits Scheme. The use of the authority also makes it more difficult to prescribe certain drugs. Dr Firman commented that is a very effective method. In addition, clinicians are provided with feedback on prescribing patterns and comparisons with peers can be made.⁴³

5.33 In relation to general practice, the current Practice Incentives Program (PIP) provides payments to support general practice activities that encourage continuing improvements, quality care, enhance capacity, and improve access and health outcomes for patients.⁴⁴

5.34 Professor Picone, ACSQHC, was less enthusiastic about incentives in hospital settings, citing a lack of evidence for the effectiveness of financial and other incentives, instead suggesting that mandating standards, such as standard 3, was a preferable approach to changing behaviour.⁴⁵

41 Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 24.

42 NHS Choices, *MRSA rates slashed, but other bugs a threat*, <http://www.nhs.uk/news/2012/05may/Pages/mrsa-hospital-acquired-infection-rates.aspx>, 23 May 2012, (accessed 10 April 2013).

43 Dr Jenny Firman, Senior Medical Adviser, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 60.

44 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 8.

45 Professor Debora Picone, Chief Executive Officer, Australian Commission on Safety and Quality in Health Care, *Committee Hansard*, 7 March 2013, p. 61.

5.35 However, Australian Society for Antimicrobials and the Public Health Association of Australia submitted to the committee that the 2001 WHO Global Strategy for Containment of Antimicrobial Resistance includes the creation of economic incentives for the appropriate use of antimicrobials.⁴⁶

Control of infections imported from overseas

5.36 The issue of control of infections in overseas countries that may impact on Australia was also noted. Professor Grayson commented on control at the border to prevent diseases being brought into Australia:

The whole reason we have things in place in airports is to prevent the importation of diseases and they have been incredibly effective. In the case of specific infectious diseases, we know that in the past when steps were instituted to control importation of swine flu or avian flu, more importantly, they were incredibly effective at preventing the importation of these diseases. We have a very robust public health system that can cope with this if the right directions are given to them in terms of screening and awareness amongst returned travellers about these issues.⁴⁷

5.37 Professor Baggoley, DoHA, also informed the committee of Australia's international work to promote infection control.⁴⁸

Alternatives to antibiotics in the food production sector

5.38 One of the central messages from JETACAR was the need to develop approaches to alternative infection prevention, particularly in the food animal sector, so that the antibiotic usage could be decreased and thus resistance is decreased. Professor Collignon summed this up in his comments to the committee:

I am not saying that animals should never get antibiotics to prevent them getting disease. My argument is that if you routinely have to add antibiotics to feed or water to prevent animals getting disease there is something wrong with your production system...In my view, continuous use of antibiotics is an example of a practice that is inherently not sustainable and needs to change so that you prevent disease by means other than antibiotics.⁴⁹

5.39 The committee was informed by the ASID that innovation and ways of preventing infections are needed. Possible approaches suggested include vaccine development, ways of preventing the common infections, reactivating Staph Aureus prevention and treatment with a staphylococcal vaccine.⁵⁰ Dr Looke noted that the

46 Australian Society for Antimicrobials, *Submission 5*, p. 8. Public Health Association of Australia, *Submission 14*, p. 9.

47 Professor M Lindsay Grayson, *Committee Hansard*, 7 March 2013, p. 11.

48 Professor Baggoley, Chief Medical Officer, Department of Health and Ageing, *Committee Hansard*, 7 March 2013, p. 50.

49 Professor Peter Collignon, *Committee Hansard*, 7 March 2013, p. 34.

50 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

agricultural sector is attempting to identify ways of producing food without antibiotics. Dr Looke stated:

I note that there was some work done in aquaculture, with trying to do prawn farming without adding antimicrobials, and it was quite successful. There has been work in the chicken industry with breeding different types of chicken stock that are resistant to the common infections that spread through the high-intensity chicken breeding industries and they do need to put antibiotics in the feed and the water for those types of things.

That is the sort of thing that we should be trying to promote as innovation and ways of preventing infections.⁵¹

5.40 The Australian Veterinarian Association (AVA) indicated its support for the development and use of alternatives to antibiotics. Whenever possible the use of non-antibiotic options is recommended prior to decision to employ antimicrobial interventions. The AVA annual conference and the Australian Veterinary Journal both regularly include information on research on alternatives to antibiotics, such as dietary manipulation, natural products, probiotics and immunological stimulants.

5.41 The AVA Guidelines for veterinary personal biosecurity also set out a comprehensive approach to protecting veterinary personnel from zoonotic infections. The AVA's Therapeutic subcommittee published a review on the prevention and treatment of Ruminal Acidosis, that noted that forward planning and preventative management can frequently avoid the onset of fermentative acidosis.⁵²

5.42 The ASID/ASA antimicrobial resistance summit in 2011 also recommended as one of its top five priorities, the development of enhanced infection prevention strategies with investigation of ways of circumventing the need for antimicrobials in all sectors of human and animal health, and agriculture.⁵³

5.43 The pork industry stated that it has been working with research bodies on a range projects, including reduction of antibiotic usage through herd management, diagnostic tools and alternative treatments, such as gene based vaccines.⁵⁴ However, Australian Pork Limited noted some concerns about the process for getting new vaccines registered:

APL believes industry endeavours in this regard are being stifled by what is typically a protracted registration process experienced by a number of companies that wish to import efficacious and safe vaccines. APL would urge the APVMA to rationalize the registration process for imported vaccines.⁵⁵

51 Dr David Looke, President, Australasian Society for Infectious Diseases, *Committee Hansard*, 7 March 2013, p. 15.

52 Australian Veterinary Association, *Submission 35*, pp 8–9, 13.

53 Australasian Society for Infectious Diseases, *Submission 18*, p. 5.

54 Australian Pork Limited, *Submission 27*, pp 4–6.

55 Australian Pork Limited, *Submission 27*, p. 4.

Non-clinical use of nano-silver and other antimicrobials

5.44 Friends of the Earth Australia and the Australia Institute raised concerns about the increased use of antimicrobials in consumer goods, particularly nano-silver and triclosan.

