MONGOLIA COVID-19 VACCINES POST-INTRODUCTION EVALUATION (cPIE)

19–30 September 2022
MONGOLIA COVID-19 VACCINES POST-INTRODUCTION EVALUATION (cPIE)

19–30 September 2022
Acknowledgements

Mongolia’s COVID-19 vaccines post-introduction evaluation (cPIE) was led by the National Center for Communicable Diseases (NCCD) and the Ministry of Health, with technical support from the World Health Organization (WHO) Country Office in Mongolia, WHO Regional Office for the Western Pacific, United States Centers for Disease Control and Prevention (CDC) and the Task Force for Global Health.

The following individuals in particular contributed to and supported the conceptualization, planning and implementation of the CPIE:

<table>
<thead>
<tr>
<th>Ministry of Health</th>
<th>Enkhbold Sereejav, Minister of Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bayarbold Dangaa, Director General, Department of Public Health</td>
</tr>
<tr>
<td></td>
<td>Enkhsaikhan Lkhagvasuren, Director, Division of Infectious Disease, Department of Public Health</td>
</tr>
<tr>
<td></td>
<td>Jargal Bulgan, Officer for Immunization and Vaccine Preventable Diseases Control and Prevention</td>
</tr>
<tr>
<td>NCCD</td>
<td>Bilegtsaikhan Tsolmon, Director</td>
</tr>
<tr>
<td></td>
<td>Baigalmaa Jantsansengee, Vice Director</td>
</tr>
<tr>
<td></td>
<td>Dashpagam Otgonbayar</td>
</tr>
<tr>
<td></td>
<td>Doctors of the Department of Immunization</td>
</tr>
<tr>
<td>Consultants</td>
<td>Narangerel Dorj, National cPIE Coordinator</td>
</tr>
<tr>
<td></td>
<td>Nyamsuren Tserennadmid, National Desk Reviewer</td>
</tr>
<tr>
<td>WHO Country Office in Mongolia</td>
<td>Anuzaya Purevdagya, Technical Officer</td>
</tr>
<tr>
<td></td>
<td>Sodbayar Demberelsuren, Technical Officer (Programme Management)</td>
</tr>
<tr>
<td></td>
<td>Mandakhnaran Davaadorj, Project Officer, Expanded Programme on Immunization (EPI)</td>
</tr>
<tr>
<td></td>
<td>Enkhtuya Munkhbat, Communications Officer, EPI</td>
</tr>
<tr>
<td>WHO Western Pacific Regional Office</td>
<td>Yoshihiro Takashima, Coordinator</td>
</tr>
<tr>
<td></td>
<td>Xiaojun Wang, Technical Officer</td>
</tr>
<tr>
<td></td>
<td>Heeyoun Cho, Technical Officer</td>
</tr>
<tr>
<td></td>
<td>Glenda Gonzales, Consultant</td>
</tr>
<tr>
<td></td>
<td>Dexter Bersonda, Consultant</td>
</tr>
<tr>
<td></td>
<td>Vaccine-Preventable Diseases and Immunization Unit</td>
</tr>
<tr>
<td>CDC</td>
<td>Jaymin Patel, Global Immunization Division</td>
</tr>
<tr>
<td>Task Force for Global Health</td>
<td>Anthony Mounts, Senior Advisor</td>
</tr>
<tr>
<td>Field teams and other participants</td>
<td>Provincial and Ulaanbaatar district field teams (see Annex 1 for the complete list of names)</td>
</tr>
<tr>
<td></td>
<td>District, provincial and soum hospital directors, EPI managers, vaccinators and other staff.</td>
</tr>
</tbody>
</table>
### Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AEFI</td>
<td>adverse event following immunization</td>
</tr>
<tr>
<td>AESI</td>
<td>adverse event of special interest</td>
</tr>
<tr>
<td>CDC</td>
<td>United States Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>COVAX</td>
<td>COVID-19 Vaccines Global Access facility</td>
</tr>
<tr>
<td>cPIE</td>
<td>COVID-19 vaccines post-introduction evaluation</td>
</tr>
<tr>
<td>DTP3</td>
<td>third dose of the diphtheria-tetanus-pertussis vaccine</td>
</tr>
<tr>
<td>EIR</td>
<td>electronic immunization record</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunization</td>
</tr>
<tr>
<td>EUA</td>
<td>emergency use authorization</td>
</tr>
<tr>
<td>FHC</td>
<td>family health centre</td>
</tr>
<tr>
<td>GASI</td>
<td>General Agency for Specialized Inspection</td>
</tr>
<tr>
<td>IEC</td>
<td>information, education and communication</td>
</tr>
<tr>
<td>MCV1</td>
<td>first dose of the measles-containing vaccine</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MMRA</td>
<td>Medicines and Medical Devices Regulatory Authority of Mongolia</td>
</tr>
<tr>
<td>NCCD</td>
<td>National Center for Communicable Diseases</td>
</tr>
<tr>
<td>NDVP</td>
<td>National Deployment and Vaccination Plan</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Emergency Management Agency</td>
</tr>
<tr>
<td>NRA</td>
<td>National Regulatory Authority</td>
</tr>
<tr>
<td>ODK</td>
<td>open data kit</td>
</tr>
<tr>
<td>PPE</td>
<td>personal protective equipment</td>
</tr>
<tr>
<td>RI</td>
<td>routine immunization</td>
</tr>
<tr>
<td>SHC</td>
<td>soum health centre</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>VSSM</td>
<td>Vaccination Supplies Stock Management</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Contents

Acknowledgements .................................................................................................................................................. iii

Abbreviations and acronyms ............................................................................................................................... iv

Executive summary ................................................................................................................................................. vi

1. Background ....................................................................................................................................................... 1
   1.1. COVID-19 response ..................................................................................................................................... 1
   1.2. Objectives of the national deployment and vaccination plan ........................................................................... 1
   1.3. COVID-19 vaccination status ...................................................................................................................... 3

2. Objectives of the COVID-19 Vaccines Post-Introduction Evaluation ............................................................. 6

3. Methods used in conducting the evaluation ...................................................................................................... 7
   3.1. Data collection tools ..................................................................................................................................... 7
   3.2. Technical topics evaluated ........................................................................................................................... 8
   3.3. Site selection ................................................................................................................................................. 9
   3.4. Evaluation team, activities and participants ............................................................................................... 10

4. Findings and recommendations ....................................................................................................................... 11
   4.1. Regulatory preparedness ............................................................................................................................ 11
   4.2. Planning, coordination and service delivery ............................................................................................... 13
   4.3. Costing and financing ............................................................................................................................... 16
   4.4. Supply chain and waste management ....................................................................................................... 18
   4.5. Human resource management and training ............................................................................................. 19
   4.6. Vaccine demand and acceptance ............................................................................................................. 21
   4.7. Vaccine safety ............................................................................................................................................ 23
   4.8. Monitoring and evaluation ...................................................................................................................... 25
   4.9. COVID-19 surveillance ............................................................................................................................ 26

Annex 1: Composition of field teams .................................................................................................................. 27
Executive summary

Mongolia, a Member State of the World Health Organization (WHO) in the Western Pacific Region, swiftly introduced and extensively distributed COVID-19 vaccines, achieving a 70% coverage rate with the last dose of the primary series for its eligible population (18 years and older at the time) within four months of initiating the vaccination programme. However, coverage for the first booster dose plateaued from February 2022 as demand declined, particularly for the booster dose, due to a decrease in disease severity concerns, perceptions of vaccine effectiveness, and the spread of vaccine misinformation, among other factors. As of September 2022, nearly two years after the first domestic case was recorded in November 2020, Mongolia reported upwards of 980 000 confirmed cases and a case fatality rate of 0.21.

In response, the Government of Mongolia transitioned from pandemic reaction to sustained management of COVID-19, aiming for more efficient delivery of immunization services. In this endeavour, a post-introduction evaluation of the COVID-19 vaccine was conducted to recognize strengths and challenges, pinpoint successful practices, and to prepare strategies for the next action plan to improve the COVID-19 vaccination roll-out, particularly for high-priority risk groups. The evaluation was spearheaded by the Ministry of Health and the National Center for Communicable Diseases (NCCD) from 19 to 30 September 2022, with WHO, the United States Centers for Disease Control and Prevention, and the Task Force for Global Health providing support across four provinces and three districts in Ulaanbaatar.

