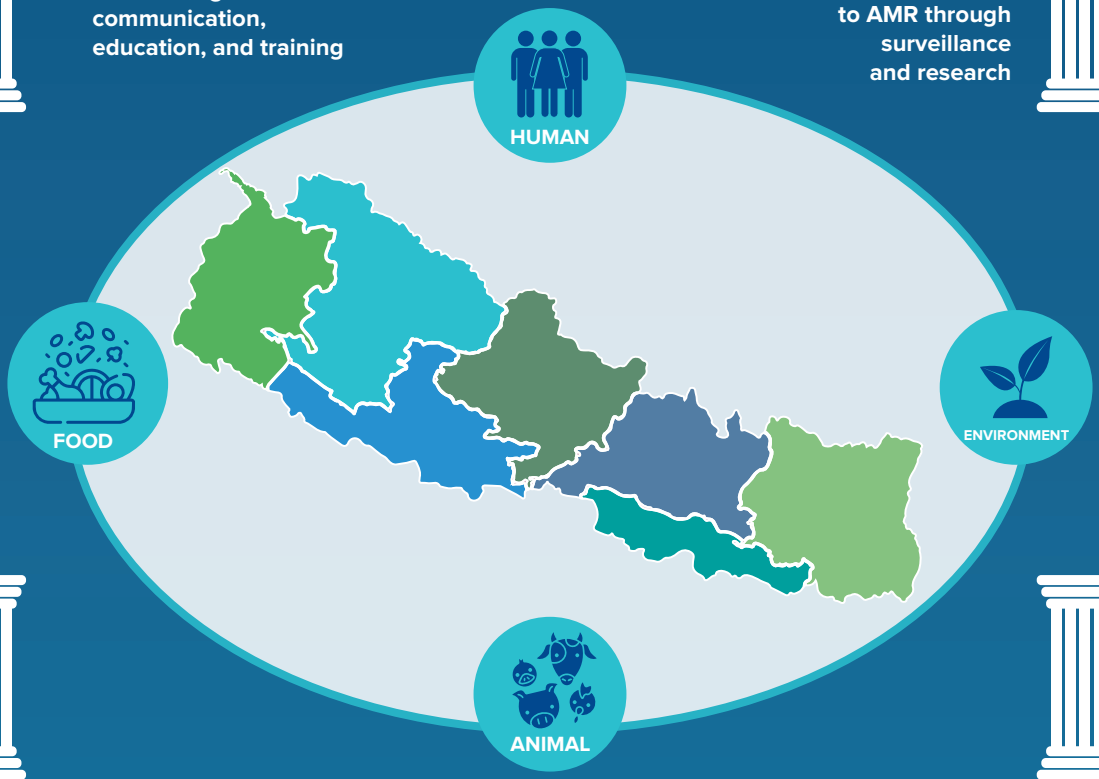
Bulletin

AMR IN ONE HEALTH

FY 2081/82

1. Improve awareness and understanding of AMR through effective communication, education, and training

2. Strengthen the knowledge and evidence related to AMR through surveillance and research



3. Reduce the incidence of infection through effective infection prevention and control

4. Optimize the use of antimicrobial agents in the human, animal, and agriculture sectors

5. Ensure sustainable resources for the containment of AMR along with promoting investment in research and innovation

Government of Nepal
Ministry of Health and Population
Quality Standard and Regulation Division
Ramshahpath, Kathmandu

Disclaimer

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ABOUT AMR BULLETIN

Antimicrobials—including antibiotics, antivirals, antifungals, and antiparasitic agents are essential medicines used to prevent and treat infections in humans, animals, and plants. However, the effectiveness of these medicines is increasingly threatened by antimicrobial resistance (AMR), which occurs when bacteria, viruses, fungi, and parasites stop responding to treatment. This makes infections harder or even impossible to treat, increasing the risk of severe illness, disability, and death.

Nepal faces a significant burden of AMR. In 2021 alone, the country recorded approximately 4,710 deaths directly attributable to AMR and an additional 19,600 deaths in which AMR was a contributing factor[1]. Addressing AMR requires a comprehensive One Health approach that emphasizes the interconnectedness of **human, animal, food, agriculture and environment sectors**.

Recognizing the urgency of the issue, Nepal endorsed the National Action Plan on Antimicrobial Resistance (NAP-AMR 2080/81–2084/85) on Falgun 14, 2080. Developed with high-level political commitment, the plan aligns with the National One Health Strategy 2076 and serves as a roadmap to contain AMR through coordinated actions across relevant sectors. The NAP-AMR outlines five strategic priorities:

- **Awareness and education:** Improve awareness and understanding of AMR through effective communication, education, and training.
- **Surveillance and research:** Strengthen knowledge and evidence related to AMR through surveillance and research.
- **Infection Prevention and Control (IPC):** Reduce incidence of infection through effective IPC measures.
- **Optimized antimicrobial use:** Optimize the use of antimicrobial agents in human, animal, agriculture and environment sectors.
- **Sustainable Resources and Innovation:** Ensure sustainable resources for the containment of AMR along with promoting investment in research and innovation.

