29 September 2023

Science Strategy and Priorities Taskforce
Department of Industry, Science and Resources
Australian Government

By email only: priorities@industry.gov.au

To whom it may concern,

Re: consultation on Australia's draft National Science and Research Priorities

Thank you for the opportunity to provide our comments on the consultation for *Australia's draft National Science and Research Priorities*.

Animal Medicines Australia (AMA) is the peak industry body representing the leading animal health companies in Australia. Our members are innovators, manufacturers, registrants and suppliers of a broad range of veterinary medicines. Our members work at the cutting edge of animal health science to prevent, control and treat disease across the livestock, equine and companion animal sectors. Products from our member companies account for more than 90% of all animal health products in Australia.

The interconnected relationship between human health and animal health within an environment that we share is complex. Understanding and embracing this relationship is critical to ensuring a sustainable and resilient future for Australia. AMA seeks to ensure that the importance of animal health is recognised in all national priorities and strategies, including the Science and Research Priorities.

The animal health sector has a strong history of innovation and an ambitious goal of a world where the threat of disease is significantly reduced by improving animal immunity and disease prevention strategies, developing earlier, more specific diagnostic technologies and more accurate, effective treatments. Fewer animals lost or suffering from disease will not only improve food security and safety, but also reduce pressure on natural resources and lower emissions associated with animal

production. Sharing our lives with companion animals is also proven to have multiple health benefits for people and veterinary medicines are critical to support longer and healthier lives for our pets.

We hope the following information about the animal health sector will be of assistance in refining the priorities for science and research and re-energise conversations across the science and research sector for the benefit of all Australians.

Please let us know if we can provide any further information to assist.

Yours sincerely,

(unsigned for electronic submission)

Dr Charmian Bennett

Director Science and Policy

SUBMISSION ON

Australia's draft National Science and Research Priorities

29 September 2023

Animal
Medicines
Australia

- **PRIORITY 1: Ensuring a net zero future and protecting Australia's biodiversity**

The animal health sector in Australia aims to make meaningful contributions under the three key pillars of sustainability:
- • Health: delivering better nutrition and healthier lives, while helping reduce hunger;
- • Environment: reducing the footprint of our operations and promoting a culture of sustainability, while providing tools for veterinarians and farmers to reduce emissions from animal production; and
- • Communities: working with our employees and partners to provide more sustainable livelihoods.

Improving animal health offers a cost-effective and sustainable opportunity for livestock industries to reduce emissions and manage climate risks. In addition to significant productivity and sustainability benefits, healthy animals produce less emissions of key climate gases, including carbon dioxide and methane. Every animal lost to illness and disease requires another to be raised elsewhere to meet market demand – representing emissions spent that are not subsequently converted into food.

A recent Oxford Analytica report commissioned by HealthforAnimals found that improving animal health and husbandry practices could reduce emissions by up to 30%.[1] This would enable livestock producers to increase production to meet the needs of an additional 1.9 billion people without increasing current emissions.

Similar data in Australian production systems would provide a mechanism for animal industries to demonstrate their climate performance and emissions reduction achievements, as well as provide incentives for improvement through better animal health. Existing models used to generate emissions reduction outcomes associated with disease prevention or mitigation require validation in Australian production systems.

AMA's report *Actions in Animal Health Sustainability 2022*[2] describes the role animal medicines play in ensuring Australians have access to safe, nutritious and affordable food, improving the health and wellbeing of the people and animals that make up our communities, and contributing to the health and biodiversity of our natural environment.

The global population is expected to increase from the current 7.7 billion to 9.7 billion by 2050, with the population in Australia and New Zealand projected to increase by 28 percent.[3] At the same time, the global middle class is expected to expand to 5.3 billion people. Collectively, these changes in population metrics are expected to generate a 35 percent increase in the demand for food by 2030 and a substantial increase in demand for animal protein from meat, eggs and dairy products.[4,5] At the same time, global climate change will continue to place growing pressures on agricultural production, especially on the quantity, quality, reliability of supply and sustainability of various commodities.

