FAIRR
A COLLER INITIATIVE

Improving antibiotics stewardship in livestock supply chains

Engagement progress report
May 2019

"We've shown that direct investor engagement on antibiotics can and is forcing companies to change their policies for the better."

Jeremy Coller
Founder of the FAIRR Initiative

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Foreword

Drug-resistant infections, in both humans and animals, are on the rise globally.[1] As we creep ever-closer to a post-antibiotic era, more and more infections will become impossible to treat.

It is an urgent health problem, already responsible for an estimated 33,000 deaths in Europe each year.[2] But drug-resistant infections do not just threaten human lives, they also threaten the global economy. The O'Neill Review predicted that if we do not act to resolve this issue, we risk losing $100 trillion of value out of the global economy.[3] The World Bank has said drug-resistant infections have the potential to cause a level of economic damage worse than that caused by the 2008 financial crisis,[4] and crucially it will hit low-income countries the hardest and drive more people into extreme poverty.

The meat and dairy sectors are acutely exposed to the crisis. Animal agriculture is the largest consumer of antibiotics globally and consumption is projected to rise by two-thirds by 2030.[5] This rampant overuse cannot continue.

Already, more than 60 countries are limiting the use of critically important antibiotics for growth promotion in animal agriculture.[6] China has launched a pilot programme that seeks to eliminate the use of antibiotics in livestock production by 2020.[7] Food companies are likely to face greater financial and reputational risks in the face of a growing consumer demand for antibiotic-free meat and tougher government regulation.[8]

This report shows that investors recognise the risks associated with antimicrobial resistance (AMR) and are working together via the FAIRR network to pressure food companies to change their stance on antibiotic use.

This is both encouraging and timely as the United Nations Inter-Agency Coordination Group on AMR (IACG) have very recently published their recommendations on action needed to tackle AMR globally. A key recommendation is for investors to systematically apply standards to assess risks and impacts related to AMR when making investments. This presents an excellent opportunity for the investment community to step up and show leadership in mitigating AMR.

In just three years, FAIRR has seen 19 out of 20 of the food companies targeted adopt policies to combat antibiotic resistance, with 12 committed to reduce or prohibit the *routine* use of medically important antibiotics in line with World Health Organisation (WHO) recommendations. The scope of the policies has improved too, with over a third (7 of 20 companies) now addressing all relevant animal species, including fish.

This pressure to reform must continue. In the US, some progress has been made since the release of voluntary guidelines. However, regulatory loopholes still allow farmers to use antibiotics previously marketed as growth promoters routinely to prevent disease – a misuse of these important medicines that will drive AMR in humans.[9]

I congratulate the investors involved in this engagement on their achievements so far. They will continue to play a key role in meeting this challenge, including ensuring food companies follow through on their commitments, with clear mechanisms to measure and audit the use of antibiotics in their supply chains.

Professor Dame Sally C Davies FRS
Chief Medical Officer for England and Chief Medical Advisor to the UK government

Overview

Antimicrobial resistance (AMR) is now globally acknowledged as a fundamental threat to public health and the global economy. The overuse and misuse of antibiotics in both humans and animals has accelerated the process by which bacteria become resistant to antibiotics, threatening our ability to treat common infections. The cost to human life is already evident. In Europe, an estimated 33,000 people die every year due to antibiotic resistant infections while in India approximately 60,000 infants are dying annually.[10,11]

Animal agriculture is the largest consumer of antibiotics globally and a key contributor to AMR. The industrialisation of livestock production has driven the rise of intensive farms that house thousands of animals in confined spaces. To be profitable, companies have relied on the routine mass medication of farm animals with antibiotics, both as a means to increase feed efficiency and to reduce mortality. As more countries embrace intensive farming systems to meet growing demand for meat, dairy and fish, the mis-use of antibiotics has continued to increase globally. It is projected that by 2030, antibiotic consumption in farm animals will rise by 67%.[12]

Today, China is the largest consumer of veterinary antimicrobials, both in relative and in absolute terms, and China, U.S., Brazil and India collectively represent nearly 75% of total antibiotic consumption worldwide.[13,14] While the impacts associated with increased resistance are significant globally, they will disproportionately affect lower-income countries, limiting our ability to meet the Sustainable Development Goals.[15]

AMR is a systemic risk that will impact multiple sectors including food and agriculture, pharmaceuticals, healthcare and insurance industries. According to the World Bank, by 2050, global GDP and world trade could shrink between 1.1% and 3.8% while the impact on global animal production could lead to a decline of between 2.6 and 7.5% per year.[16] This is why the integration of AMR into investment decision making across assets classes is essential to risk mitigation and long-term value creation. Investors have a key role to play in helping to reform current systems of production to preserve the efficacy of antibiotics against disease in both humans and animals through active ownership and stewardship.

"Since the adoption of the Global Action Plan on AMR back in 2015, countries around the world have been responding to the increasing threat posed by antibiotic resistance. This report shows investors doing their bit too. It is important that as responsible investors we push the meat and dairy sector to move further and faster to reduce excessive use of antibiotics."

Rory Hammerson
Partner at Castlefield Investment Partners LLP

Changing corporate practices

Since the adoption of the Global Action Plan on AMR back in 2015, countries around the world have been responding to the threat posed by antibiotic resistance. China, the largest consumer of antibiotics worldwide, announced last year a timetable for the implementation of its national action plan on AMR, which includes eliminating the use of antibiotics in animal feed by 2020,[17] a potential game-changer that will create significant risk and opportunity for both domestic and international companies.

The latest progress results from the World Health Organistion (WHO) show that 60% of UN-member countries have a multisectoral national action plan in place and 33% are in the process of developing one.[18] Although the focus continues to be predominantly on the human sector, some progress is being made in the animal sector with 64 countries now limiting the use of critically important antibiotics for growth promotion in animal agriculture.[19]

Consumers are also becoming increasingly aware and concerned as evidenced by the increasing demand for antibiotic-free meat. Consumer surveys have found people are willing to pay more for a 'no antibiotics' burger and that 43% of people say that they 'always' or 'often' buy meat raised without antibiotics at the supermarket.[20]

Changing consumer trends and regulation are impacting the entire value chain of meat and dairy production, and consequentially exposing portfolios to increased investment risk. Companies that either source from suppliers or are directly involved in the production of animals and use antibiotics to maintain livestock health and productivity are particularly exposed to regulatory, operational and reputational risk. The impact of regulation on international trade is already evident. The US imports about 70% of its seafood from Asia, half of which is cultured.

In 2016, the U.S. Food and Drug Administration (FDA) saw a record year for refusals to import Asian shrimp due to contamination with banned antibiotics. In January 2019, the FDA prevented 26 shipments of Indian shrimp from entering (15% of the total for that month), due to detection of banned antibiotics. India is the country's top shrimp supplier, making up 35.2% of all imports.[21]

Food companies across the value chain are starting to respond by strengthening their policies and commitments on antibiotics use. According to data from Mintel, the number of meat and poultry products making antibiotic-free related claims has increased by 117% in the past three years.[22] Investors have played a key role in helping to shift corporate practices to support the reduction of antibiotic use in animal production. In the U.S., the sale and distribution of medical antimicrobials intended for use in food-producing animals within North America decreased by 33% during 2016/ 2017 and by 41% since 2015.[23]

In November 2018, Sanderson Farms, one of the largest poultry producers in the U.S., announced that it would discontinue the use of medically important antibiotics in its live poultry operations.[24] This change in policy comes after years of public campaining where the company denied the health risks associated with the overuse of antibiotics in farm animals. Sanderson Farms was subject to multiple shareholder resolutions, including the largest shareholder vote on this issue. In February 2018, 43% of shareholders voted in favour of stopping the use of medically important antibiotics.

Costco, one of the world's largest sellers of meat and now a poultry producer, has also been under increased pressure from investors. The company responded by announcing in December 2018 that antibiotics will not be used for growth promotion in line with FDA guidance,[i] and this will extend to the company's new chicken production facility in Nebraska.[25] However, antibiotics are still used routinely to prevent disease in healthy animals.

Other companies like Perdue Farms, a major US poultry producer, are shifting production systems towards higher welfare to reduce the need for antibiotics. The company recently completed a $25 million expansion of its harvest operations in South Carolina to respond to rising consumer demand for antibiotic-free poultry products.[26] JBS, the largest beef and pork processor globally is also looking to capitalise on the growing market for antibiotic-free meat through its Seara brand.

