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

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Prelude

The Australian Lot Feeders' Association (ALFA) appreciates the opportunity to provide input into the inquiry into the progress in the implementation of the recommendations of the 1999 Joint Expert Technical Advisory Committee report on Antibiotic Resistance (JETACAR).

Whilst the recommendations from the JETACAR report were mostly directed to government departments and the veterinary profession, ALFA is nonetheless eager to explain the facts surrounding the use of antibiotics in the cattle feedlot industry given the misleading and incorrect accusations often levelled at the sector.

Whilst the following points will be elaborated upon during the submission, it is prudent that they be highlighted from the outset;

- All antibiotics used in animals and human medicine must be firstly approved by Australian regulatory authorities.

- Antibiotics have been used by livestock industries to treat sickness for over 50 years whilst resistance to antibiotics in human health is a more recent phenomenon.

- The overwhelming majority of antibiotics used in the Australian cattle feedlot industry are not used in human medicine.

- The use of antibiotics in the cattle feedlot industry is extremely low with only 1-3% of cattle treated in any one year. This is because antibiotics are overwhelmingly used only **after** infection is detected. I.e. as per their use in human medicine. Notably, they are not used for growth promotion purposes.

- Several Government reports over the last decade have demonstrated that antibiotic resistance in cattle was nil or extremely low. A further report is planned in 2013.

- Antibiotics are used both judiciously and responsibly within the cattle feedlot sector given;
  a) vets must prescribe and oversee their administration,
  b) our export markets are highly sensitive to chemical residues; and
  c) the feedlot industry quality assurance program (NFAS) requires feedlots to have trained and competent staff along with records to trace treated cattle. These requirements are independently audited each year.

- The responsible use of antibiotics by the sector is not an ambit claim. National Residue Survey results show that 99.99% of all beef samples tested for antibiotics over time are compliant with Government residue standards.

- Unfortunately, criticism of the Australian cattle feedlot sector in relation to antibiotic use is a result of conclusions drawn from their use in feedlots in other countries, other intensive livestock industries or comparisons with Ionophores. Ionophores are not used in human medicine and are not structurally related to, nor do they share the mode of action of any compound used in human medicine. As such, they do not pose a risk to increased resistance in human health.

- Whilst the food safety regulator, Food Standards Australia and New Zealand has determined that microbial loads are low in the red meat supply chain, the cattle feedlot sector has introduced a number of best management practices to reduce such loads further so that cattle health is improved and the requirement for antibiotics reduced.

- The removal of antibiotics for cattle usage would lead to inferior animal health and welfare outcomes as they would be denied access to potentially lifesaving treatments.

Background

ALFA is the peak representative body for the cattle feedlot industry. The industry has a value of production of approximately $2.7 billion while employing some 2000 people directly and almost 7000 more indirectly. Approximately 33 per cent of Australia's total beef supply and 80 per cent of beef sold in major domestic supermarkets is derived from the feedlot sector. More than 60 per cent of feedlot beef production is exported into international markets.

There are around 450 accredited cattle feedlots throughout Australia with the majority located in areas that are in close proximity to cattle and grain supplies. Queensland is the largest state in terms of cattle numbers on feed with approximately 50% followed by NSW with 30%, Victoria with 10% and the remainder shared between South Australia and Western Australia.

The industry was the first agriculturally based industry in Australia to embrace quality assurance and has had in place the National Feedlot Accreditation Scheme (NFAS) since 1994. This program ensures that every accredited feedlot is independently audited on an annual basis to ensure compliance with food safety, product integrity, environment and animal welfare legislation. NFAS is also independently owned and managed to industry. A key element of the program from an animal health, welfare, biosecurity and food safety perspective is the responsible use of animal health products such as antibiotics.

International perspectives on antibiotic resistance

DAFF conducted a survey of antimicrobial resistance in bacteria (*E. coli* and *Enterococcus*) isolated from cattle in 2003-4.[1,] The study findings determined that antibiotic resistance is present in some indicator and pathogenic bacteria in the guts of food-producing animals in Australia. However, the National Health and Medical Research Council reviewed the study's findings and found the impact on human health is likely to be small. This survey showed that a low proportion of bacteria, isolated from the three animal species, were resistant to antibiotics. Importantly, this survey found resistance to "critically important" human medicine antibiotics was non-existent or low in bacteria isolated from food- producing animals.[2]

DoHA, at the instigation of the Food Regulation Standing Committee, commissioned Food Science Australia to survey the presence of antimicrobial resistant bacteria in beef mince at retail. The report was released in 2009. In the survey, testing of bacteria isolated from foods indicated that overall resistance to the majority of antibiotics was low. When compared to reports from other countries, Australia has a very low prevalence of bacteria that are resistant to antibiotics on these foods, particularly those "critically important" for human medicine.[3]

However, it is not the purpose of this submission to argue the significance of antibiotic resistance to human health and welfare or the significance of animal agriculture to antibiotic resistance in bacteria isolated from humans. A number of international consultations on the use of antibiotics in human medicine and also in veterinary medicine have assisted in defining where the significant issues lie. Approaches to assessing the risk of antibiotic resistance have been developed internationally. Supply chains have set their own standards for responsible use.