To continue to meet the growing demands for animal protein, both domestically and for our important export markets, Australian livestock farmers will be required to not only improve

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[1] HealthforAnimals: Animal health and Sustainability: A Global Data Analysis. https://healthforanimals.us15.list-manage.com/track/click?u=9c09c452f72764a0d0eeaa4ba&id=a6f38a8eb4&e=94e890a902
[2] AMA-Actions-in-Animal-Health-Sustainability-2022.pdf (animalmedicinesaustralia.org.au)
[3] World Population Prospects - Population Division - United Nations
[4] Growing consumption | Knowledge for policy (europa.eu)
[5] Options for the livestock sector in developing and emerging economies to 2030 and beyond - CGIAR

productivity, but also their efficiency – that is, improving productivity while simultaneously reducing their environmental impact and ensuring agricultural operations remain economically viable.

Animal diseases are a direct threat to healthy diets, making nutrient -dense food more scarce and more expensive. The World Organisation for Animal Health (WOAH) estimates that more than 20% of animal production worldwide is lost as a direct result of disease.[6] Without access to animal health products such as vaccines, antimicrobials, parasiticides etc., farm productivity would be reduced due to:

- • higher farm input costs per unit of production,
- • sick animals are less productive, reducing returns on farm investment,
- • higher animal mortality due to illness or disease, and
- • more labour-intensive stock management practices to control and manage disease on farm.

Animal disease outbreaks in Australia would directly contribute to increased food costs for both domestic and overseas consumers. An outbreak of Foot and Mouth Disease (FMD) in Australia would have significant impacts on both food availability and cost. Exports would be halted for at least 6-12 months, which would be devastating for the meat and wool industries and cost the industry up to $50 billion over ten years.[7] A 1999 outbreak of Newcastle Disease in Australia resulted in the slaughter of 1.9 million meat chickens and 13,000 laying hens, with a cost to farmers of around $200 million. The eradication program took 3 months, involved 5000 people and cost the government $22 million excluding compensation. There have been no outbreaks of Newcastle Disease in Australia since a vaccination and surveillance program was implemented in 2002.[8]

Infectious animal diseases can spread rapidly because of greater global travel and trade, putting the livelihoods of farming communities around Australia at increasing risk. Vaccination and other disease prevention tools like preventative parasite control medications, along with rigorous biosecurity processes and point-of-care diagnostic technologies are at the forefront of animal disease prevention. Greater attention must be placed on detecting and preventing infectious animal diseases from entering Australia and responding to them if they do.

The National Farmers Federation's ambitious goal of Australian agriculture being a $100 billion sector[9] will only be realised by maintaining the health and welfare of Australia's livestock. All of Australia's major livestock industries, including beef, dairy, pork, sheep and poultry, focus on animal health and welfare in their sustainability frameworks and targets, reflecting the devastating impact disease outbreaks could have on the Australian livestock sector – and subsequently, the availability of safe, nutritious food for all Australians and those who rely on Australia's export markets.

Feeding an increasing global population and the burgeoning middle class sustainably is an enormous challenge that cannot be solved simply by increasing the size of production systems. Healthy animals produce more meat, milk and eggs, thereby enabling farmers to meet the increasing demand for animal protein with fewer animals. Improvements in agricultural technologies including genetics, automated farming systems, GPS devices, thermal imaging, nutrition and animal health have enabled

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[6] VS-FINAL-EN.pdf (woah.org)

[7] Animal Health Australia. Megatrends, opportunities and challenges facing Australian livestock industries. https:// animalhealthaustralia.com.au/industry-publication

[8] Newcastle Disease Management - Animal Health Australia

[9] 2030 Roadmap - National Farmers' Federation (nff.org.au)

a 20 percent reduction in land requirements for livestock while doubling production.[10] This, in turn, limits the need for expansion of farming land and allows the dedication of existing farmland to regeneration and biodiversity enhancement projects – with 38 per cent of dairy and livestock farmers dedicating at least some of their farmland to regrowing native vegetation.[11] The Australian Sheep Sustainability Framework and the Australian Dairy Industry Sustainability Framework highlight the importance of responsible on-farm environmental practices, including responsible management of natural resources such as water, soil and vegetation – all of which help to conserve and improve biodiversity.

