“Swann song” for routine antibiotic use, 50 years on?

“It is sometimes advocated that an antibiotic should be given to apparently healthy animals with the intention of preventing cases of a specific illness or illnesses which previous experience has suggested may be expected. It is hard to find any excuse in logic or in theory for this practice, and even harder to find any practical evidence that it does any good at all.”

Swann Report 1969

ALLIANCE TO SAVE OUR ANTIBIOTICS

Contents

ALLIANCE TO SAVE OUR ANTIBIOTICS

Introduction

The UK's planned departure from the European Union risks dilution of health protection and environmental standards, despite government reassurances. In particular, the desire to strike trade deals with countries operating to lower standards is highly likely to result in pressure to diverge from EU standards and undercut our current health and environmental protections. One crucial area where this may happen, with possible serious consequences for human health, is the regulation of farm antibiotic use. In 2022, the EU will be introducing much more restrictive rules on the use of farm antibiotics. These will include a ban on preventative group treatments and should ensure that a large part of antibiotic overuse in European farming is ended, after 70 years of lax, ineffective regulations.

Unfortunately, the British government is already giving ambiguous signals about whether it will completely apply all the new rules, and it appears it may seek to avoid implementing the ban on group prevention. The US government, with which the UK hopes to be soon signing free-trade deals covering agriculture, has made its opposition to the new EU legislation much clearer, attacking it as a "thinly veiled barrier to trade"[1].

This report marks the 50th anniversary of the publication of a hugely influential government-commissioned report, the Swann report[2], on how to end the overuse of antibiotics in farming and limit the spread of antibiotic resistance from livestock to humans. It tackled many of the same dilemmas facing regulators today – to support much stricter rules on farm antibiotic use and higher health and welfare standards for animals, or to maximise meat production by allowing routine antibiotic use and the further intensification of livestock farming.

Ultimately the Swann committee chose to compromise. It focused on ending the use of medically important antibiotics for growth promotion, but made no proposals for ending other types of routine use, including preventative group treatments. Because of this the Swann approach failed. Farmers simply switched from using antibiotics for growth promotion to using them under veterinary prescription for disease prevention, and so farm antibiotic use and antibiotic resistance continued to increase.

Despite its clear weaknesses, the Swann report was a ground-breaking report, which highlighted the different ways in which antibiotics could be used and misused on farms and the relevance for human medicine. It also had a major international impact, leading other countries to reconsider how antibiotics were being used on their farms. Swann has effectively formed the basis of European regulation of farm antibiotics ever since.

Now, however, the EU is moving on from the Swann compromise, and will be banning all routine antibiotic use, not just growth promotion. The UK, which once led the way, is in danger of falling behind and becoming the only country in Western Europe that still allows antibiotics to be used for preventative mass medication. British farmers have in recent years made some welcome progress in significantly cutting their antibiotic use by 50% through voluntary action, but increased competition post-Brexit from imports produced to lower standards could undermine and reverse progress if the government is not committed to ending all forms of routine farm antibiotic use.

This report shows how the questions the Swann report grappled with are still relevant today and at the heart of some international disagreement on how to control farm antibiotic use. It explains how the Swann report came to be published and shows how influential it became despite its clear flaws long being clear to many experts.

UK authorities need to draw on the lessons of past failures and regulate to ensure truly sustainable and responsible farm antibiotic use. For this to happen, it is essential that the UK adopts standards that are at least as high as the EU's and that the practice of adding antibiotics to the feed or drinking water of groups of animals, when none of them have been diagnosed as sick, is finally ended.

‘Antimicrobial resistance poses a catastrophic threat. If we don’t act now, any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can’t be treated by antibiotics.’

Former Chief Medical Officer,
Professor Dame Sally Davies

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1

A 50-year old British compromise still at the heart of farm antibiotic regulation

Fifty years ago, in November 1969, a government committee published a landmark report, the Swann report, on the future regulation of farm antibiotics. The government had commissioned the review following an outbreak of antibiotic-resistant Salmonella that had killed six people and which was blamed on the overuse of antibiotics in calf farming. Half a century later the key recommendations it made remain the basis for regulating farm antibiotic use in the UK and in most countries around the world.

The committee showed a good understanding of the different ways in which antibiotics could be misused in farming, and how this threatened human health. In particular, it made very clear that it could see no justification for continuing to feed antibiotics preventatively to groups of healthy animals.

Unfortunately, the committee's final conclusions were less lucid and the result of a compromise between those who wanted firm action and those who still wanted a light regulatory touch. As a result, the recommendations had a major loophole which allowed farm antibiotic use to keep on increasing in the decades that followed.

Swann's most important recommendation was that medically important antibiotics should no longer be permitted for use as growth promoters in order to protect these antibiotics for human treatments. But it proposed no new restrictions on the use of these same antibiotics in animal feed for routine preventative treatments, so long as a veterinary prescription was obtained. The report argued that vets could be relied upon to stop over-prescribing voluntarily, even though legally vets were permitted to profit from prescribing and selling antibiotics to farmers.

Unfortunately, voluntary responsible prescribing did not materialise. Growth-promoting use was gradually replaced by increased use under veterinary prescription for disease prevention and antibiotic use continue to soar and antibiotic resistance became an ever-greater problem. Outbreaks of multi-resistant Salmonella continued, and new superbugs emerged in farm animals and threatened human health.

