



16<sup>th</sup> February 2013

Ms. Christine McDonald  
Secretary,  
References Committee  
Standing Committee on Finance and Public Administration

Dear Ms. McDonald and Senators,

**Re: Inquiry into the progress in the implementation of the recommendations of the 1999 Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR)**

I am pleased to make a non-confidential submission regarding this issue to the Senate References Committee.

My background and qualifications for making a submission include the fact that I am:

- Professor of Infectious Diseases, Faculty of Medicine, University of Melbourne
- Professor (Hon), Department of Epidemiology & Preventive Medicine, Monash University
- Director, Infectious Diseases & Microbiology Department, Austin Health, Melbourne
- Director, Hand Hygiene Australia, Australian Commission on Safety & Quality in Health Care
- A Fellow of: Royal Australasian College of Physicians (RACP), Australian Faculty of Public Health Medicine, Royal College of Physicians (UK and Edinburgh) and Infectious Diseases Society of America (IDSA)
- Member of the Working Group of the World Health Organization Report: *"The evolving threat of antimicrobial resistance. Options for action"* (2012). ISBN 978 92 4 150318 1.
- A lead author of the original writing group of the World Health Organization Report: *WHO Global Strategy for Containment of Antimicrobial Resistance* (2001). WHO/CDS/CSR/DRS/2001.2
- Chairman, World Health Organization Writing Committee (1999). *WHO Model Prescribing Information: Drugs used in bacterial infections*
- Past President (2006-2009) - Australasian Society for Infectious Diseases (ASID)

My comments are structured as an "Overview", with specifics described under the headings suggested by the Reference Committee.

## Overview

The JETACAR report was a national and international milestone in terms of its vision for a coordinated national system of resistance surveillance and antibiotic control across both the human healthcare and agricultural sectors. Unfortunately barely any of the 22 JETACAR Recommendations have been implemented during the past 13 years, yet they remain just as

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crucially relevant to finding a solution in 2013 as they were in 1999.

In the meantime, rates of antibiotic resistance among human pathogens have increased dramatically internationally and in Australia, such that human infections with multi-resistant pathogens are now a routine daily feature of hospital- and community-based healthcare, with tremendous impacts on patient outcomes, treatment costs and the entire Australian health system. Unfortunately, present estimates suggest only continued worsening of this situation unless a coordinated response is implemented in the next 3-5 years. Current occasional cases of totally-resistant pathogens, which are impossible to cure with presently-available antibiotics, are almost certain to increase and are likely to become the norm in some sections of healthcare - especially areas with patients who are highly immunocompromised (e.g. transplantation medicine, hematology, neonatal medicine and intensive care medicine), since without effective antibiotics there are currently no other treatment options.

Since the 1999 JETACAR report, however, a number of additional issues have emerged that need to be taken into consideration when responding to JETACAR and formulating/prioritising an effective national system of control in 2013. Broadly, these can be considered under two headings:

- A. Containment of existing multi-drug resistance and prevention of transmission.
- B. Prevention of the emergence of new resistant pathogens

#### ***A. Containment of existing multi-drug resistance and prevention of transmission.***

Since JETACAR 1999, antibiotic resistance has emerged rapidly in many parts of the world, such that a very high priority now needs to be placed on preventing transmission of existing resistant strains, in addition to simply avoiding the generation of new resistance. Key steps include:

1. The massive growth in international air-travel has meant that key international “hot-spots” of resistance (e.g. India, China, Greece, Spain) can readily impact Australia via infected or colonised travellers from these areas. Thus, a greatly enhanced national focus on infection control measures to limit the transmission of “Superbugs” between hospital inpatients is required. Crucial steps include:
  - a. Improved “hand hygiene” (use of alcohol-based handrub; soap/water washing) among healthcare workers (as per the current National Hand Hygiene Initiative).
  - b. Establish national standards for hospital cleaning, with improved specialist training of hospital cleaners and greater use of effective agents, such as bleach-based products.
  - c. Establish national standards for insertion and maintenance of invasive devices (e.g. intravenous catheters) since many “Superbug” infections are related to these devices.
  - d. Establish new guidelines for hospital design that require a high proportion of single rooms (with ensuite toilet facilities) to ensure compliance with the maxim “*One bum per toilet*” in Australia hospitals. This is important, since many “Superbugs” are carried in faeces and are therefore readily transmitted between patients due to shared bathroom facilities.
2. The massive increase in agricultural use of antibiotics in many parts of Europe, India and Asia means that many imported products (especially meat and seafood) are at increased risk of containing multi-drug resistant pathogens and high concentrations of antibiotic residues. Any future improvements in surveillance and antibiotic control in Australian agriculture may therefore be heavily undermined by the importation of contaminated food products since consumers will continue to be exposed despite local control efforts. 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.

