



Animal welfare solutions to antibiotic use in farming

Farming Campaign Manager



About World Animal Protection



- Global animal welfare organization
- Offices in 14 countries
- Two campaign areas
 - WILDLIFE: Protect wildlife habitats and work to end the exploitation of wildlife used in entertainment, in pet trade and in traditional medicine
 - FARMING: Advocating for a more human and sustainable farming system
- One Health, One Welfare perspective

Antimicrobial resistance (AMR) impact



- World Health Organization (WHO) – AMR is one of top 10 global public health threats
- Animal agriculture is a significant consumer of antimicrobials and is projected to increase*+
- 70 – 80% of total consumption of medically important antibiotics is in the animal sector, for prophylactic use or growth promotion in healthy animals

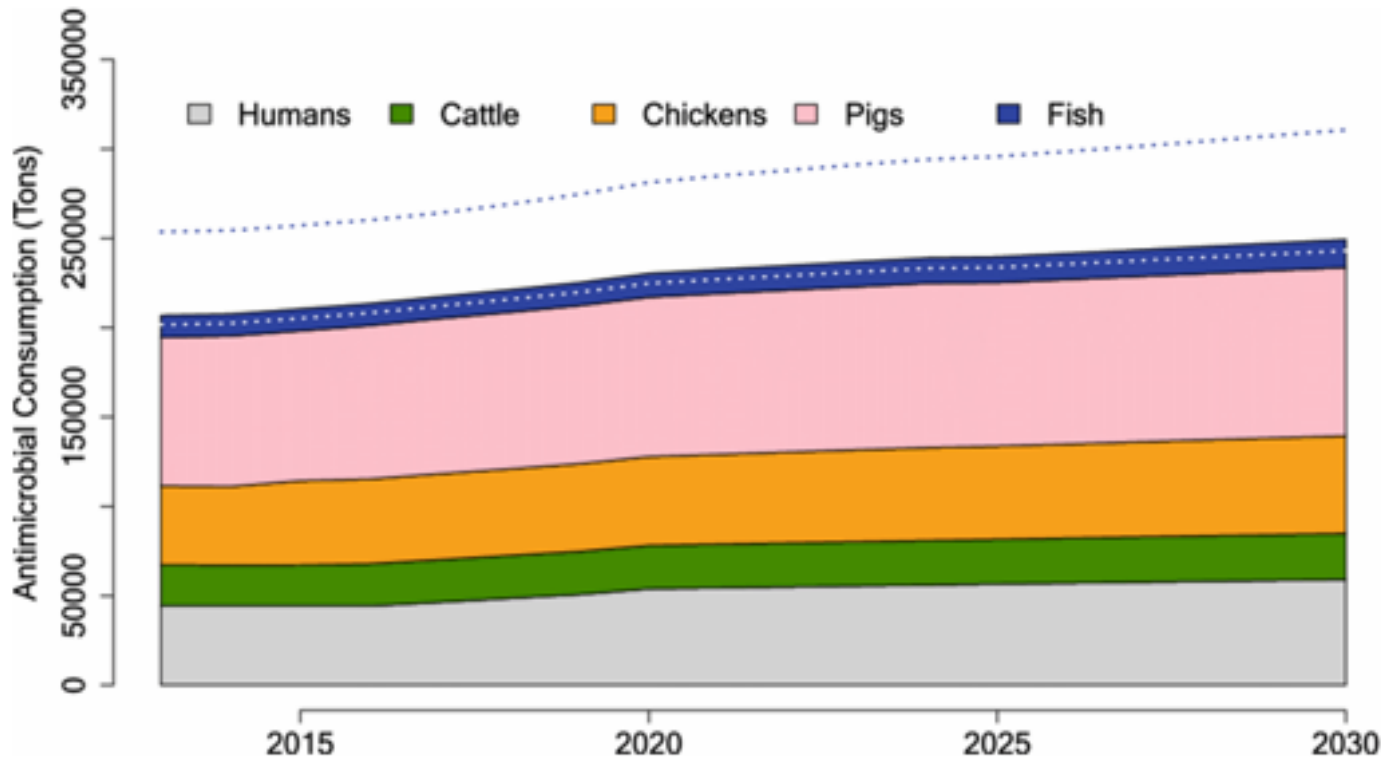
**131,109 tons in 2015 and is projected to reach 200,235 tons by 2030*

+Source: The State of the World's Antibiotics 2021: A Global Analysis of Antimicrobial Resistance and Its Drivers. Center for Disease Dynamics, Economics and Policy, 2021.