Scientists are now warning of a possible apocalyptic post-antibiotic era in which common infections and minor injuries can once again prove fatal. The World Health Organisation (WHO) says that the overuse of antibiotics in both human medicine and in livestock farming are key factors contributing to the problem[3]. More so than ever before, overusing and misusing antibiotics in human medicine or farming is seen widely as being unacceptable.

'WHO strongly recommends an overall reduction in the use of all classes of medically important antibiotics in food-producing animals, including complete restriction of these antibiotics for growth promotion and disease prevention without diagnosis. Healthy animals should only receive antibiotics to prevent disease if it has been diagnosed in other animals in the same flock, herd, or fish population.'

WHO 2017

However while politicians and regulators in the UK and abroad often claim to agree that there is a need for more responsible farm antibiotic use, there still remains significant disagreement over what action should be taken to end misuse. Two key developments occurred this year which highlight the different approaches being taken, and show how the Swann report's compromise remains topical and very relevant to the choices facing the UK post-Brexit.

In January, the European Union published new legislation[4] which, on 28 January 2022, will finally ban all routine farm antibiotic use and the use of antibiotics for purely preventative treatment of groups of farm animals. These new rules, which move on from the Swann compromise, could herald a new era for farm antibiotic use, with treatments becoming much more selective and aimed at cases of genuine need. The legislation is likely to be far more effective than earlier EU bans focused only on antibiotic growth promoters.

However, in April an international report, co-authored by the United Nations and other international agencies, on the need to tackle antibiotic resistance and achieve more responsible antibiotic use in human medicine and in farming, had far weaker recommendations[5]. Regarding farm antibiotic use, it merely called for countries to phase out the use of medically important antibiotics as growth promoters, and like Swann fifty years earlier, made no recommendations at ending other forms of routine use, such as preventative group treatments.

As the new European legislation only comes into force after Brexit, it does not automatically apply to the UK, and the government has refused to commit to implementing a ban on group prophlylaxis, suggesting instead that it will only restrict rather than ban such use[6]. On the other hand, the government has fully endorsed the approach of the UN-led body[7].

The European ban on group prevention is in line with an earlier WHO recommendation to end the routine feeding of antibiotics to healthy animals[3]. The WHO, however, has been unable to convince the Food and Agriculture Organisation (FAO) and the World Organization for Animal Health (OIE) with which it works on antibiotic resistance as part of a "Tripartite" that this is necessary. Both the FAO and OIE continue to focus only on phasing out growth promoters[8,9]. Importantly, the US government has expressed strong opposition to the WHO's recommendation and the EU's new legislation[1]. In this, at times, heated debate, the UK government unfortunately appears to want to side with the US and those who wish to avoid regulations they view as merely adding to the production costs of intensive farming.

2

Background to Swann

1949 – Antibiotic growth promotion begins and livestock farming intensifies

After the end of the Second World War, poultry production was increasing in the United States and a new source of protein needed to be found. Farmers tried replacing fish meal with soyabean meal, but soya lacked any vitamin B12 which was essential for chicken growth.

However, scientists working at the American company Lederle had recently discovered a new antibiotic, chlortetracycline, and they knew that the bacteria producing the antibiotic also produced vitamin B12. So they decided to feed chickens on the waste product from the process used to produce chlortetracycline. They saw that the chickens grew much faster than expected, and soon realised that this wasn't because of vitamin B12 but because of the low dose of antibiotic that was still in the waste product.

Within a few months they began selling their product as a source of vitamin B12 for chickens, knowing full well that what they were really providing was vitamin B12 with an antibiotic growth promoter added. When, in 1950, they revealed that their product actually contained chlortetracycline, US regulators just allowed them to continue selling it, without any need for a veterinary prescription, because it seemed to be helping chickens and pigs to grow faster.

The UK soon followed the US example. The 1947 Penicillin Act had restricted access to antibiotics by making them prescription-only drugs in both human and veterinary medicine. This was an early attempt to prevent the spread of antibiotic resistance, which was already well known at the time. But in 1953, seduced by the thought of a post-war increase in meat production, the British government introduced the Therapeutic Substances (Prevention of Misuse) Act. Despite the Act's reassuring name, it legalised the inclusion of very low doses of penicillin in the feed of pigs and poultry, without the need for a veterinary prescription, for the purpose of growth promotion.

During the parliamentary debate, some concerns were raised about antibiotic resistance, but the Health Minister, Iain McLeod MP, assured MPs that the government had received expert advice that "there will be no adverse effect whatever upon human beings"[11].

Just one MP, Colonel Gomme- Duncan, spoke out strongly against growth promoters, asking "May I ask whether we have all gone mad to want to give penicillin to pigs to fatten them? Why not give them good food, as God meant them to have?"[12]

'May I ask whether we have all gone mad to want to give penicillin to pigs to fatten them? Why not give them good food, as God meant them to have?"'

Colonel Gomme-Duncan MP 1953

What was perhaps not anticipated in 1953 was that the routine feeding of antibiotics to farm animals, even at the very low doses used for growth promotion, had a suppressing effect on the diseases to which animals are vulnerable. This meant animals could be kept in greater numbers and at a higher density and savings made on space, labour and cost. As a result, the use of antibiotics ostensibly only for growth promotion enabled the intensification of livestock farming.

