



© WHO/Etmosa Yermie

The swiss antibiotic resistance strategy pays off

“Antimicrobial resistance (AMR) is increasing worldwide and is one of the major challenges for the 21st century.” This sentence introduces chapter 13 of the “Swiss Antibiotic Resistance Report 2022” (SARR), a report commissioned by the Federal Council (Swiss Government). The report was presented in November and highlights some positive developments in Switzerland.

CHRISTIAN PAULETTO¹

The steady increase in bacterial antibiotic resistance in both humans and animals was the motive for the Federal Council to draw up its “Strategy on Antibiotic Resistance” (StAR) in 2015, including a broad spectrum of measures. One such measure is the publication of a detailed report every two years since 2016. Though the various aspects of this problem are very differentiated in terms of their cause, effect, interaction and trends, some general findings may be drawn from this report. However, before delving into it, the global context needs to be recalled.

Antibiotics resistance, a truly global issue

Antibiotic resistance is a global issue in many respects. First, it affects all the six regions defined by the WHO. Second, one of its multifactorial causes is globalisation, i.e. increased travels and trade in meat products. Even for Switzerland, the SARR concludes that Swiss and foreign incoming travellers and meat import are among the major routes for the introduction of resistant bacteria, which would then spread to other humans or in the environment and might transfer their resistance genes to other bacteria. Third, the health impact of

resistance is significant. The SARR notes that “in 2019 1.27 million deaths were attributable to bacterial AMR, with the highest burden in western sub-Saharan Africa.” Fourth, of course, the WHO plays an instrumental role in coordinating the action by governments to control this phenomenon. The May 2015 World Health Assembly adopted a *Global Action Plan on Antimicrobial Resistance*.² Before that, the Assembly had adopted its Resolution WHA58.27 for *Improving the containment of antimicrobial resistance* in 2005, and the WHO had published a *Global Strategy for Containment of Antimicrobial Resistance* in 2001.³

One concept promoted by the WHO is the “One Health” approach (the French term “une sèulesantè” is even more explicit). The StAR fully implements the One Health perspective, and now proves its capacity to bear fruits in the long run. Bacteria can live everywhere, in humans, animals, the environment or food. Thus, a workable strategy to address bacterial resistance needs to integrate all those areas and their respective stakeholders. This is why the Swiss Strategy and Report join together four different Federal Offices (in charge of public health, veterinary and food safety affairs, agriculture, and the environment).

Antibiotics consumption in human medicine

Since bacterial resistance appears to be closely correlated with the consumption of antibiotics in human and veterinary medicine, the latter has been one of the targets of the Swiss strategy. The report reveals that in 2021, total consumption of antibacterials in human medicine (inpatients and outpatients combined) was 8.6 DDD (defined daily doses) per 1'000 inhabitants per day (DID). This reflects a gradual decrease of 7% from 2012 to 2019 and a (mainly COVID-19 induced) sharp decrease of 19% between 2019 and 2021. In total, about 27,000 kg of antibiotics were sold

for human consumption in 2021. The WHO's 13th General Work Programme 2019–2023 recommends a country-level target of at least 60% of total antibiotic consumption being Access group antibiotics (according to the Access-Watch-Reserve, or AWaRe classification). In Switzerland, Access group antibiotic consumption accounted for 53% of total consumption in 2012, 61% in 2019, and 64% in 2021. In the Watch group, which includes antibiotics particularly critical for the development of resistance, a decrease has been achieved in the last ten years (from 5.4 DID in 2012 to 3.1 in 2021). This group's proportion of all antibiotic prescriptions was 36% in 2021, i.e. below the WHO target of at most 40%.

Antibiotics consumption in veterinary medicine

The Strategy's result in veterinary medicine is even more impressive. Sales of antimicrobials amounted to 28,402 kg in 2021, i.e. a decline of 48% (or 26,590 kg) since 2012. Penicillins remain the main antibiotic class used for animals, especially for poultry production (75.8% in 2020). Since 2012, “highest-priority critically important antibiotics” have decreased by approximately 67%, in part as a result of a revision of the Ordinance on Veterinary Medicinal Products (SR 812,212.27), effective in April

2016, that bans “critical antimicrobials” for livestock.

