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

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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:

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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

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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:

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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]

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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 MedinceWise, *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:

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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]

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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:

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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%.
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> 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]

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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

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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 verterinary 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]

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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 bacterials—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]

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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 Australia[62] 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

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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.