
**MULTI-SECTORAL NATIONAL
ACTION PLAN ON
ANTIMICROBIAL RESISTANCE
MONGOLIA, 2022-2025**

JOINT ORDER OF THE MINISTER OF HEALTH AND MINISTER OF FOOD AGRICULTURE, LIGHT INDUSTRY

Date: May 02, 2022

Number A/255, A/137

Ulaanbaatar city

Approval of action plan

The joint order is issued based on the Clause 2 of the Article 24 of the Law on Government and Government action plan for 2020-2024 approved by the Government resolution N 203 in 2020.

1. Approve the “Multi-sectoral national action plan on antimicrobial resistance for 2022-2025.
2. Assign the Medicine and Medical Devices Regulatory Agency (D. Narantuya) and General Authority for Veterinary Medicine Services (D. Batchuluun) to ensure implementation of the national action plan and establish multi-sectoral national committee to monitor, discuss implementation results every half year and inform to Government ministries.
3. Assign the State Secretary of Ministry of Health (Ts. Erdembileg) and State Secretary of Ministry of Food, Agriculture and Light Industry (T. Jambaltseren) to monitor implementation of the multi-sectoral national action on AMR.
4. Assign all directors, heads of the health and food, agriculture and light industry organizations to estimate and plan annual budget for implementation of the national plan at organization’s level.

MINISTER OF HEALTH

S. ENKHBOLD

**MINISTER OF FOOD,
AGRICULTURE, LIGHT
INDUSTRY**

MENDSAUKHAN.Z

Contents

Abbreviations	4
Background.....	7
Rationale to develop the strategy	7
Prevalence of antibiotic consumption in Mongolia.....	9
Prevalence of AMR in Mongolia	90
Purpose of the strategy	Errore. Il segnalibro non è definito.
Strategic objectives	10
Expected outcomes.....	111
Budget required for the implementation of the NAP: results of the cost and budget estimation exercise.....	122
Monitoring and evaluation	133
References	144
Planned activities of the multi-sectoral national action plan on AMR (2022-2025)	16

Abbreviations

AMR	Antimicrobial Resistance
ATC	Anatomic Therapeutic Class
AWaRE	Access, Watch and Reserve
COVID-19	Corona Virus Disease of 2019
DDD	Daily Defined Dose
DID	Daily Defined Dose per 1000 Inhabitants
FAO	Food and Agriculture Organization
GAP	Global Action Plan
GASI	Government Agency for Specialized Inspection
GAVS	General Authority for Veterinary Services
GDHI	General Department for Health Insurance
GLASS	Global Antimicrobial Resistance and Antibiotic Use
IVM	Institute for Veterinary Medicine
MMRA	Medicines and Medical Devices Regulatory Agency
MNUMS	Mongolian National University of Medical Sciences
MULS	Mongolian University of Life Sciences
MoFALI	Ministry of Food, Agriculture and Light Industry
MoES	Ministry of Education and Science
MoET	Ministry of Environment and Tourism
MoF	Ministry of Finance
MoH	Ministry of Health
NAP	Multi-sectoral national action plan on AMR
NCCD	National Center for Communicable Diseases
NCHD	National Center for Health Development
NCPH	National Center for Public Health
NCZD	National Center for Zoonotic Diseases
NGO	Non-government organization
SRLFM	State Reference Laboratory for Food and Medicine
OIE	World Organization for Animal Health
OTC	Over -The- Counter
PPI	Plant Protection Institute
SCVL	State Central Veterinary Laboratory
SDG	Sustainable Development Goals
SLVMTC	State Laboratory for Veterinary Medicine Testing and Certification
UN	United Nations
WAAW	World Antibiotic Awareness Week
WHO	World Health Organization

Background

Antimicrobial resistance (AMR) is a major problem that affects our ability to treat infections in all countries and all people. Resistant organisms can easily spread through human and animal migration, food or water, and resistant genes can be transferred from one species to another, without any consideration about one's wealth or status or any geographical or ecological restrictions. Therefore, countries should coordinate and control AMR across all stakeholders, including governments, international organizations, private entities, investors and individuals.

Internationally, substantial guidance and tools for containing and combating AMR are available. In 2015, the Global Action Plan on Antimicrobial Resistance (GAP) was endorsed by the Member States of the World Health Organization (WHO), Food and Agriculture Organization (FAO) and World Organization for Animal Health (OIE) in 2015.(1) The GAP included 5 strategic objectives offering a framework for national action plans to combat and contain AMR in the subsequent period of 10 –years.(1)

The GAP was then reaffirmed as a blueprint for tackling AMR during the 71st session of the UN General Assembly, where 193 Heads of State adopted resolution A/RES/71/3, which included a high-level political declaration committing countries to support and implement the GAP at national, regional and global levels. Following the GAP, AMR was encompassed within the Sustainable Development Goals (SDGs) as Framework for Action in 2016.(2)

The WHO performed a global surveillance of AMR, identifying key challenges in Member States. The identified challenges include a lack of comprehensive strategy to combat AMR in countries, unjustified use of antibiotics, lack of national and regional control mechanism to detect and control AMR, as well as insufficient actions to undertake when AMR is detected.(3)