## **B. Prevention of the emergence of new resistant pathogens**

3. JETACAR made important recommendations regarding antibiotic use in agriculture, including specific listing of certain drug classes that should not be used or at least be strictly controlled. Subsequently, in 2007, the World Health Organization prepared a key guideline document ("*Critically Important Antimicrobials for Human Medicine: Categorization for the Development of Risk Management Strategies to contain Antimicrobial Resistance due to Non-Human Antimicrobial Use*"; [http://www.who.int/foodborne\\_disease/resistance/antimicrobials\\_human.pdf](http://www.who.int/foodborne_disease/resistance/antimicrobials_human.pdf)) which outlines those antimicrobials which should not be used in agriculture due to their importance in human health and potential to generate multi-drug resistant pathogens. Thus, these 2007 WHO guidelines provide a clear international "blueprint" to guide antibiotic use in agriculture in Australia. To achieve best practice, Australia should at least adhere to these new guidelines.
4. The release in 2001 by the World Health Organization of the *WHO Global Strategy for Containment of Antimicrobial Resistance* provided a useful "road map" for how to tackle the various issues associated with emerging antibiotic resistance and both supported and enhanced many of the recommendations contained in JETACAR. In 2012, the WHO provided a further update on this issue in its publication "*The evolving threat of antimicrobial resistance. Options for action*"; <http://www.who.int/patientsafety/implementation/amr/publication/en/index.html>). Issues raised in both these important "post-JETACAR" publications should be considered when formulating interventions to control antibiotic resistance in Australia.
5. Appropriate use of antibiotics in human medicine (so-called "antibiotic stewardship") has been a key priority of many educational efforts among healthcare workers in Australia since JETACAR 1999. However, despite key efforts by bodies such as the Australian Commission on Safety & Quality in Health Care (ACSQHC) and the National Prescribing Service (NPS), most of these initiatives have achieved only limited success. Importantly, however, requirement for hospitals to have an Antibiotic Stewardship program is a criteria for accreditation under the new ACSQHC Hospital Accreditation Program from 2013.

Nevertheless, there are a number of ongoing issues that have resulted in only limited change in prescribing practices by Australian doctors – these include:

- a. Limited incorporation of antibiotic stewardship concepts into both undergraduate and postgraduate medical training. Even among the various specialist training curricula of the Royal Australasian College of Physicians and Royal Australasian College of Surgeons, few specify training in stewardship.
- b. Unlike most countries, Australia is very fortunate to have national consensus recommendations for antibiotic prescribing (the "Antibiotic Guidelines"; *Therapeutic Guidelines: Antibiotic 14<sup>th</sup> ed; Therapeutic Guidelines Limited*) – however, these are not freely available to all Australian doctors. Some States and individual hospitals, provide access to the electronic version of the Guidelines, but this is not universal and obviously requires ready internet access via a computer or smartphone. To improve appropriate prescribing, there should be routine availability to all Australian doctors of the Antibiotic Guidelines either in electronic or hardcopy format.
- c. A number of pilot studies have shown the clinical benefit of electronic internet-based antibiotic advice and approval systems to improve appropriate stewardship. However, these can be expensive to purchase/support and cumbersome to develop. Thus,



universal access by all Australian hospitals to one or more central Government-funded electronic approval systems would help ensure uniform implementation of national prescribing standards. Two systems that have been developed in Australia, are consistent with the *Antibiotic Guidelines* and are being used by some hospitals are “*IDEA<sup>3</sup>S*” and “*iGuidance*”. Ready access to such programs would greatly assist with improving appropriate antibiotic use in humans in hospitals, as well as in General Practice.

