# Joint external evaluation of the International Health Regulations (2005) core capacities of

# Pakistan

## Mission report

15–24 May 2023

World Health Organization

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# Abbreviations

| | |
|---|---|
| AMR | Antimicrobial Resistance |
| AWARE | Access, Watch and Reserve |
| CCHF | Crimean-Congo Haemorrhagic Fever |
| DCP | Disease Control Priorities |
| DDSRU | District Disease Surveillance and Response Unit |
| DGHS | Directorate General of Health Services |
| DHIS | District Health Information System |
| DRAP | Drug Regulatory Authority of Pakistan |
| EBS | Event-Based Surveillance |
| EMT | Emergency Medical Team |
| EOC | Emergency Operations Centre |
| EPA | Environmental Protection Agency |
| EPHS | Essential Package of Health Services |
| EPI | Expanded Programme on Immunization |
| FAO | Food and Agriculture Organization of the United Nations |
| FDI | Federal Directorate of Immunization |
| FELTP | Field Epidemiology and Laboratory Training Programme |
| FIC | Fully Immunized Children |
| GLASS | Global Antimicrobial Resistance Surveillance System |
| HRH | Human Resources for Health |
| IAEA | International Atomic Energy Agency |
| IBS | Indicator-Based Surveillance |
| IDSR | Integrated Disease Surveillance and Response |
| IHR | International Health Regulations |
| IHR NFP | International Health Regulations National Focal Point |
| IPC | Infection Prevention and Control |
| JEE | Joint External Evaluation |
| MDRO | Multidrug-resistant Organism |
| MIS | Management Information System |
| NAPHS | National Action Plan for Health Security |
| NCOC | National Command and Operation Centre |

| | |
|---|---|
| NDMA | National Disaster Management Authority |
| NEOC | National Emergency Operations Centre |
| NEQAS | National External Quality Assurance Service |
| NGO | Nongovernmental Organization |
| NIH | National Institutes of Health |
| NRLPD | National Reference Laboratory for Poultry Diseases |
| NVL | National Veterinary Laboratory |
| PDMA | Provincial Disaster Management Authority |
| PDSRU | Provincial Disease Surveillance and Response Unit |
| PEI | Polio Eradication Initiative |
| PHC | Primary Health Care |
| PHEOC | Public Health Emergency Operations Centre |
| PHRL | Public Health Reference Laboratory |
| PNAC | Pakistan National Accreditation Council |
| PNRA | Pakistan Nuclear Regulatory Authority |
| PoE | Point of Entry |
| PRL | Provincial Reference Laboratory |
| PSDP | Public Sector Development Programme |
| RCCE | Risk Communication and Community Engagement |
| RI | Routine Immunization |
| SDGs | Sustainable Development Goals |
| SOP | Standard Operating Procedure |
| SPAR | IHR States Parties Self-Assessment Annual Reporting Tool |
| STAR | Strategic Toolkit for Assessing Risks |
| TB | Tuberculosis |
| TPVICS | Third-Party Verification Immunization Coverage Survey |
| UHC | Universal Health Coverage |
| VPD | Vaccine-Preventable Disease |
| WASH | Water, Sanitation and Hygiene |
| WHO | World Health Organization |
| WOAH | World Organisation for Animal Health |
| XDR | Extensively Drug-Resistant |

# Executive summary

Pakistan as signatory to the International Health Regulations (2005) is committed to implementing the IHR Monitoring and Evaluation Framework, composed of the four components of IHR States Parties Self-Assessment Annual Reporting Tool (SPAR), Joint External Evaluation (JEE), After-Action Review and Intra-Action Review (AAR and IAR) and simulation exercises to monitor progress of IHR implementation in the country.

The second round of the JEE in 2023 was conducted more than five years after the first round in 2016.

The external phase of the JEE in Pakistan was held from 15 to 24 May 2023 involving extensive consultations, technical discussions, and relevant field visits at the federal and provincial levels. The external phase included evaluation visits conducted to two major provinces (Punjab and Sindh) and virtual discussions with other two provinces (Khyber Pakhtunkhwa and Balochistan) and federating regions (Islamabad Capital Territory, Azad Jammu and Kashmir and Gilgit–Baltistan).

The external evaluation team was composed of 13 experts from WHO's Regional Office for the Eastern Mediterranean (EMRO) and WHO headquarters, the United Kingdom of Great Britain and Northern Ireland Health Security Agency, the World Organisation for Animal Health, the Eastern Mediterranean Public Health Network and country peer experts from Tunisia and Portugal. A core national team – two persons for each technical area – were identified to take lead in the preparatory work and to engage with all relevant sectors for the follow-up. The national team worked under the guidance of Dr. Safi Malik, Dr. Muhammad Salman and Dr. Atiya Aabroo. The WHO Pakistan Country office, namely Dr Farah Sabih under the full guidance and leadership of WHO representative Dr. Palitha Mahipala, was heavily engaged in the preparations and provided all necessary technical and operational facilitation to the national and international expert teams.

More than 200 participants representing all the IHR-relevant sectors at the federal and provincial levels were involved in both the self-evaluation exercise and external evaluation phases. These sectors included: Ministry of National Health Services Regulations and Coordination (NHSR&C), National Institutes of Health (NIH), Ministry of National Food Security & Research (NFS&R), National Veterinary Laboratory (NVL), National Agricultural Research Centre (NARC), Pakistan Agricultural Research Council, Islamabad Health Regulatory Authority (IHRA), Law & Justice Division, Planning & Development Division, Drug Regulatory Authority of Pakistan (DRAP, Ministry of Human Rights, Border Health Services (BHS), National Disaster Management Authority (NDMA), Common Management Unit, Pakistan Atomic Energy Commission, Ministry of Industries, Ministry of Foreign Affairs (MOFA), Federal Directorate of Immunization, Pakistan Centre for Scientific & Industrial Research, Health Services Academy, Department of Health, Finance Department, Center For Disease Control and Prevention (CDC) (the collaboration concerned preceded 20 January 2025) units of Provincial Departments of Health, Livestock & Dairy Department (LADD), Planning Cell, Health Sector Reform Unit, Provincial Health-Care Commissions (HCC), Provincial Environmental Protection Agencies, Planning & Development Board, Provincial Food Authorities, Agriculture Department, Provincial Disease Surveillance & Response Units, Public Health Laboratories, Jinnah Post Graduate Medical Centre, Civil Hospital Karachi, Dow University of Health and Medical Sciences, Public Health Laboratory, Punjab AIDS Control Programme, Provincial Expanded Programme on Immunization (EPI) units, Provincial Hepatitis Programme, University of Veterinary & Animal Sciences, Public Health Engineering Department (PHED).

Partners like the Foreign Commonwealth & Development Office (FCDO); United States Agency for International Development (USAID) (the collaboration concerned preceded 20 January 2025), John Snow International (JSI), United Kingdom's Health Security Agency, Fleming Fund, UNICEF, United States Pharmacopoeia, Jhpiego, Eastern Mediterranean Public Health Network (EMPHNET) , WHO Country Office and Provincial Sub-offices, and the World Bank were also engaged during the evaluation process.

The dedication and commitment of the national team in the self-assessment at all levels enabled a thorough and effective process of JEE implementation. In some technical areas, the country is endowed with a higher level of capacity than the score may reflect; however, standards and procedures are often not documented. Other issues that prevented a higher classification in some areas are the limitations identified in the animal and environmental sectors, and in the IHR coordination and collaboration between all stakeholders.

Overall, the external evaluation team noted limited capacity in most technical areas although technical areas of radiation emergencies and immunization were scored at sustained and demonstrated and capacities level. The national expert team clearly understands the importance of the "One Health" approach as a unique opportunity to articulate the various areas and components by enhancing integration between technical departments responsible for human, animal, and environmental health.

The overall score of the JEE in 2023 stands at 43% (121/280). The country scored 5/5 in each of the indicators under radiation emergencies, which The brought up the scores for the points of entry and other IHR-related hazards capacity the highest (54%) among other major capacities. The lowest score was assigned to the response capacity (36%), and within the response capacity health emergency management and infection prevention and control (IPC) scored the lowest. The assigned scores for detection capacity were second highest at 47%, attributed to the ongoing investment in integrated disease surveillance and laboratory systems by the federal and provincial governments and partners. The prevention capacity scored 43%, with antimicrobial resistance and food safety scoring the lowest while immunization scored the highest.

In comparison to the 2016 JEE, the score for prevention capacity stands the same at 43%. The detection capacity improved from 50% in 2016 to 54% in 2023. There is slight reduction in the scores assigned to the response technical areas (scored 46% in 2016), and points of entry and other hazards (scored at 60% in 2016). The reduction of scores does not indicate reduction of capacity as WHO JEE tool was revised in 2021 based on the COVID-1 pandemic response, with new technical areas, updated and additional indicators with strict benchmarks contributing to lowering the scores in 2023. Examples are health emergency management and infection prevention and control under the response capacity and risk assessment for international travel under points of entry.