Mongolia’s extensive history of implementing its immunization programme offered a robust basis for the distribution and administration of COVID-19 vaccines. This was particularly valuable considering the country’s significant size, low population density, nomadic lifestyle, varied geography and severe climate. The influenza A (H1N1) outbreak in Mongolia in January 2019 also offered the country vital experience in rapidly deploying vaccines. Capitalizing on these experiences, Mongolia quickly secured access to COVID-19 vaccines via a well-established legal and regulatory framework and a national regulatory authority reliance mechanism, supported by a strong political commitment and leadership. Early participation in the COVID-19 Vaccines Global Access (COVAX) facility also expedited access to effective and safe vaccines. Strategic planning and preparation led to efficient delivery of vaccines across all aimags, soums and baghs. Cold-chain capacity was amplified at all levels, with the construction of a state-of-the-art vaccine storage facility in Ulaanbaatar and procurement of refrigerators and ultra-cold chain storage. Resilient and trained health-care workers also contributed to the swift and safe administration of vaccines. An electronic immunization system facilitated real-time monitoring of vaccination coverage while a well-maintained vaccine stock supply management system facilitated real-time monitoring of vaccines and vaccine supplies. Multisectoral collaboration, with secured financial and technical resources from different government agencies and international partners, provided the necessary support to implement the activities outlined in the National Deployment and Vaccination Plan.

However, challenges were encountered, particularly during the peak of COVID-19 transmission, as the capacity of health workers decreased due to fatigue and infections amongst them. Notable gaps include limited capacity in reporting, monitoring, and detecting adverse events following immunization (AEFIs), particularly at subnational levels, due to the lack of micro-planning and limited use of standard AEFI forms. Risk communication was inadequate as misinformation and false news spread. The extension of the expiration date for a particular vaccine led to mistrust and vaccine hesitancy among the populace. In the first half of 2022, as COVID-19 transmission decreased and misinformation continued in Mongolia, the demand for the COVID-19 vaccine fell, particularly for booster doses. The uptake of COVID-19 vaccines in children also remained low, and the cost-benefit analysis of reaching nomadic livestock herders was questioned. Although the overall national-level routine immunization coverage for third dose of the diphtheria-tetanus-pertussis vaccine (DPT3) and the first dose of the measles-containing vaccine (MCV1) remained high during the pandemic, a slight decrease in coverage rates was experienced in some provinces.
Recommendations and suggested activities were articulated and spearheaded by the NCCD at the conclusion of the evaluation to tackle the challenges and further enhance the response to COVID-19 vaccination. These include the execution of continuous education for vaccinators and pertinent health-care professionals concerning vaccines and vaccination, surveillance of AEFI, and risk communications through regular trainings and dissemination of information about COVID-19 in local languages. The latter includes disseminating internationally published technical literature to health workers in Mongolian. It may be necessary to increase incentives for health workers and review their workload to improve work-life balance. The interoperability and integration of different electronic systems on the COVID-19 response, and the utilization of data to determine vaccine effectiveness, need to be maintained and enhanced. Teams for risk communication, particularly at the national and provincial levels, should be organized and trained, and a comprehensive risk communication plan developed, with the clear allocation of roles and responsibilities for those involved.

Regular monitoring and review of the implementation of the planned activities are advised to ensure the ongoing success of Mongolia’s response to COVID-19 vaccination.
1. Background

Mongolia, a landlocked nation, is flanked by the Russian Federation to the north and the People’s Republic of China to the south. With an area spanning 1,564,116 square kilometres (km²) and a population of 3,250,000, the population density stands at 2.07 per km², making it the world’s most sparsely populated nation. Mongolia is comprised of 21 provinces, known as aimags, and one provincial municipality, Ulaanbaatar. Each aimag is further partitioned into smaller districts or soums, which are subsequently divided into three to four smaller units or baghs. Altogether, Mongolia houses 330 soums. The capital, Ulaanbaatar, governed as an autonomous provincial municipality, consists of nine districts and is home to 1,452,000 residents, accounting for nearly half of the country’s total population.

1.1. COVID-19 response

The first case of COVID-19 in Mongolia, an imported one, was recorded on 10 March 2020, while the first local case was noted on 11 November 2020. The Government of Mongolia implemented measures to suppress and diminish transmission, such as expanded testing, early detection, active surveillance, contract tracing and quarantine provisions.

Preparation for the deployment of the COVID-19 vaccine commenced in October 2020 through the conduct of joint assessments utilizing the Vaccine Introduction Readiness Assessment Tool. The assessment was conducted by the Ministry of Health (MOH), National Center for Communicable Diseases (NCCD), National Center for Public Health, National Emergency Management Agency (NEMA) and the General Agency for Specialized Inspection (GASI), with support from the World Health Organization (WHO), United Nations Children’s Fund (UNICEF) and the World Bank.

Inoculation against COVID-19 began on 23 February 2021, following the approval of the National Deployment and Vaccination Plan. The AstraZeneca (Covishield) COVID-19 vaccines from the COVID-19 Vaccines Global Access (COVAX) facility were the first to be introduced, followed by Sinopharm (VeroCell) on 10 March 2021, AstraZeneca (Vaxzevria) and Gamaleya (Gam-COVID-Vac) on 19 March 2021, and Pfizer-BioNTech (Comirnaty) on 26 March 2021. All five vaccines have received emergency use authorization from the Human Drug Council.

Priority groups for COVID-19 vaccination comprise health workers, members of the COVID-19 pandemic response team (such as emergency management officers, police, and specialized inspection organizations), adults aged above 50 years, individuals with disabilities and comorbidities, other front-line workers offering essential services, individuals requiring social assistance, and university educators.

Mongolia’s initial experience in responding to the COVID-19 pandemic greatly facilitated transmission management of the Delta variant. In September 2022, nearly two years after the first local case was recorded in the nation, a minimum of 982,000 confirmed cases were reported, with a 0.21 case fatality rate.
1.2 Objectives of the national deployment and vaccination plan

The National Deployment and Vaccination Plan (NDVP) received approval on 5 January 2021 from the Deputy Prime Minister, who also leads the State Emergency Commission. The NDVP delineates the strategies for the deployment, implementation and monitoring of COVID-19 vaccines with the intent to reduce morbidity and mortality associated with COVID-19 and minimize its socioeconomic impacts. National vaccination proceeds in line with the updated NDVP, which possesses the capacity to adapt to changing circumstances relating to vaccine type, availability, dose allocation, target groups, manufacturer’s instructions, and the epidemiological landscape. The NDVP forms an integral component of the Mongolia COVID-19 Pandemic Prevention and Response Strategic Plan, necessitating comprehensive measures and systematic multisectoral collaboration, communication and coordination of activities to ensure safe and effective vaccination. These activities encompass vaccine order, supply chain management, delivery of COVID-19 vaccines to the immunization units within one week of receipt, expedited vaccination of at-risk populations, and on-the-job training for health workers on the introduction of new vaccines.

Currently, the Government of Mongolia is moving from pandemic response to sustained management of COVID-19, specifically aiming to address the following:

- Administering booster doses primarily to high-risk priority groups, such as health workers and older adults.
- Enhancing the electronic immunization system, including assurance of data quality and strengthening the cold chain capacity at subnational levels with an objective to fortify the overall health system.
- Continuing to build vaccination confidence, particularly among priority groups and regions facing uptake challenges, and disseminating accurate and updated information from trusted sources.
- Enhancing vaccine safety monitoring via a robust adverse event following immunization (AEFI) surveillance system.
- Addressing the negative impact of the COVID-19 pandemic specifically on routine immunization (RI) coverage.
- Restoring and reinforcing essential services, introducing measures to guarantee safe and equitable access and availability, which include improving real-time monitoring and tracking of changes in service delivery and utilization.
1.3 COVID-19 vaccination status

By the conclusion of September 2022, Mongolia had received a minimum of 8.6 million doses of vaccines, primarily through national procurement, followed by bilateral donations and COVAX (Fig. 1). The total number of administered doses is almost 6 million, with the Sinopharm brand being the most utilized, followed by vaccines from Pfizer, AstraZeneca and Gamaleya (Fig. 2).

**Fig. 1. Total doses received by source**

![Fig. 1. Total doses received by source](image1)

*Source: Western Pacific Region VIMST COVID-19 vaccination internal dashboard.*

**Fig. 2. Total doses administered by brand**

![Fig. 2. Total doses administered by brand](image2)

*Source: Western Pacific Region VIMST COVID-19 vaccination internal dashboard.*

*Note: No disaggregated data were available for AstraZeneca Covishield and AstraZeneca Vaxzevria.*
The vaccination coverage of the eligible population (those aged 5 years and above) stands at 92%, and across the entire population, the figure is 67% for population that has received the last dose of the primary series. The first and second booster doses were introduced to the adult population (aged 18 years and above) in August 2021 and January 2022, respectively. However, coverage for the first booster dose plateaued from 30% in February 2022 to only 32% in September 2022. The vaccination of adolescents aged 12–17 years began on 15 June 2021 and of children aged 5–11 years on 1 August 2022, with the Pfizer-BioNTech (Comirnaty) vaccine.

The coverage among health workers stands at 97% for those who have received the last dose of the primary series and 40% for the first booster dose. Older adults, defined as those 50 years and older, have a current coverage rate of 98% for the last dose of the primary series. However, data regarding coverage of the first booster dose for older adults is not available. Please refer to Figs. 3–6 for details on coverage status per population groups and priority groups.

