

# Antimicrobial stewardship

IN THE AUSTRALIAN CHICKEN MEAT INDUSTRY

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## Introduction

The Australian chicken meat industry is an approximately \$2.6 billion industry, producing >652,000,000 chickens annually, that is dominated by seven companies that supply the bulk (>90%) of the domestically consumed chicken meat. Meat chickens reach processing age at approximately 6 weeks of age. The industry is highly vertically integrated and the chicken farmers are predominately contractors to the processing companies, who ultimately own the chickens. This dynamic means that the processing companies are responsible for the inputs to the farm that relate directly to the chickens – the feed, management advice and health management. Each processor's health programme is managed by at least one registered poultry veterinarian, often directly employed by a company, who oversees and manages disease surveillance, diagnosis and treatment, including the administration of antibiotics, for all company flocks including breeder flocks.

The Australian chicken meat industry has a long history of judicious use of antibiotics and implementing antimicrobial stewardship (AMS) principles, even before formal stewardship was encouraged. The chicken meat industry has a role to play in reducing the risks of antimicrobial resistance for the benefit of both human and animal health. This involves the judicious use of antimicrobials and other strategies to reduce the incidence of disease, refine the duration of treatment and reduce the potential environmental pressure that can create bacterial resistance. The industry is currently rolling out an AMS programme that can be adapted to fit the operations of each chicken meat company to formalise previous efforts and allow for better analysis of areas for further refinement of antimicrobial use. It is expected that implementation of this programme will be reviewed early in 2018. The chicken meat industry is supported by an R,D&E program operated through AgriFutures Australia, which has a total annual budget of approximately \$3million.

## THE 5RS FOR SUCCESSFUL AMS

### RESPONSIBILITY

Due to the structure of the chicken meat industry, there are only a small number of veterinarians who oversee the administration of antimicrobials to treat, control or prevent disease in meat chickens. They are all required to be registered and are more often than not members of both the Australian Veterinary Association (AVA) and the Australasian Veterinarian Poultry Association (AVPA). The AVA has a long history of established policies on the use of veterinary medicines including antibiotics<sup>1</sup>, guidelines for prescribing, authorizing and dispensing veterinary medicines<sup>2</sup> and a code of practice to support this for antimicrobials specifically<sup>3</sup>. The Australian poultry veterinarians, through the Australasian Veterinarian Poultry Association (AVPA), have embraced these policies, guidelines and codes of practices since at least 1987<sup>4</sup> with the most recent version, the code of practice for the use of antibiotics in the poultry industry, last reviewed in 2001<sup>5</sup>. The review of this document has been discussed but this is to be undertaken in light of any potential changes to AVA documents which are also planned for review. The antimicrobial stewards for the chicken meat industry are the veterinarians employed by, or working with, chicken meat processing companies, and they have taken the responsibility of judicious use of antimicrobials seriously for at least the last 30 years. Veterinarians are provided with independence in making decisions relating to antibiotic use, which is supported by the management of chicken meat companies. This responsibility requires support from the company executives, and is evidenced by the changes to health management that have been able to be made throughout the industry over time. As mentioned above, the number of veterinarians responsible for flock health programs and stewardship in the chicken meat industry is relatively small. This has allowed, and continues to facilitate, changes to be made quickly when evidence is produced to support a change in practice. The industry is also looking at what options are available for ongoing professional development in AMR and AMS for industry veterinarians. The responsibility of the farmer is to alert their company when they think there may be a health issue and to ensure biosecurity measures are in place that reduce the incidence of disease, as per the National Farm Biosecurity Manual for Chicken Growers<sup>6</sup> (currently under review) which farmers are required to adhere to as part of their contractual obligations with the processing companies. There are often financial penalties to farmers whose flocks experience an increase in flock mortality or morbidity and there is flock supervision and monitoring for adherence to company policies, procedures and industry manuals by company representatives during frequent farm visits.

### REDUCTION

The combination of common, highly infectious chicken diseases with the nature of intensive chicken production means that prevention of disease is paramount. Implementation of tighter biosecurity controls, precise nutritional management and the development and implementation of vaccine use since the 1980s has meant there has been a significant reduction in the incidence of diseases that may need treatment or prevention with antimicrobials and therefore a reduction in the overall use of many antimicrobials. As there is no current standard measure of the quantity of antimicrobial use that can be used for benchmarking it is difficult to ascertain what the extent of reduction has been, on a per chicken basis. Vaccination is widely applied where available, and AgriFutures Australia and the ACMF work continuously with the vaccine supply companies to ensure there are viable, and sustainable, options available for preventing disease in chickens. With the formalization of an industry AMS programme, companies are reporting that they can better focus their efforts on judicious antimicrobial use by assessing different methodologies for treatment and prevention which may further reduce the use of antimicrobials. This is a process that the industry has been undertaking for a number of years, to the point where most of the focus now is on refinement of use, specifically, significant improvements to disease prevention and management have resulted in reduced use of preventative treatments.