Sectoral activities under these strategic priorities are currently being implemented through collaborative efforts. The Quality Standard and Regulation Division (QSRD) of the Ministry of Health and Population (MoHP) serves as the national secretariat for AMR activities. In line with the One Health approach, coordinated action and information sharing among all sectors remain vital to the success of AMR prevention and containment efforts. This bulletin serves as a platform to highlight and disseminate multi-sectoral initiatives, progress, and lessons learned in AMR containment under the One Health framework.

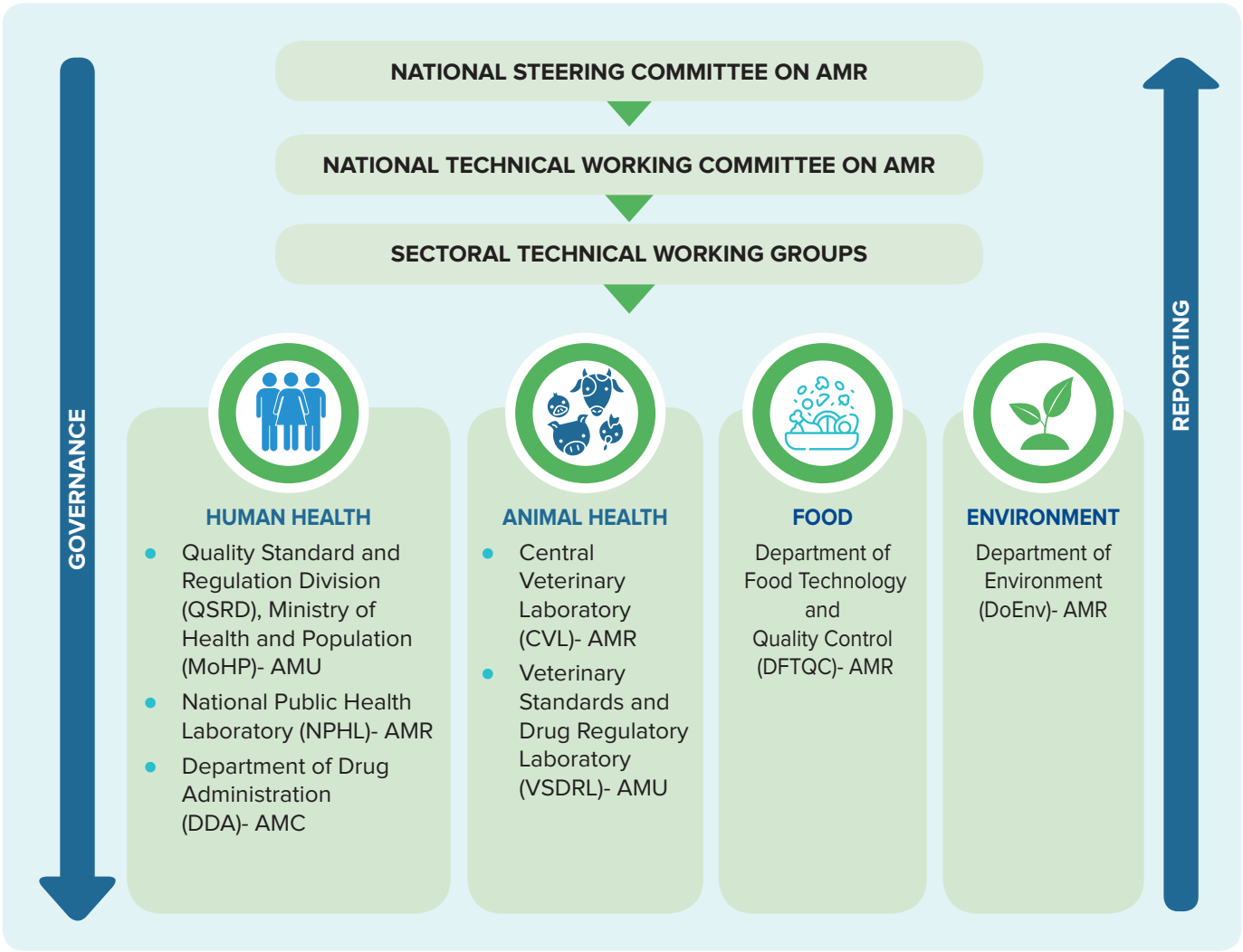
1 Institute for Health Metrics and Evaluation (IHME). GBD Compare. Seattle, WA: IHME, University of Washington, 2021. Available from: https://www.healthdata.org/sites/default/files/2023-09/Nepal.pdf