**Fig. 3. Vaccination coverage for entire population**

**Fig. 4. Vaccination coverage for children and adolescents**
Fig. 5. Vaccination coverage for health workers

![Health care workers chart]

Fig. 6. Vaccination coverage for older adults

![Elderly chart]

Source for Figs. 3-6: Western Pacific Region VIMST COVID-19 vaccination internal dashboard.
2. Objectives of the COVID-19 Vaccines Post-Introduction Evaluation

The Government of Mongolia defined the following as objectives of the COVID-19 vaccines post-introduction evaluation (cPIE):

- To underscore accomplishments in the COVID-19 vaccine roll-out and implementation strategies and to identify challenges that necessitate remedial action.
- To recognize best practices from the COVID-19 vaccination response and its impact on the health system, especially on the national immunization system and services, and the potential for integration with RI.
- To propose strategies to enhance the roll-out of COVID-19 vaccines, particularly regarding the achievement and sustenance of high vaccination coverage in high-priority risk groups with the primary series and booster dose.
- To provide lessons learned for future pandemic response as well as guidance for other countries for their COVID-19 vaccination response.
3. Methods used in conducting the evaluation

3.1 Data collection tools

Desk review

A national consultant reviewed and summarized COVID-19 vaccination response plans, legal documents, policies, research works, training curricula and communication materials to provide a comprehensive overview of vaccination activities against COVID-19. The review utilized a document analysis framework method. Given the general purpose of the review and keywords such as “COVID-19 vaccine and immunization”, nine technical topics (see Section 3.2) were deductively pre-identified as the primary category to cohesively bring together related concepts and ideas during the analysis. A total of 184 documents and materials were included in the summary (Fig. 7).

Fig. 7. Proportion of major topics included in the desk review
Key stakeholder interviews including priority groups for COVID-19 vaccination

Questionnaires served as a guide to determine and comprehend the process, implementation, challenges and best practices in different technical areas (see Section 3.2). Interviews at national, provincial, district and health facility levels were carried out, including interviews of priority groups (health workers and older adults). In total, 11 provincial/district-level and 23 health facility-level interviews were conducted; a total of 77 health workers and older adults were interviewed.

Observation of cold chain store and vaccination session

Standardized checklists were used for the observation of the facilities’ vaccine cold and dry storage and vaccination sessions. A total of 36 vaccine storage facilities and 13 vaccine sessions were observed at all levels.

3.2 Technical topics evaluated

Nine technical areas were reviewed and evaluated. These were:

1. Regulatory preparedness
2. Planning, coordination and service delivery
3. Costing and funding
4. Supply chain and waste management
5. Human resource management and training
6. Vaccine demand
7. Vaccine safety
8. Monitoring and evaluation

3.3 Site selection

At the national level, key personnel from the Department of Immunization and the NCCD were interviewed by the cPIE field teams, who also visited the National Central Vaccine Warehouse at NCCD.

At the subnational level, three districts in Ulaanbaatar were selected for evaluation, which included family health-care centres from each of these districts:

- Songino-khairkhan district, characterized by a high population and low vaccination coverage (58.8%)
- Chingeltei district, known for its low vaccination coverage (65.6%)
- Khan-Uul district, notable for a high vaccination coverage (90.8%) and a mobile/outreach immunization team.

Four provinces were also included in the evaluation, comprising a family health-care centre and one soum in each province:

- Bayan-Ulgii province, representing the western region and the Kazakhs ethnic group – low vaccination coverage for the third dose (60%)
- Khuvsgul province, representing the central region, with a high population – low vaccination coverage for the third dose (59.5%)
- Uvurkhangai province, representing the Gobi region and mobile and migrant populations – low vaccination coverage for the third dose (77.4%)
- Sukhbaatar province, representing the eastern region – high vaccination coverage for the third dose (68%).

Note that percentage coverage data were as of July 2022 (during site selection). Fig. 8 depicts the sites visited for the evaluation (highlighted in yellow).
3.4 Evaluation team, activities and participants

Evaluation teams

- Fifty members from eight field teams, including representatives from the MOH, NCCD, WHO Western Pacific Region and Country Office in Mongolia, United States Centers for Disease Control and Prevention (CDC) and the Task Force for Global Health conducted the evaluations at the national, provincial and district levels (refer to Annex 1 for the list of field teams).
- Each field team comprised seven people, with their duties and tasks approved by the MOH.
- MOH experts led the evaluation.
- Doctors from the Department of Immunization of the NCCD administered basic questionnaires on paper and via the open data kit (ODK) programme.
- Staff from the WHO Country Office in Mongolia input the English questionnaire into the ODK programme.
- Experts from the WHO Western Pacific Regional Office and the CDC monitored the evaluation, provided advice and delivered presentations related to their areas of responsibility.
- Translators offered oral translation throughout the evaluation process.

Activities and participants

A cPIE introductory meeting for decision-makers from the MOH and other pertinent organizations was held on 7 September 2022 at the MOH, with 140 participants that included representatives from the MOH and other domestic and international partner organizations.

Training for the evaluators took place from 15 to 18 September 2022 at the NCCD and Tuushin Hotel. On the first day, doctors from the Department of Immunization of the NCCD and other national partners, including the cPIE Mongolia National Coordinator and the National Desk Reviewer attended the meeting. Experts from the MOH, WHO and field evaluation teams attended the training on the second day.

Field team reporting and discussion were organized on 27 September 2022. The teams analysed the data collected in the field and delivered a presentation outlining the strengths, weaknesses, good practices, recommendations and conclusions in their relevant fields. Technical topic presentations then took place on 28 September 2022. Each technical topic lead presented a summary of the findings from the field based on the nine topics being evaluated.

A cPIE results dissemination meeting was conducted on 29 September 2022 at the Blue Sky Hotel with 130 attendees, including relevant experts from the MOH, NEMA, Ulaanbaatar City Health Department, 21 provinces and nine district health-care centres, and international partner organizations. A detailed plan of future measures, based on the conclusions and recommendations within the nine evaluated technical areas during the cPIE, was drafted on 30 September 2022. These activities are planned for implementation in collaboration with relevant organizations.
Photos of the evaluation teams from the national, provincial and district-level field visits.
4. Findings and recommendations

4.1 Regulatory preparedness

Background

In July 2020, the Government of Mongolia and the MOH officially expressed their commitment to the COVAX multilateral cooperation mechanism, thereby indicating their intention to acquire a safe and effective vaccine to combat COVID-19. The COVID-19 vaccine introduction readiness assessment facilitated the development of expedited registration procedures for the vaccine, and preparation of all pertinent documents, including those relating to vaccine importation, in accordance with existing laws and regulations. The Human Drug Council of Mongolia approved emergency use authorization (EUA) for COVID-19 vaccines (AstraZeneca, Gamaleya, Moderna, Pfizer and Sinopharm), per the Order of the Minister of Health No. A/06 dated 5 January 2021. Thereafter, the Medicines and Medical Devices Regulatory Authority (MMRA), Mongolia’s National Regulatory Authority (NRA), issued an import permit for COVID-19 vaccines. While the Human Drug Council does not function as an NRA, it grants EUA, a process followed by the MMRA’s issuing of import permits in Mongolia.

In addition, the National Assembly passed Resolution No. 36 in December 2020, providing guidance for the formation of agreements with relevant international organizations for the initial acquisition of COVID-19 vaccines. An action plan was established and implemented by the task force for diverse activities, which included preparations for international transportation, procurement of requisite permits for expedited border and customs entry, and negotiation with international organizations regarding vaccine supply and finalization of financial measures. The Government also engaged in bilateral negotiations with vaccine manufacturers in countries including Australia, Canada, China, India, Japan, the Russian Federation, the United Kingdom and the United States of America. A multisectoral working group was established according to joint orders from the Minister of Finance, Minister of Foreign Affairs, and the MOH, ensuring timely decision-making and seamless coordination.

The MMRA, a recently independent regulatory agency for vaccines and medicines, previously functioned as a department within the MOH. The purview of the MMRA encompasses all key NRA functions, such as market control, regulatory inspection, pharmacovigilance (medicine), and laboratory testing, excluding lot release. Through the COVID-19 vaccination response, the NRA’s capacity and functionality have seen substantial expansion. This fortifed capacity of Mongolia’s NRA would further reinforce the regulation of RI vaccines and emergency pandemic preparedness (such as the EUA process) in the future.

Finally, the focus of the regulatory preparedness topic was primarily on vaccine approval for the purpose of cPIE, although this topic is generally interpreted as encompassing overall regulations and laws in the Mongolian context.
Key strengths and achievements

1. Implementation of COVID-19 vaccines occurred without considerable delays.
   - The existing legal and regulatory framework, including various orders from the Minister of Health (such as Order No. A/06), are particularly in place for EUA, which guaranteed the availability of COVID-19 vaccines. The Law on Immunization in Mongolia (pertaining to all immunization programmes) provided a strong foundation to support the overall operation of COVID-19 vaccination.
   - The Human Medicines Council reviewed dossiers to make regulatory decisions for COVID-19 vaccination promptly.
2. Multiple government agencies, including the NRA, NCCD and border inspection authority, collaborated in conducting regulatory inspection.
3. The NRA’s reliance mechanism (such as the WHO Emergency Use Listing for COVID-19 vaccines) is well implemented.

