

INTERAGENCY REPORT

# **ECDC/EC/EFSA country visit to Kosovo\* to advance One Health responses against antimicrobial resistance**

9–13 October 2023



*\* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ opinion on the Kosovo declaration of independence.*

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This report was sent for consultation to the National Institute of Public Health and the Food and Veterinary Agency of Kosovo.

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## Summary

The European Centre for Disease Prevention and Control (ECDC), the European Commission's Directorate-General for Health and Food Safety (DG SANTE) and the European Food Safety Authority (EFSA), supported by a consortium composed of Epiconcept and Integrated Quality Laboratory Services (IQLS), jointly carried out a country visit to Kosovo\* from 9 to 13 October 2023. The visit is part of ECDC's accession support activities to contribute to the advancement of a One Health approach against antimicrobial resistance (AMR) in the Western Balkans funded by the Directorate General for Neighbourhood and Enlargement Negotiations (DG NEAR) of the European Commission.

The report concludes that Kosovo has initiated several key activities to address AMR issues, mostly in the human health sector. The previous National Action Plan (NAP) on AMR for Kosovo ended in 2021 and the management of the COVID-19 pandemic delayed its implementation. Activities addressing AMR in the human health sector are now included in a comprehensive plan of actions for communicable disease prevention and control 2023–2025 following the recommendations of the EC/ECDC Technical Assessment Report in 2018. However, the identification of priorities as well as the allocation of resources on AMR surveillance and the reduced and prudent use of antimicrobials for animal health, food production and environment are still to be developed to allow an effective and coordinated One Health approach on AMR involving all sectors.

In the human health sector, a national AMR surveillance system, organised and led by the National Institute of Public Health in Kosovo (NIPHK), is currently collecting data from a network of regional public health laboratories. A Laboratory Information Management System recently installed at NIPHK will be deployed to participating laboratories to facilitate the sharing and analysis of data and the reporting of AMR trends at the central level. However, AMR data are only collected for surveillance purposes and are not used for guided treatment in hospitals, and the timely reporting of critical results to clinicians has not yet been implemented.

Antimicrobial consumption (AMC) is being intermittently monitored in the country using data from imports, sales and, on some occasions, prescriptions from primary care. Establishing AMC monitoring using electronic data collection from hospital pharmacies will allow more regular and timely surveillance on the consumption. Regarding the prudent and appropriate use of antimicrobials, the legislation on prescriptions and sales of antibiotics should be enforced in order to stop the common practice of over-the-counter sales in pharmacies. The establishment of antimicrobial stewardship (AMS) committees needs to continue to cover all hospitals throughout the country. National guidelines for the treatment of common infectious diseases as well as prophylaxis in healthcare settings are required to ensure more appropriate use of antibiotics.

Strengthening hand hygiene practices in healthcare facilities, providing regular infection prevention and control (IPC) training for healthcare staff in all facilities, increasing dedicated IPC staff in hospitals, and establishing national surveillance of healthcare-associated infections (HAI) would be key measures to improve IPC in the country. Finally, it is essential to improve collaboration between the different levels and specialities in the healthcare system and to plan long-term behaviour change interventions and awareness-raising campaigns on AMR.

In the animal health and food safety sectors, there is no system in place to generate data to monitor AMR and Antimicrobial Sales and Use (ASU). Consequently, there are no baseline data to assess the burden of AMR in these sectors, allow outbreak detection and evaluate the efficacy of future actions to encourage reduced and prudent use of antimicrobials. National legislation on AMR/ASU surveillance needs to be developed, implemented and subsequently enforced to address these issues.

Laboratory capacity to monitor AMR in livestock and the food production sector is available at the Food and Veterinary Agency (FVA) although developing antimicrobial susceptibility testing (AST) capacity to EU standards would be required. Allocating resources to reinstall a *Salmonella* control plan that existed previously in Kosovo could be a first step in developing an AMR surveillance system in the animal health/food sector.

So far, the competent authority has not introduced any measures to encourage reduced and prudent use of antimicrobials in animals. The veterinarians and animal keepers had limited awareness of the risks associated with AMR and the use of broad-spectrum antimicrobials in animals, including some of critical importance for the treatment of humans, as the first line treatment. Some of the antimicrobial Veterinary Medicinal Products (VMPs) authorised in Kosovo, such as growth and yield promoters (including colistin in combination with other antimicrobials) are banned in the European Union.

For the moment, collecting data on the use of antimicrobials in different species is likely to be challenging due to the absence of a regulatory framework for the prescription of VMPs, over-the-counter sales, and the absence of

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farm records for VMPs. However, collecting data on sales of antimicrobials from wholesalers could be a starting point considering the relatively low number of companies selling VMPs in Kosovo.

The commitment of relevant actors in the human health, food production and veterinary sectors in Kosovo is a good starting point for improving AMR control and promoting the reduced and prudent use of antimicrobials. Many EC/ECDC recommendations to control AMR and HAIs are under implementation. However, many challenges for monitoring AMR in a One Health approach and establishing efficient prevention and control measures against AMR remain in all sectors, and especially in the food production, veterinary and environment sectors. Continued efforts and renewed commitment of the ministries, agencies and stakeholders in all sectors are required to move forward on the control of AMR in Kosovo. This involves further development and implementation of the AMR activities outlined in the comprehensive action plan for communicable disease prevention and control 2023–2025 and developing a comprehensive plan in the food production sector and environment. In this report, several initial recommendations are provided that could serve as a starting point to develop a more specific roadmap for a One Health approach to prevent AMR.

# 1. Introduction

Antimicrobial resistance (AMR) represents a serious threat to people's health as well as to economies around the world. Recent estimates of the burden of AMR in the WHO European Region revealed that in the year 2019 alone nearly 700 000 deaths were associated with or attributed to bacterial AMR<sup>2</sup>. A study estimated that between 2016 and 2020, 70% of antibiotic-resistant bacterial infections in the European Union and European Economic Area (EU/EEA) were healthcare-associated infections (HAI), and the number of deaths ranged from 30 730 in 2016 to 38 710 in 2019<sup>3</sup>. AMR also has significant costs, especially for healthcare systems, which could cost the world economy up to 100 trillion USD by 2050 with the current increasing trends of AMR<sup>4</sup>.

In line with the Global Action Plan (GAP) on AMR<sup>5</sup>, adopted in May 2015 by the World Health Assembly and subsequently by the World Organisation for Animal Health (WOAH) and the Food and Agriculture Organization (FAO), the European Commission published its own [EU One Health Action Plan against AMR](#) in 2017. The key objectives of this plan are built on three main pillars: (i) making the EU a best practice region; (ii) boosting research, development and innovation; and (iii) shaping the global agenda. As part of this agenda, and more specifically to the third pillar, the European Commission commits to supporting candidate countries for accession to the EU in aligning and implementing EU legislation on AMR.

One of the five strategic objectives of the ECDC Strategy 2021–2027<sup>6</sup> is dedicated to increasing health security in the EU through international collaboration and alignment regarding infectious disease policies and practice by strengthened cooperation and coordination between ECDC and partners in non-EU countries, especially EU enlargement countries. On 10 December 2019, the EU Contribution Agreement No 2019/409-781 was signed between the ECDC and the European Commission (DG Neighbourhood and Enlargement Negotiations, NEAR) and amended on 23 December 2020 to implement ECDC Action 'Preparatory measures for the participation of the Western Balkans and Turkey in the European Centre for Disease Prevention and Control with special focus on One Health against AMR and enhanced SARI surveillance, 2020–2024' (ECDC-IPA6 project) with external financial assistance under the Instrument of Pre-accession Assistance (IPA).

During the Joint ECDC and European Food Safety Authority (EFSA) regional workshop on One Health approach against AMR for EU pre-accession countries that was held in 2019 in Belgrade, Serbia, relevant national representatives recognised that there is an urgent need to boost the advancement of AMR responses and to attain a certain level of implementation of related EU legislation in the region<sup>7</sup>. National governments need to put in place regulatory requirements, necessary laboratory infrastructure and techniques, efficient comprehensive and interoperable electronic surveillance systems, training, additional human workforce in the human and animal health fields, as well as awareness raising and commitment to ensure sustainability of efforts.

Work Stream 2 of the ECDC-IPA6 project focuses on the advancement of a One Health approach against AMR in Western Balkans to discuss AMR issues, identify gaps and support the development of roadmaps on AMR in different sectors: human health, animal health, food safety and the environment. In addition, to align with previous One Health country visits on AMR organised in the EU/EEA countries, the visits to countries under pre-accession assistance will be joint visits with experts from ECDC, Directorate-General for Health and Food Safety (DG SANTE) and EFSA to cover areas relevant for AMR surveillance, Infection Prevention and Control (IPC) and antimicrobial use under a One Health perspective.

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<sup>2</sup> European Antimicrobial Resistance Collaborators. The burden of bacterial antimicrobial resistance in the WHO European region in 2019: a cross-country systematic analysis. *Lancet Public Health*. 2022 Nov;7(11):e897-e913. doi: 10.1016/S2468-2667(22)00225-0.

