How Prevention Reduces the Need for Antibiotics

Antibiotics are a cornerstone of animal and public health. These medicines remain the only way to treat a bacterial infection – **there is no alternative.** Many countries have successfully reduced the need for antibiotics in animals, leading to global declines in use. This review of studies and data across the world shows:

- **Bacterial disease remains a major threat**: Many regions still face high levels of disease prevalence. This causes pain and suffering for animals, while hurting farmer livelihoods.
- **Prevention is a proven pathway:** Numerous studies have shown that innovations in areas like vaccination, biosecurity, nutrition, diagnostics, genetic testing, and more are a proven way to prevent disease and reduce the need for antibiotics.
- **More focus and capacity are needed:** While many nations have increased prevention, leading to less need for antibiotic use, not all farms currently have the capacity to do so. More work is needed to bridge existing gaps in veterinary expertise, medicine access, and financial constraints to support higher levels of prevention.

Using these lessons can accelerate global efforts to tackle antimicrobial resistance, increase adoption of prevention tools, and reduce the need for antibiotics in animals.

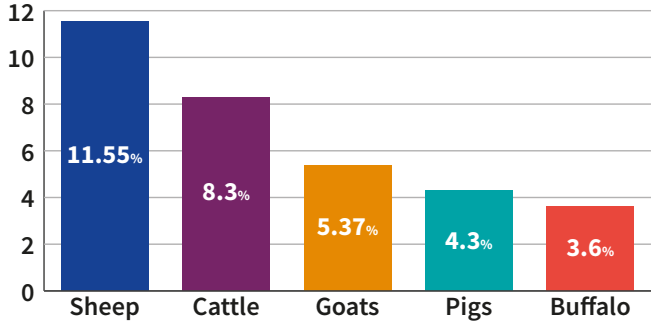
Antibiotics are needed where bacterial disease is prevalent

Many regions still face high levels of bacterial infection

Bacterial disease is common in African livestock, where prevalence can be:[1]

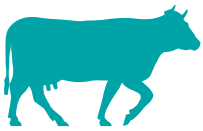
- Brucellosis: As high as 40%
- Leptospirosis: As high as 24%
- Q Fever: As high as 28.2%

The average prevalence of brucellosis in livestock across seven states in India:[2]



Bacterial disease leads to animal suffering and harms vulnerable farmers

Some livestock diseases are bacterial and require antibiotic treatment to protect animal welfare.



Contagious Bovine Pleuropneumonia (CBPP) is endemic in Africa and can cause losses from 20% to up to 80%. It affects 27 countries in Africa at an estimated annual cost of US $2 billion.[3]

Contagious Caprine pleuropneumonia (CCPP) can be found in many countries in Africa, Asia and the Middle East. Mortality rates can reach 80–100% in some cases with the total yearly cost of the disease estimated to be US $507 million.[4]

65% of veterinarians state raising animals without antibiotics worsens animal health and welfare.[5]

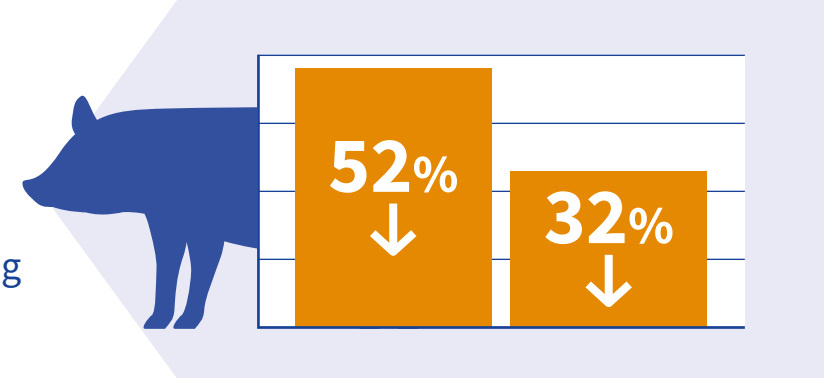
Animal health tools reduce the need for antibiotics

Protecting animal health can help prevent bacterial disease in livestock, thus reducing the need for antimicrobial treatments.

