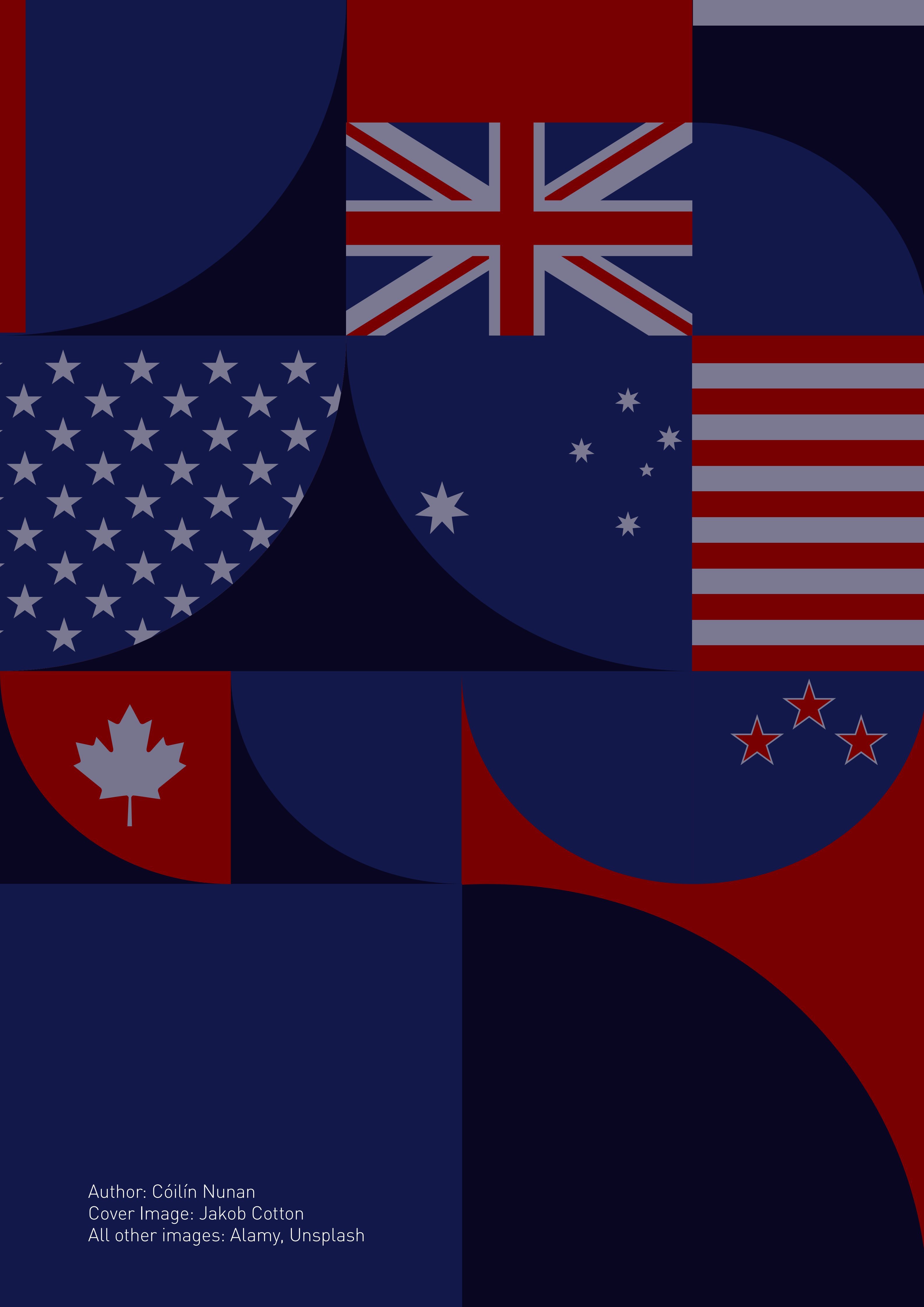
NOVEMBER 2020

FARM ANTIBIOTICS AND TRADE DEALS

– could UK standards be undermined ?

ALLIANCE TO SAVE OUR ANTIBIOTICS



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1 SUMMARY

A large majority of the UK's imports of meat and dairy currently come from the European Union. However, the government is seeking to negotiate new trade agreements with a number of countries, including the US, Canada, Australia and New Zealand. It is therefore important to understand if meat and dairy in these countries meet the same health and safety standards, and in particular antibiotic standards, which are currently required in UK or EU production.

This briefing examines the levels of farm antibiotic use in these countries and the regulations which govern the use of antibiotics in livestock. We have used available official sources on farm antibiotic sales and, where possible, have converted the data into a form that is comparable with UK and EU usage levels.

Our analysis shows that per tonne of livestock unit:

- total farm antibiotic use in both the US and Canada is about 5 times higher than in UK livestock.
- antibiotic use in US cattle is about 7 times as high as use in UK cattle, use in US pigs is over twice as high as in UK pigs. No comparable species data is available for Canada.
- antibiotic use in Australian poultry is over 16 times higher than in UK poultry and use in pigs is nearly three times

higher than in UK pigs. No precise data is available for Australian cattle and sheep, but use in these species appears to be low.

We also found that farm antibiotic sales increased in each of these countries in the last year for which data is available:

- Farm antibiotic sales increased by 9% in the US in 2018 compared with 2017
- Farm antibiotic sales increased by 6% in Canada in 2018 compared with 2017
- Farm antibiotic sales increased in Australia in 2010, the last year for which data is available, by 11% compared with 2008 (no reliable data is available for 2009)
- Farm antibiotic sales increased by 3% in New Zealand in 2017 compared with 2016.