Resistance emerges and spreads

By the late 1950s, scientists were finding evidence that, despite previous government assurances regarding the safety of growth promoters, antibiotic-resistant bacteria could spread from farm animals to humans. They found that antibiotic-resistant Salmonella were proliferating on British farms due to antibiotic use, and that farm workers also had high levels of the same strains of the bacteria.

The government decided to establish a committee to re-evaluate existing regulations. It was chaired by the retired President of the National Farmers' Union, Lord Netherthorpe, and met behind closed doors. Although some members expressed concern about antibiotic resistance, those who emphasised the economic benefits of growth promoters won out.

The committee published its report in 1962 and recommended that the use of growth promoters, which up until then had only be legal in pigs and poultry, should be extended to use in calves[13].

However, around the same time, scientists were finding that the dangers of antibiotic resistance spreading were even greater than first thought: scientists in Japan, and then the UK, showed that the genes which made bacteria antibiotic resistant could spread between different bacteria, even between different species of bacteria. Through a process called "horizontal gene transfer", antibiotic-resistant bacteria could produce copies of their antibiotic resistance genes and pass them on to other bacteria which then also became antibiotic resistant.

This meant that if bacteria developed resistance to antibiotics in farm animals, they could be passing their genes on to other bacteria in the human gut.

This completely undermined the argument that if different strains of bacteria were found in farm animals and humans, then it wasn't possible for farm antibiotic use to be relevant to human medicine.

Outbreak of multi-resistant Salmonella linked to intensive calf farming

By 1965, public pressure for greater restrictions on farm antibiotic use was growing. A series of studies lead by Professor E.S Anderson, the Director of the government's Public Health Laboratory Service (PHLS), identified a dramatic increase in human infections by a multi-resistant Salmonella strain called Type 29. This culminated in an outbreak during which six patients died.

PHLS and veterinary research showed that the emergence and spread of Salmonella Type 29 was linked to the introduction of new intensive calf-rearing practices. Calves from dairy farms were being transported to grain-producing regions, often when less than a week old, and were being routinely given a variety of antibiotics to help reduce infections.

Professor Anderson blamed not just the overuse of antibiotics for creating the problem, but the husbandry methods being used, saying, "Infections such as that caused by type 29 can be eliminated, not by the massive use of antibiotics but by improvement in conditions of animal husbandry and reduction in the opportunities for the initiation and spread of the disease"[14].

He called for severe restrictions on farm antibiotic use, including a provisional suspension on their use for growth promotion and disease prevention[15].

3

1969 – Swann report is published

Another review of farm antibiotic regulations had by now become inevitable. In order to reduce pressure on veterinarians, the government's Ministry of Agriculture, Fisheries, and Food (MAFF) pushed for this review to also include prescribing in human medicine, but this was blocked by the Ministry of Health (MH).

However, when it came to the make-up of the committee, MAFF was able to have more influence. Both MAFF and MH opposed Professor Anderson's membership, and MAFF ultimately convinced MH to agree to a membership that was weighted in favour of agricultural interests, comprising of two agriculturalists, three veterinarians and two medical scientists[15]. The committee was chaired by Professor Michael Swann, a public health expert, molecular biologist and vice-chancellor of the University of Edinburgh.

The Swann committee concluded that the misuse of antibiotics in farming did pose a danger to human health. It said that "the administration of antibiotics to animals in ways at present permitted has already caused some difficulties in veterinary practice and has caused harm to human health".

In particular, it said "We agree that the outbreaks of infection due to Salmonella typhimurium phage type 29, described by Dr Anderson, include instances in which human disease and death resulted from multiple-resistant organisms which acquired their resistance through the use of antibiotics in animals."

The report said that antibiotic-resistant E. coli from farm animals also posed a "potential threat" to human health due to the possibility of horizontal gene transfer. We now know that this danger is real as in human strains of disease-causing E. coli, resistance has been found to antibiotics used in farm animals that have never been used in humans, thus proving that transfer occurs.[i]

The Swann committee concluded "Thus it is certain that the use of an antibiotic in animal feed produces large numbers of resistant organisms, including organisms with transferable resistance, and that resistant organisms may be transmitted to man."

The Swann report highlighted instances where it was suspected that both the use of antibiotics as growth promoters, and for disease prevention, had contributed to increasing antibiotic resistance. It pointed out that, despite the earlier Netherthorpe committee recommendation, growth promoters had not yet been licensed in calves. This meant that the fatal outbreak of multi-resistant Salmonella had been due to routine preventative use, not growth-promoting use.

'We agree that the outbreaks of infection due to Salmonella typhimurium phage type 29, described by Dr Anderson, include instances in which human disease and death resulted from multiple-resistant organisms which acquired their resistance through the use of antibiotics in animals.'

Swann Report 1969

[i] One example of this is the emergence of resistance to the antibiotic colistin in E. coli and other infections in humans in China. Colistin is now a last-resort treatment for life-threatening infections in humans, but at the time had never been used in humans although it was used as a growth promoter in China.