Six major cross-cutting priorities emerged from review of the 19 technical areas required to fulfil the IHR requirements to prevent, detect and mount a comprehensive public health response to health threats. Multisectoral coordination is a prerequisite for ensuring implementation of these priorities. Political commitment at different administrative levels is a key factor for moving forward and utilizing a stepwise approach.

**First: Update the National Action Plan for Health Security.** The first plan developed after the first JEE has not been fully implemented. Updating the plan based on the new JEE findings and IHR benchmarks is, therefore, necessary. An oversight mechanism will need to be put in place to monitor progress and ensure its full implementation over time.

**Second: Increase domestic financing for health security.** The budgetary allocation for health is limited in Pakistan. Allocation of a specific budget for health security has not been a priority although funding was made available for key recommendations for JEE 2016 at national levels while it remained limited at provincial levels. However, during the COVID-19 pandemic, the government provided funds for strengthening prevention, detection, and response to health emergencies. This had an impact on the ability of the country to implement the NAPHS as the country had been mostly reliant on external funding. Conducting in-depth assessment of budgetary allocation for health security is recommended to identify

funding gaps and to increase budgetary allocation for health security. This will further inform partnership efforts with the private sector and external partners and will facilitate the implementation of the NAPHS.

**Third: Institutionalize health emergency management.** Currently, two sectors are taking lead in managing emergencies, depending on the type. The National Disaster Management Authority takes the lead in managing disasters and emergencies related to climate change and chemical events while the National Institute of Health takes the lead in managing public health (infectious disease-related) emergencies. Roles and responsibilities are defined and also identified for the other support sectors. However, multisectoral plans and jointly developed standard operating procedures (SoPs) are missing. The functioning of these structures does not fully align to a well-defined incident management system nor utilize the public health emergency operation centre as a platform for multisectoral management of health emergencies. Fully dedicated human and financial resources for managing emergencies are also limited. The country is continuously hit by different health and non-health emergencies with an impact on health. It is therefore imperative to conduct a full assessment of the emergency management system to inform policies, strategies and enhancement of measures to prevent, early detect, rapidly and effectively respond to emergencies and build back better.

**Fourth: Foster One Health approach for prevention, detection and response to One Health threats.** Pakistan is facing several threats at the human-animal-environment interface. Zoonotic diseases of different origins are prevalent, and disease pattern is changing in relation to climate change. Antimicrobial resistance is a global threat for both the human and animal sectors Food and water safety and environmental health issues are additional and exponentially increasing health threats. Addressing these inter-related threats separately is ineffective and a waste of precious resources. The utilization of One Health approach and adaptation of the regional operational One Health framework is recommended to manage the One Health threats.

**Fifth: Invest in a sustainable multidisciplinary health workforce for health security.** Pakistan is among the countries of the Eastern Mediterranean Region experiencing severe shortage of health workforce. Achieving the SDG targets of substantially increasing health financing and specially for the recruitment, development, training and retention of the health workforce remains a continuing challenge. The workforce strategy developed and updated in 2018 does not comprehensively cover the varied workforce required for implementing all IHR-related areas. Assessment of workforce availability for all IHR-related areas among all relevant sectors needs to take place to inform the updating of the existing strategy. Sustained allocation of resources for recruitment, education and capacity-building and retention is crucial for building the health security capacity in the country.

**Sixth: Continue to strengthen surveillance, diagnostic capacities, and antimicrobial resistance (AMR) at all levels.** Surveillance and laboratory capacities are the backbone of the health system for early detection, investigation and confirmation of public health threats. Threats can emerge from different origins (biological, chemical, radiological, nuclear, climate-related), hence, it is important to continue to invest in strengthening these capacities on all hazards approach. Pakistan has been investing in improving surveillance and diagnostic capacities, with partners providing significant support to establish a real time integrated disease surveillance and response mechanism. Improvement and progress in these areas has been observed in comparison to the findings of the first JEE. No significant progress has been made in the context of AMR, even though a national action plan for AMR was developed in 2017 with limited domestic funding secured at the national level and regular reporting of national AMR data to the WHO the Global Antimicrobial Resistance and Use Surveillance System (GLASS) portal since 2017. However, the necessary actions required at the provincial levels including development of AMR operational plans with budget allocation needs to be emphasized to address the huge AMR challenge at the national level.

**Seventh: Create space for the two-way community participation.** Community participation has been used extensively in Pakistan to implement public health interventions. The polio programme is an example of how communities have been successfully engaged in implementation of polio intervention. Several successful examples have also been observed in the response to COVID-19. However, engaging with the communities has always been going in one direction with predominant focus on the response. Creating two-way community participation is vital, as the public health events and emergencies start in the community and end at the community level. Thus, Efforts need to be put in place to engage communities in identifying risks, designing public health interventions and implementing programmes for the prevention, preparedness and response to health threats. Establishing a systematic and active approach of social listening and community feedback will build the trust of communities and guarantee a high level of acceptance and successful implementation of public health programmes and interventions.

Additional gaps and priorities identified for each of the 19 technical areas are summarized as follows:

Pakistan has conducted a legal mapping of relevant legal instruments for IHR implementation at the national and intermediate levels. Although legal instruments have been developed and partially mapped at the federal and provincial levels, formal assessments have not been conducted.

Legal, normative, and institutional instruments and arrangements remain insufficient to communicate effectively with all levels in the relevant sectors regarding IHR coordination. Although multisectoral coordination structures for IHR implementation are in place at the national and sub-national levels, the mechanism, procedures, and protocols have yet to be institutionalized.

The national action plan on health security for IHR preparedness and health security was developed in 2017 for implementing priority core capacities based on the key 2016 JEE recommendations. The plan on health security was tested during COVID-19, with several challenges identified, such as availability of ineffective financial resources, lack of detailed planning, progress review and incorporating the lessons learned during the COVID response.

Progress has been made in the area of AMR since 2016 JEE, with development of a national action plan and coordinating mechanism. There is, however, an urgent need to focus on strengthening systems to prevent, diagnose and manage infections in human and animal health, within food production, and to change the behaviors of health providers and patients regarding use of antibiotics. Additionally, provincial operational plans must be defined and established with systems approach to prevent and manage infections.

Pakistan has identified a list of six priority zoonotic diseases. Functional multisectoral, multidisciplinary mechanisms, policies, systems, and practices are in place to minimize the transmission of zoonotic diseases from animals to human populations. However, significant gaps still exist in the surveillance and reporting of zoonotic diseases, and information on all zoonotic events is not shared regularly between the animal and human health sectors.

The country's national food safety regulatory standards are based on international standards. One Health approach has been adopted and initiated through the notification of national and provincial One Health hubs. Capacity-building is needed at all levels of administration to manage human and animal disease surveillance, in addition to the need for a coordinating mechanism for implementation of effective responses to foodborne emergencies.

The Expanded Programme on Immunization (EPI) in Pakistan has improved vaccine access and delivery by strengthening supply chain management. The national coverage of Fully Immunized Children (FIC) currently stands at 77%. Challenges in achieving full immunization coverage persist, particularly in remote and security sensitive areas. Polio eradication is hindered due to vaccine hesitancy and resistance in some communities. Geographical disparities among provinces and federated areas also continue to be an issue of concern.

The capabilities of national laboratories are sufficient for testing most priority diseases in Pakistan and a national body is available for the accreditation of laboratories (Pakistan National Accreditation Council/ PNAC). With regard to the public health laboratories, capacity for testing all 34 priority diseases is limited to the provincial levels while significant capacity exists at the National Institutes of Health (NIH) public health laboratory. Federal and provincial health-care commissions are functional for licensing laboratories and for monitoring laboratory quality. Vertical programmes provide diagnostic facilities for HIV, TB and malaria.

National laboratory biosafety and biosecurity policies were developed in 2017, and biosafety is embedded within the curriculum in universities. However, biosafety rules require updating to integrate the biosecurity component. Other areas for further improvement include adequate resource allocation, development of training plans and mechanism for monitoring and surveillance of high-risk pathogens for conducting regular assessments.

A national strategy and guidelines for surveillance have been developed and implemented, with surveillance data collection reaching 80% coverage in the country. Over 7000 health-care staff underwent training programmes for enhancing surveillance competency. Monitoring and evaluation needs are currently priorities for further improvement.

Multisectoral workforce strategies for the health and animal sectors are in place and catered for through some programmes. There are routine capacity-building activities available for some IHR capacities. However, no database for IHR-relevant competencies is available in the country and overall, there are inadequate human resources and competencies for IHR implementation.

In the area of health emergency management, a national all-hazards risk profile was developed in 2018 using the WHO Strategic toolkit for assessing risks (STAR). The provincial risk profiling for Punjab was conducted in 2019, however, neither was converted into a multisectoral emergency preparedness and response plan on all hazards approach, emergency preparedness, budgets, research, and improving coordination between different sectors (and within sectors) remain the primary areas of focus.

Pakistan exhibited effective capacities to coordinate, plan and manage the provision of emergency health services during floods and COVID-19 response. The universal health coverage (UHC) benefit package, with an essential package of health services (EPHS), was defined at all the five levels of service provision. However, essential health services remain undefined and not incorporated within emergency preparedness plans. An evident gap regarding lack of integration of multiple information sources was also identified during the JEE assessment in 2023.

