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MEMO

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A DECADE OF DECLINING SALES OF ANTIMICROBIALS FOR ANIMALS IN EUROPE

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Main conclusion

Antimicrobials for the treatment of livestock in 25 EU/EEA countries decreased by 46.5% from 161 mg/PCU in 2011 to 86 mg/PCU in 2021. By 2021, one third of the European Commission reduction target was reached. The target is 59 mg/PCU for 2030, corresponding to a 50% decline from 2018. In Denmark, antimicrobial sales declined to 33 mg/PCU in 2021 and consumption of the critically important antimicrobials for livestock has been close to zero for several years.

Abstract

The latest ESVAC report is based on the sale of antimicrobials for total livestock production in 31 European countries in 2021. Furthermore, the report describes the development in antimicrobial sales after 2010 in 23 EU countries as well as Norway and the UK (25 EU/EEA countries). The main figure show that

- In 2021, antimicrobial consumption across the 31 countries was 84 mg/PCU, a 4.9% decline from 89 mg/PCU 2020.
- For the 25 EU/EEA countries that continuously reported data to ESVAC between 2011 and 2021, overall sales decreased by 46.5%, from 161 mg/PCU to 86 mg/PCU (Figure 1).
- In Denmark, the antimicrobial sales decreased from 47 mg/PCU in 2011 to 33 mg/PCU in 2022.

The European Commission has adopted the Farm to Fork Strategy, setting a target for the reduction of overall EU sales of antimicrobials for farmed animals and in aquaculture. The target consumption level is 59.2 mg/PCU by 2030, corresponding to a 50% decline compared to the 2018 level (118.3 mg/PCU). In the 27 EU member states, antimicrobial consumption was reduced to 96.6 mg/PCU in 2021, corresponding to approximately one third of the reduction according EC target. According to ESVAC, antimicrobial consumption in Denmark reached 33 mg/PCU in 2021, corresponding to a 10% decline compared to 2020. Thus, the consumption in Denmark is significantly below the average in European countries (96.6 mg/PCU), and well below the EU's target of 59 mg/PCU for 2030.

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Background

ESVAC (The European Surveillance of Veterinary Antimicrobial Consumption) under the European Medicines Agency (EMA), publishes an annual report on the veterinary antimicrobial consumption for animals in Europe [1].

The latest ESVAC report is based on the sale of antimicrobials for total livestock production in 31 European countries in 2021. The report also describes the development of antimicrobial sales after 2010 in 23 EU countries as well as Norway and the UK (25 EU/EEA countries).

The EU has set a target for the development of veterinary antimicrobial consumption in the EU countries of a 50% reduction in 2030 compared to 2018, i.e., a reduction from 118 mg/PCU to 59 mg/PCU.

Materials and Methods

Antimicrobial consumption is reported from each EU country at antimicrobial class and product form level. ESVAC calculates the consumption in mg/PCU, that is, the amount of active substance (antimicrobial) corrected for changes in the animal husbandry over time. The unit PCU (population correction unit) is used to correct for developments in the size of the animal population across animal species. PCU is calculated in "kg biomass", but this "biomass" is estimated very differently for different animal species and is not comparable across species. Furthermore, there is a very large difference between different animal species with regard to the need for antimicrobial treatment. Consequently, the differences between countries to a high degree reflect different compositions of the livestock population.

Prospective improved statistics from ESVAC

To improve the comparison between countries, ESVAC has a goal of calculating the antimicrobial consumption in doses per animal (or biomass) for each animal species (as in DANMAP, MARAN and some other national reports). Therefore, in 2016, ESVAC published measurement units in doses (DDDvet) for all veterinary antimicrobials [2], which is more appropriate (than mg) for comparisons across different antimicrobials. However, measuring consumption in DDDvet is possible only when antimicrobial consumption from all countries is reported by animal species. Therefore, ESVAC published guidance on the collection of standardized data at animal species level in 2018 [3].

Results and Discussion

Regarding the overall antimicrobial sales for livestock, the ESVAC report indicates,

- In 2021, antimicrobial consumption across the 31 countries fell by 4.9% to 86 mg/PCU.
- In the 25 EU/EEA countries which have reported annually since 2011, the antimicrobial sales have declined by 46.5%, from 161 mg/PCU in 2011 to 86 mg/PCU in 2021 (Figure 1).
- In Denmark, the antimicrobial use in livestock decreased from 47 mg/PCU in 2011 to 33 mg/PCU in 2022.

