Provincial workshop on all hazard health emergency risk assessment using Strategic Toolkit for Assessing Risks (STAR)

Report of the workshop in Madhesh province
December 12 - 14, 2024

मधेश प्रदेश सरकार
स्वास्थ्य तथा जनसंख्या मन्त्रालय
स्वास्थ्य निर्देशनालय
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निर्देशक

FOREWORD

I am delighted to present this detailed report on the Provincial Workshop on All Hazard Health Emergency Risk Assessment using the Strategic Toolkit for Assessing Risks (STAR), held in Madhesh province from December 12 – 14, 2024. This workshop represents a significant milestone in our continuous efforts to enhance health emergency preparedness and response capabilities within our province.

Madhesh province, located in Terai region, is known for its rich cultural heritage and diverse population. The province spans an area of 9,661 sq. km. The unique geographical, environmental, and societal characteristics of Madhesh, including its flatlands and proximity to the Indian border, necessitate a robust and adaptive approach to managing health emergencies.

The STAR methodology employed in this workshop provides a systematic and evidence-based framework for identifying, assessing, and prioritizing risks. This approach ensures that our preparedness and response strategies are both comprehensive and tailored to the specific needs and vulnerabilities of our communities.

I extend my heartfelt gratitude to all participants, facilitators and supporting organizations, including the Ministry of Health and Population, WHO Nepal, and USAID, for their invaluable contributors to the success of this workshop. The collaborative spirit and dedication demonstrated by all stakeholders are truly commendable and reflect our collective commitment to safeguarding the health and well-being of our people.

As we move forward, it is crucial that we continue to build on the insights and recommendations derived from this workshop. By integrating these findings into our provincial action plans and maintaining a multisectoral approach, we can significantly enhance our capacity to respond to health emergencies and mitigate their impacts. Additionally, the development of a comprehensive public health contingency plan will be essential in guiding our efforts. This plan, aligned with the principles of strengthening the global architecture for health emergency prevention, preparedness, response, and resilience, will provide a structured and strategic framework for our ongoing and future initiatives.

I am confident that this report will serve as a vital resource for policymakers, and all stakeholders involved in emergency management. Together, let us do our part to create a safer, healthier, and more resilient Madhesh province.

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PREFACE

The provincial Workshop on All-Hazard Health Emergency Risk Assessment, utilizing the Strategic Toolkit for Assessing Risks (STAR), represents a pivotal step in strengthening Madhesh province's health emergency preparedness and response framework. This report encapsulates the outcomes of the workshop, highlighting the collaborative efforts of various stakeholders in identifying and prioritizing health hazards specific to our province.

The workshop's objectives were clear, to advocate for the STAR methodology, engage provincial stakeholders, develop a province-specific risk profile, and formulate actionable recommendations. Madhesh province faces several hazards, and the health sector has responded to major disasters in the past. By adopting a participatory, evidence-based approach, we successfully identified 25 specific hazards (windstorm, civil unrest, fire, road traffic accident, substance abuse, rabies, flood, drowning, drought, COVID-19, antimicrobial resistance, air pollution, dengue, Japanese encephalitis, heat wave, cold wave, cholera/AWD, malaria, foodborne/water borne disease, pesticide residue, measles, medical/municipal waste, sound pollution, suicide/mental health, and snake bite) and developed a seasonal risk calendar and a risk prioritization matrix. These outputs are crucial for informed decision making and resource allocation, ensuring that our preparedness and response strategies are both effective and efficient.

I would like to express my sincere appreciation to the Ministry of Health and Population, WHO Nepal, USAID, and all participants for their unwavering support and active participation. The insights and recommendations generated during this workshop are a testament to the power of collaboration and the importance of a multisectoral approach in health emergency management.

As we move forward, this report will serve as a vital resource for integrating risk management into provincial policies and action plans. It is a call to action for all stakeholders to sustain the momentum and focus on building resilient health systems capable of safeguarding the well-being of our communities. Together, we can ensure that Madhesh province is well-equipped to tackle health emergencies and contribute to a healthier, more secure future.

Let us continue to work together to protect lives, strengthen systems, and build resilience in the face of challenges, reinforcing our commitment to the health and safety of every individual in Madhesh province.

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Acronyms

AMR	Antimicrobial Resistance
AWD	Acute Watery Diarrhea
ASV	Anti Snake Venom
EDCD	Epidemiology and Disease Control Division
EWARS	Early Warning and Reporting Systems
IHR	International Health Regulations
JEE	Joint External Evaluation
MOHP	Ministry of Health and Population
MoU	Memorandum of Understanding
NAPHS	National Action Plans for Health Security
NGO	Non-Governmental Organizations
PHD	Provincial Health Directorate
PHEOC	Provincial Health Emergency Operations Center
PPE	Personal Protective Equipment
RRT	Rapid Response Team
SOPs	Standard Operating Procedures
STAR	Strategic Toolkit for Assessing Risks
VPD	Vaccine Preventable Diseases
WHO	World Health Organization

Executive Summary

The Provincial Workshop on All-Hazard Health Emergency Risk Assessment, utilizing the Strategic Toolkit for Assessing Risks (STAR), took place in Madhesh Province from December 12 - 14, 2024. This workshop aimed to enhance the province's health emergency preparedness and response capabilities by identifying and prioritizing hazards, developing a seasonal risk calendar, and formulating actionable recommendations.

Nepal's vulnerability to various disasters and epidemic-prone diseases necessitates robust emergency preparedness and response strategies. Following the national-level Multi-hazard Risk Assessment workshop in April 2023, the Ministry of Health and Population (MoHP) initiated this provincial-level workshop to replicate the process in Madhesh Province. The workshop aimed to advocate and orient stakeholders on the STAR methodology for risk assessment, engage provincial stakeholders, including non-health partners, in health emergency preparedness, identify and list hazards specific to Madhesh Province, develop a province-specific risk profile based on the likelihood and impact of identified hazards, create a risk calendar for all identified hazards, and list key actions for inclusion in provincial contingency plans.

The workshop employed the STAR methodology, a step-by-step process involving hazard identification, likelihood evaluation, impact estimation, risk level determination, and the finalization of recommendations. Participants used the STAR data tool to document and rank hazards. The workshop successfully identified and assessed 24 specific hazards across five main types: Biological, Environmental, Hydro-meteorological, Societal, and Technological. The comprehensive all-hazards approach will enhance Madhesh Province's ability to respond to health emergencies, leading to better health outcomes for its residents. The next steps involve implementing the recommendations, regularly updating the risk assessment, and maintaining a multisectoral approach to ensure a thorough and inclusive risk assessment.

