Fuelling the pandemic crisis

Factory farming and the rise of superbugs

World Animal Protection

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Cover image: Piglets undergo painful mutilations in their first week of life: teeth and tails are cut, and males are castrated. These practices are associated with antibiotic overuse. Source: World Animal Protection

Image: Fast-growing breeds of chicken which suffer from terrible health problems, including deformed legs and hearts and lungs that struggle to keep up. In addition, chickens are kept in cramped conditions in a space less than an A4 piece of paper. Credit: World Animal Protection

Executive summary

The COVID-19 pandemic should be a worldwide wake-up call for factory farming and its regulators. The virus has changed our shopping habits, disrupted long and complex food supply chains, infected slaughterhouse workers[i] and condemned millions of factory-farmed animals to 'euthanasia' by mass suffocation.[ii]

Factory farming is clearly destructive, reliant on appalling animal suffering, worker hardship and misuse of our planet's resources.[iii] Yet it is not looking to phase itself out. And governments, rather than reining in this unjust, inefficient and dysfunctional industry, are bailing out big agribusiness and subsidising unsustainably high levels of animal protein production.[iv]

This is despite a 2020 UN report finding intensive farming responsible for more than half of all infectious diseases that have moved between animals and people since 1940. The zoonotic transmissions of swine flu, bird flu and Nipah virus are well documented.[v]

Factory farming is also laying foundations for another devastating health crisis currently sitting in COVID-19's shadow – antimicrobial resistance, the rise of the superbugs. If the pandemic is the flash flood that has taken us by surprise, the superbug crisis is the only too predictable slow rising tide.

Paying the price of antibiotic overuse

Some 131,000 tonnes of antibiotics are used annually in farming[vi] – three quarters of all those produced in the world. Antibiotics are the silent props of the factory farming system, preventing stressed, confined animals from otherwise getting sick in the dismal conditions they live. There is ample science showing how antibiotics overuse on factory farms leads to superbugs (antimicrobial resistance) that spreads to workers, the environment and into the food chain.

Yet, farm animals in high welfare systems have reduced stress, improved immunity and so resilience to disease. This in turn requires fewer antibiotics.

For example, Sweden has regulations to ensure piglets remain with their mothers for a minimum 28 days following birth. Improved immunity and robustness of piglets allows farmers to significantly reduce antibiotics used. The reduction achieved was around 100-times fewer antibiotics being used than other countries including France, Belgium and Germany.[vii]

Superbugs can make medicines less effective right at the time pandemics put health systems under extreme pressure. COVID-19 may be a virus which does not respond to antibiotics, but antibiotics are used to treat the secondary infections – such as bacterial infections of the lungs and blood– that it can cause.

Up to 50% of COVID-19 deaths in one study in Wuhan, China involved secondary infections.[viii] In this study, up to 95% of serious cases or hospital admissions were given antibiotics, and up to 90% in other studies.[ix] But how is antibiotic effectiveness compromised by superbugs? Around 700,000 people die annually from superbugs[x] and there could be a significant additional toll from superbugs during the pandemic and into the future.

World Animal Protection has found superbugs in the food chain in Brazil, Spain, Thailand and United States. These countries are some of the world's biggest producers and exporters of meat, and illustrate factory farming's dependence on antibiotics 'critically important to humans'.

Superbugs make antibiotics less effective in treating people and trigger a global health crisis. Some 10 million deaths are expected annually by 2050.[xi] These will disproportionately affect the poorest countries in the world.

The World Health Organisation (WHO) warns we could reach a stage where we are resistant to all antibiotics because of the superbug crisis – a post-antibiotic era. This means commonplace operations like caesarean sections or cancer treatment suddenly become dangerous, perhaps impossible because antibiotics will not protect against infection.[xii]

Even without the pandemic crisis, the cost of antibiotic overuse in farming on our health and economy is significant. One study finds that for every kilogram of fluoroquinolone antibiotics used on meat chickens in the USA, the health and economic cost for people is US$1,500.[xiii]

With 6,786 kilograms of these fluoroquinolone antibiotics used before the 2005 national ban, this tallies to many millions of dollars of hidden costs in one year to the public purse. This is just one example of one antibiotic class in one farming system in one country in one year.