Overall, the report was sharply critical of the practice of adding antibiotics to the feed of groups of healthy animals for disease prevention. It said: "It is sometimes advocated that an antibiotic should be given to apparently healthy animals (not known to be in contact with infection) with the intention of preventing cases of a specific illness or illnesses which previous experience has suggested may be expected. It is hard to find any excuse in logic or in theory for this practice, and even harder to find any practical evidence that it does any good at all." It warned against ongoing misuse of preventative antibiotics, saying: "We are convinced that such practice will encourage the emergence of resistant bacterial populations and that both human and animal life may be exposed to unnecessary hazard as a result."

The committee pointed out that in human medicine antibiotics were rarely used for prevention and that "it was recognised that diseases caused by organisms which readily acquire resistance cannot be prevented by antibiotics, and that antibiotic medication of healthy individuals is more likely to create trouble than to prevent it." It said it expected this to be "equally true in animals".

The committee even argued that there was no fundamental difference between using antibiotics for growth promotion and adding them to feed for disease prevention, since it was likely that growth promoters had a preventative effect despite their very low dose, and that preventative doses, which were usually higher but still below normal therapeutic levels, probably had a growth-promoting effect. The report stated: "Since it is impossible to determine the level at which these antibiotics have only a purely growth promotional effect and the level at which they take on a preventive role as well, the definition of such use depends on what is in the mind of the user."

However, despite all of the committee's analysis, it still decided to only recommend restrictions on use for growth promotion. It recommended that only antibiotics which had little or no use in human medicine should be permitted for growth promotion, and only if this did not increase resistance to medically important antibiotics. In particular, it recommended that the medically important antibiotics penicillin and tetracyclines no longer be permitted for use as growth promoters.

Regarding the routine preventative use of antibiotics, the committee recommended that no changes should be made to the law allowing veterinarians to prescribe in this way. It said that while it was certainly true that past prescribing had been "unwise", now that there was greater understanding of this, it was safe to rely on veterinarians' "professional judgement" to achieve wise use of antibiotics.

The Swann committee also highlighted the problems associated with the increasing intensification of farming saying "it now seems certain that the increase in calf salmonellosis was related to the change in the system of calf husbandry which took place at the time". It said that "the development of intensive husbandry has introduced many new problems, partly because the density of animal populations in intensive units is higher than that encountered in older methods of husbandry". It highlighted the problem of animals being unable to avoid ingesting the "excreta of an infected animal", pointing to this as a cause of common intestinal infections.

The committee therefore thought that there was greater potential to reduce animal disease by improving husbandry than there was by using antibiotics routinely. Nevertheless, it made no clear recommendation to make such changes.

So why did the Swann committee not recommend taking more effective action? Historian Dr Claas Kirchhelle of Oxford University says "The answer lies in Britain's corporatist system. The carefully staffed committee had attempted to find an acceptable compromise between demands for absolute safety and unrestricted antibiotic access"[15]. Significantly, Kirchhelle says, "the Swann report's partial AGP [antibiotic growth promoter] ban managed to square the circle by addressing some of critics' concerns while leaving antibiotic-dependent husbandry systems unharmed. Farmers and animal nutritionists could either switch to nontherapeutic AGPs or ask veterinarians, who earned a 50 percent markup charge, for higher-dosed prescription."

These failures to act on husbandry and on the use of antibiotics for disease prevention allowed the growth of antibiotic-dependent intensive-farming practices to continue unimpeded.

‘The development of intensive husbandry has introduced many new problems, partly because the density of animal populations in intensive units is higher than that encountered in older methods of husbandry.’

Swann Report 1969

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4

After Swann

The failure of the Swann recommendations

The government largely accepted the Swann recommendations, and implemented most of them. In 1971 a ban was implemented on using penicillin and the tetracycline antibiotics as growth promoters, but the use of other medically important antibiotics for growth promotion, like the macrolide antibiotics, was allowed, in breach of Swann. Crucially, penicillin and tetracyclines remained available for routine disease prevention on veterinary prescription. A similar policy was also adopted by the European Economic Community.

Some argued that the Swann report was likely to fail for this reason. Ernst Chain, a scientist who had won the Nobel Prize for Medicine in 1945 alongside Alexander Fleming and Howard Florey, for their work on penicillin, said in 1970: "The Swann report has changed nothing essential. [...] The farmer can get hold of exactly the same antibiotics as before, only it is more expensive now because you need a vet's prescription. Of course in all probability more antibiotics will be used. This is what I object to in this report. It is a hypocritical report because nothing substantial is changed"[16].

Initially, the Swann report did appear to have some effect in reducing farm consumption of beta-lactam antibiotics (the penicillin family of antibiotics) and tetracycline antibiotics, but very soon consumption began increasing again. During the 1970s and 1980s, very little reliable data on farm antibiotic use was published, but by the late 1990s when annual publication of data by the government's Veterinary Medicines Directorate began, total consumption had increased over eight-fold compared with the data on consumption in 1967 given in the Swann report, see Table 1[17].

'The Swann report has changed nothing essential. [...] The farmer can get hold of exactly the same antibiotics as before, only it is more expensive now because you need a vet's prescription. Of course in all probability more antibiotics will be used.'