As of today, more than 80% of the antibiotics in the veterinary sector is used for non-medical purpose; instead it is used as breed-mix for animal growth purposes, which in turn increases the risk of food-borne antibiotic resistance in humans. The FAO reports on antibiotics used in the veterinary sector also indicate that the use of antibiotics will increase by almost 40% to 105.6 tonnes by 2030, when compared to 2010.(4)

Inappropriate use of antimicrobials may lead to development of antimicrobial resistance. Consequences of AMR include negative outcomes on individual, organizational as well as economic level. Negative outcomes on the individual level may include prolonged treatment effects, development of adverse events and potentially increased mortality. For health organizations, the prevalence of AMR may lead to difficulties to provide treatment for infectious diseases, limited to no choice of treatment alternatives, increased treatment cost. Therefore patients, health care professionals and the countries should work together and responsively to assure the quality and responsible use of antimicrobials at all times.

On the other hand, no new antimicrobials were developed in the pipeline for the last 30 years. This means that the choice of available treatment is very limited with increased antimicrobial resistance to current medicines.

Non-communicable diseases, including cancer, diabetes, injuries were the main cause for mortality in 2018, whereas the multi-drug resistance or super-bacteria will most likely take this place, the estimates show that up to one million residents will likely to die due to the development of super-bugs.(5) Globally, AMR infections are estimated to cause 700,000 deaths each year. If no action is taken, this figure is predicted to rise to 10 million, alongside a cumulative cost of \$100 trillion, by 2050.(6) AMR also threatens many of the SDGs.(6) The World Bank estimates that 28 million people will be forced into extreme poverty additionally in less than 30 years unless AMR is contained.(7)

The WHO Assembly on AMR also emphasized the collaborative approach to be undertaken in the midst of the fight against AMR and endorsing a concerted “One Health” approach — which linked various sectors and actors in defence of human, animal and environmental health. They also agreed to mobilize adequate, predictable and sustained resources to implement those programmes and pledged to raise awareness of the phenomenon around the world.(8, 9)

The WHO/FAO/OIE tripartite survey of stakeholders involved in the assessment of the NAP indicated that the developing and implementation strategies should be focused on One-health approach and include all stakeholders in the human, animal as well as food sectors. (8, 9) (10)

Rationale to develop the strategy

The GAP sets out five strategic objectives: (1) to improve awareness and understanding of antimicrobial resistance; (2) to strengthen knowledge through surveillance and research; (3) to reduce the incidence of infection; (4) to optimize the use of antimicrobial agents; and (5) to ensure sustainable investment in countering antimicrobial resistance. These objectives can be attained through the implementation of clearly identified actions by Member States, therefore, it is expected that countries will develop their own national action plans on antimicrobial resistance in line with the global plan.

Programs to improve appropriate use of antimicrobials have been implemented in Mongolia since 2013. The Animal Health Law which was adopted by the Parliament in 2017 has played an important step towards compliance with international standards and a precondition for increased exports of livestock products. Also, it served as one of the major rudiments towards developing the 1st multi-sectoral national action plan to combat the AMR in Mongolia (12) which was approved jointly by the Health Minister and Minister for Food and Light Industry reinforced in 2017. (13)

Mongolian 1st National Action Plan (2017-2020): Re-Cap

The 1st Mongolian national action plan to combat AMR (2017-2020) was developed and approved the Government in 2017. The goal of the National Action Plan was to promote rational use of antibiotics and prevention from the emergence and spread of AMR, improve surveillance of AMR and diagnostics, treatment of antimicrobial infections and enhance quality of hospital care.

It consisted of six components.

- Establish a governance mechanism and ensure multisectoral role to combat antimicrobial resistance, sustainable investment and functioning
- Strengthen surveillance and diagnostic capacity for AMR and research
- Reduce spread of infections through better infection prevention and control
- Ensure quality and safety of antimicrobial medicines
- Optimize use of antimicrobials in the human and animal sectors
- Raise awareness and understanding of AMR and rational use of the general public, herdsmen and health professionals.

The implementation of the 1st multi-sectoral national action plan was assessed in a recent review.(14) The 1st NAP included a total of 69 activities within the six components. Of those activities, almost 60% were successfully implemented (n= 40,

58%), one-third were assessed as half-completed (20, 29%), and 9 activities were not achieved (13%). Overall, the implementation status of the NAP was 87%. A number of challenges caused a delay in the implementation the strategy, more specifically activities specified in the veterinary sector were not executed, mostly due to the ongoing COVID-19 restrictions.(14) The challenges and causes of delayed implementation have been briefly described in this rapid review and reflected to continue their implementation in the next multi-sectoral national action plan on AMR.

Prevalence of antibiotic consumption in Mongolia

Published studies regarding the antibiotic consumption include the WHO supported surveillance study on antibiotic consumption. The study employed import and manufactured data to provide estimates with WHO standardized methodology. The Daily Defined Dose per 1000 inhabitants (DID) indicated it was the highest in 2015 among the Western Pacific Countries (15, 16), although a later repeat study in 2019 indicated a decrease by 21.3% (DID=37) (15).

A 5-year hospital level data on used antibiotics were reported in 2020.(17) The DDD/100 beds was 199-420, much higher than those findings reported from similar settings in other countries. Overall, the consumption of antibiotics is still excessive(18), urging the Government to undertake substantial actions.