[1] DAFF (2007). Pilot Surveillance Program for Antimicrobial Resistance in Bacteria of Animal Origin. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

[2] Report Report of the Department of Agriculture, Fisheries and Forestry Survey for Antimicrobial Resistance in Bacteria of Animal Origin. Plain Language Summary 15 December 2008

[3] Plain Language Summary. FRSC pilot survey for AMR bacteria in Australian food

Together, these have led to a position in Australia in which the medical and animal agriculture communities in Australia are not too far apart in their positions on antibiotic use.

A number of international meetings have been held on antimicrobial resistance and appropriate responses in both medicine and agriculture. The concept of critically important antibiotics has been established. These critically important antibiotics provide a specific treatment, or one of a limited number of treatments, for serious disease. The Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials, held in 2007[4]; recognised that some antibiotics were considered critical only by WHO (for use in humans), and others were considered critical only by OIE (for use in animals), and that some were considered to be critical for both humans and animals. The antibiotics considered critically important for both humans and animals were considered to be priorities for resistance surveillance and for implementation of appropriate management measures to maintain the efficacy of the drugs. Prudent use was considered essential for all antibiotics.

The Codex Alimentarius Commission, which develops internationally accepted guidelines and codes of practice in food production, has adopted Guidelines for risk analysis of foodborne antimicrobial resistance.[5] These guidelines provide a structured risk analysis framework to address the risks to human health associated with the presence in food and animal feed and the transmission through food and animal feed, of AMR microorganisms or determinants linked to non-human use of antimicrobial agents.

Supply chains have become more cognizant of antibacterial resistance both in their food products and in their impact on the environment. One example is McDonald's, the quick service restaurant chain, which has recognised the importance of combating antibiotic resistance, and believes that voluntary, market-based actions can complement ongoing activities to address the issue of antibiotic resistance. To this end, McDonald's has a policy which specifically prohibits the use of antibiotics belonging to classes of compounds approved for use in human medicine when used solely for growth promotion purposes. Given that the overwhelming majority of antibiotics used in the cattle feedlot industry are not used in human medicine or for growth promotion purposes, the Australian cattle feedlot industry has become a large supplier of beef for the retail chain.

As a result of improved understanding of antibiotics resistance issues, behaviours and communication since the JETACAR report was released, the medical and animal agriculture communities now have a better understanding and respect of each other's position . A recent 'debate' in the Medical Journal of Australia, presented a 'yes' and 'no' case regarding the significance of antibiotic use in animal agriculture to resistance in human infections[6]. The two positions, one written by a human infectious diseases expert and the other written by a veterinary pharmacologist, when directed to the effectiveness of control exerted in Australian agriculture, were not far apart.

Actions taken by the industry to reduce antibiotic resistance

Feedlot Industry Systems and support for prudent use

The Australian cattle feedlot industry has a reputation as a producer of high quality, safe, and nutritious beef. This reputation is integral to the ongoing integrity, financial viability and promotional message to customers and consumers in our domestic and export markets. Importantly, this reputation has been obtained through the implementation of robust legislation and proactive industry programs such as NFAS.

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[4] FAO/WHO/OIE. 2008. Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials. Report of a meeting held in FAO, Rome, Italy, 26-30 November 2007. FAO, Rome, Italy, and WHO, Geneva, Switzerland.

[5] Codex Alimentarius Commission (2011) Report of the Fourth session of the Codex ad hoc intergovernmental task force on antimicrobial resistance. REP11/AMR Apprendix II

[6] Does antibiotic use in farmed animals pose a risk to human health? Medical Journal of Australia 196(5)302-303 19 March 2012

Contrary to popular misconception, the overwhelming majority of antibiotics used in the Australian cattle feedlot industry are not used in human medicine or for growth promotion purposes.
Antibiotics that are critical for human health, such as the glycopeptides (eg avoparcin, vancomycin) and the quinolones (eg nalidixic acid, ciprofloxacin) are not used in the Australian cattle feedlot industry. For instance, Virginiamycin is not used in human medicine but the pristinamycin antibiotics (dalfopristin and quinupristin - also members of the streptogramin group) are considered important drugs for the treatment of emerging vancomycin resistant enterococci. For this reason, the use of virginiamycin has been restricted by the APVMA. Whilst the product can be used to prevent lactic acidosis under specific circumstances, the antibiotic is rarely used in feedlots as there are preferable alternative treatments available to the industry. All uses for growth promotion have been banned.