Action to address the superbug crisis is surprisingly cost-effective. The World Bank considers that investment in containing and controlling superbugs should be a public policy priority. They argue it will pay off in the form of substantial reductions in the projected economic impact of superbugs.[xiv]

Never has the public health case to end factory farming been clearer and more urgent. A WHO-funded study shows that restricting antibiotic use in food-producing animals is associated with a reduction in the presence of antibiotic-resistant bacteria in these animals. Reduced antibiotic use in food-producing animals is associated with up to 24% lower antibiotic-resistant bacteria in people than the control group.[xv]

For the sake of our health, it's time to stop factory farming and move to high welfare, sustainable food systems.

To achieve this, we are calling for concerted action from the global retail, finance and animal protein production sectors, governments, and intergovernmental organisations to phase out factory farming. Stopping this cruel and inefficient system, dependent on antibiotic overuse, is vital to protect people's health, animals and economies from future pandemics.

Image: A farm worker clips the teeth of a piglet 72 hours after he was born. This practice is associated with antibiotic overuse and can be avoided. Credit: World Animal Protection / Emi Kondo

Superbugs and antibiotic overuse in farming

Antibiotic overuse in factory farming facilitates the development of superbugs,[xvi, xvii] also known as antimicrobial resistance. Superbugs can spread via food, animals, manure and the environment; they pose major risks for public health.

Yet antibiotic use in farming continues. This is despite the UN, the G20 and many world leaders recognising superbugs as a global health emergency and calling for comprehensive actions in human medicine and agriculture to address the problem. Three quarters of all antibiotics produced globally are used in farming.[xviii]

Antibiotic use in feed or water to promote fast growth of farm animals, or to prevent disease across entire groups, remains widespread in most countries. While around 90 countries prohibit the use of antibiotics to promote fast growth in farm animals,[xix] only six countries expressly prohibit the use of antibiotics across groups to prevent disease.

There is minimal national surveillance and reporting of antibiotic use or surveillance for superbugs. Antibiotics sales data is collected in some countries, however few countries trace or publicly report how antibiotics are used in farming.

Most discussions focus on the antibiotics that are most critical for use in humans. But any antibiotic overuse is risky; it can lead to antibiotic resistance within and between different classes of antibiotics.

Robert Lawrence, professor emeritus of environmental health at Johns Hopkins University, said:

"We have abundant evidence documenting the fact that when you put animals in crowded, unsanitary conditions and use low-dose antibiotics for disease prevention, you set up a perfect incubator for spontaneous mutations in the DNA of the bacteria [...] With more spontaneous mutations, the odds increase that one of those mutations will provide resistance to the antibiotic that's present in the environment."[xx]

Image: Around 60 billion meat chickens are produced annually. They are selectively bred to grow at an unnaturally fast rate to produce cheap meat within 40 to 46 days. Credit: World Animal Protection

Propping up low-welfare farming with antibiotic overuse

Factory farms squash large numbers of genetically uniform animals into stressful, barren environments which have no access to outdoors or natural light. Animals are often caged, with no room to turn around or lie down and fully extend their limbs, heads or wings. These highly stressful conditions can lead to injuries and abnormal behaviour including biting cages, chewing repetitively until frothing at the mouth, pecking feathers or even cannibalism.

Antibiotics are used across groups to prevent these stressed animals getting sick; they prop up a system of suffering for food production. Larger farms use more antibiotics than smaller farms to prevent disease.[xxi]

Pigs are one of the most intensively farmed species on the planet; consequently, pig farming depends on very high quantities of antibiotics. Up to 90% of antibiotics are administered in the first 10 weeks of pigs' lives. This is during the time when animals are usually painfully mutilated: their tails and teeth cut, and males castrated.[xxii]

E.coli is one of the most common bacteria, with strains that can harm people. More than 40% of E.coli bacteria detected in poultry production in the USA, China, Brazil, Poland, United Kingdom, Germany, France, and Spain are resistant to antibiotics commonly used in those farm systems.[xxiii]

Rates of antimicrobial resistance to fluoroquinolones and quinolones (antibiotics 'critically important to humans') are above 40% in Brazil, China, and the EU. Despite this, fluoroquinolone use remains legal.[xxiv]

Fish farming uses large quantities of antibiotics to treat or prevent disease. Chile accounts for 35% of the world's salmon production and also accounts for 96% of all antibiotics used in salmon farming globally.[xxv] Recent research shows high antimicrobial resistance in aquaculture systems for 40 countries that account for 93% of global production. Resistance is especially high in Indonesia and China.