As of November 2021, there were 4243 medicines registered, of which 11% (n=471) were antibiotics. Most of registered antibiotics were imported (n=440), and approximately 7% were locally manufactured.(19) Analysis of reimbursed medicines from the Health Insurance General Agency indicated the most dispensed medicines belonged to amoxicillin (38.8%). The dispensed cohort involved patients aged 0 to 19 years (20). Although amoxicillin was the most prevalent dispensed medicine, the recent data shows that the proportion of macrolides, fluoroquinolones and carbapenems increased, potentially due to global pandemic situation.(20) These are antibiotic classes belong to the 'Watch' group that have higher resistance potential and should be prioritized as key targets of stewardship programs and monitoring.(21)

In 2021, a national-wide study was executed by the Medicines and Medical Devices Regulatory Authority of Mongolia.(22) The study assessed the knowledge, attitude and practice towards antimicrobial resistance and appropriate use of antimicrobial medicines in the community and health professionals. The study reported that the community members have inconsistent source of information regarding the appropriate use of medicines, depending on their residency. Moreover, the doctors indicated the long waiting time for sensitivity analysis as one of the major challenges when prescribing antibiotics. Among the respondents, only one- third had sufficient knowledge, one in five respondents had appropriate attitude towards antimicrobials and AMR(22).

Prevalence of AMR in Mongolia

Data regarding antimicrobial resistance are insufficient in Mongolia. Previous reports from two tertiary hospitals in Mongolia demonstrated that only one in five infections, microbiological diagnostics (19%) were done, with antibiotics were given without sensitivity testing in 92% of cases.(23)

Increasing rates of MRSA confirmed cases were reported from Mongolian hospitals. Data from 4 major hospitals of Ulaanbaatar showed 3% MRSA in 207 *Staphylococcus aureus* strains investigated.(24) A 2013 study reported that among 251 *Staphylococcus aureus* isolates, methicillin resistance was confirmed in 8.8% of isolates (22/251)(25)

A 2021 study investigated the rate of gram-negative multi-drug resistant organism in admitted and hospitalized patients in Mongolia. Of 158 eligible patients, baseline colonization rate was found in almost 30% (n=46). After hospitalization, this rate increased up to 70(p<0.01). Enterobacterales were found to be the predominant colonizer and was highly resistant to 3rd generation cephalosporin, particularly cefotaxime.(26)

Increased use of cefotaxime was found in two hospitals of Mongolia(11.1–13.1 DDD/100 bed days and 4.2–15.7 DDD/ 100 bed days).(17) This reiterates the high risk of hospital-acquired infection being posed to inpatients and the need for strengthening the infection control in the hospitals.(26)

In farm animals, particularly chicken, resistant bacteria to *Campylobacter* species were detected in Ulaanbaatar area. The study reported that all isolates were resistant to tetracycline, and 3 *Campylobacter coli* isolates were resistant to erythromycin.(27)

Considering high antibiotic use, documentation of prevalent AMR in both human and animal isolates, it is important to control and monitor the consumption of antimicrobials and AMR in Mongolia. In particular, evidence-based data regarding the AMR need to be generated at the national level. Moreover, the data must be analysed and distributed to relevant authorities to inform the practice, as well as the policymakers.

Existing efforts and future actions must be directed to strengthen surveillance system for resistant pathogens, prevent the spread of infection and share and exchange findings with international organizations and other countries.

Amongst others, the key activities to prioritize are stop the over-the-counter (OTC) availability of antimicrobials from community pharmacies, strengthening control of reimbursed antimicrobials via electronic prescription and dispensing system (triage linkage between the prescriber, dispenser, health insurance claims, and the patient), intensified actions towards improving the knowledge and attitude on AMR among public, especially among herders and those residing in remote areas.

Purpose of the strategy

The Multi-sectoral national action plan on antimicrobial resistance aims to prevent and tackle antimicrobial resistance through improving surveillance in human and animal health sectors, controlling the consumption, strengthening infection prevention control, and increasing knowledge and attitude of public, human and animal health professionals to optimize use of antimicrobials.

Strategic objectives

1. Strengthen the governance mechanism to prevent from AMR, establish a multi-sectoral coordination committee which will develop and monitor annual action plan and its implementation.
2. Improve the detection and surveillance of antimicrobial resistance, strengthen capacity to collate, analyze and inform data on antimicrobial resistance at national level.
3. Strengthen responsible use of antimicrobials by controlling antimicrobial consumption, reducing irrational use of antimicrobials, and implementing effective stewardship programs.
4. Improve infection prevention and control, undertake preventive measures from environmental contamination, stop the spread of infection.
5. Raise awareness of antimicrobials among community, professionals, incorporate the training modules in high school curricula, improve knowledge and practice to prevent and reduce antimicrobial resistance.