The workshop led to the creation of a seasonal risk calendar, a risk prioritization matrix, and a database for prioritizing risks. Key actions and recommendations were developed for each hazard. Applying the results of the STAR workshop is essential for enhancing Madhesh Province's health emergency preparedness and response capabilities. The comprehensive all-hazards approach derived from the workshop's findings will bolster the province's ability to respond to health emergencies, ultimately leading to better health outcomes for its residents. The next steps involve implementing the recommendations and regularly updating the risk assessment as new hazards emerge or existing ones evolve. Maintaining a multisectoral approach and involving various provincial departments and ministries is crucial for a thorough and inclusive risk assessment. This report will aid decision-makers in allocating resources to address priority hazards, even with limited resources and competing priorities.

I.Introduction

Nepal is highly susceptible to various disasters and epidemic/pandemic prone diseases, underscoring the need to strengthen emergency response across multiple sectors through comprehensive preparedness and response activities. The urgency for such measures was highlighted during the Joint External Evaluation (JEE) workshop in November 2022, which served as a platform to assess Nepal's preparedness and response mechanisms. The workshop's recommendations emphasized the development of a multisectoral, multi-hazard health emergency management plan, including emergency risk assessments, readiness evaluations, and preparedness and response plans at both national and provincial levels. Thus, profiling the hazards existing in the country is essential for preparing effective contingency and action plans.

Following the national-level workshop on Multi-hazard Risk Assessment held in April 2023, the Ministry of Health and Population (MoHP) recognized the importance of replicating this process at the provincial level. This initiative aims to achieve comprehensive hazard profiling, including seasonality and risk matrices, by involving multiple stakeholders such as government agencies, Non-Governmental Organization (NGOs), and local communities. Utilizing the Strategic Toolkit for Assessing Risk (STAR) methodology, this provincial-level effort will provide localized insights into specific risks and vulnerabilities within different regions of the country.

The Strategic Toolkit for Assessing Risk, developed by the World Health Organization (WHO), is designed to help countries identify hazards and assess their risk levels. This tool supports evidence-based planning, policy development, strategy formulation, decision-making, and prioritization of activities associated with managing all-hazard health emergencies. It enables national, subnational, and local authorities to rapidly conduct strategic and evidence-based assessments of public health risks. Aligned with the International Health Regulations (IHR 2005) Monitoring and Evaluation Framework, STAR calls for countries to develop risk profiles to inform emergency preparedness and response planning.

The STAR methodology emphasizes the following key principles:

- **All-Hazards Approach**: Recognizes that diverse types of hazards pose similar threats to health and management functions, and that developing stand-alone response mechanisms for each unique hazard is neither efficient nor cost-effective.
- **Whole-of-Society Engagement**: Encourages the involvement and coordination of all essential players in health and other sectors at all levels of society.
- **Health System Focus**: Considers hazards and their dangers at all levels of the health system, including primary, secondary, and tertiary care.
- **Risk-Informed Evidence Compilation**: Utilizes primary and secondary data from various sources to inform risk assessments, such as research, surveillance, and reviews of past emergencies.

- **Transparency**: Ensures clear and open communication throughout the risk assessment process.

By adopting a risk-based approach to emergency management, we can minimize health risks and the consequences of various emergencies and disasters. This approach involves identifying, mapping, and describing risks within a given area to prioritize actions that drive planning and strengthen coping capacities. Identifying vulnerable groups is essential to ensure equitable and inclusive resource distribution, helping to mitigate both immediate and long-term impacts on the most affected populations.

The STAR toolkit is relevant to a broad range of stakeholders involved in emergency and disaster response management. It can be applied at all stages of the emergency response cycle and is recommended to be conducted at least every 2-3 years or during major emergency responses. Through this provincial-level initiative, the Epidemiology and Disease Control Division (EDCD) seeks to enhance its capacity to manage health emergencies effectively, fostering a more resilient response to various hazards and emergencies across the nation.

II.Objectives of the STAR workshop

1. To advocate and orient on the methodology for risk assessment (use of STAR tool) at the subnational level
2. To engage all provincial stakeholders for health emergencies preparedness including non-health partners
3. To identify and list down hazards specific for the province
4. To develop a province specific risk profile determining the risk level of the identified hazards based on the likelihood and impact
5. To develop a risk calendar for all identified hazards
6. To list down key actions based on identified hazards that provinces need to adopt in their respective contingency plans.