#### **Specific issues:**

##### **(a) Examination of steps taken, their timeliness and effectiveness**

As a member of the Australian Society for Antimicrobials (ASA) and Australasian Society for Infectious Diseases (ASID), I agree with the issues described in the ASA and ASID submissions to the Committee on this issue and will not reiterate these points in detail further.

Nevertheless, of the 22 JETACAR recommendations I believe the following is an accurate summary:

- Recommendations 1-13: There has been minimal to no progress - especially with those recommendations related to control/surveillance in the agriculture sector.
- Recommendation 14: Some progress has been made, particularly by the Australian Commission on Safety & Quality in Health Care, which is to be congratulated on its efforts.
- Recommendations 15-17: Minimal/no effective progress in agriculture and minimal progress in educational activities by learned medical societies.
- Recommendations 18: Minimal progress regarding research funding agencies. The creation of a special funding stream on antibiotic resistance by the NH&MRC would be a great initiative. However, there appears to have been minimal activity on this issue in the agriculture sector.
- Recommendations 19-20: Although the NPS has conducted some public educational activities, the overall approach to communication on this topic has lacked central coordination (Recommendation 20) and been fragmented depending on the relevant craft group.
- Recommendations 21-22: Recent announcements (12-15<sup>th</sup> February 2013) regarding the establishment of a number of high level Commonwealth committees with members from both DoHA and Veterinarians from the Department of Agriculture are a very welcome development that will hopefully help address these two important recommendations.

##### **(b) Where and why failures have occurred**

Overall, there has been a lack of understanding, urgency and commitment by various State and Federal Governments regarding the seriousness of the problems associated with emerging antibiotic resistance. Important considerations regarding both surveillance and interventions to control antibiotic use have been ignored and policy decisions repeatedly avoided or postponed. In some areas, especially in agriculture, external lobbying by sectors driven largely by self-interest rather than the “greater good” has wielded excessive influence – resulting in avoidance of effective action.

As a member of the Australian Society for Antimicrobials (ASA), I agree with the detailed summary provided in the ASA Submission to the committee on this issue.



### **(c) Implications of antimicrobial resistance on public health and the environment**

Without urgent action to control the current problems of antibiotic resistance, Australia will undergo a massive change in its healthcare system. “Superbug” infections will increase dramatically both in immunocompromised patient populations as well as in the otherwise healthy community. Common infections will no longer be treatable with cheap, readily-available agents, and instead will require expensive, often parenteral drugs and hospital admission. It is likely that this change will initially have greatest impact on specialist medical care areas such as intensive care medicine, transplantation, cancer and leukaemia programs, and on neonatal care services since all these units treat immunocompromised hosts where infectious complications are common and where there is a total dependence on the availability of effective antibiotics.

Both human and agricultural use of antibiotics are critically linked, since the bacteria that are developing resistance are often present in both humans, animals and seafood. Consumption of food that contains these resistant bacteria results in faecal colonisation with multi-resistant organisms and can subsequently be associated with clinical infections. Thus, any program of control requires a multi-faceted approach that limits emergence in humans, food-producing animals/seafood and the environment in which we all live. Recent studies in China and the Netherlands have highlighted heavy contamination of soil and waterways with multi-resistant organisms contained in manure from food-producing animals (esp. pigs, poultry and cattle) that have been fed antibiotics as growth promoters or for disease prevention associated with overcrowded intensive farming practices.

In some countries such as India, heavy contamination of drinking water and surface water has been associated with poor sewerage and potable water infrastructure, resulting in mixing of these two such that routine drinking water in New Delhi and other major cities is now commonly colonised with multi-resistant pathogens resulting in gut colonisation among those who consume this water. Although this does not appear to be a major problem in Australia, it highlights the need to ensure good engineering infrastructure in this country, particularly at times when major flooding events (as has recently been experienced in Queensland and NSW) have frequently overwhelmed sewerage facilities and resulted in contamination of waterways from which drinking water is often drawn. Detailed studies in India highlight the inter-linkage between humans and the environment in terms of dissemination of “Superbugs”, since many of the patients who were found to be infected and colonised were first identified in the UK after they had returned from travelling in India. Thus, the problems in one country can readily affect all nations.