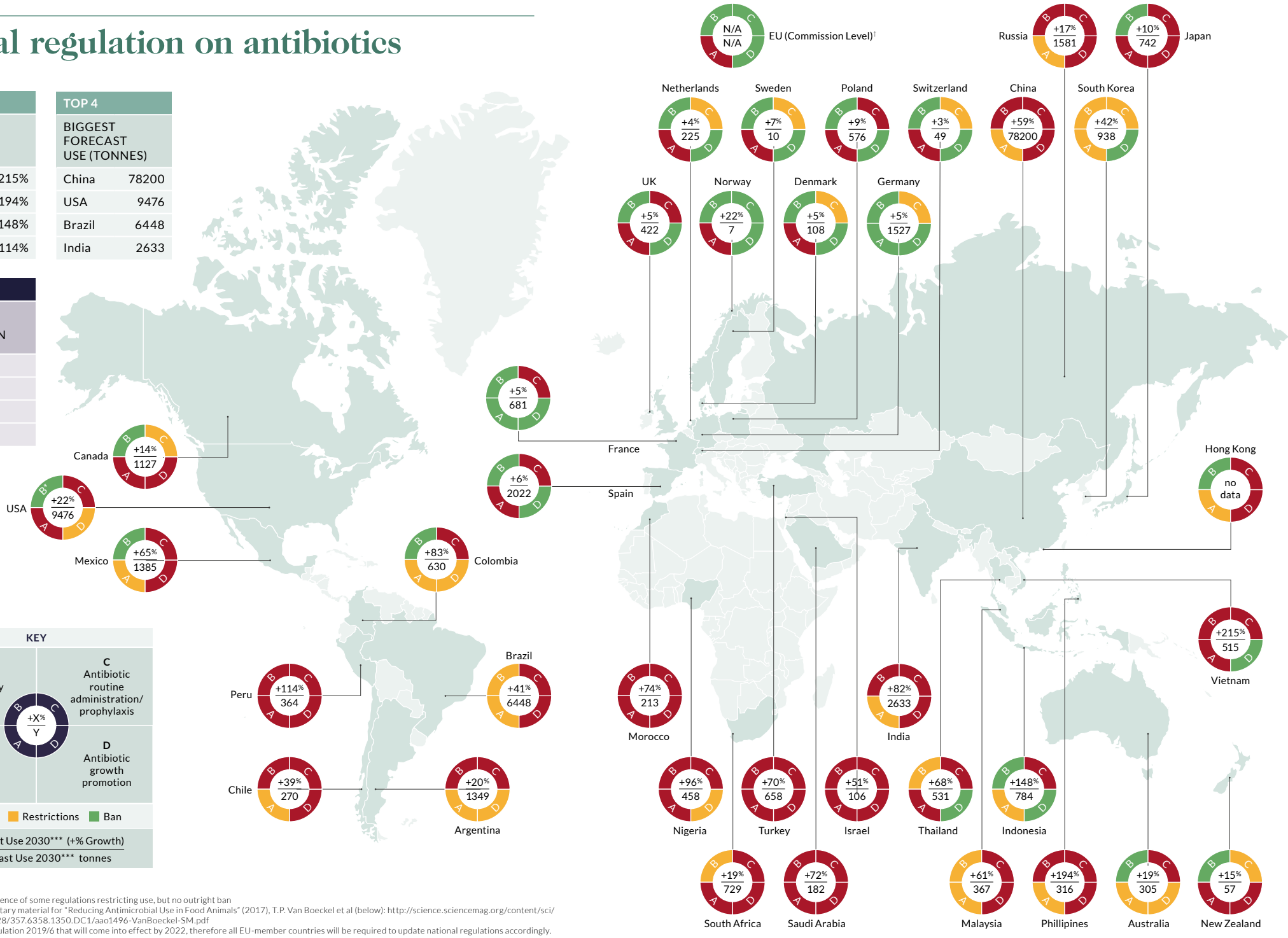
i FDA Guidance 213 requires medically important antimicrobials that are used in the feed or drinking water of food-producing animals be under veterinary oversight and to eliminate the use of these products in animals for production (e.g., growth promotion) purposes. Company policies complying with FDA guidance can still use antibiotics routinely in healthy animals for prophylaxis, i.e., to prevent disease.

Global regulation on antibiotics

TOP 4 BIGGEST FORECAST GROWTH	
Vietnam	215%
Philippines	194%
Indonesia	148%
Peru	114%

TOP 4 BIGGEST FORECAST USE (TONNES)	
China	78200
USA	9476
Brazil	6448
India	2633

TOP 4 STRONGEST REGULATION
Germany
Switzerland
France
Norway



KEY

B Unprescribed use of medically important antibiotics

C Antibiotic routine administration/ prophylaxis

A Critically important antibiotics

D Antibiotic growth promotion

+X% / Y

No ban | Restrictions | Ban

X = Forecast Use 2030*** (+% Growth)

Y = Forecast Use 2030*** tonnes

* voluntary ban

** signifies the presence of some regulations restricting use, but no outright ban

*** From Supplementary material for "Reducing Antimicrobial Use in Food Animals" (2017), T.P. Van Boeckel et al (below): http://science.sciencemag.org/content/sci/suppl/2017/09/28/357.6358.1350.DC1/aao1496-VanBoeckel-SM.pdf

† Enforced by Regulation 2019/6 that will come into effect by 2022, therefore all EU-member countries will be required to update national regulations accordingly.

Growing investor support

Investors now recognise that the routine non-therapeutic use of antibiotics in livestock production is a leading cause of rising antimicrobial resistance worlwide that affects not only public health, but multiple sectors including insurance, pharma, food and agriculture. Improving antibiotics stewardship in livestock supply chains is therefore crucial to protecting public health, and essential to risk mitigation and value creation across investment portfolios.

In the US, the number of shareholder resolutions filed on antibiotics overuse in livestock production has increased significantly. Between 2010 and 2015, four resolutions were filed. In 2016 and 2017, a total of twelve resolutions were filed. In 2018 and 2019, eight resolutions have been filed to date.

As a global institutional network of investors focused on addressing ESG risks and opportunities associated with global food supply chains, the FAIRR Initiative recognises one of the most effective mechanisms for driving change is active ownership and stewardship through company engagement. For over three years, FAIRR has been working in collaboration with groups of investors to improve antibiotics stewardship in livestock production through direct engagement with companies.

FAIRR has also provided expert research and guidance including a best practice policy for food producers and retailers that was developed in consultation with leading industry and issue experts. The best practice policy is available on pages 30 to 34.

Sign the Global Investor Statement on Antibiotics Stewardship
74 investors representing over $3.4 trillion in combined assets have signed the statement urging food companies to take action and phase out routine, non-therapeutic use of antibiotics across all livestock, seafood and poultry supply chains.

FAIRR's collaborative investor engagement on antibiotics overuse with the global fast food and casual dining sector was launched in early 2016 targeting 10 companies. The number of companies expanded in 2017 to include a total of 20 companies. Investor support for the engagement has grown significantly since inception, doubling in size during every phase to reach a total of 74 investors representing $4.9 trillion in combined assets in August 2018. A detailed overview of company progress in response to the collaborative investor engagement is available on pages 20 to 26.

PHASE 1
March 2016

Companies engaged:
10

Investors:
54

Suppoting assets:
$1.0 trillion

PHASE 2
June 2017

Companies engaged:
10

Investors:
73

Suppoting assets:
$2.3 trillion

PHASE 3
August 2018

Companies engaged:
20

Investors:
74

Suppoting assets:
$4.9 trillion

Case study

EBRD's Sustainability Principle & AMR

The European Bank for Reconstruction & Development (EBRD)'s commitment to sustainability is articulated in the Agreement Establishing the EBRD. It is implemented in policies and strategies and through initiatives that are developed in response to the emerging challenges and an evolving international context.

The EBRD is committed to helping its Countries of Operations (COO) working toward reaching the targets and outcomes defined by the 2030 UN Sustainability Development Goals (SDGs). AMR imposes critical challenges for countries where the Bank works in attaining the SDGs, and the Bank's revised **2019 Environmental & Social Policy**, launched at the Bank's Annual General Meeting in May 2019, recognises AMR's global risks and promotes good international practices to prevent the proliferation of AMR.

The policy addresses antibiotics use and AMR risks in Performance Requirement 4 on Health & Safety and Performance Requirement 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources, respectively. As a project-focused Multilateral Development Bank (MDB), the Bank's approach is a commitment to promoting high environmental and social safeguards and standards through projects and policy dialogue with stakeholders. The new policy is the first MDB policy that explicitly references AMR.

Dr Alistair Clark, Corporate Director of Environment & Sustainability Department, EBRD says, *"We recognise the global public health implications of AMR. We hope to learn from lessons and experience from the climate change strategy of the Bank to tackle AMR issues."*

The EBRD has been engaging with the AMR issue since the 2016 UN Declaration on combating AMR proliferation. As AMR is a complex and cross-sectoral subject, requiring detailed scientific and technical knowledge, the Bank has developed collaborative networks with AMR experts in the WHO, the World Bank, OECD, the British Society for Antimicrobial Chemotherapy (BSAC) and UK academics. As a private sector-focused MDB, the Bank has also been collaborating with industry leaders. In September 2018, EBRD and Aviva Investors jointly organised an AMR seminar on the role of the private sector with Dame Sally Davies, the Chief Medical Officer (CMO) for England and Chief Medical Advisor to the UK government, as a key note speaker.

European Bank
for Reconstruction and Development

"33,000 deaths a year in Europe alone is not something we as investors can ignore anymore. While we support pharmaceuticals developing novel agents to address drug resistance, we must, with the same intensity, support food chains acting responsibly towards antibiotic use. Regulation and consumers are moving fast on antibiotics. Food companies can't afford to stand still."

Sophie Deleuze
Senior ESG Analyst, Engagement Specialist at Candriam

FAIRR antibiotics engagement

The investor coalition, coordinated by FAIRR, has engaged with a total of 20 companies in the global fast food and causual dining sector over a three-year period. Of these, 13 companies are US-based and 7 are based in the United Kingdom. The companies represent approximately $279 billion in market capitalistion and generated over $72 billion in revenue in 2018. The companies were initially contacted by post and email, with follow up calls and meetings for direct engagement with coalition representatives.

Engagement objectives

Companies were asked to:

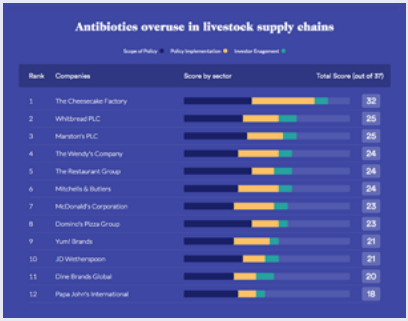
- Establish a comprehensive antibiotics policy to phase out routine, prophylactic use of antibiotics across all livestock, seafood and poultry supply chains.
- Specify clear targets and timelines for implementation.
- Increase transparency by reporting on implementation, including mechanisms to measure and audit the use of antibiotics in supply chains.