III.Risk profiling Methodology

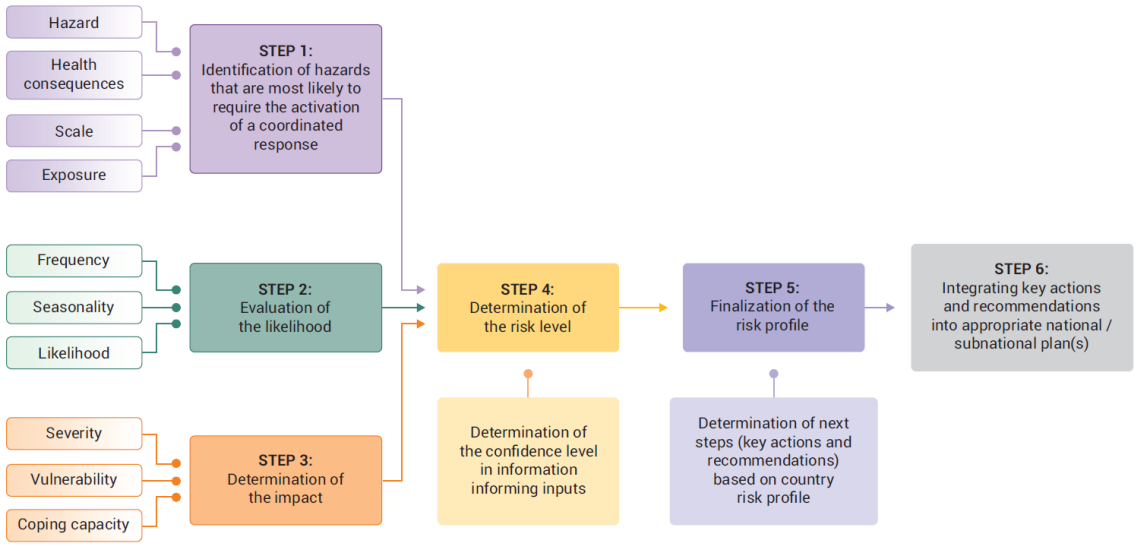
A. General overview of STAR methodology

On Dec 12 - 14, 2024, a three-day "Provincial Workshop on All Hazard Health Emergency Risk Assessment" was organized in Bardibas, Madhesh province by Epidemiology and Disease Control Division and supported by WHO Nepal and USAID. It served as a crucial follow-up to the national workshop on all hazard health emergency risk assessment, utilizing the Strategic Toolkit for Assessing Risks. This workshop aimed at assessing risks using the STAR tool, to formulate a comprehensive risk profile, seasonal calendar and priority actions specifically tailored for Madhesh province, ensuring a more resilient and responsive healthcare system required for effective planning, adequate resource allocation, and prompt response mechanisms to mitigate health emergencies effectively within the region.

During the workshop, participants followed a step-by-step method to describe risks in the provincial setting, using a qualitative, participatory, and discussion-based approach to generate consensus amongst the larger group. The key steps in the risk assessment included:

Step 1: Identify hazards and describe the scenario most likely to require the activation of a coordinated response
Step 2: Evaluate likelihood
Step 3: Estimate the impact
Step 4: Determine the risk level
Step 5: Finalize recommendations and workshop report
Step 6: Integrate recommendations and priority actions into provincial action plans for sustainable capacity building (after the workshop).

Figure 1. Summary of strategic risk assessment using STAR



Participants used the STAR data tool, an MS Excel sheet which is a user-friendly data entry component with an automated risk calculation matrix, to document each step of the assessment and facilitate the ranking of hazards.

In the first step in STAR, hazards are selected and the scenario that is most likely to necessitate a national coordinated response is detailed. To identify the hazards most likely to necessitate a coordinated response, this requires analyzing previous risk assessments, surveillance reports, capacity assessment reports, and official databases. The scale and magnitude of the dangers should be documented and mapped, along with any negative effects on physical, psychological, social, economic, or environmental health that may emerge from them.

Step 2 involves evaluating the likelihood of the hazards identified in Step 1. This includes defining the frequency and seasonality of each hazard and using these outputs to determine the likelihood of the hazard occurring in the next 12 months. Seasonality is defined by identifying the months of the year during which the hazard is most likely to occur, and this is done on a green-red color scale.

Step 3 involves estimating the impact of the identified hazard. It includes three sub-steps: (a) assessment of severity, which requires information on transmission potential, negative consequences on the population, disruption to essential services, and effect on the health workforce; (b) assessment of vulnerability, which considers factors such as health status, social determinants of health, presence of vulnerable groups, and environmental factors; and (c) assessment of hazard-specific coping capacity, which measures how people, organizations, and systems use available skills and resources to manage adverse conditions, risks or disasters related to the identified hazard. The workshop participants need to consider the availability and functionality of coping capacity in relation to each identified hazard.

Step 4 involves determining the risk level of the identified hazards. This is done by determining the confidence level of the available data and information and using a risk matrix to rank the hazards based on their level of risk. The risk matrix is automatically populated within the tool based on inputs from the workshop discussions in Steps 1-4. The final output of Step 4 is the national or subnational emergency risk profile, which includes a display of risk ranking of hazards, visualization of the 5x5 risk matrix table, and qualitative information on the identified hazards.

Step 5 involves finalizing recommendations and the workshop report. In Step 5a, priority recommendations and actions are drafted based on the identified risks, with reference to the risk matrix and seasonal calendar. In Step 5b, a draft report is created based on the evidence compiled prior to the workshop and agreements among participants. In Step 5c, further discussion and validation of actions may be necessary to finalize and validate recommendations and next steps.

Step 6 of the STAR methodology involves integrating the recommendations and priority actions developed in Step 5 into provincial action plans for sustainable capacity building. The workshop report helps decision-makers prioritize and plan readiness activities, mobilize and allocate resources, and strengthen provincial capabilities for mitigation, prevention, detection, response, and recovery. The recommendations should be integrated into relevant emergency response plans to provide a sustainable platform for implementation.

The STAR workshop will aid by producing these following three output:

- Seasonal calendar of Risk
- Risk prioritization, matrix, and database
- Key actions and recommendations

This will support equity-based planning and budgeting, and further strengthen the foundation in updating/developing contingency plans, strategic readiness and response plans, and national/provincial action plans. Data consolidation and further training needs to follow the workshop to ensure effective implementation of the STAR tool's outcomes in Nepal.

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B. Provincial Profile: Madhesh Context

Total Area: 9,661 Sq. Km (6.5% of Nepal)

- **Districts: 08**
- **Local Governments: 136**

Metropolitan City: 1
Sub Metropolitan City: 3
Municipalities: 73
Rural Municipalities: 59

- **Wards: 1271**

Map of Madhesh Province

Madhesh Province, located in Nepal, comprises eight districts and 136 local governments, including one metropolitan city, three sub-metropolitan cities, 73 municipalities, and 59 rural municipalities. The total area of the province is 9,661 square kilometers, which constitutes 6.5% of Nepal's total area. Madhesh province is diverse by both caste and ethnicity. The dominant cultural practices in Madhesh province are shaped by Hinduism and Islam. The province is also diverse in terms of language. Maithili is spoken by the majority of the population.

Key Health Facts	
Maternal Mortality Ratio (per 100,000 live births)	140
Prevalence of stunting among children under five years of age	29.3
Number of FCHVs	7619
LMIS reporting status	97
Institutional Deliveries (%)	63
Cases of animal bites (in number)	24667
Cases of snake bites (in number)	1987
Dengue cases (in number)	2706
Kala-azar cases (in number)	14
TB case notification rate (all forms of TB)/100,000 population	163
HIV/AIDS – number of new positive cases	510

Source: Government of Nepal, Ministry of Health and Population, Nepal Heath fact Sheets 2024

The health governance structure in Madhesh Province includes several provincial-level offices such as the Health Directorate, Provincial Public Health Laboratory, Provincial Health Logistic Management Center, and Provincial Health Training Center. Additionally, there are health offices and Ayurved offices in all eight districts. The province is served by three hub hospitals: Gajendra Narayan Singh Hospital in Rajbiraj, Madhesh Institute of Health Science in Janakpur, and Narayani Hospital in Birgunj. There are also several provincial hospitals located in Siraha, Chapur, Pokhariya, Bardibas, Jaleshwar, Lahan, Kalaiya, Bhardaha, and Malangwa.

