Antimicrobial resistance: Investment implications from farm to pharma
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Antimicrobial resistance: Investment implications from farm to pharma

The increasing resistance of bacteria to common antibiotics is one of the most important and far-reaching health issues since modern medicine began, yet the wider costs and benefits across industries are not fully understood.

A recent UK government report by economist Jim O’Neill found that as a result of deaths and productivity losses, the resistance threat could cost $100 trillion globally by 2050 if no action is taken1. The World Bank has warned that antimicrobial resistance (AMR) could damage the global economy as much as the financial crisis, repeated every year, with global GDP falling by 1-4% each year by 20502.

AMR has gained social awareness and political attention; the healthcare burden and scale of the challenge is sobering. As global regulators, medicines agencies, physicians and farmers alike join forces to tackle the scale of the problem, it is clear that the antimicrobial resistance threat has serious implications for any long-term investor, across sectors, regions and asset classes.

Antimicrobial drugs are medicines that are active against a range of infections, such as those caused by bacteria (antibiotics), viruses (antivirals) and fungi (antifungals). The reasons for growing resistance are multi-faceted and the solutions and cost implications complex. A recent flurry of gloomy press reports has reprimanded the food supply chain, to which many investors’ interest has turned. In our view, that focus distracts long-term investors from the greater costs and opportunities across other industries.

While the challenge is gradual, the impacts are likely to play out more quickly – crystallised both by regulation and awareness campaigns. A UN declaration signed in September 2016 sets a two-year deadline for all member states to report back on the actions they have taken to reduce resistance. We think this creates a tight inflection point for governmental action. Other international agreements have been penned and national regulation is planned which will fundamentally undermine the value of industries tied to conventional antimicrobials, while opening opportunities to companies providing solutions.

Risks and opportunities
We map out a broad spectrum of risks and opportunities across the healthcare and food value chains, looking at antibiotics, the most widely used antimicrobials, and the key focus of attention.

Table 1: Risks and opportunities across healthcare and food value chains

<table>
<thead>
<tr>
<th>Lever</th>
<th>Industries affected</th>
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<tbody>
<tr>
<td>A curb on excessive use in humans</td>
<td>Generic manufacturers of antibiotics, Pharmaceutical companies</td>
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</table>
| - Europe has been aware of antibiotics use for some time. Recent data show a 6% decrease in antibiotic consumption (by humans) in the EU in the last seven years.  
- In the US, around 50% of antibiotic prescriptions are unnecessary, which leaves ample room to curb usage.  
- Several global and regional initiatives are underway to limit incorrect usage. |
| A curb on excessive use in animals | Manufacturers of antibiotics, Animal health companies, Chemicals companies exposed to feed additives, Farmers, Food industry |
| - In the EU, antibiotic use on farms fell by c. 2% over the last decade and by as much as 12% in many countries. |
| More responsible access | Pharmaceutical companies – restrictions on growth, Generic manufacturers of antibiotics |
| - In contrast to the EU, use of antibiotics is rising fast in developing countries; a welcome development given that currently, more people die from lack of access to antibiotics in these regions than from antimicrobial resistance.  
- Access campaigns are gathering pace, but the emphasis is firmly on providing responsible access to antibiotics, indicating potentially lower growth than anticipated. |
| Restrictions on over-the-counter (OTC) medications | Businesses reliant on emerging markets, especially those selling in regions that don’t have the same standards as developed markets |
| - Currently across several developing countries, antibiotics are available over the counter and without prescriptions. As public health campaigns increase awareness, regulatory interventions seem more likely. |
| Widening incentives for new antibiotics, and alternatives to antibiotics | Pharmaceutical companies, Adjacent industries e.g. diagnostics, Vaccine-heavy pharma, Chemicals companies exposed to feed additives |
| - Despite traditionally low returns on antibiotics due to restrictions on their use and manufacturing complexities, the hurdles that have deterred research and development (R&D) are beginning to be removed.  
- Meanwhile demand for peripheral services such as hospital cleaning and diagnostic testing stand to benefit, and prevention of infection via vaccination is rising rapidly. |