Three-year engagement process

PHASE 1

In Phase 1, the investor coalition engaged with 10 of the largest publicly listed global companies in the fast food and casual dining restaurant sector. A review of the companies' policies and practices found that companies were not acknowledging their role in addressing antibiotics resistance, and none had comprehensive policies or strategies in place to address and limit the use of antibiotics in their meat and poultry supply chains. Companies were contacted by post and email in March 2016, with follow-up calls and meetings where needed.

Out of the 10 companies, 9 responded to the investor coalition. Darden was the only company that did not provide a response.



New online resource for investor members

Access the new FAIRR investor portal to view individual company evaluation on antibiotics stewardship.

PHASE 2

In Phase 2, the number of target companies was expanded to include an addititional 10 publicly listed companies. Companies were contacted by post and email in June 2017, with follow-up calls and meetings where needed. 19 out of the 20 companies recognised the need to address antibiotics resistance and either had a public policy in place or one in the pipeline. However, policies remained limited in scope and the strength of commitments varied significantly.

Out of the 20 companies, 18 responded to the investor coalition. Brinker International and Bloomin' Brands were the only companies that did not provide a response.

PHASE 3

Phase 3 was the final phase of the engagement, and the focus was on policy implementation. Companies were contacted by post and email in August 2018, with follow-up calls and meetings where needed. All twenty companies now recognise the need to limit antibiotics use in order to address antimicrobial resistance, and companies are working to collect relevant data on antibiotics use and monitor supplier compliance with their policies.

In 2018, 18 out of 20 companies responded to the investor coalition. Brinker International and Sonic Corporation were the only companies that did not provide a response. Texas Roadhosue and Greene King's responses were inadequate.

Evaluation framework

During Phase 3 of the engagement, FAIRR further refined its established framework for assessing company policies and implementation on antibiotic use.

The framework is comprised of three assessment categories: Scope of policy, Implementation and Investor engagement.

Each category is further supported by a set of cascading key performance indicators (KPIs) that represent a maximum score of 37 points.

A detailed overview of the evaluation framework and associated scoring is included on pages 18-19. We encourage analysts and portfolio managers to utilise the framework when evaluating companies and engaging directly with portfolio companies.

SCOPE OF POLICY

Does the company have a policy on antibiotics stewardship?		Does it cover animal-derived protein sources across all relevant species?		Does it cover animal-derived protein sources across all operations?		How strong is the company's commitment?	
0	No information	0	No informaton or unclear scope or only one product line is covered	0	No information	0	No information
1	High level and generic statement acknowledging awareness on the issue, but does not point to any sort of commitment aimed at addressing it.	1	Only one species (e.g. chicken) despite sourcing other species	1	Only one market covered despite significant operations in multiple markets	1	No growth promotion for medically important antibiotics (MIAs) - as per FDA guidance
2	In the process of developing a policy/ commitment on antibiotics stewardship.	2	Only two species (e.g. chicken and pork) despite sourcing other species	2	Multiple, but not all operating markets covered. Companies with over 90% of revenues from a single market will be scored in this category.	2	No critically important or highest priority critically important antibiotics (CIAs)
3	Internal policy/ commitment on antibiotics stewardship	3	Only three species (e.g. chicken, pork and beef) despite sourcing other species	3	Global policy in place covering all operating markets.	3	No medically important antibiotics (MIAs) or no routine use of MIAs
4	Publicly available policy on antibiotics stewardship	4	All relevant and sourced species covered			4	No routine use of any antibiotics (growth promotion and prophylaxis). Antibiotics only used when there is a disease present and administered by a veterinarian. No antibiotics ever policies will be scored in this category.

POLICY IMPLEMENTATION

Does the policy commit to specific targets or timelines for all species?		Does the company disclose quantities of antibiotics used?		Does the company commit to and/or carry out third-party auditing and monitoring?	
0	No information or past targets with no updates on implementation or progress.	0	No information	0	No information
1	Targets or timelines under development or statements made that suppliers comply with basic law/regulatory guidance such as FDA 213.	1	In the process of gathering data	1	Internal auditing and monitoring for one market only, despite operating in multiple markets
2	Targets or timelines in place for one species (e.g. chicken) despite sourcing others	2	Records data on antibiotics used, but does not disclose this externally	2	Internal auditing and monitoring for multiple, but not all operating markets. Companies with over 90% of revenues from a single market will be scored in this category.
3	Targets or timelines in place for two species (e.g. chicken and pork) despite sourcing others	3	Reports % of animals that received antibiotic treatment (or) % that are no antibiotics ever (or) quantity per tonne of product	3	Internal auditing and monitoring for all operating markets
4	Targets or timelines in place for three species (e.g. chicken, pork and beef) despite sourcing others	4	Reports % of animals treated with antibiotics, separating out WHO-defined medically important antibiotics from other antibiotics	4	Company works with independent third party auditors; or suppliers that have third party audits for one market despite operating in multiple markets
5	Targets or timelines in place for all relevant sourced species	5	Reports % of animals treated with antibiotics, separating out WHO-defined medically important antibiotics from other antibiotics and explains reason(s) for usage	5	Company works with independent third party auditors; or suppliers that have third party audits for multiple but not all operating markets
		6	Reports by intensity of antibiotics used e.g. the milligrams of antibiotics consumed per kilogram of animal weight (mg/kg), separating out WHO-defined medically important antibiotics from other antibiotics and does not explain reason(s) for usage.	6	Company works with independent third party auditors; or suppliers that have third party audits for entire supply chain across all operating markets
		7	Reports by intensity of antibiotics used e.g. the milligrams of antibiotics consumed per kilogram of animal weight (mg/kg), separating out WHO-defined medically important antibiotics from other antibiotics and explains reason(s) for usage and where non-compliance identfied, the company states action (s) taken.		

INVESTOR ENGAGEMENT

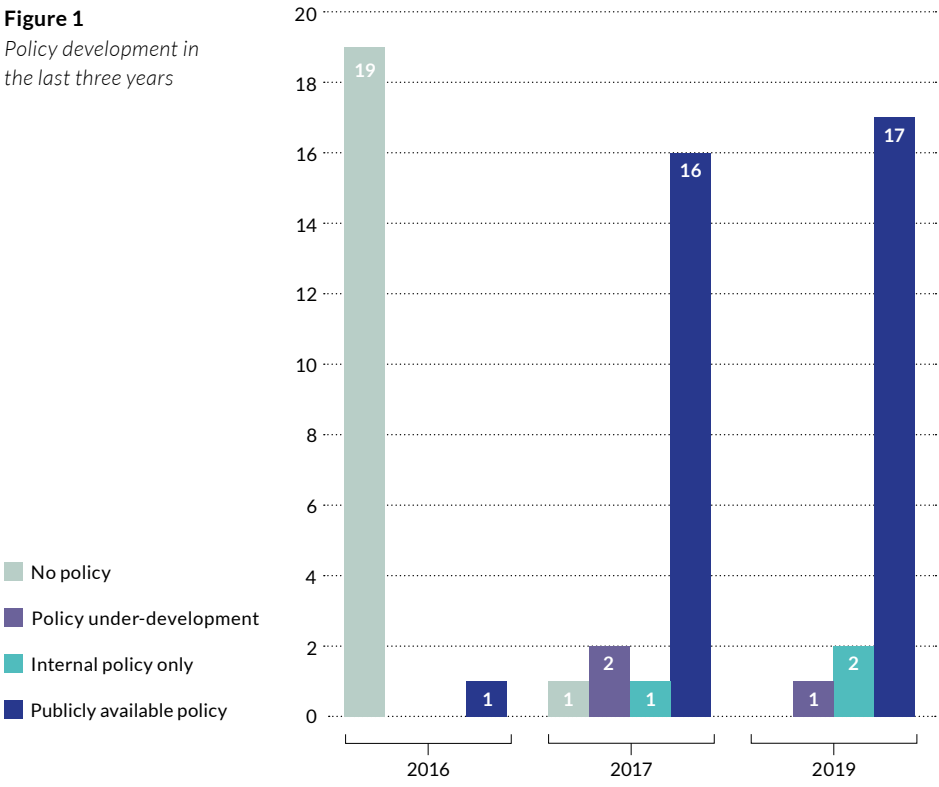
What is the company's level of engagement with FAIRR?	
0	No response
1	Inadequate responses (limited reference to investor questions)
2	Provide some insights, but incomplete answers to investor questions
3	Clear, insightful answers to all questions
4	Met with investors

Key outcomes and highlights

Company awareness and recognition of the impacts associated with the overuse of antibiotics in farmed animals has increased significantly since the start of the engagement. Back in 2016, only one company had a regional policy on antibiotics use that was limited in scope. Today, all companies in the engagement recognise the need to address antibiotics resistance and either have a policy in place or will be shortly announcing one.

17 of 20 (85%) companies have publicly available policies. Two companies (Greene King and Papa Johns) have internal policies, and Bloomin' Brands has indicated that it is developing a policy that will be released later this year.

Figure 1
Policy development in the last three years



Policy scope and strength

The scope of the policies has improved with 7 of 20 companies (35%) now addressing all relevant animal species sourced including fish, and 8 of 20 companies (40%) have established global policies to address all relevant operating and sourcing markets.