O'Neill, J. Chair. Tackling a Crisis for the Health and Wealth of Nations.; 2014:1-84.

Global antimicrobial use



Source: Schar, D., Klein, E. Y., Laxminarayan, R., Gilbert, M. & Van Boeckel, T. P. Global trends in antimicrobial use in aquaculture. *Sci. Rep.* 10, 21878 (2020).

Categories of antimicrobials



Table 1. Health Canada categories for antimicrobials

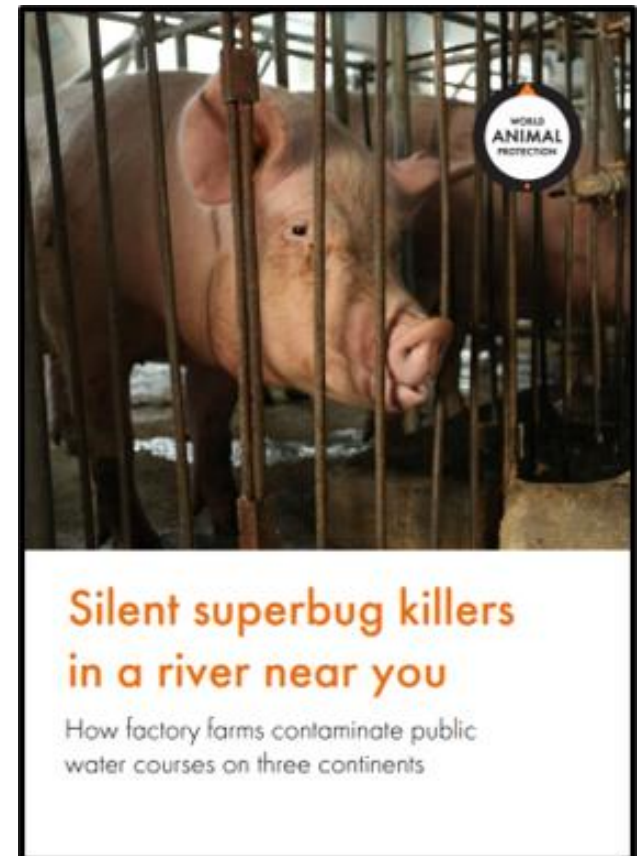
Category	Description
I – Very High Importance	These antimicrobials are essential for the treatment of serious human illnesses. Very few or no alternatives are available if these don't work.
II – High Importance	These antimicrobials treat a variety of serious infections. Alternatives are generally available if needed, including Category I antimicrobials.
III – Medium Importance	These antimicrobials treat a variety of less serious infections. Alternatives are generally available, including Category I and II antimicrobials.
IV – Low Importance	Antimicrobials in this category are currently not used in human medicine.



AMR in the environment



- Investigated the presence of antibiotic-resistant genes (ARGs) in animal waste discharged from industrial pig farms into public waterways or onto soil (or crops) in four countries.
- Water and soil samples were collected from public rivers and streams next to industrial pig operations in **Spain, Thailand, US and Canada**
- 6-10 farms per regions; several samples taken from each site
- Samples tested for 27 target antibiotic resistance genes (ARGs) at an accredited lab



AMR in the environment



- Positive results for resistance to antibiotics categorized as **highly important or critically important** found in all countries
- CANADA – $\frac{3}{4}$ positive for three or more tetracycline-resistance genes, may highly or critically important
- SPAIN – several samples were found in groundwater at very high concentrations in the three Catalonia evaluated locations; some of these ARGs are classified as **critically important**



AMR in the environment



- US
 - high level of contamination; 92% of samples (83/90) had positive results for three or more resistance genes;
 - the largest number of genes in single sample was 10.
 - Around half of the samples were positive for three or more tetracycline-resistance genes
- THAILAND – ARGs found in samples from 6/9 farms; in 4/9 cases, ARGs were in the highly important category

