



22 October 2014

Australian Antimicrobial Resistance Prevention and Containment Steering Group
Department of Health and Department of Environment
GPO Box 9848 / 787
CANBERRA ACT 2601
Australia

Dear Steering Group members,

**WILDLIFE HEALTH AUSTRALIA SUBMISSION: STAKEHOLDER CONSULTATION -
DEVELOPING A NATIONAL ANTIMICROBIAL RESISTANCE STRATEGY FOR AUSTRALIA**

Please find attached a submission to the Steering Group regarding the development of Australia's national antimicrobial resistance (AMR) strategy.

Wildlife Health Australia acknowledges the considerable amount of information that has been collated to inform the discussion paper.

As changes in land use, climate change, animal movements and societal attitudes bring wildlife, livestock and people into closer contact, it is important to take into consideration wildlife (both native and feral) and the environment, in addition to humans, domestic animals and livestock, in order to achieve a 'One Health' approach for development of the national AMR strategy.

The potential role of environmental contamination in the transfer of AMR between wildlife, domestic animals and humans has been documented, and highlights the need for further surveillance and research to determine the extent and significance of this process.

We are happy to discuss this submission with you face to face should you feel it would assist the steering group. We hope that our submission helps you with this important work.

Best Wishes,

Rupert Woods PhD
CEO, Wildlife Health Australia

WILDLIFE HEALTH AUSTRALIA SUBMISSION: STAKEHOLDER CONSULTATION - DEVELOPING A NATIONAL ANTIMICROBIAL RESISTANCE STRATEGY FOR AUSTRALIA

THE IMPORTANCE OF CONSIDERING WILDLIFE AND THE ENVIRONMENT IN A NATIONAL ANTIMICROBIAL RESISTANCE STRATEGY

WHA considers that the proposed goal of the Strategy is appropriate, and that the proposed objectives are suitable.

We note that the discussion paper recognises the need for a *'whole-of-system perspective'* for Australia's response to AMR, and that the development of the AMR Strategy is to be *'underpinned by a One Health approach'*, which considers strategies to support the health of people, animals and the environment. In order to successfully achieve these goals, we recommend that wildlife (native and feral) and the environment be considered along with humans, domestic animals and livestock in the development of the National AMR Strategy. **This becomes more crucial as changes in land use, climate change, animal movements and societal attitudes bring wildlife, livestock and people into closer contact.**

The potential role of environmental contamination in the transfer of AMR between wildlife, domestic animals and humans has been recognised (e.g. Greig et al, 2014; Guenther S et al, 2011; Radhouani et al, 2014; Wellington et al, 2013). Wildlife populations have the potential to act as reservoirs for antimicrobial resistance, however the dynamics of this process and the magnitude of the risk to public health and agriculture are poorly understood, and further research in this area is needed.

Emerging pathogens from wildlife are growing in significance as free-ranging wildlife populations become increasingly urbanised, resulting in greater overlap of usage of the environment, and closer direct and indirect contact with humans and domestic animals. There may be a similar effect in relation to antimicrobial resistance, particularly as proximity to human populations is known to influence AMR in wildlife (Radhouani et al, 2014). Wildlife may provide alternate opportunities for transfer of antimicrobial resistance genes and act as reservoirs for AMR and emerging resistant pathogens (Radhouani et al, 2014), however further research is required to clarify the importance of wildlife in the epidemiology of AMR.

We understand that the main focus of the Strategy must be on livestock/domestic animal and human health, however we note that wildlife are not specifically mentioned in the discussion paper. The environment forms another compartment that could play a role in AMR, and although its significance in relation to AMR development and transmission is not well understood, it should be considered in relation to a national Strategy, in particular the identification of surveillance and research needs.