The majority of UK-based companies have either established global policies that address all relevant species sourced and markets, or are currently revising their policies to inlude all fish and seafood pruchases.

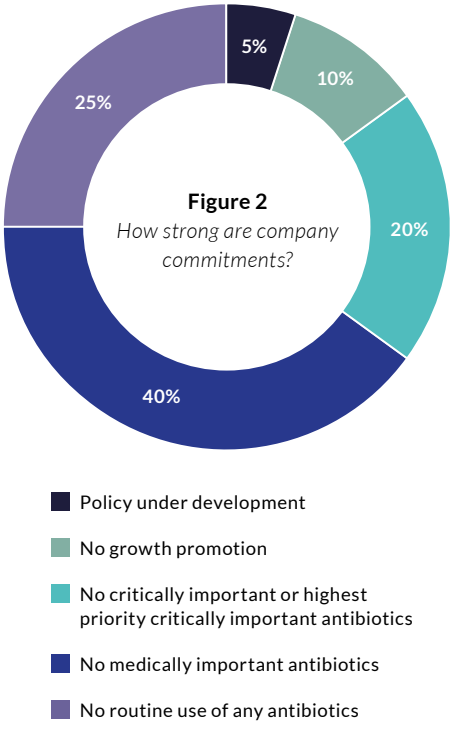


Figure 2
How strong are company commitments?

The Cheesecake Factory continues to be the only US-based company with a comprehensive policy in place addressing all relevant sourced species and markets. However, other US companies are beginning to expand their scope beyond poultry. McDonald's has committed to curbing medically important antibiotics use in its global beef supply chain, while DineBrand's new policy extends to pork.

Companies are also strengthening their commitments. 13 of 20 companies (65%) are now focused on reducing or prohibiting the *routine use* of either all antibiotics or the use of medically important antibiotics in line with the World Health Organisation's (WHO) recommendations.

Specifically, US-based companies are moving beyond FDA guidance 213, which currently advises against the use of medically important antibiotics for growth promotion purposes only. This means that antibiotics can still be routinely given to healthy animals to prevent disease. Sonic Corporation and Texas Roadhouse are the only companies in the engagement focused on prohibiting the use of medically important antibiotics for growth promotion only. This means their policies lag behind their peers, and do not meet the WHO's recommendations to stop using antibiotics routinely to prevent disease in healthy animals.

Companies like Darden, Denny's and DineBrands have recently strengthened their programmes by committing to phase out the routine use of medically important antibiotics.

Policy implementation

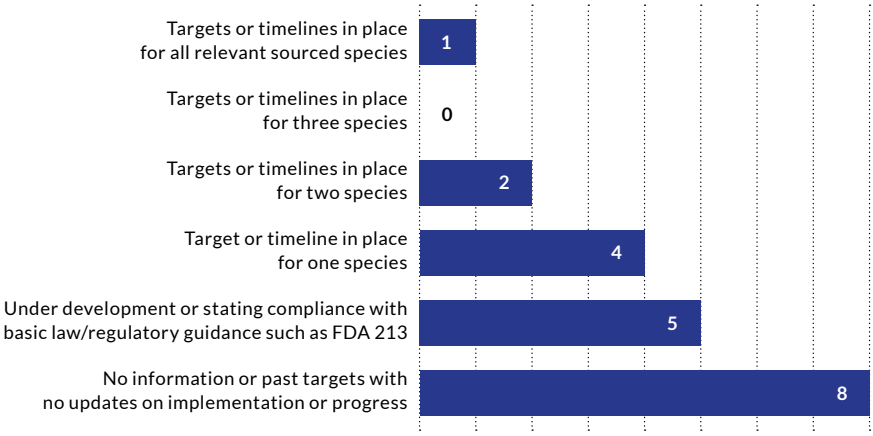
Although all the companies in the engagement now have a formal policy in place or are expected to release one later this year, there is little transparency on implementation, including poor disclosure around antibiotics use and auditing practices.

Figure 3 shows that 13 of 20 companies (65%) in the engagement have either yet to establish relevant time-bound commitments for phasing out antibiotics use in their supply chains or simply state that they are complying with basic regulatory guidance such as FDA 213.

The Cheesecake Company is the only company in the engagement with a clear time-bound commitment for transitioning its entire supply chain to being antibiotic-free. McDonald's and Wendy's have targets in place for two species. Darden, Denny's, Papa John's and Yum! Brands have set targets for chicken only. None of the UK-based companies have set public targets for implementation.

Figure 3

Are companies committing to targets and timelines for implementation?

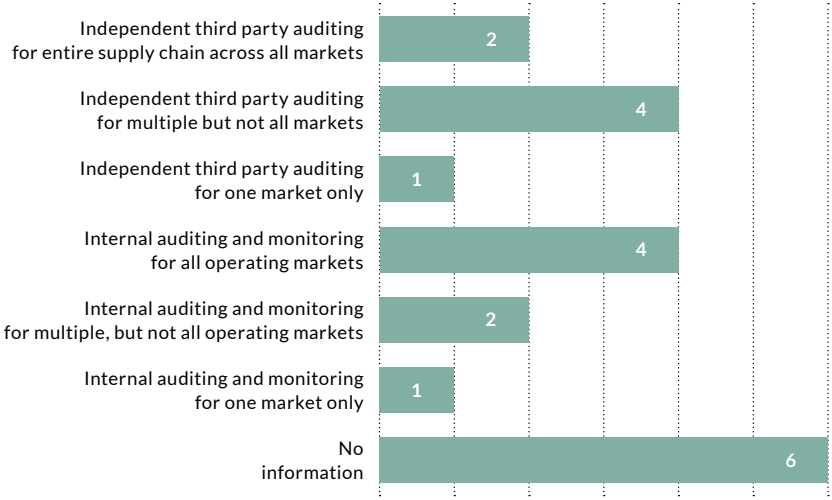


It is crucial for companies to monitor supplier compliance against their policies. However, 6 of 20 companies (30%) provide no information on their approach to engage and monitor suppliers. Seven companies use internal auditing systems to monitor compliance, including Domino's Pizza UK & Ireland, JD Whetherspoon, Mitchells & Butlers and the Restaurant Group who have said they monitor compliance across all relevant markets.

The number of companies either committing or already using independent third-party providers to monitor compliance has marginally increased from 6 companies in 2017 to 7 companies in 2019. However, out of these seven companies only two have committed or already carry out third-party audits across all sourcing and operating markets.

Figure 4

How are companies monitoring supplier compliance?

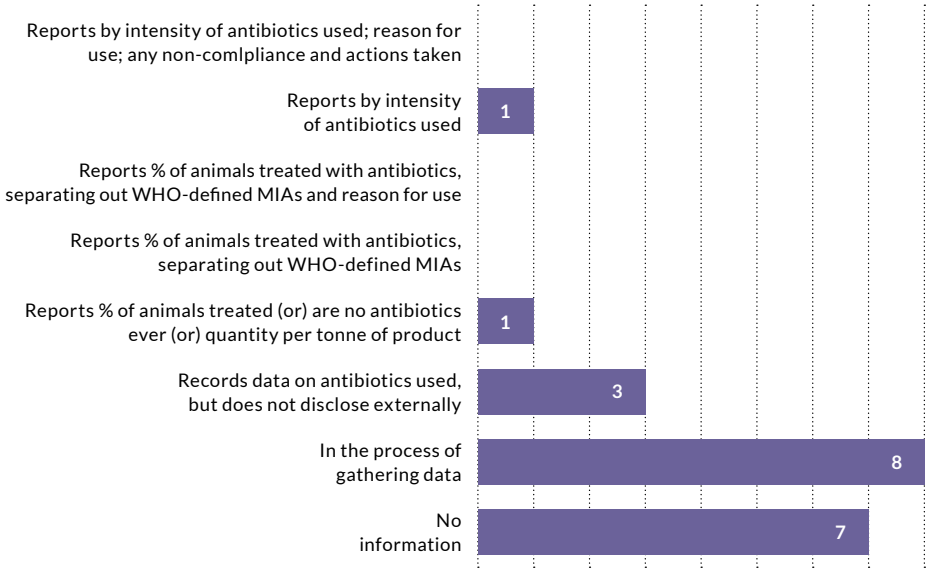


In terms of reporting and disclosure, back in 2017, none of the companies in the engagement reported antibiotics use. This has begun to shift as noted in Figure 5. UK-based Mitchells & Butlers is the first and only company in the engagement to publicly report on antibiotics use for poultry and pork using an industry standard measure of mg/Population Correction Unit (PCU).

The Cheesecake Factory is the second company in the engagement that now publicly reports on the percentage of pigs entering its supply chain that are considered 'no antibiotics ever'.

Figure 5

Are companies reporting and disclosing on antibiotics use?



Case study

New Standard to Help Certify Responsible Antibiotic Use

The Antibiotic Resistance Action Center (ARAC) at the Milken Institute School of Public Health at George Washington University has helped set a new standard for antibiotic use in poultry in the United States through its Certified Responsible Antibiotic Use (CRAU) standard.

The Need

In the U.S., significant steps have been taken to raise awareness and address inappropriate antibiotic use in human medicine. However, it has been more challenging to reduce unnecessary uses of antibiotics in agriculture because of resistance by some food-animal production companies and trade associations. Conversely, others have moved to practices that disallow antibiotic use altogether (i.e. "No Antibiotic Ever" or "Raised Without Antibiotics" practices). This left a major gap between the current permissive federal regulations and the absolute prohibition of antibiotic uses, which may be preventing many producers from adopting more responsible antibiotic-use practices.