In contrast, farm antibiotic use in the EU has fallen in recent years. Average European farm antibiotic sales fell by 3% between 2017 and 2018, by 17% between 2016 and 2018 and by 35% between 2011 and 2018. UK farm antibiotic sales fell by nearly 50% between 2014 and 2018, but increased again by 5% in 2019.

In January 2022, the EU will ban the importation of all meat and dairy produced with antibiotic growth promoters, but it is still not clear whether the UK will implement this legislation. The legislation could have implications for trade with these four countries. All of them have ended the use of antibiotics they consider medically important as growth promoters but continue to use other antibiotics for growth promotion, unlike the EU and the UK which have banned all growth promoters.

The US uses a variety of antibiotics as growth promoters. This includes bacitracin, an antibiotic used in human medicine which the World Health Organization classifies as medically important. There is also some evidence that the use of bacitracin in livestock could increase resistance to colistin, an antibiotic of last resort used in humans to treat serious life-threatening infections which are not treatable with other drugs. The US also currently uses Carbadox as a growth promoter despite this antibiotic being shown to be carcinogenic in laboratory animals. The US also uses the antibiotic bambermycin as a growth promoter. Bacitracin, Carbadox and bambermycin are not permitted to be used in UK or EU livestock.

Australia permits the use of the antibiotics avilamycin, bambermycin and olaquindox as growth promoters. Avilamycin is a member of a family of antibiotics which has been considered for use in human medicine, whereas olaquindox is considered genotoxic and possibly mutagenic. Bambermycin is also permitted to be used as a growth promoter in New Zealand. None of these antibiotics are permitted to be used in EU or UK livestock.

All four countries allow the use of ionophore antibiotics as growth promoters. These antibiotics are widely used in poultry in the UK and the EU, but are only licensed for controlling a disease called coccidiosis and are not permitted for growth promotion. Although they are not currently used in human medicine, some scientists have suggested that they could be used in the future for treating infections like Clostridium difficile and MRSA.

In January 2022, the EU will ban all routine antibiotic use, including all preventative group treatments, but the UK government has not committed to implementing a similar ban. In contrast, the US, Canada, Australia and New Zealand still permit routine antibiotic use, including for preventing diseases caused by poor husbandry.

The US, Canada, Australia and New Zealand all permit the use of hormone growth promoters implants in cattle, something which is banned in the UK and the EU. Hormone implants often also contain an antibiotic as an active ingredient to prevent an infection at the implant site. The most widely used antibiotic for this purpose is tylosin, an antibiotic classified by the WHO as a high-priority critically important antibiotic.

To prevent the importation of meat and dairy produced to low standards and with routine antibiotic use, the UK must maintain its ban on the importation of beef produced with growth hormones and introduce a ban on the importation of all foods produced with antibiotic growth promoters. Furthermore, in order to help achieve lower and more responsible farm antibiotic use, it should implement the EU ban on routine antibiotic use and on preventative group treatments and phase out the importation of meat and dairy produced with these type of treatments.

2 INTRODUCTION

Since formally leaving the European Union, the UK has begun trade talks with a number of countries, such as the US, Canada, Australia, New Zealand and Japan [1]. The government's desire to set up new trading relationships with non-European countries has however raised concerns that there may be negative consequences for UK food and farming standards since regulations within the EU are often tighter than elsewhere in the world.

This is in particular true in the case of regulations governing farm antibiotic use. One the 28 January 2022 the European Union will be banning all routine farm antibiotic use, including all preventative group treatments. This is a long overdue development aimed at achieving more responsible and limited antibiotic use in livestock farming. The knowledge that this change is coming appears aleady to be contributing to falling levels of farm antibiotic use in Europe [2]. Unfortunately, the British government has so far refused to commit to fully implementing these bans on the misuse of antibiotics in British farming [3].

As this report shows, a failure to maintain and improve standards, coupled with a shift from importing EU-produced meat to importing cheaper meat from countries such as the US, Canada or Australia may have significant consequences for the levels of antibiotic resistance being spread via the food chain.

Farmers and environmental campaigners have been calling for a commitment to avoid lowering standards for imports to be enshrined in law. However, the House of Commons has rejected amendments to the Agriculture Bill aimed at giving legal status to current standards. The government has argued that such amendments were unnecessary as ministers had already committed to ensuring that UK food standards would be kept in any post-Brexit trade agreements [4].

The government says that existing EU rules, such as banning imports of chlorine-washed chicken or of hormone-treated beef, or pig meat, poultry meat and beef from animals treated with the growth-promoting chemical ractopamine, will be automatically written into UK law once the post-Brexit transition period ends on 31 December 2020 [5]. A spokesperson for the government recently said that "Chlorinated chicken and hormone-injected beef are not permitted for import into the UK. This will be retained through the EU Withdrawal Act and enshrined in UK law at the end of the transition period" [6].

The use of growth-promoting hormones in cattle farming has consequences for routine antibiotic use, as explained in this report. Hormone implants given to cattle also often contain an added antibiotic to prevent infection at the implant site. The antibiotic which is most widely used in this way is classified as a high-priority critically important in human medicine by the World Health Organization (WHO). Using such an important antibiotic for purely production purposes is a clear misuse of antibiotics which should no longer be tolerated by regulators worldwide.

The international trade secretary, Liz Truss, and the environment minister, George Eustice, have however attempted to provide further reassurance in a recent article they wrote for the Daily Mail newspaper, in which they said that the Trade and Agriculture Commission, an advisory board set up to advise and inform the government on trade policy, would be made a statutory body which would provide reports to Parliament on the impact on animal welfare and agriculture of any new trade deals. They said that the government had also tabled an amendment to the Agriculture Bill which would bolster parliamentary scrutiny of free-trade

* This amendment ensures that the government has a duty to report to Parliament on whether, or to what extent, commitments in new Free Trade Agreements relating to agricultural goods are consistent with maintaining UK levels of statutory protection in relation to human, animal and plant life and health; animal welfare; and environmental protection. However, the amendement does not give Parliament new powers to block any trade deal.

agreements* [7], [8]. Truss and Eustice said "Chlorinated chicken and hormone-injected beef are already banned in the UK, and we will not negotiate to remove that ban in a trade deal."