5.45 Compounds such as alcohol, mercury, silver and bleach act as antimicrobials. Silver can be manipulated into small nanoparticles which allow it to spread further and to increase its efficiency. Friends of the Earth noted nanosilver has 'important clinical applications: lining wound dressings, catheters, stents—places where bacteria can infect compromised people in hospitals and, ultimately, nanosilver can help save lives'.⁵⁶ However, nano-silver is being increasingly used in consumer goods such as dish cloths, hair brushes, baby mattresses, toothbrushes and computer keyboards.⁵⁷

5.46 Triclosan was first developed and introduced as an antimicrobial and preservative in the 1960s. Since this time, triclosan has been used in clinical settings as an antiseptic. However, like nano-silver it is also used in a 'vast range of domestic products under trade names such as *Microban* and *Ultrafresh*, including hand soaps, pillows, toothpastes, cosmetics, mouthwash, deodorants, cutting boards, wound disinfectants, facial tissues, plastic utensils, socks and toys'. Friends of the Earth went on to note that both nano-silver and triclosan are non-specific antimicrobials and have the ability to kill good microbes as well as the bad.⁵⁸

5.47 Dr Crocetti, Friends of the Earth, concluded:

So we have two classic examples of antimicrobials that could form vital weapons in our ongoing battle against multidrug-resistant bacteria—superbugs—in hospitals, but at the current rate of this frivolous use in consumer goods we will inevitably lose effectiveness. Also, the widespread use of these antimicrobials will lead to an even greater problem.⁵⁹

5.48 Dr Crocetti also raised the dangers of co-selection if these antimicrobials are used unnecessarily in household products. Co-selection means, in simple terms, that if microbes or bacteria becomes resistant, the resistance can be passed on to successive microbes or bacteria for not just the initial antimicrobial but for other similar antimicrobials. Dr Crocetti explained this in more detail in evidence.⁶⁰

56 Dr Gregory Crocetti, Nanotechnology Campaigner, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 2.

57 The Australia Institute, *Submission 13, Attachment 1*, p. 14; Dr Gregory Crocetti, Nanotechnology Campaigner, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 2; Friends of the Earth Australia, *Submission 3*, p. 9.

58 Friends of the Earth Australia, *Submission 3*, p. 15.

59 Dr Gregory Crocetti, Nanotechnology Campaigner, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 2.

60 Dr Gregory Crocetti, Nanotechnology Campaigner, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 2.

5.49 Similarly, Dr Liz Frazer noted that exposure to mercury can contribute to co-selection for resistance. Dr Frazer also pointed out that contact with mercury, through food sources, such as fish, or older dental amalgams could contribute to resistance.⁶¹

5.50 The Public Health Association of Australia⁶² and Friends of the Earth Australia suggested that usage of antimicrobials such as nano-silver and triclosan should be restricted to their clinical applications:

Experts agree that regulators need to halt the excessive and unnecessary use of powerful antimicrobials in every day products. This kind of regulation is critical in order to maintain the effective clinical uses of those antimicrobials, as well as the continued effectiveness of antibiotics.⁶³

5.51 DoHA responded to concerns about the use of nano-silver and stated it has not taken any specific actions relating to nano-silver. DoHA went on to note that there is very limited data to support human toxicological risk assessment. Further studies are needed to understand the many forms of nano-silver and their effects. Concerns that exposure to nano-silver may potentially lead to AMR are not supported by evidence of any increased bacterial resistance to silver in the medical literature.⁶⁴

Conclusions

5.52 It is acknowledged that infection prevention strategies and hygiene measures are an important aspect of controlling the antibiotic use and therefore the incidence of AMR. The committee acknowledges that progress has been made for infection prevention and hygiene, such as the development and implementation of standards and national guidelines, covering areas including healthcare associated infections, food standards, and industry based quality assurance programs.

5.53 In relation to infection control in hospital settings, the committee notes the work of ACSQHC in the implementation of standard 3 of the National Safety and Quality Health Service Standards.

5.54 The National Hand Hygiene Initiative is another important program which has resulted in increased compliance from 64 per cent in 2009 to 73 per cent in 2012. The committee considers that further work on hand hygiene as outlined by DoHA should be progressed as a priority. In addition, the committee considers that more private hospitals should be encouraged to contribute data to the initiative.

5.55 While the implementation of standard 3 and the success of the Hand Hygiene Initiative are welcome, there other areas that have been poorly addressed. These areas include national standards for hospital cleaning and cleaning training, and national standards for the insertion and maintenance of invasive devices. The problem of

61 Dr Liz Frazer, *Submission 21*, pp 1–2.

62 Public Health Association of Australia, *Submission 14*, p. 11.

63 Friends of the Earth Australia, *Submission 3*, pp 2, 18.

64 Department of Health and Ageing, *Answer to question on notice No. 4*, received 16 May 2013.

infection transmission in multi-patient hospital rooms was also highlighted to the committee.

5.56 The committee has noted the comments received in relation to incentives for hospitals to ensure that every effort is to improve infection control and thus decrease AMR rates. The committee does not consider that incentives are required at this point in time. The need to comply with standard 3, which in part requires infection control and prevention strategies to gain and maintain accreditation, is a significant mechanism to ensure that hospitals meet the standards required. In addition, publication of hand hygiene rates and cases of golden staph for each hospital on the MyHospitals website acts as a further incentive to improve infection control and hygiene. However, the committee considers that further investigation of means to implement effective infection control in community medical practices is warranted.

5.57 The committee also considers that, while infection control programs are required under the Standards and Guidelines for Residential Aged Care Services Manual, it would be appropriate for those standards to explicitly address AMR aspects of infection prevention and control. In addition, the committee considers that the standards should substantially reflect the standards contained in standard 3 of the National Safety and Quality Health Service Standards.