Drivers of antimicrobial use (AMU) and AMR in farming

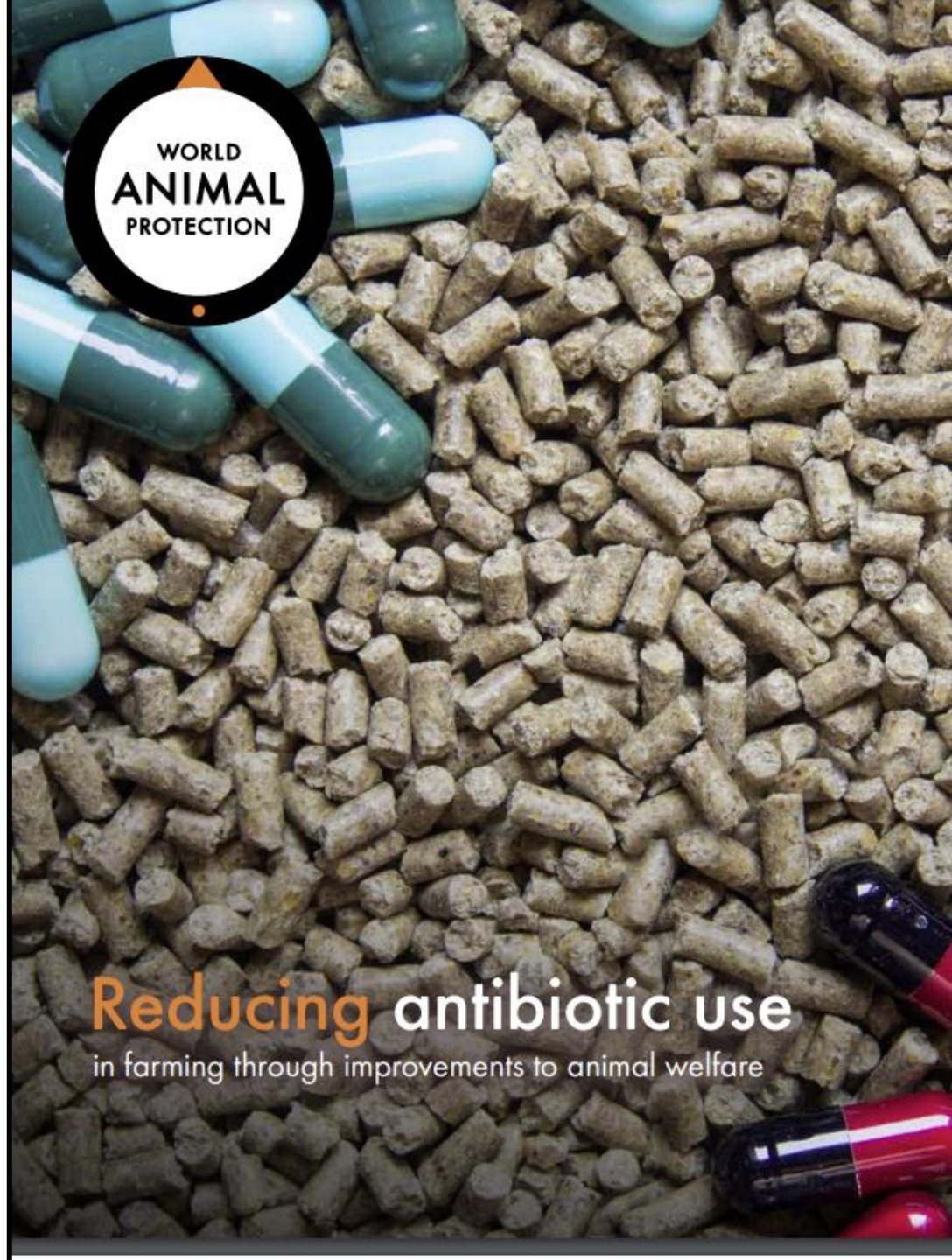


- Intensification of animal agriculture
- Low animal welfare
- Stressful environments and practices
- Inadequate housing and management practices that prioritize economic and production interests over animal welfare
- Increasing demand for diets high in animal protein
- Antibiotic overuse and misuse



Literature review resources

- Report published in 2022
- Hundreds of articles, studies, reports, and other print materials were reviews
- Priority given to publications after 2010
- Many papers published after 2015
- Interviews with animal scientists and veterinarians (mostly Canadian)