Regulatory bodies, legal frameworks and guidelines serve as essential foundation in linking public health with the authorities, and this linkage should be formalized and institutionalized. The administrative coordination mechanisms between all tiers of the health system are in place, although an effective coordination mechanism and standard operating procedures (SOPs) for preparedness and response should be developed. Joint trainings between public health and security authorities and dedicated resources for preparedness and response for public health events would further strengthen the linkage between these sectors.

The policy environment for implementing IPC has been developed in Pakistan, with availability of national guidelines infection prevention and control (2020), national strategic framework (2021) and standardized training modules (2021-22) for all categories of healthcare workers The focus of IPC and combating healthcare-associated infections is now geared towards enhancing multisectoral engagement, financial resources, and increasing training opportunities. In addition, it is essential to formulate national legislation for mandatory health service after basic and postgraduate qualification of health-care workers.

The capacity development of information, education and communication resources on different diseases/ events is sufficient for activities pertaining to risk communication and community engagement (RCCE). Furthermore, an active national RCCE plan is needed for clarity on the role of different sectors, establishing a formal communication function to address misinformation, and institutionalizing RCCE-related activities in all national and subnational health departments with a dedicated workforce.

Despite financial resource constraints, the diverse functions of points of entry (PoE) are enabled by data digitalization, rules, and round-the-clock presence of staff, although availability of adequate human resources remain a continuing challenge. Cross-border collaboration and increases in the availability of rapid response teams at major PoEs are critical areas of focus.

Pakistan is a signatory to various international agreements and chemical conventions. Sufficient legislation is available and relevant implementation departments exist in all sectors. Undeveloped institutional capacities, insufficient human resources, and a lack of relevant equipment and awareness serve as bottlenecks in addressing chemical events in a streamlined manner.

Plans for radiation emergencies, radioactive material transport safety and radioactive waste management have been developed, backed by national regulations and guidelines. Additionally, an independent national body, the Pakistan Nuclear Regulatory Authority (PNRA) was established, and interagency coordination and communication mechanisms are in place. Priority implementation should be targeted towards the training of emergency medical response and consequence management teams and increasing public awareness on radiation safety.

Through the updating and implementation of the NAPHS, the country will surely enter a new cycle of strengthened prevention, detection, and response capacities to health threats within the scope of the IHR and integral to health system strengthening.

# Introduction

Pakistan is a federal country comprising Islamabad (capital territory), four provinces – Balochistan, Khyber Pakhtunkhwa, Sindh, Punjab, and federating areas of Gilgit Baltistan and Azad Jammu and Kashmir. The country has a more than 1,046-kilometer coastline along the Arabian sea and the Gulf of Oman in the south. It is bordered by India to the east, Afghanistan to the west, Iran (Islamic Republic of) to the south-west, and China to the north-east. It is separated narrowly from Tajikistan by Afghanistan's Wakhan Corridor in the north-west, and also shares a maritime border with Oman.

The population of Pakistan is around 247.7 million in 2023,[1] with 0–14 years accounting for 36% of the population in Pakistan; while 60% is aged 15–64 years and 4% is over 65 years of age.[2] The inter-census population growth rate (2017–2023) is reported at 2.55%,[3] whereas actual population growth rate was reported to be 2.03 in 2020.[4] The life expectancy at birth in Pakistan was reported to be 65 years (64.5 years for males and 65.5 years for females) in 2020.[5] Around 61% of Pakistan's population lives in rural settings.[6] Urbanization is increasing rapidly with migration both from rural areas within the country and from outside the country.

Pakistan continues to be one of the world's largest refugee hosting countries. The country is currently hosting 1.32 million Afghan card holders, 12 038 registered refugees and 48 902 registered asylum seekers under the mandate of the United Nations High Commissioner for Refugees. These are mainly from Afghanistan, followed by Somalia, Yemen, Myanmar, the Syrian Arab Republic, Iran (Islamic Republic of), and China.[7] At the end of 2022, 8.2 million of the population were internally displaced due to natural disasters – floods, earthquakes, drought, wet mass movement, extreme temperatures, and storms.[8] Around 11 million persons were reported to be in need of humanitarian assistance in 2021.[9]

Pakistan is a lower-middle-income country, with gross domestic product per capita at US$ 1568 in the fiscal year 2022–2023.[10] The gross national income per capita was around US$ 5680 (PPP) US$ in 2021.[11] The gross domestic product annual growth stood at 0.29% in 2023.[12] The unemployment rate of the total labor force was estimated at 6.4% in 2022.[13] The literacy rate of population aged 10 years and above has improved and was reported to be 60% in 2019–2020, as compared to 58% percent in 2013–1204.[14] The primary gross enrolment ratio (age 4–9 years) is 87%[15] while the gross enrolment ratio at the secondary level is 58%.[16],[17]

Pakistan is undergoing epidemiological and demographic transitions. The Institute for Health Metrics and Evaluation,[18] indicates the burden of communicable, maternal, perinatal and nutritional conditions, which was more than 65% of the total burden of diseases in 2000, has gone down to 46.2% in 2021. However, the burden of non-communicable diseases, which was 29.9% of the total burden in 2000, had increased to 42.6% in 2021. The share of the burden of injuries increased from 4.73% to 7.09% over the same period.

1 See: Pakistan.pdf (pbs.gov.pk)
2 See: World Population Dashboard -Pakistan | United Nations Population Fund (unfpa.org)
3 See: Pakistan.pdf (pbs.gov.pk)
4 Pakistan Bureau of Statistics, 2020; Pakistan Demographic Survey
5 Pakistan Demographic Survey 2020. See: https://www.pbs.gov.pk/publication/pakistan-demographic-survey-2020.
6 Pakistan Bureau Statistics. See: Pakistan.pdf (pbs.gov.pk)
7 See: https://data2.unhcr.org/en/documents/details/101904
8 See: Pakistan | IDMC - Internal Displacement Monitoring Centre (internal-displacement.org)
9 USAID. Bureau for humanitarian assistance, Pakistan Assistance Overview. 2021.
10 See: Highlightsfinal.cdr (finance.gov.pk)
11 See: GNI per capita, Atlas method (current US$) - Pakistan | Data (worldbank.org)
12 See: Highlightsfinal.cdr (finance.gov.pk)
13 World Bank data. See: https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS
14 See: 2.14a.pdf (pbs.gov.pk)
15 See: 2.4.pdf (pbs.gov.pk)
16 PSLM 2019-2
17 See: 2.12a.pdf (pbs.gov.pk)
18 See: https://vizhub.healthdata.org/gbd-compare/

In 2019, the death rate was 6.7 deaths per 1000 population, with 55.3% of all deaths attributed to noncommunicable diseases, 38.0% to communicable diseases, maternal, neonatal, and nutritional conditions and 5.69% due to injuries.[19] Pakistan still has a high fertility rate of 3.7 children per woman in 2020. Births attended by skilled health personnel were 74% of all births in 2020.[20]

Pakistan affected by climate change, increased urbanization, and environmental degradation is facing increasingly severe and larger-scale natural disasters such as drought, floods, heat waves, extreme cold, and earthquakes. According to the Climate Risk Index 2021, Pakistan ranked eighth among the countries most affected by extreme weather events between 2000 and 2019. The National Disaster Management Authority (NDMA) and Pakistan Meteorological Department and the provincial counterparts take responsibility for monitoring natural disasters and coordinating the identification and implementation of mitigation measures with other relevant stakeholders.[21]

In 2022, unusually heavy monsoon rains between June and September resulted in flash floods and prolonged water stagnation across low lying areas of Pakistan. Around 33 million people were reported to be affected directly in 84 districts with more than 1 600 deaths and 12, 900 injuries. More than 1.2 million livestock were killed, and 3 million acres of crops destroyed, with widespread destruction of homes and health infrastructure. The number of people in need of humanitarian assistance exponentially increased to around 21 million due to the floods. The standing floodwater and secondary impacts resulted in an increase in waterborne and vector-borne diseases[22] The 2023 monsoon starting in June, resulted in 86 deaths, 151 injuries, damage to 97 houses, and loss of 46 livestock. In Punjab province, the capital city of Lahore witnessed an exceptional volume of rainfall, setting a record for the highest levels observed in the past three decades. Waterborne and vector-borne diseases remain a significant concern in flood-affected districts. The 2023 heavy flooding further aggravated the food security situation and already existing vulnerabilities of the 2022 flood-affected communities.[23]

Pakistan and Afghanistan are the only two remaining polio-endemic countries in the world, unable to interrupt polio virus transmission so far. Overall, the environment in Pakistan remains conducive to poliovirus circulation due to poor sanitation, hygiene and sub-optimal immunization coverage. Twenty (20) cases of poliomyelitis caused by wild poliovirus were reported in 2022, while two cases were reported from southern Khyber Pakhtunkhwa until May 2023, with 33 environmental samples tested positive from seven districts in Punjab and Sindh.