Recommendation 8

5.58 The committee recommends that Australian Commission on Safety and Quality in Health Care coordinate the development of a national system of enhanced infection control including minimum hospital inpatient infection control standards, and standards for community health practices and aged care facilities.

Recommendation 9

5.59 The committee further recommends that the Commonwealth consider further support for research and development in infection control in farmed animals with the goal of reducing the need for the use of antibiotics in agriculture, taking into account the costs and impacts of proposed measures on animal health and farming practices.

5.60 The increasing non-clinical use of powerful antimicrobials in consumer products was brought to the committee's attention. Some witnesses suggested that such uses can contribute to significant multi-drug resistance and undermine the use of these antimicrobials in clinical settings. The committee considers that this issue is worthy of further monitoring of research outcomes in relation to nano-silver.

Chapter 6

AMR education and research

6.1 This chapter examines the implementation of the JETACAR recommendations in relation to education and research.

Education

6.2 JETACAR recommendations 15 to 17 urged the development of prudent use codes of practice for antibiotics; regularly updated antibiotic use guidelines; and the development of continuing educational programs on AMR by learned (medical and veterinary) and professional societies. Recommendations 19 and 20, which related to communications, also called for the development of an ongoing education strategy to provide appropriately targeted information on AMR to relevant professional bodies, stakeholders and the general public. The Government supported these recommendations.

6.3 In relation to education, DoHA noted that the Government continues to fund education programs and awareness campaigns to ensure that health professionals, industry and the community are informed about antibiotic use. Part of this program is undertaken by the National Prescribing Service NPS. Relevant NPS activities include NPS News and Australia Prescriber journal; education on targeted therapeutic programs; and consumer awareness campaigns as well as a medicine line that consumer can call for information.¹

6.4 DoHA also commented that the implementation of activities to address AMR in Australia is a shared responsibility between governments, industries, educators, health and veterinary professionals and the community.² One group providing education in relation to antibiotic use is NSP MedicineWise. NPS MedicineWise is currently running a campaign aimed at reducing the prescription of antibiotics by 25 per cent over five years. In April 2013, NPS launched a comprehensive campaign encouraging all Australians to become 'antibiotic resistance fighters'.³

6.5 Two key communication campaigns were identified by DoHA: Antibiotic Awareness Week; and the National Hand Hygiene Initiative. Antibiotic Awareness Week is a global initiative that aims to raise awareness of the importance of appropriate use of antibiotics in our hospitals and the community. The National Hand Hygiene Initiative is delivered on behalf of the ACSQHC by Austin Health. Its success has been recognised by the WHO which awarded the Initiative a 'Centre of Excellence Award' in 2011. DoHA noted that in 2012, 569 hospitals contributed data

1 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 17–18.

2 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 2.

3 Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 20.

to the national initiative, comprising over 90 per cent of public hospitals and over 50 per cent of private hospitals.⁴

6.6 In relation to the veterinary aspects of recommendations 15 to 17, DAFF stated that it understands that these obligations have been, and continue to be, fulfilled. For example, state and territory veterinary registration boards have developed codes of practice and antibiotic use legislation is in place. In addition, the AVA has published guidelines on the use of veterinary medicines and policies on use of antimicrobial drugs.⁵ DAFF also noted that part of its website is dedicated to AMR issues associated with food producing animals and food regulation and safety, and the Codex Adhoc Intergovernmental Task Force on Antimicrobial Resistance.⁶

Concerns with the implementation of recommendations relating to education

6.7 To successfully address the growth of AMR, effective education programs will be required for medical professionals, veterinarians, the public sector and the community. The implementation of the JETACAR recommendations relating to education appears to have been progressed significantly. However, important issues were raised in evidence including the effectiveness of education programs for both practitioners and the community. For example, the committee was informed that, in spite of the various education programs that had been conducted, Australia's antibiotic usage remains high.⁷ Over the period 2005–06 to 2010–11, the aggregate antibiotic utilisation rates for hospitals increased from around 930 to 985 daily defined doses per 1000 occupied bed days.⁸ In total, more than 22 million prescriptions for antibiotics are issued each year.⁹

6.8 Submitters pointed to a number of significant areas where improvements in education could be undertaken for both the community who seek antibiotics, and practitioners who prescribe them.

6.9 Submitters argued that properly targeted education campaigns can have a significant impact on prescribing rates. Friends of the Earth Australia pointed to Scandinavia where more than a decade of education campaigns have contributed to some of the lowest levels of superbugs in the world.¹⁰ NPS MedicineWise provided further detail on what has been achieved in Scandinavia:

They have run a campaign and evaluation between 1994 and 2004 where they implemented surveillance and education. They saw a fall in

4 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, pp 18–20.

5 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 9.

6 Department of Agriculture, Fisheries and Forestry, *Submission 12*, p. 10.

7 The Australia Institute, *Submission 13, Attachment 1*, p. 13; Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, pp 20–22.

8 National Antimicrobial Utilisation Surveillance Program, *Annual Report 2011–2012*, p. 11.

9 Public Health Association of Australia, *Submission 14*, p. 11.

10 Dr Gregory Crocetti, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 3.

prescriptions from 536 prescriptions per thousand population per year down to 410 prescriptions per thousand per year. Those rates have been sustained. They still have the lowest recorded levels of MRSA. So they are seeing the lowering of prescribing translating into lower rates of the antibiotic resistant infections.¹¹

6.10 The ASA also emphasised the importance of ensuring that education campaigns were sustained and coupled with audit and feedback on outcomes:

Research has demonstrated that the education campaigns and guidelines are ineffective unless they are combined with sustained interventions such as audit and feedback methods and/or a system where proactive steps are taken to assist prescribing and interventions are made to address poor performance.¹²

6.11 NPS MedicineWise concurred with the need for sustained education programs and noted that each time it had undertaken an education campaign and implemented a program to fight antibiotic resistance, evaluation has shown a decline in antibiotic prescribing and a rise in community awareness. However, when the campaigns have ceased, and in the absence of ongoing effort, some of the gains have been lost.¹³