The Australian animal health sector is working towards a future where the impacts of animal disease on the environment, animal and human health and the livelihoods of Australians are greatly reduced. Scientific advances and emerging technologies are providing novel solutions for improving individual and herd immunity and disease prevention, as well as rapid, specific diagnostic processes and targeted, effective treatment options. Ready access to and widespread adoption of these ground-breaking innovations will assist the Australian livestock industries in achieving their own sustainability goals, by reducing emissions and the use of natural resources, as well as minimising the number of animals lost to disease.

● PRIORITY 2: Supporting healthy and thriving communities

Human and animal health are inextricably linked – from the health and wellbeing benefits provided by companion animals to the everyday availability of safe, affordable and nutritious food produced using gold standard animal health and biosecurity measures, freedom from zoonoses and shared challenges such as antimicrobial resistance. Consequently, any consideration of the effectiveness of preparedness and disease responses must include the animal health sector alongside that of human health.

Zoonotic Diseases

In addition to devastating impacts on animal health and welfare, an estimated 60% of infectious diseases are zoonotic - they can be transferred from animals to people, and from people to animals.[12] While improved animal health management in Australia significantly reduces the risk of zoonotic disease transfer to humans, transmission does occasionally occur – for example, via contact with sick animals, insect bites or contaminated food. The most effective preventive health approach to reducing zoonotic diseases is to keep animals healthy - healthy animals are much less likely to carry infections that could potentially be transmitted to people.

All animal owners and carers must have sufficient access to all tools available for improving and maintaining animal health, including veterinary medicines. Australia's strong biosecurity and industry-led disease preparedness and response processes, including access to disease prevention

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[10] Food and Agriculture Organization of the United Nations. Transforming the livestock sector through the Sustainable Development Goals. https://www.fao. org/3/CA1177EN/ca1177en.pdf
[11] Natural Resource Management and Drought Resilience — survey of farm practices - DAFF (agriculture.gov.au)
[12] Global Challenges: Zoonoses. Available at https://www.healthforanimals.org/global-challenges/zoonoses/

tools such as vaccines and antiparasitic medicines, are central to keeping devastating animal diseases out of Australia.

Public health responses to a zoonotic disease will necessarily interact with 'non-health' sectors, such as those involved in protecting and maintaining food safety and supply, national and state farming and livestock industry associations, the food production sector, regulators including the APVMA, transport, trade and imports sectors etc. Animal disease outbreaks can have significant impacts on human health, such as considerable reductions in access to nutritious, affordable food if a significant animal disease (such as foot-and-mouth disease or lumpy skin disease) entered Australia. The 2001 UK foot-and-mouth disease epidemic resulted in up to 10 million animals being culled and was associated with profound mental health trauma for farmers, veterinarians, rural healthcare practitioners and government staff that persisted well after the epidemic had been controlled.[13]

More collaborative approaches between the public health and animal health sectors would support greater awareness and early identification of zoonotic disease threats, including the identification of effective interventions and more holistic approaches to outbreak management.

Health benefits of pet ownership

The benefits of our pets to our health are increasingly being recognised, with 97 percent of doctors reporting the health benefits of owning a pet.[14] The improved health of pet owners has also been shown around the world to reduce the burden on health systems, with significant associated savings in health care costs.[15,16] In Australia, these savings were estimated to be around $2 billion, with pet owners visiting the doctor 11 per cent less each year than non-owners.[17]