Source: Schroders

Table 2: Cross-sector impacts

<table>
<thead>
<tr>
<th>Sector</th>
<th>Animal health</th>
<th>Chemicals/feed additives</th>
<th>Farming/food producers</th>
<th>Retailers &amp; restaurants</th>
<th>Generic pharmaceuticals</th>
<th>Innovative pharmaceuticals</th>
<th>Healthcare services and diagnostics</th>
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<tr>
<td>+/- impact</td>
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</table>
| Implication | Slowing sales due to restrictions of antibiotics to farms.  
Innovative feed practices likely to be rewarded e.g. probiotics, essential oils.  
Increased initial costs in altering farming practices for companies with poor animal welfare or over-reliance on antibiotics.  
Opportunity to meet high consumer demand, can pass costs on.  
Facing restrictions in sales methods of certain (medically important) antibiotics; stunted sales growth in developed markets; falling volumes over longer term.  
Stands to benefit from increased incentives to develop new antibiotics and vaccines driving additional revenues.  
Increased demand for diagnostic testing for infections, cleaning services and alternatives to antibiotics. |

Source: Schroders

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3 European Commission Eurobarometer Survey 2016
4 European Medicines Agency, based on data collected from members states on the sales of antibiotics for veterinary purposes in 2014 (i.e. usage for therapeutic purposes only, not to assist in growth promotion).
5 Global antibiotic consumption grew by 30% between 2000 and 2010. This growth is driven mostly by countries such as South Africa and India, where antibiotics are widely available over the counter and sanitation in some areas is poor. Source: Nature.com.
Resistance to antimicrobials is a natural process that has been observed since the first antibiotics were discovered. It occurs when bacterial DNA replicates and is damaged or changed. Most of the time this causes the cell to die, but occasionally the change causes a mutation. The mutated (resistant) bacteria then overtake the original bacteria.

Misuse and overuse of antibiotics gives bacteria more opportunity to adapt and multiply, and therefore more opportunity for mutation and for the development of drug-resistant ‘superbugs’. Antimicrobial resistant-microbes are found in people, animals, food, and the environment (in water, soil and air). They can spread between people and animals, and from person to person.

The six key reasons for the acceleration in resistance are outlined below. Presently scientists do not know the relative importance of each area.

### How antibiotic resistance happens

1. **Lots of germs. A few are resistant**

2. **Antibiotics kill bacteria causing the illness, as well as good bacteria protecting the body from infection**

3. **The drug-resistant bacteria are now allowed to grow and take over.**

4. **Some bacteria give their drug-resistance to other bacteria, causing more problems**

Source: US Center for Disease Control and Prevention, 2017

**Figure 2. Reasons for increasing resistance**

- Over-prescribing of antibiotics and over-the-counter availability
- Patients not taking antibiotics as prescribed (e.g. not finishing course)
- Poor infection control in hospitals and clinics
- Lack of rapid laboratory tests leads to incorrect usage
- Unnecessary antibiotic use in agriculture
- Poor hygiene and sanitation practices

Source: Adapted from US Center for Disease Control and Prevention, 2017
Facing a growing enemy with a largely depleted army
We lack new drugs to challenge superbugs. There are approximately 10 classes of antibiotic, generally divided into ‘first line’ of defence (such as penicillins), medium and ‘last resort’ antibiotics (such as colistin). Each have their own spectrum of bacteria against which they are active. 2016 was a key tipping point in the AMR debate, when news broke that ‘superbug’ bacteria were developing resistance to colistin.

A perfect storm: increased resistance and falling innovation rates
With a growing number of bacteria able to survive in the presence of antibiotics, it becomes increasingly difficult for doctors to cure patients with infections. They grow and reproduce very quickly; for instance the e-coli bacteria double their numbers every twenty minutes. Today, bacteria are resistant to a greater numbers of drugs.