This commitment appears to rule out a lifting of these particular bans via a trade deal, but it is not an unequivocal commitment that these standards will not be dropped since it is possible that developments other than a trade deal could lead to the bans being lifted. In the case of hormone-treated beef for example, a ban on importing such meat could be challenged at the World Trade Organisation by exporting countries.

In fact, a Food Standards Agency document obtained by Greenpeace through a Freedom of Information request [9] reveals that government officials believe that any continuing UK ban on the importation of meat produced with growth-promoting substances, such as hormones in cattle or beta agonists which are widely used in pigs or cattle in countries such as the US, Canada, Australia and New Zealand may be challenged at the World Trade Organisation (WTO). The WTO has previously ruled that the US and Canada have the right to impose sanctions on the EU for banning the importation of hormone-treated beef since the WTO concluded that the EU did not have a sufficiently strong scientific basis for banning the produce.

During the longstanding US-EU dispute over the use of growth hormones, the UK has consistently opposed the EU's scientific position [10]but nevertheless agreed to implement the EU ban. In particular, the government's Veterinary Products Committee (VPC), an advisory committee to the government's Veterinary Medicines Directorate (VMD), has twice disagreed with the EU's assessment of the dangers to human health of using growth-promoting hormones in livestock[11]. In its second report, published in 2006, the VPC found that it was "unable to support the conclusion of the EU Scientific Committee on Veterinary measures relating to Public Health (SCVPH), that risks associated with the consumption of meat from hormone-treated cattle may be greater than previously thought" [12].

If countries like the US and Canada were to challenge the UK ban on importing hormone-treated beef, it is not clear the government would retain the ban if the VMD's position on the science was to support the US/Canada position.

A further concern is that the US continues to use an antibiotic for growth promotion which is classified by the World Health Organization as important in human medicine, and the US, Canada, Australia and New Zealand all use other antibiotics for growth promotion which are not at present used in human medicine. Some of these growth-promoting antibiotics may be used in human medicine in the future.

The EU will be banning the importation of meat and dairy products produced with growth-promoting antibiotics in January 2022 and it is important that the UK also implements this legislation.

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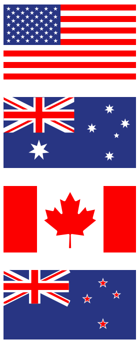


LEVELS OF FARM ANTIBIOTIC USE IN THE US, CANADA, AUSTRALIA AND NEW ZEALAND

In order to make the data on farm antibiotic use comparable between different countries, the size of the different livestock populations needs to be taken into account. To do this, the EU has introduced a unit for measuring livestock populations called the "Population Correction Unit" (PCU) (see Annex 1 for further information on how to calculate the PCU).

Each year, the European Medicine Agency publishes data from over 30 European countries which is given in terms of mg of active ingredient of antibiotic per kg of PCU [2]. The UK also publishes its data in the same format [13].

However, outside of Europe, only some countries currently use the PCU unit for measuring their livestock populations. Others, however, may publish sufficiently detailed information on their livestock numbers to enable the PCU to be calculated. Furthermore, some countries publish detailed information, by species, on their farm antibiotic sales, whereas others publish more limited data.

Below we examine the available data in the US, Canada, Australia and New Zealand.

3.1 Farm antibiotic sales in the US

The US Food and Drug Administration (FDA) publishes annual data on the sales of antibiotics for use in livestock, see Table 1.

Table 1 US farm antibiotic sales 2009 to 2018 (in tonnes of active ingredient) [14]

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
7,687	8,229	8,256	8,897	9,193	9,479	9,702	8,356	5,559	6,036

In 2018, US sales of farm antibiotics was 9% higher than in 2017 although there was still a 38% reduction in use compared with 2015. The fall in antibiotic use between 2015 and 2017 is very probably due to the FDA's decision to phase out the use of most medically important antibiotics for growth promotion between 2014 and 2016. However, the resumption of increasing use in 2018 may be due to an increase in routine preventative antibiotic use, which remains legal in the US. In comparison, UK farm antibiotic use has fallen by 50% between 2014 and 2018, but increased again by 5% in 2019 [14].

The US does not use the PCU but does publish data on its livestock population which has meant that we have been able to calculate the PCU. It also publishes data on antibiotic sales by species for most species. In an earlier report of ours [15], we calculated the PCU for each species, and published US usage levels in a format which was comparable with European statistics.

Table 2 Antibiotic sales the US in 2018 compared with sales in the UK in 2019 (mg of antibiotic per kg of PCU)

	US	UK	US/UK ratio
Pigs	258	110	2.3
Chickens	25	17	1.5
Turkeys	426	42	10.1
Cattle	161	22–24	7
All food animals	160.7	31	5.2

Table 2 shows that total US farm antibiotic use per PCU is over 5 times higher than in the UK and is 7 times higher for cattle and over 10 times higher for turkeys.

The particularly large difference in antibiotic use in cattle between the two countries is likely to be at least in part due to the more industrial-type farming systems used in US cattle farming in comparison to the UK and raises concerns about the ways in which US beef is produced and the potential dangers it may pose to consumers. Antibiotic use in US pigs and turkeys is also at very high levels.

3.2 Farm antibiotic sales in Canada

Canada publishes annual farm antibiotic sales data in terms of mg per kg of PCU. Some data is also published on usage by animal species, but this does not use the PCU method and the available information does not enable us to calculate species statistics using the PCU method.