<sup>3</sup> European Centre for Disease Prevention and Control (ECDC). Assessing the health burden of infections with antibiotic-resistant bacteria in the EU/EEA, 2016–2020. 17 November 2022. Stockholm: ECDC; 2022. Available at:

<https://www.ecdc.europa.eu/en/publications-data/health-burden-infections-antibiotic-resistant-bacteria-2016-2020>

<sup>4</sup> The World Bank. Drug-Resistant Infections: A Threat to Our Economic Future. March 2017. Washington: World Bank; 2017. Available at: <https://www.worldbank.org/en/topic/health/publication/drug-resistant-infections-a-threat-to-our-economic-future>

<sup>5</sup> World Health Organization (WHO). Global action plan on antimicrobial resistance. 1 January 2016. Geneva: WHO; 2016. Available at: <https://www.who.int/publications/i/item/9789241509763>

<sup>6</sup> European Centre for Disease Prevention and Control (ECDC). Amended ECDC Strategy 2021–2027. 21 December 2023. Stockholm: ECDC; 2023. Available at: <https://www.ecdc.europa.eu/en/publications-data/ecdc-strategy-2021-2027>

<sup>7</sup> European Centre for Disease Prevention and Control (ECDC). ECDC/EFSA Regional workshop on One Health approach against antimicrobial resistance in EU pre-accession countries. Stockholm: ECDC; 2019. Available at: <https://www.ecdc.europa.eu/en/news-events/ecdc-efsa-regional-workshop-One-Health-approach-against-antimicrobial-resistance-eu-pre>

## 2. Objectives and scope

The overall objective of this joint country visit to Kosovo was to discuss and review the advancement of a 'One Health' approach against AMR through: (i) the identification of strengths and weaknesses in the current national AMR strategies, action plans and intersectoral coordination mechanisms; (ii) a review of the functioning of national reference laboratories (NRLs) for AMR and their capacity to detect resistance trends; (iii) the documentation of the situation and efforts being made by Kosovo on AMR surveillance, antimicrobial consumption (AMC) and HAIs; (iv) a review of actions related to the prudent use of antibiotics in human health, animal health, food safety, as well as in the environmental sector; and (v) a review of activities and approaches to raise awareness regarding AMR. A detailed agenda of this One Health country visit is provided in the Annex.

The visit focused on: (i) the laboratory capacity to process, collect and share AMR data in humans and animals at national and local level; (ii) monitoring activities on AMR in humans, animals and food; (iii) monitoring of AMC in humans and surveillance of sales and use of antimicrobials in the veterinary sector; (iv) antimicrobial stewardship (AMS), treatment guidelines and prudent use of antimicrobials in humans and policies to tackle AMR through the reduced and more prudent use of antimicrobials in animals; (v) infection prevention and control (IPC); and (vi) communication, behavioural change interventions and awareness activities. The evaluation and discussions on the human aspect of AMR were guided by the respective assessment tool developed by ECDC<sup>8</sup>. To a limited extent, the visit also covered environmental aspects of AMR such as the disposal of expired and unused drugs in the food production sector.

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<sup>8</sup> European Centre for Disease Prevention and Control (ECDC). Assessment tool for joint 'One Health' country visits in relation to antimicrobial resistance. 30 March 2021. ECDC: Stockholm, 2021. Available at: <https://www.ecdc.europa.eu/en/publications-data/assessment-tool-joint-one-health-country-visits-relation-antimicrobial-resistance>

### 3. Background

Kosovo is a member of the WHO Regional Office for Europe and of the Central Asian and Eastern European Surveillance of Antimicrobial Resistance (CAESAR) network established in 2014. In 2019, Kosovo also joined the Global Antimicrobial Resistance and Use Surveillance System (GLASS). In the latest report of antimicrobial resistance surveillance data in Europe for the year 2021<sup>9</sup>, higher proportions of resistance were found in Kosovo for most of the monitored pathogen-antimicrobial combinations in humans compared to other countries in the WHO European Region. Only the proportion of resistance to carbapenems (imipenem and/or meropenem) in invasive isolates of *Escherichia coli* and *Klebsiella pneumoniae* was lower than in other European countries.

Kosovo has achieved significant progress in recent years on reducing total antibiotic consumption in humans. Wholesale data on antibiotic consumption indicate a substantial decrease from 2013 to 2018 (from 26 to 22 defined daily dose per 1 000 inhabitants per day). From 2014 to 2018, an Access-to-Watch index of 1.5 was reported<sup>10</sup> (according to the relative consumption of Access, Watch and Reserve antibiotics, which would be consistent with a distribution of Access to Watch agents of 60% to 40%). Data collected and shared with the WHO Regional Office for Europe Antimicrobial Medicines Consumption (AMC) Network in 2019 concluded that, while there were increases in total consumption of J01 antibacterials for systemic use over time, the patterns of relative consumption were reasonably stable<sup>11</sup>. The report also showed that increases in volumes of consumption of several Watch agents, namely oral fluoroquinolones, ciprofloxacin and levofloxacin and parenteral ceftriaxone, 'suggest targets for further investigation, interventions and stewardship activities'. Consumption of agents from the Reserve list remained very low, with no notifiable increases<sup>12</sup>.

A recent point prevalence survey on HAIs and antimicrobial use in Kosovo hospitals funded by WHO (February 2023) revealed an overall HAI prevalence of 4.6% (4.9% in the previous report from 2019). Although the report does not provide details, it suggests that these figures are underestimated due to the low frequency for taking microbiology samples and underutilisation of clinical microbiology services. Gram-negative bacteria were the most commonly identified pathogens in HAIs (25.7%) and third generation cephalosporins were the most frequently prescribed antibiotics (44.2%). Surgical departments followed by intensive care units (ICUs) had the highest prevalence of HAIs<sup>13</sup>.

In the veterinary and food production sectors, the responsibility to address AMR and Antimicrobial Sales and Use (ASU) issues has very recently been assigned to the FVA under the leadership of the Ministry of Agriculture, Forestry and Rural Development. The FVA carries out official controls at distributors (importers), outpatient and veterinary practices, veterinary pharmacies, and farmers. The FVA is also an inspection body delegated by the government of Kosovo to carry out inspections in the field of safety, hygiene, traceability and labelling of food and feed. Regarding AMR, there is currently no organised or systematic collection of data.

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<sup>9</sup> Antimicrobial resistance surveillance in Europe 2023 – 2021 data. Stockholm: European Centre for Disease Prevention and Control and World Health Organization; 2023. Available at: <https://www.ecdc.europa.eu/en/publications-data/antimicrobial-resistance-surveillance-europe-2023-2021-data>

<sup>10</sup> Value set according to the relative consumption of Access, Watch and Reserve antibiotics.

<sup>11</sup> WHO Regional Office for Europe. Antimicrobial Medicines Consumption (AMC) Network. Available at: <https://iris.who.int/bitstream/handle/10665/330466/9789289054744-eng.pdf?sequence=1&isAllowed=y>

<sup>12</sup> Ibid.

<sup>13</sup> Raka et al. Point prevalence survey of healthcare-associated infections and antimicrobial use in Kosovo hospitals. *Infect Dis Rep.* 2019 Mar 19;11(1):7975.



## 4. Observations and conclusions

### 4.1 AMR strategies, action plans and coordination, based on a One Health approach

#### 4.1.1 Multi-sectoral collaboration and coordination

Until recently, the Group for Containment of Antimicrobial Resistance in Kosovo (GNKRA) was a multi-sectoral committee in charge of AMR whose role and responsibilities have been established with Terms of Reference (ToRs) clearly defining scope, membership and expected outcomes. The objectives were to:

- implement the National Action Plan (NAP) on AMR across human, veterinary, and environmental sectors;
- regularly report on the current state of AMR in the three sectors, challenges, and progress made;
- strengthen intersectoral collaboration and communication on AMR issues.

Based on the recent law on the prevention and control of infectious diseases, the GNKRA is replaced by the Antimicrobial Resistance Control Committee (KKRA)<sup>14</sup>. This committee will be a continuation of the GNKRA and will be composed of the following 15 members assisted by an administrative secretary:

- one member from the Ministry of Health (MoH);
- one member from the FVA of the Ministry of Agriculture, Forestry and Rural Development (MAFRD);
- one member from the Ministry of Environment and Spatial Planning;
- four members from the National Institute of Public Health of Kosovo – (including the chair of the committee. Domain of expertise covered by the four members are epidemiological surveillance, laboratory, health promotion and education;
- one member from the Health Inspectorate;
- three members from the Clinical University Hospital Service of Kosovo;
- one member from the Faculty of Agriculture and Veterinary in Pristina;
- one member from the Professional Health Chambers;
- one member from the Kosovo Chamber of Pharmacists;
- one member from the primary healthcare sector.

There are a number of good practice examples and initiatives such as a rapid assessment of antibiotic use in primary care in 2023 and the development of national treatment guidelines for primary care performed under the leadership of GNKRA members. However, funding or secretarial support have not been allocated so far and regular meetings were not held.

#### 4.1.2 National strategies and action plans on antimicrobial resistance

A NAP on AMR for the period 2019-2021 had been developed previously with a very limited budget resulting in the implementation of about half of the actions described in this plan. The reallocation of resources due to the COVID 19 pandemic also had an impact on the implementation.

In the human health sector, a comprehensive action plan for communicable disease prevention and control for 2023–2025 has been developed following recommendations of the EC/ECDC Technical Assessment Report from 2018 (referred to below as the TAR-AP). AMR and HAI specific objectives and activities have been described in the section on national disease programmes. Among activities outlined in this plan are the creation of AMS teams in hospitals and trainings on antibiotic stewardship programmes (ASPs) for health professionals, the strengthening of regional and international cooperation on AMR, the inclusion of AMR in curricula of pre-service and in-service training programmes, the enforcement of the existing legal framework that prohibits sales of antimicrobials without prescription and the development of clinical guidelines for the rational use of antimicrobials in clinical settings.

Whereas targets of the TAR-AP for AMR and HAI activities are set for 2025 or 2030, a budget was defined only until 2025. In addition, a budget for some activities had not been allocated at the time of visit (mid-October 2023). Monitoring of the TAR-AP activities is conducted by the Department for Strategic Development of the MoH.

Whereas actions targeting the human health sector are currently under implementation, objectives, outcomes and activities on AMR and prudent use of antimicrobials in the animal health, food or the environmental sectors have not yet been developed, which greatly limits a coordinated approach to AMR under a One Health approach.

#### 4.1.3 Conclusions

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<sup>14</sup> Based on the same law, the Minister of Health will also establish a stand-alone committee in charge of HAI-specific issues.