The Approach

CRAU recognizes the value of limited antibiotic use to treat illnesses in food animals. It is the first non-profit created and managed, U.S. Department of Agriculture (USDA)-verified standard that allows for minimal use of medically important antibiotics in poultry, and requires companies to undergo regular on-site USDA audits to verify conformance. CRAU protects medically important drugs, promotes better animal husbandry, prohibits the use of antibiotics without clear medical justification, and requires that use is infrequent and well documented.

The Results

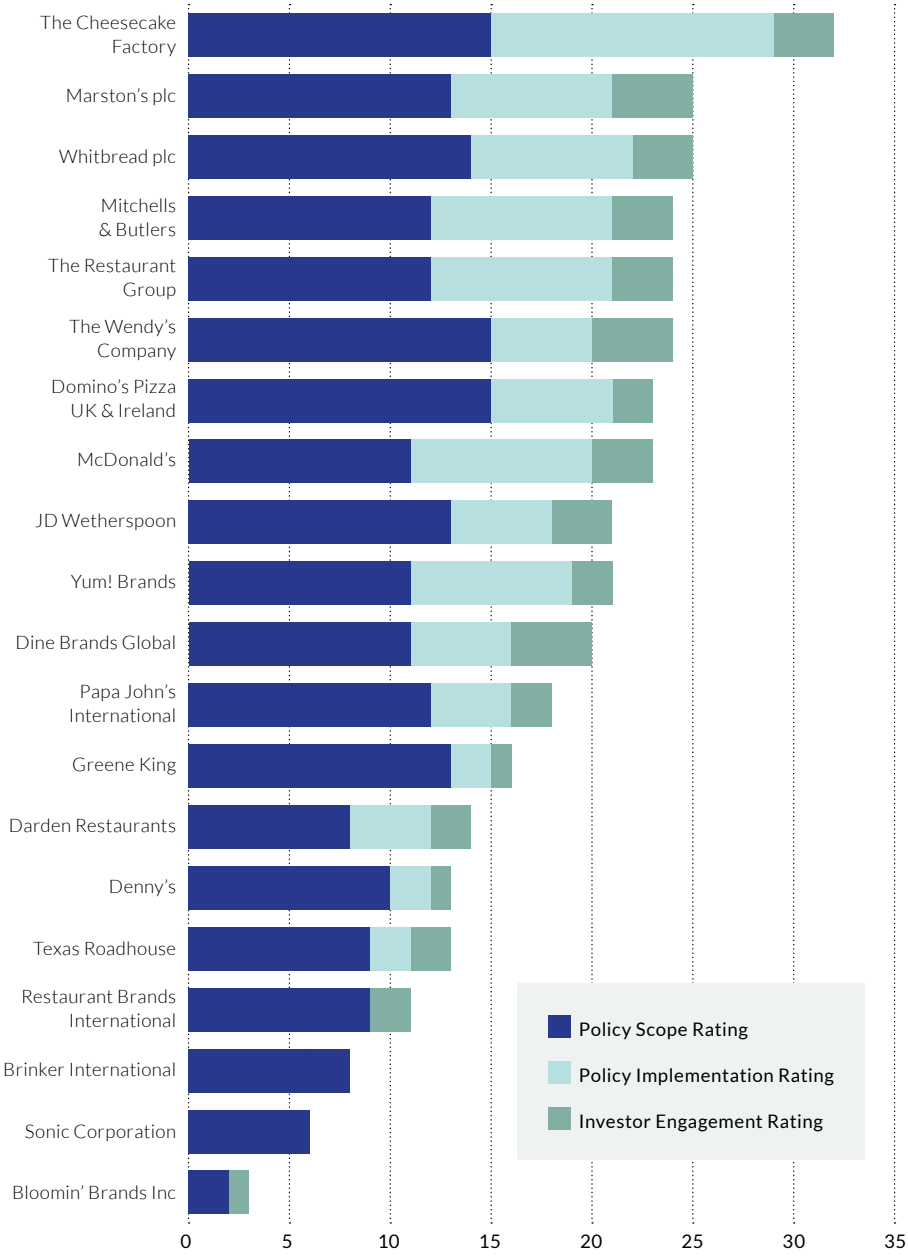
CRAU has succeeded in establishing an independent, voluntary standard to reduce antibiotic use in raising animals. It was originally conceived for schools and other institutions seeking these products at an affordable price. In four years, CRAU has harnessed the power of the marketplace to catalyze major change in antibiotic use practices in the poultry industry, sparked interest in the pork and beef sectors, and changed the national conversation about antibiotic use. Since its launch in late 2014, CRAU has been adopted by many of the largest poultry producers in the U.S including Tyson, Perdue, Mountaire, Cargill, and Butterball. See the **USDA CRAU page** for the most up to date **list of approved CRAU programs**. This field-tested standard comes with the integrity of 3rd party non-profit ownership, verification by USDA, and broad-based support from poultry producers, institutional buyers, and public health advocates.

The Future

The CRAU standard has been well received, is aligned with international standards, and already enjoys considerable support from the animal agriculture industry. ARAC is now working to establish CRAU in the beef and pork sectors and to expand it to foodservice and retail markets. For more information, please contact Laura Rogers, deputy director, ARAC at laurarogers@gwu.edu.

Antibiotic Resistance Action Center
CERTIFIED
RESPONSIBLE
Veterinary prescribed antibiotics only to treat illness
ANTIBIOTIC USE
www.certified-responsibleantibioticuse.org

Benchmarking corporate practice on antibiotics stewardship



Our work to engage stakeholders

FAIRR engages and collaborates with a wide-range of stakeholders, including most recently UN agencies, development banks, and pension groups.

Supporting the finalisation and implementation of the IACG recommendations

The FAIRR team participated in the IACG Shaping the Future Agenda on Antimicrobial Resistance events that took place in London and New York in February 2019. The events, organised by the Wellcome Trust and the United Nations Inter-Agency Coordination Group on Antimicrobial Resistance (IACG), brought together representatives from the private sector to discuss the IACG's recommendations prior to submission to the UN Secretary General and to explore mechanisms for systemic engagement and the implementation of the IACG recommendations to the private sector.

Roundtable to assess progress AMR

The FAIRR team participated in the roundtable on AMR to review progress against the recommendations of the 2016 Review on Antimicrobial Resistance and to identify key priorities for action going forward.

FAIRR/ EBRD collaboration

The FAIRR team collaborated with EBRD on their revised 2019 Environmental & Social Policy (ESP) to incorporate AMR issues for human health and animal health in Performance Requirement (PR) 4 (Health & Safety) and PR6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. This is the first International Development Bank's policy that incorporates AMR issue. FAIRR presented at EBRD's AGM in May 2019, and at EBRD-Aviva Investors joint AMR conference in November 2018.

FAIRR Director Maria Lettini speaking on antibiotics at the Pension and Lifetime Savings Association Conference in 2019

Investor events

The FAIRR team presented at the Pension and Lifetime Savings Association (PLSA) conference in March 2019 in Edinburgh on the investment risks associated with antibiotic resistance and how investors can play a key role to play in improving antibiotics stewardship by engaging with portfolio companies.

Investor resources

Engagement questions for food companies

1. **Does the company have an antibiotics policy publicly available on its website?**
2. **What is the scope of the policy?**
   - Does it cover animal-derived protein sources across all its operations and across all relevant species?
   - Does it cover all antibiotics, or is it limited to a certain class of antibiotics only (for example, critically important antibiotics)?
3. **How strong is the commitment? For example:**
   - Does it only prohibit growth promotion?
   - Does it prohibit all routine uses of antibiotics i.e. growth promotion and prophylactic use?
4. **Does the policy commit to specific targets and timelines for all species?**
5. **Does the company commit to third-party auditing and monitoring?**
6. **Does the company report on progress, including levels of antibiotics use?**

TEMPLATE ENGAGEMENT LETTER FOR COMPANIES

Dear [X]

Antimicrobial resistance (AMR) is an increasingly urgent global public health threat that presents a systemic risk across industries. As such, curbing routine use of antibiotics is now firmly on the regulatory agenda. In November 2017, the World Health Organisation (WHO) developed guidelines recommending farmers and the food industry to stop using antibiotics routinely – i.e for purposes of growth promotion or routine disease prevention – on animals. Governments around the world are developing national action plans that are likely to be supported by federal and local regulation aimed at curbing antibiotic use in livestock production.[ii] Regulations such as these will significantly impact the operational expenditure of businesses that rely on antibiotics as a means to achieve efficiency and keep disease at bay.

AMR is also an increasingly critical issue for emerging markets. Consumption of antibiotics in food animals is forecast to increase by 53% by 2030 from 2013 levels, and will be led by these regions.[iii] Given *[Company X]'s* existing operations in *[xxx]* and plans to expand locations in *[xxx*], we believe this is an even more relevant operational risk for [company name] to address.

We are encouraged by your policy to *[add individual company assessment]*. However, we remain concerned by the lack of *[add individual company assessment]*. As a coalition of 74 institutional investors with **over $4.9 trillion in combined assets**,, we respectfully recommend that [*Company X]* follow the below recommendations:

1. Establish a comprehensive antibiotics policy to phase out routine, prohylactic use of antibiotics across all livestock, poultry, seafood, dairy and egg supply chains.
2. Specify clear targets and timelines for implementation.
3. Increase transparency by reporting on implementation, including mechanisms to measure and audit the use of antibiotics in supply chains.