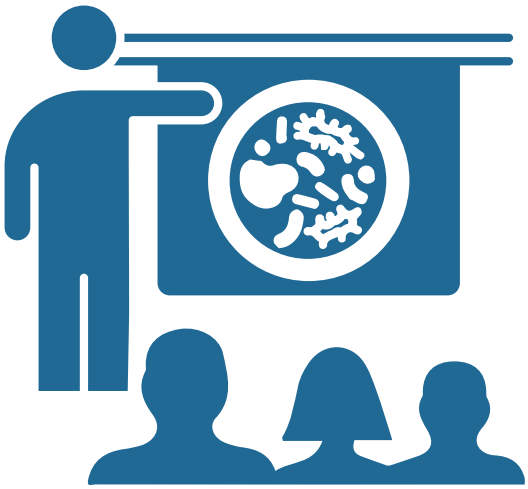
CONTENTS

GOVERNANCE

The National Steering Committee on Antimicrobial Resistance (NSC-AMR) serves as the primary governance body guiding Nepal's national response to AMR. It provides oversight and facilitates coordination to ensure a multisectoral approach in implementing the NAP-AMR across human health, animal health, food, agriculture, and environment sectors. The NSC-AMR works closely with the National Technical Working Committee (NTWC) and other technical working groups within these sectors.

The NTWC leads the implementation of the NAP-AMR through active engagement with key stakeholders and coordinates closely with the NSC-AMR to support execution, provide policy-related recommendations when needed, and ensure cross-sectoral alignment. It also oversees efforts to strengthen surveillance systems for AMR, antimicrobial use (AMU), and other AMR related activities. Various Technical Working Groups (TWGs) under different strategic pillars and in all sectors support the implementation of NAP-AMR activities. During the fiscal year 2081/82, altogether, four NTWC meetings and one NSC-AMR meeting were held.





IMPROVE AWARENESS AND UNDERSTANDING OF AMR THROUGH EFFECTIVE **COMMUNICATION, EDUCATION AND TRAINING**

Human Health

The MoHP has been organizing a series of activities to celebrate the World Antimicrobial Resistance Awareness Week (WAAW) (November 18–24). In 2081, the walkathon commenced at the Department of Livestock Services (DLS) and concluded at the Department of Health Services, symbolizing the collaborative spirit of the One Health approach.

A message from the Prime Minister was also issued on the occasion, reaffirming the government's commitment to containing AMR and promoting the responsible use of antimicrobials across all sectors. Further reinforcing this commitment, a joint press release from all the three ministries (MoHP, Ministry of Agriculture and Livestock Development (MoALD) and Ministry of Forests and Environment (MoFE) was published in Gorkha Patra (national daily), underscoring the need for cross-sectoral collaboration and sustained political commitment in addressing AMR.

The National Health Education, Information and Communication Center (NHEICC) has been leading broader public awareness efforts related to human health. As part of these efforts:

- Radio messages and television broadcasts were aired through national media channels to educate the public on the rational use of antibiotics.
- Advocacy programs were conducted in 10 districts, including Makwanpur, Parsa, Kapilvastu, Dang, Nawalparasi, Salyan, Rautahat, and Tanahun, to raise awareness and promote responsible antibiotic practices at the community level.

The National Health Training Centre (NHTC) has played a key role in strengthening AMR prevention and response among healthcare professionals.

- A three-day basic training course on AMR was developed and delivered using a Training of Trainers (ToT) model to promote wider dissemination of knowledge.
- Since the launch of the basic training on 2077/01/13, 13 batches have been conducted, with 187 healthcare professionals successfully completing the course. In addition, the ToT program, initiated on 2077/11/16, has trained 61 participants across 5 batches.
- In light of the recent development and implementation of new national guidelines, including the National Antimicrobial Treatment Guidelines 2023 and One Health approach, NHTC has recognized the need to update the AMR training manual. The revision of course modules and training manuals is currently underway in close consultation with subject matter experts and relevant stakeholders.
- Pre-service training for healthcare professionals has included AMR content, with AMR addressed as a cross-cutting issue within other training programs.
- NHTC has been developing an e-learning platform which also plans to include AMR-related training content.

Animal Health

DLS has been implementing a range of activities to increase awareness and promote judicious use of antimicrobials within the animal health sector.