The problem is likely to worsen as climate change progresses. Research suggests climate-related changes to water temperature will likely increase bacteria growth and negatively affect fish health. This in turn will lead to increased use of antibiotics and emergence of antimicrobial resistance.[xxvi]

Despite the widespread problem of antibiotic overuse across animal farming, the industry is reluctant to disclose antibiotic use data. Asian aquaculture companies are particularly poor at reporting on antibiotic use, but there is a problem right across the animal protein sector.[xxvii]

Image: Factory farmed pigs raised for meat are reared in overcrowded, barren pens. Their tails are cut in their first week of life to try and prevent tail biting. However, tail biting still occurs. Antibiotics are used in feed or water to prevent disease. Credit: World Animal Protection

Super spreaders contaminate the environment

Superbugs do not remain on the farm. Intensive animal production generates large quantities of animal waste, which is often spread on land for use as a fertiliser, or discharged into public water ways. It can also seep into groundwater.

Animals excrete up to 70% of the antibiotics administered to them in their urine and faeces, and bacteria can survive in untreated farm animal waste for two to 12 months. [xviii] As these antibiotics pass through the animals and into the environment via manure, they speed the evolution of antibiotic- resistant bacteria in soil and water.[xxix] Antibiotic-resistant bacteria can also be found in the air surrounding livestock farms.[xxx]

Insects also come into contact with livestock and manure, contract antimicrobial resistant bacteria and spread it to people. Research from Johns Hopkins University in the USA finds that many houseflies near chicken operations carry antibiotic-resistant bacteria strains. [xxxi]

This is not just a problem for land-based farming. Up to 75% of antibiotics used in aquaculture may also be lost into the surrounding environment. [xxxii]

Heavy metal use in animal feed to promote fast growth, nutritional supplements and disinfectants used to clean, or in footbaths and washes also drive antimicrobial resistance in the environment. [xxxiii]

Despite this, surveillance and monitoring of antimicrobial resistance in the environment is minimal. A 2017–2018 global survey from the United Nations Food and Agriculture Organisation global survey found only 10 out of 78 countries surveyed, with regulations limiting antimicrobial residue discharge into the environment. [xxxiv] There is no international standard indicating what the limits should be on environmental antimicrobial resistance contamination. There are also no internationally agreed methodologies to track such contamination.

World Animal Protection is investigating antimicrobial resistance contamination of water courses near factory farms in Africa, Asia, the Americas and Europe.

Image: Fish are farmed in very high densities, with variable water quality, often requiring high use of antibiotics to prevent or control disease. Credit: World Animal Protection

Factory farming endangers people's health

Superbugs can spread to people via animals, the environment or food; they pose a great threat to food safety and public health. When infections are resistant to antibiotics, treatment is more costly and death rates are higher. And due to antibiotic resistance, antibiotics previously used to treat common or foodborne infections may no longer be effective.

Alternate treatment options are costly and may cause serious side effects. The risk of bloodstream infections is also higher. Infants and young children, the elderly, cancer patients, and people with weak immune systems through other illness or injury are most at risk. [xxxv]

Globally, the two most common foodborne infections are from Campylobacter and Salmonella bacteria. These can account for between 15%–50% of foodborne illnesses[xxxvi] and cause severe issues or death among the elderly, children or the immuno-suppressed. [xxxvii] Bacteria resistant to antibiotics to treat Campylobacter and Salmonella have emerged. [xxxviii]

Between April and September 2015, 192 people across five US states were made ill by two species of multi-drug-resistant Salmonella, an outbreak that the US Center for Disease Control and Prevention attributed to commercial pork products. [xxxix] This is just one case among many. World Animal Protection found superbugs critically important to humans in pork products in supermarkets in Brazil, Spain, Thailand, [xl] and the USA.[xli]

In Canada, the excessive use of Ceftiofur (an antibiotic considered critically important to humans) has led to superbugs in chickens transferring to people via the food chain. [xlii]

Image: Slower growing chickens in high welfare systems have been documented to have significantly less antibiotic use. Credit: World Animal Protection

Ending antibiotic overuse – human health and financial benefits

If no action is taken, a continued rise in antimicrobial resistance by 2050 is expected to lead to at least 10 million[xliii] people dying every year, or a total of 300 million deaths by 2050.