Challenges

1. Regular updates for COVID-19 vaccination based on the epidemiological situation and evolving evidence/instructions from manufacturers.
   - Existing regulations/orders/laws do not always reflect the most recent information, although many legal provisions and regulations are currently being formulated for a newly independent NRA in Mongolia.
2. The NRA’s pharmacovigilance function is not yet integrated with the AEFI surveillance conducted by the NCCD. At present, the NRA primarily focuses on medicine pharmacovigilance, while the NCCD is the leading agency for AEFI surveillance. However, a clear collaboration mechanism for the NRA and NCCD for an integrated pharmacovigilance system is lacking – specifically, a gap was identified in monitoring and responding to adverse events related to vaccine quality defects.

Recommendations

To surmount the challenges noted earlier, we recommend the following strategic actions:

1. Update certain laws and decrees to incorporate current data on COVID-19 vaccines and to weave COVID-19 immunization into the national vaccination programme.
   - The initial step should be to scrutinize all documents (such as governmental resolutions and health ministerial orders) issued in relation to COVID-19 vaccination and harmonize them for consistency.
   - Create a legal structure to integrate COVID-19 immunization into RI services, keeping in mind that COVID-19 vaccination will persist, although the strategy might evolve over time (from pandemic response).
   - Legal provisions for the EUA process should be maintained even post pandemic for future pandemic preparedness.
   - Revise current regulations on AEFI surveillance and waste management.
2. Clearly define the roles and responsibilities of the MMRA and NCCD in relation to pharmacovigilance, including their collaboration mechanism to enhance vaccine (and medicine) safety surveillance at national and subnational levels.
   - Formulate standard operating procedures for both medicine and vaccine pharmacovigilance.
   - Bolster the MMRA’s capacity to review and assess all relevant dossiers for vaccines imported into Mongolia, particularly for timely detection, quality-defect inspection and response to AEFIs related to quality defects, if any.
4.2 Planning, coordination and service delivery

Background

The NDVP delineated the pivotal activities necessary to execute Mongolia’s COVID-19 vaccination response, including identifying main stakeholders and their respective roles. This is to ensure intersectoral collaboration to organize vaccination, coordinate activities, exchange information, and facilitate citizen participation and support. A national coordinating committee was also established to oversee the introduction of COVID-19 vaccines, with specified terms of reference for involved stakeholders. The Minister of Health was appointed as the Chair of the committee with members from diverse divisions of the MOH, including the NCCD, other government agencies (Ministry of Finance, NEMA, GASI) and international organizations (Asian Development Bank [ADB], UNICEF, WHO and World Bank).

At the onset of the vaccination response, when vaccine availability was scarce, the primary immunization strategy was to organize vaccination for target groups in a prioritized, rapid, phased manner, separate from RI rooms at temporary sites (such as sports centres, schools, cultural centres), and by mobile teams composed of doctors, vaccinators, nurses, record keepers and drivers. Most temporary sites have closed since the fourth quarter of 2021, with a few exceptions in Ulaanbaatar, and COVID-19 vaccinations are now administered in health-care facilities in the provinces.

During the assessment, all the health facilities visited carried out outreach activities to administer COVID-19 vaccines to any of the priority groups. Moreover, nearly half of the health facilities visited have incorporated their COVID-19 vaccination with other health services.

This thematic topic encompasses two critical programmatic areas: planning and coordination, and service delivery. Under this topic, many remarkable achievements and best practices were identified during the assessment. This section underscores a few key findings at both the macro and micro levels.

Key strengths and achievements

Planning and coordination

Throughout the national implementation of COVID-19 vaccines, governmental bodies at national and local levels demonstrated significant political commitment and leadership in directing and executing the COVID-19 vaccination response. A robust legal foundation was established to guide the nationwide swift roll-out of the COVID-19 vaccine, maintaining compliance with laws, resolutions, orders and technical guidelines at all tiers. Coordination and management structures were effectively implemented across various levels. Joint decision-making processes were applied, with the active participation of the National Immunization Technical Advisory Group and other pertinent professional committees. The whole-of-government and whole-of-society approaches were effectively adapted, serving as key enabling factors leading to the success of the national COVID-19 vaccine roll-out. The entire governmental system was effectively mobilized. Outstanding multisectional collaborations, including the mobilization of department personnel, were often highlighted during various discussions. Communities, private sector entities, and nongovernmental organizations were also actively involved.

Service delivery

Efficient planning and preparation practices were observed at national, provincial and health facility levels. Uniform pre-registration of individuals eligible for COVID-19 vaccination was conducted nationwide, with registration forms available for review at health facilities visited during the field evaluation. This action laid a robust foundation in several key dimensions – for example, enabling the efficient identification of high-priority groups. Given the large scale of COVID-19 vaccination activities, systematic work – such as detailed human resource mapping and planning exercises (including the involvement of retired staff and health staff at schools) – was conducted as part of effective planning at health centre and provincial levels. This effort was instrumental in identifying human resource needs and gaps and triggering practical solutions to ensure surge capacity for smooth operations of COVID-19 vaccination. Updated micro-plans were present at most health facilities visited during the evaluation, reflecting the evolving local situations.
The country endeavoured to make vaccination services available and accessible to all individuals by providing services close to people and communities. The establishment of adequate temporary vaccination posts (1200 temporary posts established nationwide) at strategic locations (outside health facilities, at schools, stadiums, malls) played a vital role in ensuring easy access to vaccination services and the continuity of essential health services. Active outreach activities and home visits were arranged to deliver COVID-19 vaccinations. Dedicated health workers exhibited extraordinary dedication under rapidly evolving and challenging circumstances, often involving long working hours.

A nationwide electronic immunization registry system functioned effectively during the COVID-19 vaccine roll-out. This system also enabled a tracking and reminder system for vaccination appointments, particularly for the primary series. Using the tracking system, COVID-19 immunization teams could, in real time, identify individuals eligible for vaccination who were either unvaccinated or had not completed the primary series of COVID-19 vaccines. Individuals were sent SMS reminders about getting vaccinated, including a follow-up SMS for the second dose.

With effective systems and mechanisms established and in operation, by the third week of July 2021, the country had fully vaccinated over 90% of both health workers and older adults, as well as 60% of its entire population, with the last dose of the primary series of COVID-19 vaccines.

Mongolia has effectively demonstrated the resilience of its health system. The country maintained high coverage of RI amid the pandemic; for example, the national average vaccination rates remained over 95% for both DTP3 and MCV1 from 2020 to 2022. This was an exceptional achievement in sustaining primary health-care services during the pandemic, when many countries worldwide experienced a decline in RI over the previous two years.

At the administrative level, clear messages and requirements from the central level focused on balancing the essential needs of delivering not only COVID-19 vaccination but also RI. At the operational level, practical guidance and means existed for resilient planning for both COVID-19 vaccination and RI sessions with available human resources. Other good examples of service delivery planning included integrated micro-planning exercises. For example, some health facilities rotated available vaccinators between conducting COVID-19 vaccination sessions on certain days (such as in temporary posts) and attending RI sessions at other times (in health centres). In recent months, many health facilities adjusted their operational strategies and approaches by providing both COVID-19 vaccination and RI at the same health facility.

Transportation and distribution of COVID-19 vaccines to subnational levels.
Challenges

The uptake of booster doses for COVID-19 vaccines is relatively low. As of 16 September 2022, the national coverage for the first booster dose was 32% for the entire population and 45% among the eligible population (currently aged 5 years and above). The NCCD reported that coverage of the first booster dose varied from 47% among seniors aged 85 years and above, to 67% among those aged between 65 and 74 years. The vaccination rate for health workers with the first booster dose was only 40% during the evaluation period (September 2022), a situation that raises concerns. Vaccine hesitancy was also observed among a minority of health workers in Mongolia, as evidenced by the low coverage of the first booster dose in this group. It is challenging for health workers who have low confidence in COVID-19 vaccines to convince other eligible population groups to get vaccinated. Additionally, demand for COVID-19 vaccination was low among children aged between 5 and 11 years.

Reaching mobile and dispersed population groups and covering large geographic areas with COVID-19 vaccination presented some significant challenges. More resources – both human and financial – were required to organize outreach services for reaching hard-to-reach communities and families. Human resource constraints were reported, particularly during peak times of COVID-19 infection and mass vaccination activities. Many health workers experienced long working hours and high workloads, and had to manage with reduced staff due to COVID-19 infections. During intense periods of mass COVID-19 vaccination activities, maintaining proper infection prevention controls presented some challenges due to limited space, long queues, overcrowding, and a lack of handwashing facilities at temporary vaccination posts.