A multi-sectoral committee is established with ToRs providing a clearly defined scope and expected outcomes. A NAP on AMR for the period 2019–2021 had been developed and partially implemented. Following a technical assessment conducted by ECDC in 2018, AMR-specific activities have been incorporated and budgeted into a larger action plan for communicable disease prevention and control in human health. GNKRA members have also implemented several good initiatives on data collection and the improvement of antimicrobial prescribing.

An improvement of the National AMR Strategy and coordination is needed, as the NAP on AMR has been fully developed using a One Health perspective but was not implemented in the animal health, food safety and environmental sectors. The multi-sectoral committee has met irregularly in the recent years. Finally, there is insufficient national funding to implement the NAP.

## 4.2 Human health aspects of antimicrobial resistance

### 4.2.1 Organised multidisciplinary collaboration at local level

Examples of multidisciplinary collaboration (e.g. the constitution of AMS committees or dissemination of and training on treatment guidelines) at local level are limited. The MoH organised an event in September 2023 to promote the national treatment guidelines for primary healthcare with all directors and quality coordinators of the 31 main family medicine centres in Kosovo<sup>15</sup>. More recently, a project aimed at strengthening AMS also in primary healthcare centres supported by the International Centre for Antimicrobial Resistance Solutions (ICARS) has started in February 2024<sup>16</sup>.

Noteworthy is the insufficient collaboration between microbiologists and clinicians. This observation is supported by discussions with hospital and primary care doctors. There is also no established collaboration between different healthcare settings such as primary care, hospitals and surrounding long-term care facilities to improve prudent use of antibiotics.

### 4.2.2 Clinical diagnostic and reference laboratory services

The NRL for human health is established at the NIPHK and has the capacity for identification of pathogens using MALDI-TOF technology and automated Minimum Inhibitory Concentration (MIC) testing platforms or the Kirby-Bauer disk diffusion method for confirmation of resistance profiles. Access to Whole Genome Sequencing (WGS) equipment (one Illumina and one GridION sequencer) is available although not used for bacterial sequencing so far due to a lack of consumables and trained staff. The NRL is currently implementing a laboratory information management system (LIMS) called MedLis that will ease the generation of resistance statistics and analysis of trends. This LIMS will be deployed across the network of regional public health laboratories allowing real-time sharing and central analysis of laboratory results. The NIPHK regularly participates in international External Quality Assessment (EQA) schemes, including those from ECDC for various networks.

Three laboratories are currently sharing AMR data as part of the CAESAR network (the NRL, the university hospital laboratory in Pristina and the regional laboratory in Prizren). The extension of data collection to the other regional public health laboratories is planned along with the nation-wide implementation of MedLis.

The university hospital in Pristina has its own recently established microbiology laboratory whereas diagnostic microbiology services for the regional hospitals are provided by regional public health institute laboratories. The university hospital laboratory transfers all carbapenem- and/or colistin-Resistant *Enterobacteriales* (CCRE), carbapenem-resistant *Acinetobacter baumannii* (CRAb), carbapenem-resistant *Pseudomonas aeruginosa* (CRPa), vancomycin-resistant *Enterococcus* spp. (VRE) and methicillin-resistant *Staphylococcus aureus* (MRSA) isolates and all EARS-Net priority pathogens routinely to the NRL for confirmatory testing. However, laboratory services are underutilised with very low blood culture rates. For instance, the Public Health Laboratory visited received less than 250 blood cultures from the regional hospital in 2023 (January to mid-October).

Regarding patient care, laboratory results are not communicated to clinicians in a timely manner to be useful for clinical management decisions. Major shortcomings were observed during the visit, including the reporting of positive blood cultures only at the time of sharing antibiogram results three or more days after initial positivity. Pathogen identification from blood cultures was not communicated on time to clinicians (neither on initial positivity nor when preliminary species identification was available). Gram staining was not performed systematically on positive blood cultures or cerebrospinal fluid samples. Clinicians confirmed that they were receiving laboratory results too late for their clinical decision-making process. Laboratory results are usually collected by nursing staff and are paper based. A LIMS or health management information system (HMIS) to link laboratory data to patient records was not in place in both hospitals visited. Microbiologists did not proactively communicate results to clinicians or got involved in antimicrobial therapy decisions although they stated that they would like to have a

<sup>15</sup> <https://msh.rks-gov.net/Publications/Details/2323>

<sup>16</sup> <https://icars-global.org/icars-and-ministries-of-kosovo-sign-mou-formalising-their-partnership>

closer collaboration. Out-of-hour microbiology services were not available. Laboratories closed at 2:00 PM on working days (Monday – Saturday) and samples were neither accepted nor microbiology expert advice provided after this time. Finally, point-of-care testing was not available in hospital or at primary care level.

According to microbiologists from NIPHK, all regional public health laboratories are using EUCAST (European Committee on Antimicrobial Susceptibility Testing) standards for susceptibility testing. AST for colistin is performed according to EUCAST recommendations using a broth microdilution method. Other guidelines for laboratory testing were not used in the laboratories.

### 4.2.3 Monitoring of antimicrobial resistance

The key priority bacteria and antimicrobial resistance combinations under surveillance at the national level are those established in the CAESAR (for which Kosovo has been reporting AMR data since 2014) and GLASS protocols (reporting since 2019). Currently there is no genomic AMR sentinel, food/waterborne or emerging pathogens surveillance at the national level although Kosovo is collaborating with the European Antimicrobial Resistance Genes Reference Laboratory Capacity-building (EURGen-RefLabCap) project within the carbapenem-resistant *A. baumannii* capacity survey group. Kosovo does not report regular integrated AMC and AMR data other than those shared with CAESAR or WHO GLASS for surveillance at national level. So far, data have not been reported regularly to the multi sectoral committee. The deployment of the MedLis at all Public Health Institutes (central and regional level) should facilitate AMR data collection and analysis in the future.

NIPHK epidemiologists collect data on notifiable diseases through an electronic web-based platform and report aggregated data on a weekly basis to the national level which is then summarised in monthly epidemiological bulletins. There is, however, no detailed feedback to the reporting centres as only national results are generated with no stratification by region or type of healthcare facility (hospital, primary healthcare). National data are generated every year for AMR proportions for key pathogen-antimicrobial combinations for CAESAR and GLASS. Epidemiologists will have access to laboratory data through the MedLis mentioned above once fully operational.

### 4.2.4 Monitoring of antimicrobial consumption

There is no specific legal framework for AMC data collection and imports and sales data are used to measure and report AMC in human health although on some occasions, in specific small-scale studies, also prescription data from the primary care sector have been used. The MoH regularly collects and analyses AMC data that are being shared internationally with WHO (wholesale, hospital, and community levels) since 2012 through the WHO Regional Office for Europe Antimicrobial Medicines Consumption Network. Only data published by WHO are publicly available, either as raw/aggregated data or in a report format. In addition, information is available on inadequate antibiotic prophylaxis for surgical procedures. There are no data stratified by sector (primary care or hospital), level of administration (e.g., regional or national), provider (public/private), prescriber, or indication/pathogen. Although AMC data are collected by the MoH, there is no budget assigned for data collection.

There is currently no national electronic system to collect information from antimicrobial prescriptions. The development of such a system is planned following the implementation of a health insurance scheme for which a starting date has not been set yet. Specific studies to determine prescription patterns have been undertaken including a study in primary care in 2023 showing that 31.3% of all patients have received antibiotics<sup>17</sup>.

Kosovo has a relatively high consumption of antibiotics compared to the EU as well as other Western Balkan countries. Misuse of antibiotics have been confirmed by healthcare workers during the visit raised concerns for example regarding the high prescription rate of third-generation cephalosporins in primary care.

The WHO GLASS report (2014–2018) concluded that, while there were increases in the total consumption of antibacterials for systemic use (ATC J01) over time, the patterns of relative consumption were reasonably stable. Increases in consumption volumes of several antimicrobials from the Watch group (oral fluoroquinolones, ciprofloxacin, levofloxacin, and parenteral ceftriaxone) suggests targets for further investigation, interventions and stewardship activities. From 2014 to 2018, an Access-to-Watch index of around 1.5 was reported, which would be consistent with a distribution of Access-to-Watch agents of 60% to 40%.

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<sup>17</sup> Dr Lul Raka, personal communication (not published).

## 4.2.5 Antimicrobial stewardship and treatment guidelines

At the time of the visit, there was no institutional or nationwide antimicrobial stewardship program (ASP) in Kosovo. The revised ToRs for the KKRA should however address this gap as mentioned in its ToRs whereby the 'committee with the aim of achieving its outlined objectives, may establish specialized working groups within its structure to support its priority areas, such as antimicrobial stewardship'.

Local initiatives, such as the constitution of a multidisciplinary team to discuss AMR and prudent use of antimicrobials, are taking place as seen at the University Hospital visited, where an antimicrobial stewardship committee has been created with regular meetings planned. However, neither of the two hospitals visited had guidelines for diagnostic stewardship, infection prevention and control, empirical and targeted antimicrobial therapy or surgical prophylaxis in place. On the contrary, in the neonatal intensive care unit (NICU), until recently, there was the recommendation to administer medical prophylaxis to admitted neonates when they had a peripheral catheter.

Some healthcare workers from the hospitals visited mentioned occasional shortages of antibiotics, including ceftazidime, cefuroxime, azithromycin and linezolid.

Antibiotic consumption is very high and the prescribing profile is not optimal in hospital settings. Observations of the team in this regard included:

- a) Surgical prophylaxis was extended for several days after surgery and ceftriaxone used as the drug of choice e.g., in cholecystectomy and hernia surgery.
- b) Microbiological testing in hospitalised patients with suspected infection was underused. Blood cultures are restricted to adult and neonatal intensive care departments and the number of samples submitted is very low.
- c) The pharmacy departments in the two visited hospitals did not provide regular data on antimicrobial consumption that was up-to-date or stratified by antimicrobial agent or department. Antimicrobial prescribing is paper-based in both hospitals.
- d) The microbiology departments of the two hospitals visited did not provide local resistance statistics indicating the most common pathogens and their antimicrobial susceptibility.
- e) The request for microbiological diagnostic tests and the reporting of culture results were paper based.
- f) The hospital's annual management agreement with the health authorities did not contain AMS and AMR objectives although one of the hospitals visited has started to create an AMS team.
- g) Scientific societies did not carry out specific training activities related to AMS.