We look forward to your response, and thoughts on a timescale for taking action on this matter.

ii For example, a 2017 ordinance by San Francisco will require grocery stores in the city to report on antibiotics in their meat. While local, the ordinance is expected to impact companies across their meat supply chains. In June 2018, the European Parliament recently agreed a common position that will ban routine prophylactic use, and restrict metaphylactic use of antibiotics in animals. These new rules are expected to come into force in the next three years.

iii Van Boeckel et. Al. (2017) Reducing antibimicrobial use in food animals , Science [Online]. Available at: http://science.sciencemag.org/content/357/6358/1350.full

Best practice policy on antibiotics stewardship

This best practice policy on antibiotics stewardship has been developed in consultation with leading industry and issue experts. We encourage food companies, including both meat producers and purchasers (such as retailers and restaurants), to refer to this as guidance in the development of their individual policies.

Expert endorsements

This policy is endorsed by:

- Interfaith Center on Corporate Responsibility
- Alliance to Save our Antibiotics
- Center for a Livable Future at Johns Hopkins Bloomberg School of Public Health
- Antibiotic Resistance Action Center at the George Washington University
- Natural Resources Defense Council
- Compassion in World Farming

Antibiotics are a critical public health intervention; their prudent use is necessary to preserve their continued efficacy against life-threatening diseases. [Company X] understands that increasing use of antibiotics in humans and animals drives the development of antibiotics resistance. As a producer of products derived from animal agriculture and/or aquaculture, we are committed to being responsible stewards of antibiotics use.

Principles of antibiotics use

[Company X] is committed to meeting the following principles on antibiotics stewardship across our global supply chains:

Antibiotics should only be used to treat the diagnosed presence of disease in animals, and in limited circumstances to control disease outbreaks. Antibiotics should not be used to promote animal growth or for routine disease prevention.

Antibiotic use should be supervised by a veterinarian familiar with the premises and the animals.

Livestock producers should report their use of antibiotics so that oversight agencies and the public can track progress in meeting use-reduction goals and identify resistance risks and trends.

Livestock producers should rely on better husbandry practices to improve animal health and welfare, and to minimize the need for routine antibiotics use on farms.

We will apply these principles to our global operations and across all relevant species in our supply chains.[iv]

Our commitments

We will work to eliminate the use of all antibiotics, including animal-only antibiotics, for purposes of growth promotion, feed efficiency and routine prevention (both prophylactic and metaphylactic use).[v]

We will administer antibiotics to treat animals, including fish, that have a bacterial infection with clinical signs, and only when prescribed by a veterinarian.

We will prioritise the reduction of all antibiotics classified as "medically important antimicrobials."[vi]

We will underpin our time-bound antibiotic reduction plan with good animal welfare practices and management (e.g., biosecurity, vaccination, hygiene, and animal welfare practices that include avoiding overcrowding and excessive group size, reducing stress, enabling natural behaviours, maintaining good air quality and avoiding mixing).[vii,viii]

iv Refers to all animal-derived ingredients where antibiotics use is prevalent

v The elimination of routine prophylactic use in groups of animals will not prevent prophylactic use in an individual animal, following an operation, an injury or a difficult birth. Nor does it prevent prophylactic use in a group of animals in exceptional circumstances, for example, to stop a national or regional disease outbreak.

vi As defined by the World Health Organization. Critically Important antibiotics for human use 5th revision. Geneva, 2017. Accessed at http://www.who.int/foodsafety/publicaf tions/antimicrobials-fifth/en/

vii See "Four Golden Rules" of disease control developed by the Responsible Use of Medicines in Agriculture. Accessed at http://www.ruma.org.uk/antibioticss/guidelines

viii See "How to develop an antibiotics stewardship programme: a guide for corporates" by Compassion in World Farming. Accessed at https://www.compassioninfoodbusiness.com/media/7431208/how-to-develop-an-antibiotic-steward-ship-programme.pdf

We will incorporate antibiotics stewardship into [Company X]'s waste and water management plans for all relevant production facilities to reduce the potential spread of antibiotic-resistant bacteria through the disposal of animal waste.

We will commit to supporting research to identify the points of exposure of livestock, poultry, meat and seafood production and processing workers to antimicrobial-resistant pathogens, and develop and implement best management practices to protect workers from this growing threat.

We will engage farmers, suppliers and other stakeholders to reduce the use of antibiotics across the industry and establish standard reporting requirements on antibiotics use.

We will document and report publicly on [Company X]'s overall use of antibiotics annually, including total weight in kilograms, types of antibiotics administered and reason for administration (by species).

We will audit [Company X's] compliance against this policy using independent third-party verification and/or certification schemes.

We will set out global targets and timelines to meet these commitments for all relevant species in our supply chains.[ix] We will also put in place a transparent mechanism to regularly disclose progress on adoption and implementation.

Suggested targets and timelines

POULTRY	100% of our poultry products will comply with this policy by December 2020.
FISH	100% of our farmed fish will comply with this policy by December 2020.
CATTLE, PIGS AND LAMB	100% of our products from cattle, pigs and lamb farming will comply with this policy by December 2025.

ix Refers to all animal-derived ingredients where antibiotics use is prevalent

Antibiotics are a critical public health intervention; their prudent use is necessary to preserve their continued efficacy against life-threatening diseases. [Company X] understands that the higher use of antibiotics in humans and animals drives antibiotics resistance. As a purchaser of products derived from animal agriculture and/or aquaculture, we are committed to being responsible stewards of antibiotics use.

Principles of antibiotics use

[Company X] is committed to meeting the following principles on antibiotics stewardship within our global operations:

Antibiotics should only be used to treat the diagnosed presence of disease in animals, and in limited circumstances to control disease outbreaks. Antibiotics should not be used to promote animal growth or for routine disease prevention.

Antibiotic use should be supervised by a veterinarian familiar with the premises and the animals.

Livestock producers should report their use of antibiotics so that oversight agencies and the public can track progress in meeting use reduction goals and identify resistance risks and trends.

Livestock producers should rely on better husbandry practices to improve animal health and welfare, and to minimize the need for routine antibiotics use on farms.

We will apply these principles to our global operations and across all relevant species in our supply chains.[x]

Our commitments

We will not source animal-derived products that use any antibiotics for purposes of growth promotion, feed efficiency and routine prevention (both prophylactic and metaphylactic use).[xi]

We will require suppliers to administer antibiotics to treat animals, including fish, that have a bacterial infection with clinical signs, and only when prescribed by a veterinarian.

We will require suppliers to prioritise the reduction of all antibiotics classified as "medically important antimicrobials."[xii]

We will require suppliers to underpin our antibiotic reduction plan with good animal welfare practices and management (e.g., biosecurity, vaccination, hygiene, and animal welfare practices that include avoiding overcrowding and excessive group size, reducing stress, enabling natural behaviours, maintaining good air quality and avoiding mixing).[xiii,xiv]

x Refers to all animal-derived ingredients where antibiotics use is prevalent

xi The elimination of routine prophylactic use in groups of animals will not prevent prophylactic use in an individual animal, following an operation, an injury or a difficult birth. Nor does it prevent prophylactic use in a group of animals in exceptional circumstances, for example, to stop a national or regional disease outbreak.

xii As defined by the World Health Organization. Critically Important antibiotics for human use 5th revision. Geneva, 2017. Accessed at http://www.who.int/foodsafety/publications/antimicrobials-fifth/en/

xiii See "Four Golden Rules" of disease control developed by the Responsible Use of Medicines in Agriculture. Accessed at http://www.ruma.org.uk/antibioticss/guidelines

xiv See "How to develop an antibiotics stewardship programme: a guide for corporates" by Compassion in World Farming. Accessed at https://www.compassioninfoodbusiness.com/media/7431208/how-to-develop-an-antibiotic-stewardship-programme.pdf

We will ensure that our products do not have any prejudicial levels of antibiotics residues by requiring suppliers to comply with strict withdrawal periods and through routine monitoring and sampling.

We will engage farmers, suppliers and other stakeholders to reduce the use of antibiotics across the industry.

We will document and report publicly on [Company X]'s overall use of antibiotics annually, including total weight in kilograms, types of antibiotics administered and reason for administration (by species).

We will require suppliers to implement a time-bound action plan, audited by third-party verification schemes, on compliance against this policy. We will support suppliers who meet the commitments included in this policy, and exclude suppliers who are unwilling to comply with them.

We will set out global targets and timelines to meet these commitments for all relevant species in our supply chains.[xv] We will also put in place a transparent mechanism to regularly disclose progress on adoption and implementation.

Suggested targets and timelines

POULTRY	100% of our poultry products will comply with this policy by December 2021.
FISH	100% of our farmed fish will comply with this policy by December 2022.
CATTLE, PIGS AND LAMB	100% of our products from cattle, pigs and lamb farming will comply with this policy by December 2026.

xv Refers to all animal-derived ingredients where antibiotics use is prevalent

Appendix

GLOSSARY

Antibiotics refers to chemical substances (for example, penicillin) which are able to inhibit the growth or destroy bacteria and other microorganisms, and which are primarily used in the treatment of infectious diseases.

Antimicrobials refers to drugs that work against a variety of microorganisms (for instance bacteria, viruses, fungi and parasites). An antibiotic drug is an antimicrobial. However, not all antimicrobials are antibiotics.[27]

Critically important antibiotics fall within the list of medically important antibiotics identified and ranked by the World Health Organization according to their importance in human medicine. This term refers to antibiotics deemed by the WHO as critically important to human medicine.[28]

Fluoroquinolones are broad-spectrum antibiotics. They are a sub-family of quinolines, classified by the World Health Organization as 'Highest priority critically important antimicrobials' for human medicine in the WHO list of 'Critically important antimicrobials for human medicine'.*"Quinolones are one of the few available therapies for serious Salmonella and E.coli infections. Given the high incidence of human disease due to Salmonella and E. coli, the absolute number of serious cases is substantial."*[29]

Ionophores are a class of antibiotics widely used in intensive poultry farming. At present, ionophores are too toxic to be used in human medicine and so are not currently considered to be medically important.