Costs of US$100tn are expected over this period plus an additional US$120–310tn if superbugs mean key surgical interventions can no longer be performed.

The global increase in healthcare costs alone may range from US$300bn to more than US$1tn per year by 2050.[xliv]

For every kilogram of fluoroquinolone antibiotics used on meat chickens in the USA, the human cost is estimated at US$1,500. Before the national ban in 2005, 6,786 kilograms[xlv] of these fluoroquinolone antibiotics were used annually. This represented many millions of dollars as a hidden cost over one year to the public purse in the USA alone.

A WHO-funded study shows that restricting antibiotic use in food-producing animals is associated with a reduction in the presence of antibiotic-resistant bacteria in these animals. Reduced antibiotic use in food-producing animals is associated with up to 24% lower antibiotic resistant bacteria in humans than the control group.[xlvi]

The World Bank argues that investment in containing and controlling superbugs should be a public policy priority. They maintain it will pay off in the form of substantial reductions in the projected impact of superbugs on economies. Even investment that results in a modest 25% containment of antimicrobial resistance would provide a substantial return.[xlvii]

Slowing antimicrobial resistance against projections to delay severity by just 10 years could save as much as US$65tn to 2050.[xlviii]

Reducing antibiotics in farming – moving to high welfare

WHO strongly recommends an overall reduction in the use of all classes of antibiotics critically important to humans in food-producing animals. This includes a complete restriction on their use to promote fast growth or prevent disease.[xlix]

Such a reduction can be achieved by moving to high animal welfare systems. Farm animals in high welfare systems have reduced stress and improved immunity and resilience to disease. This in turn requires fewer antibiotics.

Sweden has regulations to ensure piglets remain with their mothers for a minimum of 28 days following birth. Improved immunity and robustness of piglets allows farmers to significantly reduce antibiotics used. The reduction achieved was around 100-times fewer antibiotics being used than other countries including France, Belgium and Germany.[l]

If painful mutilations like tail docking and teeth clipping of pigs are not carried out, then antibiotics may not be used routinely to prevent infection. In Finland, Sweden, Denmark, Netherlands and Thailand, ending tail cutting of piglets has reduced antibiotic use.[li, lii]

High welfare also means allowing animals to express natural behaviour by providing manipulable materials and room to move. Studies in Europe show that pigs in organic, high-welfare systems have lower rates of antimicrobial resistance compared with pigs raised in conventional intensive systems.[liii, liv]

Animals fed on pasture outside tend not to be given antibiotics routinely in their feed. A study in Belgium finds intensively farmed veal calves are given far higher amounts of antibiotics than less intensively reared beef cattle.[lv]

The use of high welfare chicken breeds that grow more slowly allows for substantial reductions in antibiotic use compared with conventional intensive systems.[lvi, lvii]

Antibiotic-free farming – a dangerous trend

Some farmers have started to market 'raised without antibiotics' or 'antibiotic-free' products in response to consumer concern over this issue. We do not support such approaches. It is important that antibiotics are reserved to treat sick individual animals when disease is clinically diagnosed. The antibiotic-free trend can act as a disincentive for farmers to treat sick animals and resolve underlying issues; this is not in the interest of animal welfare.

More than 500 American vets and producers familiar with antibiotic-free production have expressed concern for animal welfare outcomes.[lviii] Antibiotic-free intensive chicken systems are associated with serious animal welfare issues resulting in skin burns, and eye and respiratory injuries.[lix]

High-welfare farm systems have lower antibiotic resistant E. coli bacteria and pose a lower risk to the environment and consumer than antibiotic-free, intensive systems.[lx]

Farms should not tighten biosecurity to address disease risk without addressing underlying animal welfare issues that drive over reliance on antibiotics. Tightening biosecurity or producing 'specific pathogen-free' animals often relies on confining them to barren living conditions without manipulable materials such as straw to relieve their stress and boredom.