Similarly to the US, Canada has recently ended the use of medically important antibiotics for growth promotion, and from December 2018 farmers need to obtain a veterinary prescription for using medically important antibiotics. This action may have contributed to a fall in use from 170 mg/kg in 2014 to 150 mg/kg in 2018 [16]. However, between 2017 and 2018 use actually increased by about 6%.

At 150 mg/kg, Canadian farm antibiotic use is nearly 5 times higher than British use (31 mg/kg) per livestock unit.

3.3 Farm antibiotic sales in Australia

Australia does not have good surveillance of its farm antibiotic use. Unlike nearly all European countries and the United States, Australia does not publish data on its farm antibiotic use annually. In fact, the most recent data on Australian farm antibiotic use is contained in a report published in 2014 by the Australian Pesticides and Veterinary Medicines Authority (APVMA), which only gives information on the sales of veterinary antibiotics between 2005 and 2010 [17]. Antibiotic sales were higher in 2010 than in each year between 2006 and 2009, but slightly lower than in 2005. According to the official report, there may have been underreporting in 2009.

Table 3 Farm antibiotic sales in Australia, 2005–2010, in tonnes active ingredient [17]

2005–06	2006–07	2007–08	2008–09	2009–10
655	571.5	580	481.5	644

Australia does not use the PCU method, but for pigs and poultry it publishes sufficiently detailed information for the PCU to be calculated. For cattle and sheep the information on antibiotic sales and animal numbers is not sufficiently detailed, but an estimate can nevertheless be given. We have not been able to calculate an estimate of total use in terms of the PCU.

In Annex 2 below we provide the detailed calculations of the PCU for various Australian species and produce data on antibiotic use by species. These are given in Table 3.

Table 3 Antibiotic sales in Australia in 2010 compared with UK sales for 2019 (mg of antibiotic per kg of PCU)

	Australia	UK	Australia/UK ratio
Pigs	293	110	2.7
Poultry	299	18	16.6
Cattle*	5–8	22–24	0.2–0.4

* The values for antibiotic use in Australian cattle are just Alliance estimates based upon incomplete information.

Despite having very high levels of antibiotic use in pigs and poultry, Australia is ahead of the UK and the EU in one key area of farm antibiotic regulations: it does not permit the use of fluoroquinolone antibiotics in any farm animals. These antibiotics are classified as high-priority critically important antibiotics by the WHO [18]. Fluoroquinolones are important antibiotics for treating serious food-poisoning infections in humans, and as a result of the lack of use of these antibiotics in livestock in Australia, much lower levels of fluoroquinolone resistance are found in Australian campylobacter infections than in the UK or the EU [19].

Australia also does not use 4th generation cephalosporin antibiotics in livestock, which are also classified as high-priority critically important in human medicine.

3.4 Farm antibotic sales in New Zealand

New Zealand publishes annual data on its farm antibiotic sales and the most recent data is for 2017. However it does not produce a full breakdown by species. New Zealand also does not use the PCU method so we are unable to directly compare with UK usage levels.

The available data shows that farm antibiotic sales in New Zealand increased by 3% between 2016 and 2017 and by 9% between 2014 and 2017, see Table 4.

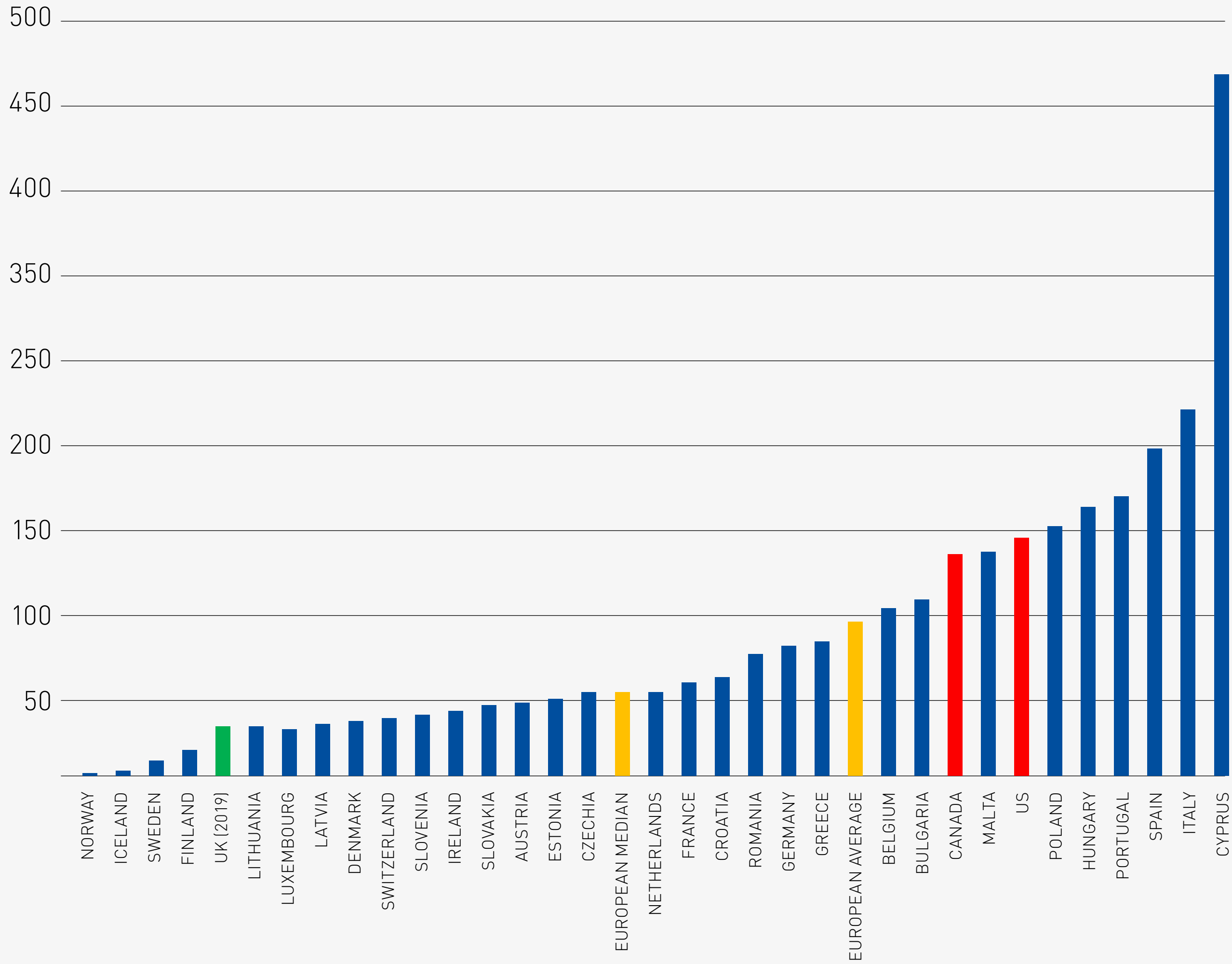
Table 4 Farm antibiotic sales in New Zealand (in tonnes of active ingredient) [20]