With regard to RI, although the overall national coverage remains high, there are a few areas with decreased coverage, resulting in a varied degree of decline in RI in certain provinces. Consequently, these areas are facing an increasing risk of outbreaks of measles and other vaccine-preventable diseases.

Recommendations

Efforts at all levels should be intensified to enhance the uptake of booster doses, prioritizing key groups such as health workers, older adults and people with comorbidities. Given the pivotal role of health workers, it is imperative to bolster their confidence in COVID-19 vaccines and the vaccination process. A deeper understanding of the evolving perceptions of health workers regarding COVID-19 vaccines and vaccination is necessary. With such knowledge, it would be possible to adjust and tailor operational strategies accordingly. Older adults – being among the most vulnerable – should always receive prioritization. Mongolia has performed exceptionally well in administering primary doses of COVID-19 vaccines to older adults. Therefore, existing strategies and best practices could be utilized, including the identification of individuals who have missed booster doses and provision of outreach services that include home visits.

Prevention of outbreaks of other vaccine-preventable diseases is critical. In areas experiencing a decline in RI coverage, timely corrective action is paramount in order to close immunity gaps against measles and other vaccine-preventable diseases by catching up with under-vaccinated or unvaccinated children.

It is prudent to gradually incorporate COVID-19 vaccination into the overall immunization system and programme. Nationally, the MOH and NCCD should formulate plans to streamline and operationalize the integration of COVID-19 vaccination into the regular immunization programme. Given the resilience shown in the country’s response to COVID-19 vaccination, the NCCD could guide the health departments in the capital city and provinces to develop, test and evaluate different approaches suitable for various local contexts.

The assets derived from the COVID-19 vaccination response, which have built or enhanced the national immunization systems, should be leveraged. These include the electronic immunization register system, upgraded cold chain infrastructure, and real-time monitoring systems for temperature, stock and vaccination, all of which were strengthened or added in response to the vaccine roll-out. These assets should be further developed and integrated into the RI programme.

The National Immunization Programme is highly encouraged to document the country’s best practices in resiliently maintaining essential RI services during the nationwide roll-out of COVID-19 vaccines. The National Immunization Programme is also urged to share or publish its successful initiatives, thus contributing to the global knowledge base for sustaining primary health-care services during a pandemic.
4.3 Costing and financing

Background

The Government of Mongolia is responsible for the funds required for vaccination. Primary sources of funding for vaccines and their delivery have been identified in collaboration with the ADB, UNICEF, WHO and the World Bank. The costs associated with the purchase of COVID-19 vaccines are accounted for in the state budget and the World Bank project. Additional expenses tied to the acquisition of vaccines, rapid immunization implementation, and the distribution plan have been negotiated with the ADB. Donations and grants from other nations also constitute sources of funding.

The Ministry of Finance manages the cost of purchasing the vaccine, its auxiliaries, cold chain equipment, personal protective equipment (PPE), and costs related to distribution and vaccination. Governors at all levels are accountable for the costs associated with immunization, which include vehicles, fuel, daily subsistence allowances, meals, overtime pay and communication. The NCCD is tasked with submitting the cost estimates for vaccines, its auxiliaries and immunization activities to the MOH and international partner organizations. The latter offer technical and financial assistance for immunization activities.

Health-care organizations at all levels have collaborated to maintain daily records of income and expenses related to vaccines. Provincial and district health centres have utilized the Vaccination Supplies Stock Management (VSSM) programme to generate expense reports.

Key strengths and achievements

Several positive aspects of the financial management and support for the COVID-19 vaccine roll-out by the Government of Mongolia were identified. To begin with, effective management and oversight mechanisms were established early on. A technical working group was created in November 2020 for the procurement of approved vaccines, and a resolution by the national Government delegated cost allocations to various governmental tiers. For instance, the procurement of vaccines, other supplies and cold chain equipment was assigned to the national Government, whereas transportation and staff resources, including the daily subsistence allowance and overtime pay, were entrusted to the provincial government. Notably, funding at the service delivery site came from the national insurance plan, based on a reimbursement per vaccine dose delivered (5000 tugrik per vaccinated individual). Staff at the service delivery sites reported this funding as adequate to cover costs, including staff overtime and outreach transportation, ensuring resources were proportionate to the level of work required at each site. Furthermore, to alleviate the pressure on health-care facilities, insurance reimbursements for patient care services were increased by 50% during the COVID-19 pandemic.

Though the primary operational costs were borne by the Government of Mongolia, it also collaborated with partners to secure additional support, both financial and technical. Some specific examples include:

- Additional operational funds from the World Bank and the ADB.
- Additional operational costs, organizational support, training and communications support from WHO and UNICEF.
- Procurement of vaccines and supplies, with some technical support from the Global Fund to Fight AIDS, Tuberculosis and Malaria, UNICEF and WHO.
- Bilateral assistance provided through various embassies, which contributed to supporting the roll-out.

The Government of Mongolia was among the first to sign the COVAX agreement, which ensured an adequate supply of COVID-19 vaccines.

An impactful decision made by the Government of Mongolia regarding funding was the subsidy provided to vaccine recipients to encourage participation in the vaccination programme. This strategy had a dual effect. Along with promoting vaccine uptake, it helped mitigate the impact of lockdowns on families.

Due to this effective management and support from external partners, those interviewed for this evaluation reported no significant financial shortfalls.
Challenges

A few challenges did surface in the execution of the funding. For instance, there were reports of inconsistent and delayed overtime pay. This discrepancy particularly affected vaccinators, who did not receive remuneration on par with other health workers of similar skill levels. Additionally, much debate surrounded the limited budget allocated for outreach programmes, such as those targeting nomadic population groups like herders. Many stakeholders argued that the high costs of these outreach initiatives were not justified by the relatively small number of individuals reached. One health worker reported a journey of more than 20 kilometres to vaccinate one or two people, a process which consumed several hours and substantial financial resources.

Recommendations

Performing a cost-benefit analysis to determine the optimal strategy for reaching hard-to-reach areas or populations is recommended. It is acknowledged that the expense of reaching the most difficult-to-access members of a community is often considerably higher than the cost of reaching others. Nonetheless, in some instances, these hard-to-reach individuals are also the most vulnerable, as they may have limited access to care, have mobility issues, or live in impoverished conditions.

Consideration should be given to increasing the salary and financial incentives for vaccinators, who seem to be undervalued in the current pay structure. In connection with this, the issue of pay equity should be addressed, with an emphasis on performance-based incentives relative to the value of the job. Lastly, even where funding and pay are sufficient, there is a need to improve the implementation of existing policies on overtime pay, including ensuring timely payment.

Mongolia is the world’s most sparsely populated country, which makes delivery and administration of COVID-19 vaccines to remote areas challenging and costly.
4.4 Supply chain and waste management

Background

Supply chain

The readiness of the supply chain is crucial for the effective delivery of the COVID-19 vaccine to the target population, according to a specific immunization strategy. The obsolete cold chain infrastructure in Mongolia presented difficulties in storing and transporting routine childhood vaccines across the country. These issues were exacerbated when the need arose to vaccinate the majority of the adult population against COVID-19. As a response, a new central warehouse for vaccines and biological preparations was constructed in three months and began operations in August 2021, within the NCCD compound in Ulaanbaatar. This facility, which is four times larger than the previous storage facility and constructed in line with high international standards, is equipped with a standard and safe storage system for various vaccines. Furthermore, 800 refrigerators and 34 types of ultra-cold chain equipment were purchased, and 10 cold rooms were installed in central warehouses and vaccination units throughout the country. This infrastructure upgrade enabled every vaccination unit in the country to receive and properly store vaccines delivered from the central warehouse.

From the inception of the COVID-19 vaccination programme, schedules were developed for vaccine transportation to local areas, contracts were established with transport organizations for quick distribution, and the vaccine cold chain equipment was reviewed to estimate capacity. Measures were taken to increase it if necessary. Standard operating procedures were developed for vaccine packaging, storage, distribution and transportation. In September and October 2021, an evaluation of Good Vaccine Management 2.0 was conducted with support from UNICEF. This evaluation concluded that Mongolia’s immunization supply chain operations and overall performance were “excellent”, with an effectiveness of 88%.