Overview – practices associated with high levels of AMU



- Premature or abrupt weaning methods
- Barren housing environments (crowded, unsanitary environments and/or mixing of unfamiliar animals)
- Breeding tactics, genetic selection for increased production or faster growing/larger animals
- Medication protocols to improve feed efficiency and body mass/weight gain
- Stress associated with painful procedures



Beef cows – practices associated with high AMU



- Abrupt weaning and cow-calf separation
- Mixing at auction sites
- High grain diets



Solutions to reducing antimicrobials in beef industry



- Implement two-stage weaning
- Pre-condition all calves (vaccination, dehorning, castration) – use pain control and allow for recovery time before transfer to feedlot
- Gradually transition from milk to forage (on farm)
- Adjust feed ratios at feedlot for a higher mix of forage than grains to benefit animal health (and thus reduce liver abscesses and acidosis)
- Expand and utilize online/satellite auctions to reduce mixing

Dairy cows – practices associated with high AMU



- Abrupt dry off
- Poor hygiene and inappropriate stall size (increasing infection risk)
- Feeding protocols



Solutions to reducing antimicrobials in the dairy industry



- Gradual dry off supported by adjusting feed protocols (unrestricted feed rations with reduced feed energy density)
- Selective dry cow therapy
- Pre- and post-milking teat dips to improve sanitation
- Stall size appropriate to full body length of cows
- Frequent cleaning of floors and alleyways
- Use sand bedding and clean, dry straw bedding in winter months

Pigs – practices associated with high AMU



- Barren environments, lack of enrichment
- Mixing
- Early weaning
- Painful procedures



Solutions to reducing antimicrobials in the pork industry



- Provide enrichment, including straw
- Phase out painful procedures as much as possible
- Eliminate gestation and farrowing crates
- Reduce stocking density
- Extend weaning to a minimum of 28 days
- Avoid mixing – keep animals in stable groups



Broiler chickens – practices associated with high AMU



- Crowding and stocking density
- Fast-growing breeds
- Barren environments (no enrichments)



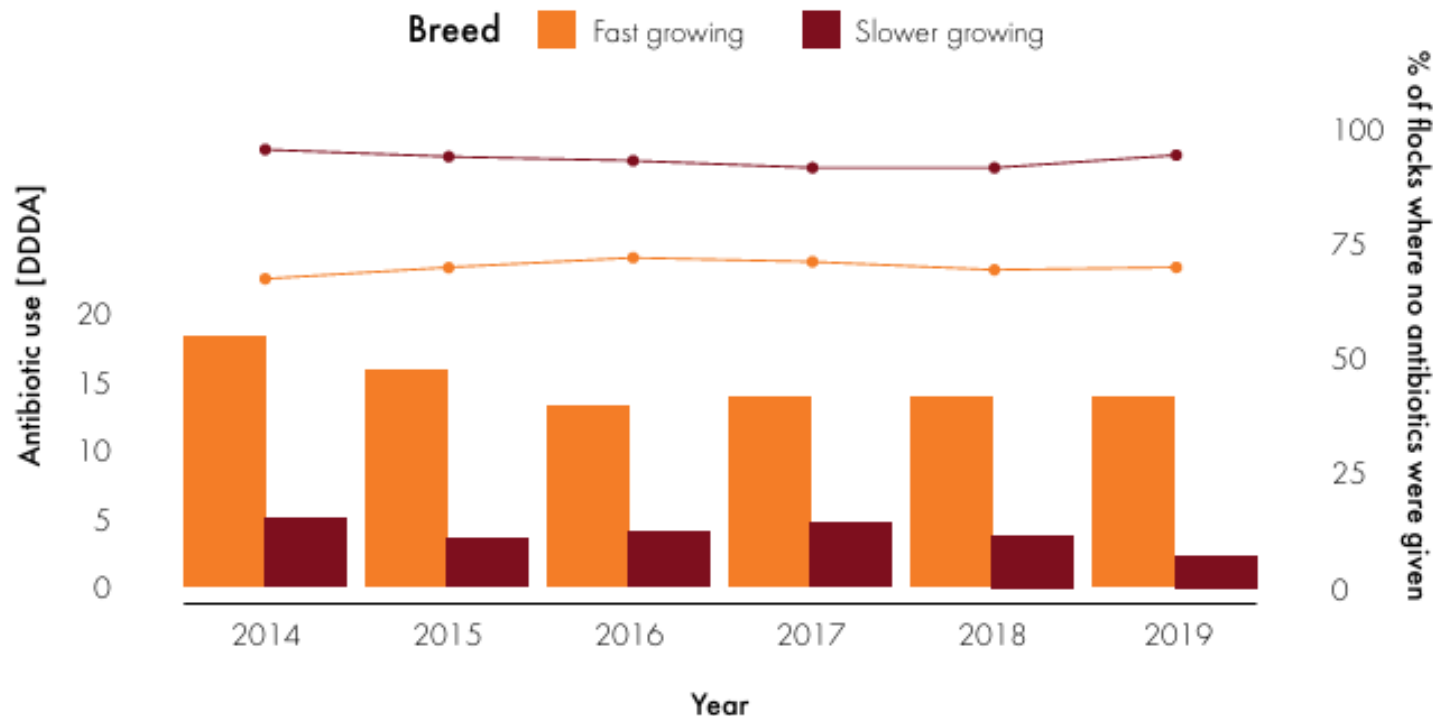
Solutions to reducing antimicrobials in the broiler chicken industry