A number of vaccines have become available since 2000, and are being used commercially, for the control of bovine respiratory disease (BRD) in feedlot cattle. These include Rhinogard® for control of bovine herpesvirus, Pestigard® for control of bovine pestivirus, and Bovilis Mh® for control of *Mannheimia haemolytica*, an important secondary bacterial infection agent in cases of BRD. The viral infections are important precursors to bacterial infections, so they are relevant in the context of reducing the need for antibiotic use.

Additionally, many producers and lotfeeders are now yard weaning and backgrounding cattle prior to feedlot entry. These processes involve the implementation of procedures and best management practices to improve cattle health prior to their introduction to the feedlot environment. As a result, the consequential risk of disease and hence the potential use of antibiotics is reduced Some of these programs e.g. Feeder Guard™ and MaxiStart™ incorporate third party audited QA programs with many feedlots offering premiums to grass fed producers to be involved.

In addition, the cattle feedlot industry has significantly improved biosecurity practices since 2000 thereby reducing the potential introduction of disease into the cattle feedlot environment. Biosecurity plans have not only been developed as an industry but are a requirement of the industry's quality assurance program NFAS.

The National Feedlot Accreditation Scheme (NFAS) incorporates a number of elements to improve animal health, welfare and biosecurity whilst also ensuring the prudent use of animal health products. For instance the NFAS standards involve;

- Staff who administer animal health products to be trained to ensure they have the appropriate skills and knowledge to perform their duties.

- Records are maintained to provide documented evidence regarding compliance with the standards and traceability of cattle and feedstuffs;

- A regular and continual improvement process of the rules and standards to ensure they meet community expectations

- The regular monitoring of livestock, reporting of incidences and the development of contingency plans as part of a broader animal health program

- Exposure of animals to fodder crops, grain and pasture, and introduced stock feed that have been treated with or exposed to agricultural chemicals is managed to minimise the risk of unacceptable chemical residues in livestock for human consumption.

- The requirement to ensure that the welfare of livestock is not compromised whilst within the control of persons responsible for their care and well being, and that prompt and appropriate remedial action is taken when required.

- The development of risk assessment procedures and actions to minimise the likelihood of disease entry into and spread from the Feedlot.

- Internal audits to be performed on procedures, records and property facilities at least once per annum.

As stated previously, NFAS also requires feedlots to be independently audited on an annual basis to ensure compliance with the standards along with animal welfare, food safety and environmental legislation.

Besides NFAS, the feedlot specific QA program, the beef industry has also established a number of on-farm assurance programs to minimise risks associated with the management and administration of livestock chemicals and treatments. These programs include the Livestock Production Assurance (LPA) food safety program, covering more than 195,000 farms, and Quality Assurance programs such as LPA QA (encompassing Cattlecare and Flockcare). Supported by the National Vendor Declaration, these programs require livestock producers to document all animal treatments, including relevant withholding periods or export slaughter intervals, and pass this information on when selling livestock. Notably, NFAS accredited feedlots are required to ensure that cattle consigned to the feedlot are sourced only from an LPA accredited property.

Monitoring

Antibiotics are used both judiciously and responsibly within the cattle feedlot sector. This is delivered via several mechanisms. Firstly, APVMA requires that all antibiotics used in the cattle feedlot industry must be prescribed by and their use overseen by qualified veterinarians. Secondly, Australia cannot afford to lose its important beef export markets due to antibiotic residues in beef, particularly given two thirds of Australia's production is exported and our markets are highly sensitive to chemical residues. Thirdly, it is an NFAS requirement that antibiotics are administered by trained and competent staff with records maintained to trace treated livestock. Feedlots are third party audited against the program on an annual basis.

Compliance with Maximum Residue Limits (MRLs) for antibiotics indicates responsible use and minimal risk to humans through consumption. The responsible use of antibiotics is evidenced by the results of randomized testing within the National Residue Survey program which demonstrates that throughout the history of the program, 99.99% of beef samples tested for antibiotics are compliant with Australian legislated standards.

The food safety regulator, Food Standards Australia and New Zealand has determined that microbial loads are low in the red meat supply chain[7]. Such research demonstrates that current regulatory and industry quality assurance systems are effective in managing microbial loads. Regardless, the industry has conducted several further studies to examine the hygienic quality of meat in Australia, at both the meat processing facility (abattoir)[8,9]and at retail[10]. While the prevalence and concentration of bacteria, particularly those of greatest concern with antibiotic resistance, is low in Australian meat, ALFA has proactively supported the development of new regulatory standards to further reduce such loads[11]. The achievement of these standards will minimise the potential for antibiotic resistance throughout the food chain.

