

## The Australian poultry industry's antibiotic use

The third Australian Veterinary Antimicrobial Stewardship Conference (AVAMS) was held in the Crowne Plaza in Surfers Paradise over three days in November. It coincided with Schoolies but overcast weather had everyone concentrating on the topic.

More than 50 veterinarians, scientists and company leaders from many different industries across Australia came together to tackle the problem of antimicrobial stewardship.

On the second day Chris Morrow, Technical & Marketing Manager at Bioproperties, presented a paper on 'Australian poultry industries antibiotic usage in comparison to rest of world. An undocumented success story' which is presented below.

AntiMicrobial Resistance (AMR) is a human health problem where infections fail to respond to treatments and although most of the problem to date has been caused by antibiotic usage in humans the origin of some 'Superbugs' could be from animals.

This fits into the concept of One health where a coordinated response of the users of antibiotics consider the effects of resistance in bacteria in animals or agriculture getting into humans.

This is especially worrying for resistance developing in antibiotics that doctors rely on as last resort treatments. We heard that in some parts of the world like Pakistan and India people diagnosed with cancer are now not having chemotherapy because the risk of getting an untreatable infection while immunocompromised is just too great.

So all antibiotic users got together – pet animals, horses, food producing animals, laboratory animals and wildlife carers and discussed the problem.

Resistance has been around forever but some of the things we do amplifies the amount of resistance or selects new combinations of resistance.

It seems that if you take certain precautions, that this resistance problem can be minimised or even reversed but you have to measure over time the resistance in various animal sectors to be sure of this.

In the long term, antibiotics are needed by the industries to treat sick animals. All agree that this is essential for the welfare of the animals.

The creed here is to use as little antibiotic as possible but as much as necessary. After this the arguments become increasing technical but often



*Christopher Morrow, Technical and Marketing Manager from Bioproperties, presenting his paper at the AVAMS conference in November.*

it appears biosecurity and the control of challenges and containment of infections are important.

The first thing to do is to reduce the need for antibiotics. The Australian poultry industry is a long way ahead here with the control of Mycoplasma in flocks, with mycoplasma freedom of replacement stock and mycoplasma vaccination with the live mycoplasma vaccines.

Vaccination was first implemented at scale during the 1990s and our antibiotic use decreased dramatically.

The chicken industry had some big advantages to achieve this, including the complete separation of generations and biosecurity of farms and flocks.

Clinical mycoplasma problems seem a distant memory to Australian farmers, with some farmers having only heard about the problem of mycoplasma from their fathers.

Other countries are now following Australia and replacing large antibiotic programmes in lay with mycoplasma vaccination.

Even the price sensitive layer industries are seeing the advantages of vaccination (its cheaper than antibiotic programmes).

Control of coryza and fowl cholera with vaccines is important on some farms where birds are on the ground but even then these diseases are milder without mycoplasma in the background.

Ionophores can be considered antibiotics and are used in layers and broilers but coccidiosis vaccines are used by producers who want to be antibiotic free.

This could be considered the last prophylactic use of antibiotics in the industries. Some factors other than antibiotic use can also alter the prevalence of resistance like Copper and Zinc in diets by their effects control infections.

The results of surveys of antimicrobial resistance in Australian layers and meat birds shows low levels of resistance and even some evidence of resistance disappearing.

It is becoming evident that humans can infect poultry and other animals with some resistant organisms.

Long term, the Australian industry is in a good position but this needs to be communicated to the public and our trading partners.

We can also help the rest of the world by sharing our experience at making our poultry industries sustainable with the need for antibiotics except for treatment of the occasional sick flock.

*A full report on the Australian Veterinary Antimicrobial Stewardship Conference for 2023 will be published in the next issue of Poultry Digest and more papers will be run in forthcoming issues.*



## Australian poultry industries antibiotic usage in comparison to rest of world. An undocumented success story

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Most poultry in Australia receive no antibiotics for their whole life. Reductions are occurring in the use of ionophores as coccidiosis controls. Some sick flocks need treatments for Fowl Cholera or Spotty liver (mainly *Campylobacter hepaticus*) in cage free flocks but interventions are sporadic and direct response to needing to treat clinically affected flocks (Morrow 2018). Australian poultry industries ended up in this position by funding the development of the live *Mycoplasma gallisepticum* (MG) vaccine ts-11 in the first half of the 1980s in the response to the emergence of tylosin resistance in MG infecting various meat breeding operations (a killed coryza vaccine was also developed). These initial successes prompted the funding of *M. synoviae* (MS) vaccine development. Massive advances in decreasing antibiotic dependence were the outcome by the new millennium (nearly 100% of meat breeders are now vaccinated) and this spilled over into the layer industries where nearly 80% are now vaccinated with both MG and MS vaccines. This was all before the AMR became an issue and consequently largely undocumented. In contrast routine antibiosis especially during laying in layers and breeders and antibiotics to prevent "post vaccinal reactions" is still common in many countries and the target here is avian mycoplasma infections. This use of antibiotics is poorly documented in the literature although Kleven (2008) mentions the use of tetracyclines or tylosin in lay (a week a month) but is estimated to be 2.1 to 3.65 tonnes of active per Million layers per year and 6.7 tonnes of active for 400K PS and progeny per year (Morrow 2021). This mycoplasma control is the major use of antibiotics in poultry worldwide and live mycoplasma vaccines can replace it.

Acquired antimicrobial resistance in pathogenic Avian mycoplasmas is not a problem with direct consequences like transference of this resistance to human pathogens. Of more worry is the pressure for emergence of resistance in zoonotic infections in poultry and transfer by the human food chain (Mulchandani and others 2023). Salmonella (especially *S. Enteritidis*) and *Campylobacter jejuni* and related organisms deserve our focus. Salmonella infections are subject to control measures and there are vaccines and may be considered controllable with current technologies. On the other hand, Campylobacter infections are ubiquitous in poultry and asymptomatic - indeed as far as the chicken is concerned, they seem to be a commensal. In humans this is different situation with macrolide treatment being considered an option whose effectiveness is needed to be maintained.

1. Kleven SH (2008) "Control of Avian Mycoplasma Infections in Commercial Poultry." Avian Diseases, 52, 367-374
2. Morrow, CJ "Focused antibiotic stewardship for the poultry industries", Nov 2018 AVMAS conference, Sunshine Coast, Queensland, Australia.
3. Morrow, CJ (2021) "Antimicrobial resistance in avian mycoplasmas in Asia". Asian Poultry. Jan p14-16.
4. Mulchandani R, Wang Y, Gilbert M, Van Boeckel TP (2023) "Global trends in antimicrobial use in food-producing animals: 2020 to 2030." PLOS Glob Public Health 3(2): e0001305. <https://doi.org/10.1371/journal.pgph.0001305>