The benefits of optimal physical human health to a sustainable future are clear – and the importance of mental health and wellbeing in achieving a sustainable future must not be overlooked. With around 264 million people suffering from depression worldwide, it is a leading cause of disability and a major contributor to the global burden of disease.[18] Pets and therapy animals are proven to alleviate stress, anxiety, depression, and feelings of loneliness and social isolation.[19,20] Animal Medicines Australia's Pets and the Pandemic report exposed a boom in pet ownership during the COVID-19 pandemic, with around 30.4 million pets now residing in 69 percent of households.[21] Companionship, comfort, positive mental and physical health and unconditional love were

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[13] Psychosocial effects of the 2001 UK foot and mouth disease epidemic in a rural population. British Medical Journal (2005), v331(7527). Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1289318/

[14] HABRI. New Survey Reveals 97% of Doctors Believe There Are Health Benefits to Owning a Pet. https://habri.org/ pressroom/20141027

[15] Companion Animal Economics. 2017. The economic impact of companion animals in the UK. https://cabidigitallibrary.org/ doi/10.1079/9781786391728.0000

[16] HABRI. Pet Ownership Saves $11.7 Billion in Health Care Costs. https://habri.org/ pressroom/20151214 5

[17] Headey, B., & Grabka, M.M. 2007. Pets and Human Health in Germany and Australia: National Longitudinal Results. Social Indicators Research. 80, 297-311. https:// doi.org/10.1007/s11205-005-5072-z

[18] World Health Organisation. Depression. https://www.who.int/ en/news-room/fact-sheets/detail/ depression#:~:text=Depression%20 is%20a%20leading%20cause%20 of%20disability%20worldwide,and%20 pharmacological%20treatments%20 for%20moderate%20and%20severe%20 depression.

[19] HABRI. Mental Health. https://habri.org/ research/mental-health/

[20] HABRI. Mental Health and Well-Being. https://habri.org/research/healthy-aging/ mental-health/

[21] Pets and the Pandemic: a social research snapshot of pets and people in the COVID-19 era - Animal Medicines Australia

commonly cited as overall benefits of pet ownership and 70 percent of respondents said that being a pet owner improved their lives during the pandemic.

Antimicrobial Resistance (AMR)

Antimicrobial resistance (AMR) is recognised globally as a significant threat to both human and animal health. Antibiotics are a cornerstone of modern medicine and public health protection against infectious diseases – there are no alternatives to treating life-threatening bacterial infections. Animals can get sick just like humans do, and sometimes an antibiotic is the only appropriate treatment. The animal health sector envisages a future where the effectiveness of veterinary antibiotics as a therapeutic tool is maintained and these important medicines are used responsibly to protect and treat animals. Equally important, however, is the increasing challenge of addressing antimicrobial resistance in human health, and protecting and improving food safety and security.

Ongoing support and investment in scientific research activity is critical to identify new molecules and compounds that offer novel ways to target bacteria without using antibiotics. New mechanisms to treat bacterial infections, especially those resistant to commonly used antibiotics, are among the most valuable potential innovations in both animal and human health care. The animal health sector has prioritised the research and development of alternative technologies, such as bacteriophages, antimicrobial peptides, ambient cold plasmas, nanotechnology and immunotherapies.

Other innovations can reduce the need to use antibiotics in animals by preventing disease occurrence. Vaccines are one of the most reliable and effective ways to prevent animal diseases. The role of vaccines in preventing previously deadly and costly livestock diseases, improving animal health and wellbeing, increasing agricultural productivity and reducing reliance on antimicrobials highlights the importance of integrated and multi-modal approaches to agricultural innovation.

Climate Change

Climate change will pose diverse and growing threats to both animal and human health. Most notably, changing environmental conditions will alter the distribution and behaviour of many animal and insect species, in turn leading to changing distributions of vector-borne diseases.

Flies, ticks, mosquitoes and rodents are common animal disease vectors that can quickly spread into new areas in favourable environmental conditions where they have not been previously detected or routinely looked for, and where the animal or human population may be immunologically naïve. Environmental stressors can result in altered disease transmission routes (if the preferential target species for a mosquito is not found in the new environment, it may feed on a new species) as well as increased infectivity and pathogen virulence.