[7] This report can be made available from FSANZ upon request

[8] Phillips, D., Bridger, K., Jenson, I. and Sumner, J. (2012) An Australian national survey of the microbiological frozen boneless beef and beef primal cuts. J. Food Protection 75(10)1862-1866

[9] Phillips, D., Tholath, S., Jenson, I and Sumner, J (2013) Microbiological quality of Australian sheep meat in 2011. Food Control 31:291-294

[10] D. Phillips, D. Jordan, S. Morris, I. Jenson and J. Sumner (2008) A national survey of the microbiological quality of retail raw meats in Australia. J. Food Protect. 71(6) 1232-1236.

[11] The Primary Production and Processing Standard is set to be finalised and implemented in 2013

Current Industry Research

Animal Health

The industry is currently funding research projects to develop molecular diagnostic tools for use in lambs and calves with diarrhoea to establish whether the cause is viral, bacterial or protozoal, so that the correct treatment can be given early.

Basic research is commencing on the innate immune system, focussing on ways in which this might be exploited for better disease control and improved production.

Antibiotic resistance

The cattle industry has funded scientific research aimed at developing scientific capability to investigate antibiotic resistance in the red meat supply chain. This research demonstrated, for the industry, the low level of resistant bacteria in animals and in meat, well before the DAFF and DoHA reports were released. In fact, industry funding developed capability that was utilised to perform the work presented in the DoHA report and provided a valuable insight into how to conduct the study. A contract has been entered into for the conduct of a survey to produce new data on antibiotic resistant bacteria in cattle. This study will be comparable to the earlier studies and also collect data of interest to current concerns. The medical community is being consulted about the details of this survey.

The understanding of the molecular basis for resistance, the ability for resistance to transfer, and prevalence in various animal raising environments has been investigated in extensive industry-funded projects, resulting in a number of scientific publications.[12]

[12] Barlow, R. S., Fegan, N., and Gobius, K. S. 2009. Integron-containing bacteria in faeces of cattle from different production systems at slaughter. Journal of Applied Microbiology 107(2), 540-5

Barlow, R. S., Fegan, N., and Gobius, K. S. 2008. A comparison of antibiotic resistance integrons in cattle from separate beef meat production systems at slaughter. Journal of Applied Microbiology 104(3), 651-8

Barlow, R. S., and Gobius K. S. 2006. Diverse class 2 integrons in bacteria from beef cattle sources. Journal of Antimicrobial Chemotherapy 58(6), 1133-8

Barlow, R. S., Pemberton, J. M., Desmarchelier, P. M., and Gobius, K. S. 2004. Isolation and characterisation of integron-containing bacteria without antibiotic selection. Antimicrobial Agents & Chemotherapy 48(3), 838-842

Annex:

Summary of actions taken by the industry relating to recommendations from JETACAR

Number	Recommendation	Action by the industry
3	Stronger audit trail for antibiotics from the importer to the end-user be implemented	Record keeping requirements are embedded within NFAS and other industry's assurance programs including LPA Food Safety, LPA QA (Cattlecare and Flockcare).
10	Surveillance of the prevalence of antibiotic-resistant bacteria and resistance genes	Surveys have been conducted by the industry on cattle at the time of slaughter, beef at abattoirs and beef at retail. The industry cooperated with DAFF and DoHA on the design and conduct of surveys they conducted on animals and meat A new survey is being conducted in 2013
12	Hazard analysis critical control points (HACCP)-based food safety procedure be implemented	NFAS, LPA Food Safety and LPA QA (Cattlecare and Flockcare) program requirements are based on an on-farm HACCP approach Meat processors have adopted HACCP which is mandated by authorities through the Australian Standard for the production and transportation of meat and meat products for human consumption (AS4696). Microbiological surveys of meat demonstrate the effectiveness of HACCP and control strategies
13	Cost-effective non-antibiotic methods to increase productivity and prevent disease should be developed	Pre-weaning techniques, Biosecurity plans, low stress stock handling methods, commingling methods, promote direct consignments, methods for the introduction of cattle to grain. Furthermore research is underway on vaccines, animal health and diagnostics. Extension information is available to producers on cost-effective animal husbandry that focusses on disease prevention, and simple treatments.
17	Continuing education programs on the issue of antibiotic resistance	Advice is given through NFAS, LPA Food Safety and LPA QA (Cattlecare and Flockcare), with strict program requirements for use of livestock treatments according to label and veterinary directions
18	Research into antibiotic resistance	Antibiotic resistance research has been funded by the red meat industry for a significant period and funding has recently recommenced. Several publications on molecular epidemiology have been published.