Achieving the Sustainable Development Goals (SDGs) targets appears to be challenging for Pakistan. The following para presents the latest status indicating slow progress in most of the SDG health targets:

SDG target (3.1): In 2021, Pakistan reported a maternal mortality ratio of 154 per 100 000 live births, against the target of reducing the maternal mortality ratio to less than 70 per 100 000 live births by 2030.

SDG target (3.2): The neonatal mortality rate was reported at 39 per 1000 births in 2021and the under-five mortality rate was reported at 63 per 1000 births in 2021. Achieving the target of at least 12 per 1000 live births for neonates and at least 25 per 1000 for the under-fives by 2030 therefore also appears challenging.[24]

SDG target (3.3). Pakistan continues to face disease outbreaks and epidemics, including AIDS, tuberculosis, malaria, hepatitis and neglected tropical diseases. The prevalence of hepatitis B was reported at 0.91% among children under 5 years in 2020. In 2021, Pakistan reported the incidence of tuberculosis (TB) at 264 per 100 000 population, and the number of people requiring interventions against neglected tropical diseases at 25.2 million. In 2022 the incidence of malaria was reported at 7.71 per 100 000 population.

19 WHO. Country Cooperation Strategy for WHO and Pakistan, 2022-2025. See: https://apps.who.int/iris/bitstream/handle/10665/341869/9789290226642-eng.pdf

20 Pakistan Demographic Survey 2020. See: https://www.pbs.gov.pk/publication/pakistan-demographic-survey-2020.

21 Centre for excellence in disaster management and humanitarian assistance. Pakistan Disaster Management Reference Handbook. 2021. See: https://www.cfe-dmha.org/LinkClick.aspx?fileticket=AX72CE2swv8%3d&portalid=0.

22 Business Brief: Humanitarian Overview and Call to Action - Pakistan Floods Response Plan (17 October 2022) - Pakistan | ReliefWeb

23 Pakistan: 2022 Monsoon Floods - Situation Report No. 18 (As of 12 July 2023) - Pakistan | Relief Web

24 Monitoring health for the Sustainable Development Goals. World health statistics, 2023 report. See: https://www.who.int/publications/i/item/9789240074323.

SDG target (3.4): In 2019, the probability of dying from noncommunicable diseases between the ages of 30 and 70 years was 29.4% compared to h 27.7% in 2015. Thus, the country is regressing in achieving the target related to reducing the probability of dying by a third by 2030 relative to 2015 levels. Negligible reduction has been observed in the suicide mortality rate from 8.97 per 100 000 population in 2015 to 8.92 in 2019.[25]

SDG target (3.6): The mortality rate from road traffic injuries has reduced over time. In 2019, 13 road traffic deaths per 100 000 population were reported in Pakistan compared to 25.4 for males and 12.7 for females in 2016. The country is, therefore, contributing to the target of reducing the mortality rate from road traffic injuries and halving the global number of deaths and injuries.

SDG target (3.7): Between 2013 and 2021, the proportion of women of reproductive age in need of family planning and satisfied with modern methods was reported at 48.5%. The adolescent birth rate was reported at 46 per 1000 women aged 15–19 years[26] and a birth rate of 0.4 per 1000 reported among women aged 10–14 years. These levels indicate slow progress in ensuring universal access to sexual and reproductive health-care services including family planning, information and education, and the integration of reproductive health into national strategies and programmes by 2030.

SDG target (3.8): The service coverage index for universal health coverage (UHC) increased in Pakistan from 40 in 2015 to 52.7 in 2022. Between 2013 and 2021, 5.4% population spent more than 10% of the household expenditure or income on health while 1% population spent more than 25% of total household expenditure or income on health. The UHC targets for financial risk protection, access to quality services and medical countermeasures also appear to be progressing slowly, although the country has defined its essential health services package based on Disease control priority 3 (DCP3).[27]

SDG targets (3.9, 6.1 and 6.2).[28]: Deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination continue to be reported in Pakistan. In 2019, mortality rate of 192.1 per 100 000 population was attributed to household and ambient air pollution in Pakistan. The mortality rate from unintentional poisoning was reported at 1.6 per 100 000 population compared to 1.7 per 100 000 in 2015.

The proportion of the population using safely managed drinking water services was reported at 36% in 2020. Challenges continue to exist in the use of safely managed sanitation services. The mortality rate attributed to exposure to unsafe water, sanitation and hygiene (WASH) services was reported at 38.8 per 100 000 population. The targets of substantial reduction of related deaths and illness appear to be far from being achieved in 2030.

SDG target (3.b): In 2021, the coverage of diphtheria, tetanus, pertussis (DTP3) was reported at 83%, measles-containing vaccine second dose was 79%, and pneumococcal conjugate third dose was 83%. Immunization coverage appears to be high but vaccine-preventable disease outbreaks continue to take place in the country.

Pakistan is still facing various forms of malnutrition with reference to the SDG targets (2.2). In 2022, among children under 5 years, Pakistan reported 37.6% stunting, 7.1% wasting and 2.7% being overweight. In 2016, age-standardized overweight adults 18+ years was reported at 3.1% and age-standardized obese adults 18+ years was reported at 8.6%. In 2018, anemia among women of reproductive age (15–49 years) was reported at 43%.[29]

The concept of "health in all policies" is not well recognized in the national strategic direction in Pakistan. In strategies where health is addressed, enforcement and alignment of implementation needs further strengthening. The COVID-19 pandemic demonstrated limitations related to some of the existing laws and provisions. The related laws, ministerial decrees and administrative procedures need to be collected,

25 Indicators index. Global Health Observatory. World Health Organization. See: https://www.who.int/data/gho/data/indicators/indicators-index.

26 Pakistan demographic health survey 2017–18

27 Tracking Universal Health Coverage – 2021 Global Monitoring Report. World Health Organization; 2022 See: https://www.who.int/publications/i/item/9789240040618.

28 World Bank data. Mortality rate attributed to household and ambient air pollution, age-standardized (per 100 000 population).

29 Pakistan National Nutrition Survey 2018. See: https://www.unicef.org/pakistan/national-nutrition-survey-2018.

reviewed, updated, and aligned.

Pakistan was the first country in the Eastern Mediterranean Region to conduct the Joint External Evaluation (JEE) in 2016. The JEE comprises a number of essential features to fulfill its purpose, such as multi-sectoral collaboration and an openness to information-sharing by the country, which the technical team in Pakistan have demonstrated. The overall first JEE score in 2016 was 48%. The country's capacity for prevention public health events and health emergencies was scored at 43%, capacity to detect scored at 50%, and capacity to respond was scored at 46%. The country's capacities for points of entry and other hazards achieved the highest score of 60%.

The JEE established a common platform to enable the country to identify urgent needs and prioritize potential opportunities to enhance preparedness and response to public health events to fulfill its role in IHR implementation. Consequently, Pakistan managed to develop a five-year National Action Plan for Health Security (NAPHS) with engagement of all stakeholders and provinces. The country remained firm on the commitment for NAPHS implementation through with availability of domestic and external resources, despite the delays and preoccupation with COVID-19 pandemic response.

Pakistan's second round of the JEE was formally requested by the Ministry of National Health Services Regulations and Coordination to identify the progress made since the first round in 2016, evaluate country's overall performance following COVID-19 response and update the NAPHS accordingly.

A national technical working group was identified for the self-assessment phase starting in October 2022 with the support of the WHO Country Office in Pakistan. The preparations including briefings on IHR monitoring and evaluation framework, JEE tool and methodology, compilation of supporting documents, culminated with a national consultative workshop in February 2023 to conduct the self-assessment phase with engagement of all relevant stakeholders from at the federal and provincial levels. The national technical working group continued with planning and preparations for the external phase which took place in May 2023.

The 2023 JEE mission conducted intensive discussions and consultations for five days in Islamabad followed by provincial visits to Karachi and Punjab to identify the progress made since first JEE in 2016 and document best practices and challenges encountered in 19 technical areas. Virtual discussions also took place with Khyber Pakhtunkhwa and Balochistan provinces. More than 20 field visits were conducted during the JEE mission to hospitals/healthcare facilities, surveillance units, laboratories, points of entry and administrative offices at the federal and provincial level. A consensus was achieved on 56 indicators under the 19 technical areas with agreement to highlight existing provincial differences.

The JEE is in direct alignment with Pakistan's *National Health Vision 2016–2025* which aims to improve the health of all Pakistanis through a harmonized, resilient and responsive health system to attain the SDGs, and fulfill other global health responsibilities. Guided by the underpinning values of strong governance, innovation and transformation, equity, responsiveness, transparency, accountability, and synergistic methods of working across all sectors, the National Health Vision aims to provide a coherent and united approach to address multiple health challenges.

A formidable opportunity for health-care systems is presented by the JEE to address issues pertaining to the country's systems, planning health-care delivery structures and, programmatic interventions. The JEE provides a jointly developed account of strategic directions to unify the common vision for health security by guiding current best practices for all relevant actors to implement their respective policies and initiatives based on the identified gaps, and address challenges guided by the recommendations generated from the JEE. Significant differences exist in capacity between sectors and amongst provinces. This diversity is a challenge but also an opportunity to replicate the experiences and best practices of more advanced areas to strengthen IHR implementation throughout Pakistan.