Waste management

The COVID-19 vaccination campaign is the largest immunization effort in Mongolia’s history. Consequently, an unprecedented amount of immunization-related waste has been generated at all vaccination sites across the country. By the end of 2021, Mongolia had produced approximately 3.5 tonnes of immunization-related waste since the start of the COVID-19 vaccination programme, according to the Immunization Department of the NCCD. Health Ministerial Order No. A505 mandates proper collection, storage, transportation and disposal of PPE used in the COVID-19 response across all health-care facilities. Waste generated from used PPEs is disposed of in local waste disposal sites, while waste from COVID-19 vaccination is buried after autoclaving. However, the implementation of this ministerial order varies across provinces and districts, depending on the available infrastructure and resources. In relation to COVID-19 vaccines, the redistribution and re-collection process of unused vaccines remains unclear, despite regulations and accompanying instructions regarding the use and disposal of opened vaccines.
Key strengths and achievements

One crucial achievement in enhancing supply chain logistics was the construction of a cutting-edge vaccine storage facility in Ulaanbaatar in August 2021. This facility included numerous large refrigerators (2–8°C), freezers (up to −20°C) and deep freezers (up to −80°C), accompanied by the development of a real-time temperature monitoring system. This temperature monitoring system is operational at the national-level facility and is being implemented at provincial levels. This considerable investment bolstered the quality and capacity of cold chain equipment for COVID-19 vaccines and routine Expanded Programme on Immunization (EPI) vaccines, both at the national and provincial levels, with a capacity increase of two to 10 times across all levels.

A VSSM system was developed, allowing for electronic tracking of vaccine stock at national and provincial levels. Primarily used for COVID-19 vaccines, this system will also accommodate routine EPI vaccines in the future.

The MOH capitalized on partnerships with multiple agencies to transport vaccines to provinces efficiently, safely and punctually. This forward planning and collaboration prevented vaccine stockouts at subnational levels.

Challenges

During the initial deployment of the COVID-19 vaccination programme, it was observed that there was insufficient cold chain storage capacity. This challenge was largely driven by the use of the Sinopharm (Verocell) vaccine, which came in single-dose vials requiring substantial physical storage space. The issue of limited storage was mitigated by adding more freezers at the provincial level and scheduling frequent vaccine supply trips from Ulaanbaatar to the provinces, including distributing vaccines to districts en route to provincial cold chain storage. In one province visited for evaluation, cold chain storage equipment was temporarily borrowed from veterinary laboratories until new freezers were procured and delivered. However, at the provincial and district levels, there were instances of non-functional cold chain equipment and personnel who lacked adequate training on cold chain management.

As waste management was handled at the provincial and district levels, the surge in waste resulting from COVID-19 vaccinations added pressure to waste management systems in provinces and districts outside of Ulaanbaatar.

The extension of the use period for the Pfizer BioNTech Comirnaty vaccines nearing the manufacturer’s expiration date also created supply challenges and contributed to vaccine hesitancy.

Recommendations

At the national level, it is recommended that the VSSM system be integrated with the electronic immunization registry. This would enable the better linking of data sources. National medical waste management guidelines should be updated to incorporate waste associated with infectious diseases and address the increased burden on health-care facilities. Additionally, an official policy or recommendation regarding the use of vaccines nearing their expiration date should be developed, along with a vaccine redistribution and re-collection process for unused vaccines, to minimize wastage.

At the provincial level, coordination among cold chain maintenance personnel across provinces and districts should be strengthened to ensure all cold chain equipment remains operational. It is also recommended that effective waste management agreements and protocols be put in place and followed.

4.5. Human resource management and training

Background

Human resource planning and training for the COVID-19 vaccination effort is governed by an interim directive, which includes formulating a comprehensive list of health practitioners and personnel mobilized for the endeavour. For every profession, a customized training plan was developed and unique training modules for each aspect of vaccination were produced and distributed to the immunization units.

Training covered a diverse range of topics, such as: COVID-19 vaccines, the organization of NDVP execution, identification of target demographics, vaccination strategy, human resource planning, registration and reporting, safe immunization, AEFI surveillance, response activities, supportive supervision, infection prevention controls, waste management, vaccine management, cold chain monitoring, and the use of information, education and communication (IEC) materials during vaccination campaigns.
The trainings were attended by the leadership and members of the provincial emergency management commission, the heads of health departments, deputy heads for public health, EPI managers, specialists responsible for cold chain management, doctors and vaccinators. All told, 32 e-courses were organized, and a total of 8279 individuals received training across various subject matter.

Staff expressed the sentiment that there is need for more specific training in areas such as waste management and adverse event reporting. There was also dissatisfaction regarding the perceived insufficiency of updates, particularly in relation to newly recognized adverse events, such as thrombosis with thrombocytopenia syndrome, and the reasoning behind the extension of some vaccine expiry dates. Staff believed that enhanced scientific training on vaccination evidence and a greater amount of international published literature translated into Mongolian would have been beneficial. This provision could have been particularly useful in countering misinformation, a task they felt inadequately prepared to tackle.

**Key strengths and achievements**

The enduring commitment that Mongolia has shown in staffing its health-care delivery and public health system bore fruit during the COVID-19 pandemic. The fundamental staffing for health at the service delivery level was satisfactory and although COVID-19 stressed the system, necessitating overtime, the level of staffing generally fulfilled the demand. This was particularly apparent at the service delivery level, where only designated vaccinators were required for administering vaccines, contrasting with many other countries where personnel who do not typically administer vaccines were drafted and trained for that purpose. Additional nurses, clinical service providers, nursing students and retired health workers were drafted to aid in the vaccine roll-out, but their roles were confined to screening and providing other supplementary support. Other government sectors lent support services such as crowd control and registering vaccine recipients.

A combination of remote and in-person training was employed to train staff; written instructions for vaccine handling were issued and read by staff. It was evident in their accurate responses to specific questions regarding standard practices at the service delivery level that they were trained. While not every member of vaccination teams had received training, the consensus was that it was adequate as long as one or two team members had undergone the training.

**Challenges**

Service delivery in Mongolia invariably has to take into account the extensive distances and mobile population. Nevertheless, a remarkably efficient mechanism for tracking individuals exists, and at the most peripheral level of care, providers are cognizant of their clientele’s identities and locations. Workers reported extended work hours, with some exceeding 14 hours in a day at the height of the pandemic, leading to a number of resignations. Intermittent staff shortages transpired due to the pandemic, when personnel were exposed or infected and subsequently placed in stringent, prolonged quarantine or isolation. Staffing issues were potentially more problematic at the provincial level than at the service delivery level due to less redundancy at the provincial level. While vaccination sites can enlist additional clinical personnel for service delivery, several key positions at the provincial level – such as store managers – have minimal redundancy and few personnel to share the workload or fill in during prolonged absences of the primary contact person.

**Recommendations**

Future follow-up training for health workers in response to and for the mitigation of forthcoming events, building on experience gained from the roll-out of COVID-19 vaccines, can be pursued. This is not to redress any shortcomings noted in the recent pandemic, but rather stems from the general consensus that they could be even better prepared to respond to future events based on their recent experiences. Additionally, the MOH should contemplate methods to provide scientific literature in the Mongolian language to health-care providers.

Specific forms of training could be considered to further equip health workers, for example:

- Targeted vaccine training for new staff members.
- Establishment of an internship programme, serving as a form of training, for provincial staff at the national level. This would promote understanding of the functioning of existing systems and could provide crucial backup for staffing when required.
- Management training to address issues related to overtime and inequitable compensation.
- Training in risk communications and community engagement to adequately and effectively address questions on COVID-19 vaccines and vaccination safety issues.
The MOH should consider methods to increase redundancy for key positions through rostering, additional training, internship programmes, and so forth. It should also review the staffing plan and contemplate strategies for future events, such as a formal strategy for the recruitment of retirees.

4.6 Vaccine demand and acceptance

Background

By decree of the Prime Minister of Mongolia, a mandate for the state central administrative body responsible for health is to spearhead and organize IEC activities pertinent to vaccine immunization, and to designate a risk communication specialist. Consequently, a COVID-19 vaccination risk communication plan forms part of Mongolia’s NDVP. The plan incorporates conduct of risk assessment and response measures; the creation of IEC resources for health workers; planning and execution of risk communication and information materials and initiatives, inclusive of training a spokesperson who will provide public information on COVID-19 vaccination; and proactive surveillance of public attitudes prior and subsequent to the vaccine introduction. Roles and responsibilities of different agencies at various levels have been stipulated. Prior to the vaccine introduction, studies were undertaken to assess immunization readiness and perception concerning the new COVID-19 vaccines. Health officials and renowned scientists were urged to spearhead the vaccination process to bolster public and health worker confidence in COVID-19 vaccines.

Key strengths and achievements

An information and communication plan intended to foster acceptance and demand was formulated and executed at all levels. This encompassed the conduct of surveys to gauge immunization readiness, social and behavioural determinants related to vaccines, and knowledge, attitudes and practices surveys at a national level. The plan included activities such as leveraging multiple platforms to provide COVID-19 vaccination information, encompassing IEC materials, brochures disseminated at health facilities, posters in various establishments, social media, and national and local television stations.

Innovative approaches to augment demand and coverage were implemented. These included local initiatives such as “breakfast tea” and health competitions among sub-districts, and the establishment of hotline numbers in every provincial, district and family health centre (FHC) catchment area to facilitate bidirectional communication between the community and health officials.

Health officials and esteemed scientists were urged to take the lead in the vaccination process to enhance the confidence of the public and health workers in COVID-19 vaccines.

The COVID-19 immunization registry was utilized to automatically remind citizens of their scheduled vaccinations, extending to herders/nomads residing far from districts or soums.