Expected outcomes

Strategic objective	Current baseline	Expected outcomes
Governance	No fully functioning committee	Established multi-sectoral committee, organized committee meeting at least twice a year
Surveillance, prevention	No baseline study	Generated, analyzed national data linked with GLASS.
Consumption of antimicrobials	DID 37 according to imported and manufactured data, started estimation using health insurance data No baseline data available in the veterinary sector	DID decreased by 10% (DID 27) Completed estimation using health insurance data based on the WHO ATC/DDD methodology with report by AWARE classification. Available baseline data in veterinary sector
Infection prevention control and surveillance	No baseline data	Information available on hospital-acquired infection
Information, education, advocacy	Advocacy and trainings for WAAW AMR integrated into the postgraduate training curriculum	At least 5 main activities organized every year for the celebration of WAAW Integrated AMR modules to secondary and high school curricula, and in agriculture sector's training programs.

Budget required for the implementation of the NAP: results of the cost and budget estimation exercise

The required budget to implement detailed activities was estimated using the WHO- NAP- budgeting tool. The estimates include inflation rates for the year 2023, 2024 and 2025, respectively(28). At the time of writing the report, 3000.2 MNT was equal to 1 USD. The local UN tariffs applicable for individual organizations and activities were used to calculate the estimates, unless otherwise specified.

The required 4-year budget for the implementation of the NAP was estimated to be 13,914,468,019.12 MNT. Most (70%) of the budget will be spent for the activities classified in the ‘infection prevention control’ strategic area for both human and veterinary sectors. Activities planned under this strategic objective included procurement of equipment and tools required for sanitation and disinfection, as well as consumables, infrastructure repairs, maintenance required for infection control and monitoring.

Activities relating to governance and coordination require more than 12% of the planned budget in 2022, whereas the estimated budget decreases by one-third in the following years of the NAP implementation. Approximately 15% of the planned budget is directed to implement activities in the area of strengthening surveillance, generating evidence-based knowledge.

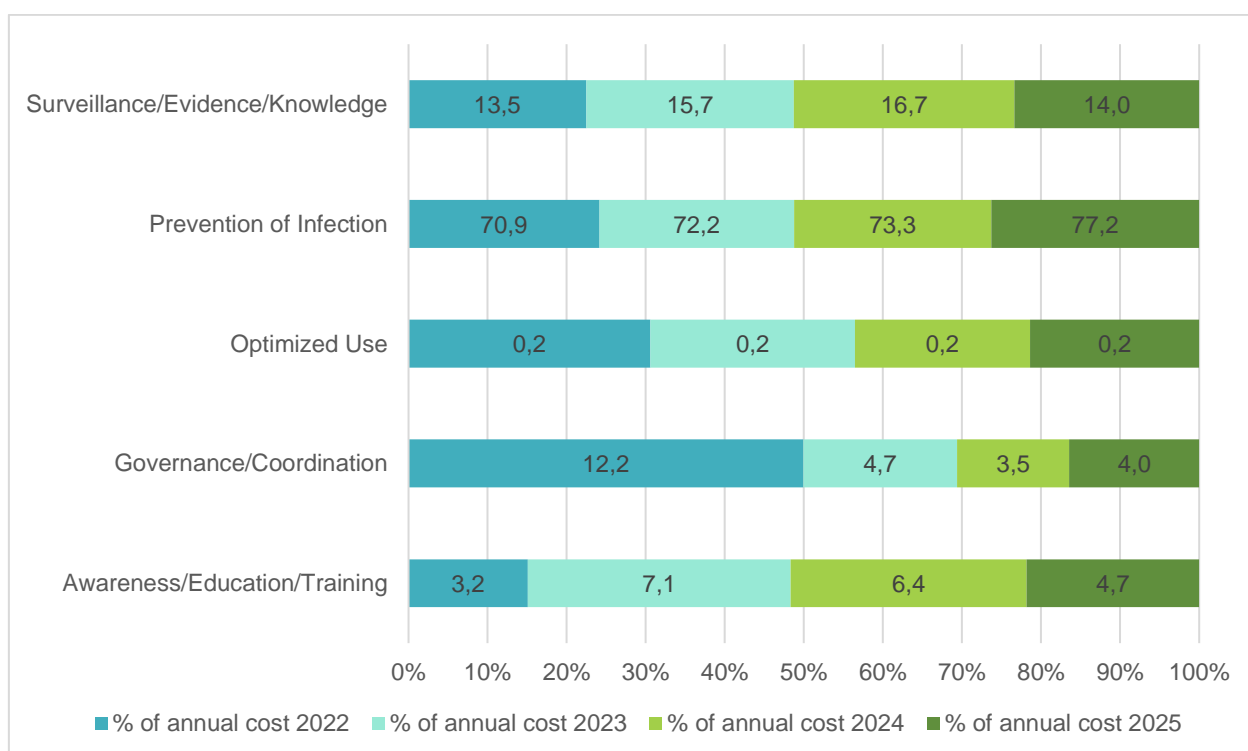


Figure 1 Proportion of allocated budget by strategic objective, by year

A small proportion of the funding is indicated as available or partially funded (**0.65%**, 90,179,787.46 MNT), mostly through the government and international donor organizations.