Medically important antibiotics refers to the list of antimicrobials the World Health Organization has termed important to human medicine. This term encompasses antibiotics defined as 'critically important', 'highly important' and 'important' to human medicine.[30]

Prophylactic or non-therapeutic use is a term used to describe the use of antibiotics to promote growth ot ro prevent (rather than treat) disease and infection in healthy animals. Such routine use of antibiotics allows livestock to be reared in densely packed and often-unhygienic conditions, contributing to dangerously high levels of AMR.

Therapeutic use refers to the use of antibiotics to treat disease that has been diagnosed by a licensed veterinarian. This term refers to the treatment of specific illness, as opposed to non-therepatuic or prophylactic use.

**Since November 2017, these countries have strengthened their regulation on antibiotics use, or in the case of the European Union will be required to do so following changes at the EU Commission level.*

EUROPE*

The European Union in October 2018 voted to ban the routine and prophylaxis use of antimicrobials in animals by 2022. The use of antimicrobials for growth promotion is also banned and veterinary prescription is always required. This will impact EU-member country regulation, specifically those countries where antibiotics are still permitted for routine disease prevention including countries like Spain and France.

EU Commission Regulations*

In Europe, antibiotics are already banned as feed additives (with exception of coccidiostats or histomonostats) by regulation 1831/2003/EC.[31] In early 2019, the new Regulation 2019/6 that repealed Directive 2001/82/EC was launched and will be effective by 2022, stipulates that antimicrobial medicinal products shall not be applied routinely, cannot be used as growth promoters nor to increase yield, shall not be used for prophylaxis and shall be used for metaphylaxis only when the risk of spread of an infection or of an infectious disease in the group of animals is high and where no other appropriate alternatives are available.[32] These products should only be available on veterinary prescription. The Directive also declares that veterinary medicinal products from other countries should comply with the same requirements as products manufactured in the Union, or with requirements which are recognised to be at least equivalent.

Denmark

Recognising the potential for a health crisis, Denmark stopped the administration of antibiotics used for growth promotion (i.e., non-medical uses) in broiler chickens and adult swine (finishers) in 1998, and in young swine (weaners) in 1999. Today in Denmark, all uses of antibiotics in food animals must be accompanied by a prescription in a valid veterinarian-client-patient relationship, and veterinarians cannot profit from the sale of antibiotics. In addition, farmers, veterinarians and pharmacies must report the use and sale of antibiotics, and farm inspections are conducted regularly.[33]

France*

In France, as in the rest of Europe, antibiotics cannot be used for growth promotion and a veterinary prescription is always required. However, following changes in regulation at the EU Commission level that will come into effect by 2022, routine use of antibiotics will be banned. Currently, there appears to be some restrictions on critically important antibiotics: per Decree No. 2016-317, drugs containing one or more antibiotic substances of critical importance listed by order are prohibited in veterinary medicine for preventive use. For other uses (curative or metaphylaxic), they can be prescribed if laboratory results indicate that the bacterial strain identified is sensitive only to this critical antibiotic substance. Law no °2014-1170, Art. L. 5141-14-2 bans promotions/price discounts of farm antibiotics.[34] France has been collecting data on sales of veterinary antibiotics since 1999, that are annually reported by ANSES.

Most recently, the French Ministry of Agriculture and Food established a national plan to reduce the risk of antimicrobial resistance in veterinary medicine called Écoantibio 2017-2021, which includes goals to reduce antibiotics use in animals.[35]

Germany*

In Germany, as in the rest of the European Union, antibiotics cannot be used for growth promotion and a veterinary prescription is always required. When the veterinarian dispenses veterinary drugs to the animal owner, "strict rules ensure the close correlation between diagnosis and treatment of the animals." It is unclear if any of these rules currently ban prophylaxis. However, following changes in regulation at the EU Commission level that will come into effect by 2022, routine use of antibiotics will be banned. The 16th amendment of the German Drug Act, which came into force in 2014, requires farmers to report on their use.[36] There appear to be some restrictions on the sale of systemic antibiotics in livestock.[37]

Netherlands

Since 2011, all antibiotics used in Dutch farming have been classified as 1st, 2nd and 3rd choice. Only 1st choice antibiotics can be used "empirically", i.e. before it is known what the bacteria causing the infection are, and without carrying out sensitivity tests. Second-choice antibiotics can only be used if sensitivity testing (i.e. testing to see whether the bacteria are resistant to particular antibiotics) shows that 1st choice antibiotics would be unlikely to work. The 3rd choice antibiotics can only be used if sensitivity testing shows that neither 1st or 2nd choice antibiotics would work.

All critically important antibiotics are classified as 3rd choice, which has greatly helped in reducing their use since 2009.[38] Routine preventative use has ended which has largely contributed to reducing overall use, but mass medication remains nevertheless by far the most common form of treatment.

Norway

The use of antibiotics as growth promoters has been banned in Norway since 1995.[39] There is national regulation that forbids veterinarians to profit from selling antimicrobials and other drugs according to "the Norwegian livestock industry's joint action plan on antimicrobial resistance."[40] Currently there appears to be no blanket restrictions on the use of critically important antibiotics for preventative uses. However, less than 1% of salmon in Norway is treated with antibiotics.[41] Those that are treated with antibiotics, are done under the supervision of a fish health biologist or veterinarian. Norway is not a member of the EU, however, it follows EU law for trade reasons. This means any future regulatory changes will likely reflect the future ban of antibiotics for routine use.

Poland*

As in the rest of the European Union, antibiotics cannot be used for growth promotion and a veterinary prescription is always required. However, following changes in regulation at the EU Commission level that will come into effect by 2022, routine use of antibiotics will be banned.According to the country's Chief Veterinary Inspectorate, Poland has been collecting data on the sale of antibiotics as stated in the Pharmaceutical Law Act, which indicates that these can only be purchased with a veterinarian prescription.[42]

Spain*
As in the rest of the European Union, antibiotics cannot be used for growth promotion and a veterinary prescription is always required. However, following changes in regulation at the EU Commission level that will come into effect by 2022, routine use of antibiotics will be banned. [43]

Sweden
Sweden banned antibiotics as growth promoters in 1986, since then, the country has further strengthened its regulation to reduce prophylactic use. It only allows veterinarians to administer antibiotics, and in cases of chronic mastitis cows are culled rather than treated due to low chance of recovery and penicillin resistance.[44]

Switzerland
In 1999, Switzerland banned the addition of antibiotics to animal feed as growth promoters. Other legal requirements were introduced in 2004, such as a prohibition on the administration of antibiotics to livestock without a prescription by a veterinarian.A regulation on the use of antibiotics in veterinary medicine was adopted to curb the use of antibiotics for prophylactic treatment. Since 2016, the sale of critically important antimicrobials for human medicine has also been restricted in veterinary medicine.[45] Like Norway, Switzerland is not an EU-member country, but it follows EU law for trade reasons. This means any future regulatory changes will likely reflect the future ban of antibiotics for routine use.

United Kingdom*
At the time of writing, the UK continues to follow EU law. In the case of a possible exit from the EU, the UK like Norway or Switzerland may choose to strengthen regulation to reflect the future ban of antibiotics for routine use. Currently, all antibiotic veterinary medicines in the UK are available only on prescription by a veterinary surgeon, who in turn is only permitted to prescribe to animals under their care.[46] Most recently, the UK launched its 20-year vision for antimicrobial resistance and the UK 5-year action plan for antimicrobial resistance for 2019–2024, both include goals to reduce antibiotics use in animals.[47]

NORTH AMERICA

In the US, medically important antimicrobials require a prescription for use on animals. There is a voluntary ban on growth promotion. In Canada, the use of medically important antibiotics on animals now requires a prescription and claims relating to growth promotion are being removed from drug labels. In Mexico, there are restrictions in place relating to the use of antibiotics on animals, and veterinary prescription is required.

Canada*
As at December 2018, all medically important antibiotics for veterinary use will be sold by prescription only.[48] Canada is also working to remove any growth promotion claims found on the labels of medically important antibiotics. However, there is not ban in place to prohibit the use of antibiotics for growth promotion.

Canada has also introduced mandatory reporting on the sales of medically important antibiotics for veterinary use.[49] These efforts are part of Canada's broader approach to tackle AMR as referenced in their National Action Plan for AMR.

United States

The use and legislation of antimicrobials varies by state. Federal FDA Guidance #213, implemented in January 2017, prohibits use of medically important antibiotics for growth promotion. Animal producers also need to obtain authorisation from a licensed veterinarian to use these for prevention, control or treatment of a specifically identified disease. This is considered a voluntary ban at this stage.[50]At the state level, California's Senate Bill No. 27 of 2015 prohibits medically important antibiotics for growth promotion and these can only be used for veterinarian prescription treatment. The Bill also requires the state Department of Food and Agriculture to bolster oversight by creating a tracking system on antibiotic usage and resistance.[51] The US has developed a National Action Plan that recognises the need to eliminate medically important antibiotics for growth promotion in food animals.