# Pakistan scores and priority actions

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| **Prevent** | | | |
| **P1. Legal instruments** | **P1.1. Legal instruments** | **2** | • Scoping review for prioritization of public health laws related to IHR (2005), for further legal analysis to update IHR-related legislation as per requirement. Examples are: legal instruments to ensure effective surveillance, prevention and control of priority diseases including zoonotic diseases, and legal instruments to ensure implementation of restrictions on over-the-counter sales of antibiotics.<br>• Utilize national and provincial legislation in health / one health for use in other provinces.<br>• Enhance advocacy and awareness of IHR (2005) legislation and establish a system to enforce compliance.<br>• Assess health and gender equity in IHR-related policies and technical areas.<br>• Draft legislation for public health emergencies, as in the bill passed for COVID-19 in Punjab. |
| | **P1.2. Gender equity and equality in health emergencies** | **2** | |
| **P2. Finance** | **P2.1. Financing for IHR (2005) implementation** | **2** | • Develop a national and provincial comprehensive health financing strategy to mobilize a sufficient and sustained budget (internal and external) for health security.<br>• Revamp and update the federal regulation of the financial health system to improve provinces' ability to forecast financial resources, allocate sufficient funds for health, and coordinate donors.<br>• Revise the public financial management for having cost centers for IHR core capacities and public emergencies to ensure flexible and transparent spending in alignment with national and provincial priorities.<br>• Track spending on IHR activities and public emergencies to inform budget allocations and funding decisions by policy-makers and international partners. |
| | **P2.2. Financial resources for public health emergency response** | **2** | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| P3. IHR coordination, National IHR Focal Point functions and advocacy | P3.1. National IHR Focal Point functions | 2 | • Establish a governance mechanism at strategic and operational levels for IHR both at the national and provincial levels for enhancing ownership and to provide oversight, resources, effective coordination and technical guidance while NAPHS in being implemented. Further monitoring and evaluation is needed to monitor the progress of NAPHS:<br>– at national level, chaired by the Prime Minister / Federal Minister for Health/Advisor; with federal and provincial secretaries as members from all stakeholders while at operational levels all DG/ DGHS from relevant ministries/departments along with development partners be a part of such forums;<br>– at provincial level, high powered committee chaired by the Additional Chief Secretary (Dev), and Secretaries as members from health & all one health stakeholders, DGHS and development partners. The IHR Focal Point could provide secretarial support.<br>• Establish, enhance and empower the IHR NFP secretariat at the CDC Pak – NIH with adequate, competent and qualified human resources, level of authority and financing and ensure the availability of such a structure at the provincial level with defined terms of reference.<br>• Review and update the established IHR multisectoral task forces at federal and provincial levels and develop terms of reference to ensure clarity on institutional focal points, coordination, communication and information-sharing, and support IHR implementation for all IHR-relevant stakeholders at national and provincial levels.<br>• Build the technical and leadership capacities of the IHR NFP and IHR contact points in the other sectors at the federal and provincial levels by arranging regular training and providing the necessary infrastructure.<br>• Organize simulation exercises and after-action reviews to test the functionality of the IHR NFP and IHR multi-sectoral coordination and communication, and ensure that lessons learned during the -response to health emergencies are used to update the related terms of reference and SOPs. |
| | P3.2. Multisectoral coordination mechanisms | 2 | |
| | P3.3. Strategic planning for IHR, preparedness or health security | 2 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| P4. Antimicrobial resistance | P4.1. Multisectoral coordination on AMR | 2 | • Undertake a systematic review and update the current plan (which expired in 2022) to develop a second NAP for AMR. This should be used as the basis for priority-setting and practical operational plans at the federal and provincial levels and should be linked to the health and food sector plans with fixed timelines and involving all relevant stakeholders.<br>• Promote the development of evidence-based policies and programmes in human and animal health to encourage the appropriate use of antimicrobials in hospitals and in the animal health sector and to ensure that data generated through AMR surveillance and targeted research is analyzed and disseminated to policymakers and practitioners, including between sectors to strengthen One Health collaboration.<br>• Review and update the list of priority pathogen/drug combinations according to WHO, WOAH, and the Food and Agriculture Organization (FAO) standards for AMR surveillance and develop standard guidelines and protocols for the management of patients with MDROs.<br>• Explore strategies for the enforcement of relevant laws to implement restrictions on over-the-counter sales of antibiotics under the Watch and Reserve groups in the AWaRe index for the human and animal health sectors. Develop rules and regulations on the use of antimicrobials in animals, including phasing out their use in growth promoters and monitoring their implementation.<br>• Incorporate AMR, the Antimicrobial Stewardship Programme practices and IPC into curricula for health and veterinary professionals, in collaboration with the Pakistan Medical Commission and Pakistan Veterinary Medical Council.<br>• Strengthen immunization in humans and animals and promote research on other interventions to decrease the reliance on antibiotics.<br>• A surveillance system for healthcare-associated infections needs to be established to provide evidence and data for advocacy and resource mobilization. |
| | P4.2. AMR surveillance | 2 | |
| | P4.3. Prevention of multidrug-resistant organisms | 1 | |
| | P4.4. Optimal use of antimicrobial medicines in human health | 2 | |
| | P4.5. Optimal use of antimicrobial medicines in animal health/ agriculture | 2 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| P5. Zoonotic disease | P5.1. Surveillance of zoonotic diseases | 3 | • The liaison between human health and animal health needs to be strengthened to alleviate public health risks. Activities should be sustainable.<br>• Extend and integrate e-surveillance and reporting systems (Integrated Disease Surveillance and Response system/Animal Disease Surveillance and Response system/District Health Information System) in human and animal sectors at provincial and federal levels, utilizing the One Health approach.<br>• Designate provincial zoonotic disease reference laboratories and link with national reference laboratories to ensure reliability and consistency of diagnostic capabilities for human and animal health and strengthen diagnostic capacity of health workers at the field level.<br>• Develop operational plans at the provincial level for active surveillance and response to priority zoonoses and allocate sufficient budgets to support implementation, including for applied research related to the surveillance and control of priority zoonotic diseases.<br>• Strengthen capacity to undertake risk analysis, and use of risk communication to optimize the use of resources for surveillance, prevention and control of priority zoonotic diseases, and strengthen advocacy and awareness activities through the development of joint communication plans on best practices.<br>• Develop guidelines and standard operating procedures to promote good sanitary practices in animal breeding and production of animal products, and provide training to veterinary inspectors to record and report on ante- and post-mortem inspection findings to epidemiology units at provincial/federal levels.<br>• Capacity-building of the laboratory personnel handling zoonotic and emerging pathogens needs to be enhanced.<br>• Infrastructural improvement in accordance with international standards of biorisk and biosafety needs to be improved in core areas of zoonosis research-related laboratories and the development of laboratories. |
| | P5.2. Response to zoonotic diseases | 2 | |
| | P5.3. Sanitary animal production practices | 2 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| P6. Food safety | P6.1. Surveillance of foodborne diseases and contamination | 2 | • Finalize National Food Safety Policy, National Healthy Diet Policy and National Nutritional Policy, and develop Good Animal Husbandry Practice/ Good Management Practice guidelines and standard operating procedures and establish Food Courts to take appropriate and timely legal action for non-compliance of standards and rules in the area of food safety.<br>• Introduce food safety within the curricula of educational and training institutes, extend coverage of FELTP to all districts including veterinary inspectors and implement needs-based training programmes for food safety actors at all levels of health and food systems to ensure desired levels of competency.<br>• Extend surveillance capacity and strengthen provincial and district laboratories to identify pathogens and chemical contaminants linked to the investigation of cases and outbreaks of food borne illness events and establish real-time information exchange and regular formal coordination and communication meetings between the competent authorities with shared responsibilities.<br>• Strengthen documentation of detection, reporting and recording of foodborne diseases/contaminant events to inform a risk analysis and thus the planning of risk-based surveillance and control programmes and introduce risk analysis and risk- based management system based on Hazard Analysis and Critical Control Point/ISO 22000 for surveillance and control of food hazards along animal product value chains.<br>• Establish capacities for managing food safety emergencies through the utilization of the One Health approach. |
| | P6.2. Response and management of food safety emergencies | 1 | |
| P7. Biosafety and biosecurity | P7.1. Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities | 2 | • Expand the national strategic action plan for biosafety to include biosecurity in all sectors.<br>• Develop an inventory of dangerous pathogen and facilities in all sectors.<br>• Develop control measures informed by regular risk assessments and implement methods for the safe handling and disposal of wastes.<br>• Develop a training programme with and for facilities that work with high-consequence agents.<br>• Implement the national laboratory biosafety and biosecurity policy.<br>• Finalize the list of high-consequence pathogens.<br>• Conduct monitoring and evaluation of all laboratories, including high-containment laboratories.<br>• Develop a sustainable programme for training, along with implementation. |
| | P7.2. Biosafety and biosecurity training and practices in all relevant sectors (including human, animal and agriculture) | 3 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| P8. Immunization | P8.1. Vaccine coverage (measles) as part of the national programme | 2 | • Improve immunization coverage by enhancing demand creation and implementing risk communication strategies with a particular focus on provinces and districts with low coverage, as well as in urban slums/rural/desert areas of provinces to address barriers to immunization among vulnerable groups.<br>• Establish a system of continuous training program for health-care workers on vaccination strategies, cold chain management and RCCE to address vaccine hesitancy.<br>• Integrate immunization within the essential package of health services and ensure data quality at all levels.<br>• Build capacity of fixed sites to deliver vaccination services through the establishment of vaccination facilities in union councils without EPI centers and operationalize facilities with low performance and refurbish and rebrand the EPI sites, with a focus on maintaining the cold chain infrastructure.<br>• Provide support towards monitoring and evaluation for routine immunization activities at all levels and disseminate and implement plans for mass vaccination response to outbreaks of VPDs<br>• Consolidate EPI/PEI synergy at all levels to develop a more integrated model of vaccine delivery and efficient utilization of resources and build technical and logistical capacity of human resources for timely resource mobilization and effective response to enable them in multitasking during emergency situations. |