**Table 1 Required budget overview and availability by strategic objective and year
(in million tugriks)**

Strategic objectives	Awareness/ Education/ Training		Governance/ Coordination		Optimized Use	IPC	Surveillance/ Evidence/ Knowledge	
	Yes	No	Yes	No	No	No	Yes	No
Funding availability								
Required budget in 2022	0	92.74	12.5	338.24	6.38	2040.68	5.5	382.77
Required budget in 2023	1.34	233.33	14.37	142.64	6.2	2390.16	9.65	511.34
Required budget in 2024	1.42	231.45	14.63	112.06	5.88	2679.8	10.21	602.26
Required budget in 2025	0	189.57	15.69	147.5	6.3	3139.76	4.87	565.25

Monitoring and evaluation

The interim and final monitoring and evaluations will be performed jointly by the Ministry of health, ministry of food, agriculture and light industry involving relevant agencies and stakeholders.

References

1. World Health Organization. Global action plan on antimicrobial resistance. 2015.
2. Assembly UG. Political declaration of the high-level meeting of the general assembly on antimicrobial resistance. New York, NY: United Nations. 2016.
3. World Health Organization. Global surveillance of antibacterial resistance in humans: second WHO technical consultation. World Health Organization; 2014.
4. Food and Agriculture Organization. The FAO Action Plan on Antimicrobial Resistance 2021–2025. FAO Rome, Italy; 2021.
5. Murray CJ, Ikuta KS, Sharara F, Swetschinski L, Aguilar GR, Gray A, et al. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. *The Lancet*. 2022.
6. O'Neill J. Antimicrobial resistance: tackling a crisis for the health and wealth of nations. The review on antimicrobial resistance. Review on Antimicrobial Resistance, London, United Kingdom. London, United Kingdom, [https://amr-review.org/sites/default/files/AMR ...](https://amr-review.org/sites/default/files/AMR...); 2014.
7. World Bank. Drug-resistant infections: a threat to our economic future: World Bank; 2017.
8. World Health Organization. Antimicrobial resistance: a manual for developing national action plans. 2016.
9. World Health Organization. Country progress in the implementation of the Global Action Plan on Antimicrobial Resistance: WHO, FAO and OIE global tripartite database. 2018.
10. World Health Organization. Strategic framework for collaboration on antimicrobial resistance: together for One health: Food & Agriculture Org.; 2022.
11. Монгол улс. Антибиотикийн зохистой хэрэглээг төлөвшүүлэх, эмэнд нянгийн тэсвэржилт үүсэхээс сэргийлэх стратеги /2013-2017/. 2013.
12. Монгол улс. Мал, амьтны эрүүл мэндийн тухай. 2018.
13. Монгол улс. Нянгийн тэсвэржилтээс сэргийлэх үйл ажиллагааны салбар дундын төлөвлөгөө /2017-2020/. 2017.
14. Ministry of Health. Rapid assessment of the implementation of National Action Plan to Combat Antimicrobial Resistance in Mongolia /2017-2020/. 2022.
15. Монгол улс, Эрүүл мэндийн яам. Антибиотик эмийн тандалт судалгаа 2019.
16. Dorj G, Dembereldorj B, Choijoo A, Enkhee E, Sanjjav T, Blix HS. National surveillance of antibiotic consumption in Mongolia. *International Journal of Infectious Diseases*. 2020;101:96.
17. Dorj G, Salvesen Blix H, Sunderland B, Gankhulug B, Tegshee O, Purevkhoo M, et al. Antibiotic utilization trends in two state hospitals of Mongolia from 2013 to 2017. *BioMed Research International*. 2019;2019.
18. World Health Organization. Antimicrobial consumption in the WHO Western Pacific Region: early implementation of the Western Pacific Regional Antimicrobial Consumption Surveillance System (WPRACSS). 2021.
19. Монгол улс, Эм эмнэлгийн хэрэгслэлийн зохицуулалт хяналтын газар. Монгол улсын эм зүйн салбарын үзүүлэлт. 2021.
20. Монгол улс, Эрүүл мэндийн даатгалын сан. Эрүүл мэндийн даатгалын сангаас хөнгөлттэй үнээр олгогдох эм. 2020.
21. World Health Organization. 2021 AWaRe classification. 2021.
22. Монгол улс, Эм эмнэлгийн хэрэгслэлийн зохицуулалт хяналтын газар. Иргэдийн эмийн зохистой хэрэглээний талаарх мэдлэг, чадвар, хандлагын судалгаа. 2021.
23. Ider B-E, Clements A, Adams J, Whitby M, Muugolog T. Prevalence of hospital-acquired infections and antibiotic use in two tertiary Mongolian hospitals. *Journal of Hospital Infection*. 2010;75(3):214-9.
24. Orth D, Grif K, Erdenechimeg L, Battogtokh C, Hosbayer T, Strommenger B, et al. Characterization of methicillin-resistant *Staphylococcus aureus* from Ulaanbaatar, Mongolia. *European Journal of Clinical Microbiology and Infectious Diseases*. 2006;25(2):104-7.
25. Nair R, Hanson BM, Kondratowicz K, Dorjpurev A, Davaadash B, Enkhtuya B, et al. Antimicrobial resistance and molecular epidemiology of *Staphylococcus aureus* from Ulaanbaatar, Mongolia. *PeerJ*. 2013;1:e176.