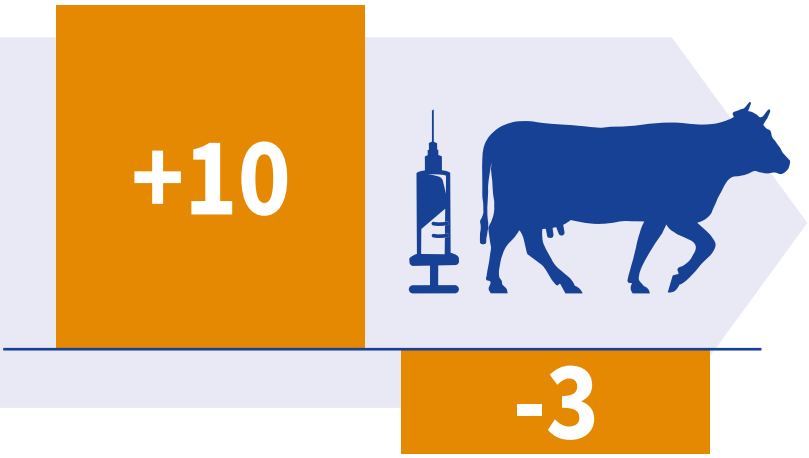
Overall health is the foundation of disease prevention

Reducing the need for antibiotics requires a range of animal health tools, from vaccination to genetics to nutrition. Each can make a positive contribution, but when combined, they can provide outsized results.

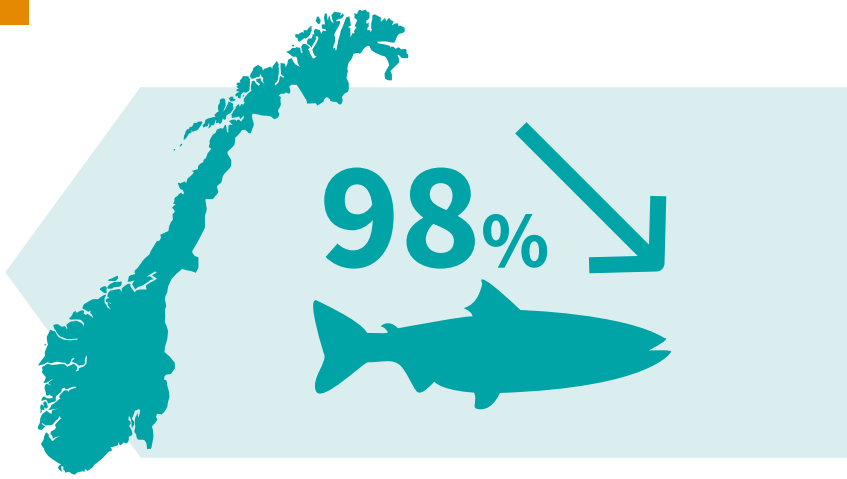
A study of EU swine found increased uptake of combined animal health measures, including biosecurity and vaccination, led to a reduction in antimicrobial usage by 52% for fattening pigs and 32% for breeding animals.[6]



Vaccines are one of the most effective tools in reducing antibiotic need



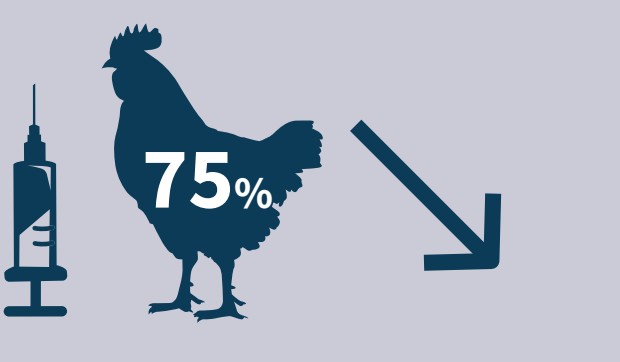
A study of East Coast Fever vaccination found that for every 10 cattle vaccinated, 3 fewer antibiotic treatments were needed in the herd.[7]



Antibiotic use in Norwegian salmon fell approximately 98% following the introduction of an effective vaccine against a key bacterial disease.[8,9]