At the primary care level, national antibiotic treatment guidelines were released by the MoH in 2023. Antimicrobial prescriptions have been assessed in primary care but prescriptions cannot be monitored (data not available on a regular basis). Similar to the situation in hospitals, antibiotic consumption was very high and the prescribing profile was not optimal in primary care. Observations in this regard included:

- a) Approximately 31% of all patients attending primary care services had received antibiotics.
- b) Ceftriaxone, which accounted for 24% of total prescriptions, was the most commonly administered antimicrobial. Amoxicillin-clavulanic acid was the second most used antimicrobial treatment.
- c) There was lack of AMC surveillance and therefore feedback to the prescribers could not be given.
- d) There was a lack of local epidemiological data on pathogens and their susceptibility, that could guide the physicians to more targeted treatment of the infections, especially to the most common infections in the outpatient care, such as urinary tract infections.
- e) There were no electronic resources for monitoring AMC and bacterial resistance in the community.
- f) There was a lack of communication between primary care and hospital physicians in general, and regarding AMR and AMS related issues in particular.
- g) Commercial marketing appeared to have a strong influence on prescriptions.

Although a medical prescription is required to buy antibiotics in pharmacies on a legal basis, it has been reported to the visiting team that over-the-counter (OTC) sales are frequent.

## 4.2.6 Infection prevention and control

The two hospitals visited had both IPC committees and teams in place. However, regular IPC-related activities were limited, and the IPC teams appear to be insufficiently staffed considering the high levels of AMR. The IPC nurse-to-bed ratio in the hospital in Pristina was 1:500 which is not sufficient to meet the challenges of the rising AMR rates, establishment of HAI surveillance and implementation of IPC measures. Staffing was also problematic in the ICU where a high turnover rate of non-experienced nurses was reported.

The healthcare workers at the two hospitals visited often did not follow good IPC practice as described below and knowledge of international guidelines for preventing device-associated infections was weak. Healthcare professionals did not follow appropriate hand hygiene standards in the wards of the hospitals visited. A hand

hygiene observation programme was not in place in any of the hospitals visited and therefore data on hand hygiene compliance rates were not available.

Observations in the hospital wards visited, including ICUs and the NICU revealed a nearly constant use of gloves, especially from nurses who were not performing hand hygiene according to any of the 5 Moments for Hand Hygiene<sup>18</sup>. Particularly worrying was a lack of standard hand hygiene while caring for different patients, leaving the patient areas, opening doors and touching common areas using the same pair of gloves. Alcohol-based hand rub was not available at the point of care of most of the hospital areas, including the ICUs and the NICU. Most of the hand washing facilities did not have disposable tissue paper, including the NICU in a newly built ward.

In addition, several breaches in standard IPC measures were observed: the dressings of the central vascular catheters were not transparent enough to allow frequent assessment of the exit site resulting in the need to change the dressings more often than required. These frequent dressing changes may increase the risk of infection, bacterial colonisation and skin irritation. For several patients, urinary drainage bags were almost completely filled with urine. Open windows in the ICUs were also noticed.

There is currently no hospital-based surveillance system for HAIs and antimicrobial resistant infections although there is a plan to implement a HAI-surveillance system including antimicrobial resistant pathogens in some hospitals (no details were provided). Furthermore, it was foreseen that some antimicrobial resistant infections and HAIs (yet to be determined which ones) will be reported to the public health epidemiological surveillance services under the category of 'special conditions' within the list of notifiable diseases. Although there is no national surveillance for HAIs, specific time limited research projects have provided some data in this regard. Kosovo has also participated in the ECDC point prevalence protocol meetings of HAIs in acute care hospitals.

There was no screening policy for multidrug-resistant bacteria in the visited hospitals. Outbreak investigations or interventions to reduce transmission of specific pathogens, such as carbapenem-resistant *A. baumannii* (CRAB), were not reported.

The situation regarding the management of AMR in the visited hospitals represents a serious patient safety issue. The number of single rooms in most of the wards, including the ICUs, was not sufficient considering the high number of patients with multidrug-resistant pathogens. Bed occupancy was mentioned as being high in one of the visited ICUs, often at twice the optimal patient capacity and including patients who remain in the ICUs for a very long time related to the lack of palliative care capacity in other institutions. However, during our visit, patient rooms and ICUs were not fully occupied. Beds and areas of patients carrying multidrug-resistant infections were not marked to remind staff to take enhanced precautions. This lack of preventive and awareness measures could potentially result in healthcare staff tolerating or ignoring outbreaks and endemicity with frequent onwards transmission of resistant pathogens in the hospital.

#### **4.2.7 Educational programs on antimicrobial resistance and infection prevention and control**

Starting from the first semester in 2024, two new elective courses have been included in the curricula of medical undergraduate students: patient safety and antimicrobial use and resistance. For nurses, there was already an IPC module as part of their basic education. A specific educational IPC training programme for IPC nurses or other healthcare staff required for specific job profiles was not in place.

Kosovo has a mandatory continuing professional education programme for general physicians, but there were no systematic trainings or meetings for IPC, AMR and antimicrobial stewardship. Post-graduate courses on IPC, AMR and antibiotic prescribing for family physicians and general practitioners were organised sporadically. Web-based courses on these topics were not mentioned by the professional societies.

#### **4.2.8 Public information and behavioural change interventions on antimicrobial resistance**

Considerable efforts were made to increase antibiotic awareness through (i) posters, cartoons of a famous caricaturist with key messages, e-Bug education campaign in schools; (ii) a short antibiotic resistance awareness video (45 sec) broadcast on National TV for free during the World AMR Awareness Week (WAAW) in November 2022; (iii) other activities related to European Antibiotic Awareness Day (EAAD) and WHO WAAW implemented at regional and national level.

There was insufficient knowledge within the general public and often among healthcare practitioners on the use of antibiotics, hand hygiene, and IPC. The adherence to standards in hospital settings was insufficient in the hospitals visited, thus suggesting the need for behaviour change communication campaigns.

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<sup>18</sup> World Health Organization (WHO). Five moments for hand hygiene. 4 March 2021. Geneva: WHO; 2021. Available at: <https://www.who.int/publications/m/item/five-moments-for-hand-hygiene>

Posters with AMR prevention messages were not seen by the visit team in public areas, pharmacies, healthcare settings or public health institutions. However, there were posters available in the microbiology department of NIPHK and in the storage of the regional public health institute.

Limited resources were available to produce information leaflets and posters, as well as for their distribution or display in public spaces where the same fees apply as for advertisements of commercial products. There was no information on how much resources (human and financial) had been allocated to past educational campaigns.

The evaluation of awareness campaigns was not performed regularly or systematically. The last Eurobarometer survey that evaluates awareness regarding antibiotic use was performed in 2017 and suggested a slight improvement in this regard in comparison with previous years. The next Eurobarometer is planned for 2024.

### 4.2.9 Marketing-related issues

There was unhindered access of the pharmaceutical industry to medical doctors and, according to the information received from physicians, this access seems to be used for aggressive marketing (uncontrolled commercial marketing). A code of conduct for the pharmaceutical industry in Kosovo did not exist.

The visit team was informed that pharmacists were allowed to dispense generic medication and were not obliged to provide the exact brand prescribed.

### 4.2.10 Conclusions on human health aspects of antimicrobial resistance

The NRL at the NIPHK has capacity for confirmation of species identification and phenotypic and genomic AST. The NRL participates in international EQAs and collaborations and cooperates with the FVA and University of Agriculture and Veterinary Medicine. The network of six public health laboratories in Kosovo provide laboratory and AMR diagnostic services for the regional hospitals. All laboratories use EUCAST breakpoints and guidance. Although infrastructure and expertise is in place to perform microbiological testing of good quality, a low frequency for taking microbiology samples and an underutilisation of clinical microbiology services for timely patient care and for AMR monitoring were observed. There is also a need to address the lack of communication between microbiologists and clinicians. The ongoing implementation of a web-based LIMS, which is currently unavailable outside of the NRL, will provide data-sharing in real time from the regional public health laboratories and central data analysis capacity which should improve the timeliness of reporting results. This will enhance the ability of the NRL to alert and support AMR outbreak investigations.

Regarding AMR monitoring, there is a need to improve the use of the knowledge gained within the existing network of the six public health laboratories in Kosovo and the experience acquired with the participation of Kosovo in different international surveillance networks (CAESAR, GLASS, ECDC networks). The ongoing implementation of an electronic data management system will provide useful information for AMR surveillance activities. However, apart from reporting data to international surveillance networks, there was no notification of antimicrobial resistant pathogens from laboratories or hospitals to the national level or any alert system for critical resistance profiles. This lack of AMR surveillance system at national level, including definitions and specifications for data processing, leads to an absence of detailed analysis and regular public reporting of existing national data stratified by healthcare setting (hospital-specific/primary care) or geographical/administrative level (national, regional or local level), which would be helpful to design and implement prevention and control activities.

AMC was intermittently monitored in the country using data from imports, sales and, on some occasions, prescriptions (primary care and hospitals). The capacity to monitor AMC nationally was enhanced by reporting national consumption to WHO since 2012, developing research studies and providing other assessments. There were also electronic data available on AMC from hospital pharmacies. Kosovo has a high consumption of antimicrobials compared to the EU and other Western Balkan countries and there is evidence of misuse of specific antibiotics. Despite the existing legislation banning the dispensing of antibiotics without prescription in Kosovo, it was still possible to obtain over-the-counter antibiotics. Moreover, there was neither regular AMC monitoring in hospitals and primary care nor monitoring of antimicrobial prescriptions in the absence of an electronic prescribing system and public health insurance.