2014	2015	2016	2017
64.4	64.4	68.3	70.4

3.5 European farm antibiotic sales compared with sales in the US and Canada

All EU countries are required to collect data on the sales of farm antibiotics and the results are published annually by the EMA 2. The latest EMA report provides data for sales in 2018.

Graph 1 Farm antibiotic sales in the US, Canada and Europe (mg per kg of PCU) in 2018 and in UK in 2019

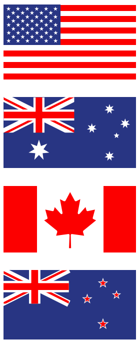


As Graph 1 shows, very large differences in antibiotic use exist between the lowest users in Europe (Norway 2.9 mg/kg, Iceland 4.9 mg/kg and Sweden 12.5 mg/kg) and the highest users (Cyprus 466.3 mg/kg, Italy 244 mg/kg and Spain 219.2 mg/kg).

- In most European countries, antibiotic use is higher than in the UK (31 mg/kg) but lower than in the US (161 mg/kg) and Canada. In particular:
- median European use is 57 mg/kg and average European use is 103.2 mg/kg*, whereas use in the US is 160.7 mg/kg and in Canada it is 150 mg/kg. So US farm antibiotic use is 2.8 times higher than the median use in European countries and 56% higher than the average use throughout Europe. Canadian use is 2.6 times higher than median European use and 45% higher than average European use.
- out of 31 European countries, only 6 had higher farm antibiotic use than the United States and Canada. Countries with higher farm antibiotic use per livestock unit than the US are Cyprus, Italy, Spain, Portugal, Hungary and Poland. Twenty five European countries have lower farm antibiotic use than the US.

Average European farm antibiotic sales fell by 3% between 2017 and 2018, by 17% between 2016 and 2018 and by 35% between 2011 and 2018. In contrast, whereas US and Canadian farm antibiotic sales fell between 2015 and 2017, they increased again in 2018, in the US by 9% and in Canada by 6%.

* The median is the value which lies at the midpoint such that half of European countries are above it and half below. The average is a weighted average taking into account the different sizes of livestock populations in different European countries.



4 USE OF ANTIBIOTIC GROWTH PROMOTERS IN THE US, CANADA, AUSTRALIA AND NEW ZEALAND

On 1 January 2006 the UK and the EU banned the use of antibiotics as growth promoters and made antibiotics prescription only. The legislation applies to all antibiotics, whether or not they are currently being used in human medicine.

Furthermore, on the 28 January 2022 the EU will also ban the importation of animal foods produced with antibiotic growth promoters [21]. It is however unclear whether the UK will also introduce a similar ban.

On the other hand, the US, Canada, Australia and New Zealand have weaker regulations governing the use of growth promoters. All four countries have implemented some restrictions, some of which are voluntary, aimed at ending the use of most antibiotics as growth promoters. However, these countries all continue to use certain antibiotics, which they consider medically unimportant, as growth promoters.

4.1. Use of antibiotic growth promoters in the United States

The US Food and Drug Administration asked pharmaceutical companies to voluntarily withdraw antibiotics they considered medically important from use as growth promoters by 1 January 2017. The companies complied with the request, however certain antibiotics licensed for growth promotion including one which is used in human medicine.

Bacitracin is an antibiotic which is used in human medicine for topical treatments and is classified by the World Health Organization as medically important [18]. Bacitracin is nevertheless licensed as a growth promoter in chickens, pigs and turkeys in the US [22]. The use of bacitracin as a growth promoter could select for bacitracin-resistant bacteria which transmit to humans through the food chain.

In addition, in 2018 scientists from the US, Japan and China found that a gene which makes bacteria resistant to another antibiotic, colistin, also makes the bacteria resistant to bacitracin [23]. Colistin is an antibiotic used as a last resort in human medicine for treating certain highly antibiotic-resistant and life-threatening infections. It is classified by the WHO as high-priority critically important in human medicine [18]. The finding that a colistin-resistance gene can make bacteria resistant to bacitracin means that the use of bacitracin could select for colistin resistance. For this reason the scientists who made the discovery said that the use of bacitracin in livestock production should be reconsidered and use minimised to prevent the spread of colistin resistance. Furthermore scientists in Brazil isolated E. coli bacteria from chickens that were resistant to colistin even though they had not been fed the antibiotic. They said this suggested some other factor was selecting for colistin resistance. The chickens were fed bacitracin (and some other antibiotics) [24].