In the 27 EU member states, antimicrobial consumption was reduced to 96.6 mg/PCU in 2021, corresponding to approximately one-third of the reduction according to the objective. Noteworthy, Denmark is already significantly below the EU's target of 59 mg/PCU in 2030.

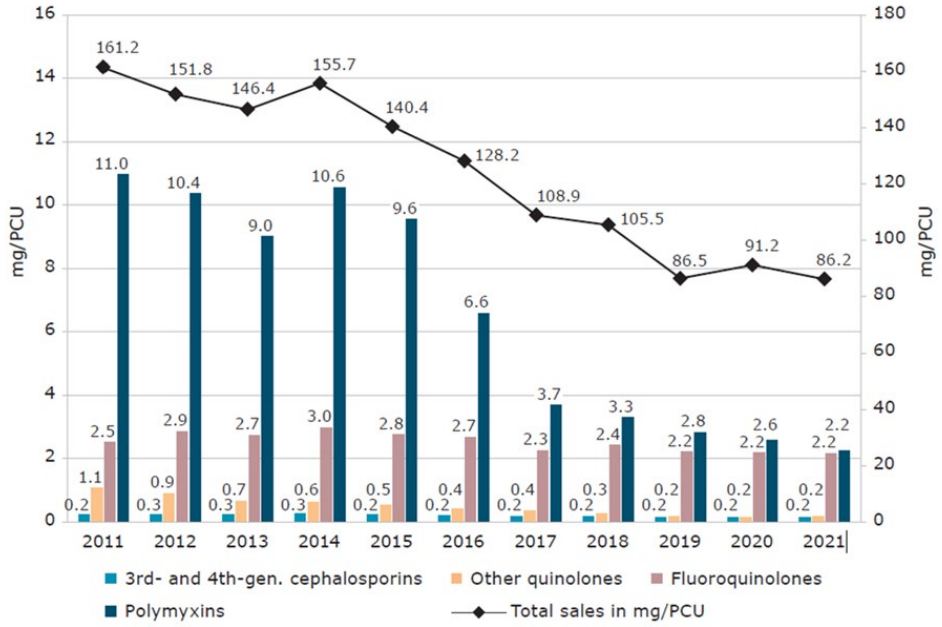

Figure 1. Trends of aggregated overall sales, sales of 3rd- and 4th-generation cephalosporins, other quinolones, fluoroquinolones and polymyxins, in mg/PCU, for the 25 EU/EEA countries reporting data for ESVAC from 2011 to 2021.

From ESVAC[1] (Figure 15). Note the different scales of the two y-axes.

Differences in livestock and antimicrobial consumption between countries

Antimicrobial consumption varies greatly between the individual countries (2.5-297 mg/PCU). ESVAC emphasizes that the unit mg/PCU is not suitable for comparison between countries, partly due to large differences in animal populations, which is why differences between countries must be interpreted with great caution. Nevertheless, the differences can give an impression of an approximate level of the total antimicrobial consumption for animals in the different countries. Generally, the more equivalent the composition of the livestock population, the less biased is the comparison.

ESVAC data indicates that antimicrobial sales for Danish livestock reached 33 mg/PCU in 2021, corresponding to a 10% decrease from 2020, and is significantly below the average in European countries (84.4 mg/PCU). Only in 11 of the 31 European countries is the antimicrobial sales below 40 mg/PCU The of antimicrobial use is significantly lower in the other Nordic countries, mainly due to the demographic differences in the livestock, as well as antimicrobial policies and campaigns. The animal husbandry in these countries is dominated by animal species that typically have a very low need for antimicrobial therapy, including especially sheep and beef cattle. Norway is at the very bottom due to a very large fish production in cold waters, where antimicrobials are largely not used.

Antimicrobial consumption in livestock in Denmark is much lower than most other countries with comparable livestock demographics, i.e., where a large pig production constitutes a large proportion of the livestock (Figure 2). Among these pig producing countries, only Austria and the Netherlands has an antimicrobial usage almost as low as Denmark. The slightly higher antimicrobials consumption in the Netherlands compared to DK is caused by the large import of calves from dairy producers in other EU countries.