During the visit several strengths and improvements were observed on AMS and treatment guidelines in human health including the recent establishment of an AMS committee in Pristina University Hospital, treatment guidelines for primary care and examples of appropriate antimicrobial use in specific wards (neonatology, paediatrics). Despite these advances, a number of weaknesses have been detected such as the misuse of third-generation cephalosporins (ceftriaxone) and the overuse of amoxicillin-clavulanic acid, the lack of a national ASP and continuous training, the absence of guidelines for diagnosis and treatment and surgical prophylaxis in hospitals, and the uncontrolled commercial marketing of antibiotics.

Standard Operating Procedures (SOPs) for IPC have recently been approved (MoH, 2022) and IPC committees were in place in hospitals visited. Engagement and interest in IPC issues from stakeholders and healthcare workers

(HCWs) were observed during the visit. However, despite progress several observations indicate that considerable improvement of IPC in Kosovo is still needed: (i) limited SOP distribution to healthcare facilities; (ii) lack of IPC programme implementation at hospital level with limited activity of the IPC committee; (iv) limited availability and implementation of IPC guidelines at hospital level for example for prevention of device-associated infections; (v) lack of systematic regular IPC training and education for HCWs resulting in the overuse of gloves and refilling of bottles with alcohol hand rub; (vi) lack of hand hygiene compliance surveillance and audits (absence of baseline data, resulting in poor motivation for improvement); (vii) absence of surveillance of HAIs; (viii) IPC understaffing with a 1 nurse:500 bed ratio; (ix) inappropriate infrastructure and equipment.

In the field of AMR and IPC education, a mandatory IPC course integrated in the nursing school curriculum and elective courses on patient safety and antimicrobial use and resistance in undergraduate medical schools has started in 2024. Kosovo had limited professional development plans to train future healthcare professionals on IPC and AMS in the undergraduate curricula of medical and nursing schools and colleges of pharmacy. Furthermore, there were insufficient courses on AMS and IPC as continuous professional development and accredited programmes.

Significant efforts have been observed to increase awareness on the prudent use of antibiotics with activities organised during the EAAD and WHO WAAW. However, posters with key messages were not seen by the visit team in public areas, in pharmacies, healthcare settings or public health institutions. Limited resources were available to produce information leaflets and posters, as well as for their distribution or display in public spaces. Furthermore, there is insufficient knowledge within the public and often among healthcare practitioners on the use of antibiotics, hand hygiene, and IPC. The adherence to IPC standards in hospital settings was insufficient in the hospitals visited, thus suggesting the need for behaviour change communication campaigns. The evaluation of awareness campaigns was also not performed regularly or systematically.

## 4.3 Animal health, food safety and environmental aspects of antimicrobial resistance

### 4.3.1 Diagnostic laboratory services and reference laboratory services

Currently no laboratory within the Ministry of Agriculture Forestry and Rural Development has been officially designated as reference laboratory for AMR in the animal health and food safety sector. Laboratory capacity to undertake bacteriology isolation, pathogen identification and susceptibility testing was available at the FVA within the Food Safety Laboratory (FSL) and Animal Health Laboratories (AHL). The lack of Minimum Inhibitory Concentrations (MICs) testing capacities hindered the possibility of reporting the resistance data to EFSA in accordance with the EU model and none of the laboratories at the FVA were accredited for bacteriology testing according to ISO/IEC 17025. Nevertheless, quality assurance measures and connections with EU laboratories and EU NRLs did exist allowing the possibility to effectively monitor AMR in animals and foods. Molecular diagnostic capacity was also available at the Serology and Molecular diagnostic unit of the FVA with the capacity and expertise to run real-time-PCR that could complement phenotypic testing on specific Antimicrobial Resistance Genes (ARGs).

### 4.3.2 Monitoring of antimicrobial resistance in animals and food

There was no national legislation aligned with the regulatory EU framework on AMR monitoring (Commission Implementing Decision (EU) 2020/1729<sup>19</sup>) and there was no system in place for official AMR monitoring in food-producing animals and foods. Overall, sampling and AST testing were occasional. In the absence of an active monitoring system, baseline on the AMR situation in the animals and foods was currently not available in Kosovo and the assessment of temporal or spatial trends is not possible.

Official samples were taken to test for food-borne pathogens at food processing plants (e.g., testing for microbiological criteria similar to Commission Regulation (EC) No 2073/2005<sup>20</sup>). A Salmonella control plan in poultry farms was developed and active until a few years ago but was currently not implemented. AST of the zoonotic/commensal bacteria isolates was performed only when linked to research projects (e.g. some testing done for *Listeria monocytogenes*). AST of veterinary clinical samples was also performed only occasionally (a handful of samples per year). A collection of *Salmonella* spp. isolates was currently stored in the AHL and was sometimes used for research purposes or as positive controls.

### 4.3.3 Monitoring the use of antimicrobials in animals

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<sup>19</sup> Commission Implementing Decision (EU) 2020/1729 of 17 November 2020 on the monitoring and reporting of antimicrobial resistance in zoonotic and commensal bacteria and repealing Implementing Decision 2013/652/EC; OJ L 387, 19.11.2020, p. 8–21.

<sup>20</sup> Commission Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs; OJ L 338, 22.12.2005, p. 1–26.

The national legislation was not aligned with Regulation (EU) 2019/6, the EU legal framework for the Veterinary Medicinal Products (VMPs)<sup>21</sup>. Among specific requirements concerning the use of antimicrobials in animals (including restrictions on prophylactic and metaphylactic use, provision of prescriptions and record keeping), this legislation obliges EU Member States to collect and report data on the sales and use of antimicrobials in animals.

In Kosovo, the data on sales and/or use of antimicrobials in the veterinary sector were not collected, resulting in the absence of a baseline, assessment of trends and thus targets. The FVA authorised VMPs and had a list of them available on its website<sup>22</sup>. Wholesalers were obliged to inform FVA of the amounts of imported VMPs. They also had to register amounts of VMPs they sold to veterinarians and to provide related data to the FVA. The veterinarians were obliged to inform the FVA of the antimicrobials used in their practice. However, the level of controls in the farming, veterinary and VMP sector was not sufficient and not all veterinarians and wholesalers informed the FVA of their use or sales of VMPs (however, there was only a small number of practising veterinarians and VMP wholesalers, which could facilitate obtaining such data and an overview of the sector).

The team was informed that there was no veterinary prescription as such. Wholesalers were supposed to sell VMPs only to veterinarians. However, it was acknowledged by the competent authorities, for both human health and animal health, that the controls were not sufficient and the animal keepers could easily obtain VMPs/human medicines, including antimicrobials, OTC or from abroad. This situation could additionally distort the national AMC/ASU data for both human and animal health sectors. However, the amount of antimicrobials authorised for humans and sold to the veterinarians in pharmacies to be used for animals was considered relatively small.

#### 4.3.4. Activities to promote the reduced and/or prudent use of antimicrobials in animals

The veterinarians met were aware of AMR in general. Some were also aware of the problems with overprescribing, OTC sales and the possible patient safety risk due to the current AMR situation in Kosovo.

Veterinarians' services were generally affordable for the animal keepers. Any veterinarian can prescribe VMPs on a given farm (with little oversight of the flock/herd health situation). Although AST testing using the disk diffusion method for clinical samples was available at the veterinary laboratory, in practice this possibility was rarely used due to long delays in receiving the results, perceived expense of testing or testing actually being performed abroad.

Activities to promote the reduced and prudent use of antimicrobials in animals (if they were implemented) would confront several obstacles: i) the farming sector in Kosovo was characterised by large number of backyard farms and there was no definition of the size of farm or number of animals that would require registration with FVA; ii) a formal contract between the farmer and the veterinarian overseeing the health of animals on the farm was not required; iii) the number of practising veterinarians was low and technicians with no formal veterinary qualification were also serving the farms; and iv) farmers should have been advised by the veterinarian about the required withdrawal periods but were not obliged to keep treatment records.

The team was informed that some poultry farmers treat their flocks for presumed pathogenic *E. coli* infection with enrofloxacin, a fluoroquinolone listed as Critically Important Antimicrobial (CIA) and as the first line treatment. Allegedly the VMPs were obtained either directly from wholesalers in Kosovo or from abroad with no veterinary oversight. Among the veterinarians met, there was little awareness of the risk of using CIAs, especially colistin. The veterinarians admitted a preference for empirical treatments using wide-spectrum antimicrobials, CIAs and a combination of antimicrobials in order to secure positive treatment outcomes and thus avoiding the risk of losing clients.

There were some examples of prudent use of antimicrobials, such as samples being taken to establish the causes of mastitis in cattle and attempts at selective dry cow therapy (based on the results of the Californian Mastitis Test).

The visit team was informed about recent improvements to infrastructure and biosecurity on a number of medium and large-sized poultry farms with support provided by the government of Kosovo. The veterinarians met were interested in examples of treatment guidelines already available (e.g., FECAVA and Finnish treatment guidelines).

Some of the antimicrobial VMPs authorised in Kosovo are banned in the EU, in particular products intended for use as growth and yield promoters (including colistin in combination with other antimicrobials). Antimicrobials reserved

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<sup>21</sup> 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; OJ L 4, 7.1.2019, p. 43–167. According to the representatives of the FVA, medicated feed was not used in Kosovo. Therefore, the relevant EU legislation (Regulation (EU) 2019/4 of the European Parliament and of the Council of 11 December 2018 on the manufacture, placing on the market and use of medicated feed, amending Regulation (EC) No 183/2005 of the European Parliament and of the Council and repealing Council Directive 90/167/EEC) was not quoted.