### **(d) Implications for ensuring transparency, accountability and effectiveness in future management of antimicrobial resistance**

Future initiatives regarding antibiotic resistance surveillance (human and agriculture), assessment of drug residues in meat/seafood (local and imported) and monitoring of antibiotic usage in both human health and agriculture should be coordinated centrally by a Commonwealth agency, but in collaboration with the States/Territories. All data should be collected regularly and reported publicly.

One excellent model that could be used as a “blueprint” for these initiatives is the approach currently taken by the Australian Commission on Safety & Quality in Health Care (ACSQHC) in monitoring and reporting rates of compliance with national hand hygiene protocols among Australian healthcare workers. Importantly, this initiative was a joint venture between ACSQHC and the States/Territories. The generic details are as follows:

- A government-funded authority (ACSQHC) established an independent group (“Hand Hygiene Australia” [HHA]) consisting of government health experts, to design and implement a national education program regarding the use of alcohol-based hand-rub and



other hand hygiene techniques to improve rates of appropriate hand hygiene in Australian hospitals.

- HHA developed a standardised auditing process and tool, based on world best practice (World Health Organization), which was practical, accurate and clinically relevant that allowed implementation of regular auditing (3-times annually) by all Australian public hospitals (and later most private hospitals).
- A detailed training program for all hospital-based auditors was established so that all submitted data was known to be reliable and absolutely comparable between submitting sites. Thus, data accuracy and integrity was beyond dispute by participating hospitals. This is an important feature if results for an individual site are sub-standard, since there is no dispute about their accuracy.
- Following each audit, HHA reviews all submitted data and validates its accuracy with each submitting site.
- Validated data is reviewed by a Steering Committee consisting of key members from ACSQHC, DoHA and each State/Territory before release to all participating jurisdictions.
- Each jurisdiction forwards the results to each participating hospital in that State/Territory, identifying their performance (including 95% confidence intervals) in relation to the national benchmark and the State/Territory average.
- After each participating hospital has been notified, each jurisdiction forwards the same results to a Government authority for public release on the *MyHospitals* website to allow public scrutiny.

Although the details will vary from this “blueprint” for any proposed national system of antibiotic resistance surveillance and antibiotic usage, the principles should be similar – namely:

- Central coordination in collaboration with the jurisdictions
- Use of standardised national definitions
- Validation of all data for accuracy against the national definitions
- Oversight by a learned Steering Committee that consists of representatives from each of the jurisdictions and stakeholders
- Coordinated release to the stakeholders, followed by public release

I believe such an approach will greatly assist with ensuring transparency, accountability and effectiveness in managing antimicrobial resistance.

#### **(e) Any other related matter.**

As a member of the Australian Society for Antimicrobials (ASA), I agree with the comments regarding “related matters” provided in the ASA Submission to the committee.

Similar to countries such as Denmark and Sweden, Australia has an opportunity to take a leading role in developing a detailed cross-sector surveillance and control program that will potentially protect the nation for decades to come. Establishing such a system is likely to have a major multiplier effect beyond simply reduced rates of multi-resistant infections in humans – these include:

- Reduced healthcare costs through shorter hospital length-of-stay and reduced antibiotic costs
- Reduced morbidity and therefore improved human productivity in Australia
- Reassessment of good farming practices and the creation of an agricultural sector that produces high quality, proven-safe, high value food in an international region where many of Australia’s competitors do not produce food with such credentials. If we are currently entering the “Asian century” in terms of economic and population growth, the positioning of Australia in such a manner is likely to have major economic, reputational and potentially security benefits.

- The establishment of a detailed screening program of all imported foods (especially pork, chicken, beef and seafood) for both multi-resistant organisms and drug residues will ensure the safety of imported foods for Australian consumption, avoid the undermining of local efforts in controlling the spread of “Superbugs” and help exporting nations, who may not have such a screening program, identify problems in their agriculture sector. Thus, Australia’s program may help highlight and control emerging resistance in our region.
- At a time when Australia’s agriculture sector is under tremendous economic pressure, the re-positioning of local production to one of being sustainable and quality-based, will readily off-set any small changes in production quantity associated with changed farming practices that no longer depend on antibiotic use to sustain production volumes.

Thankyou for consideration of this submission.

Kind regards

Yours sincerely,

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