Information on COVID-19 vaccines were provided to the public through different social media sites, such as on a video streaming site.
Challenges

In spite of the inclusion of risk communication within the NDVP, it remains deficient across all tiers, especially during periods of heightened COVID-19 transmission. Risk communication teams were not specifically appointed, with clearly defined roles and responsibilities. These teams, in most instances, were operational only during the early stages of the COVID-19 vaccine roll-out. Comprehensive risk communication plans were absent, budget allocation was limited, and no formal spokesperson was selected to advocate for COVID-19 vaccination.

Misinformation and fabricated news were neither addressed swiftly nor sufficiently. Anti-vaccine entities were proficient in organizing protests and gatherings.

Vaccine hesitancy persists for a multitude of evolving reasons, such as misinformation, apprehension over potential long-term side effects, ongoing COVID-19 transmission despite vaccination, perception of low risk of infection, vaccine preference, and doubts about vaccine quality – for example, the extension of expiration dates of Pfizer vaccines caused hesitancy. As the transmission of COVID-19 in Mongolia decreases, many believe they are less likely to contract the virus and that completion of the primary vaccine series is sufficient; there is a perception that a booster dose is unnecessary. This hesitancy also impacts the vaccination of adolescents and children, as their vaccination status is influenced by their parents’ reticence.

While all health workers in the health facilities evaluated during the assessment have completed their primary series, demand for the booster dose is low, as government guidance on its necessity is unclear and health workers themselves remain unconvinced of the vaccine’s effectiveness. This sentiment extends to other population groups as well.

Recommendations

Formation and training of risk communication teams should be prioritized, along with the development of a comprehensive risk communication plan at all levels, including the following:

- Identification and training of health professionals, influencers, celebrities and educators to serve as vaccination spokespersons. Such an approach would not only motivate more individuals to seek vaccination but would also prevent the spread of misinformation.
- Given their role as the first line of health information access for most citizens, health workers at all levels should be trained as risk communicators. They should be provided with the latest scientific information on COVID-19 vaccines to counter misinformation and promote vaccine demand.
- The risk communication plan should target the most vulnerable groups – health workers, older adults, and individuals with co-morbidities – with a primary series and first booster dose. Additionally, the plan should focus on age-groups with low coverage, currently children and adolescents, at least with the primary series.
- Risk communication specialists should be identified, particularly at provincial levels, to ensure the aforementioned activities are executed more efficiently.

Immediate and active engagement is necessary to address serious concerns arising from social listening, which includes information gathered from hotline calls, surveys and social media posts.

- Social listening should be utilized to identify the various reasons behind hesitancy and concerns specific to different age or priority groups. This information should inform the tailoring of strategies and messages.
- The results from national surveys should guide the creation of messages, particularly when reasons for refusal are linked to vaccine quality and side effects.
- Provincial- and district-level surveys should be conducted to identify specific local-demand indicators that need to be addressed, as different provinces and districts may have unique reasons for vaccine refusal.
4.7. Vaccine safety

Background

One of the top three reasons for vaccine hesitancy, especially regarding booster doses and for children, pertains to misinformation and apprehensions about vaccine safety (such as the emergence of chronic diseases following vaccination) in Mongolia. Orders issued by the Minister of Health exist to oversee the safety of vaccines and immunization, including AEFI reporting. The National AEFI Surveillance Manual (2018), premised upon the Immunization Safety Surveillance Guidelines of the WHO Western Pacific Regional Office (2015), is operational. As per Order No. A/278 issued by the Minister of Health in 2016, AEFI surveillance (synonymous with “vaccine safety surveillance”) is to be undertaken by all health-care organizations and health professionals at every level. Health Minister’s Order No. A/527 (2018) also necessitates reporting of suspected or specific cases of AEFIs within a 24-hour period. Furthermore, citizens have been empowered to report AEFIs themselves via an online form. In instances of severe AEFIs, the task of the AEFI Causality Committee is to review and evaluate the case and report to the relevant international body if it is determined to have a link with the vaccination. For managing AEFI emergencies, inclusive of anaphylaxis management, the Health Minister’s Order mandates the presence of an emergency medical kit and essential equipment at all permanent and temporary immunization sites. Throughout the initial phase of the COVID-19 immunization campaign (until the third quarter of 2021), temporary vaccination sites (e.g. schools and sports centres) were assigned exclusively for COVID-19 immunization, while health-care facilities were solely utilized for RI due to limited space and infection control protocols. To address emergency situations at non-health-care facilities (such as temporary vaccination sites), a trained clinician was stationed at each vaccination site.

Key strengths and achievements

1. Health Minister’s Orders and the national AEFI surveillance manual are established for AEFI surveillance, which include a standard emergency reporting form and an investigation form.
2. Online training programmes covering AEFI reporting and emergency management were delivered to vaccinators in the preparatory phase of the COVID-19 immunization campaign.
3. The EPI staff in the Provincial Health Department possess a basic understanding of epidemiology/statistics, facilitating the strengthening of AEFI surveillance.
4. Preparation for serious AEFI management, inclusive of an AEFI kit and a referral system, is available at provincial and sub-provincial (soum) levels.
   • One clinician from a provincial general hospital is responsible for AEFI management at vaccination sites, which were established outside health-care facilities for COVID-19 immunization.
   • Vaccinators at soum health centres (SHCs) possess basic knowledge about anaphylaxis management for identified suspected cases post-immunization.
5. A national AEFI committee for causality assessment is in place.

Challenges

Generally, there are areas for improvement in immunization programmes in relation to vaccine safety, specifically for COVID-19 vaccination and RI, notably at subnational levels. Gaps and challenges identified during the cPIE activities can be summarized as follows:

1. The implementation of Health Minister’s Orders for AEFI surveillance is inadequate, particularly at subnational levels. These inadequacies include:
   • Micro-planning for COVID-19 vaccination at FHCs and SHCs occasionally fails to include AEFI reporting and monitoring in some provinces, despite this requirement being stipulated in a health ministerial order.
   • Standard forms provided by the NCCD are not consistently used; a new form, created by untrained staff during a vaccinator’s absence, lacks essential information such as age and sex of vaccine recipients.
   • EPI staff at Provincial Health Departments and health workers/vaccinators at FHCs and SHC have limited knowledge about, and inconsistent practice of, reporting and monitoring of AEFIs (including serious AEFIs and adverse events of special interests [AESIs]). This results in significant under-reporting of AEFIs.
   • Some Provincial Health Departments lack a regular AEFI reporting and monitoring system.
and consequently do not share AEFI data with the NCCD.

- Despite distribution of the 2018 national AEFI surveillance manual to FHCs and SHCs, some health workers and vaccinators remain unaware of it.
- There is a notable misconception that a suspected or confirmed causal association is required to report AEFIs. For instance, there were several serious AEFIs in one province but no cases were reported.
- Under-reporting of AEFIs was observed in neonatal AEFIs (such as polydactyly) even though COVID-19 vaccination has been widely advised and implemented for pregnant women since June 2021 in Mongolia.

2. A clear process for AEFI investigation and causality assessment is absent at the subnational level, despite a Provincial Health Department order in February 2021 detailing AEFI review committee members, including essential clinical specialists for causality assessment.

- Despite documentation of AEFI review committee (or Council) members, the actual functionality of this Council is suboptimal. For example, no regular meetings of this committee occur due to lack of serious AEFI reports in some provinces.

3. Health workers/vaccinators possess limited knowledge and confidence in risk communication to address vaccine safety concerns and rumours presented by vaccine recipients.

- Health workers play a significant role in educating individual patients and the public, given the high respect they are accorded in Mongolian society. Their limited knowledge and confidence in COVID-19 vaccine safety adversely affects retention or improvement of the public’s trust and demand in overall immunization programmes, inclusive of RI and COVID-19 vaccination.
- The limited counselling roles of health workers at the ground level reflect constrained capacity and implementation of overall AEFI surveillance, a fundamental foundation to provide vaccine safety information to the public with evidence specific to the country.

**Recommendations**

Supportive supervision ought to be enhanced to ensure that Health Minister’s Orders are operationalized at both provincial and sub-provincial levels. This includes verification of micro-planning in FHCs and SHCs and ensuring that standard forms incorporate all key details.

Refresher trainings, inclusive of post-training evaluations, ought to be offered to all EPI staff and vaccinators/health workers at the subnational level, aligning with the national AEFI surveillance guideline.

- EPI administrators in Provincial Health Departments ought to devise and maintain a routine practice of monitoring AEFIs reported from FHCs and SHCs, by preserving a simple platform, such as an Excel sheet or paper registry, as a provincial AEFI database. Data from 21 provinces shared with the NCCD could establish the foundation for a population-based AEFI surveillance database.
- Vaccinators and health workers need to bolster their knowledge and comprehension about the overall AEFI surveillance, including detection and reporting. They also need to familiarize themselves with the standard reporting form and investigation form to comprehend the process and purpose of causality assessment of serious AEFIs/AEISs.