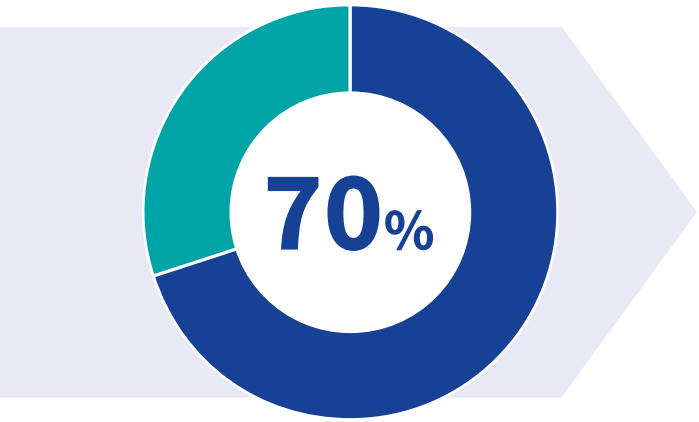
A study of Austrian pigs found a 67% decline in antibiotic use on finishing farms when PCV-2 vaccines were used.[10]

A *e.Coli* vaccine trial showed a 75% decline in antibiotic treatments in vaccinated versus unvaccinated poultry.[11]



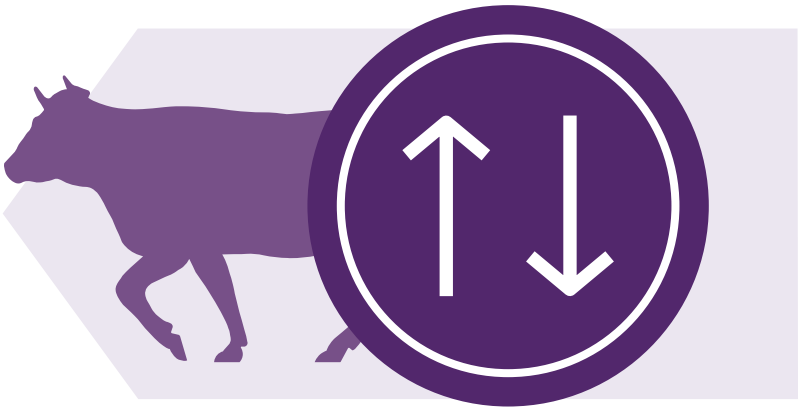
Biosecurity keeps bacterial disease off the farm and away from animals

Biosecurity means implementing practices to keep bacteria off the farm altogether. This can range from simple measures like boot washing stations to high-tech filtration systems.



A review of 27 studies across 16 countries found 70% of results showed a positive association between farm biosecurity and management with a reduction in antimicrobial usage.[12]

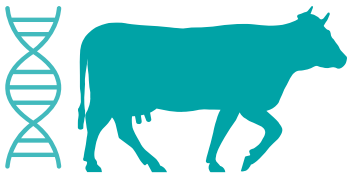
A German study found that higher biosecurity of a herd was associated with lower antimicrobial usage.[13]



Genetic testing helps farmers breed animals with stronger natural immunity

Tracking the health characteristics of a herd through genetics then breeding animals that show a stronger innate defense against bacterial disease has been proven to reduce the need for antibiotics.

A 2022 study of dairy cows found that:



...the top

25%

of cows with superior genetics...

...required

44% fewer

antibiotics during their lifetime...

...while producing

35%

more milk.[14]

Nutrition supplements improve animals innate defense against disease

Products like probiotics, essential oils and nutraceuticals are an emerging class of products that can strengthen livestock gut health and natural immune system, which allows them to better fend off disease without needing antibiotics.