## REFINEMENT

The ACMF established a policy back in 2007 that antibiotics should not be used for growth promotion purposes and has been actively working with the product registrants since then to get growth promotion claims for chickens removed from labels. If the products couldn't substantiate a therapeutic claim for their use then it was made clear that there would be no future for those products in the Australian market. Currently there remain three products registered for use in chickens that have growth promotion claims. One of these products is an avilamycin formulation (there are two registered but only one has growth promotion claims) that is registered for use in Australian chickens but isn't actually available for sale in Australia. The second is flavophospholipol which has no registered therapeutic claim but is occasionally used to treat necrotic enteritis or enteritis when other preventative and treatment measures have failed to control disease. The third is Roxarsone which is not currently used by the industry, and hasn't been available since 2011. Disease prevention and refinement of antimicrobial usage have been key to ensuring production of healthy chickens without being excessively cost prohibitive. The industry has made, and continues to make, substantial investments in identifying gaps and improving biosecurity to reduce introduction and spread of pathogens. This has reduced the need for treating, or indiscriminately trying to prevent, illness in chickens with the use of antimicrobials. Improved vaccination strategies have also allowed for further refinement of antimicrobial use by identifying how to protect more chickens more effectively by preventing immunosuppressive diseases (such as Marek's disease, Chicken anaemia virus and infectious bursal disease) and secondary bacterial infections, or vertically transmitted diseases (eg. Mycoplasmosis). The industry AMS programme is putting mechanisms in place to identify areas where further refinement of antimicrobial use, within the restrictions of withholding periods, can be made for all antimicrobials including those that aren't used in human medicine. This potentially includes the formalization of a set of prescribing guidelines, which would need to be coordinated with the Australian Veterinary Association.

## REPLACEMENT

The Australian poultry industry is a world leader in identifying and implementing alternatives to antibiotics. Significant advances in science and the development of vaccines have occurred in Australia which have significantly reduced the use of antimicrobials in Australia, and internationally. The development of vaccines to prevent mycoplasma-associated diseases<sup>7</sup> has meant macrolide antibiotics are rarely indicated, or required, and these vaccines are now sold internationally to benefit the international poultry industry. Chronic respiratory disease (CRD) complexes used to be the biggest contributor to disease and secondary bacterial infections in meat chicken production, requiring treatment with antimicrobials. With the use of Australian-developed Mycoplasma vaccines in breeding flocks, this disease complex is rarely seen today, and this development has probably made the single biggest contribution to the reduction in the need for antimicrobial treatments in the chicken industry. The development and implementation of vaccines for Newcastle disease virus, infectious bronchitis virus, infectious laryngotracheitis virus and Marek's disease virus has similarly significantly reduced the use of antimicrobials (particularly amoxicillin, oxytetracycline, trimethoprim and macrolides), in Australian chickens. Many of these vaccines have been developed in Australia. These vaccines have been successfully applied either directly to meat chickens or to breeder stock to ensure the meat chickens have adequate early immunity and to break the infection cycle. Importantly, improvements in biosecurity have reduced the industry's reliance on vaccines like these in meat chickens. The introduction of an *E. coli* vaccine has yet to be tested in the Australian industry, and it remains to be seen if this is an effective, viable alternative for widespread implementation in breeder flocks (where use will be most effective as they are longer lived). The Australian industry has funded the development and licencing of a vaccine candidate for necrotic enteritis prevention which looks promising and, if ultimately viable, implementation would significantly reduce the need for some preventative antimicrobial use in Australia, and internationally. The biggest delay for implementing vaccines (and reducing antimicrobial use) comes from the approvals process for their use and the ACMF works with the regulatory authorities to help reduce these delays. The industry is also continually looking to develop more effective vaccines against bacterial pathogens and significant work has been done, and continues, to assess the viability of alternative treatment options such as the use of pre-

and pro-biotics and other feed supplements that don't have direct antimicrobial action but may improve gut health and function and are effective replacements for antimicrobial use.

## REVIEW

Independent verification of the industry AMS programme which was implemented in 2017 by each of the seven major companies is planned in 2018 to help further support the industry's AMS efforts to identify areas for further refinement and reduction of antimicrobial use. There is no industry QA Program. This means each company has different approaches and requirements depending on their customers and specific markets. The elements of the AMS program have been adopted voluntarily and integrated into standard business operations which means that independent verification of the programme is vital to ensuring the industry as a whole is able to continue refining judicious use practices. It is expected that a number of recommendations for future research to support industry AMS will be identified as part of this process. As part of the commitment to judicious antimicrobial use, the Australian poultry industry reviewed the efficacy of AMR methodologies in the 1980s to ensure that AMR detection and surveillance approaches are consistent<sup>8</sup>. Since then, there has been greater alignment of techniques used by industry laboratories for detection and reporting of AMR, however improvements can still be made. The Department of Agriculture and Water Resources has funded an ACMF surveillance pilot study for the meat chicken industry that aligns with similar studies undertaken in the pork and cattle industries. The results of the chicken meat study are expected to be released in early 2018, and will allow comparison (as far as possible) with previous studies in 2000<sup>9</sup> and 2003<sup>10</sup>. Further, the industry has recently produced a position statement<sup>11</sup> on antimicrobial resistance that has provided industry with a policy framework to underpin the industry's continuous efforts to minimise the impact of the chicken industry on the development of antimicrobial resistance.

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This report is planned as a contribution to the cross-livestock industry AMS compendium which is being coordinated by an informal group of livestock industry stakeholders, and chaired by the ACMF. This contribution for the meat chicken industry is also useful as a standalone industry reference document. The compendium is designed to be a single source of publicly available information on antimicrobial stewardship available for each of the livestock industries. There are plans to have it endorsed by the AVA and the Department of Agriculture and Water Resources (DAWR) and published on a number of platforms, but primarily the AMS website being developed by DAWR.

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