6.12 A common theme in the inquiry was the continuing overuse of antibiotics in situations where they were not really needed, or where their effectiveness was questionable, such as in the presence of viral infections. The CHF indicated that their research showed that there is continued widespread confusion about the efficacy of antibiotics in the treatment of viral and bacterial infections.¹⁴ NPS MedicineWise also noted that consumers create significant demand for antibiotics:

Recent NPS research found approximately 1 in 5 Australians still expect to receive antibiotics when they visit their GP with a cough or cold. This number increased to 76% – 3 in 4 people – if they had an ear, nose, throat or chest infection, with 53% stating they would ask for a prescription if one was not supplied by the GP. Consumers need to understand how antibiotics work, which conditions they don't work for, and have a broader understanding of the impact their treatment choices will have on the future of available effective treatments for life threatening infections.¹⁵

11 Dr Phillipa Binns, Clinical Adviser, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 21.

12 Australian Society for Antimicrobials, *Submission 5*, p. 8.

13 Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 20.

14 Consumer Health Forum of Australia, *Submission 10*, p. 2.

15 NPS MedicineWise, *Submission 30*, pp 1–2.

6.13 Friends of the Earth, CHF and NPS MedicineWise argued that educating consumers is vital if the usage rates of antibiotics are to be reduced.¹⁶ NPS MedicineWise concluded that to ensure that unnecessary prescribing rates for antibiotics decline and consumers change their behaviour, ongoing education campaigns are required:

Previous NPS research has shown during and immediately after an antibiotic campaign has been run prescribing rates decline, however once the campaign is out of mind antibiotic prescribing starts to increase. An investment needs to be made in longer funded campaigns to achieve adequate population exposure.¹⁷

6.14 In relation to practitioners, submitters commented on university curricula and the attitudes to AMR and prescribing of those who working in the community. Associate Professor Gottlieb highlighted gaps in the university curricula for the education of medical professionals:

Where we have not kept up to date in an educational way is in university curricula where there is very little mention of antimicrobials. Our medical students, as an example, and I am sure those in other areas as well, hardly hear about the problems of antimicrobial resistance. It is up to individuals lecturers to mention it. They walk into hospitals, particularly surgical trainees and so on, not having much of an idea of the scale of the problem. If you do not get to people early then you may lose them.¹⁸

6.15 Similar concerns about training in the veterinary use of antibiotics were raised by Professor Barton:

In veterinary schools although the microbiologists will educate students about responsible antimicrobial use and the risks to animal and human health from antimicrobial resistance, once the students get into the clinical years this is dismissed as irrelevant by many of the clinician veterinarians and the vets with whom they do work experience.¹⁹

6.16 As AMR is an international problem and thus resistance entering Australia from other countries is a significant challenge, Associate Professor Gottlieb noted that Australia could have an educational role internationally if we are able to get our own house in order:

I see there is a huge problem in Asia—in South-East Asia, China and so on. We can lead by example. There is no reason why Australia cannot contribute to the dialogue that is out there. So I think we have an

16 Dr Gregory Crocetti, Nanotechnology Campaigner, Friends of the Earth Australia, *Committee Hansard*, 7 March 2013, p. 5; Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 20; Consumer Health Forum of Australia, *Submission 10*, p. 2.

17 NPS MedicineWise, *Submission 30*, p. 3.

18 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 39.

19 Professor Mary Barton, *Submission 7*, p. 5.

educational role. But before we extend ourselves over there we have to be seen to be doing the right thing here as well.²⁰

Conclusions

6.17 The education recommendations appear to be one of the areas more effectively addressed following JETACAR. However, much remains to be done, given the continuing increases in antimicrobial usage and resistance in the community with more than 22 million prescriptions for antibiotics being issued each year.

6.18 One of the reasons for the high usage of antibiotics is the poor understanding in the community of efficacy of antibiotics in the treatment of viral and bacterial infections. JETACAR also noted that farmers who have infected animals under veterinary care similarly have a poor understanding of the use of antibiotics. In order to improve the understanding of the correct use of antibiotics, education campaigns are required. The committee was provided with examples of successful education campaigns which have led to the increased awareness and reduction in antibiotic usage rates. However, to achieve a real and sustained change in behaviour, education campaigns must be well targeted and sustained.

6.19 Submitters also pointed to the lack of focus in both medical and veterinary curricula and ongoing education for those already in the workforce.

6.20 The committee notes that as part of the proposed new national strategy to address AMR, matters to be addressed include education and stewardship and community and consumer campaigns. The committee welcomes the inclusion of these matters in the national strategy. Further, the committee considers that education campaigns under the national strategy must take account of some of the issues identified in this inquiry, including:

- better linkages to monitoring and evaluation so the effectiveness of education programs can be determined;
- ensuring that efforts are sustained, rather than being of a start-stop nature;
- focussing on consistency of education and communication across hospitals, healthcare facilities, general practitioners, veterinarians, agriculture and the community;
- consistency of education within different levels in particular disciplines, across disciplines (medicine and veterinary), and across jurisdictions; and
- making contributions to education with Australia's trading partners and neighbours.

Research and development

6.21 The JETACAR report observed that Australia had a high level of expertise in the molecular biology of antibiotic resistance. However, the lack of a centrally coordinated research facility or agenda had resulted in several important areas needing

20 Associate Professor Thomas Gottlieb, President, Australian Society for Antimicrobials, *Committee Hansard*, 7 March 2013, p. 40.

attention, including alternatives to antibiotic growth promotants for animal production, alternatives to other antibiotic uses in animals and humans (including vaccines), epidemiology of resistance (including molecular epidemiology and gene transfer mechanisms), effects of intervention programs (for example, to reduce levels of prescribing and antibiotic use), clinical efficacy and rapid diagnostic methods. JETACAR recommended that all relevant research funding agencies give priority to research into AMR.