The biggest barriers to finding new classes of antibiotics are not regulatory or financial: they are scientific. There have been negligible research breakthroughs in antibiotics over the last three decades despite significant research. Given that antibiotics are originally derived from naturally-occurring molecules, they are not easy to find, develop, and make commercially viable.

Figure 3. Increased resistance

Figure 4. Number of antibacterial new drug applications, vs year intervals

Source: Nature magazine, December 2015
Source: The Antibiotic Resistance Crisis, Ventola, C., Pharmacy & Therapeutics Journal, April 2015
Sector implications: healthcare industry

Looking at the healthcare industry in particular, the sector has not borne the blame for antibiotic resistance, yet it is the supplier of antibiotics for both human and animal use, and companies could therefore face restrictions on sales of antibiotics. At the same time, the World Health Organisation has declared that “greater innovation and investment are required in the research and development of new antimicrobial medicines, vaccines, and diagnostic tools”7. Most of this will arise from the healthcare industry.

We expect these factors to play out in different ways across the industry, mapped out in Figure 5.

A global declaration signed in 2016 by 80 pharmaceutical and biotechnology companies (the Davos Declaration) called for:
1. Better education on the appropriate use of antibiotics to reduce unnecessary prescriptions by clinicians and overuse by patients and in livestock;
2. Improved access to high-quality antibiotics for all; and
3. Increased investment in the research and development of new antimicrobial treatments. Notably, it also urges governments to support research efforts by committing to funding and improving incentives for new medicines.

The declaration shows the industry firmly positioning itself as a solution, rather than a cause, to the AMR problem, remaining silent on the impacts of fewer antibiotics in the marketplace. It also indicates a shift towards increased research and antibiotic stewardship programmes.

### The challenge facing drugmakers

The total market for antibiotics is around $40 billion a year. While there is opportunity for the development of new antibiotics, the commercial returns on R&D – particularly for developed country markets – have been traditionally unattractive, given (i) the restricted use of the product (short-term and only when absolutely necessary) and (ii) complexities in manufacturing (such as the need for very sterile environments and difficulty in obtaining supply of active ingredients).

### Incentives go beyond fiscal reward

Yet the traditional regulatory hurdles are beginning to dissolve, and various incentives are materialising, for example:

- **$1 billion market entry reward**: the O’Neill Review of Antimicrobial Resistance recommends a market entry reward of $1 billion per drug for effective treatments. The cost of developing, testing, marketing and distributing a drug could easily amount to $1 billion, and therefore this level of reward is needed to provide sufficient impetus for drugmakers. (The award has not yet been adopted).

- **Global Innovation Fund**: the UK and Chinese governments have each already agreed to contribute $72 million to a new Global Innovation Fund, which is likely to grow internationally.

- **Generating Antibiotic Incentives Now (GAIN) Act**: the GAIN Act in the US provides funding and fast-track approval for new antibiotics; it is also extending the period during which drugs can be sold without competition from generics by five years. For example, The Medicines Company developed a new antibiotic that treats a drug-resistant bacterium (CRE), which was awarded $132 million under the GAIN Act and was fast tracked for regulatory approval. While GAIN incentives may not be enough at this stage and despite a shaky start, according to the Government Accountability Office, all ten drug companies who submitted products for fast-track approval so far have reported better communication and facilitation from the Federal Drug Agency (FDA).

- **FDA Priority Review Voucher Scheme**: The US has also implemented a voucher programme for neglected tropical diseases which lays out additional incentives and incorporates drug classes such as antivirals.

- **Our research has identified a list of the companies that currently have new antibiotics in the pipeline. Not all are publicly listed, although face the possibility of being bought by the larger companies.**

### Pricing disruptions

We also sense some regulatory change in the pricing of antibiotics; for example, bundling the cost of antibiotics as an add-on to surgery or oncology treatment. There are a number of possible mechanisms by which antibiotic sales could be re-priced to restrict volumes, and sales incentives to sell antibiotics further restricted. Meanwhile, Ernst & Young has suggested an R&D tax credit for companies, predicting that it could increase R&D spending on antibiotics by over $1 billion over a 10-year period.