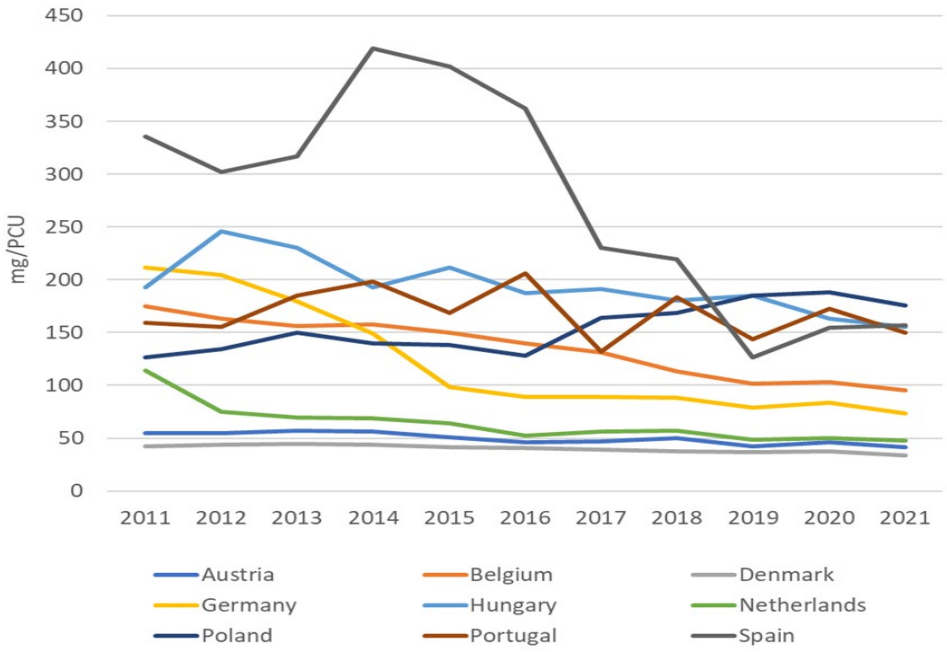

Figure 2: Trends in antimicrobial sales in countries with a relatively large[a] pig production

a) The pig production comprises >30% of the countries PCU and more than 1% of the European pig production (in PCU). Data from ESVAC [1]

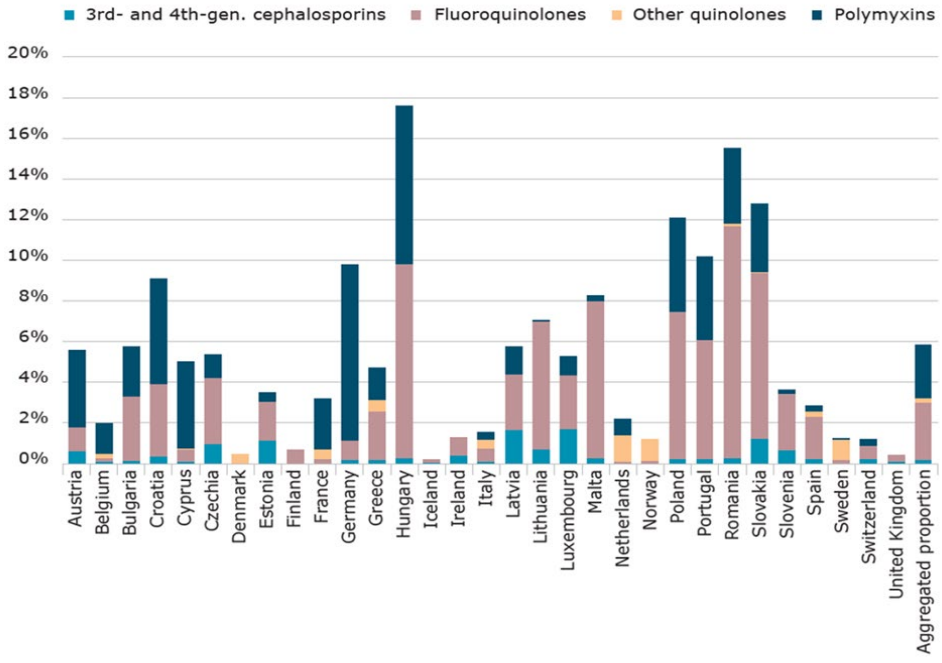

Figure 3. Proportion[1] of sales of 3rd- and 4th-generation cephalosporins, fluoroquinolones, other quinolones and polymyxins of total sales, in mg/PCU, of antimicrobial VMPs for food-producing animals in 31 European countries in 2021.

Figure from ESVAC **[1]** (Figure 6). Variations between the countries should be interpreted with great care due to the large differences in dosing schemes between these classes/subclasses of antimicrobials, and differences in total mg/PCU.