<sup>22</sup> <https://auvk.rks-gov.net/download/lista-e-produkteve-mjekesore-veterinare-te-aprovuara-nga-auv>



for treatment of humans (as set out in Regulation (EU) 2022/1255<sup>23</sup>) were not authorised as VMPs. However, they could potentially be bought OTC, notably for use in companion animals. To compensate for low professional fees, the profits from sales of medicines contributed to the veterinarians' income. This situation created a potential for conflict of interest when attempting to promote reduced and prudent use of antimicrobials.

### **4.3.5 Communication activities on antimicrobial resistance and the prudent use of antimicrobials in animals**

The visit team was informed that some lecturers and students from the Veterinary Faculty and some veterinary practitioners attended relevant conferences on AMR in the past (including on a One Health approach). However, the level of awareness of AMR among veterinarians and farmers was still very modest and the education, training and communications on this subject were very limited. The new president of the Veterinary Council expressed his wish to prioritise AMR and aimed to scale up the efforts to educate the practising veterinarians and prospective students on this topic with the One Health implications.

One of the main gaps was the low number of practising veterinarians (together with limited number of students currently enrolled in the Veterinary Faculty) and the lack of requirements for mandatory continuing professional development which could limit the impact of any awareness campaign aiming to change behaviour.

### **4.3.6 Environmental monitoring of antimicrobials and antimicrobial resistance**

This section contains limited information, as representatives from the Ministry of Environment, did not participate in the visit.

In recent years, Kosovo has participated in a study related to AMR monitoring in urban sewage.

According to the health professionals met (doctors, pharmacists and veterinarians), there were no safe routes for the disposal of unused and expired medicines, including antimicrobials, available to them and the general public.

### **4.3.7 Conclusions on veterinary and environmental aspects of antimicrobial resistance**

Whereas laboratory capacity and expertise were available at the FVA, developing and implementing a surveillance system for AMR following the EU model would require a major effort (to organise proper sampling and to upgrade AMR diagnostic capacity to meet EU standards). There is however a good potential for initiating the AMR monitoring at least for some bacteria/species combination and continuing from there.

Monitoring of sales and use of antimicrobials was absent in the country. Animal keepers were able to obtain antimicrobials without veterinary oversight.

There was a lack of awareness amongst veterinarians of the risk associated with the use of broad-spectrum antibiotics as a first-line treatment, including CIAs.

Some VMPs are authorised as growth and yield promoters in Kosovo. In addition, VMPs containing colistin in combination with other antimicrobials were authorised and marketed in Kosovo.

A concern emerged during the visit regarding human resources with a risk of attrition of veterinarians in the coming years and the low numbers of veterinarians and inspectors which are too few even for the small farming/livestock sector in Kosovo.

A key advantage of Kosovo was the relatively small size of the food industry sector with the capacity to target most stakeholders in a short time resulting in a potential high return on investment if awareness actions are designed and supported effectively.

This visit was not successful in engaging in discussion with the relevant stakeholders from the environmental sector in Kosovo.

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<sup>23</sup> Commission Implementing Regulation (EU) 2022/1255 of 19 July 2022 designating antimicrobials or groups of antimicrobials reserved for treatment of certain infections in humans, in accordance with Regulation (EU) 2019/6 of the European Parliament and of the Council; OJ L 191, 20.7.2022, p. 58–60.

## 5. Conclusions

1. There was a comprehensive inter-sectoral NAP on AMR for the period 2019-2021 and AMR specific activities in human health and the veterinary sector have been included into a plan of actions for communicable disease prevention and control 2023-2025 addressing the EC/ECDC Technical Assessment Report from 2018. A dedicated NAP with One Health approach against AMR in Kosovo does not exist.
2. In human health, the NRL for AMR at NIPHK has the capacity to confirm species identification and AST, but there is a low frequency for taking microbiology samples and underutilisation of clinical microbiology services in hospitals. Although a LIMS is under implementation, it is not available to laboratories other than the NRL which makes timely reporting of results to clinicians difficult. In addition, there is a need to improve the communication between microbiologists and clinicians.
3. Kosovo participates in international surveillance networks (CAESAR, GLASS, ECDC networks). Despite the fact of having a network of six public health laboratories and an electronic data management system under implementation, a national AMR surveillance system is not in place yet. Such a system should include data from all types of clinical specimens and have clear objectives and detailed descriptions of data processing and analysis. Surveillance results are currently not reported to clinicians or other stakeholders, including decision-makers. Apart from the information published in GLASS and CAESAR, there are no national reports on AMR at national or regional level in any format, neither for health professionals nor for the general public.
4. Kosovo has AMC data available from hospital pharmacies and reports these data to WHO. Nevertheless, there are no systems in place to monitor AMC in hospitals and primary care. Monitoring of antimicrobial prescriptions cannot be undertaken due to the absence of an electronic prescribing system and national health insurance. Despite the existing legislation banning the dispensing of antibiotics without prescription in Kosovo, it is still possible to obtain OTC antibiotics.
5. Advances on ASPs were described during the visit including the recent establishment of an AMS committee in Pristina University Hospital, the recently completed infectious diseases treatment guidelines for primary care and examples of appropriate antimicrobial use in specific wards. However, there is a lack of a national ASP and related continuous training, the absence of guidelines for diagnosis and treatment of infectious diseases and for surgical prophylaxis in hospital care, and the uncontrolled commercial marketing of antibiotics. Of particular concern is the misuse of ceftriaxone and the overuse of amoxicillin-clavulanic acid in primary healthcare also reported during the visit.
6. SOPs for IPC had been approved by the MoH in 2022. IPC committees were in place in hospitals visited. However, there are several key observations that need to be addressed in order to improve IPC in Kosovo including (i) limited SOP distribution to healthcare facilities; (ii) lack of IPC programme implementation at hospital level; (iii) limited availability and implementation of IPC guidelines at hospital level; (iv) lack of systematic IPC training and education of HCWs; (v) lack of HAI surveillance and hand hygiene compliance surveillance and audits; (vi) IPC understaffing; and (vii) inappropriate IPC-related infrastructure and equipment.
7. Significant efforts were made to increase awareness on the prudent use of antibiotics with activities organised during the EAAD and WHO WAAW. However, there was insufficient knowledge within the public and among healthcare practitioners on the appropriate use of antibiotics and IPC. The adherence to IPC good practices in hospital settings was insufficient in the hospitals visited, thus suggesting the need for behaviour change communication campaigns.
8. Significant work to develop a strategy for AMR surveillance in animal and food, and the monitoring of sales and use of antimicrobials for use in animals is required.
9. The laboratory capacity to conduct AST at the FVA laboratories requires some adjustments to meet the level of EU standards. However, the main stumbling block is the absence of organised sample collection for the active surveillance of AMR, at least for key priority zoonotic and/or commensal bacteria, along with almost no testing of clinical samples. These issues combined, do not allow to measure the spread of AMR in animals and foods in order to establish the baseline and to analyse trends.
10. There are limited data on antimicrobials sales and/or use in the veterinary sector. However, legislative provisions are available at FVA to collect data from wholesalers and perform basic descriptive estimations of sales of antimicrobials (as a starting point, using a list of authorised VMPs).
11. Animal keepers can obtain antimicrobials OTC or from abroad, which raises some concerns on law enforcement activities for the control of antimicrobial use.
12. Significant issues regarding the appropriate and responsible use of VMPs have been identified. There is a lack of awareness amongst veterinarians of the risk associated with the use of broad-spectrum antibiotics, including CIAs, as a first-line treatment. Some antimicrobial VMPs are authorised as growth and yield promoters (using antimicrobials for the purpose of growth and yield promotion is banned in the EU). Some of these VMPs, contained colistin combined with other antimicrobials (VMPs containing colistin in combination with other antimicrobials are not allowed in the EU).
13. The commitment of relevant actors, in the human health, food production and veterinary sectors in Kosovo is a good starting point for improvement of AMR control and promotion of the reduced and prudent use of

antimicrobials. Many EC/ECDC recommendations to control AMR and HAIs are under implementation. Many challenges for monitoring AMR from a One Health approach and establishing efficient prevention and control measures against AMR remain in all sectors and especially in the food production, veterinary and environment sectors. During the country visit, the ECDC/EFSA/DG SANTE team had good engagement with national authorities, service providers and stakeholders in charge of AMR-related One Health activities. This engagement augurs well for future actions to build on achievements to improve AMR control across all sectors.

## 6. Considerations for future actions

The options for future actions provided below have been identified by the team of experts from ECDC, EFSA and DG SANTE, and may be useful for the relevant competent authorities and stakeholders to support Kosovo in further strengthening the development and implementation of a One Health NAP on AMR and immediate and long-term sectoral actions.

### 6.1 Governance and One Health aspects of antimicrobial resistance

#### Intersectoral collaboration and NAP

- a) Resuming meetings of intersectoral committee.
- b) Improving collaboration in a One Health perspective, enhancing the co-operation between human and animal health/food safety and involving the environmental sector.
- c) Continuing with the implementation of the proposed actions in the human health sector and urgently commencing actions in the animal health/food safety sector.
- d) Providing sustainable national funding for activities.
- e) Intensifying the training and awareness raising under a One Health approach for health professionals in the human and animal health sectors. Continuing with awareness raising campaigns directed at the general public, while incorporating One Health messages.

### 6.2 Human health aspects of antimicrobial resistance

#### Priority and key actions

- a) Improving IPC in hospitals.
- b) Stopping OTC sales in pharmacies.
- c) Increasing microbiological sampling and timeliness of reporting of results.
- d) Generating routine data on AMR, AMC and HAIs, and integrating these data into patient management in primary care and in hospitals in the framework of AMS.
- e) Improving collaboration between levels, sectors, and specialties.

Detailed option for actions by area:

#### Diagnostic laboratory services

- a) Increasing microbiological testing by issuing diagnostic stewardship guidance on indications for sampling, appropriate sampling procedures as well as training of healthcare staff.
- b) Improving access to timely clinical microbiology services by establishing LIMS in clinical laboratories and immediate reporting of critical results to clinicians.
- c) Improving feedback and reporting to providers by strengthening communication and collaboration between clinicians and microbiologists and providing feedback from NRL to clinical laboratories.
- d) Improving NRL capacity to support outbreak investigations.