Figure 5. Healthcare risk/opportunity spectrum for AMR

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Diagnostic testers</th>
<th>Healthcare services</th>
<th>Drug innovators</th>
<th>Branded antibiotic makers</th>
<th>Generic antibiotic makers</th>
<th>Antibiotic makers with animal focus</th>
</tr>
</thead>
</table>

Source: Schroders

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8 “GAO: Drugmakers want more clarity on antibiotic incentives”, Regulatory Affairs Professionals Society, March 2017.
Incumbent generic leaders face the biggest risks

We have researched the companies with the largest antibiotic sales volumes in the US and assessed whether they already have a strategy on AMR (comparable data outside the US is not available). Several of these companies are predominantly generics manufacturers and we therefore do not expect them to invest heavily in R&D.

However, despite large volumes of antibiotic sales, the resistance threat is not yet upon corporate risk registers or opportunity radars. Given that 70% of the antibiotics used on farms are generics, there are likely impacts on manufacturers supplying to the farming industry if further restrictions are introduced. Depending on the markets into which these manufacturers sell antibiotics for clinical use and prescriptions, there is also likely to be an impact on demand in the medium to long term. Typically the antibiotics market is highly competitive with already low margins. We have conducted our own in-house company research, and the non-profit group Access to Medicines will be releasing an Antimicrobial Resistance Benchmark later this year, which seeks to measure how drug companies are responding to AMR.

Animal health: downplayed effects, but small proportion of sales

In most cases (e.g. Lilly’s Elanco division, or Merck Animal Health), pharmaceutical companies with major animal health divisions have a more varied portfolio and therefore face minimal risk. There are very few pure animal health companies, and our research shows that while some effects may already have been felt, others might be downplayed. Our research has considered both Zoetic Inc and Dechra plc.

Opportunities beyond antibiotics: fighting infection across the healthcare spectrum

Aside from developing novel anti-infectives, we see numerous opportunities for companies providing either alternatives to antimicrobials or peripheral services. Our in-house research has identified a number of investment opportunities, and we provide a top-level overview here.

1) Alternatives to antimicrobials
   
   Vaccines
   
   Taking a 'prevention rather than cure' view, it is clear that the vaccines industry could offset some of the need for antibiotics. Farming practices are developing to make greater use of vaccines than antibiotics.

   The big four vaccine providers, (GSK, Merck & Co, Pfizer and Sanofi) represent around 80% of global vaccine revenues. However, there appears to be little in the way of new vaccine research. Data from the Access to Vaccines Foundation (Figure 6) indicates that 48% of pipeline projects are for adaptations of existing vaccines.

   Probiotics
   
   Prebiotics, probiotics, and enzymes, are among additional technologies which claim to improve the gut health of animals and reduce the use of conventional antibiotics. A clear view of their efficacy has not yet formed; there are similarly-sized bodies of evidence proving and disproving their efficacy. It is particularly unclear whether probiotics work under farming conditions, where they would most likely be used as enhancers to make antibiotics more effective. Despite the uncertainty, the probiotics market is growing fast. Our research note has identified leading companies in this space.

2) Peripheral Services
   
   Diagnostics
   
   There is an existing – and we believe growing – market for diagnostic testing for infections. This ranges from testing whether infections are bacterial, to identifying specific pathogens, testing meat and water, and beyond. For example, the US Center for Disease Control and Prevention has a ‘solutions initiative’ currently underway to increase research into rapidly uncovering food-borne bacteria using whole genome sequencing.

   Cleaning services
   
   Two of the reasons identified for accelerating antibiotic resistance in Figure 2 above related to cleanliness (poor hygiene and poor infection control). While official data is lacking, anecdotal evidence suggests that there is much room for improvement in hospital cleanliness. Our research has identified companies offering differentiated cleaning services, disposable products and infection prevention solutions.