CURRENT KNOWLEDGE - ANTIMICROBIAL RESISTANCE IN WILDLIFE

Radhouani et al (2014) refer to AMR as an "ecological problem", demonstrating that wildlife can act as an environmental reservoir and also a "melting pot" for bacterial resistance. The existence of AMR in a range of wildlife species is well documented overseas, and in a limited number of published cases in Australia (e.g. Sherley et al, 2000; Chen et al, 2014). A scoping review of published research evaluated the role of wildlife in transmission of AMR to the food chain, and found that 309 of 866 relevant primary research articles reported AMR in wildlife, with AMR transmission reported in 110 (Greig et al, 2014). Reported risk factors for transmission of AMR/bacteria from wildlife to food animals, environmental sources or humans included presence of wild birds, shared range, and contamination of water by wildlife.

Studies in Australia found “a low but widespread prevalence of anti-microbial resistance” in an analysis of 946 strains of Enterobacteriaceae isolates from wild Australian mammals from 1993-1997 (Sherley et al, 2000). The isolates came from 77 species (14 families) collected from all jurisdictions of Australia. Chen et al (2014) found wallabies in a pristine environment and in a captive zoo situation in South Australia to be a significant reservoir of antibiotic resistance in a number of *Staphylococcus* species, with resistance to β -lactam antimicrobials in around a third of all isolates. Interestingly, multi-drug resistant staphylococci were found in free-ranging wallabies in a remote area without significant contact with humans or prior exposure to antibiotics. This finding is consistent with other studies, indicating the complex dynamics of AMR spread among wild populations (Radhouani et al, 2014).

CURRENT KNOWLEDGE – THE ROLE OF THE ENVIRONMENT IN ANTIMICROBIAL RESISTANCE

As explained by Sherley et al (2000): “The prevalence of antibiotic resistance in environmental strains may be influenced by human antibiotic use in several ways: through the spread of resistant strains or their genes from human and agricultural systems, the evolution and selection of new resistant strains or the amplification of pre-existing resistant strains in the environment.” Wellington et al (2013) describe the reservoir of antibiotic resistance genes in the environment as a mix of naturally occurring resistance, those present in animal and human waste, and the selective effects of pollutants. Transfer of AMR between wildlife and humans and/or domestic animals could potentially occur through environmental contamination with human/animal waste, particularly in water.

As well as a potential environmental AMR reservoir to humans and domestic animals, the impact of AMR environmental contamination from treatment of livestock and in aquaculture (Barton, 2012) should also be considered. The environment may be contaminated by veterinary antimicrobials via treatment of livestock on pasture, use in aquaculture, or following application of manure from intensive livestock production. These may be cycled and re-cycled through soil, ground water, marine water, wild animals, crops, shellfish and livestock (Wellington et al, 2013).

Power et al (2013) also reported on the risk of introduction of AMR into the environment through species recovery programs, with integrons associated with clinical AMR found in 48% of faecal samples of brush-tailed rock-wallabies (*Petrogale penicillata*) in a captive breeding program, which were later released. Free-ranging wildlife populations have the potential to act as sentinels for environmental contamination, and can therefore be a useful target for a surveillance program.

COMMENTS ON KEY ELEMENTS OF THE STRATEGY

Of the ‘key elements’ outlined in the discussion paper, Surveillance, Research and development and Governance are those of most relevance to wildlife. Under the element of Surveillance, the discussion paper recognises the importance ‘for surveillance to take a One Health approach and monitor patterns of AMR in all sectors’. For the Research element, one of the stated goals is to better understand how resistant bacteria move between animals, the environment, food and humans. Surveillance and research under this strategy should therefore include investigation of the extent of AMR within the Australian free-ranging wildlife population and the environment as a whole, and antimicrobial usage for the treatment of wildlife rehabilitation cases that present at zoo hospitals, wildlife rehabilitation centres and private veterinary clinics.

WHA coordinates a number of national wildlife disease surveillance programs, including the General Wildlife Disease Surveillance Program, the Zoo Based Wildlife Disease Surveillance Program, and the Sentinel Clinic Wildlife Disease Surveillance Program. WHA also coordinates a national Universities

Focus Group, which represents universities conducting research in diseases of wildlife, a Bat Health Focus Group and a Zoo Animal Health Reference Group. WHA-coordinated surveillance programs operate at a national level, providing a link between organisations at a local and jurisdictional level, and between government and non-government organisations.