6.22 The Government acknowledged that research into the areas identified by JETACAR played an important and necessary role in controlling the emergence and impact of antibiotic resistance. The Government also acknowledged that Australia had access to research being undertaken overseas which should be used to guide Australian research priorities and assist in making evidence-based policy decisions.²¹

6.23 DoHA provided information on NHMRC research funding relating to AMR and noted that it has increased dramatically over the last ten years. In 2002, NHMRC invested \$1.0 million in AMR research across 13 grants. By 2012, this amount had grown nine-fold to \$9.7 million across 65 grants (forecast expenditure). The NHMRC's Strategic Plan (2010–2012) identified *Planning for emerging infectious disease threats* (including AMR) as a strategic research priority. The Strategic Plan for 2012–2015 will continue funding for AMR research.

6.24 DoHA also noted that in 2012, NHMRC launched the Research Translation Faculty, a major strategic initiative for health and medical research translation in Australia and commented that 'this initiative will support more effective and accelerated translation of health and medical research into improved policy and practice in Australia...AMR is one of the health issues that will be considered for action by the Faculty during the current NHMRC triennium, 2013–2015.'²²

6.25 One program funded by the NHMRC is the Centre for Research Excellence in Minimising Antibiotic Resistance in Acute Respiratory Infections. This program is investigating issue including side-effects of antibiotics, the extent of benefits of antibiotics for acute respiratory infections, changes in prescribing practice and whether changes to packaging can improve the use of antibiotics.²³

6.26 Research is also undertaken by industry associations. This research has been conducted on molecular diagnostic tools, innate immune systems, predisposing factors, capabilities to investigate AMR in the red meat supply chain, chicken meat programs such as enhancing bird performance, antibiotic replacement, and AMR in

21 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32, Attachment 1*, The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR), August 2000, p. 29.

22 Department of Health and Ageing and portfolio bodies joint submission, *Submission 32*, p. 19.

23 Centre for Research Excellence in Minimising Antibiotic Resistance in Acute Respiratory Infections, *Submission 4*, p. 1.

pork.²⁴ The committee was also informed that some industry research investigating AMR in red meat had informed the conduct of subsequent government studies:

This research demonstrated, for the industry, the low level of resistant bacteria in animals and in meat, well before the DAFF and DoHA reports were released. In fact, industry funding developed capability that was utilised to perform the work presented in the DoHA report and provided a valuable insight into how to conduct the study. A contract has been entered into for the conduct of a survey to produce new data on antibiotic resistant bacteria in cattle. This study will be comparable to the earlier studies and also collect data of interest to current concerns. The medical community is being consulted about the details of this survey.²⁵

6.27 The CHF concluded that much has been done to advance the research envisaged in recommendation 18, and that 'research into antimicrobial resistance itself has largely been recognised as a priority'.²⁶

Concerns with the implementation of recommendations relating to research

6.28 Not all submitters supported the view that the AMR research program responds comprehensively to the JETACAR recommendation. The ASM, for example, lamented the failure to develop a comprehensive research agenda, although it acknowledged that there had been initial flurry of activity in the research sphere following the release of the JETACAR report. This activity included support for research in a variety of agricultural pursuits by the Rural Industries Research and Development Corporation.²⁷

6.29 However, both ASM and the ASA noted that the NHMRC's attempt to establish a targeted AMR management research agenda has been unsuccessful despite the Commonwealth in its response to JETACAR acknowledging that research plays an important and necessary role in controlling the emergence and impact of AMR. Similarly, a bid for a Cooperative Research Centre into Antimicrobial Resistance Management was not supported.²⁸

6.30 While the recent NHMRC funding for a centre for clinical research excellence at Bond University to investigate AMR was viewed as a positive step, other submitters noted that generally, there is a lack of funding for AMR.²⁹ Professor Barton

24 Australian Lot Feeder's Association, *Submission 11*, p. 7; Cattle Council of Australia and Sheepmeat Council of Australia, *Submission 16*, p. 6; Australian Chicken Meat Federation, *Submission 24*, p. 8; Australian Pork Limited, *Submission 27*, pp 7–8.

25 Joint submission by the Cattle Council of Australia and Sheepmeat Council of Australia, *Submission 16*, p. 6.

26 Consumers Health Forum of Australia, *Submission 10*, p. 2.

27 Australian Society for Microbiology, *Submission 6*, p. 2.

28 Australian Society for Microbiology, *Submission 6*, p. 2; Australian Society for Antimicrobials, *Submission 5*, p. 4; Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 45.

29 Dr Lynn Weekes, Chief Executive Officer, NPS MedicineWise, *Committee Hansard*, 7 March 2013, p. 21; Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, pp 27–30.

commented that there is little funding for AMR research from the NHMRC and argued that this was an outcome of the NHMRC's focus on esoteric science rather than on practical measures to address AMR. Professor Barton also noted a limited level of interest from industry on AMR research:

I was the beneficiary of funding from RIRDC Chicken Meat, the then Pig Research and Development Corporation and then Australian Pork Limited to carry out some baseline studies and the Meat and Livestock Australia have funded some work in the beef feed lot industries. Other industry funding bodies appear to have no interest – some respond that antimicrobial resistance is a public health issue and so research should be funded by the NHMRC.³⁰

6.31 Professor Cooper also commented on the NHMRC research priorities and argued that the low level of AMR research funding does not reflect that rates of deaths caused by AMR:

In the last round for the NHMRC less than 2 per cent of the budget was allocated to infectious disease research. Of that, going through the grants awarded, only \$2.6 million was awarded to antibiotic research and new antibiotics. That is a very, very small number. We estimate that the cost to the Australian economy is definitely in the hundreds of millions and may be even higher. The amount of research funding available for antibiotics is less than 1 per cent of the cost to the economy. That doesn't make sense. So we need to review our research priorities in this area.³¹

6.32 Similarly, the AVA commented that the funding for antimicrobial research is 'well below what the subject demands' and may indicate that this 'area has not attracted the priority it deserves by governments and other funding agencies'.³²