Figure 6. Vaccine adaptations account for half of R&D projects

* Serum Institute of India’s pipeline is based on publicly available sources. It has additional projects for which the data are confidential.

A large body of academic research highlights the farming and food industries’ roles in the AMR challenge, supported by several global public bodies including the UN Food and Agriculture Organization (FAO), US Center for Disease Control and Prevention9, and the World Health Organization10. These organisations are clear that bacteria that becomes resistant in livestock can transfer to humans, either through direct contact with animals, through the food chain, or through the environment (air, water, food crop contamination), and that farms are a source of potential increasing resistance11. Data from FAIRR (Farm Animal Investment Risk & Return) indicates that 80% of all antibiotics used in the US are for animals, nearly half of all antibiotics in the UK, and two thirds in the EU. According to the UN FAO, around 40% of antibiotics are used as growth promoters, with the remainder being used therapeutically for animals12.

There are two main stakeholder drivers behind a u-turn in this approach: consumers and regulators.

Table 3. Regulations and guidelines on antibiotics in farming

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Details</th>
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| EU                            | - Since 2006, several antibiotics banned for growth promotion in farming.  
- Review currently underway of EU Veterinary Medicinal Products and Medicated Feed Regulations. May lead to ban on routine administration of antibiotics to animals (this would make it illegal to treat groups of animals unless disease is diagnosed in at least some individual animals in the flock or herd).  
- Members of the European Parliament have voiced concern that “use of antibiotics should under no circumstances be used to compensate for poor animal husbandry”. [FAIRR; Europa] |
| France                        | - Introduced target between 2013-2016 to reduce use of certain antibiotics by 25%.  
- In 2014, prohibited rebates and discounts on antibiotics and required reporting of antibiotics sold to, and agreements entered into with, certain animal healthcare providers (including veterinarians, veterinary schools, pharmacists and students). Resulted in a 20% drop in the use of certain antibiotics.  
- Launched second plan to reduce AMR between 2017-2021, targeting 50% reduction in use of colistin in farm animals.  
- Plan (known as “EcoAntibo”) also aims to: promote use of alternative treatments (herbal medicine, aromatherapy, phage therapy, etc.); promote awareness on an international level; develop tools for valuing the consequences of AMR. |
| Denmark & Sweden, Germany, Netherlands | - Denmark & Sweden also sharply restricted the use of antibiotics in farm animals.  
- Germany has a new strategy to reduce the use of these drugs in both human medicine and livestock production.  
- The Netherlands has already reduced animal antibiotic use by half. See case study in box below. |
| UK                            | - UK is expected to follow Scandinavia’s lead and set targets of 50mg of antibiotic per kilo of meat, as recommended by the O’Neill review.  
- Currently average use across the EU is three times higher at 152mg per kg, showing significant potential for future reductions in volumes. |
| US                            | - As yet no hard law, but FDA has issued a set of guidelines on antibiotic use in the farming industry, recommending phase-out of medically-important antibiotics used as growth promoters.  
- At January 2017, use of medically important antibiotics in the water or feed of food production animals now requires written authorisation by a licensed veterinarian.  
- Gradually over time, the recommendations will become hard law. This was one of the bills in the 21st Century Cures Act, which was approved in December 2016 and contains several bills related to the marketing and use of antibiotics. |
| China                         | - No regulation, but has committed to ramp up surveillance on both human and veterinary usage – likely the first step towards further action. |
| India                         | - The use of antibiotic growth promoters, and routine prophylactic usage of antibiotics on livestock, is not prohibited.  
- However awareness is growing in the medical field. In February 2017 the Indian Council of Medical Research issued guidelines on antibiotic use, dosage and duration of treatment. |
| Brazil                        | - The use of antibiotic growth promoters, and routine prophylactic usage of antibiotics on livestock, is not prohibited. |

9 “Antibiotic resistance from the farm to the table”, Centre for Disease Control and Prevention website, updated September 2015.  
Stakeholder driver 1: regulators

Given the increasing body of evidence linking antibiotic resistance with farm animal use, policymakers in developed countries are starting to act. Table 3 above shows regulations and guidelines currently in place – we believe the regulatory trend is rising. Box 1 shows how regulation has already had an impact in the Netherlands.