#### Monitoring of AMR

- a) Establishing national AMR surveillance, including data from all clinical specimens, with clear objectives and definitions (including for alerts) and a detailed description of procedures.
- b) Performing data analysis at least quarterly and providing feedback to data providers.
- c) Publishing national reports on AMR.
- d) Making pathogens with critical resistance profiles notifiable.
- e) Including AMR data generated in all six regional Public Health Institutes as part of data provided to the CAESAR network.

#### Monitoring of AMC

- a) Enforcing the legislation banning the dispensing of antibiotics without medical prescription.
- b) Establishing AMC monitoring in hospitals using the data available from hospital pharmacies.
- c) Establishing monitoring of antibiotic prescriptions in primary care.

#### AMS and treatment guidelines

- a) Restricting the use of ceftriaxone in primary care and regulating the commercial marketing of pharmaceutical companies.
- b) Implementing AMS in primary care and hospital settings and including AMS as an objective in the annual planning of healthcare facilities.

- c) Developing local guidelines for prophylaxis, diagnosis and treatment of infections in hospitals under the framework of AMS training activities.

#### **Infection prevention and control (IPC)**

- a) Strengthening hand hygiene practices in hospitals by using alcohol-based hand rub and reducing the inappropriate use of gloves.
- b) Ensuring availability of alcohol-based hand rub solutions at the point of patient care.
- c) Providing regular IPC training for healthcare staff in all facilities.
- d) Increasing IPC staff in hospitals to at least one IPC nurse per 250 beds.
- e) Establishing national surveillance of HAIs and *Clostridioides difficile* infections.
- f) Considering systematic screening in areas with outbreaks or areas endemic for carbapenem-resistant *Acinetobacter baumannii* and carbapenem-resistant Enterobacterales.

#### **AMR and IPC education**

- a) Investing in a professional development plan to train future healthcare professionals by including modules on IPC and AMS in the undergraduate curricula of medical and nursing schools and colleges of pharmacology.
- b) Incorporating AMS and IPC-related training into the continuous professional education priorities of professional societies.

#### **Public information and behavioural change interventions for AMR**

- a) Maintaining current activities and further promoting awareness on the prudent use of antibiotics and IPC (such as e-Bug, posters with cartoons and messages).
- b) Planning a long-term behaviour change communication intervention starting with raising the awareness of the public (continuous public information through media, posters, EAAD, WAAW) and of healthcare providers on the prudent use of antibiotics, hand hygiene and prevention of AMR. In support, ECDC has developed EAAD materials that could be translated into Albanian (Annex 7.2) including communication toolkits to promote prudent antibiotic use aimed at: (i) primary care prescribers; (ii) professionals in hospitals and other healthcare settings; (iii) those self-medicating with antibiotics; (iv) general public; and (v) for engaging in social media activities promoting prudent antibiotic use.
- c) Considering engaging pharmacies, regional PHI, behaviour change communication specialists in planning and evaluating national antibiotic awareness campaigns.
- d) Continuing efforts with national TV, streaming promotional videos and expanding media channels.
- e) Evaluating regularly the impact of the implemented campaigns via national or targeted surveys (e.g., via apps for HCWs), including data collected by the Eurobarometer on AMR.

## **6.3 Animal health and food safety aspects of antimicrobial resistance**

#### **Monitoring of AMR in animal health and the food sector**

- a) Planning for the development and implementation of AMR monitoring in food producing animals and foods. This will require: (i) an estimation of a budget and ensuring adequate resource allocation for its implementation over the coming years; (ii) further strengthening AHL and FSL to monitor commensals and zoonotic agents and to implement MIC testing capabilities on a routine basis (manual or automated); (iii) ensuring alignment with methodology in place in the EU (see legislation and related protocols by the EU Reference Laboratory for AMR (EURL-AR); and (iv) seeking ISO/IEC accreditations starting with ISO/IEC 17025 for bacteriology testing.
- b) Starting a step-by-step implementation of AMR monitoring in food-producing animals and foods, considering:
  - i. Animal species: starting with one species based on the national production (e.g. poultry or cattle) and adding a second species in subsequent years (also rotating species every year);
  - ii. Bacterial species: considering current sampling available (e.g. if *Salmonella* control plan is in place, the monitoring may start by testing susceptibility to antimicrobials of *Salmonella* spp. isolates; or if sampling for microbiological criteria is in place, the monitoring may start from testing susceptibility of the isolates from those samples) or considering starting from *E. coli* as general indicator since sampling intestinal material at slaughter level would be efficient (isolation from all species, samples can be easily collected by slaughter inspectors).
  - iii. Accessibility of samples: focusing on few large farms/companies at the beginning and moving later to obtaining a representative sample of national production.
  - iv. Panels of antimicrobials tested: panels should reflect public health priorities.

- c) Enhancing testing of veterinary pathogens with a focus on a disease/condition of high interest for veterinarians to understand most common AMR situations (e.g. antimicrobial susceptibility of pathogens causing mastitis in cattle).
- d) Further sharing experiences and asking for support and training from other countries and institutions (e.g. EURL-AR, NRLs from Member States and neighbouring countries).

#### **Monitoring of sales and use of antimicrobials in animals**

- a) Prioritising and developing a system for collecting data on sales of veterinary antimicrobials for use in animals to establish a baseline. Collection of data on antimicrobial use in different species can be developed once the collection of sales data is performed routinely as it will be more laborious and resource demanding.
- b) Considering reporting sales of antimicrobials using a Population Correction Unit (PCU) developed by EMA to take into account the country's animal population.
- c) Strengthening the controls of farms, veterinarians, and wholesalers, among others, to enforce the transfer of sales and use data from the wholesalers and veterinarians and to promote and enforce record keeping by farmers.

#### **Activities to promote the reduced and prudent use of antimicrobials in animals**

- a) Implementing existing legislation by intensified controls of farms, veterinarians, and wholesalers, among others, checking stocks of medicines, promoting and enforcing record keeping and reporting obligations for farmers, veterinarians and wholesalers.
- b) If feasible, combining inspections on VMPs with, for example, inspections on animal health and welfare, so that inspectors can check the procedures for medication while on the premises (the use of checklists is advisable). Considering legislative measures to restrict group treatments of animals (prophylaxis and metaphylaxis).
- c) Considering banning the use of antimicrobials for growth promotion or to increase yield, to align with EU legislation.
- d) Considering the withdrawal from the market of antimicrobial VMPs not allowed in the EU. When authorising new veterinary antimicrobials, checking if such a VMP is on the market in any EU Member State and whether additional conditions for the marketing authorisations are needed (e.g. for CIAs).

#### **Education and communication**

- a) Training officials and practising and future veterinarians on the principles of prudent use of antimicrobials and spreading awareness on the impact of overprescribing of antimicrobials in general and the use of CIAs in particular. Encouraging and supporting the participation of students, lecturers and practising veterinarians in relevant conferences (including AMR and One Health).
- b) Urgently commencing training and awareness raising activities targeting officials, veterinary students, and practitioners.
- c) Considering starting rapidly the training activities, to take advantage of the EAAD and/or WAAW (in November 2023).
- d) Engaging with human health to take part in the training activities under a One Health approach.
- e) Using the training resources and AMR awareness raising materials already available (ECDC, WHO, EURL-AR, etc).

## **6.4 Environmental aspects of antimicrobial resistance**

Encouraging the active involvement of the environmental sector in the work related to AMR.

Establishing safe routes for disposal of unused and expired medicines, including antimicrobials.

# Annex 1. Agenda of the country visit

DAY 1: Monday 9 October 2023		
09:00 – 09:45	<p><b>Opening meeting with national authorities and stakeholders</b></p> <ul style="list-style-type: none"> <li>- Ministry of Health</li> <li>- Ministry of Agriculture Forestry and Rural Development</li> <li>- National Institute of Public Health in Kosovo</li> <li>- Food and Veterinary Agency</li> </ul> <p><b>Round table:</b> short presentation of participants</p> <p><b>Presentation from ECDC, EFSA and DG SANTE</b> on the objectives of the visit, expected outputs and outcomes, and the One Health concept</p>	<b>Location: Hotel International</b>
09:45 – 13:15	<p><b>Meeting with the Intersectoral Group on Antimicrobial Resistance Control (GNKRA) (ECDC, EFSA and DG SANTE Team)</b></p> <p><b>Governance, surveillance and One Health aspects of AMR</b></p> <p><b>Objective:</b> gather information on the current situation of AMR governance and AMR surveillance strategies in Kosovo</p> <p><b>Presentations:</b></p> <ul style="list-style-type: none"> <li>- National AMR strategy and its implementation in Kosovo and current policy and legislation in Kosovo</li> <li>- Monitoring of AM use/consumption in human health</li> <li>- Monitoring AMR in human health in Kosovo</li> <li>- Electronic surveillance of AMR</li> <li>- Opportunities and barriers in establishing an AMR National Reference laboratory for veterinary and livestock production</li> <li>- Antibiotic awareness activities</li> </ul> <p><b>Q&amp;A session/discussion on:</b></p> <ul style="list-style-type: none"> <li>- Inter-sectoral coordination mechanism (indicators in section 1.1 of ECDC Assessment Tool)</li> <li>- National Action Plan (indicators in section 1.2)</li> <li>- Organized multidisciplinary collaboration at local level (indicators in section 2)</li> <li>- Monitoring of AMR (indicator 4) and antimicrobial consumption (indicators in section 5)</li> <li>- Clinical diagnostic and reference laboratory services (indicators in section 3)</li> <li>- Public information and behavioural change interventions related to AMR (indicators in section 9)</li> </ul>	<b>Location:</b> same as above
11:00 – 11:15 Coffee break		
13:15– 14:15	Lunch break	