- Various awareness programs have been conducted through the Agriculture Information and Training Center (AITC), Provincial Livestock Training Centres and DLS.
- AITC has produced a documentary focused on AMR to raise awareness and promote understanding of the issue. In addition, AITC has developed a comprehensive three-day training curriculum targeted at officer-level personnel and successfully conducted training sessions based on this curriculum.
- Training programs organized through DLS were conducted targeting agro-vets, farmers, and veterinary technicians, reaching a total of 797 participants.
- Various awareness programs promoting Good Animal Husbandry Practices (GAHP) were conducted to strengthen biosecurity and encourage rational use of antimicrobials.
- Information, Education and Communication (IEC) materials on biosecurity, GAHP, judicious antimicrobial use, and vaccination were developed and disseminated.
- Public service announcements were broadcasted through various media platforms, focusing on safe meat and milk consumption, animal disease outbreak alerts, and preventive practices.
- Key events, such as World Zoonoses Day (June 6), One Health Day (November 3), and WAAW were observed to promote awareness and cross-sectoral collaboration.
- Communication programs were conducted by district-level veterinary hospitals with local authorities to build awareness on AMR and AMU.
- Veterinarians and para-veterinarians were sensitized on AMR, AMU, and judicious use of antimicrobials in different programs (targeted trainings and as a supplement in other associated training programs).
- Laboratory findings on AMR were shared with veterinarians and para-veterinarians to support evidence-based and rational treatment decisions.

Food Sector

The Department of Food Technology and Quality Control (DFTQC) has been actively working to raise awareness about food-borne AMR through targeted efforts informed by national assessments.

- A ToT program on food safety and food-borne AMR was organized, specifically targeting government officials from the animal health and food sectors across provinces to strengthen provincial-level capacity.
- Comprehensive information, IEC materials in Nepali language have been developed to promote the implementation of Codex AMR texts, ensuring standardized messaging and practices.
- Awareness programs were conducted for students in food technology institutions, members of the Nepal Food Scientists and Technologists Association (NEFOSTA), as well as veterinarians, pharmacists, and environmental professionals.
- A three-day capacity building training on food safety compliance for meat processing industries was organized to improve food hygiene through Good Manufacturing Practices (GMP) and Good Agricultural Practices (GAP), and compliance with food safety standards aimed at containing food-borne AMR.
- Guidelines based on GMP were developed and implemented to monitor processed water, milk, meat industries, and sanitation in hotels and restaurants. The GMP guidelines and the Food Hygiene and Quality Act 2081 have also been enforced.
- In collaboration with the Food and Agriculture Organization (FAO)'s Action to Support Implementation of Codex AMR Texts (ACT) project, DFTQC has engaged youth across the nation to advocate for food safety and disseminate messages on food-borne AMR.
- Annual events, including World Food Safety Day (WFSD) and WAAW, were organized in collaboration with One Health actors, development partners, private sector stakeholders and youth groups.
- DFTQC laboratory personnel, in collaboration with FAO-ACT Nepal, are participating in FAO's Assessment Tool for Laboratories and AMR Surveillance Systems (ATLASS) virtual online training, organized by the FAO Regional Office for Asia and the Pacific (RAP), to strengthen capacity of laboratory personnels to conduct ATLASS assessment of regional laboratories for AMR testing.
- A study on the prevalence of AMR and resistant genes in commercial fish farms is underway in collaboration with the FAO-ACT project and Agriculture and Forestry University. The study also includes mapping the sales and distribution of processed fish products from Bara district. The report is expected by the end of January 2026.

STRENGTHEN KNOWLEDGE AND EVIDENCE ON AMR THROUGH SURVEILLANCE AND RESEARCH

Human Health

A five-year roadmap for the National Public Health Laboratory (NPHL) has been developed, with plans underway to translate this roadmap into a comprehensive national strategy for AMR surveillance and laboratory strengthening.

Strengthening laboratory quality and surveillance systems

To ensure the quality and reliability of AMR surveillance data, NPHL has implemented multiple laboratory quality assurance initiatives:

- A standardized AMR laboratory evaluation checklist has been developed and is routinely used to assess participating laboratories.
- Proficiency testing (PT) panels are distributed to AMR surveillance sites three times a year. Test results are reviewed systematically, and technical feedback and recommendations are provided.
- To enhance microbiological testing quality, NPHL piloted a modified External Quality Assessment (EQA) approach using the Denmark Technical University (DTU) EQAsia modality. Under this model, each PT round includes five isolates (two target pathogens, one non-target pathogen, and additional controls), compared to the earlier practice of distributing two isolates only.
- To further improve laboratory quality, NPHL has distributed American Type Culture Collection (ATCC) reference strains to surveillance sites. Several laboratories have strengthened quality control practices, including temperature monitoring, sterility checks, media performance verification, and routine use of control strains.