Information and monitoring

Though sales bans of specific products are among the options envisaged in the StAR, the Strategy strives to achieve results mainly through awareness and information. Physicians can access updated resistance data and treatment guidelines online. Hospitals are regularly informed on their individual antibiotic use, and are benchmarked against comparable hospitals. Since October 2019, veterinarians must register all prescriptions of antibiotics in the Information System for Antibiotics in Veterinary Medicine. This record shows an increasing prescription of so-called first-line antibiotics, a proof that veterinarians do apply the government guidelines (available online).

Water sanitation

Adding up the aforementioned quantities of antibiotics sold for human and animal treatment, it results that potentially 55 tons of antibiotics are excreted and enter the water cycle either through wastewater or the soil. Since 2016, selected wastewater treatment plants are being upgraded in Switzerland to allow the elimination of micropollutants. Technologies such as ozonation or activated carbon eliminate 90%

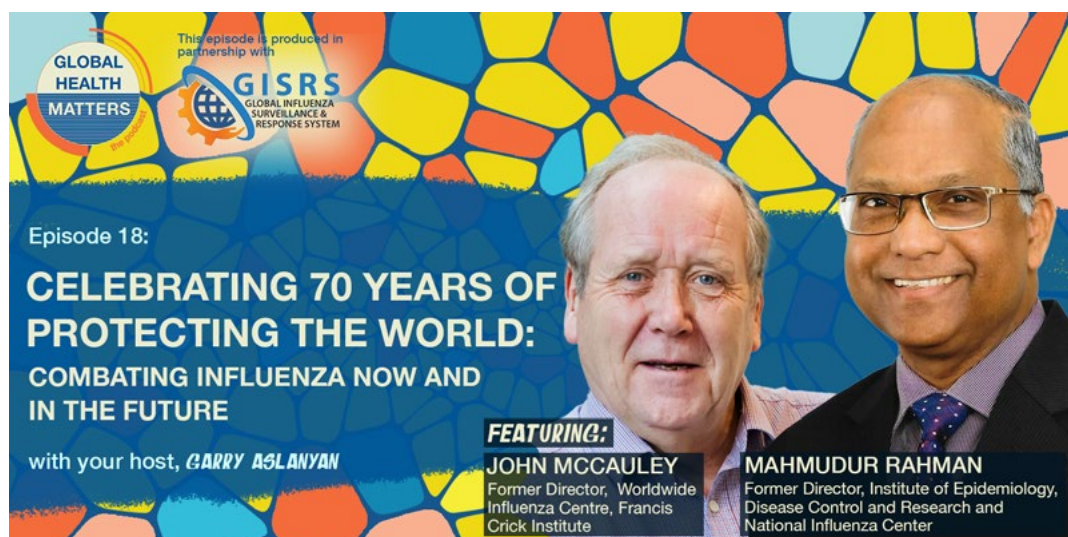
of the antibiotics. In 2020, twelve treatment plants representing 11% of Switzerland's wastewater were equipped with such technologies. The planned upgrade of plants extends until 2040, at which time approximately 70% of municipal wastewater would be treated against micropollutants, which should lead to a significant reduction of the load of antibiotics released into the aquatic environment. Already now, measures of the concentration of antibiotics in the Rhine River show a positive trend, and this trend will be further confirmed in the future across Switzerland in surface and in groundwater.

Conclusion and lessons

The overall takeaways from the Strategy and Report could be summarised as follows:

- An integrated strategy according to “One Health” is a must. While universities split the world into various disciplines, bacteria don't.
- Efforts must be long-term oriented.
- Though measures must apply at all levels, including, when necessary, a ban on the use of some antibiotics, basic measures such as information, training, awareness, and monitoring are a must, and indeed form the basis of the strategy.

The Report constitutes a valuable contribution to the understanding of this highly complex research area and the likely impact of public policies. ■



1 Member of the Board and lecturer on the Swiss Political Institutions at the Université Populaire du Canton de Genève.

2 See official records of the Sixty-eighth World Health Assembly (document WHA68/2015/REC/1, Annex 3), and WHO (2015), Global Action Plan on Antimicrobial Resistance, ISBN: 978-92-4-150,976-3, <https://www.who.int/publications/i/item/9789241509763>. See also http://www.who.int/drugresistance/global_action_plan/en/.

3 See <https://apps.who.int/iris/handle/10.665/231.633?locale-attribute=en>.