26. Baljin B, Gurjav U, Tulgaa K, Baldan G, Gunchin B, Sandag T, et al. High Acquisition Rate of Gram-Negative Multi-Drug Resistant Organism Colonization During Hospitalization: A Perspective from a High Endemic Setting. *Infection and Drug Resistance*. 2021;14:3919.
27. Byambajav Z, Bulgan E, Hirai Y, Nakayama M, Tanaka M, Nitta Y, et al. Research Note: Antimicrobial resistance of *Campylobacter* species isolated from chickens near Ulaanbaatar city, Mongolia. *Poultry Science*. 2021;100(3):100916.
28. World Bank. Inflation, consumer prices (annual %). 2022.

Planned activities of the multi-sectoral national action plan on AMR (2022-2025)

No	Activity	Year				Indicator	Outcome	Implementing agency	Collaborating organizations
		2022	2023	2024	2025				
Strategic objective 1: Strengthen the governance mechanism to prevent from AMR, establish a multi-sectoral coordination committee which will develop and monitor annual action plan and its implementation									
1.1	Establish a multi-sectoral coordination committee to ensure implementation, and monitoring of the NAP	+	+	+	+	The decision of the meeting	Biannual meetings shall be held at 7 least times, actions discussed.	MMRA, GAVS	MoH, MoFALI, WHO, FAO, MoE, MoET, Codex-national committee
1.2	Present and discuss results of activities against AMR, use and consumption of antimicrobial drugs in human and agriculture sector, provide recommendations and make decisions	+	+	+	+	The number of resolutions achieved in meetings.	Results on AMR and antimicrobial use will be presented at least 4 times	MMRA, GAVS	Human drug council, Veterinary drug council
1.3	Include budget required to implement AMR activities in organizations annual financial plan	+	+	+	+	The required budget included in the financial plan.	Required budget to implement the activities will be included in the annual budget of the organizations	All implementing organizations	MoH, MoFALI
1.4	Conduct external evaluation on NAP implementation	-	+	-	+	Number of external evaluations	Mid and final evaluations will be completed, recommendations and conclusions will be made.	Multi-sectoral committee	MoH, MoFALI, MMRA, GAVS, WHO, UN, FAO
1.5	Organise national conferences on prevention and control of AMR	-	+	+	+	Number of organized conferences, and seminars	National conferences will be attended by at least 250 participants	Multi-sectoral committee	MoH, MoFALI, MMRA, GAVS, WHO, UN, FAO, /OIE/

1.6	Include AMR related indicators in the accreditation and performance evaluation indicators in human and veterinary organizations	-	+	+	+	Indicators included in the assessment	Guidelines on antimicrobials will be developed, laboratories will be linked to the WHONET.	MOH, NCHD, GAVS, MoFALI	Health organizations, MASM
1.7	Join international networks, movements combatting AMR to learn and exchange information	+	+	+	+	Number of conferences and meetings attended	At least 5 times to attend international conferences on AMR.	MoH, MoFALI, MMRA, GAVS, NCCD	WHO, UN, FAO, OIE
1.8	Translate codex standard on food –borne AMR, discuss it at MASM, technical committee and public to get approval	-	+	-	+		2 codex guidelines, 1 regulation of practice will be translated and approved.	MoFALI, UN, FAO	MASM, GAVS
1.9	Revise and update regulation for Drug Therapeutic Committee in relation to AMR	+	+	-	-	Number of approved regulations	Health Minister’s Order will be approved.	MMRA	Health organizations
1.10	Conduct an assessment on AMR legal framework in the agriculture sector	-	+	-		Report of the assessment and recommendation	Recommendations based on the assessment will be provided.	Multi-sectoral committee	MoH, MoFALI, GAVS, MoET, GASI, International organizations
Strategic objective 2: Improve the detection and surveillance of antimicrobial resistance, strengthen capacity to collate, analyze and inform data on AMR at national level									
2.1	Develop and revise regulations with focus on detection, surveillance of AMR and identify roles and functions of authorities and organizations, information and reporting	-	+	+	-	Number of approved regulations	2	NCCD, GAVS	MoH, MoFALI, MMRA, International organizations
2.2	Conduct lab based surveillance study on AMR in human and veterinary sectors	+	+	+	+	Number of studies	Recommendation and conclusion based on study results will be reported.	NCCD, GAVS	MNUMS, IVM, Human and veterinary health departments in aimag and city, International organizations