Critically Important Antimicrobials

The antimicrobials designated as critically important by the EMA ad hoc advisory group (AMEG gr. B) include the 3rd and 4th generation cephalosporins, fluoroquinolones, other quinolones and polymyxins (colistin).

Denmark, Finland, Iceland, Sweden and Norway have the lowest consumption of the critically important antimicrobials in Europe, - apart from "other quinolones", which are used in aquaculture in Denmark and Norway (Figure 3). “Other quinolones” are mainly used in the Netherlands and Norway, where it makes up just over 1% of the total antimicrobial consumption.

The sales of critically important antimicrobials (AMEG gr B) have declined by 46.5% since 2011 in the 25 EU/EEA countries (Figure 1): The decline amounts to 38% for 3rd and 4th generation cephalosporins, 14.2% for fluoroquinolones, 83% for other quinolones and 80% for polymyxins (colistin). Measured in kg antimicrobial, the consumption of colistin has decreased the most, but still accounts for 2.6% of the total sales of antimicrobials for livestock. The 3rd and 4th generation cephalosporins make up only 0.15% and polymyxins 0.18% of the total antimicrobial consumption. The use of fluoroquinolones has decreased only slightly and is still high in some countries – between 3.4-14.8 mg/PCU in Bulgaria, Spain, Slovakia, Romania, Portugal, Poland, and Hungary. In comparison, the sale of fluoroquinolones for production animals in DK amounts to 0.003 mg/PCU.

Antimicrobial resistance data supports the observed trends

Data on antimicrobial resistance in bacteria from animals are collected by the European Food Agency (EFSA)[4]. Resistance data reflect antimicrobial use over a longer period. A very low level of resistance to the critically important antimicrobials in indicator *E. coli* from Danish pigs reflects that the consumption of these has been very low for many years in DK, and a similar pattern is seen for the other Nordic countries. In contrast, a much higher incidence of resistance is seen to fluoroquinolones in many other countries. Tetracycline resistance, on the other hand, is widespread in coliform bacteria from Danish pigs - but at a significantly higher occurrence of resistance is observed in many other countries that have higher consumption of tetracyclines, especially other countries with large pig production. A marked decrease in antimicrobial consumption in many other countries since 2010 (e.g., the Netherlands) is also reflected in a decreasing incidence of resistance. Thus, the occurrence of resistance in *E. coli* from Dutch pigs has decreased to the same level as in DK. The resistance figures thus underpin the above conclusions regarding the consumption of antimicrobials in DK compared to other European countries.

Conclusion

Sales of antimicrobials for the treatment of livestock has almost halved from 2011 to 2021 in the 25 EU/EEA countries which have reported to ESVAC since 2011. In these countries, antimicrobial consumption has decreased to 86 mg/PCU on average. The antimicrobial sales are slightly higher in the 27 EU countries, but the sales have declined from 188 mg/PCU in 2018 to 96.6 mg/PCU in 2021. This reduction corresponds to 1/3 of the target for reduction from 116 mg/PCU in 2018 to 59 mg/PCU in 2030. In Denmark, the sale of antimicrobials for production animals decreased to 33 mg/PCU in 2021, i.e., significantly below the EU's target for 2030.

The consumption of the critically important antimicrobials for Danish livestock has been close to zero for a number of years, which is reflected in the low incidence of resistance to these antibiotics in Danish pigs (and other livestock). In the 25 EU/EEA countries, consumption of the critically important antibiotics has also been reduced by 46% since 2011, but consumption varies considerably between countries, and fluoroquinolones and polymyxins are still widely used in some countries.

References

[1] European Medicines Agency, European Surveillance of Veterinary Antimicrobial Consumption, 2022. 'Sales of veterinary antimicrobial agents in 31 European countries in 2021' (EMA/795956/2022). ISBN 978-92-9155-069-2

[2] European Medicines Agency, European Surveillance of Veterinary Antimicrobial Consumption, 2016. Defined daily doses for animals (DDDvet) and defined course doses for animals (DCDvet) (EMA/224954/2016)

[3] European Medicines Agency, European Surveillance of Veterinary Antimicrobial Consump-tion, 2018. Guidance on collection and provision of national data on antimicrobial use by animal species/categories (EMA/224959/201617)

[4] EFSA (European Food Safety Authority) and ECDC (European Centre for Disease Prevention and Control), 2022. The European Union Summary Report on Antimicrobial Resistance in zoonotic and indicator bacteria from humans, animals and food in 2019–2020. EFSA Journal 2022;20(3): 7209, 197 pp. (p. 75-78).