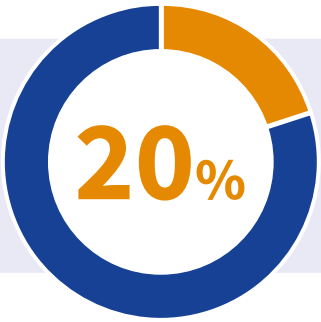
Studies have found products like essential oils and probiotics can support:

- Better immune response
- Healthier intestinal microflora
- Reduced stress in the gut

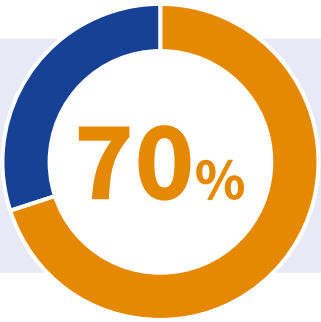
All of which help an animal avoid bacterial illness.[15,16]

Digital & diagnostics tools reduce the spread of disease through early detection

Bacterial disease cannot always be prevented, and some animals will fall ill. If a disease is detected early stages, it can be treated before it spreads throughout herds and flocks. This means antibiotics can be targeted at a smaller group of animals, reducing overall need.



20% of calf mortality is a result of Bovine Respiratory Disease. It is a leading reason for antimicrobial use in dairy cattle.



Digital monitoring technologies can identify 70% of sick animals days before they even show symptoms, allowing for early, targeted treatment.[17]

> “By tailoring the treatment to the nature of the infectious pathogen and its resistance pattern, diagnostics help reduce the unnecessary use of antimicrobials in humans and animals.”
>
> *European One Health Action Plan on AMR*[18]

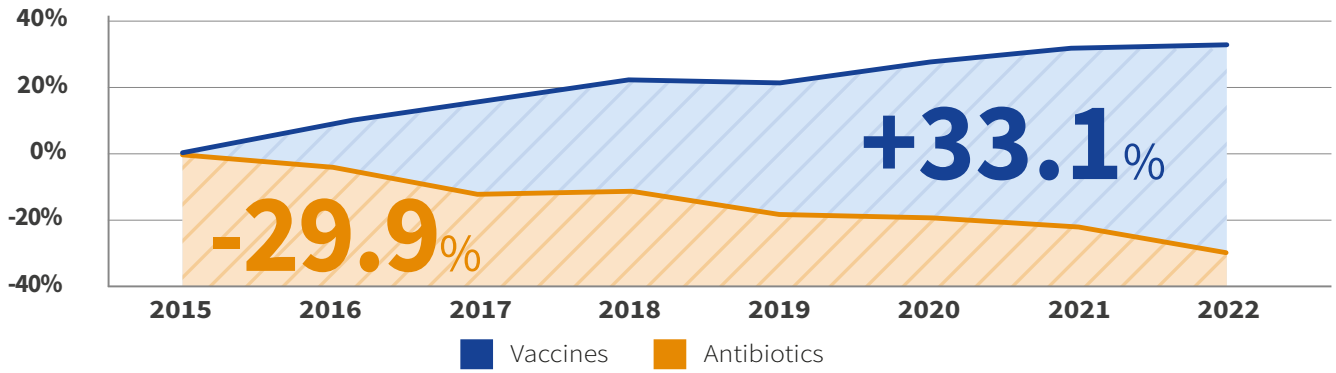
Looking Ahead: How to Maximize Prevention

Optimizing antibiotic use means maximizing prevention to avoid bacterial illness and reduce the need for treatments.

Increasing vaccine use is a proven method

Global sales of animal health products show that as vaccine sales have increased in recent years, antimicrobial sales have declined in a near-mirror image. Increasing adoption of vaccines to reduce bacterial disease pressure is a proven way to reduce the need for antibiotics.