Warming temperatures and changing rainfall patterns due to climate change are also resulting in parasite species being able to thrive in new regions, increasing the urgency to discover new parasiticides and other effective methods of parasite control to improve animal and human health through the control of zoonotic and other vector-borne diseases, increase productivity, reduce environmental impacts and manage parasiticide resistance.

Health risks posed by changing disease and parasite distributions may be subtle and not immediately apparent, hence there is a need to ensure systems can detect both direct and indirect risks to animal and human health, and have the agility to respond to sudden shocks (such as disease incursions or disruptions to supply chains) when 'business as usual' is not possible.

● PRIORITY 3: Enabling a productive and innovative economy

The use of animal health products in Australia created an additional 9,898 jobs and generated more than $578 million in wages in 2015-16, and the use of animal health products reduced the average consumption prices for meat, eggs and dairy products for local consumers by approximately 12.8 percent.[22]

Local Manufacturing

The veterinary medicine sector is one of Australia's most highly regulated industries, with significant regulatory requirements regarding efficacy, safety and quality assurance. The majority of animal health products available in Australia are currently manufactured overseas, alongside small-volume, high-value global exports of Australian-made veterinary medicines.

Australia has a reputation for high quality manufacturing capability. A National Priority to promote and advance Australia's local manufacturing capabilities would assist in protecting local capacity in high-tech, specialised markets, such as animal health products. The capability to manufacture more animal health products locally, while maintaining high quality and consistency standards and minimising waste, would provide our members with greater opportunities for local manufacturing and would, in turn, aid in safeguarding Australia's livestock and companion animal sectors against potential supply issues, as were recently experienced during the COVID-19 pandemic.

Supporting Innovation in Veterinary Medicines

There are 7 key areas of focus for innovation in the global animal health sector which would benefit from greater focus within the National Science and Research Priorities:[23]

1. New types of vaccines, such as mRNA vaccines, heat-resistant vaccines and 'custom' vaccines, as well as new vaccine delivery platforms to deliver vaccines to large groups of animals.
2. Alternatives to antibiotics, including true alternatives like bacteriophages or naturally produced antimicrobial peptides, as well as compounds that reduce infection risk and reduce the need to use antibiotics.
3. Digital technologies to enable individual-level care for large groups of animals via sensors, tags and collars, and facilitate earlier diagnosis and more specific treatment using real-time animal health and disease monitoring.

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[22] [Economic Contribution of Animal Health Products to Australia's Livestock Industries, 2015-16 - Animal Medicines Australia](#)
[23] [New Frontiers in Animal Care - HealthforAnimals](#)

4. Accurate and timely diagnostics that reduce the severity of animal disease by facilitating early, appropriate treatment.
5. New methods of parasite control that facilitate better management of resistance, like mRNA parasite vaccines, 'green' parasiticides that break down quickly and oral parasiticides.
6. Nutritional advances to improve immunity and gut health such as probiotics, phytogenic feed additives and novel supplements like seaweed can minimise the likelihood of an animal getting sick and requiring treatment, while minimising environmental impacts.
7. Innovative new methods to demonstrate the safety and efficacy of new animal health products before they are able to be used, including *in- vitro* testing, stem cell technology and biomarkers.

Australia's business operating environment has important ramifications for innovation in veterinary medicines, which could include new chemical entities, new formulations, delivery mechanisms, packaging, compliance aids and other platforms to assist in the delivery of healthcare for animals.

Innovation in animal health requires scientific and risk-based approaches and policy settings that aim to eliminate barriers, provide seamless systems between registrations and product uses, incentivise development of local infrastructure and resources, facilitate collaboration, support regulatory innovation, promote unencumbered trade of animals and animal products, support animal welfare of both livestock and companion animals, and meet the challenges of social license.

