

# 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.<sup>1</sup>

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.<sup>2</sup>

### *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'.<sup>3</sup>

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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.<sup>4</sup> 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.<sup>5</sup>

3.7 A *Strategy for Antimicrobial Resistance Surveillance in Australia* encompassing humans, animals and animal-derived foods, was released in September 2003.<sup>6</sup> 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.<sup>7</sup>

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.<sup>8</sup>

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'.<sup>9</sup> 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.<sup>10</sup>

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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*.

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### *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.<sup>11</sup>

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.<sup>12</sup>

### *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.<sup>13</sup> ALFA also

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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.<sup>14</sup>

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.<sup>15</sup> A research project on AMR in red meat production in Australia is being funded by Meat and Livestock Australia.<sup>16</sup> 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.<sup>17</sup>

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.<sup>18</sup> 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.

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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.

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

### **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.<sup>20</sup> 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.<sup>21</sup>

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.<sup>22</sup>

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.<sup>23</sup>

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.<sup>24</sup>

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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.<sup>25</sup>

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.<sup>26</sup>

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.<sup>27</sup> 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.<sup>28</sup>

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.<sup>29</sup>

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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.

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### *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.<sup>30</sup>

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.<sup>31</sup>

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).<sup>32</sup>

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'.<sup>33</sup> 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.<sup>34</sup>

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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'.<sup>35</sup>

### *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.<sup>36</sup>

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.<sup>37</sup> 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.<sup>38</sup>

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

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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.

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

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.<sup>40</sup> 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.<sup>41</sup> 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.<sup>42</sup>

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

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.<sup>44</sup>

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:

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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.<sup>45</sup>

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.<sup>46</sup>

#### *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'.<sup>47</sup> While the program is voluntary, APVMA stated that compliance with the request has been high.<sup>48</sup> 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.<sup>49</sup> 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.<sup>50</sup>

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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'.<sup>51</sup>

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?<sup>52</sup>

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'.<sup>53</sup>

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.<sup>54</sup>

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'.<sup>55</sup> 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:

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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.<sup>56</sup>

### ***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'.<sup>57</sup> 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.<sup>58</sup>

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...<sup>59</sup>

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

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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.

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

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.<sup>61</sup> 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.<sup>62</sup>

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.<sup>63</sup>

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.<sup>64</sup>

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.<sup>65</sup> 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,

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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.<sup>66</sup>

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'.<sup>67</sup> 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.<sup>68</sup>

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.'<sup>69</sup>

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.<sup>70</sup>

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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.<sup>71</sup> 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.<sup>72</sup>

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.'<sup>73</sup> 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.<sup>74</sup> 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.<sup>75</sup>

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.<sup>76</sup> 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.<sup>77</sup>

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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.<sup>78</sup>

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

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

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'.<sup>80</sup> 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.<sup>81</sup>

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.<sup>82</sup> 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'.<sup>83</sup>

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'.<sup>84</sup>

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.<sup>85</sup>

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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.<sup>86</sup> 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.<sup>87</sup>

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.

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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.<sup>88</sup>

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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.