| | P8.2. National vaccine access and delivery | 4 | |
| | P8.3. Mass vaccination for epidemics of vaccine-preventable diseases (VPDs) | 3 | |
| **Detect** | | | |
| D1. National laboratory system | D1.1. Specimen referral and transport system | 3 | • Finalize and endorse the national strategic plan for health laboratories, including the essential diagnostic list<br>• Expand the capacity of laboratories to test for all priority diseases/pathogens across the country while implementing and improving the Laboratory Quality Management System and establish a health-care commission in provinces and regions that lack this body (i.e. Balochistan, Azad Jammu and Kashmir, and Gilgit-Baltistan).<br>• Strengthen the national specimen collection and referral system, in line with national laboratory policy (for human and animal health).<br>• Expand the country's sequencing capacity and ensure connection and data-sharing with global systems.<br>• Develop and implement strategies for conducting point-of-care/farm-based diagnostics for all priority pathogens. |
| | D1.2. Laboratory quality system | 2 | |
| | D1.3. Laboratory testing capacity modalities | 3 | |
| | D1.4. Effective national diagnostic network | 2 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| D2. Surveil-lance | D2.1. Early warning surveillance function | 3 | • Establish a national data hub at CDC Pak NIH by linking with provincial, regional and district DSRUs to consolidate and links IDSR at all levels. Moreover, integration of different vertical surveillance programs and laboratory systems data to avoid fragmentation and establishing the linkage between epidemiological, clinical and laboratory data utilizing the DHIS2 as an integrated data management system.<br>• Strengthen monitoring and evaluation systems to ensure surveillance data quality and advance data management.<br>• Enhance data collection, analysis and reporting, and promote collaboration with the other One Health sectors through expanding existing platforms (for cholera, dengue and Severe Acute Respiratory infections ) for information-sharing, risk assessment and rapid investigation and response to cover all priority diseases. |
| | D2.2. Event verification and investigation | 3 | |
| | D2.3. Analysis and information-sharing | 3 | |
| D3. Human resources | D3.1. Multisectoral workforce strategy | 2 | • Conduct workforce surge capacity assessment at national and provincial level, develop, review and update the workforce strategy for health to ensure addressing all IHR disciplines across the different sectors<br>• Strengthen the existing academic and technical institutions; a future expansion policy needs to be prepared.<br>• Develop and implement plans for retainment, career path and performance-based incentives.<br>• Develop and implement policies and plans for surge capacities and mobilize sufficient resources for their implementation.<br>• In Punjab Province:<br>– Strengthen the surveillance system in PDSRU Punjab for data analysis and preparation of situation reports as there is a shortage of human resources, including epidemiologists and data analysts.<br>– Personnel support and training are required at PDSRU and DDSRU in analysis of DHIS2 data IDSR.<br>– Analysis of provincial and district AWD data from the disease surveillance system's dashboard data for 36 district DDSRU.<br>– Support daily data analysis for dengue components,<br>– Support analysis of data for COVID-19, Severe Acute Respiratory Illness/Influenza Like Illness.<br>– Support analysis of SMOG data.<br>– Support any upcoming health emergency data or event and field response for 36 districts.<br>– Provide human resources support and capacity-building on IHR based at PDSRU. |
| | D3.2. Human resources for implementation of IHR | 2 | |
| | D3.3. Workforce training | 2 | |
| | D3.4. Workforce surge during a public health event | 1 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| **Respond** | | | |
| R1. Health emergency manage-ment | R1.1. Emergency risk and readiness assessment | 1 | • Plan and develop a 5-year national and intermediate (provinces and beyond) all-hazards risk profiling strategy based on multisectoral multi-hazard risk assessments. Moreover, develop and update necessary Emergency Preparedness and Response plans with a clear incident management governance structure. These plans should be reviewed annually and updated to accommodate emerging threats and shared regularly with the relevant sectors and stakeholders.<br>• Assess the existing PHEOC structures and develop a sustainable and well-functioning governance structure for Emergency Operation Centres across the provinces and regions along with strong linkages among all EOCs. Institutionalization of EOCs with the provision of essential equipment, infrastructure, logistics, supplies, human resources and continuous capacity -building of EOC staff including all cadres.<br>• Develop national and intermediate levels of surge capacity and resource deployment plans, outlining a system for pre-deployment, deployment, and post-deployment of surge personnel, including sending and receiving personnel and teams during public health emergencies to encompass the development of plans for EMTs and rapid response teams.<br>• Develop and institutionalize a public health emergency research and development framework underpinned by policy and ethics (including financing, mapping institutions and implementation mechanisms), and with provision for expedited regulatory review for emergency preparedness and response and related fields.<br>• Review and strengthen the emergency logistics and supply chain management system at national and provincial levels.<br>• To ensure sustainability, regular programme funding and available human resources should be warranted as currently existing public health infrastructures at national and intermediate levels (human resources, logistics and financing) are largely dependent on funding from time-bound projects. |
| | R1.2. Public health emergency operations centre | 3 | |
| | R1.3. Management of health emergency response | 3 | |
| | R1.4. Activation and coordination of health personnel during a public health emergency | 1 | |
| | R1.5. Emergency logistic and supply chain management | 2 | |
| | R1.6. Research, development, and innovation | 1 | |
| R2. Linking public health with security | R2.1. Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspected or confirmed biological, chemical, or radiological event | 2 | • Establish an apex body to formalize a cooperation and information-sharing mechanism between public health and security authorities at the national and provincial levels, with clear SOPs and dedicated resources for preparedness and response.<br>• Conduct regular joint training sessions, orientations and discussions between public health and security authorities to reach a mutual understanding of their expected roles and responsibilities.<br>• Leverage, build upon and institutionalize existing functioning mechanisms by utilizing the experiences of the polio program and the COVID-19 response.<br>• Development and promulgation of relevant legislation or amendments in existing law to ascertain the legislative cover |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| R3. Health service provision | R3.1. Case management | 3 | • Bridge health gaps in service delivery by restructuring public facilities with regular quality monitoring, and incorporate national public health and emergency programmes at the district and provincial levels.<br>• Expand the integrated PHC model of care to improve health service utilization.<br>• Revise the essential package of health services to include emergency management interventions (a separate Basic Package of Health Services is proposed to be developed in line with DCP3-UHC EPHS).<br>• Develop case management guidelines for priority events other than infectious diseases (other guidelines – such as for IMPAC, IMNCI etc. – need to be reviewed before making such recommendations. |
| | R3.2. Utilization of health services | 2 | |
| | R3.3. Continuity of essential health services | 2 | |
| R4. Infection prevention and control | R4.1. IPC programmes | 2 | • Establish comprehensive IPC program. Establish IPC programmes that incorporate all WHO core components, with dedicated staff and budgets at national and facility levels. Ensure monitoring of their implementation.<br>• National, provincial IPC cadre/positions must be sanctioned.<br>• Implement IPC and WASH standards within health-care facilities and communities.<br>• Develop and implement infection prevention guidelines at veterinary hospitals, and for hygiene and biosecurity on farms, with One Health approach.<br>• Conduct specific studies/surveillance (when relevant) of healthcare-associated infection in secondary and tertiary care facilities, and ensure data are analysed, widely disseminated and utilized.<br>• Establish and enforce accountability mechanisms through regulatory bodies and enhance awareness to reduce the use of inappropriate and unsafe injections and infusions in health-care settings.<br>• Sustain and build on good practices and positive behaviour changes adopted during COVID-19.<br>• Review and revise national IPC guidelines to include provisions for ensuring a safe environment for health facilities guidelines.<br>• Develop and mandate Continuous Development Programmes for health-care workers at the facility level to introduce high standards of IPC knowledge and practices<br>• Address gaps in IPC infrastructure<br>• Develop and enforce national quality standards and provision of IPC supplies |
| | R4.2. HCAI surveillance | 1 | |
| | R4.3 Safe environment in health-care facilities | 1 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| R5. Risk communication and community engagement | R5.1 Risk communication systems | 1 | • Prioritize RCCE (including infodemic management and behavioural insights) and integrate RCCE activities as key elements for preparedness, readiness and response mechanisms for emergencies and position it within the public health emergency operating centre structure.<br>• Develop a fully resourced RCCE system, leveraging on existing mechanisms and structures in the Ministry of National Health Services Regulations and Coordination and NIH, and best practices and experiences from the national and subnational level.<br>• Set up a dedicated RCCE team/unit based on the RCCE infodemic management competency framework and provide them with formal trainings and adequate resources.<br>• Develop a national multi-hazard and multisectoral RCCE (and infodemic management) strategy/action plan and SOPs for its operationalization that is endorsed by high level officials and implemented, in collaboration with partners, and ensure that it is regularly tested and updated.<br>• Establish SOPs for community engagement as a guiding document to manage activities related to strengthening community engagement, including systematic social listening, community feedback and infodemic insights collection during health emergencies, leveraging on lessons identified from other health programmes (e.g., polio, vector-borne diseases, COVID-19 and immunization). |
| | R5.2 Risk communication | 2 | |
| | R5.3 Community engagement | 2 | |
| **IHR related hazards and points of entry and border health** | | | |
| PoE. Points of entry | PoE1. Core capacity requirements at all times for PoEs (airports, ports and ground crossings) | 2 | • Continue to build surveillance and response core capacities at designated PoEs integrated with the national system.<br>• Develop the infrastructure for the use of digital applications in the context of travel.<br>• Establish quarantine facilities for sick or suspected travellers or workers at each PoE with appropriate facilities.<br>• Enter in cross-border collaboration to ensure minimum capacities at ground crossings.<br>• Develop public health contingency plans for designated PoEs and test their functionality.<br>• Promote understanding and use of a risk-based approach to inform travel advice and sanitary measures. |
| | PoE2. Public health response at PoEs | 2 | |
| | PoE3. Risk-based approach to international travel-related measures | 1 | |