Australia's ability to deliver on sustainability, efficiency, trade (in animals and animal commodities) and economic goals is dependent on the commercialisation and adoption of new technologies, and regulation that is effective, efficient, fit for purpose, and consistent with government principles of best practice regulation.[24] The Australian market is small, which limits the ability of companies to recover the costs of bringing a new product to the market. Particularly for new and emerging technologies, there may be minimal regulatory guidance or standards available, which can stifle the opportunities for new technologies to be brought to the local market. Streamlining interactions between industry, stakeholders and government, and recognising intellectual property and other incentives that support commercial decision-making, will encourage investment in Australia.

Australia's National Science and Research Priorities must support efficient and appropriate evaluation of new technologies and encourage the adoption of innovations across broad areas to address animal health challenges, such as genetics, remote sensing, management systems, information technology and robotics. Such actions could also boost the potential value of Australian-developed technologies in international economies.

Digital and 'Smart' Technologies

As outlined by Animal Health Australia in their report *Megatrends, opportunities and challenges facing Australian livestock industries*, digital technologies and the ability for the animal health and production industry to analyse and share big data are key to future strategies for disease surveillance (for example, remote sensing), diagnostics (including robotics and artificial intelligence) and emergency disease management (via risk mapping for preparedness, response, eradication and proof of disease absence).[25]

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[24] Home | The Office of Impact Analysis (pmc.gov.au)
[25] Animal Health Australia. Megatrends, opportunities and challenges facing Australian livestock industries. https:// animalhealthaustralia.com.au/industry-publication

Digital technologies, including mobile apps, have been developed to support disease monitoring, generate early warning alerts and improve the response of farmers, health workers and veterinarians to disease outbreaks and threats. Digital technology offers opportunities for veterinary medicine to become more efficient and precise, enabling individualised veterinary care even in large groups of animals.

Wearable technologies are playing an increasing role in disease prevention and enable farmers and veterinarians to treat herds at an individual level on a scale that was previously not possible. Tracking devices such as ear tags and biosensors can offer real-time data on an animal's health, behaviour, movement and feeding and watering habits – alerting farmers to the early warning signs of ill health or disease outbreaks. Technological advances in surveillance methods, including cameras, microphones and sensors can produce accurate, continuous data regarding animal health and wellbeing, productivity and performance. These innovations allow for earlier diagnosis and targeted treatments, leading to improved animal health and reduced costs – for example, detecting early signs of disease based on the volume and frequency of feed consumption or using thermal cameras to detect the first elevated temperature amongst a herd of animals.

Biological sensors could provide an invaluable tool for detection of biological materials, with a role in countering both biosecurity and national security threats. Further consideration of how this technology could be applied more broadly to local biosecurity management, disease outbreak and spread would be valuable.

Software systems that can capture the increasing wealth of data provided by these digital technologies and predict disease or health challenges before they occur are critical for improving the productivity and welfare of livestock production in Australia. Through approaches like machine learning technologies and artificial intelligence-driven algorithms, tools can be developed that are capable of analysing continuous on-farm data, predicting likely health threats and facilitating effective preventative actions. Satellite rainfall and vegetation data has been used to identify correlations between the El Niño weather pattern and disease outbreaks. Utilising historical and contemporary climatic data could be invaluable for predicting and preparing for disease outbreaks in both humans and livestock, and greatly assist in minimising the spread of infectious and zoonotic diseases.

Communication technologies with reliable spatial data coverage are critical to the successful development and expansion of these key technologies and on-farm adoption. However limited connectivity in many parts of rural Australia is a major barrier to digital advancements. Improving access to telecommunications and internet in rural areas is vital to facilitate the uptake of digital innovations.

Gene Technology

AMA would encourage the inclusion of gene technologies in animal health as a research priority. By allowing for small and precise heritable changes to the genome of animals, gene editing technologies can replicate naturally occurring changes in the process of genetic variation and take advantage of naturally occurring mutations. This process has already been successfully utilised to improve livestock production and animal health and welfare, for example, by breeding virus-resistant pigs and polled (hornless) cattle.