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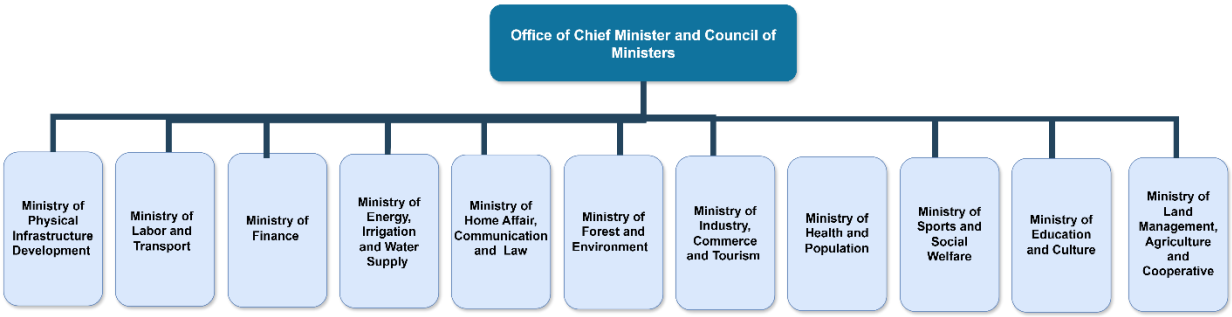


Figure 1. Madhesh Province - Ministries of Province

Ministry of Health and Population Governance Structure		
Provincial level offices	• Provincial Health Directorate • Provincial Public Health Laboratory • Provincial Health Logistic Management Center • Provincial Health Training Center	
Health Office	• 8 districts	
Ayurved Office	• 8 Districts	
Hub Hospitals	• Gajendra Narayan Singh Hospital (GNSH), Rajbiraj, Saptari • Madhesh Institute of Health Science (MIHS), Janakpur, Dhanusha • Narayni Hospital, Birgunj, Parsa	
Provincial Hospitals	• Siraha hospital • Bardibas hospital • Malangwa Hospital • Pokhariya hospital • Bhardaha Hospital	• Chapur hospital • Jaleshwar Hospital • Lahan Hospital • Kalaiya Hospital

There are various types of health facilities available in the province, including 53 Ayurveda Aushadhalayas, eight community health units, seven district Ayurveda health centers, seven district clinics, five district hospitals, 55 general hospitals, 748 health posts, 11 nursing homes, 33 primary health centers, one sub-regional hospital, three teaching hospitals, and 26 urban health centers. Madhesh Province faces several common hazards such as landslides, floods, disease outbreaks, lightning, earthquakes, and road traffic accidents. The health sector has responded to major disasters since 2020, including the COVID-19 pandemic, a cholera outbreak in Saptari in 2021, flood responses in Lal Bakaiya in 2023 and 2024, and a cholera outbreak in Rautahat in 2024. The existing emergency response teams at the provincial, district, and municipal levels, includes rapid response committees and teams, emergency medical teams, and the Provincial Health Emergency Operation Center (PHEOC). The PHEOC plays a crucial role in coordinating responses to health incidents and verifying rumors. From 2019 to November 2024, the province has experienced various incidents, including road traffic accidents, foodborne diseases, cholera, earthquakes, and floods. The health sector has responded to these incidents through communication and coordination with hospitals and security personnel, as well as functionality assessments of damaged health facilities using the HeRAMS tool.

C. Provincial workshop

Day 1: Inauguration and Technical Sessions

The workshop began with an inaugural session designed to set the stage for three days of collaborative learning and practical application. Mr. Bhola Adhikari welcomed the dignitaries and participants, followed by the introduction of the dignitaries on the dais. Key stakeholders from the Ministry of Health and Population (MoHP), the World Health Organization (WHO), provincial authorities, and other sectors participated in the session, with approximately 45 participants. Distinguished guests, Dr Sanjay Thakur, Secretary, MoHP, Madhesh Province, Dr. Shravan Kumar Nayak, Director, Provincial Health Directorate (PHD) and Dr Mukesh Poudel, Section Chief, Epidemiology and Outbreak Management System, Epidemiology and Disease Control Division (EDCD).

Welcome Remarks and Keynote Speeches

The workshop began with welcome remarks from Mr. Shravan Kumar Nayak, Director, Provincial Health Directorate, Madhesh Province, extending a warm welcome to all participants, emphasizing the significance of the workshop. He expressed that the event was crucial as it provided a clear sense of direction on how to prepare for potential hazards before they occurred. By focusing on proactive readiness, he noted, risks could be minimized, and resilience enhanced.

He highlighted the importance of the STAR Toolkit, explaining that it would serve as a vital resource for the province during emergencies or disasters by offering actionable guidance for critical phases of a hazard. He also briefly discussed the International Health Regulations (IHR) 2005 and the State Party Annual Reporting (SPAR) tool, emphasizing how the workshop would contribute to strengthening alignment with these global frameworks.

He encouraged all participants to actively engage and make the most of the workshop, expressing confidence in the group's ability to achieve meaningful outcomes that would enhance health preparedness and response capabilities. Concluding his remarks, he wished everyone success in completing the workshop and reiterated the importance of full participation.

Workshop Overview and Objectives

Dr. Mukesh Poudel, Epidemiology and Disease Control Division, Section chief, delivered a comprehensive overview of the workshop's goals, methodologies, and anticipated outcomes. The workshop aimed to equip participants with the skills to conduct strategic risk assessments, identify and prioritize hazards, and develop actionable recommendations aligned with global frameworks such as the International Health Regulations (IHR) and the Sendai Framework for Disaster Risk Reduction.

The specific objectives were to:

1. Orient stakeholders to the STAR methodology, focusing on risk identification, assessment, and prioritization.
2. Enhancing collaboration across sectors, integrating non-health stakeholders into health emergency preparedness efforts.
3. Develop critical outputs, including a seasonal risk calendar and a risk prioritization matrix.

Dr. Poudel began the session by setting the scene for understanding emergency and disaster risk management. He emphasized the importance of recognizing the key components: hazards, exposure, vulnerabilities, and coping capacities. This foundational knowledge is crucial for developing effective strategies to manage and mitigate risks.