Stakeholder driver 2: consumers are driving change

Consumer awareness of antibiotics in the food chain is increasing. According to surveys in the US conducted by Consumer Reports\textsuperscript{14}, 72% of consumers are very concerned or extremely concerned about the widespread use of antibiotics in food products. The top-listed reason is fear of rising antibiotic resistance and the proliferation of multi-drug resistant superbugs. Trends show a rise in ‘raised without antibiotics’ labelled meat sales, despite declining overall sales of meat in the US.

Case study: regulation in the Netherlands and Denmark: impacts felt from farm to pharma

The use of antibiotics as growth promoters has been banned in the EU since 2006. The Netherlands in 2009 extended that rule by mandating a 50% reduction in total antibiotic usage in farms by 2012 – i.e. including antibiotics for preventative and therapeutic purposes. This was to be achieved through applying defined daily dosages and prescription transparency\textsuperscript{13}.

From 2007 to 2014, antibiotic sales to Dutch livestock farms decreased significantly (see Figure 6).

There is useful data from Denmark to compare the impact on production with or without antibiotic use. When Denmark banned antibiotic growth promoters in pig production (phased in between 1995 and 2000), swine production over the same period increased by 47%. The number of farms in Denmark decreased over the same period, indicating that farms either consolidated or closed. This also suggests that farms with better farm management techniques were able to remain profitable after the ban.

There were upfront costs for Danish farmers and farms initially saw an increase in disease outbreaks. However, overall both Denmark and the Netherlands remain commercial exporters of meat products.

Two important conclusions arise:
- Farms are having to adapt farming practices to make them less reliant on antibiotics, with initial upfront costs.
- Antibiotics producers are experiencing declines in sales volumes.

\textsuperscript{13} “Tackling a crisis for the health and wealth of nations”, Jim O’Neill, December 2014.
\textsuperscript{14} “Entering the ‘Raised without antibiotics’ market”, Food Quality & Safety, 2 March 2016.
Food producers reliant on antibiotics could face additional costs

Reducing antibiotic consumption in swine, cattle, dairy and poultry all have different implications. According to FAIRR, a ban on the routine administration of antibiotics in animals in the US would cost pig producers around $700 million over a 10-year period. Although this would amount to minor costs per animal, (approximately US$4.50 per animal) it would require a change in operating models and would certainly be more expensive for farms that operate under crowded conditions. It would likely also be more expensive for cattle. A re-think in farming methods may be required to keep animals free from infection without the use of antibiotics and this would translate to further costs.

We researched the top eight global meat producers and analysed their stance on antibiotics, and where they were in the journey. It was evident that only those producers aimed at the US market were currently offering, or planning to offer, antibiotic-free meat. Some companies disagreed with antibiotic-free meat, citing it as a “consumer misconception”.

Innovation in farming practices

Bans in Europe have triggered many innovations on the farm, which may have to be adopted more widely.

1. Veterinarians now look at the cause of disease rather than just treating the effect.
2. Farm management: cultures have changed. Many farms now apply a type of ‘total farm management’ programme which includes preventing and specialising the type of treatments.

Consumer impact

It is unclear how much of this would be passed on to the consumer. A Consumer Reports survey found that more than 60% of consumers would be willing to pay at least $0.05 per pound more for meat raised without antibiotics (equating to an additional $6 per pig15), with 40% willing to pay $1 or more per pound.

Feed additive companies could benefit

As well as providing antibiotic-containing products, feed additive companies have significant potential to innovate and expand nutrients. Feed additives such as enzymes, probiotics and essential oils can be used to improve gut health immunity and therefore reduce reliance on antibiotics. They can also be used in combination with antibiotics.

