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Strengthening measures against antimicrobial resistance in the primary care sector

Issue

Antimicrobial resistance leads to 300 deaths per year in Switzerland, increasing trend. The mitigation potential of the primary care sector is by far not exploited.

Context

1. Antimicrobial resistance (AMR) has experienced a drastic increase over the past years globally[1]. In Switzerland alone, 300 deaths and 7'000 infections yearly are attributed to AMR whereas in Europe the respective number amounts to 25'000, trend rising[2]. In addition, AMR leads to reduced economic productivity and increased morbidity and healthcare costs. The latter are difficult to estimate due to lack of reliable figures in Switzerland[3].
2. The application of antibiotics promotes the selection of resistant bacteria[4]. The more they get exposed to such substances, the more resistances will result. Thus, the emergence of AMR cannot be avoided but limited by decreasing the application of antibiotics.
3. The first scientific approach to the AMR situation in Switzerland was taken in the National Research Programme *Antibiotic Resistance* (NRP 49) from 2001 to 2006[5]. As a result, the *Swiss Centre for Antibiotic Resistance* (ANRESIS) was developed as a national surveillance system for antibiotic resistance and consumption in human medicine. ANRESIS has been co-financed by the Federal Office of Public Health (FOPH). It investigates anonymous AMR data.
4. In the health-policy agenda *Health 2020*, approved by the Federal Council (FC) in 2011, AMR was mentioned for the first time as a critical issue of national health policy[6]. One of the goals set by Health 2020 is to monitor and control AMR.
5. In 2015 and as part of *Health 2020*, the FC launched the *Strategy on Antibiotic Resistance Switzerland* (StAR)[7]. StAR integrates human, animal and ecosystem health (*One-Health Approach*)[8]. The strategy is built on the insight that society is accelerating the development of AMR by using them excessively and inappropriately. Among the strategic objectives are: 1) a cross-sector monitoring of antibiotics use and spread of resistance, 2) their prudent application and 3) the application of rapid diagnostic tests to prevent inappropriate use of antibiotics in primary care.

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[1] (Salam et al., 2023)
[2] (Gasser et al., 2019)
[3] (Federal Department of Home Affairs & Federal Department of Economic Affairs, Education and Research, 2015)
[4] (Naegeli et al., 2022)
[5] (Federal Department of Home Affairs & Federal Department of Economic Affairs, Education and Research, 2015)
[6] (Federal Office of Public Health, 2013)
[7] (Federal Department of Home Affairs & Federal Department of Economic Affairs, Education and Research, 2015)
[8] (WHO, 2023)

6. The Parliament underlined its intention to tackle AMR in the revision of the Epidemics Act[9] (EpidA) in 2016. EpidA requires national strategies on pathogen resistance. Currently, there are 23 parliamentary procedures on AMR ongoing or pending[10].
7. In coordination with StAR, the NRP *Antimicrobial Resistance* (NRP 72) was initiated. It monitors the implementation of the strategy and develops further measures against AMR. In 2022, it concluded that the measures against AMR were not adequate and that the problem was worsening continuously[11]. Besides, it reinforced that AMR is a One-Health problem.
8. Around 90% of antibiotic consumption in Switzerland happens outside hospitals. This underlines the importance of the primary care sector. The total antibiotic consumption decreased slightly between 2012 and 2021[12]. In 2022, the most frequent reasons for prescribing antibiotics in outpatient care were respiratory and urinary tract infections[13].
9. A considerable proportion of antibiotics in primary care settings is prescribed for conditions without corresponding indication[14]. The main causes include tight consultation time and practitioners trying not to miss a dangerous bacterial infection[15]. Quick and cheap diagnostic tools could bring relieve.
10. Monitoring is seen as a key element of a national strategy against AMR[16]. A crucial gap is primary care where no systematic data collection on the use of antibiotics exists[17]. Despite the existence of ANRESIS, the lack of an Integrated Surveillance System for AMR in Switzerland is criticised by WHO[18].
11. For near real-time resistance surveillance and data exchange, the *Swiss Pathogen Surveillance Platform* (SPSP) was founded in 2020. SPSP covers phenotypic surveillance and should be complemented with genomic data.