| Capacities | Indicators | 2023 scores | Priority Actions |
|---|---|---|---|
| CE. Chemical events | CE1. Mechanism established and functioning for detecting and responding to chemical events or emergencies | 2 | • Identify priority chemicals and national inventory of facilities of chemical storage and develop health plans for managing chemical incidents.<br>• Develop poisons information centres for the provision of clinical management advice and enhance laboratory testing.<br>• Develop a mechanism to collate data on chemical exposures for toxicovigilance and surveillance. |
| | CE2. Existence of an enabling environment, including national policies or plans or legislation in place for management of chemical incidents | 2 | |
| RE. Radiation and nuclear emergencies | RE1. Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies | 5 | • Build medical response capacity for upgrades of health-care facilities and expanding laboratory capabilities at national level.<br>• Enhance the inventory of pharmaceutical agents, training medics and paramedics to deal with radiation accidents, and strengthen the provision of equipment at national level.<br>• Increase awareness of radiation safety measures for the public at national level. |
| | RE2. Enabling environment in place for management of radiological and nuclear emergencies | 5 | |

# Progress made since 2016

The JEE team reviewed implementation of 2016 recommendations; The following table describes progress made and remaining challenges:

| Technical areas | Progress made since 2016 |
|---|---|
| **Legal instruments** | Mapping of legal instruments is continuously undertaken during development of a new instrument or update of the existing ones.<br>Assessment of some IHR-related instruments has taken place, but a comprehensive assessment was not conducted as recommended in 2016.<br>A legal officer in the Ministry of National Health Services Regulations and Coordination is in place but a unit has not been established. Capacity-building of legal officers in all IHR-related sectors has not taken place. Newly developed legal instruments are aligned to the IHR and linkage with health system strengthening is referred to in the new strategic direction of the heath sector but not in the other sectors. |
| **Financing** | Financing IHR was part of the legislation technical area in the JEE 2016. The JEE report indicated that funding for IHR/disease surveillance and emergency response has been fragmented, with no specific budget allocations for the IHR in the regular or development budget in the past. A dedicated budget line need to be included in the public financial management system and funding need to be approved to support IHR implementation. The JEE 2023 financing technical area includes two indicators. Comparison between 2016 and 2023 might not be allowed due to the absence of baseline scores but the narrative above indicates no progress in allocating dedicated IHR financing. |
| **IHR coordination, national IHR focal point function and advocacy** | Provincial IHR NFPs were established in all provinces but with no clear terms of reference. An IHR duty officer 24/7 is placed at the federal level but none at provincial levels. The IHR multisectoral tasks force was established at federal level and in all provinces during first JEE 2026. However, clear terms of reference and SOPs were developed for Sindh. Despite 2016 recommendations, protocols and SOPs for communication and information-sharing between the IHR NFP and the other sectors have not been developed. The NPAHS was developed through a multisectoral approach with slow and varied progress across provinces. Capacity-building activities of IHR-related staff are limited and are mostly focused at the federal level. |
| **Antimicrobial resistance** | There has been progress since the 2016 JEE with the development of a national action plan and coordinating mechanism in line with the WHO Global Action Plan. Provincial operational plans have not yet been developed. There have been effective actions in human and animal health, including the development of an expanding network of quality-assured surveillance sites, and good practice in some facilities. A national antimicrobial stewardship programme that involves human and animal sectors has not been addressed yet. AMR surveillance and diagnostic capacities have improved. Wide-scale implementation of existing plans and procedures remains a challenge. |

| Technical areas | Progress made since 2016 |
|---|---|
| **Zoonotic diseases** | The 2016 JEE recommendations mainly focused on advancing the One Health approach through developing the needed legislation and a mechanism for information-sharing. Progress has been made in gradually adopting the One Health approach through the official notification of One Health hubs and taskforces and Steering Committees at the federal and provincial levels and the identification of a priority list of zoonotic diseases. However, the One Health approach has not yet been reflected in operationalizing other areas under the related indicators. For example, surveillance and reporting of priority zoonoses need strengthening and linking up with human sector both at national and provincial levels while operational plans for responding to priority zoonotic diseases need to be developed at provincial levels. The scores related to surveillance and response areas have not improved. A new indicator has been added to the 2023 JEE (not initially included in the 2016 JEE) relating to sanitary animal production practices. Pakistan's capacity is limited in this area. Guidelines and SOPs need to be developed and disseminated to promote good sanitary practices in animal breeding and production of animal products, and resources need to be allocated for their implementation. |
| **Food safety** | Following the 2016 JEE, the National Food Safety Policy, National Healthy Diet Policy and National Nutritional Policy have been developed and are currently under finalization. Guidelines and SOPs are still to be developed. No progress was made regarding the introduction of risk analysis and risk- based management system. Little progress observed in capacities for managing food safety emergencies, but capacities are still limited and varied across the country. Limited capacity exists for the workforce with no systematic approach to build such a capacity. The 2016 JEE included one indicator for surveillance and response. This indicator is divided into two indicators with expansion of the capabilities under the surveillance and response to foodborne disease and contamination. Hence, scores may not be indicative of progress made in this area. |
| **Biosafety and biosecurity** | Although no progress is shown in the score related to whole-of-government biosafety and biosecurity system, several efforts have been put in place since the 2016 JEE. For example, a multisectoral committee was established, identifying the list of dangerous pathogens and toxins and the facilities that have them, developing a framework for biosafety and biosecurity. These activities need to continue and be taken a further step in order to observe progress in the related score. Examples are: endorsing the list, enacting the legislation to ensure it covers biosecurity and developing risk-based plans for the response to accidents. Several capacity-building activities have taken place in the country for biosafety and biosecurity, and this resulted in improving the related score. A sustainable programme for training is still to be developed and ensure its implementation to all workers in laboratories and research and other facilities with focus on those who are dealing with hazardous pathogens and toxins. |
| **Immunization** | Several efforts and activities have been implemented to expand immunization service delivery by establishing vaccination centres and mobile and outreach vaccination. Consequently, the score related to the coverage has improved. The work related to vaccine access and delivery has been maintained since JEE 2016 with further improvement. Immunization has been integrated within the Essential Package of Health Services across the country. Synergy between the EPI and the Polio Eradication Initiative (PEI) at all levels is, however, recommended through the 2023 JEE. This will eventually contribute to further advances in this technical area. A new indicator has also been added, which was initially addressed under the 2016 JEE, related to mass vaccination for epidemics of vaccine-preventable diseases (VPDs). No baseline information exists to measure progress, but Pakistan capacity has appeared as developed in this indicator. Implementation of plans for mass vaccination response to outbreaks of VPDs will further improve the capacity of the country. |