- Reduce stocking density
- Use slower growing breeds to improve health outcomes
- Institute 10-day turnover and supply fresh, clean bedding
- Regularly monitor environment (temperature, ventilation, air quality)



Solutions to reducing antimicrobials in the broiler chicken industry



A word about antibiotic free production



- 'Raised Without Antibiotics' (RWA) an 'No Antibiotics Ever' (NAE)
- Niche market
- Consumers don't understand the complexity of the issues
- Disincentive for farmers to treat sick animals
- Animal welfare concerns
- Animals may not be treated in a timely fashion

Summary – better management practices can reduce AMU



- **Beef cows**
 - 2-step weaning, increase forage to grain ratio, avoid mixing – move to online auction/sales
- **Pigs**
 - decreased litter size, longer weaning times, open housing with enrichment
- **Broiler chickens**
 - Slower growing breeds, reduced stocking density, extend barn turnover time between flocks for proper sanitation, eliminate drafts, improve ventilation and heat sources
- **Dairy cows**
 - selective dry cow therapy using gradual dry-off, frequent floor cleaning, improved milking hygiene to prevent mastitis, sand and straw bedding, increased stall size

Policy actions



Expert recommendations – three major actions needed to address the threat of AMR alongside other pandemic threats:

- Global intersectoral cooperation
- Equitable resource allocation
- Strengthened accountability mechanisms

A Global Pandemic Treaty Must Address Antimicrobial Resistance

Global Health Law

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Keywords: Antimicrobial Resistance, International Health Regulations, Pandemic Antimicrobial Treaty, World Health Organization, Global Health Law

Abstract: Antimicrobial resistance (AMR) is one of the defining global health threats of our time, but no international legal instrument currently offers the framework and mechanisms needed to address it. Fortunately, the actions needed to address AMR have considerable overlap with the actions needed to confront other pandemic threats.

to catalyze collective action against future pandemics.³ However, early discussions of the treaty have taken an overly narrow approach to defining pandemics, with the majority of attention focusing on the need for better surveillance and monitoring of emerging zoonotic infections.⁴

While zoonoses may indeed play a role in the next pandemic, comprehensive pandemic preparedness must involve planning for all potential pandemic sources: zoonoses, antimicrobial resistance (AMR), accidental release, and deliberate release.⁵ While deliberate release is already addressed through the *Biological Weapons Convention*,⁶ an inclusive global pandemic treaty must include provisions to tackle the other three main pan-

Policy actions



- Investments in changes to on-farm practices along with expansion to veterinary services will be needed to support these policy approaches, including financial support to incentivize farmers to adopt higher welfare farming systems
- Implement mandatory monitoring and surveillance of antibiotic use on farms
- Cap on antibiotic use
- User fees
- Reduced consumption of animal-based foods

Source: *Antimicrobial consumption in food animals by 2030* Source: Van Boeckel, T. P. et al. *Reducing antimicrobial use in food animals. Sci. Mag.* 1350–1352 (2017).



Thank you!