Stakeholders

12. Any measure taken in the primary care sector requires consultation of general practitioners (GP) as a condition for sustainable implementation. Their association, *Haus- und Kinderärzte Schweiz*, repeatedly complained about missing trust in their prescription practices. They welcome quick laboratory point-of-care diagnostics and supporting guidelines. Also, they would only welcome a benchmarking system if they are not involved in data collection efforts.[19]
13. Since 2016, the reporting system Sentinella has been run by the FOPH and a total of 200 GPs participating on a voluntary basis. The GPs report infectious diseases to the

[9] (*Epidemics Act*, 2012)
[10] (Swiss Parliament, 2023)
[11] (Steering Committee of NRP 72, 2022)
[12] (Federal Office of Public Health and Federal Food Safety and Veterinary Office, 2022)
[13] (ANRESIS, 2023)
[14] (Glinz et al., 2017)
[15] (Van Der Zande et al., 2019)
[16] (*WHO Report on Surveillance of Antibiotic Consumption: 2016-2018 Early Implementation*, n.d.)
[17] (Steering Committee of NRP 72, 2022)
[18] (*Antimicrobial Resistance TrACSS Switzerland 2022 Country Profile*, 2022)
[19] (Haus- und Kinderärzte Schweiz, 2015)

FOPH thus allowing to detect changes in their frequency[20]. This shows that at least part of the GPs is willing to engage in national efforts.

14. Health insurers are generally favourable of reducing AMR since it cuts down their costs. *Santésuisse* welcomes monitoring measures and prescription criteria to fight AMR[21]. Besides, they emphasize the importance of data privacy aspects.
15. The cantons and cantonal Ministries of Public Health are crucial partners for any measures taken in the health care sector. A successful implementation requires support from the cantons. Therefore, a period of 9 months is planned to prepare implementation of the chosen approach in the cantons.
16. Pharmacists have an interest to sell drugs including antibiotics. Nevertheless, *pharmaSuisse* engages in several campaigns to fight AMR.
17. Antibiotics are applied extensively in farming. On the one hand, the *Bauernverband* might oppose measures in the human health sector arguing that they want to prevent expansion to the farming sector. On the other hand, they might be in favour of measures in the human health sector if thereby pressure on the farming sector is released.
18. The incentives for the pharmaceutical industry to produce antibiotics are low[22]. This is due to the prices that do barely cover the cost of development. *Interpharma* calls for incentives for research and development of new antibiotics.
19. *H+*, the association of hospitals, supports measures to fight AMR. Hospitals are running surveillance systems for inpatient care. Besides, various programs of antimicrobial stewardship are in place.
20. Various NGOs (*foraus*, *mediCuba Suisse* or *Roundtable Antibiotics*) pressure government and demand policy measures to mitigate AMR.
21. The *Schweizerische Patientenorganisation* aims to ensure a high-quality and cost-effective healthcare. Hence, they support measures to fight AMR if the financial burden for the individual patient is limited.

Options

22. **Option 1:** Introduce standardisation of insurance claims nationally to form a basis for monitoring of antibiotic prescriptions in the primary care sector:

    Anonymised health insurance claim data can be used for monitoring and benchmarking of antibiotic consumption in the primary care sector in several categories: overall, by age group, by GP or followed by hospitalisation[23]. This system allows for a personalised antibiotic prescription feedback to GPs without identifying them. Via such a feedback, GPs can be sensitised to reduce their AMR prescriptions. They could compare it to regional or national reference levels. Health insurers have an interest in reducing antibiotic prescription because their costs are decreased thereby.

[20] (Federal Office of Public Health, 2023)
[21] (santésuisse, 2015)
[22] (Plackett, 2020)
[23] (Glinz et al., 2021)

Cost: *moderate (~ CHF 1.2 million / year)*

- Systemwide feedback interventions such as this are generally seen as low-cost interventions[24,25].
- The main part of the cost arises from human resources. Generously calculated with 10 FTE's, the total personnel cost is around CHF 1 million per year.
- Extra costs for secure transfer of this highly sensible data must be taken into account.

Advantages

- Since the procedure is anonymised, less resistance from GPs is to be expected.
- No change to the pricing system for medical services is required.
- No complication for patients involved
- Experience can be drawn from monitoring tools running in hospital care.
- Puts soft pressure on GPs to reflect their prescription practices.

Disadvantages

- Health insurers need to be convinced or obliged to provide the claim data.
- Interoperable file formats are required for insurance claim data processing which requires cooperation of health insurers.
- Blaming of individual physicians based on their prescription pattern must be avoided.
- Does not close the gap in monitoring genetic resistance data

23. **Option 2:** Make whole genome sequencing (WGS) a standard procedure in the diagnostic of infections in primary care

Reducing AMR requires a better understanding of resistance dynamics. If one can trace the spread of AMR, it is easier to take targeted measures to break it. For example, one would be able to detect clusters in time and/or space. As a reaction, one could switch to another antibiotic to fight the bacteria resistant to the previous one. Also, it would be possible to adapt the treatment to the bacterial genomic data. Besides, preventive measures could be envisaged.