This denies animals their natural behaviour like foraging and exploring, and their ability to regulate their body temperatures and reduce stress. Barren and crowded housing containing genetically uniform animals is also a pandemic risk factor.[lxi, lxii, lxiii]

Barren, biosecure environments also rely heavily on disinfectants which can drive antimicrobial resistance and do not always prevent disease or animal pandemics.[lxiv]

Replacing antibiotic use with probiotics or herbs is not a solution. It does not address the barren, low welfare conditions that drive the emergence of disease.[lxv] Probiotics are bacteria and can also harbor antibiotic-resistant genes which can be harmful to public health.[lxvi]

Sustainable food systems – protecting people's health

From 2022, the European Union will prohibit all routine antibiotic use in farm animals including the use of antibiotics in animal feed and drinking water to prevent disease across groups. Antibiotics sales and use data will be collected. The import of live animals and animal products produced through antibiotics promoting fast growth will be prohibited.

This development will bring the EU into line with Denmark, Finland, Sweden, Norway, Iceland and Netherlands. These countries already prohibit antibiotics to prevent disease in groups of animals.

To address the unsustainable overuse of antibiotics in farming and improve farm animal welfare, we need to stop factory farming. It is vital that our planet moves towards more sustainable, high welfare food systems and less animal production. Consuming fewer animal products and more plant-based foods is also critical. Remaining farm animal production should be high welfare with far less antibiotic use. This will help us address one of the key drivers to antimicrobial resistance and public health risk. [lxvii]

Credit: World Animal Protection / i.c. productions

Recommendations

Ending factory farming and moving to a more sustainable food system will help us address the superbug threat currently compounding the pandemic crisis. It will also reduce the risk of the next pandemic coming from farm animals.

Global food retail and animal protein production sectors should...

- Develop an overarching animal welfare policy aligned with the Five Domains[lxviii] framework and phase in procurement requirements in line with the FARMS animal welfare requirements as a minimum.
- Commit to using antibiotics responsibly in farming. This means ending the routine use of antibiotics including those to promote fast growth and to prevent disease across groups.
- Not pursue 'antibiotic -free' or 'no antibiotics ever' or 'raised without antibiotics' policies or product lines. This can create a disincentive for producers to treat sick animals and does not address underlying welfare issues.
- Increase the proportion of plant-based protein options to support an average global reduction in meat production and consumption of 50% by 2040. [lxix]
- Publish annual reports on their progress towards implementing high welfare commitments in conjunction with antibiotic use data on supplier farms. They should also document progress on humane and sustainable protein diversification.

Governments and intergovernmental organisations should...

- Introduce and enforce regulations in line with FARMS animal welfare requirements as a minimum.
- Introduce and enforce regulations ending the routine use of antibiotics including to promote fast growth and to prevent disease across groups.
- Commit to national surveillance and public reporting of antibiotic use at farm level in conjunction with reporting on welfare practices on farms.
- Redirect industry subsidies and financial incentives to high welfare systems that align with the Five Domains welfare framework and in support of an average global reduction in meat production and consumption of 50% by 2040.

Financial investors in food systems should...

- Require companies to meet FARMS animal welfare requirements as a minimum. Phase in requirements for companies towards systems that meet the Five Domains welfare framework.
- Require companies to commit to using antibiotics responsibly in farming: ending the routine use of antibiotics including to promote fast growth and to prevent disease across groups.
- Not, however, pursue 'antibiotic-free' or 'no antibiotics ever' or 'raised without antibiotics' policies or product lines. This can create a disincentive for producers to treat sick animals and does not address underlying welfare issues.
- Increase the proportion of plant-based protein in the investment portfolio to support an average global reduction in meat production and consumption of 50% by 2040.
- Influence policy such as supporting regulations on stricter animal welfare requirements, antibiotic use, mandatory disclosures, and due diligence processes.

Image: Organic systems usually include outdoor access and have been shown to have reduced antibiotic resistance compared with raised without antibiotic factory farm systems. Credit: World Animal Protection

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