Molecular surveillance and advanced diagnostics

- To strengthen national capacity for detecting bacterial resistance mechanisms, NPHL is conducting pilot molecular surveillance activities at five sites: Kathmandu Medical College (KMC), Tribhuvan University Teaching Hospital (TUTH), Bir Hospital, Kanti Children's Hospital, and NPHL.
- These pilots focus on detecting key resistance genes, including:
  - Extended-spectrum beta-lactamase (ESBL) genes (e.g., *CTX-M, TEM, SHV, OXA-10/11*),
  - Carbapenemase genes (e.g., *KPC, VIM, IMP, NDM, OXA-48, OXA-23, OXA-51, OXA-58*), and
  - Methicillin-resistant *Staphylococcus aureus* (MRSA)–associated genes (*mecA, mecC*).

These activities support improved detection of resistance patterns in both hospital-acquired infections (HAIs) and community-acquired infections (CAIs).

- NPHL is also preparing a protocol for bacterial Whole Genome Sequencing (WGS), with a focus on AMR pathogens and outbreak investigations. While viral WGS is already operational, identification of reagents and workflows for bacterial WGS—covering both Illumina and Nanopore platforms is currently underway.

Capacity building, data management, and coordination

- Regular training programs are conducted on bacterial identification, antimicrobial susceptibility testing (AST), quality management systems, mycology, multidrug-resistant organism identification, and laboratory data management.
- AMR review meetings are organized to facilitate data sharing and coordination among stakeholders from human health, animal health, food, and environmental sectors.
- NPHL has developed and regularly updates guidelines, protocols, and Standard Operating Procedures (SOPs) to harmonize laboratory practices across AMR and non-AMR sites. These documents are accessible through the NPHL website, and protocols for biorepository management are currently under development.
- Collaboration with private laboratories has been initiated. A budget proposal has been submitted to the Government of Nepal for FY 2082/83 to support capacity-building in data collection, analysis, reporting, and laboratory management with private-sector engagement.

Surveillance expansion and infrastructure support

- Expansion activities are ongoing at the provincial level, supported by laboratory assessments, infrastructure development, and equipment distribution including supplies received through the Fleming Fund Country Grant for Nepal (FFCGN) and WHO Pandemic Fund.
- Equipment and resources have been provided to 25 hospitals with more than 50 beds, and selected microbiology laboratories nationwide to expand microbiology testing capacity.
- NPHL conducts routine monitoring and evaluation, including site visits, on-site orientation, and technical support using standardized assessment tools.
- Facilities such as MALDI-TOF (VITEK MS) and VITEK 2 (automatic AST platform) are used at NPHL for confirmatory testing and AST. Surveillance sites may send isolates for confirmation or advanced testing. These services are provided free of charge to AMR surveillance sites, while non-AMR sites are charged a nominal fee.
- Critical alert pathogens must be referred to NPHL for confirmation and inclusion in the national biorepository. Surveillance sites are encouraged to maintain their own biorepositories.

One Health surveillance and research

- NPHL shares national AMR surveillance data annually through the World Health Organization (WHO)'s Global Antimicrobial Resistance and Use Surveillance System (GLASS).
- The ESBL *Escherichia coli* Tricycle project initiated in 2019 and extended due to COVID-19 has evolved into Joint AMR Surveillance for ESBL-producing *E. coli* across human, animal, and environmental sectors which is currently supported by FFCGN.
- A Mycology Reference Laboratory has been established at NPHL, with plans to develop it into a national reference centre. Two microbiologists have received advanced training at the Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, and further training is planned with WHO support.

Use of AMR data for action

AMR surveillance data generated through NPHL are used at multiple levels:

- **Local level:** to support appropriate antibiotic selection and development of hospital antibiograms.
- **National and global levels:** for trend analysis, outbreak response, monitoring hospital-acquired infections, and tracking cross-border spread.
- **AMR data** have informed National Action Plans, treatment guidelines, burden estimation, and outbreak investigations.

NPHL continues to strengthen One Health surveillance, sensitizing sentinel sites to refer critical pathogens for detection of emerging resistance patterns. While this practice is not yet fully institutionalized, progress is being monitored toward routine implementation.

Animal Health

CVL has been Implementing activities to strengthen AMR surveillance, laboratory capacity, and data generation within the animal health sector.

Capacity building and laboratory strengthening

- CVL has conducted capacity-building activities for laboratory personnel, veterinarians, and technicians from local and provincial levels on AMR-related topics, including specimen collection, dispatch, and epidemiological reporting.
- Field level trainings have been organized for local and provincial staff focusing on proper specimen collection and shipment.
- Laboratory placement training has been conducted through CVL and veterinary laboratories, covering microbiology modules such as bacterial culture and AST.
- Bacterial identification and AST of clinical samples have been conducted at CVL since 1995, establishing a strong foundation for AMR testing in the veterinary sector.