Ernst Chain (Nobel Prize 1945) 1970

Table 1

Total veterinary consumption of beta-lactams and tetracyclines before and after Swann (in tonnes of active ingredient)

	Beta-lactams	Tetracyclines	Total
1967	20	22	168
1996	63	300	533
2018	61	86	226

Meanwhile, antibiotic resistance continued to increase, and in the 1980s and 1990s there were further major outbreaks of multi-resistant Salmonella. In 1993, fluoroquinolone antibiotics, which were a key treatment for food-poisoning infections, were licensed for use in poultry production despite clear warnings it would undermine their effectiveness in human medicine. In 1997, PHLS scientists reported that fluoroquinolone resistance in human Salmonella infections had "increased exponentially" since 1994[18].

The EU ends use of antibiotic growth promoters

In the 1980s, Sweden too was concerned about its levels of antibiotic-resistant Salmonella[19]. Sweden therefore decided to end all antibiotic growth-promoter use in 1986, and it took action to phase out and end routine preventative use too. In the subsequent 30 years, overall Swedish farm antibiotic use fell by 80% and group antibiotic treatments in farming fell by 98%. Individual treatments now account for over 90% of Swedish farm antibiotic use[20].

When Sweden and Finland joined the European Union in 1995, farm antibiotic rules needed to be partly harmonised. Sweden and Finland argued for stricter regulations, but some other Member States wanted even antibiotic growth promotion to continue.

A Swann-type compromise was agreed. Antibiotic growth promotion was phased out between 1999 and 2006, and since 2006 all use of medically important antibiotics has been prescription-only. However, there was again no action at all against adding antibiotics preventatively to the feed or drinking water of groups of animals, despite widespread acceptance that farmers were likely to increase the use of antibiotics in this way.

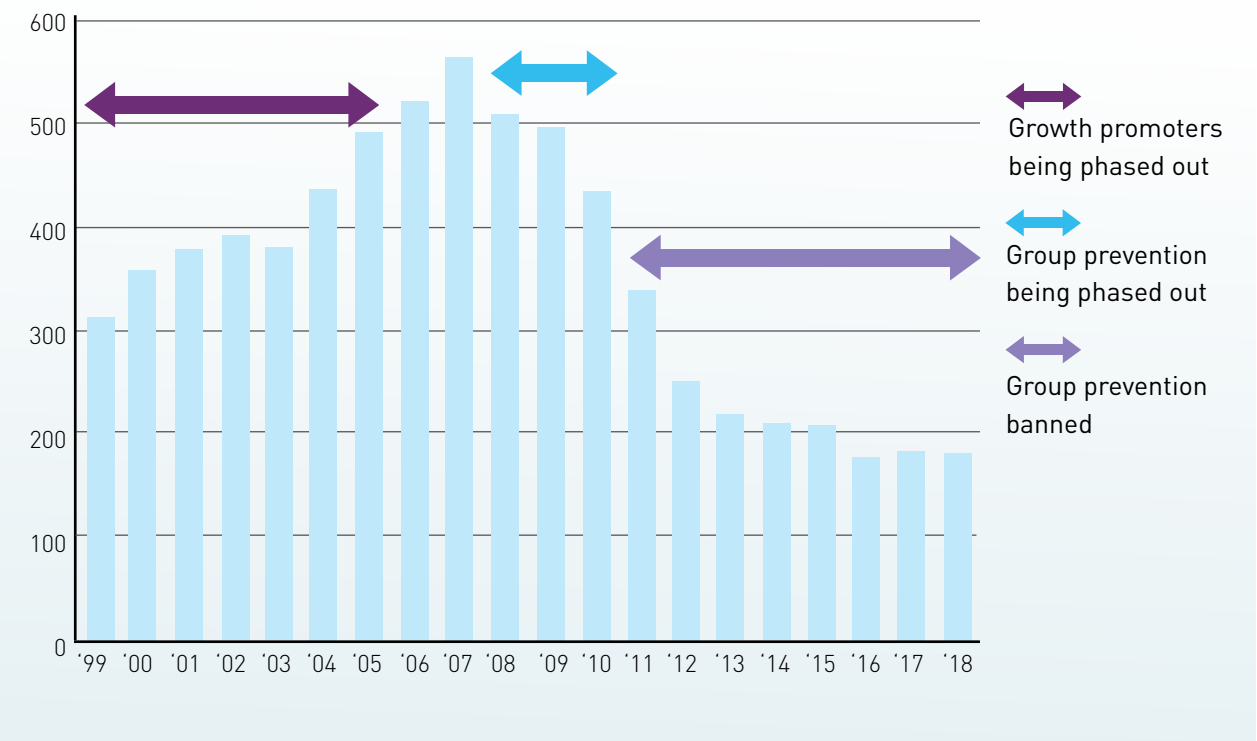
In the UK, farm antibiotic use did fall during the phaseout of the growth promoters, but this was mainly due to a large reduction in the size of the pig industry that was occurring at the time. By contrast, in countries where there was no reduction in animal numbers, the ban appeared to have a minimal impact on total antibiotic use.

In the Netherlands, official data showed that total antibiotic use actually increased throughout the phaseout and achieved a record high in 2007 after all growth-promoter use had been banned. The Dutch authorities, concerned about the continued misuse of farm antibiotics, and the emergence of new superbugs in pigs, poultry and intensively farmed veal calves, such as MRSA[ii] and ESBL E. coli[iii], which were spreading to humans, then decided to ban all preventative group treatments with antibiotics. This ending of routine preventative antibiotic use was followed by a major fall in total antibiotic use, see Figure 1[21].