Mexico*

In 2018, Mexico's National Service of Health, Safety and Agri-Food Quality (SENASICA) published a list of 32 substances that are prohibited from being used in animals destined for human consumption. 16 of these prohibited substances are antimicrobials and 3 are hormonal promoter.[52] Mexico requires veterinary prescription to use antimicrobials in animals.[53]

BRICS

With the exception of Russia, all BRICS countries have developed National Action Plans to address AMR that include animal agriculture. Both India and South Africa recognise the need to restrict antibiotics use and strengthen AMR surveillance. China has banned the use of colistin, which is a last resort antibiotic, as a growth promoter and feed additive in animals. Brazil's ban on colistin relates to animal feed only.

Brazil

Brazil prohibits the addition of additives to animal feed, including some critically important antibiotics such as penicillin by Ordinance 159 of 06/23/1992; spiramycin by Normative Instruction N° 14 of 17/05/2012; colistin sulfate by Normative Instruction N° 45 of 22/11/2016 and avoparcin use was suspended from 06/08/98.[54] Some evidence was found to indicate that a veterinarian prescription is required for the use of controlled drugs including antibiotics.[55] Brazil continues to allow the use of antibiotics as growth promoters for its home market. For the EU market, producers will have separate production lines and follow EU regulation.[56] Brazil has developed a National Action Plan which references animal agriculture in relation to surveillance and improved stewardship, however, there are no associated reduction targets.

China*

In 2016, the Ministry of Agriculture banned the use of colistin as a growth promoter and feed additives for animals (announcement no. 2428), stated by the China National Center for Food Safety Risk Assessment (CFSA).[57] In 2018, the Chinese government announced a timetable for the implementation of its National Action Plan on AMR, which aims to eliminate the use of antibiotics in animal feed by 2020.[58]

India*

In December 2018, the media reported that the Indian government was considering a ban on the use of critically important antibiotic colistin as a growth promoter.[59] However, no legislative evidence to support these claims has been found. India has developed a National Action Plan which references animal agriculture in terms of restricting and phasing-out non-therapeutic use. However, there are currently no mandatory regulations on antibiotics use or surveillance. Routine use of antibiotics is widespread. Within aquaculture, some critically important antibiotics and other cases of antibiotics are prohibited, such as nitrofurans, glycopeptides, chloramphenicol, neomycin, fluoroquinolones and select sulfonamide drugs.[60]

Russia

Regulation only seems to pertain to residues in the final product.[61] No other regulation was found.

South Africa

Antibiotics for animal use are regulated by the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947). Antibiotics intended for use by the lay public (chiefly farmers) are registered under Act 36 as stock remedies and are available over the counter.[62]

Veterinary medicines are controlled by the Medicines and Related Substances Control Act (Act 101), which primarily controls human medicines. Antibiotics intended for use in animals and registered under Act 101 may only be administered or prescribed by a veterinarian.[63] South Africa has developed a National Action Plan that addresses antibiotics use in animal agriculture and recognises that legislation will need to be changed to regulate the use antibiotics for growth promotion and disease prevention.

ASIA

South Korea and Thailand have both banned antibiotics for growth promotion. Japan, Philippines and Hong Kong require a veterinary prescription. No country currently bans the use of critically important antibiotics; however South Korea, Philippines, Hong Kong and Malaysia now restrict the use of certain antibiotics. The National Action Plans developed by Vietnam, Thailand, and Malaysia have goals to tackle antibiotics use in animals.

Hong Kong

Avoparcin, a type of critically important antibiotic as well as other antibiotic growth promoters were banned in Hong Kong in 2001. Additionally, seven veterinary drugs, including two antibiotics, are prohibited in any fish, meat or milk. Veterinary prescription for antibiotic use in animals is also required by law.[64]

Japan

Antimicrobial additives permitted by ordinance number 271 (20/06/03), for growth promotion and feed efficiency under Law No. 35, 1953.[65] Prescriptions are required

for all veterinary antimicrobials by Article 49 of the Pharmaceutical Affairs Law.[66] In 2003 the Japanese government passed legislation enforcing traceability from the farm through retail sale for livestock products, however, it is unclear if this includes antibiotics.[67] Japan has strengthened the Japanese Veterinary Antimicrobial Resistance Monitoring System since it was established in 1999[68] and strategy 4.2 of the Japanese National Action Plan on Antimicrobial Resistance has goals to reduce the use of antibiotics in livestock and aquaculture, however this has not yet been translated into Japanese Law.[69]

Malaysia

Malaysia prohibits the use of some critically important antibiotics: avoparcin, chloramphenicol, norfloxacin, teicoplanin. It also prohibits the use of some medically important antibiotics: nitrofurans, vancomycin in food-animals including aquaculture. Malaysia's Animal Feed Act 2009 stipulates the banned antibiotics (group A) and maximum residue limits for the allowed antibiotics (group B). Poultry, bovine, porcine and goat/sheep are monitored annually.[70] Most recently, the Malaysian Agriculture and Agro-based Industry Minister publicly declared that colistin would be banned in animal feed from 1 January 2019.[71]

Philippines

Veterinary medicines must be sold by registered pharmacies or drugstores, biological laboratories, veterinary clinics and government veterinary agencies.[72] The Joint Administrative Order No. 2 s. 2000 prohibits use of antibiotics from the nitrofurans group in livestock.[73] The Philippines has developed an AMR National Action Plan, which references animal agriculture, however it does not include any reduction goals.

South Korea

There is a ban on growth promotion since July 2011 and a veterinary oversight system is currently being implemented.[74]

Thailand

Existing registered antibiotics are prohibited from use as growth promoters in food animals in accordance with the regulations of the Ministry of Agriculture and Cooperatives 2015.[75] Thailand FDA states that 'growth promotion' is not permitted; specific antibiotic classes such as fluoroquinolones, cephalosporins and polymyxins should be used in animals as restricted drugs and require a prescription. However, medicated feed is exempted from being a drug and is controlled under the Animal Feed Quality Control Act.[76]

Vietnam*

Since 2017, Decree no.39/2017/ND-CP prohibits antibiotics for growth promotion in animal and aquatic feed. This law also states that antibiotics for the purpose of disease prevention will be phased out by 2021 and contains rules aimed at strengthening legislation to address AMR including surveillance to monitor the development of resistance to antimicrobials including those the medically important antibiotics chloramphenicol and tetracyclines.[77]

Indonesia*

Indonesia recently issued a decree known as Permentan N°14/2017 on the classification of animal drugs, which bans all use of growth promoting antibiotics as of January 1, 2018.[78] This is part of a multi-stage approach to curb AMR, which includes the establishment of antimicrobial surveillance, awareness raising campaigns and a National Action Plan.

OCEANIA

Both Australia and New Zealand require veterinary prescriptions for antibiotics use. Australia has banned the use of certain antibiotics for growth promotion including virginiamycin and last year, launched an Animal Sector National Antimicrobial Resistance Plan. The New Zealand government states that most antibiotics can only be used to treat sick animals, however, antibiotics can still be used for disease prevention.

Australia*

No ban on growth promotion but certain antibiotics are banned for growth promotion, such as critically important antibiotics fluoroquinolones and avoparcin; and medically important antibiotic virginiamycin.[79] Some critically important antibiotics such as fluoroquinolones, colistin and fourth generation cephalosporins and other classes of antibiotics are not registered for use in food producing animals. Antibiotic use must be prescribed and overseen by a veterinarian. In 2018, Australia launched the Animal Sector National Antimicrobial Resistance Plan to reduce antibiotics use in the animal sector and support the country's second National AMR Strategy that will be published sometime after 2019.[80]

New Zealand

Use of antibiotics is controlled under the Agricultural Compounds and Veterinary Medicines Act. Veterinary prescriptions are required, and antibiotics can only be used to treat individual animals or groups of animals that show symptoms of disease. However, the regulation also allows the use of antibiotics to prevent sickness in cases where there is a high risk to the animal.[81]

SOUTH AMERICA

Argentina, Chile and Colombia prohibit the use of certain medically important antibiotics on animals intended for human consumption. Peru does not appear to have any restrictions on the sale or use of antibiotics despite the development of a National Action Plan on AMR.

Argentina

Argentina prohibits some medically important antibiotics for use in foods and medicines destined to animals for human consumption: cloranfenicol by Resolution SENASA N° 253/95; nitrofurazona by Resolution SENASA No. 248/95; metronidazole and dimetridazole by Resolution SAGPyA No. 76/98. Resolution SAGPyA No.148/06 prohibits the use of drugs labelled as growth promoters that contain beta-agonists.[82]

Chile

Chile prohibits the use of some medically important antibiotics including chloramphenicol and substances derived from nitrofurans and 5-nitroimidazoles on animals intended for human consumption.[83]

Colombia

Colombia prohibits the use of medically important antibiotics: dimetridazole by ICA Resolution 991/2004; Furazolidone, and Furaltadone by Resolution ICA 1082/1995. In feeding additives, the critically important antibiotics polymyxin E (colistin) and polymyxin B are prohibited for use as growth promoters. The country also requires veterinary prescription of antimicrobials for animal use.[84] No other regulations were found.

Peru
There appears to be no limitations on the types of antibiotics veterinary professionals can sell or administer and antibiotics are available to farmers over the counter without a veterinarian prescription.[85] Peru has developed a National Action Plan that references animal agriculture, however, no legislation to support the implementation of that plan was found.

OTHERS

Nigeria*

In 2018, the National Agency for Food and Drug Administration and Control (NAFDAC) issued a ban against the use of antibiotics for growth promotion in animal feed.[86] The ban was in response to increased concerns of AMR-related deaths in the country.

Saudi Arabia
The use of some medically important antibiotics: nitrofurans, furazolidone and furaltadone in food-producing animals is prohibited in Saudi Arabia.[87] No other regulations were found.

Turkey
No legislation found.

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