To date, interactions between AMA member companies and Australia's Gene Technology Regulator have primarily concerned animal vaccines. However, gene technologies and genetic modification are becoming increasingly important tools in veterinary medicine, just as they are in human medicine. In the future, innovative new veterinary medicines developed using gene technologies may be registered for use in Australia, such as antisera, vector vaccines, antivirals, immunoglobulins and monoclonal antibodies. Regulation of new technologies needs to be agile, flexible and based on scientific risk assessment in order to facilitate the adoption of these new technologies. Close engagement with respected overseas regulators will support global alignment of regulatory requirements for new technologies and encourage new innovations to be brought to the Australian market.

● PRIORITY 4: Building a stronger, more resilient nation.

Australia's economy is heavily dependent on agricultural production. Australia produces significantly more food than we consume, with around 70 percent of total agricultural production exported overseas. Every year, each Australian farmer produces enough food for 600 people[26] and it has been estimated that, while our population sits at around 26 million, 61 million people will eat food produced in Australia.[27]

With a rising global population requiring food, and in a climate-changed future, Australian livestock farmers will be required to improve productivity while simultaneously reducing their environmental impact and ensuring agricultural operations remain economically viable.

Animal health products are critical tools to feed a growing world population and produce more food more sustainably, whilst simultaneously using less land and resources, and reducing greenhouse gas emissions from those food production systems.

The 2023 report *Animal health and Sustainability: A Global Data Analysis*[28] examined the broader relationship between animal health and the economy, environment and society, and quantified the association between good animal health on productivity and greenhouse gas emissions. The modelling found that livestock diseases were associated with significant increases in livestock GHG emissions and land use, while vaccination and parasite control correlated to reductions in both.

Key findings included:

- Productivity:
  - A 60% global vaccination rate for beef cattle correlates to a rise in productivity of more than 52.6%. This is equivalent to the beef consumption needs of 3.1 billion people.
  - Every 1% reduction in livestock disease rates would increase production enough to meet the average annual meat consumption needs of 82 million people.
- Environmental sustainability:
  - A 40% global vaccination rate for cattle in a given year is associated with a 5-13% reduction in the land required for livestock production.

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[26] https://farmers.org.au/farm-facts/
[27] https://theconversation.com/how-many-people-can-australia-feed-76460
[28] https://www.healthforanimals.org/resources/publications/publications/animal-health-and-sustainability-a-global-data-analysis-summary/

- When 20% of poultry globally are affected by disease, 8.6% more land is estimated to be necessary to maintain production levels.
- A 10% decline in animal disease levels is associated with an 800 million tonne decrease in livestock greenhouse gas (GHG) emissions. This is equivalent to the average annual GHG footprint of 117 million Europeans.
- UN FAO data showed that scaling up existing practices in animal health and husbandry could potentially meet the needs of a global population of over 9 billion in 2050 without increasing GHG emissions.
- Social sustainability, undernourishment and food insecurity:
  - Strong associations between levels of animal disease, vaccination, human nutritional outcomes and levels of food security.
  - Every 2 cattle globally that are vaccinated equates to 1 person avoiding hunger.
  - Poultry disease was associated with a 5% increase in hunger in 2019, equating to an additional 34 million people worldwide going hungry.

The *Animal Health and Sustainability* report indicates that livestock disease control can impact global needs and targets, and deliver multiplier benefits for economic, environmental and social sustainability.[29] These include reductions in GHG emissions, hunger, malnutrition, undernutrition, food insecurity and poverty in line with the targets set by the UN's Sustainable Development Goals for 2030.

In Summary

The interconnected relationship between human health and animal health within an environment that we share is complex. Understanding and embracing this relationship is critical to ensuring a sustainable and resilient future for Australia.

The animal sector is innovative, technologically advanced and deeply invested in scientific research and development. AMA appreciates the opportunity to encourage greater awareness of, support for and investment in animal health through the National Science and Research Priorities.

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[29] https://www.healthforanimals.org/resources/publications/publications/animal-health-and-sustainability-a-global-data-analysis-summary/