[ii] Meticillin-resistant Staphylacoccus aureus
[iii] Extended-spectrum beta-lactamase Escherichia coli

Figure 1

Dutch farm antibiotic sales, 1999 to 2018 (tonnes of active ingredient)



Despite the growth promoter ban, group antibiotic treatments still account for about 90% of European antibiotic use, and about 75% in the UK. However, in countries like Sweden, Norway or Iceland where group prevention is banned, antibiotic use is much more targeted and most treatments are of individual animals only.

Cuts in UK farm antibiotic use

In the years after the growth-promoting ban, the problem of antibiotic-resistance in farm animals and humans continued to worsen in the UK. ESBL E. coli and/or MRSA emerged in poultry, pigs and in calves from dairy farms, due to the misuse of the high-priority critically important modern cephalosporin antibiotics, and concerns were raised that this was contributing to the spread of these infections in humans. Last-line reserve antibiotics began to be used in human medicine, as for many infections no new antibiotics had been discovered in 30 or even 40 years.

These issues led the government to commission the Review on Antimicrobial Resistance (also called the O'Neill review). The review published a series of reports in 2015 and 2016, including one calling for significant global reductions in farm antibiotic use.

To its credit, the British livestock industry has accepted the need for change and has taken action. The British Poultry Council (BPC) began collecting and publishing annual data on its antibiotic use in 2012, which helped put pressure on high users to cut their use. In 2016 the BPC announced that it was voluntarily ending all preventative use of medically important antibiotics and all use of the last-resort antibiotic colistin. These restrictions subsequently became part of Red Tractor standards, but only for poultry. These actions have contributed to an 80% cut in the BPC's use of medically important antibiotics per unit of poultry between 2012 and 2018[22].

The pig industry also began collecting voluntary data on its antibiotic use, and this contributed to a 60% reduction in use per pig unit between 2016 and 2018[23]. However, the pig industry continues to oppose a ban on preventative group treatments, and use in pigs remains much higher than in other species.

Overall, farm antibiotic use has been cut by about 50% between 2014 and 2018[17]. However, while ending or reducing preventative mass medication has played a major part, in the case of poultry and pigs respectively, there is little evidence of significant changes to husbandry aimed at improving animal health and welfare and reducing the incidence of disease.

Instead, many poultry and pig farmers have been increasingly relying on alternative treatments that also have antimicrobial properties.

In the case of poultry, intensive farmers are using very large quantities of "coccidiostats". These are antimicrobial substances which are added routinely to poultry feed to control an intestinal disease called coccidiosis. Coccidiosis occurs when chickens ingest chicken droppings, which is unavoidable in intensive systems where tens of thousands of birds are kept permanently indoors in a single shed with a space allowance of less than an A4 sheet of paper per bird.

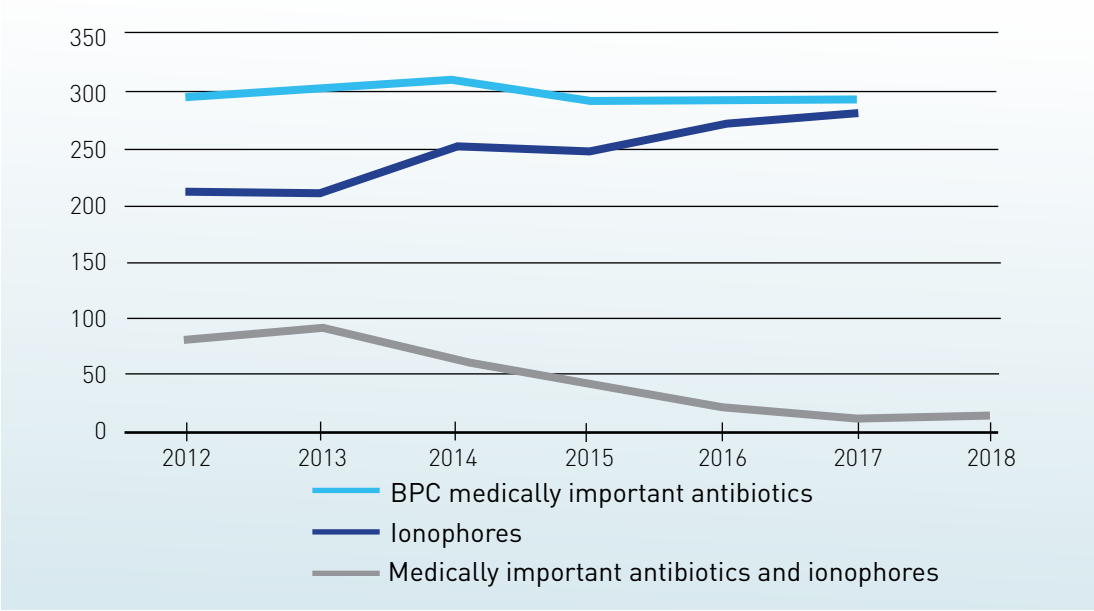
The most widely used coccidiostats are ionophore antibiotics. These antibiotics are not currently used in human medicine due to their toxicity, which is why regulators allow them to be used routinely without any need for a veterinary prescription. There are, however, concerns about their routine use in poultry, including the possibility of harmful residues in food, the environmental impact of spreading poultry manure containing high concentrations of the drugs and the fact that some scientists say these antibiotics could be developed for human medicine in the future[24].