He then introduced the concept of Strategic Risk Assessment, explaining its primary purpose. The STAR approach is designed to develop a comprehensive risk profile that enables national and subnational governments to prioritize preparedness and readiness actions based on evidence. This method supports strategic and operational planning by linking to International Health

Regulations tools such as SPAR, JEE, and IHR-MEF. Dr. Poudel highlighted that the STAR toolkit is adaptable and flexible, making it suitable for various local contexts and focus areas. It employs a multi-sectoral, whole-of-society approach and relies on participatory methods and available data from all sectors.

Dr. Poudel discussed the application of the provincial risk profile, tailored to meet specific objectives and needs. This profile helps prioritize National Action Plans for Health Security (NAPHS) and capacity-building for health emergencies. It also enhances surge capacity mechanisms, addresses concurrent emergency risks, and aids in developing or revising policies and legislation. Identifying gaps in knowledge and needs for further assessment is another critical aspect of this process.

Dr. Poudel detailed the steps involved in conducting strategic risk assessments:

1. Identifying hazards likely to trigger a provincial response.
2. Evaluating the likelihood of these hazards.
3. Determining the potential impact.
4. Assessing the overall risk level.
5. Finalizing the risk profile.
6. Integrating key actions into appropriate plans and operations.

He presented the outputs of the STAR process, which include provincial risk profiles, seasonal calendars of risk, key actions and recommendations, and risk prioritization matrices. These tools help visualize risks in terms of likelihood and impact, facilitating better preparedness and response planning.

Dr. Poudel provided examples of priority actions based on the risk profile. These actions include reviewing and updating contingency plans, developing Standard Operating Procedures (SOPs) and Memorandums of Understanding (MOUs), increasing social awareness, and reviewing early warning systems and health infrastructure. These steps are essential for ensuring continuity of essential health services and mitigating risks effectively.

He emphasized the importance of gathering relevant data in advance to support the STAR exercise. This data includes health information, non-health information, and population dynamics. Collecting this data helps create a comprehensive risk profile and supports informed decision-making.

Dr. Poudel concluded the session by highlighting key considerations for the effective implementation of the STAR tool. Drawing from past experiences, he stressed the importance of a participatory approach, the use of available data, and the need for flexibility and adaptability in applying the toolkit.

Identification of hazard that will trigger provincially coordinated emergency response

The session commenced with a presentation on the identification of hazards that could necessitate a provincially coordinated emergency response. During the technical discussion, participants were introduced to the concept of a hazard, defined as a process, phenomenon, or human activity with the potential to cause loss of life, injury, property damage, social and economic disruption, or environmental degradation. The session also covered various types of hazards, including biological, non-biological, geophysical, weather-related, societal, environmental, hydro-meteorological, and technological hazards.

Group Work: Hazard Identification

Participants worked in groups to identify hazards relevant to Madhesh province, guided by STAR's structured criteria followed by an interactive exercise in plenary for selection of hazards. Participants were provided with a long list of reference for all-hazard types, including biological, geophysical, hydro-meteorological, technological, societal, environmental, and extra-terrestrial hazards and encouraged to select only the hazards that would likely result in activation of a provincial coordinated response mechanism. Participants were provided with key points to consider, which included whether the hazard had recently been experienced in the province, whether it was experienced within the last 5-10 years, whether risk assessments (all-hazards or hazard-specific/vertical) or risk models available had been reviewed, whether there were potential cross-border risks or risks from neighboring province/countries, and whether the hazard would likely trigger a provincial response mechanism. A total of 24 hazards were identified, during the hazard identification exercise (See annex 1). Participants were then divided into five thematic groups based on specific hazard types.

Through the discussion, it was noted that hazards that have similar or the same consequences can be grouped together. Some hazards, such as cyber-attack, structural collapse, conflict, enterotoxemia, leprosy and water supply failure were removed from the list after the discussions as participants stated it does not require a provincial coordinated response.

The exercise helped in active collaboration among participants, highlighting the importance of diverse perspectives in comprehensively assessing provincial risks.

Session on describing the Health Consequences, Scale and Exposure

This session focused on equipping participants with the skills to describe the health consequences, scale, and exposure associated with identified hazards. After which the session moved on to group work where the focus was on the utilization of the STAR tool, the tool was provided to all the groups, it was ensured every group had one laptop with them. The group worked on the tool by working on it with their own knowledge, experience and online data source, the participants were able to assess the scale of each hazard and identify potential risks more accurately.

Overall, the exercise highlighted the need for improved surveillance in health sectors and provincial level response readiness due to the nature of the hazards.

Day 2: Technical Sessions and Group Work Continuation

The second day commenced with a recap of Day 1, reinforcing the key takeaways, and ensuring alignment among participants and emphasizing the need for continuity and thoroughness in the discussions.

Session on describing seasonality, frequency and likelihood

During the session, participants concentrated on the potential occurrence of specific hazards that would necessitate a provincial-level response, with a particular focus on Madhesh Province. They utilized a variety of data sources, including hazard-specific information, meteorological reports, early warning data, historical emergencies, and vaccine uptake rates or interruptions in regular immunization services, along with their expert judgment.

They evaluated the scenario by comparing it with historical data and existing models to estimate the frequency of the hazard. They also considered the seasonality of the hazard, identifying the months when it is most likely to occur based on past patterns. Using the available data, participants assessed the likelihood of the hazard occurring within the next 12 months, which would require a coordinated provincial response.

During the working group session, members made informed judgments based on all relevant hazard-specific data and their collective expertise. By identifying the seasonality of hazards, especially in Madhesh Province, professionals can better plan for surge capacity, prioritize actions, and deploy timely and appropriate risk-reduction measures.

Session on describing Severity, Vulnerability, and Coping Capacity

The day's second session introduced participants to the third step of the STAR methodology: assessing the severity, vulnerability, and coping capacity of identified hazards. Facilitators from WHO explained these concepts in detail, providing practical frameworks for analysis:

1. **Severity Assessment:**

The process began with assessing severity using the severity algorithm, which is crucial for prioritizing resources, implementing mitigation measures, and managing potential health crises effectively. This involved evaluating the gravity of health outcomes resulting from exposure to identified hazards, including the severity and duration of illnesses, potential mortality rates, and long-term health implications. For biological hazards, it also included assessing the ease and speed of transmission within the population. Additionally, the assessment considered the disruption to essential health services.