Utilizing the range of existing Health Ministerial orders, a clear process such as a standard operating procedure as well as roles and responsibilities of the AEFI investigation team (including at least one clinician) needs to be developed and operationalized for AEFI investigation in all provinces. Meticulous and scientific AEFI investigation at the provincial level will ultimately support the causality assessment conducted by the national AEFI committee.

Health workers and vaccinators need to be educated in counselling individual patients about vaccine safety concerns and rumours, using population-based AEFI surveillance data. This will enable them to rectify misconceptions and prevent hesitancy among the public when adverse events are incorrectly attributed to vaccines.
4.8. Monitoring and evaluation

Background

Mongolia has developed and implemented an electronic immunization record (EIR) for COVID-19 wherein vaccination data are logged daily. The EIR acts as a registration system for the eligible population, a database for maintaining individual records, and a vaccination certificate generator. Consolidated reports on immunization activities are compiled and submitted to the MOH and the NCCD. Both electronic and paper-based systems of recording and reporting persist in all health facilities visited. At present, the MOH and NCCD are integrating other immunization data into the EIR.

Vaccine recipients are informed of their vaccine schedule through electronic messaging (via SMS) and during their initial vaccination visit. A system to identify and follow up with those who default, such as individuals who fail to show up for their second vaccination, is in place through the EIR.

Information on vaccination locations and progress is accessible from the MOH website. Regular updates on COVID-19 vaccination coverage are also provided via the MOH’s official social media accounts. Other electronic systems developed for COVID-19 include vaccine supply monitoring (such as the VSSM system) and AEFI reporting.

The GASI and provincial authorities conducted frequent supportive supervision visits both before and during vaccine roll-out, including throughout distribution, transport and storage of vaccines.

Key strengths and achievements

The EIR system permits real-time tracking of vaccine administration and coverage, which is crucial in monitoring and evaluating the national and subnational roll-out of the COVID-19 vaccine programme. The EIR allowed health officials to estimate vaccine coverage by age, vaccine type and number of doses. The system also helped identify dropouts and difficult-to-reach areas and populations. Furthermore, the EIR provided the capacity to generate vaccination certificates, which are significant for travel and to avail of certain services.

A self-report electronic system was also established for citizens to voluntarily report AEFIs promptly, complementing the active efforts by health personnel to record vaccine adverse events. This passive surveillance system is useful for monitoring trends over time. National and provincial-level authorities performed frequent supportive supervision visits during the preparation of the COVID-19 vaccination programme and throughout the vaccine roll-out. This proactive approach allowed for early identification and prompt resolution of issues.

Challenges

Initial technical issues with the EIR system led to delays in the data entry and reporting process related to vaccine administration. Nevertheless, these glitches were rectified promptly, enabling the system to function as intended.

The COVID-19 pandemic has had an impact on RI coverage. Over the duration of the pandemic, Mongolia reported a 2–8% decline in vaccine coverage for the second dose of measles and DTP3.

Although supportive supervision before and during the COVID-19 vaccine roll-out proved beneficial, the high number of inspections and visits from multiple government agencies and authorities to check on the progress of the roll-out posed an undue burden on the day-to-day operations for vaccination activities.

Recommendations

At the national level, it is recommended to improve interoperability among the various electronic reporting systems. More specifically, a stronger linkage should be created between the EIR, vaccine management and hospitalization databases. The Government should also continue integrating data from other immunization activities to devise a single electronic system for vaccine-preventable diseases.

The development of human resources related to data reporting and management should be furthered. Refresher trainings should be organized, and continuing education materials on COVID-19 data management should be developed and disseminated to the existing and new workforce. At the provincial level, refresher trainings should be provided for health workers, particularly on EIR procedures and AEFI reporting protocol, to strengthen data reporting and management. Supportive supervision on COVID-19 vaccination activities should still be continuously conducted, ideally integrated with the supervision activities of other health programmes.
4.9. COVID-19 surveillance

Background

Surveillance of COVID-19 is crucial for monitoring trends, comprehending disease dynamics, and pinpointing areas of high transmission to facilitate rapid decision-making. Information on confirmed COVID-19 cases and associated deaths is gathered daily from all vaccination sites in both paper and electronic forms. Regular updates are available online via the Ministry of Health’s websites and official social media accounts.

Key strengths and achievements

Daily monitoring of confirmed COVID-19 cases and deaths has empowered the Government to determine increases in numbers in specific geographical areas (hotspots) or within certain age groups. This capacity has enabled the Government to swiftly devise strategies to mitigate such increases. Making such information readily available to the public has served as a warning for them to take necessary personal precautions to limit transmission.

Numerous ongoing research studies focus on COVID-19 vaccines, covering topics such as vaccine effectiveness and pre- and post-vaccination antibody levels, among others. COVID-19 test results are electronically recorded in hospital databases, which can be cross-referenced with other systems, such as vaccination status of COVID-19 cases, using unique identifiers. This approach facilitates the monitoring of vaccine effectiveness.

Challenges

During the peak of COVID-19 transmission, surveillance of other vaccine-preventable diseases was temporarily suspended due to limited human resources. This was either due to health workers primarily attending to COVID-19-related roles or being infected with COVID-19 themselves.

At the provincial and district levels, confirmed COVID-19 cases are not actively linked with vaccination histories. Cross-referencing and analysing this information can provide insight into the effectiveness of COVID-19 vaccines. At present, only deaths are linked with COVID-19 vaccination histories.

Recommendations

It is recommended to further integrate the COVID-19 surveillance system with other RI surveillance systems, as well as with the requisite human resources. Mongolia should leverage its available data to ascertain the impact of COVID-19 vaccines. The data to assess the severity of COVID-19 and deaths by vaccination status are accessible. Such an approach would assist in effectively communicating the benefits of the vaccine to the public and combating vaccine misinformation. Therefore, consideration should be given to linking COVID-19 cases with vaccination status to readily determine vaccine effectiveness, particularly at the provincial and district levels.

The conduct of studies to evaluate vaccine effectiveness, the duration of protection, and the necessity for additional or booster doses should be continued. The results of these studies should be utilized to inform policy decisions, as well as to address vaccine hesitancy and increase vaccine demand by providing information to the public on vaccine efficacy. Once the studies are completed, it is essential to promptly disseminate significant findings and emphasize key points for evidence-based decision-making. This will not only facilitate local response but will also contribute to the global knowledge on COVID-19 vaccines.
## Annex 1: Composition of field teams

### Provincial teams

#### Bayan-Ulgii province
- Enkhtuya Munkhbat, WHO Country Office in Mongolia
- Heeyoun Cho, WHO Western Pacific Regional Office
- Uranjargal Chuluundorj, EPI, NCCD
- Khuslen Nyamkhuu, EPI, NCCD
- Erdenetuya Gavaadorj, Chingeltei District Health Center
- Oyunbolor Munkh, translator

#### Khuvsgul province
- Davaadorj Mandakhnaran, WHO Country Office in Mongolia
- Glenda Gonzales, WHO Western Pacific Regional Office
- Jaymin Patel, CDC
- Tselkhaasuren Batjargal, NCCD
- Gantsooj Baatar, NCCD
- Anir Batsukh, translator

#### Sukhbaatar province
- Sodbayar Demberesuren, WHO Country Office in Mongolia
- Yoshihiro Takashima, WHO Western Pacific Regional Office
- Altancheigm Samdan, NCCD
- Sodnomjamts Bayarsaikhan, NCCD
- Batzaya Gungaa, translator

### Uvurkhangai province
- Xiaojun Wang, WHO Western Pacific Regional Office
- Anthony Mounts, Task Force for Global Health
- Gerelmaa Danzan, WHO Country Office in Mongolia
- Suvd Batbaatar, National Center for Public Health
- Oyun Munkhdavaa, EPI, NCCD
- Ankh-Udval Sumya, EPI, NCCD
- Khishigdelgerekh Palam, translator
- Ochirsukh Oidov, driver

### Ulaanbaatar district teams

#### Songino-Khairkhan district
- Tselkhaasuren Batjargal, EPI, NCCD
- Khuslen Nyamkhuu, EPI, NCCD
- Ankh-Udval Sumya, EPI, NCCD
- Tselmeg Erdenebat, EPI, Bayanzurkh district
- Kiogora Morris, Stop Program, WHO Country Office in Mongolia

#### Chingeltei district
- Altancheigm Samdan, EPI, NCCD
- Uranjargal Chuluundorj, EPI, NCCD
- Sodnomjamts Bayarsaikhan, EPI, NCCD
- Davaadorj Mandakhnaran, WHO Country Office in Mongolia

#### Khan-Uul district
- Narangerel Dorj, National cPIE coordinator
- Oyun Munkhdavaa, EPI, NCCD
- Baigal Vanya, EPI, NCCD
- Enkhtuya Munkhbat, WHO Country Office in Mongolia