There is also evidence that the use of ionophores can actually increase resistance to medically important antibiotics. In particular, a Norwegian review of the evidence suggested that some ionophores may increase the incidence in poultry of vancomycin-resistant enterococci (VRE), which can cause serious infections in humans[25.] For this reason the Norwegian poultry industry decided to phase out the use of ionophores, and in the two years to 2018 it cut use by 99.5%. Remarkably, the latest Norwegian data showed no VRE could no longer be found in Norwegian chickens, after several decades of the bacteria having being present[26]. This seems to strengthen the case that ionophore use increases the incidence of VRE.

In contrast, ionophore use is now at record levels in the UK poultry industry. Figure 2 shows that total use of medically important antibiotics and ionophores has remained stable since 2012, suggesting that use of medically important antibiotics is being replaced with more ionophore use.

Figure 2

Use of medically important antibiotics and ionophore in UK poultry (tonnes of active ingredient)[17]



In the pig industry, use of zinc oxide as a feed additive is at also record levels, up from 376 tonnes in 2013 to 500 tonnes in 2016[17]. Zinc oxide is used to control post-weaning diarrhoea caused by E. coli, a condition which occurs frequently when piglets are weaned too early. Zinc oxide also selects for resistance to medically important antibiotics, and the use of high concentrations in piglet feed will be banned in the EU in 2022 due to its harmful environmental impact.

5

2019 – Time to move on from Swann

In April of this year, the Interagency Coordination Group on Antimicrobial Resistance (IACG) published its final report providing guidance to UN Member States on how to tackle effectively antibiotic use and resistance in human and veterinary medicine globally. The IACG was established by the UN Secretary General after the 2016 Political Declaration of the High-level Meeting of the United Nations General Assembly on Antimicrobial Resistance, and other international agencies and individual experts were represented on the committee.

Like the Swann report 50 years earlier, the IACG report stated that the use of antibiotics for growth promotion and routine prevention both contributed to avoidable antibiotic resistance in livestock, and it expressed concerns about the scale of livestock production saying: "The use of antimicrobials to promote growth and routinely prevent disease in healthy animals and crops without appropriate indication and in the absence of good agricultural practices to prevent infectious diseases on farms are further contributing to the development and spread of antimicrobial resistance."

Unfortunately, in a similar way to Swann, the IACG recommendations focused only on growth promotion with medically important antibiotics, calling for this to be phased out, without any target date being set. No recommendations were made to end routine preventative use or to improve animal husbandry.

In contrast, the EU has decided to move beyond just focusing on growth promoters. New legislation will prohibit all forms of routine antibiotic use in farming, including preventative group treatments, on 28 January 2022. The legislation took years to negotiate, but knowledge that much greater restrictions were coming is likely to have already contributed to European countries cutting farm antibiotic use by 32% in five years[27]. Further reductions are expected in coming years as routine antibiotic use is phased out.

The European Union has also recognised that good animal husbandry is important to minimising infections, and the European Medicine Agency and European Food Safety Authority have even stated that some intensive-farming systems may need to be phased out in order to achieve sustainable levels of antibiotic use. Unfortunately, the EU has yet to produce legislation aimed at significantly improving husbandry.

Practices such as weaning piglets very early, keeping very high densities of animals permanently indoors, or using very fast-growing chickens which are more prone to health problems are all known to contribute to avoidable antibiotic use, but still remain legal in the EU and the UK.

6

Conclusion

The Swann committee was highly critical of the misuse of antibiotics in farming, and saw no valid justification for preventative mass medication. Ultimately it stopped short of recommending a ban on the practice, choosing to rely on voluntary action and hoping that greater awareness would lead to more responsible use.

However, those who forecast that the Swann recommendations would fail were proven correct. The effect of the Swann report in reducing farm antibiotic use was short lived and very soon prescribing for routine disease prevention increased to replace any banned growth promotion use.

In the past few years, voluntary industry action has finally had an effect and farm antibiotic use has had its first significant fall since the Swann era. But use still remains far higher than it was at the time of the Swann report, and the current decreases could be threatened if post-Brexit the UK decides to undercut EU regulations and to open the British market to imports produced to much lower standards and with very high antibiotic use. Increased competition from such cheap imports may convince some farmers to reverse their voluntary cuts in antibiotic use.

To avoid this happening, the government should implement a complete ban on preventative mass medication as a step towards sustainable and responsible farm antibiotic use. It should also work to ensure that imports are produced to at least the same standards as those imposed on British farmers.

To truly achieve sustainable use, however, the government also needs to introduce measures aimed at improving animal health and welfare, the other factor overlooked in the Swann recommendations.

The pig and poultry industry have made major reductions in their antibiotic use in recent years, but they remain very heavily reliant on alternative, unsustainable routine medication. The reason for this is that so many intensively farmed animals are kept in stressful conditions, permanently indoors, in high numbers with poor air quality, and so they are sick all too frequently. Only by raising animals in healthy conditions, where they are not exposed to high number of bacterial and viral infections, can we expect to be able to avoid reliance on excessive antibiotic or other veterinary treatments.