The toxic antibiotic Carbadox is currently used as a growth promoter in pigs in the US [22]. It has been completely banned from use in EU and UK food production since 1999 as it has been shown to be carcinogenic and genotoxic in laboratory animals [25]. The US FDA accepts that it is carcinogenic and its Centre for Veterinary Medicine recommended in July 2020 that it no longer be permitted for use in food production because it could not be sure that residues did not remain in meat [26]. However the proposed ban is currently opposed by the US pig industry and has not yet been finalised [27]. Imports of US pork containing Carbadox residues could be a threat to human health.

The antibiotic bambermycin is used as a growth promoter in pigs and poultry in the US 22. This antibiotic was banned in livestock in the EU when growth promoters were banned in 2006.

Antibiotics in the ionophore family of antibiotics, called monensin and lasalocid, are licensed as growth promoters in cattle [22]. Monensin is also licensed to increase milk production in dairy cows. Ionophores are widely used in poultry worldwide, including in the UK and the EU, to control a disease called coccidiosis. However, these antibiotics are not permitted for growth promotion in the UK or the EU. Some scientists have suggested that ionophores could possibly be used in human medicine in the future for treating infections such as Clostridium difficile and MRSA [28].

4.2 Use of antibiotic growth promoters in Canada

Medically important antibiotics can no longer used for growth promotion in Canada [29]. However, some ionophore antibiotics (monensin and lasalocid) are licensed as growth promoters in cattle [30]. Monensin is also licensed to increase milk production in dairy cows.

4.3 Use of antibiotic growth promoters in Australia

In Australia there is still no statutory ban on antibiotic growth promoters but in December 2017 the livestock, veterinary pharmaceutical and animal feed industries voluntarily agreed to the removal of label claims for growth promotion from antimicrobials of importance to human health [31]. However, numerous antibiotics which are not currently used in human medicine are still licensed as growth promoters.

Avilamycin is used as a growth promoter in Australian chickens [32]. It is in the Orthosomycin family of antibiotics, and another antibiotic in this family, called evernimicin, has previously been considered for use in human medicine. According to the WHO, both antibiotics possess activity against bacteria like Clostridium difficile and staphylococci [18]. This could be undermined by the continued use of avilamycin as a growth promoter. Regarding the orthosomycins WHO has said that "with increasing emergence of multi-drug resistance among Gram-positive organisms to multiple potent antimicrobials, the need for new antibiotics is more urgent than ever before." Avilamycin was banned by the EU as a growth promoter in 2006 and is no longer licensed to be used in any form in livestock in the EU or the UK.

The toxic antibiotic Olaquindox is used as a growth promoter in Australian pigs [32]. This antibiotic was banned from all use in UK and EU livestock in 1999 partly because it is genotoxic and possibly mutagenic [25].

The antibiotic bambermycin (also called flavomycin) is used as a growth promoter in poultry, pigs and cattle in Australia. It is not currently used in human medicine but since bambermycin and other antibiotics in the same family are active against certain human pathogens and have low toxicity, it has been suggested that they could be used for human therapy in the future [33]. Bambermycin was banned as a growth promoter in the EU in 1999 and is no longer permitted to be used in livestock in the UK or the EU.

Ionophore antibiotics (monensin and salinomycin) are licensed for use as growth promoters in cattle, pigs and sheep and for increased milk production in dairy cows.

4.4 Use of antibiotic growth promoters in New Zealand

New Zealand does not permit the use of antibiotics considered medically important for growth promotion. However, some antibiotics which are not currently used in human medicine are used for growth promotion.

The antibiotic bambermycin is used as a growth promoter in poultry [34]. Several ionophore antibiotics (lasalocid, monensin and salinomycin) are also used as growth promoters in pigs and cattle and for increased milk production in dairy cows.

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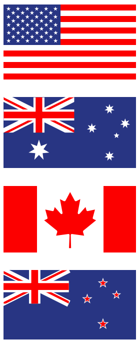


ROUTINE USE OF ANTIBIOTICS WITH HORMONE GROWTH PROMOTERS

The US, Canada, Australia and New Zealand all permit the use of hormones as growth promoters in cattle, although this practice has been banned in the UK and the EU since 1987 due to health concerns.

Six different hormones are widely used as growth promoters: oestradiol, testosterone, zeranol, progesterone, trenbolone acetate and melengestrol acetate [35]. They are often administered as subcutaneous implants in the animal's ear.

To prevent infection at the implant site, implants containing oestradiol, testosterone, progesterone and trenbolone often have an antibiotic included as an active ingredient [36]. See Figure 1.

Figure 1 Label of hormone growth promoter with high-priority critically important antibiotic added to prevent infection at implant site [36]

Product Name: ELANCO COMPUDOSE-G WITH TYLAN GROWTH AND FINISHING IMPLANTS FOR STEERS AND HEIFERS

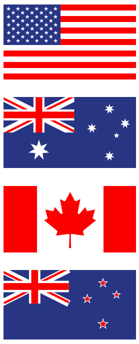
APVMA Approval No: 60373 / 125096

Label Name:	ELANCO COMPUDOSE-G WITH TYLAN GROWTH AND FINISHING IMPLANTS FOR STEERS AND HEIFERS
Signal Headings:	PRESCRIPTION ANIMAL REMEDY KEEP OUT OF REACH OF CHILDREN FOR ANIMAL TREATMENT ONLY
Constituent Statements:	Each implant (4 pellets) contains: 29 mg TYLOSIN TARTRATE 60 mg TRENBOLONE ACETATE 12 mg OESTRADIOL This product contains a palpable marker. This product must only be supplied in accordance with Division 4.2 of the Agvet Code Regulations (Supply of Hormonal Growth Promotants).
Claims:	FOR IMPROVED GROWTH PROMOTION IN PASTURE FED STEERS AND HEIFERS. TYLAN IS INCLUDED AS A LOCAL ANTIBACTERIAL TO REDUCE THE INCIDENCE OF ABSCESS FORMATION CAUSED BY TYLOSIN SENSITIVE ORGANISMS AT THE IMPLANT SITE.

