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Article Type: Review

Journal Section: Conference proceedings

Layout Instructions

Figures: 0

Tables: 0

Word Count (approx.)

Antimicrobial stewardship in the dairy industry: responding to the threat of antimicrobial resistance

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Dairy Australia is the national service body for the Australian dairy industry. Its role is to help farmers adapt to a changing operating environment and achieve a profitable, sustainable dairy industry. Although the use of antibiotics in Australian agriculture is relatively low in global terms, Dairy Australia recognises important drivers for continuous improvement in antimicrobial stewardship (AMS). Dairy Australia's first strategic priority is to support profitable farms. This priority has driven the development of a range of on-farm change management programs in the animal health and welfare fields to optimise the unit cost of production and dairy cattle welfare. Dairy Australia's third strategic priority is to further develop a 'trusted dairy industry'. Previous and current work under these two strategies position the dairy industry favourably with respect to confronting the challenge of antimicrobial resistance (AMR) and supporting sound AMS with the guiding principle of 'as little as possible, as much as necessary'. However, given an incomplete but ongoing threat of AMR, more work is needed. Supported by Dairy Australia, the dairy industry has developed an antimicrobial use strategy aligning with the Australian Animal Sector National AMR Plan 2018.

Keywords antimicrobial resistance; antimicrobial stewardship; Australia; dairy cattle

Antimicrobial stewardship in the dairy industry

The dairy industry recognises four key drivers for ongoing improvement in AMS.

1. Market and customer requirements: residues and impact on food safety are a key priority for milk companies. As well, global food companies have announced their desire to reduce antibiotic use in their supply chains.
2. Government requirements: animal industries are increasingly under scrutiny for the types, amounts and indications of antimicrobials used.

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: [10.1111/avj.12807](https://doi.org/10.1111/avj.12807)

3. Animal health: maintaining access to effective drugs is critical to cow and calf health and welfare, and therefore dairy farming livelihoods.
4. Community health: routine human infections are increasingly at risk of becoming untreatable as microorganisms develop resistance to today's antimicrobials, so this affects all of society.

Long history of prudent antimicrobial management

A 'stocktake' undertaken in 2018 provides an extensive timeline of activities undertaken by the Australian dairy industry to optimise the use of antimicrobials over the past 40 years. This includes leading the development of the International Dairy Federation's (IDF) *Guide to prudent use of antimicrobial agents in dairy production*.¹ It also includes extensive milk and meat residue monitoring programs, such as the Australian Milk Residue Analysis Survey,² and significant investment in farm extension programs focussed on animal health and prudent antimicrobial use (AMU). These are briefly described below and include but are not limited to: Countdown, Healthy Hooves, Rearing Healthy Calves and Transition Cow Management. These change management programs focus on disease prevention coupled with early, accurate diagnosis of conditions and advocating the development of treatment protocols. Countdown, Dairy Australia's national milk quality program, was the first industry supported, nationally based levy-funded program. Since 1999, Countdown has developed training and resources for farmers and their advisers (veterinarians, field officers and milking machine technicians) to build their capability to reduce mastitis and optimise milk quality on Australian dairy farms. Consultation with milk processors has also focussed Countdown activities on the changing market and customer requirements relating to residues and food safety. Reducing clinical and subclinical mastitis reduces the need for AMU. Recent investment in resources to support enhanced dry cow management further support improved decision making by veterinarians and farmers at this critical control point of the lactation process. A web-based dry cow consult tool, updated technotes, videos on dry cow management and discussion groups have been designed to optimise AMU at dry off and ultimately reduce the reliance on whole-herd AMU.³

Other Dairy Australia change management animal health programs such as Rearing Healthy Calves, Healthy Hooves and Transition Cow Management have similarly supported improved health outcomes to reduce AMU and improve AMS. Biosecurity is also a critical component of improving preventative health and AMS. Dairy Australia has developed a biosecurity planner, which can be created, stored, updated and shared from an online platform. In this tool, a dairy farm's specific animal health risks are identified and scientifically valid options for control are suggested. The dairy industry's efforts in AMS are summarised in the 2018 publication *Antimicrobial stewardship in Australian livestock industries*.⁴

Monitoring use

Dairy Australia has been monitoring AMU through surveys of veterinary sales data based on aggregated quantity (kg) of actives sold. These surveys provide a 'snap shot' of antibiotics administered via injection, the intra-mammary route (lactating and dry cow) and orally. Key findings are as follows.

1. The proportion of antimicrobials used by class over two time periods.
2. Indicative use of antimicrobials given a 'high' risk rating by global and Australian agencies (because of their importance in human medicine).
3. Identification of gaps in AMU metrics.

Significant international market and government drivers and requirements, along with goals now set by peer competitors such as New Zealand, suggest the need for ongoing risk analysis and a coherent framework for industry policy development.

To align with the Australian Animal Sector National AMR Plan 2018,⁵ the dairy industry has developed a statement of commitment and a comprehensive strategy to ensure best practice management of antibiotics and avoid methods of use that may lead to resistance. The antibiotic strategy has five components:

Watch

Consider appropriate pathways for surveillance of AMR in pathogens affecting both dairy cattle and humans. There is a strong role for government in this surveillance.

Measure

Further investigate and adopt an appropriate method for measuring dairy industry AMU (metrics), noting methods used by other livestock industries and expectations of government and international body stakeholders.

Manage

Seek to optimise and where feasible reduce AMU over time through programs aimed at improving herd health (reducing the spread of infection and disease) and prudent AMS programs based on risk assessment and risk management principles.

Engage

Seek to increase collaboration between farmers, veterinarians and milk processors; cooperate with stakeholders such as the other livestock industries, Australian Veterinary Association, the pharmaceutical industry, the Australian Government, IDF and the OIE.

Be open

Communicate the Australian dairy story around antibiotics.

The dairy industry's Sustainability Framework will be a key communication tool going forward for setting targets and measuring ongoing industry performance on animal care.⁶

Dairy Australia's investment in improving productivity through optimising animal health and welfare has allowed the development of evidence-based, peer-reviewed resources that support improved health outcomes. These change management programs now provide a great platform for more overt AMS messaging to support industry and government AMR strategies. Maintaining investment in these programs and improving AMS now strongly aligns with Dairy Australia's third strategic priority in having a 'Trusted Dairy Industry', which seeks to promote our longer-term social license. The dairy industry's Sustainability Framework is an important vehicle for setting targets and measuring and communicating progress of AMS.⁶

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Title:

Antimicrobial stewardship in the dairy industry: responding to the threat of antimicrobial resistance.

Date:

2019-07-01

Citation:

Coombe, J. E., Tymms, S. M. & Humphris, M. (2019). Antimicrobial stewardship in the dairy industry: responding to the threat of antimicrobial resistance.. Australian Veterinary Journal, 97 (7), pp.231-232. <https://doi.org/10.1111/avj.12807>.

Persistent Link:

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