2.3	Develop and revise guidelines, SOPs in conducting and analysing sensitivity tests to detect AMR	-	+	-	-	Number of newly implemented analysis methods	Guidelines, SOPs will be approved	NCCD, GAVS	MNUMS, IVM, SCVL, SLVMTC
2.4	Investigate the possibility to link hospital e-system /HIS, LIS/ with WHONET and exchange information	+	+	-	-	Report of the study, recommendation	Recommendations on linking the programs to WHONET will be provided	MoH, NCHD, hospitals	
2.5	Conduct a situational analysis on capacity of AMR surveillance in food and agriculture laboratories using UN, FAO proposed methods 'ATLASS'	+	-	-	-	Report of the assessment	Assessment on capacity to detect AMR and conduct surveillance will be completed	GAVS, SCVL, IVM, SLVMTC, SRLFM, NCCD	MoFALI, UN, FAO
2.6	Conduct trainings for human and veterinary laboratories on linkage and data exchange with global surveillance systems (GLASS, WHONET), invite international consultants	-	+	+	-	Number of trainings, report of the consultant	Laboratory staff will be trained	MoH	MMRA, NCCD, NCZD, IVM, NCPH, human and veterinary laboratories
2.7	Build national capacity to collect, collate, analyse and report AMR data	-	+	+	+	Number of professionals involved in the training	At least once per year trainings will be organized and knowledge of the professionals will be improved	NCCD, GAVS	MoH, MoFALI, MMRA
2.8	Expand linkage of national laboratory system with WHONET, by enabling aimag, district laboratories in a stepwise manner	+	+	+	+	Number of health organizations linked to the system	Central hospital, specialized centres, aimag and district hospitals will be linked to WHONET.	NCCD	Aimag and district hospitals, WHO
2.9	Develop report on resistance and inform to health care organizations twice a year	+	+	+	+	Nature and prevalence of resistant microbes	At least 6 reports will be distributed to health organizations	NCCD	Health organizations
2.10	Undertake external quality evaluation for microbiology laboratories in human and veterinary sectors	+	+	+	+	Number of externally evaluated laboratories	External evaluation will be completed	NCCD, NCZD, GAVS	MoH, MoFALI, WHO, OIE

2.11	Strengthen capacity of the laboratory staff in quality assurance, management and standard methods to detect AMR and conduct sensitivity analysis	-	+	+	-	Number of trained staff	At least 50% of laboratory staff will be trained and their skills improved.	GAVS	MoH, MoFALI, Codex- national committee
2.12	Conduct surveillance studies to detect resistance rates of common pathogens causing disease in plants	+	-	+	-	Number of surveillance tests	Report of surveillance, recommendations distributed to relevant authorities	MoFALI	PPI, GASI
Strategic objective 3: Strengthen responsible use of antimicrobials by controlling antimicrobial consumption, reducing irrational use of antimicrobials, and implementing effective stewardship programs									
3.1	Estimate consumption of antimicrobials used in veterinary by OIE method and develop reports	+	+	+	+	Number and classification of antimicrobials used in the veterinary sector	Reports will be distributed to national and international organizations	GAVS	MoH, MoFALI
3.2	Estimate consumption of antimicrobials used in the human sector annually, distribute the results to health care organizations and stakeholders, partners	+	+	+	+	Results on imported and locally produced antimicrobials	Consumption of antimicrobials will be estimated at the national level, compared with the Region	MMRA	MoH, WHO, research organisations
3.3	Conduct surveillance studies on healthcare-associated resistant bacteria in hospitals	-	+	+	+	Surveillance reports	Conclusion and recommendations based on study results will be distributed to relevant authorities	NCCD	MMRA, Health organizations
3.4	Develop and get approval on list of prescription medicines and regulation on prescription in the veterinary sector	+	-	-	-	Regulation -1, List of drugs-1	Regulation and list of drugs will approved, shared with public community	GAVS	Veterinary drug council
3.5	Develop a mapping tool for veterinary medicines on dispensing, use, disposal, monitoring and information and set-up database	-	+	+	+	Mapping, database	Annual data on antimicrobials and turnover will be produced.	GAVS	SLVMTC, GASI, Veterinary drug wholesalers, Veterinary pharmacy

3.6	Conduct assessment on use of antibiograms in hospitals to prescribe and select antibiotics in patient treatment	+	-	+	-	Number of assessed organizations	Recommendations and conclusions based on assessment will be distributed to relevant authorities.	MMRA	Health organizations
3.7	Require GMP for all local antimicrobial manufacturing, support to conduct continuous trainings	-	+	+	+	Number of local producers certified with GMP	Local manufacturers producing antimicrobials will be certified with GMP.	MMRA	Drug manufacturers, NGOs, associations
3.8	Include a requirement for bioequivalence test on multi-sourced generic antimicrobials to be registered in the country	+	+	+	+	Indication of the regulation/ clause order	Order will be approve	MMRA	Drug wholesalers
3.9	Conduct surveillance studies on hospital-level consumption of antimicrobial drugs	-	+	+	+	Number of surveillance studies	Conclusion and recommendations based on study results will be developed and distributed to relevant authorities	MMRA	Health organizations
3.10	Implement antimicrobial stewardship programs in health organizations, invite international consultant to conduct the trainings and share expertise	+	+	+	+	Number of health organizations	Central hospital and specialized centers will implement the AMS.	MMRA	Central hospitals, specialized hospitals
3.11	Take multi-sectoral joint measures to stop OTC availability of antimicrobials in community pharmacies	+	+	+	+	Number of controls and inspections o	All community pharmacies will sell antibiotics only per prescription.	MMRA, GAVS, Drug association	GASI
3.12	Conduct surveillance of antimicrobial residues in meat and milk	+	+	+	+	Surveillance report	Conclusion and recommendations based on study results will be developed and distributed to relevant authorities	GAVS	Research organizations, laboratories in aimag and city, SCVL
Strategic objective 4: Optimize infection prevention and control, undertake preventive measures from environmental contamination, stop the spread of infection									
4.1	Organize capacity building trainings on AMR and IPC for health care workers	+	+	+	+	Number of trained health care staff	Trainings will be organized and knowledge and expertise of doctors will be improved	MoH, NCCD	Universities, MNUMS