The antibiotic most widely used in this way is tylosin, which is one of the macrolide family of antibiotics. Macrolides are classified by the WHO as high-priority critically important antibiotics in human medicine, due to their importance in treating food-poisoning infections like Campylobacter and Salmonella and due to the clear evidence that the overuse of macrolides in livestock has led resistance in human infections.

Another antibiotic which is sometimes included as an ingredient in hormone growth-promoting implants is oxytetracycline, a member of the tetracycline family of antibiotics [37]. Tetracyclines are very widely used in human medicine for treating a range of infections, and are classified as highly important in human medicine by the WHO [18].

When implanting growth-promoting hormones in cattle's ears, an antibiotic is also sometimes used to coat the implanting needle to prevent infection [38]. This too is an unacceptable use of antibiotics for production purposes.



6 ROUTINE USE OF ANTIBIOTICS FOR DISEASE PREVENTION AND TO COMPENSATE FOR POOR HUSBANDRY PRACTICES

Antibiotics are widely used through the world for routine disease prevention in livestock. Often antibiotics are permitted to be used for treating or preventing diseases which routinely occur as a result of poor husbandry practices, particularly in intensive farming systems. This occurs in the UK, the EU and elsewhere.

However, an important new piece of European legislation, which comes into force on the 28 January 2022, will ban all routine use of antibiotics in livestock farming, including all purely preventative group treatments, throughout the EU. Unfortunately, the British government has not committed to implementing the legislation in full 3.

The new European legislation also says that antibiotics will no longer be able to be "used to compensate for poor hygiene, inadequate animal husbandry or lack of care or to compensate for poor farm management" 21. These new European rules have the potential to contribute to improvements in animal husbandry, aimed at improving animal health and welfare and reducing the need for medication. The knowledge that these changes are coming has already contributed to reductions in farm antibiotic use in Europe, see section 2.1.

The WHO has also produced guidance recommending that the routine preventative use of antibiotics should be ended [39]. Unfortunately, Zealand the US has strongly opposed the WHO's guidance and has also been very critical of the new EU regulations, claiming they are just a "a thinly veiled reason to create a trade barrier" [40], [41].

In contrast to developments in the EU, there are no plans to end routine preventative treatments in the US, Canada, Australia or New, and antibiotics remain licensed for the treatment and prevention of diseases caused by poor husbandry. Some of the diseases caused by inadequate husbandry which are controlled with antibiotics include:

- Respiratory and intestinal diseases, such as necrotic enteritis, in poultry caused by intensive systems [42]and infections caused by stresses such as beak trimming [43].
- Respiratory and intestinal diseases in pig intensive farming, including in particular post-weaning diarrhoea which is exacerbated by early weaning [44].
- Liver abscesses in feedlot cattle receiving a unnatural diet with high levels of grain and little roughage and intestinal diseases in cattle caused by the stress of transportation to feedlots [45]. As mentioned above, antibiotics are also routinely used to control infections caused by hormone implants [46].

ANNEX 1
THE POPULATION CORRECTION UNIT

As explained by the government's Veterinary Medicines Directorate (VMD): "The Population Correction Unit (PCU) is a theoretical unit of measurement developed by the European Medicines Agency (EMA) in 2009 and adopted across Europe. It takes into account a country's animal population over a year, along with the estimated weight of each particular species at the time of treatment with antibiotics. Although it is an estimation it does enable year-on-year comparisons to be made and trends to be seen.

The PCU is a technical unit which estimates the average animal weights at time of treatment. The EMA takes into account that the majority of antibiotics are used in young animals. Therefore, the weight used is likely to be below final weight at slaughter" [47].

The PCU weights are given below (this image is taken from a VMD document) [47]:

Slaughter cows	425 kg
Slaughter heifers	200 kg
Slaughter bullocks and bulls	425 kg
Slaughter calves & young cattle	140 kg
Imported/exported cattle for slaughter	425 kg
Imported/exported for fattening	140 kg
Livestock dairy cows	425 kg
Slaughter pigs	65 kg
Imported/exported pigs for slaughter	65 kg
Imported/exported pigs for fattening	25 kg
Livestock sows	240 kg
Slaughter broilers	1 kg
Slaughter turkeys	6.5 kg
Imported/exported poultry for slaughter	1 kg
Slaughter sheep & goats	20 kg
Imported/exported sheep & goats for slaughter	20 kg
Livestock sheep	75 kg
Living horses	400 kg
Slaughtered fish based on liveweight	- - kg
Slaughter rabbits	1.4 kg

Adjustments need to be made to the PCU to take into account animals exported to, and imported from the country during the year in question. The PCU weight of imported animals get subtracted from the PCU total, and PCU weights of exported animals get added.

ANNEX 2
CALCULATION OF AUSTRALIAN ANTIBIOTIC USE PER KG OF PCU

The Australian Bureau of Statistics (ABS) provides data on the number of animals of each species that are slaughtered each year [48]. This enables us to calculate the total PCU for Australian pigs and poultry, but unfortunately the cattle slaughter data is insufficiently detailed to enable calculation of the PCU.

Antibiotic use in Australian pigs

For pigs, ABS data shows that 4,617,000 were slaughtered in 2010. In addition, data from the Australian Pig Annual shows that there were 231,675 sows in Australia in 2010 [49]. Data from the Food and Agriculture Organisation shows that in 2010 Australia exported 249 live pigs and imported none [50].