Wildlife health data captured through the surveillance programs coordinated by WHA are managed through a national web-based database known as eWHIS (the 'electronic Wildlife Health Information System'). The data in eWHIS are available to inform policy and management decisions by relevant authorities, for international reporting, and to protect Australia's trade, human health, livestock health and biodiversity. The surveillance programs and eWHIS database have the capacity to capture national data on the occurrence of AMR in free-ranging wildlife. Several cases of multi-resistant bacterial infections in free-ranging wildlife have already been reported through the Zoo Based Wildlife Disease Surveillance Program. This has prompted WHA to recognise the need to raise awareness of AMR in free-ranging animals and encourage further reporting.

In relation to Governance, the discussion paper mentions opportunities to '*identify and establish other partnerships and collaborations that will support the effective implementation of a One Health approach*'. WHA is the peak body for wildlife health in Australia and networks with a wide range of stakeholders including representatives from federal, state and territory conservation, agriculture and human health agencies and industries, wildlife health professionals, universities, zoos, private practitioners, wildlife carer groups, hunters and fishers, and diagnostic pathology services. WHA primarily does this through expert focus groups, surveillance programs, and a weekly email Digest that reaches over 600 subscribers with an interest in wildlife health. Establishing linkages with WHA and associated groups and stakeholders may assist in expanding the scope of the Strategy to address AMR issues associated with wildlife and the environment.

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ABOUT WILDLIFE HEALTH AUSTRALIA

Wildlife Health Australia (WHA) is the peak body for wildlife health in Australia and operates nationally. The head office is located in Sydney, NSW.

WHA activities focus on the increasing risk of emergency and emerging diseases that can spill over from wild animals and impact on Australia's trade, human health, biodiversity and tourism. We provide a framework that allows Australia to better identify, assess, articulate and manage these risks. We provide the framework for Australia's general wildlife health surveillance system.

WHA's vision is for "One Health", a concept that means different things to different people. For us, it is the recognition that human, domestic animal and wildlife biosecurity are strongly interlinked with each other and the environment. It also recognises that the best biosecurity outcomes will result from strong collaboration and communication between workers in these fields. WHA activities are underpinned by this principle and we actively foster interdisciplinary work on wild animal health.

Our mission is to develop strong partnerships in order to better manage the adverse effects of wildlife diseases on Australia's animal health industries, human health, biodiversity, trade and tourism.

WHA directly supports the Animal Health Committee (AHC), Animal Health Australia (AHA), the Animal Health Policy Branch and the Office of the Chief Veterinary Officer (OCVO) within the Australian Government Department of Agriculture (DoA) and Australian governments in their efforts to better prepare and protect Australia against the adverse effects of wildlife diseases. It provides priorities in wildlife disease work, administers Australia's general wildlife disease surveillance system as well as facilitating and coordinating targeted projects. Wildlife health intelligence collected through the National Wildlife Health Information System (eWHIS: www.wildlifehealthaustralia.com.au) administered by WHA is provided to members of AHC and the Australian Government DoA, and Departments of Health (DoH) and Environment (DoE), on issues of potential national interest, potential emerging issues and significant disease outbreaks in wildlife. The information is provided in line with the agreed policy for data security.

WHA is administered under corporate governance principles. A management group, chaired by an appointment from DoA provides strategic direction and advice to a small team, which oversees the running of WHA. It is important to note that WHA involves almost every agency or organisation (both government and NGO) that has a stake or interest in animal and wildlife health issues in Australia. In addition WHA also comprises more than 600 wildlife health professionals and others from around Australia and the rest of the world who have an interest in diseases with feral animals or wildlife as part of their ecology that may impact on Australia's trade, human health and biodiversity.

More information on WHA is available at: www.wildlifehealthaustralia.com.au