Participants evaluated the health consequences of each hazard, focusing on morbidity, mortality, and the disruption of essential services. Factors such as transmission potential and the hazard's impact on vulnerable populations were also discussed. The working group concluded the severity of the 25 hazards are as follows: *Very high: 2, High: 10, Moderate: 11, Low: 1 and Very Low: 1*.

2. **Vulnerability Analysis:**

Next, the presentation discussed describing vulnerability, which refers to the characteristics and circumstances that make individuals, communities, systems, or assets susceptible to the damaging effects of a hazard. Vulnerability factors include age, gender, health status, socioeconomic status, disability, and access to resources and support networks. The assessment categorized vulnerability into individual, community, system, and infrastructure levels. Socioeconomic factors like poverty, employment status, and literacy levels, as well as environmental factors such as climate change and environmental degradation, were also considered. The Cochrane Methods Equity Progress-Plus Model was highlighted as a framework for analyzing health equity and identifying health inequities.

Using the Progress Plus model, participants examined socio-economic determinants, geographic disparities, and marginalized groups' exposure to risks.

3. **Coping Capacity Evaluation**:

Finally, the presentation covered assessing coping capacity, which measures how people, organizations, and systems use available skills and resources to manage adverse conditions, risks, or disasters. This included evaluating governance and coordination, health sector capacities, non-health sector capacities, and community capacities. Governance and coordination involved existing plans, legal frameworks, multisectoral coordination, and political will. Health sector capacities included the functionality of health services, health workforce readiness, surveillance systems, and supply chain functionality. Non-health sector capacities encompassed socio-economic support, private sector engagement, telecommunications, and logistics capacities.

Community capacities involved knowledge, attitudes, practices, social support mechanisms, and community health worker programs.

Participants assessed the readiness of governance systems, healthcare infrastructure, and community networks to manage and mitigate the impacts of each hazard. They considered factors such as early warning systems, resource availability, and community resilience.

In the latter part of the day, participants began drafting actionable recommendations for hazards allotted to each group. This involved outlining responsibilities, setting timelines, and identifying resource requirements. With this, day 2 was wrapped up with concluding the session.

Day 3: Final Discussions and Outputs

The third day focused on consolidating the insights and outputs generated during the workshop. The morning session began with a review of the previous day's work, followed by discussions aimed at refining the drafted priority actions.

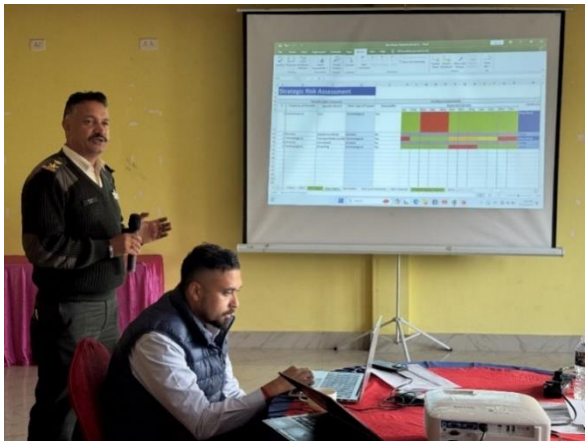
Refinement of Risk Assessments

Participants revisited their risk assessments, incorporating feedback from facilitators and peers. Adjustments were made to ensure that risk levels accurately reflected the province's context.

Plenary Presentations and Stakeholder Feedback

In the plenary session, each group presented their finalized priority actions, receiving constructive feedback from participants. Recommendations focused on enhancing the feasibility and alignment of proposed actions with provincial capacities. Examples included:

- Case surveillance, outbreak response management, ensuring proper vaccination, and engaging the community through risk communication are key actions for JE.
- Updating guidelines, conducting AMR surveillance, enforcing strict laws to limit the use of antibiotics without prescription are critical steps to combat AMR.
- Increasing the frequency of awareness programs at the community level, procuring necessary kits, and ensuring access to pure drinking water are essential steps.

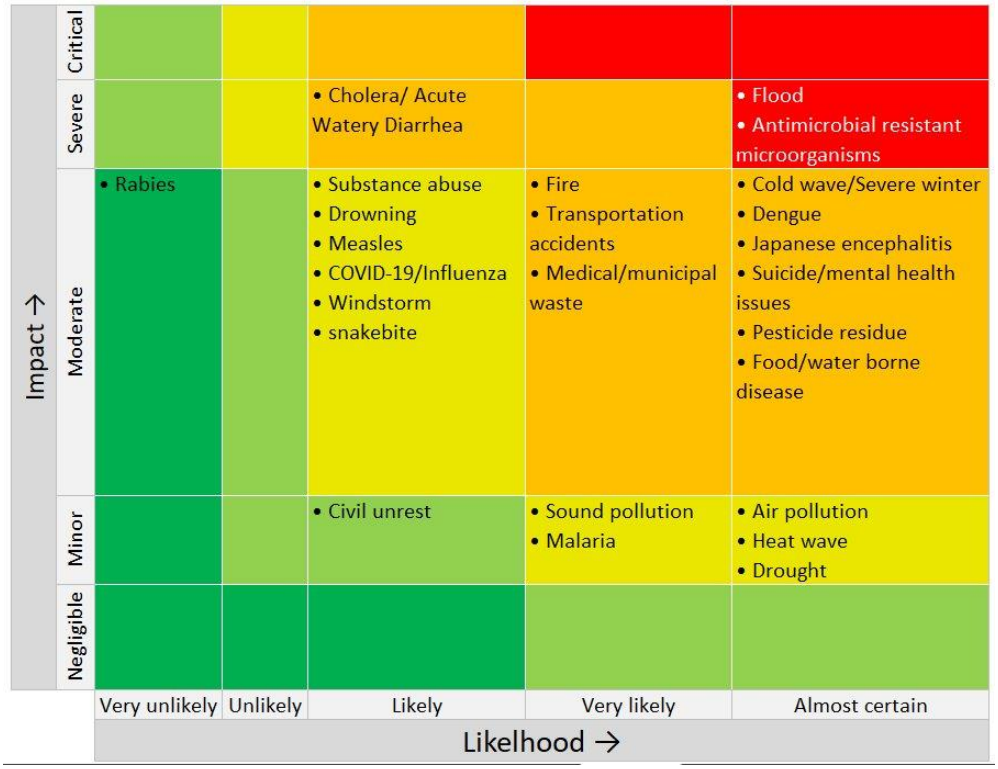



Key Outputs

1. **Seasonal Risk Calendar:** A detailed timeline highlighting high-risk periods for prioritized hazards, enabling targeted preparedness efforts.