New types of feed ingredient include:
- Organic acids
- Enzymes: especially fytase, xylanase, glucanase
- Probiotics
- MCFAs (medium chain fatty acids)
- Other gut health improvers
- Glutamine, threonine, valine
- Butyrate Beta glucans, immunoglobulins
- Plant extracts
- Thymol, carvacrol

Our research noted the key ingredients suppliers. Those with a proactive approach to developing alternatives to in-feed antibiotics will be best placed to meet the current challenge.

Retailers and restaurants: initial costs but attractive to customers

Given the increased consumer focus on antibiotic-free foods, many US and UK retailers and restaurant groups are already strengthening supply chain policies restricting antibiotic use (e.g. McDonald’s, Tyson, Walmart). Antibiotic-free chicken accounted for 15% of total US chicken sales in 2016; this is predicted to rise to 40% by 202216. Those that are not developing policies face public backlash17. Larger companies with leverage on suppliers will stand to benefit the most across the consumer sector, given that suppliers could absorb much of the cost, although there will be initial costs to monitor suppliers.

It’s not over: lack of awareness in developing markets and little movement on cattle...

While the momentum gains in the developed world, currently there appears to be little consumer appetite for antibiotic-free food in developing markets. Furthermore, while eight out of 10 companies contacted during a research project conducted by FAIRR issued public statements stating they did not support prophylactic use of medically-important antibiotics, none have yet committed to phasing out antibiotics for cattle, which would have much higher cost implications.

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15 Based on 120lbs of meat from one pig.
17 For example, “High street restaurants called out for lagging behind on antibiotic-free meat policy”, the Independent website, February 2017.
Schroders’ influence: engaging on antibiotic stewardship

Healthcare sector
Given the substantial cross-industry investment impacts we have identified, we have sought to understand how companies are approaching and managing AMR risks and opportunities, and encouraging further data disclosure that will enable us to value the impacts in our models. This is vital: the resistance threat is not yet on corporate risk radars for 70% of the 10 companies with the largest US antibiotic sales.

Our engagement questions18 centre on:
– Product areas affected by the AMR trend
– Sales, marketing and pricing disruptions
– Approach to R&D
– In-house knowledge of the latest policy developments
– Impact of the O’Neill review on risk discussions
– Assessment of the collateral impact of AMR on demand for other therapies, devices or treatments which are dependent on antibiotics

Food sector
– Collaborative investor engagement: In the food industry we have supported an engagement initiative led by non-profit organisation Business Benchmark for Farm Animal Welfare (BBFAW). The engagement comprised a range of animal welfare standards including the reduction or elimination of the routine use of antibiotics. The results show progress in this area: 77% of companies in the 2016 benchmark published policies relating to the avoidance of close confinement (versus 72% in 2015) and 47% of companies (versus 39% in 2015) published commitments to reduce or eliminate routine antibiotics use in animals.

– Proxy voting: Resolutions filed by shareholders on AMR have also started to creep into food company AGM ballots this year. The resolutions request timeframes be set on removing non-therapeutic use of antibiotics in meat supply chains. We supported the resolution filed at Sanderson Farms but voted against at McDonald’s given the company is already committed to phasing out antibiotics.

Conclusion: Resistance to antibiotics could undermine the value of many industries

While the AMR challenge is gradual, the impacts are likely to play out more quickly. We do not believe the threats and opportunities have been sufficiently registered by companies. Overall we believe the AMR threat could fundamentally undermine the value of industries tied to conventional antimicrobials, while opening opportunities to companies providing solutions.

Action is needed from investors, regulators, consumers and the agriculture industry. Otherwise, the macroeconomic impacts of taking no action could mark the end of medicine as we know it.

18 Certain questions are credited to “Superbugs and super risks: The investment case for action”, November 2016, compiled by FAIRR, Aviva and Alliance to Save our Antibiotics
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