From this we can calculate the total PCU for Australian pigs:

Pig PCU= (4,617,000*65)+(231,675*240)+(249*65) kg =355,723,155 kg = 356 thousand tonnes.

According to the APVMA report, 104.2 tonnes of active ingredient of antibiotics were used in pigs in 2010. This means that use in Australian pigs was:

Australian antibiotic use in pigs = 104.2/355.7 g/kg = 293 mg/kg.

Antibiotic use in Australian poultry

According to ABS data, 512,169,600 chickens were slaughtered in Australia in 2010 and FAO data shows that 698,000 live chickens were exported with none being imported.

According to a report prepared for the Department of Agriculture, Fisheries and Forestry, in 2009 there were approximately 5.2 million turkeys slaughtered.

From this information we can estimate Australian poultry PCU in 2010:

Poultry PCU 512,169,600+698,000+(5,200,000 *6.5) kg = 547 thousand tonnes

According to the APVMA report, 163.1 tonnes of active ingredient of antibiotics were used in poultry in 2010. This means that use in Australian poultry was:

Australian antibiotic use in poultry = 163.1/547 g/kg = 299 mg/kg

Antibiotic use in Australian cattle and sheep

According to the APVMA report, 49.7 tonnes of antibiotics were used in Australian cattle and sheep in 2010 (excluding coccidiostats). This is not broken down between cattle and sheep. Furthermore Australian cattle slaughter data is insufficiently detailed to enable an accurate calculation of the total PCU.

Nevertheless, based on an approximate calculation of the PCU, we can deduce that use in Australian cattle and sheep averages somewhere between 5 mg/kg and 8 mg/kg. This level is a low level as use in sheep in the UK is estimated to be about 11 mg/kg and use in cattle around 17-20 mg/kg. In comparison in US cattle is 161 mg/kg.

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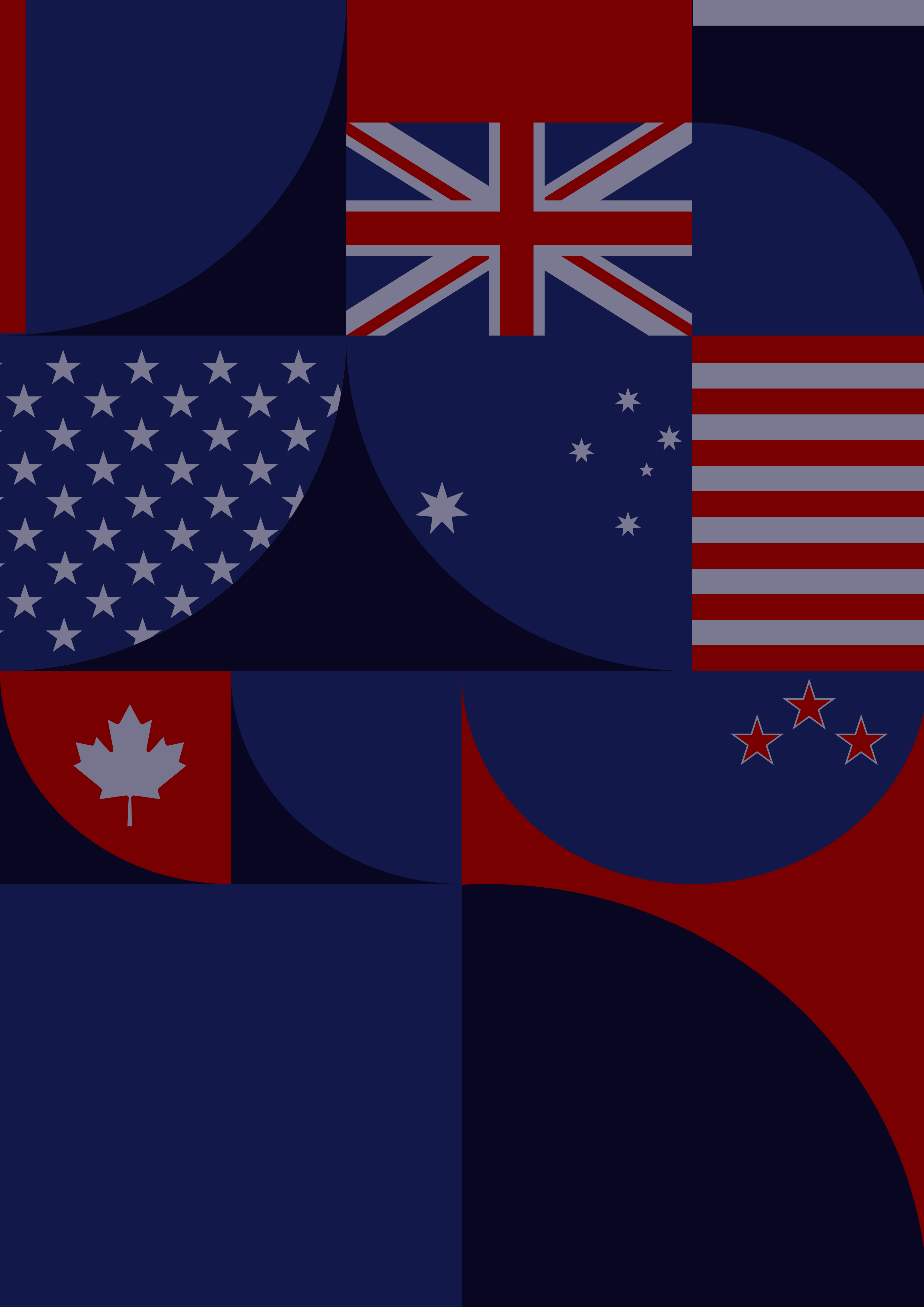

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