6.33 The ASM suggested that the apparent disinterest in adopting a comprehensive research agenda may have been the result of the Government's response to recommendation 18 which 'could be read to imply that Australia could just adopt the outcomes of research that was conducted overseas'. The ASM stated that such a view 'totally ignored the unique conditions present in Australia in both human health and agriculture'.³³

6.34 Submitters called for a greater emphasis on AMR research and suggested a number of ways to achieve this.³⁴ The ASM recommended that an inter-sectorial group be re-established to re-formulate a strategic research plan for AMR management in Australia.³⁵ The AVA submitted that it would be very useful to have a

30 Professor Mary Barton, *Submission 7*, p. 5.

31 Professor Matthew Cooper, *Committee Hansard*, 7 March 2013, pp 29–30.

32 Australian Veterinary Association, *Submission 35*, p. 16.

33 Australian Society for Microbiology, *Submission 6*, p. 2.

34 See for example, Australasian Society for Infectious Diseases, *Submission 18*, p. 3.

35 Australian Society for Microbiology, *Submission 6*, p. 2.

central register of research on AMR across human and animal species that included some assessment of the effectiveness of the research being carried out.³⁶

6.35 The ASA suggested that a new approach is needed with a focus on epidemiology in both human and animal settings and on effective interventions for the public sectors, focusing on education and behavioural change. The ASA went on to comment:

Despite funding by the NHMRC and other bodies for basic science research on microbiology, many essential aspects, such as research into educational interventions required to combat antibiotic resistance do not find a ready place in existing project grant structures.³⁷

6.36 The PHAA also advocated for research directions that include epidemiological studies and translation of basic research findings into practical applications for prevention diagnosis and treatment of resistant infections.³⁸ Professor Rood noted that difficulties of accessing funding for epidemiology research.³⁹

6.37 In addition, the Antimicrobial Resistance Summit in 2011 addressed research and called for 'a major research effort targeting all aspects of this threat to human and animal health in terms of causes, consequences, new antimicrobial agents, and prevention strategies'.⁴⁰ Another suggestion put to the committee was that a single independent body responsible for managing AMR be established and that its role include funding and influencing the AMR research agenda.⁴¹

6.38 A further area of research raised by submitters was the development of new antibiotics. As noted in chapter 1, there had been a significant decline in research and development by large pharmaceutical companies. Submitters argued that there are opportunities for small pharmaceutical companies, working in conjunction with researchers, to look at developing new antimicrobials to a point where they can be drawn to the attention of large companies. Professor Rood saw this as a model for the future with advantages in terms of fewer constraints, smaller pilots and many more targets being identified and worked on.⁴²

6.39 The ASM supported this approach. However, only limited resources are currently being allocated through standard competitive granting schemes even though members of ASM are key players in driving innovative drug development on both the

36 Australia Veterinary Association, *Submission 35*, p. 4.

37 Australian Society for Antimicrobials, *Submission 5*, pp 7, 8.

38 Public Health Association of Australia, *Submission 14*, p. 10.

39 Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 46.

40 Australasian Society for Infectious Diseases, *Submission 18*, p. 5.

41 Public Health Association of Australia, *Submission 14*, p. 5; Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, pp 45–46.

42 Professor Julian Rood, Past President, Australian Society for Microbiology, *Committee Hansard*, 7 March 2013, p. 47.

national and international stage. The ASM recommended the formation of an Innovation in Antimicrobials Research Steering Committee to formulate strategic funding initiatives to drive research leading to antimicrobials development and implementation.⁴³

6.40 In addition, Professor Cooper suggested that, to support the antibiotic pipeline, regulatory reform was required as well as funding to support expensive stages of research and development. Professor Cooper also stated that there was a requirement for training academic researchers in the science of drug discovery. Exchanges with industry could be supported by government funding with academics allowed, even encouraged, to spend time with partner pharmaceutical companies and 'learn by doing'.⁴⁴

Conclusions

6.41 While the DoHA and DAFF argued that significant funding has been provided for AMR research, evidence was received that there is poor funding of research for AMR issues. The committee considers that the lack of emphasis on research in relation to AMR does not reflect the extent of the present problem or the potential problems facing the health sector and the Australian community.

6.42 Much of the research agenda proposed by JETACAR remains to be undertaken, in areas such as epidemiology of resistance (including molecular epidemiology and gene transfer mechanisms), effects of intervention programs (e.g. to reduce levels of prescribing and antibiotic use), clinical efficacy and rapid diagnostic methods. In particular the epidemiological research needed to understand AMR trends has not been delivered. The resulting lack of epidemiological information has made it much more difficult to implement and evaluate policies to effectively address AMR.

6.43 The committee acknowledges that some research has been sponsored by food animal industries, but further research needs to be undertaken into alternatives to antibiotic growth promotants for animal production and alternatives to other antibiotic uses in animals and humans (including vaccines).

6.44 Another significant research issue brought to the committee's attention during the inquiry is the dwindling supply of new antimicrobials. A large portion of the research on new antibiotics has been undertaken by pharmaceutical companies in the past. However, that is no longer the case, partly as a result funding of changes that have dramatically reduced the profitability for new antimicrobials as opposed to treatments for other conditions. Evidence indicated that there are ways Australian research can make significant contributions to the development of new antibiotics, including partnerships between researchers and companies focussing on a larger number of smaller trials.

43 Australian Society for Microbiology, *Submission 6*, p. 3.

44 Professor Matthew Cooper, *Submission 23*, pp 7–8.

6.45 The committee notes that research into AMR and its prevention were to be included the work of AMR Standing Committee on a national strategy and that the Australian Antimicrobial Resistance Prevention and Containment Steering Group is to provide advice on future research priorities for Australia in relation to AMR. The committee welcomes this recognition of the importance of research in addressing AMR issues.

Recommendation 10

6.46 The committee recommends that the Commonwealth consider measures to support research into strategies to deal with antimicrobial resistance, including research into new antibiotics and consideration of antimicrobial resistance being designated a National Research Priority Area.