Specific Hazard	Risk Level	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flood	Very high												
Antimicrobial resistant microorganisms	Very high												
Fire	High												
Transportation accidents	High												
Cold wave/Severe winter	High												
Medical/municipal waste	High												
Dengue	High												
Japanese encephalitis	High												
Suicide/mental health issues	High												
Pesticide residue	High												
Cholera/ Acute Watery Diarrhea	High												
Food/water borne disease	High												
Substance abuse	Moderate												
Drowning	Moderate												
Air pollution	Moderate												
Heat wave	Moderate												
Drought	Moderate												
Measles	Moderate												
COVID-19/Influenza	Moderate												
Sound pollution	Moderate												
Malaria	Moderate												
Windstorm	Moderate												
snakebite	Moderate												
Civil unrest	Low												
Rabies	Very low												

2. **Risk Prioritization Matrix:** A comprehensive categorization of hazards based on their severity, vulnerability, and coping capacity.



3. **Actionable Recommendations:** Tailored strategies for each high-priority hazard, complete with lead agencies, implementation timelines, and estimated budgets.

To address the risks associated with various hazards, the participants finalized the following key actions:

Hazard	Narrative
Fire	• Prioritize monitoring and Emergency Medical teams (EMT) to ensure rapid response. • Conducting public awareness campaigns and training programs to educate the community on fire prevention and safety measures.
Transportation accidents	• Conducting continuous monitoring and awareness programs • Implementing and enforcing laws related road safety. • Ensure having EMTS ready for quick response
Civil unrest	• Monitoring and deploying EMTs as needed. • Public awareness policies and designating restricted areas can help maintain order and safety.
Flood	• Essential to activate early warning system and construct strong dams near river. • Relocating high risk populations to safer areas

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	• Providing training to security personnel and having readily available rescue equipment
Air Pollution	• Measuring the air quality index, promoting tree plantation, and encouraging behavioral changes to reduce emissions.
Drought	• Tree plantation, effective irrigation management, town planning, and proper waste disposal.
Heat wave	• Focus on tree plantation, awareness programs, and enhancing the healthcare system to handle heat-related illnesses.
Cold wave/severe winter	• Improving early warning systems • Conducting awareness and public education campaigns • Investing in research and development to mitigate the effects of severe winter conditions.
Antimicrobial Resistance	• Updating guidelines, conducting AMR surveillance, enforcing strict laws to limit the use of antibiotics without prescription
COVID-19	• Updating existing guidelines, ensuring vaccination, and promoting hand washing practices.
Measles	• Allocating a budget for awareness campaigns in specific districts conducting community awareness programs • Advocating with local leaders to reach target groups
Medical/Municipal waste	• Proper segregation and disposal of waste • Orienting stakeholders about waste management guidelines • Establishing a monitoring and evaluation framework for effective waste management.
Sound Pollution	• Measuring sound pollution levels • Preparing guidelines to control sound pollution. • Orienting stakeholders about these guidelines.
Dengue	• Preparing a provincial level contingency plan • Procuring and prepositioning kits • Expanding search and destroy activities in hotspot areas for dengue management.
Japanese Encephalitis	• Case surveillance, outbreak response management, ensuring proper vaccination, and engaging the community through risk communication
Malaria	• Screening, surveillance, and management of malaria cases, especially in border areas • Procuring and prepositioning kits, drugs, and medicated nets • Training health workers and ensuring risk communication
Pesticide residue	• Establishing and expanding testing centers • Orienting farmers on proper pesticide use • Implementing laws with adequate supervision and monitoring

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Suicide/mental health	• Raising awareness through campaign • Ensuring risk communication, and engaging the community • School health programs, recruitment of health workers, and establishing rehabilitation centers and safe houses are also important. • Expanding mental health services and ensuring proper allocation of psychosocial counselors and psychiatrists with adequate drug supply
Cholera/Acute Watery Diarrhea	• Increasing the frequency of awareness programs at the community level • Procuring necessary kits • Ensuring access to pure drinking water are essential steps.
Food/Water Borne Diseases	• Increasing personal hygiene awareness programs • Making the food control system more effective • Implementing good agricultural and veterinary practices
Rabies	• Starting vaccine production at the provincial level • Increasing the frequency of health education and awareness programs • Timely vaccination of animals
Snakebite	• Increasing the number of snake bite treatment centers at the local level • Ensuring an adequate supply of anti-snake venom • Conducting preventive awareness programs
Windstorm	• Ensuring timely availability of food and logistic support • Mobilizing Rapid Response Team (RRT) in affected areas • Deploying emergency medical teams under standard operating procedures
Substance Abuse	• Need to prioritize monitoring and raising awareness campaigns.
Drowning	• Need to prioritize monitoring and emergency medical teams to ensure rapid response. • Public awareness campaigns are essential to educate the community on drowning and safety measures.

Closing Remarks

The workshop concluded with a ceremony acknowledging the contributions of all participants. Dr Rajeev Kumar Jha, Director, Provincial Health Logistic Management Center, stated that the discussion was incredibly important. He noted that that province faces some form of disaster annually, and their response is often uncoordinated, likely due to the limited resources. He expressed that the workshop had provided a multisectoral direction moving forward and that the provincial health logistic management center would support these efforts.

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Mr. Shravan Kumar Nayak thanked all participants. He mentioned that the three-day workshop, focusing on multi hazard risk assessment, had been enlightening. He suggested that moving forward, they should develop a proper action plan based on the recommendations and coordinate with PHEOC. He emphasized the importance of utilizing resources and policy instruments, reflecting on legal frameworks, and noted that the workshop would guide them. He highlighted the activity's alignment with the core components of the IHR and stressed the need for close collaboration with all line ministries. He also mentioned the importance of reviewing the workshop documentation and ensuring effective implementation. He discussed the one health approach and multisectoral collaboration, especially in vulnerability mapping and hazard identification. He suggested that the workshop outputs should be shared across all districts and municipalities and encouraged everyone to work together to improve response mechanisms.