<b>Separate parallel meetings</b>	
14:15 – 15:45	<p style="text-align: center;"><b>ECDC team</b></p> <p><b>AMR in the human health sector – Antimicrobial stewardship and IPC</b></p> <p><b>Presentations:</b></p> <ul style="list-style-type: none"> <li>- Antimicrobial stewardship and Infection Prevention and Control (IPC) in Kosovo</li> <li>- Education on AMR/IPC in curriculum of health professionals</li> </ul> <p><b>Discussions on:</b></p> <ul style="list-style-type: none"> <li>- Antimicrobial stewardship and treatment guidelines (indicator 6),</li> <li>- IPC (indicator 7)</li> <li>- AMR and IPC education (indicators in section 8)</li> <li>- Public information and behavioural change interventions related to AMR (indicators in section 9)</li> </ul>
	<p style="text-align: center;"><b>DG SANTE and EFSA team</b></p> <p><b>Meeting with representatives of the Food and Veterinary Agency on Environmental aspects of AMR</b></p> <p>AMR and ASU monitoring for animal health, food producing animals and foods</p> <p><b>Q&amp;A/discussion:</b></p> <ul style="list-style-type: none"> <li>- Overview of the farming sector in Kosovo</li> <li>- AMR surveillance</li> <li>- Monitoring of Sales and Use of VMPs</li> </ul>
15:45 – 16:00	Coffee break
16:00 – 17:00	<p><b>Meeting with representatives of professional associations and heads of chambers of commerce: (ECDC team only)</b></p> <ul style="list-style-type: none"> <li>- Kosovo Medical Association (Representatives of the Kosovo Society of Clinical Microbiology and Infectious Diseases, Association of Family Doctors, Association of Intensive Care Doctors)</li> <li>- Kosova Chamber of Doctors, Dentists, Pharmacists and Nurses</li> </ul> <p><b>Discussion</b> on educational programs and awareness campaigns, treatment guidelines, strategies and initiatives to reduce antimicrobial consumption/ antibiotic stewardship</p>
	<p><b>Meeting with representatives of the Kosovo Food and Veterinary Agency</b></p> <p>Continued discussion</p>



**DAY 2: Tuesday 10 October 2023**

09:00 – 12:00	<p><b>National Institute of Public Health in Kosovo – all teams</b></p> <p><b>Objective of the visit:</b> having an overview of the bacteriology and AMR diagnostic capacity at NIPHK; how NIHPK ensure its role as the NRL for AMR in HH (and other sectors)</p> <ul style="list-style-type: none"> <li>- Meeting at the director’s office of the NIHPK (presentation of the OH country visit)</li> <li>- Clinical diagnostic and reference laboratory services in human health</li> <li>- Visit of the microbiology lab</li> <li>- Visit to the communicable disease epidemiology/surveillance unit and other relevant units for One Health in AMR</li> </ul> <p><b>11:00 to 12:00 Round table discussion</b> on opportunities and challenges of AMR surveillance, electronic surveillance, prevention, and control in human health, other laboratory-based surveillance for other sectors (animal health, food safety, the environment in Kosovo) and challenges in implementing the One Health approach on AMR.</p>		<p><u>Location:</u> NIPHK Pristina</p>
<b>Separate visits</b>			
13:30– 14:30 Lunch Break			
12:00 – 13:30	<p style="text-align: center;"><b>ECDC team</b></p> <p><b>Kosovo Medicines Agency</b></p> <p><b>Discussion</b> on policy and regulation on the prudent use of AMR antibiotic and AMC monitoring in the human health sector<sup>24</sup>, and on marketing-related issues (indicators in section 10).</p> <p><b>Representative of the Ministry of Health (nearby to NIPHK)</b> to join the meeting</p> <p><b>Objective of the discussion:</b> review Kosovo legislation on AMR and current alignment plans with EU acquis and next steps</p>	<p style="text-align: center;"><b>DG SANTE and EFSA team</b></p> <p><b>Kosovo Food and Veterinary Agency (FVA) and Food and Veterinary Laboratory</b> with representative of <b>NIPH laboratory services</b></p> <p><u>Location:</u> Pristina</p> <p>Visit to Food and Veterinary Laboratory</p> <p><b>Presentation (EFSA)</b> EU harmonised AMR monitoring in Zoonotic and Commensal bacteria in certain food producing-animals and food</p> <p><b>Discussion</b> on AMR surveillance and the potential for Kosovo to establish surveillance based on the EU model.</p>	
14:30 – 17:00	<p style="text-align: center;"><b>ECDC team</b></p> <p><b>Hospital 1</b></p> <p><b>Discussion on:</b></p> <ul style="list-style-type: none"> <li>• <b>AMR prevention and control measures and related needs</b> with hospital managers and healthcare professionals from different wards/departments (surgery, ICU adult, paediatric and neonatal units, oncology department, infectious diseases, infection control, microbiology laboratory and pharmacy)</li> </ul>	<p style="text-align: center;"><b>DG SANTE and EFSA team</b></p> <p><b>The Food and Veterinary Agency (FVA) of Kosovo</b> (continued visit)</p> <p><u>Location:</u> Same as above</p> <p><b>Presentation:</b> Overview of the farming sector in Kosovo, model for veterinary care for food-producing animals and companion animals</p> <p>Reporting of antimicrobial sales and use (ASU) in the EU and the Finnish experience in combatting the AMR and collecting ASU data</p>	

<sup>24</sup> This agency does not cover antibiotic for use in the veterinary sector nor medicated feed.

		<b>Discussion</b> on AMR surveillance and ASU surveillance – the current efforts to obtain data and the prospects of establishing effective surveillance.
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**DAY 3: Wednesday 11 October 2023**

Morning	<p><b>ECDC team</b></p> <p><b>Visit to Hospital 2 and Regional Institute of Public Health</b></p> <p><b>To meet and discuss about prudent use/stewardships of antibiotics, AMR prevention and control measures and related needs</b> with hospital managers and healthcare professionals from different wards/departments (surgery, infectious diseases, infection control, microbiology laboratory and pharmacy)</p>	<p><b>DG SANTE and EFSA team</b></p> <p><b>The Food and Veterinary Agency (FVA) of Kosovo (continued visit)</b></p> <p><u>Location: Same as above</u></p> <p><b>Presentations</b></p> <ul style="list-style-type: none"> <li>- Measures taken to encourage prudent use of antimicrobials in the veterinary sector in Kosovo</li> </ul> <p><b>Discussion</b> on any measures taken to raise awareness of AMR among prescribers and animal keepers to encourage more prudent use of antimicrobials in production and companion animals. Discussion on the current EU VMP legislation and its AMR aspects (in terms of EU acquis). 12:00 – 13:30 The overview of the Finnish experience in combating AMR – the veterinary angle.</p> <p><b>Discussions</b> on available data for antimicrobial sales and use and measures taken to raise awareness on AMR among prescribers and encouraging the reduced and/or more prudent use of antimicrobials in production and companion animals and relevant environmental aspects e.g., disposal of VMPs.</p>
LUNCH	13:00 – 14:00: Lunch break in Prizren	13:30 – 14:30 Lunch break in Pristina
Afternoon	<p><b>ECDC team</b></p> <p><b>Visit to a long-term care facility</b> 15:00 – 17:00</p> <p><b>Objective of the visit:</b> To meet and discuss about prudent use/stewardships of antibiotics, AMR prevention and control measures and related needs</p> <p>Note: this visit was postponed to Thursday 12 October 2023</p>	<p><b>DG SANTE and EFSA team</b></p> <p><b>The Food and Veterinary Agency (FVA) of Kosovo (continued visit) –</b> 14:30 – 17:00</p> <p>Meeting with the veterinarians, veterinary professional organization(s), VMP stakeholders and farming associations</p> <p>Short presentations by the associations on the farming sectors they cover, the memberships levels and activities undertaken by the associations.</p>

**DAY 4: Thursday 12 October 2023**

	<p><b>Meeting with General Practitioners at a primary healthcare centre</b> 10:30 – 11:30</p>	<p><b>Visit to the Animal Health Laboratory and Food Safety Laboratory</b> 14:00 – 16:00</p>
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	<p><b>General practitioner and Paediatricians:</b> To meet and discuss prudent use/antimicrobial stewardship, AMR prevention and control measures and related needs.</p>	<p><b>Discussion</b> of the laboratory capacity for bacteriology and AMR testing</p>
	<p>11:30 – 13:00  <b>Visit to a community pharmacy</b>  <u>Location:</u> Pristina walking distance nearby City Inn</p> <p>Pharmacy: To meet and discuss prudent use/stewardships of antibiotics and public behaviour related with antibiotic use.</p>	
13:00 – 14:00	Lunch	
14:00 – 17:00	Visiting team will prepare for the closing meeting /preliminary report preparation	

#### DAY 5: Friday 13 October 2023

09:00 – 12:00 Coffee break	<p><b>Closing meeting with the national authorities:</b></p> <ul style="list-style-type: none"> <li>- Ministry of Health/ Ministry of Agriculture, Natural Resources and Environment and relevant agencies and stakeholders</li> <li>- Technical experts from national institutions, including the members of GNKRA</li> </ul>
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## Annex 2. List of ECDC antibiotic awareness materials to be translated by ECDC into Albanian for use in Kosovo

The following ECDC EAAD materials could be translated into Albanian language for the use during national campaigns in Kosovo (<https://antibiotic.ecdc.europa.eu/en/plan-campaign>)

- [Communication toolkit to promote prudent antibiotic use aimed at \*\*primary care prescribers\*\*](#)
- [Communication toolkit for \*\*professionals in hospitals and other healthcare settings\*\*](#)
- [Communication toolkit to promote prudent antibiotic use with focus on \*\*self-medication with antibiotics\*\*](#)
- [Communication toolkit to promote prudent antibiotic use aimed at \*\*general public\*\*](#)
- [Toolkit for engaging in \*\*social media activities\*\* promoting prudent antibiotic use](#)