**Senator Scott Ryan
Chair**

Australian Greens Additional Comments

1.1 The Australian Greens welcome this important and timely report. The Greens felt this inquiry was necessary due to the increasing urgency of antimicrobial resistance, which in recent years has gone from terrifying future possibility to a challenge of daily clinical practice in Australia. As is evident from the report and the evidence received, the problem is real, acute and on a worrying trajectory.

1.2 The Greens heard from various stakeholders who raised the problem and expressed concern about the lack of concerted government action to mitigate the serious health risks posed by the rise of antimicrobial resistance. As became clear, and as the evidence received by the Committee has since borne out, there is no central agency tasked with the monitoring, surveillance and reporting of the problem nor with developing and enforcing measures to slow its development. While the inquiry heard that some countries, such as Canada and Denmark, have made coordinated efforts to tackle the problem, sadly Australia cannot be counted a world leader in this space.

1.3 The problem is not a new one and has been brought to the attention of government before. In 1997, the Joint Expert Technical Advisory Committee on Antibiotic Resistance was established to report on the problem and make recommendations for tackling it. Although it reported in 1999 and many of the recommendations were welcomed by government, the lessons were clearly not taken to heart. The terms of reference for the present inquiry were therefore framed around the recommendations made by JETACAR and the action or inaction that has taken place in the intervening decade and more.

1.4 The inquiry was wide-ranging and thorough and draws a clear picture of the current state of readiness in Australia. Evidence was received from a wide variety of experts in the medical and healthcare professions, agriculture and food science, pharmaceutical industry and government. As the report makes clear Australia needs to lift its game in terms of readiness and response. Since 1999, there have been rapid and worrying rises in the prevalence of multi-drug resistant infections and the Australian Greens come to the conclusion that our response must be broad, coordinated and properly identified as a national priority.

1.5 The Greens agree with the recommendations of the Committee but make the following additional comments.

1.6 The Greens agree with the Committee's concerns that current and future government responses, including the establishment of the AMRSC and the AMRPC Steering Group, run the risk of following a similar trajectory to the JETACAR recommendations – languishing in committee followed by in-principle support and a lack of effective, coordinated action. For this reason, the Greens strongly support the first recommendation which calls for the establishment of a national centre or independent body to coordinate Australia's response to this growing threat. An Australian Centre for Disease Control, modelled after the European equivalent, is one promising option.

1.7 The World Health Organisation strategy, as mentioned in the report, outlines a multi-pronged strategy for dealing with the problem.¹ Three important aspects of this plan focus on slowing the rise of AMR pathogens; strengthening surveillance; and dealing with infections when they occur through regulation.

Stewardship and vigilance

1.8 Noting the report's conclusions about the seriousness of the problem and the lack of a pipeline of new antibiotic agents, it is incumbent upon us to look for ways to slow the rise of AMR pathogens and to extend the lifespan of current antibiotics as long as possible. Evidence received suggests our current tolerance for the use and overuse of antibiotics may be too high.

1.9 It is therefore clear we need better monitoring of the use of antibiotics so that we can identify problem areas and curb overuse of the antibiotics that must be preserved for infection control in seriously ill human patients. Comprehensive monitoring of antibiotic use would not necessitate intrusive regulation at the clinical level. Valuable data could be gleaned through monitoring which would be in the form of aggregate data and sampling in particular institutions or areas.

1.10 Monitoring should also include their use in animals. One of the failings in our response to rising AMR has been lack of coordination between health bodies and agricultural stakeholders. The authorities and researchers need good data on which antibiotics are being used in agriculture so that all agencies can work together to allow agriculture to thrive without putting human health at risk.

1.11 Monitoring must also include the prevalence of multi-drug-resistant pathogens. Most importantly, where they lead to infections in humans and are detected in a clinical setting. Because of the risk of transmission, the incidence of particular Multiple Drug Resistant (MDR) bacteria in animals and imported meat should also be measured.

1.12 As antibiotic use in agriculture has the potential to undermine the effectiveness of these antibiotics in humans by leading to the evolution of MDR bacteria, gathering data on antibiotic residue in domestic and imported meat should be a priority and should focus on "critically important antimicrobials in humans" as recommended by the World Health Organisation.

1.13 The Greens support Recommendation 9 calling for research and development into means to reduce the use of antibiotics in farmed animals. Due to the urgency of the issue, we would urge government to immediately begin work with the industry to develop guidelines to change best practices and do whatever possible to reduce reliance on antibiotics.

1.14 The Greens also share the concerns of the Committee regarding non-medicine antimicrobial agents such as nano-silver. As evidence to the Committee outlined, the

1 World Health Organisation, *WHO Global Strategy for the Containment of Antimicrobial Resistance*, 2001, pp 1–2.

unregulated use of potentially valuable antimicrobial agents, largely for marketing purposes, could have serious public health consequences.²

Dealing with infections

1.15 The ultimate and inevitable problem that results from AMR is the rise of drug-resistant infections in human patients. As the experts made clear and as Chapter 1 makes clear, such an infection is at best expensive and painful and can easily be life-threatening. Any response to the problem must therefore include monitoring and reporting of such infections. The tracking and response to potential outbreaks or clusters of MDR infections represent a clear public health threat.

1.16 Furthermore, since a reduction in multi-drug resistant infections is the ultimate goal of any program to contain AMR, a measure of their prevalence is the most meaningful way to evaluate the success of other measures. This underscores the need for monitoring as outlined above. Because of the potential for outbreaks, a system of MDR infection monitoring should be as close to real-time as possible.

Mitigating the harm of MDR pathogens

1.17 Since a rise in serious MDR infections is inevitable (and is already occurring apace), the Australian healthcare sector must be prepared to meet this challenge and provide safe care to patients in an environment where the risks associated with infection are significantly higher than we have experienced in the past. In short, since we are losing the ability to cure an infection with medicines we must take greater care to prevent infections occurring in the first place.