AMR surveillance and quality assurance

- Active AMR surveillance in the animal sector was initiated in 2020 with support from FFCGN, with four Veterinary laboratories testing samples from poultry. It has been expanded to all veterinary laboratories and the National Avian Disease Investigation Laboratory (NADIL) as of 2025.
- Several SOPs have been developed for AMR surveillance activities, including specimen collection for AMR detection in healthy poultry, isolation and identification of *E. coli, Enterococcus spp, Campylobacter, Salmonella* spp.
- ATCC strains are maintained in all veterinary laboratory and are used for quality control purposes.
- A unified Laboratory Information Management System (LIMS) has been adopted across all veterinary laboratory network to ensure standardized data collection and reporting.
- National External Quality Assessments (NEQAS) are conducted by CVL to monitor laboratory performance and ensure quality standards. Five veterinary laboratories, NADIL, and DFTQC participated in NEQAS organized by CVL.

Advanced diagnostics and one health linkages

- Facilities such as BD-Phoenix, MALDI-TOF (VITEK MS) and VITEK 2 (automatic AST platform) are used for bacterial indentification and AST within the veterinary laboratory network.
- Molecular level work targeting mcr-1 gene has been established at CVL.
- Laboratory-clinical Interface (LCI) strengthening programs are conducted periodically to improve communication between laboratories and veterinarians.
- The microbiology section of CVL serves as the focal point for InFARM AMR reporting.
- Sampling of chickens, pigs and dairy animals from market are periodically conducted to monitor trend of AMR.

Antimicrobial residue surveillance in animal products

- For the surveillance of antibiotic residues in food of animal origin, such as meat, milk, eggs, and fish, VSDRL has drafted a *Surveillance Plan for Antimicrobial Residues in Animal Products*, which is currently under review for approval.
- To support the development of national standards for determining the Maximum Residue Limits (MRLs) of antimicrobials, VSDRL is currently reviewing and preparing a comparative chart of MRLs established by globally recognized bodies such as the Codex Alimentarius, the European Union, and standards set by other countries.
- VSDRL is also reviewing previous reports on antimicrobial residue detection in food of animal origin to support the formulation of evidence based, country specific MRLs, in coordination with DFTQC.
- Following approval of the surveillance plan, VSDRL and CVL are planning to implement antimicrobial residue surveillance in animal products in accordance with the *Surveillance Plan for Antimicrobial Residues in Animal Products*. This will produce useful information on the status of antimicrobial residues in food from animal products. In addition, VSDRL is establishing quantitative methods for the confirmatory detection of selected antimicrobials in food from animal products.

Food Sector

DFTQC focuses on promoting recognition of Codex texts, strengthening food-borne AMR surveillance, and evaluating the regulatory framework to support effective policy implementation and enforcement.

Surveillance activities

- Passive AMR surveillance of foods of animal origin was initiated in December 2021 with support from FFCGN.
- Active AMR surveillance was conducted on processed meat products in 2022, and on yogurt in 2025 with support from FFCGN. The findings were disseminated to the stakeholders.
- Joint food-borne AMR surveillance has been carried out along the poultry value chain in collaboration with the DLS with support from FAO.
- Food-borne AMR surveillance was expanded to the provincial level in 2025. With technical and logistical support from FFCGN, the microbiology laboratory at the Nepalgunj Food Technology and Quality Control Office (Lumbini Province) was refurbished, and food-borne AMR surveillance in the province was initiated in July 2025.

Laboratory strengthening and capacity building

- A laboratory manual for the isolation, identification, and AST of food-borne pathogens has been developed and revised.
- A protocol for active AMR surveillance in meat products has been developed.
- A protocol for active AMR surveillance in yogurt has been developed.
- Hands-on AST training at Chulalongkorn University was provided to the laboratory personnel in AMR and antimicrobial residue testing with support from the FAO-ACT project.
- The National Food and Feed Reference Laboratory (NFFRL) at DFTQC was assessed using the FAO-ATLASS tool (laboratory module) and the FAO ATLASS surveillance module for the national AMR surveillance network in the agri-food system, applying a One Health approach.
- DFTQC has been regularly participating in EQA programs, including EQAsia and Proficiency Testing of AST (PTAST) at Chulalongkorn University, Bangkok, since 2022.
- DFTQC is establishing and strengthening antimicrobial residue testing at the department by fully operationalizing the Liquid chromatography–mass spectrometry (LC-MS) unit, providing hands-on training on LC-MS to the laboratory personnel and planning a pilot surveillance of antimicrobial residue testing from animal feed and processed food of animal origin.
- Along with external assessment, there has been participation in NEQAS provided by the CVL.