Resistance dynamics data would complement phenotypic SPSP data. Genomic data of bacteria causing infections from the primary care sector is thus crucial. To get this data, usual bacterial testing can be complemented by whole genome sequencing in case of a positive test.

Cost: *High (~ CHF 6.5 million / year)*

- The cost of bacterial WGS is below CHF 10 per genome[26] and expected to decrease further[27].

[24] (Gulliford et al., 2019)
[25] (Hemkens et al., 2017)

- In 2021, the total of antibiotic prescriptions in Switzerland is estimated at 600'000[28]. Thus, yearly costs of CHF 6 million should be expected only for the WGS.
- Additional costs of approx. CHF 500'000 arise from the technical upgrading of the platform (the current annual operation cost of SPSP amounts to CHF 250'000)[29].

Advantages

- Closes the primary care gap in monitoring of AMR
- No opposition of physicians expected since their workload does not increase.
- Allows high-resolution tracking of the spread of resistance
- Genomic data allows to improve therapeutic interventions.
- No complications for patients involved because sequencing probes have been taken anyway before to test for infection.
- No opposition from health insurers expected if state carries the cost for the tests.
- During the SARS-CoV-2 pandemic, tremendous sequencing capacities have been built[30]. Those could be used.
- A respective platform, SPSP, already exists.
- Could be expanded to veterinary health sector

Disadvantages

- Requires technical upgrading of SPSP to include genomic data from WGS as well as corresponding metadata.
- Inclusion of metadata could interfere with data privacy. The Data Protection Act and the Human Research Act would need to be taken into consideration[31].
- Increases maintenance cost of SPSP.
- Data storage capacity needs to be raised drastically.

24. **Option 3:** Guide antibiotics prescription by an algorithm based on a point-of-care procalcitonin test in primary care

Via a point-of-care test measuring the biomarker procalcitonin, it is possible to differentiate between bacterial and viral infections reliably[32]. This allows for a more

[26] (Perez-Sepulveda et al., 2021)
[27] (Rossen et al., 2018)
[28] (Federal Office of Public Health and Federal Food Safety and Veterinary Office, 2022)
[29] (*The Potential of an Institutionalised Early Warning System for Pandemics in Switzerland: An Economic Benefit-Cost Analysis*, 2023)
[30] (Neves et al., 2023)
[31] (Federal Office of Public Health and Federal Food Safety and Veterinary Office, 2022)
[32] (Simon et al., 2004)

targeted prescription of antibiotics. Thus, the amount of prescribed antibiotics can be reduced significantly[33]. Implementation only requires GPs to have access to point-of-care procalcitonin testing.

Cost: *low (~ CHF 0.2 million / year)*

- The costs of this procedure are similar to the costs for the usual care procedure[34].
- Cost arises mainly from administrative expenditure for the negotiations with health insurance providers.
- GPs would have to equip themselves with testing devices. In case of adequate reimbursement of the testing, that should not be an obstacle.

Advantages

- Allows to reduce antibiotic prescriptions without endangering patients
- reduces GPs' fear of missing a dangerous infection and thus empowers them to reduce antibiotics prescription[35].
- The procedure seems to be accepted among GPs[36].
- The *Swiss Society for Infectious Diseases* added the procalcitonin test to their guidelines[37].
- The MedTech industry would probably support this intervention because it creates demand for procalcitonin test devices.

Disadvantages

- The implementation requires adequate reimbursement of procalcitonin testing by health insurers, which is currently not the case. Such reimbursement negotiations are usually complicated.
- Adaptation of primary care guidelines regarding treatment of respiratory tract infections would be required to get the full support of GPs. These guidelines are edited by the *Swiss Society of General Internal Medicin*e which consequently needs to be convinced.
- Slight complications for patients involved since they need to undergo an additional procalcitonin test.
- Does not close the gap in monitoring genetic resistance data in the primary care sector.

[33] (Lhopitallier et al., 2021)
[34] (Lhopitallier et al., 2021)
[35] (Lhopitallier et al., 2021)
[36] (Geis et al., 2023)
[37] (Lhopitallier et al., 2021)

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