1.18 Evidence received made it clear that there is significant potential for hospitals and other facilities (such as in aged care) to improve infection control procedures. There is at present no nationally coordinated effort to develop and enforce best practices in this area. While a comprehensive response to the threat may require the facilities themselves to be redesigned,³ there are other measures, such as improved cleaning regimes, that could be developed and put in place cheaply and quickly.

1.19 The Greens therefore support Recommendation 8, that the Australian Commission on the Safety and Quality of Health Care coordinate the development of a national system of enhanced infection control including minimum hospital infection control standards. These standards should be mandatory, measurable and enforceable.

The research pipeline

1.20 Given the threat the rise of AMR poses to global human health, it is imperative that research into solutions be accelerated. As the report indicates, the inquiry heard evidence that the pipeline of new antibiotics is almost completely dry due to the perverse incentives that lead the pharmaceutical industry to pursue medicines that can and will be used in a more widespread fashion than a back-line antibiotic can or should be used.

2 Friends of the Earth Australia, *Submission 3*, p. 2.

3 Pine Creek Fish Hatchery, *Submission 9*, p. 2.

1.21 It is therefore crucial that publicly funded research fills the gap. Although AMR is a global problem, Australian health is as much at threat as any nation's, and we are well-equipped to play a leading role in the medical research that could lead to new and effective treatments for infection.

1.22 The Greens therefore support Recommendation 10, that AMR become a National Research Priority Area.

Senator Richard Di Natale

APPENDIX 1

Submissions and Additional Information received by the Committee

- 1 Animal Health Alliance (Australia) Ltd
- 2 Veterinary Manufacturers and Distributors Association
- 3 Friends of the Earth Australia
- 4 Centre for Research Excellence in Minimising Antibiotic Resistance
in Acute Respiratory Infections
- 5 Australian Society for Antimicrobials
- 6 The Australian Society for Microbiology
- 7 Professor Mary Barton
- 8 Mr Trevor Kerr
- 9 Pine Creek Fish Hatchery
- 10 Consumers Health Forum of Australia
- 11 Australian Lot Feeders' Association
- 12 Department of Agriculture, Fisheries and Forestry
- 13 The Australia Institute
- 14 Public Health Association of Australia
- 15 Name Withheld
- 16 Joint Submission from the Cattle Council of Australia and the
Sheepmeat Council of Australia
- 17 The Royal College of Pathologists of Australasia
- 18 Australasian Society for Infectious Diseases
- 19 Professor M Lindsay Grayson
- 20 Dr Rey Tiquia
- 21 Dr Liz Fraser
- 22 Dr Ivan Hooper
- 23 Professor Matthew Cooper
- 24 Australian Chicken Meat Federation
- 25 Dr Darren Trott
- 26 Department of Agriculture, Fisheries and Forestry (Queensland)

- 27 Australian Pork Limited
- 28 NSW Department of Primary Industries
- 29 The Australian Pesticides and Veterinary Medicines Authority
- 30 NPS MedicineWise
- 31 Pharmaceutical Society of Australia
- 32 Joint Submission from the Department of Health and Ageing on behalf of Commonwealth Department of Health and Ageing; Australian Commission on Safety and Quality in Health Care; Therapeutic Goods Administration; Food Standards Australia New Zealand; and National Health and Medical Research Council
- 33 Goat Veterinary Consultancies
- 34 Professor Peter Collignon
- 35 The Australian Veterinary Association Ltd
- 36 Victorian Government
- 37 The Royal Australasian College of Physicians
- 38 Mr Chris Mardon

Tabled Documents

- 1 Department of Health and Ageing, Additional Information, tabled at public hearing, 7 March 2013
- 2 Australian Commission on Safety and Quality in Health Care, Additional Information, tabled at public hearing, 7 March 2013

Answers to Questions on Notice

- 1 Answer to Question on Notice, Agriculture, Fisheries and Forestry, 20 March 2013, received 18 April 2013
- 2 Answer to Question on Notice, NPS MedicineWise, 7 March 2013, received 23 April 2013
- 3 Answer to Question on Notice, NPS MedicineWise, 7 March 2013, received 23 April 2013
- 4 Answer to Question on Notice, NPS MedicineWise, 7 March 2013, received 19 April 2013
- 5 Answers to Question on Notice, Health and Ageing, 20 March 2013, received 16 May 2013

Additional Information

- 1 Department of Health and Ageing, Additional Information, received 16 May 2013

APPENDIX 2

Public Hearing

Thursday, 7 March 2013

Mantra Hotel, 222 Russell Street, Melbourne

Witnesses

The Australia Institute

Ms Kerrie Tucker, Research Fellow

Friends of the Earth

Dr Gregory Crocetti, Nanotechnology Campaigner

Professor M Lindsay Grayson

Australasian Society for Infectious Diseases

Dr David Looke, President

NPS MedicineWise

Ms Lynn Weekes, Chief Executive Officer

Dr Philippa Binns, Clinical Adviser

Professor Matthew Cooper

Professor Peter Collignon (*via teleconference*)

Australian Society for Antimicrobials (*via teleconference*)

Associate Professor Thomas Gottlieb, President

Australian Society for Microbiology

Professor Julian Rood, Past President

Department of Health and Ageing

Ms Megan Morris, First Assistant Secretary, Office of Health Protection

Prof Chris Baggoley, Chief Medical Officer

Dr Jenny Firman, Senior Medical Officer

Australian Commission on Safety and Quality in Health Care

Professor Debora Picone, Chief Executive Officer

Dr Marilyn Cruickshank, Program Director

Therapeutic Goods Administration

Dr Anthony Gill, Senior Medical Advisor

Food Standards Australia New Zealand

Dr Paul Brent, Chief Scientist

Department of Agriculture, Fisheries and Forestry

Dr Bob Biddle, Assistant Secretary, Animal Health Policy

Dr Mark Schipp, Australian Chief Veterinary Officer

Australian Pesticides and Veterinary Medicines Authority

Ms Kareena Arthy, Chief Executive Officer

Dr John Owusu, Principal Evaluator, Veterinary Medicines