Research and regulatory assessment

- In collaboration with the FAO-ACT project and the Central Department of Microbiology, Tribhuvan University, DFTQC conducted qualitative and quantitative analyses of AMU among poultry farmers to understand knowledge, attitudes, and practices, and explore how these relate to behaviours and economic considerations in poultry farming.
- Using the FAO-ACT tool, DFTQC reviewed the national AMR regulatory framework with a One Health approach, identified gaps, and provided recommendations to the Ministry to improve the legal framework of AMR in alignment with Codex standards.

Environment Sector

- A microbiology laboratory has been established, with laboratory equipment and essential reagents for AMR surveillance.
- A two-year strategy for AMR surveillance in the environment sector has been drafted.
- Protocols for environment AMR surveillance and joint surveillance of ESBL producing *E.coli* across humans, poultry, and the environment are finalized.
- A SOP for bacteriology has been drafted and is under review for finalization.
- A six-day training on microbiological analysis has been successfully completed.
- Joint AMR surveillance is being conducted.

A data review and **reflection workshop** was organised under the leadership of **MoHP**, with participation from **One Health stakeholders**, to share **AMR, AMU and AMC data** on a **common platform**. The workshop provided an **opportunity** for **multisectoral stakeholders** to come **together, exchange insights, and recommend** on both sector-specific and cross-sectoral policy actions.

REDUCE THE INCIDENCE OF INFECTION THROUGH **EFFECTIVE INFECTION, PREVENTION AND CONTROL**

Human Health

NHTC has been implementing basic and blended Infection Prevention and Control (IPC) trainings in provincial and federal hospitals as part of whole-site orientation program. In nearly all clinical trainings, IPC is integrated as a key component. **The Nursing and Social Security Division (NSSD)** serves as the focal point for IPC coordination, supporting the implementation of IPC activities across health facilities. Their key activities include:

- Induction training for school health nurses has been conducted, focusing on personal hygiene practices.
- The National IPC Guidelines (2079) and the IPC Manual (2080) have been officially launched.
- Health facility IPC assessment is regularly being conducted in all the federal level health facilities in line with the national IPC guideline.
- IPC committees have been established in federal health facilities to lead implementation efforts. A draft *National Infection Prevention and Control Strategy* has also been prepared.
- SOP on HAI has been drafted, and the HAI surveillance program has been piloted in five federal level health facilities.

The Family Welfare Division (FWD) has been implementing immunization activities in human health.

- Health workers with support from Female Community Health Volunteers, have conducted household visits to identify children who have missed vaccinations, and encourage caregivers to have them immunized.
- The National Immunization Program continues as a priority program.
- Every year, the month of Baisakh is observed as National Immunization Month across the country, during which public awareness campaigns are carried out to encourage vaccination of missed doses. Informational and awareness messages are also disseminated through the National Immunization Program's Facebook page.

Animal Health

DLS has been leading IPC efforts in the animal health sector, focusing on biosecurity training for farmers and promoting GAHP. Key activities include:

- A handbook on biosecurity and prudent use of antimicrobials in poultry farms has been published.
- Biosecurity training for veterinarians organized in coordination with the Nepal Veterinary Association (NVA).
- GAHP has been endorsed to strengthen farm biosecurity and promote rational use of veterinary drugs.
- Hospital-based activities for IPC have been discussed at the Central Referral Veterinary Hospital, and programs are being conducted to minimize HAI infections.

OPTIMIZE THE USE OF ANTIMICROBIAL AGENTS IN THE HUMAN, ANIMAL, AND AGRICULTURE SECTORS

Human Health

MoHP has been organising various activities for the promotion of rational use of antibiotics.

- MoHP, with support from the FFCGN, organised an orientation program on the National Antimicrobial Treatment Guideline 2023, engaging more than 25 public and private hospitals. The program aimed to raise awareness of the guideline and support its use in clinical practices.
- The ministry has prepared a draft of "National guideline on Antimicrobial Stewardship Program (AMSP) in Health Facilities of Nepal" with the support of WHO Nepal.
- The "Protocol for Antimicrobial Use Point Prevalence Survey (PPS) in Hospitals of Nepal" is in the approval phase.
- Hospital-based AMU PPS, supported by Fleming Fund has been completed in 24 hospitals.

The Curative Service Division (CSD) organised orientation programs on the National Antimicrobial Treatment Guideline 2023 at the provincial level.

- Workshops were conducted in Chitwan and Biratnagar with 20 – 25 medical officers and consultants from hospitals across Koshi, Madhesh and Bagmati provinces.
- An orientation on AMSP was also conducted for health professionals in Sudurpaschim and Karnali provinces with 25 participants from five selected hospitals, including hospital directors (Chief/ Medical Superintendent), clinicians (medical officers or consultants), nursing staff, pharmacy staff, and laboratory personnel.
- Following the training, each hospital developed a tailored action plan for AMSP implementation at their institution with realistic timelines.