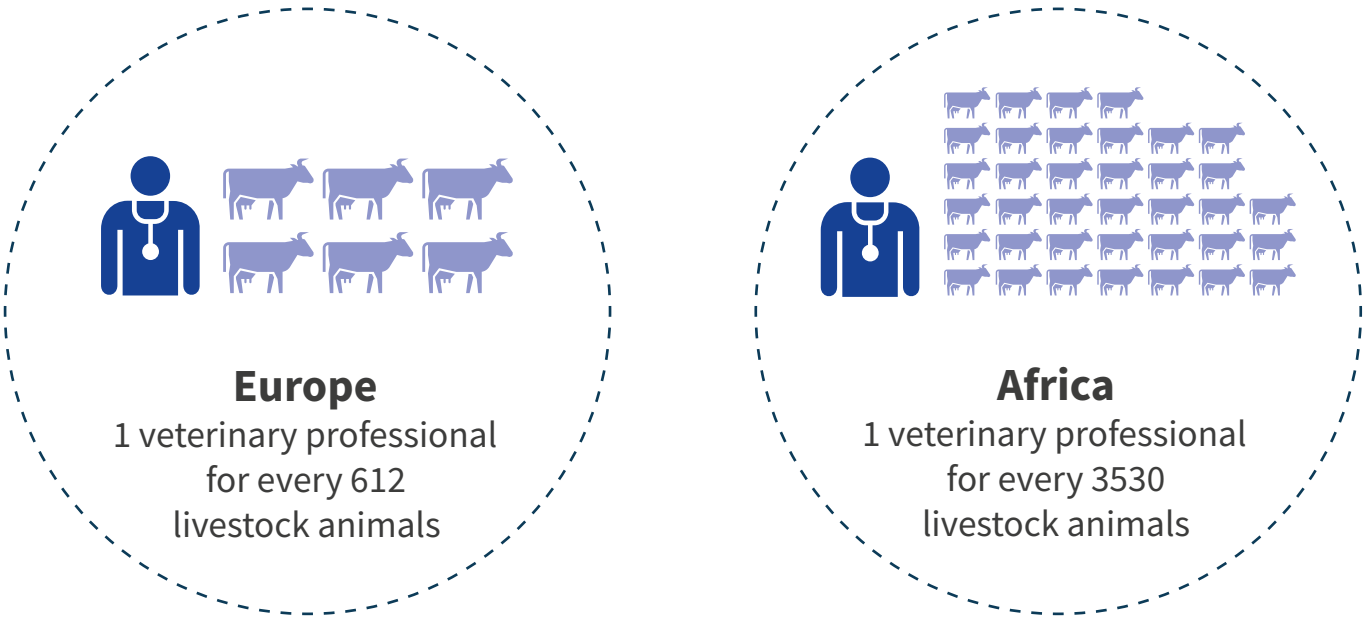
Livestock Vaccine vs Antibiotic Sales, Percent Change (2015 Euros)[19]



Greater capacity for prevention needed in animal health

Animal disease prevention is the primary way to reduce the need for antibiotics and ensure that risk of AMR transfer remains low. This is particularly important in emerging markets where production will grow in the coming decades. However, veterinary capacity and investment in animal health remains low in these markets compared to developed regions. For instance, there are five to six times as many veterinary professionals per livestock animal in Europe compared to Africa.

Ratio of veterinary professionals per livestock animal in Europe versus Africa[20]



Greater focus on prevention and optimized use is needed

Countries across the world are reducing the need for antibiotics in animals as part of their efforts to manage antimicrobial resistance. Achieving this in a manner that respects animal welfare requires addressing disease levels, not simply use. This means maximizing prevention and focusing on optimizing the use of antibiotics. These medicines will always be necessary for addressing bacterial disease; however, we can reduce the threat of these illnesses in the first place.

Objectives of the World Health Organization's Global Action Plan on AMR[21]

Reduce the incidence of infection

Optimize the use of antibiotics in human and animal health

Endnotes

1 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6631375/#B91-pathogens-08-00050
2 https://rr-asia.woah.org/wp-content/uploads/2021/08/session-3_india.pdf
3 https://www.galvmed.org/livestock-and-diseases/livestock-diseases/contagious-bovine-pleuropneumonia/
4 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6830973)
5 https://www.frontiersin.org/articles/10.3389/fvets.2019.00452/full
6 https://pubmed.ncbi.nlm.nih.gov/27362766/
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15 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4359495/
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17 https://www.researchgate.net/publication/372033359_A_Machine_Learning_and_Optimization_Framework_for_the_Early_Diagnosis_of_Bovine_Respiratory_Disease
18 https://health.ec.europa.eu/system/files/2020-01/amr_2017_action-plan_0.pdf
19 Data provided by CEESA. Their International Sales Survey covers sales from the 9 largest global animal health manufacturers (all HealthforAnimals Members) and local/regional manufacturers in Italy, Spain, the UK and Latin America.
20 WOAH data states the ratio of veterinary professionals per livestock unit is 3530:1 in Africa and 612:1 in Europe. Source: WOAH 2022 Observatory Annual Report
21 https://www.who.int/publications/i/item/9789241509763