Further reading

"Swann Song: Antibiotic Regulation in British Livestock Production (1953–2006)" by Dr Claas Kirchelle of Oxford University, https://muse.jhu.edu/article/698175/pdf

This is a history of British farm antibiotic regulation from the legalisation of growth promotion in 1953 to the EU growth-promoter ban in 2006, with extensive discussion of the Swann report's origin and fate and of how the UK's traditional laissez-faire arrangements struggled to cope with the risk posed by bacterial resistance.

References

[1] Food Chemical News, 2018. US trade official slams EU antibiotic trade rules at NCC meeting, https://iegpolicy.agribusinessintelligence.informa.com/PL218190/US-trade-official-slams-EU-antibiotic-farm-rules-at-NCC-meeting?vid=Agri

[2] Swann *et al.* 1969, Report of the Joint Committee on the use of Antibiotics in Animal Husbandry and Veterinary Medicine

[3] WHO 2017, Stop using antibiotics in healthy animals to prevent the spread of antibiotic resistance, https://www.who.int/news-room/detail/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance

[4] REGULATION (EU) 2019/6 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on veterinary medicinal products and repealing Directive 2001/82/EC

[5] IACG, No Time to Wait, https://www.who.int/antimicrobial-resistance/interagency-coordination-group/final-report/en/

[6] Eustice, 2018, reply in Parliament, https://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2018-10-08/176052/

[7] HM Government 2019, Tackling antimicrobial resistance 2019–2024, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784894/UK_AMR_5_year_national_action_plan.pdf

[8] FAO 2016, THE FAO ACTION PLAN ON ANTIMICROBIAL RESISTANCE 2016-2020, http://www.fao.org/3/a-i5996e.pdf

[9] OIE – RESOLUTION No. 36 Combating Antimicrobial Resistance through a One Health Approach, https://www.oie.int/fileadmin/Home/eng/Our_scientific_expertise/docs/pdf/AMR/A_RESO_AMR_2016.pdf

[10] US Department of Agriculture 2017, USDA Chief Scientist Statement on WHO Guidelines on Antibiotics, https://www.usda.gov/media/press-releases/2017/11/07/usda-chief-scientist-statement-who-guidelines-antibiotics

[11] Hansard 1953, Therapeutic Substances (Prevention of Misuse) Bill, https://api.parliament.uk/historic-hansard/commons/1953/may/13/therapeutic-substances-prevention-of

[12] Hansard 1953, Pig Fattening (Penicillin and Aureomycin), https://api.parliament.uk/historic-hansard/commons/1953/feb/19/pig-fattening-penicillin-and-aureomycin#S5CV0511P0_19530219_HOC_215

[13] Netherthorpe *et al.* 1962, Report of the Joint Committee on Antibiotics in Animal Feeding

[14] Anderson 1968, Drug resistance in Salmonella typhimurium and its implications, British Medical Journal

[15] Kirchelle 2018, Swann Song: Antibiotic regulation in British livestock 1953-2006, Bulletin of the History of Medicine

[16] Mennie 1970. Report of the proceedings of the symposium at the Royal Society of Medicine, sponsored by Cyanamid

References

[17] Veterinary Medicines Directorate data

[18] Threlfall *et al* 1997, Increasing incidence of resistance to trimethoprim and ciprofloxacin in epidemic Salmonella typhimurium DT104 in England and Wales, Eurosurveillance

[19] Report from the Commission on Antimicrobial Feed Additives, Stockholm 1997. Antimicrobial feed additives

[20] Swedish Veterinary Antibiotic Resistance Monitoring

[21] Monitoring of Antimicrobial Resistance and Antibiotic Usage in Animals in the Netherlands

[22] BPC 2019, Antibiotic Stewardship Report 2019, https://www.britishpoultry.org.uk/bpc-antibiotics-report-2019/

[23] NPA 2019, NPA welcomes significant reduction in antibiotic use in pigs, http://www.npa-uk.org.uk/NPA_welcomes_significant_reduction_in_antibiotic_use_in_pigs.html

[24] Antoszczak and Huczyñski 2019, Salinomycin and its derivatives - A new class of multiple-targeted "magic bullets", European Journal of Medicinal Chemistry

[25] VKM 2015, The risk of development of antimicrobial resistance with the use of coccidiostats in poultry diets, Opinion of the Panel on Animal Feed of the Norwegian Scientific Committee for Food Safety

[26] NORM-VET 2019, Usage of Antimicrobial Agents and Occurrence of Antimicrobial Resistance in Norway

[27] European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) 2019, Sales of veterinary antimicrobial agents in 31 European countries in 2017

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"In some farming systems, much reliance is placed on the routine use of antimicrobials for disease prevention or for the treatment of avoidable outbreaks of disease, such that these systems would be unsustainable in the absence of antimicrobials. The stress associated with intensive, indoor, large scale production may lead to an increased risk of livestock contracting disease."

European Food Safety Authority and European Medicines Agency 2017

Published November 2019

The Alliance to Save Our Antibiotics is an alliance of health, medical, environmental and animal welfare groups working to stop the over-use of antibiotics in animal farming. It was founded by the Soil Association, Compassion in World Farming International and Sustain in 2009. Its vision is a world in which human and animal health and well-being are protected by food and farming systems that do not rely routinely on antibiotics and related drugs.

COMPASSION in world farming

sustain the alliance for better food and farming

Soil Association