4.2	Organise capacity building trainings on AMR and IPC for medicine and medical care inspectors	+	+	+	+	Number of trained inspectors		MMRA, GAVS, GASI, GDHI	MoH, MNUMS, MoFALI, International organizations
4.3.	Develop a guideline on the appropriate use of antimicrobials based on international standards and guidelines /One health/	+	+	-	-	Number of international resources	Manual will be developed and distributed to veterinary organizations	MoFALI	MoH
4.4	Develop training and awareness raising materials on IPC for health care workers	+	+	-	-	Number of developed materials	Information materials will be distributed to health organizations	MoH, NCCD	International organizations
4.5	Organize evaluation and supportive supervisions on AMR and IPC in health care organizations	+	+	+	+	Number of organizations enrolled in assessment and monitoring	Recommendations based on assessment results will be distributed to relevant authorities	MoH, NCCD	Aimag, city health departments
4.6	Increase supply of sanitation and hygiene equipment and devices for soft goods in hospitals	+	+	+	+	Number of devices used sanitation and disinfection	Sanitation and disinfection of soft goods will be improved	Health organizations	-
4.7	Increase stock on linen and other goods for hospitalized patients	+	+	+	+	Stock of patient gowns, bed, soft goods	Patients will be provided required sheets, gowns from internal stock	Health organizations	-
4.8	Conduct surveillance study on hospital -acquired infections and pathogens	-	+	-	+	Surveillance report	Recommendations based on assessment results will be distributed to relevant authorities	NCCD	MNUMS, health departments
Strategic objective 5: Raise awareness of antimicrobials among community, professionals, incorporate the training modules in high school curricula, improve knowledge and practice to prevent and reduce antimicrobial resistance									
5.1	Conduct a KAP survey on rational use of antimicrobials and AMR among public	+	+	+	+	Number of planned activities	Planned activities will be implemented .	MMRA, GAVS	MoH, MoFALI, MoE, NCPH, research

	annually to develop and implement awareness raising and advocacy plan								organizations, Public relations organizations
5.2	Disseminate information thru media regarding AMR in human health and agriculture sectors according to the developed plan	+	+	+	+	Number of results	Community members knowledge will be improved	MMRA, GAVS	MoH, MoFALI, NGOs
5.3	Develop public communication strategy on AMR and use of antimicrobials	-	+	-	-	Communication strategy document will be developed and approved	Communication strategy will be distributed to relevant authorities.	International organizations, GAVS, MMRA	MoH, MoFALI
5.4	Organise World Antimicrobial Awareness Week every year	+	+	+	+	Number of activities, trainings	Activities and trainings will be completed in accordance with the working plan	MMRA, GAVS	MoH, MoFALI
5.5	Organise AMR campaigns during other world health days with emphasis of relevant issues	+	+	+	+	Program will include topics on AMR	Activities and trainings will be completed in accordance with the working plan	MMRA, GAVS, NCPH	International organizations
5.6	Organise one-month campaign at hospitals on rational use of antimicrobials every year	+	+	+	+	Number of health organisations implementing the campaign	Plans and agenda will be developed and distributed to health organizations.	MMRA	Health organizations
5.7	Capacity building on estimation of AMR economic burden	-	+	+	-	Number of healthcare staff	Knowledge of healthcare staff will be improved, enabling them to estimate the economic burden caused by AMR	MMRA, GAVS	GDHI, Higher education providers, selected hospitals
5.8	Conduct assessment on KAP on AMR among health and veterinary sector workers	-	+	+	-	Number of assessments	Recommendations based on assessment results will be distributed to relevant authorities	MMRA, GAVS	Health organizations
5.9	Develop training program for herders and agriculture workers on good practices related to appropriate use of antimicrobials to improve their knowledge and practice	+	+	-	-	Number of organized trainings	Trainings will be conducted in accordance to the working plan	MoFALI, GAVS, MULS	Education providers

5.10	Include modules on AMR and rationale use of antimicrobials in postgraduate training programs for veterinary professionals	-	+	+	-	Number of veterinary doctors receiving the credit hours	Module will be integrated in the training program, knowledge of veterinarians will be improved	MULS, MoES	GAVS, Higher education providers, NGOs
5.11	Include AMR surveillance, laboratory detection methods in the laboratory programme of the field epidemiology training curriculum	-	+	+	-	Number of credit hours included in the program	Module will be integrated in the training program, knowledge of students will be improved	NCCD	MMRA
5.12	Organise trainings with credit hours on rational use, prescription policy and consequences of AMR for PHC (soun and family health) practitioners	+	+	+	+	Number of family group practitioners receiving credit hours	Knowledge of family group practitioners will be improved	MMRA, NCHD, AFGP	NCPH, Higher education providers
5.13	Develop a proposal to include rational use of antimicrobials, AMR consequences in the secondary school health programme and discuss	-	+	+	-	Number of activities to be included in the program	Recommendations will be developed and submitted to the MoES	MMRA, GAVS	MoES
5.14	Organize national and subnational trainings on AMR and rational use of antimicrobials with credits	-	+	+	+	Number of trainings	Trainings will be conducted in accordance to the working plan	GAVS	Education providers