The DDA leads activities related to antimicrobial consumption (AMC) and enforcement of regulations concerning the use of antimicrobials.

- AMC data is submitted to the GLASS AMU platform.
- The Guideline for Management of Pharmaceutical Waste has been officially endorsed, and the National List of Essential Medicines is under revision.
- The Risk-Based Post-Marketing Surveillance (RB-PMS) program now includes antibiotics, and a public notice has been issued restricting the sale of reserve antibiotics from hospital pharmacies only.
- DDA functions as the National Pharmacovigilance (PV) Center, designating various hospitals as regional PV centres.
- Currently, 19 hospitals participate in Adverse Drug Reaction (ADR) reporting.
- The Good Pharmacy Practice (GPP) and Good Storage and Distribution Practice (GSDP) guidelines have been revised and implemented to ensure proper storage and handling of medicines.
- Data collection through Post Marketing Software (PMS) is ongoing.
- The annual work plan and budget also include awareness raising programs on the rational use of medicines for relevant stakeholders.
- The AMC TWG has been established and is actively engaged in its tasks.
- DDA continues regular monitoring and inspections of drug stores, taking necessary actions against those violating the Drug Act, 2035.

At the end of the fiscal year, the QSRD organised an annual review workshop, bringing together One Health stakeholders to review progress in implementing NAP-AMR.

Animal Health

In animal health sector, under the leadership of DLS, a Practitioner Engagement Program (PEP) has been being implemented as part of stewardship efforts for containing AMR.

- In 2017, an official ban on the use of antibiotics as growth promoters in animal feed was issued.
- The Government of Nepal has banned the use of antimicrobials in poultry feed. AMU surveys are conducted nationwide to monitor the trend of antimicrobials use in the poultry sector.
- An AMU survey protocol has been developed for dairy animals.
- Treatment guidelines for different clinical conditions in animals have been drafted.
- Protocols for AMU survey in poultry and cattle have been developed, while protocols for aquaculture and pigs are currently in the draft stage.
- An Antimicrobial Stewardship (AMS) Committee with ToR was formed at the DLS.
- AMS Action plans for veterinary sector are drafted and awaiting approval from DLS.

ENSURE SUSTAINABLE RESOURCES FOR THE CONTAINMENT OF AMR ALONG WITH PROMOTING **INVESTMENT IN RESEARCH AND INNOVATION**

Through several **initiatives,** different sectors are **strengthening** their efforts to generate **evidence on antimicrobial resistance.**

Human Health

- The **Nepal Health Research Council (NHRC)** completed a national study titled "Situational Assessment of Antibiotic Use and Its Resistance in Nepal (2020–2021)", focusing on both human and animal health sectors. In addition, a study on "Environmental Antimicrobial Resistance (AMR) Profiling in the Bagmati River" was initiated in 2025 and is currently ongoing.
- Research projects conducted at Bir Hospital and Seti Provincial Hospital are assessing the economic burden of AMR, further contributing to evidence-based policymaking.

Animal Health

- In the animal health and aquaculture sectors, a collaborative research study has been launched in the commercial aquaculture of Bara District to assess the status of AMR. This study is being carried out in collaboration with the FAO, Agriculture and Forestry University (AFU), DLS, and the ACT project.
- The Fleming Fund fellows are in the process of developing a Monitoring and Evaluation (M&E) Plan for the NAP-AMR, with the objective of enhancing accountability and tracking progress across sectors.
- The National Animal Health Research Center under the Nepal Agricultural Research Council (NARC), Khumaltar, has traditionally been organizing expert consultation workshops to guide research and set research priorities. However, these activities have not been aligned with the NAP-AMR and have been implemented as internal research project of NARC.
- Under the NARC, the National Animal Health Research Center in Khumaltar has been conducting the Monitoring of Antibiotic Resistance in Pathogens Isolated from Food Animals (MARPFA) program for the past five years. As part of MARPFA, a study was conducted in 250-layer poultry farms across four districts to assess the types of antibiotics used by farmers, their dosages, and methods of administration. Additionally, samples collected from these farms, specifically cloacal swabs, were tested for the presence of *Salmonella* and *E. coli*. The study is also analyzing the minimum inhibitory concentration (MIC) of antibiotics for these bacteria and identifying resistance genes.
- WGS of *Salmonella* and *E. coli* has also been initiated using the Oxford Nanopore platform, but due to limited resources and lack of adequate human capacity, operations have not yet been smooth.

The Fleming Fund
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