Dr. Yadu Chandra Ghimire, Director, EDCD, stated that the major discussions had highlighted the importance of priority setting, which the workshop had provided. He noted that isolated programmes lack linkages, but the outputs from the workshop would be reviewed, and EDCD would provide support in any way possible. He mentioned that this being the last STAR workshop, the team is in the process of publishing a bulletin soon. He emphasized the need to work in an organized and managed manner, considering realistic budgets. He highlighted the importance of multisectoral discussions as they extended beyond health. He noted that identifying roles of other sectors had been a significant aspect of the workshop, especially in the provincial context. He mentioned the lack of proactiveness and response during the recent flood disaster in Kathmandu. He concluded by stating that now they had identified and prioritized hazards, they must prepare for response mechanisms, identifying lead agencies and collaborating closely with other sectors.

Conclusion

The Madhesh Province STAR workshop successfully identified and assessed 25 specific hazards. These hazards were further categorized into five main types: Biological, Environmental, Hydro-meteorological, Societal, and Technological. This was achieved through a step-by-step process that incorporated a participatory approach and existing data. The workshop led to the creation of a seasonal risk calendar, a risk matrix, and a database for prioritizing risks. Key actions and recommendations were developed for each hazard.

Applying the results of the STAR workshop is essential for enhancing Madhesh Province's health emergency preparedness and response capabilities. The comprehensive all-hazards approach derived from the workshop's findings will bolster the province's ability to respond to health emergencies, ultimately leading to better health outcomes for its residents.

Next steps involve implementing the recommendations and regularly updating the risk assessment as new hazards emerge or existing ones evolve. Maintaining a multisectoral approach and involving various provincial departments and ministries is crucial for a thorough and inclusive risk assessment. The STAR workshop report should be disseminated to all relevant sectors, partners, and donors to support decision-making, prioritize readiness activities, and strengthen health emergency and disaster risk management capacities. This report will aid decision-makers in allocating resources to address priority hazards, even with limited resources and competing priorities.

Annex:

Annex 1: Identification of Hazards

S. N	Subgroup of Hazards	Specific Hazard	Main type of hazard
1	Weather related	Windstorm	Hydro-meteorological
2	Societal	Civil unrest	Societal
3	Environmental	Fire	Environmental
4	Technological	Road Traffic Accident	Technological
5	Societal	Substance Abuse	Societal
6	Animal-human contact (zoonosis)	Rabies	Biological
7	Weather Related	Flood	Hydro-meteorological
8	Technological	Drowning	Environmental
9	Weather Related	Drought	Environmental
10	Respiratory pathogens	COVID-19	Biological
11	Other infectious hazards	Antimicrobial resistance	Biological
12	Environmental	Air pollution	Environmental
13	Vector-borne diseases	Dengue	Biological
14	Vector borne disease	Japanese Encephalitis	Biological
15	Weather Related	Heat wave	Environmental
16	Weather Related	Cold wave	Environmental
17	Fecal-Oral disease	Cholera/AWD	Biological
18	Vector borne disease	Malaria	Biological
19	Fecal-oral disease	Food borne/Water borne disease	Biological
20	Technological	Pesticide Residue	Biological
21	Respiratory Pathogens	Measles	Biological
22	Technological	Medical/municipal waste	Environmental
23	Technological	Sound Pollution	Environmental
24	Societal	Suicide/mental health	Societal
25	Animal-human contact (zoonosis)	Snakebite	Biological

Annex 2: List of Participants

S. N	Name of the Participants	Designation	Organization
1	Dr. Yadu Chandra Ghimire	Director	EDCD
2	Shravan Kumar Nayak	Director	PHD, Madhesh
3	Dr. Rajeev Kumar Jha	Director	PHLMC, Madhesh
4	Dr Mukesh Poudel	Section Chief	EDCD
5	Ram Pukar Sah	PHO	Health Directorate
6	Dilip KC	Lt, Col.	Nepal Army
7	Umesh Kumar Yadav	PHA	Health Office Dhanusha
8	Gopal Prasad Baral		Nepal Redcross, Bardibas
9	Satya Narayan Yadav	Recorder	MIHS Madhesh Province
10	Birendra Sah	IT Officer	MIHS Madhesh Province
11	Sunita Gupta	Nursing Officer	Health Directorate
12	Yugal Kishor Yadav	L.T.O	PPHL Janakpur
13	Dushyant Michle	L.T.O	PPHL Janakpur
14	Navin Yadav	M.P.O	AASMAN Nepal
15	Sanjib Sapkota	C.A.O	Bishnu Municipality, Sarlahi
16	Shiv Narayan Yadav	L.D.O	DOLFD
17	Mira Kumari Mandal	J.T	DOLFD
18	Anjala Khanal	Development Officer	DOLFD
19	Ganesh Bahadur Magar	HC	PEOC
20	Santosh Kumar Yadav	PC	PEOC
21	Jeetendra Kumar Sah	Microbiologist	PPHL Janakpur
22	Saroj Kumar Yadav	S.O	Health Directorate
23	Dipesh Kumar Mishra	Sr. A.H.W	PHLMC
24	Ram Naresh Yadav	C.H.O	Health Office Bara
25	Phulendra Yadav	Sr. L.T.O	Health Directorate
26	Bala Krishna Khadka	District Coordinator	WVI Nepal
27	Ratna Kant Jha	Food Nutritionist	FTTG Janakpur
28	Lal Babu Ray	Statistic Officer	Health Office Sarlahi
29	Vijay Kumar Yadav		PEEPN Dhanusha
30	Shiva Prasad Bhatta	Sub Inspector	APF
31	Kuldeep Yadav	PHI	Bardibas Hospital
32	Bhola Yadav	Statistic Officer	Health Directorate
33	Raghubir Mahato	Lab Technician	Health Office Saptari
34	Nabal Kishor Sah	Acting Chief	Health Office Mahottari
35	Krishna Deo yadav	Chief	Health Office Siraha
36	Dinesh Raut	S.I	Nepal Police
37	Bishal Bahadur Budathoki	Inspector	Nepal Police
38	Dr Sudeep Kumar Thakur	Me.SU	Bardibas Hospital
39	Bhola Adhikari	LTI	EDCD
40	Dr Avinash Kayastha	FMO	WHO
41	Saugat P KC	KMO	WHO

42	Jawed Mohammad	IMA	WHO
43	Dr Sagar Poudel	FMO	WHO

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Ministry of Health and Population
Department of Health Services
Epidemiology and Disease Control Division