| Technical areas | Progress made since 2016 |
|---|---|
| **National laboratory system** | The national laboratory policy has been approved and is currently under implementation utilizing a tiered approach for diagnostics. The level and capacity of laboratory infrastructure and diagnostics have been improved and expanded across the country. The genome sequencing capacity has also been introduced and is being expanded. Several laboratories have been certified and ISO-accredited since the 2016 JEE. The national quality assurance schemes have been developed and introduced in some federal and provincial laboratories. A standardized approach to specimen collection and referral is in place but needs further strengthening in some provinces. The ongoing capacity-building of laboratory workforce needs to be maintained. These improvements are not reflected in increasing scores between 2016 and 2023 as as expanding the capacity of laboratories to test for all 34 priority disease across the country, developing and implementing tier-specific point-of-care/farm-based testing strategies for priority pathogens needs to be enhanced. |
| **Surveillance** | The Public Health Act has been enacted at the federal and provincial levels addressing, among other things, the list of notifiable diseases. Surveillance data and information-sharing has improved with an established platform since 2016, as 130 districts out of 160 have been trained on the Integrated Disease Surveillance and Response (IDSR)-DHIS2 in Islamabad Capital Territory, all four provinces and two area governments in relation to the list of 34 priority diseases. The integration of surveillance with the vertical programmes and links with laboratories is a work in progress which utilizes the DHIS2 as a platform. Moreover, the surveillance systems of both human and animal sectors are not linked at national and provincial levels. The epidemiology/laboratory training programmes have generated a great number of trained personnel who have been utilized by the different surveillance units at the federal and provincial levels and have improved the capacity of data management. Further continuous capacity-building is needed in the analysis, reporting and forecasting. |
| **Reporting** | This was part of the IHR coordination technical area in the 2023 JEE. Capacity-building activities have taken place but are more focused at the federal level. The multilateral and bilateral reporting mechanisms between sectors and provinces have improved as has reporting with other countries using the IHR system. However, the timely reporting needs further improvement, particularly between the health and non-health sectors.<br>Formal protocols and SOPs have not been developed for the reporting mechanism but the newly established terms of reference for the IHR NFP refers to notification and reporting of public health events. Protocols are still to be developed for the provincial IHR cell and for the focal points in the other sectors. |
| **Human resources** | The field epidemiology/laboratory training programmes is a well-established programme that has been generating trained cadre both at the federal and provincial levels. A workforce strategy has been developed in Pakistan with a health workforce component. However, it does not address all IHR-related disciplines. Plans for retainment and a career path for the IHR-related workforce have not been developed yet. New indicators were included in the 2023 JEE. In the absence of a baseline, progress cannot be measured but recommendations were identified regarding surge capacities and the availability of training opportunities beyond the epidemiology/laboratory training programmes. |

| Technical areas | Progress made since 2016 |
|---|---|
| **Preparedness, response and medical countermeasures and personnel deployment** | These technical areas are all merged under health emergency management in the 2023 JEE. Therefore, comparison was allowed as follows: strategic risk mapping has taken place in the country for specific hazards at the national level. The risk assessment on all hazards approach was conducted at the national level in 2018 using the STAR tool. The provincial risk profiling for all hazards was limited to one province of Punjab only. The risk profiling was not used for development of all hazards emergency preparedness and response plans or national multisectoral strategic framework.<br>The 2016 JEE reported only on the polio emergency operations centres (EOCs)s at the national and provincial levels. Several emergency operations centres (EOCs) have since been established at the federal and provincial levels such as public health EOC at NIH, Dengue EOC, provincial EOCs at the Provincial Disease Surveillance and Response Unit (PDSRU), for managing health emergencies. A plan for strengthening the functionality and connectivity of public health emergency operations centres (PHEOCs) developed recently needs to be discussed, finalized, and endorsed. The implementation of such a plan will eventually strengthen the existing PHEOCs and their utility as platforms for managing health emergencies.<br>There has been good progress in enhancing country capacity to manage health emergencies, but further work is needed to ensure the required capacities are available at all levels with a clear incident management structure. A comprehensive plan and strategy identifying procedures and decision-making mechanisms, including roles and responsibilities related to sending and receiving health personnel during a public health emergency has not been developed but plans including surge support were developed for some departments such as NDMA and health departments.<br>Pakistan is a member of the Global Outbreak Alert and Response Network but needs to take concrete steps to classify its medical teams as emergency medical team in line with WHO standards. Two other indicators (R1.4 and R1,6) included under the health emergency management area have no baseline information from the 2016 JEE. The logistics and supply system appears to be in place and works fairly well during emergencies, but further improvement is needed. Pakistan has engaged in many different research efforts but a comprehensive research agenda for health emergencies is lacking. Lastly, human and financial resources for managing emergencies are in place but with limitations. It is necessary to allocate dedicated resources for managing health emergencies. |
| **Linking public health with security** | Health emergency preparedness and response plans have been updated but not across the country and not covering all hazards. Response plans for national disasters were developed and updated at the federal level and in some provinces. Capacity-building activities have been taking place with the engagement of security personnel but a joint workplan for orientation of relevant staff in public health and security agencies is to be developed. |
| **Health service provision** | This is a new area under the 2023 JEE not covered in the 2016 JEE. This area includes three indicators on utilization of health services and continuity of essential health services. No baseline information is available and therefore comparison is not available. A third indicator, on case management, was also included under the response technical area in 2016 JEE. Progress has been observed in this indicator as case management guidelines have been developed for most of the priority diseases in the country. Further work is needed to develop case management guidelines for priority chemical and radiation events. |

| Technical areas | Progress made since 2016 |
|---|---|
| **Infection prevention and control (IPC)** | These are new technical areas under the 2023 JEE. IPC was initially covered by one indicator under the antimicrobial resistance (AMR) technical area through health care-associated infection prevention and control programmes. Regarding this indicator, national IPC policy, guidelines and a training manual were developed, and several capacity-building activities related to IPC took place in Pakistan following the 2016 JEE. The establishment of a comprehensive IPC programme with dedicated resources at the federal and provincial levels is a work in progress. Other recommendations emerged based on assessment of other indicators such as the establishment of actions for health care-associated infections in tertiary hospitals and the implementation of IPC and water, sanitation and hygiene (WASH) standards in health facilities and communities. |
| **Risk communication** | COVID-19 provided an opportunity to develop several information, education and communication materials and has further enhanced the capacity of the country in this regard. Engagement of communities and the utilization of religious leaders has been instrumental, particularly for polio and COVID-19. A risk communication plan has been put in place for COVID-19 by UNICEF and WHO; however, a national plan of risk communication and community engagement has not been developed. Integration and streamlining of efforts related to risk communication led to reviews of the existing structures to ensure that risk communication is systematically addressed for the prevention, preparedness and response to public health threats. This is a work in progress. Undertaking this work will lead to enhancing multisectoral coordination. Efforts related to community engagement need to be further systemized, guided by behavioral insights. |
| **Points of entry** | Following the 2016 JEE, designation of PoEs for IHR implementation has been completed and shared with WHO. Several capacity-building activities have taken place targeting the workforce at federal and provincial levels. Assessment of IHR implementation has also taken place for some designated points of entry, and contingency plans were developed for emergency management. Cross-border collaboration is ongoing in relation to polio and malaria. Ports were also identified for the issuance of ship sanitation certificates and training of relevant officials took place for conducting authorized assessment and inspection. Developing the infrastructure and further enhancing the IHR capacities at PoEs is still needed. A new indicator on risk-based approach to international travel-related measures has been added which was not initially included in the 2016 JEE. Comparison with 2016 is not available in the absence of a baseline but a recommendation was identified on promoting the understanding and use of the risk-based approach to inform travel advice and sanitary measures. |
| **Chemical events** | No progress has been made in this area. The 2016 JEE recommendations remains valid. Urgent attention is needed to build health sector's capacity to respond to chemical events and emergencies. |
| **Radiation emergencies** | Pakistan has scored the highest points in this area – sustainable capacity (5/5) in the two related indicators. The country maintains its capacity in managing radiation emergencies with the allocation of dedicated resources and has also been progressing in maintaining systematic information exchange among relevant sectors. A focal point to coordinate and communicate with the Ministry of National Health Services Regulations and Coordination is still to be designated. Building the capacity of the medical response, upgrading the health-care facilities, and expanding laboratory capabilities are additional recommendations that emerged from the JEE in 2023. |

# Prevent

# P1. Legal instruments

## Introduction

Legal instruments refer to legally binding and enforceable measures that are enacted and implemented by national or intermediate levels of government. The types of legal instruments vary, depending on the country's legal system (e.g. constitution, laws, decrees, regulations, administrative requirements and applicable international agreements). The scope of this area under the JEE includes two main elements. The first element is the process of developing legal instruments, reviewing and enforcing their implementation at the national and subnational levels, and establishing the linkages between the different administrative levels. This element includes: the role of the existing legal instruments to facilitate IHR implementation, including multi-sectoral coordination and cooperation, during public health events and emergencies; the level of awareness among sectors about existing legal instruments; and the availability of legal technical expertise and resources to guide IHR implementation. The second element addresses equity in the existing legal instruments in IHR implementation and in healthy emergency management in order to determine if health inequity or limited IHR implementation are related to gender inequality in the country.

## Target

*Adequate legal instruments for States Parties to support and enable the implementation of all their obligations and rights created by the IHR. The development of new or modified legal instruments in some States Parties for the implementation of the Regulations. Where new or revised legal instruments may not be specifically required under a State Party's legal system, the State may revise some laws, regulations or other legal instruments in order to facilitate their implementation in a more efficient, effective or beneficial manner. Ensuring that legal instruments are in place in all relevant sectors to support IHR implementation, including core capacity development and maintenance, is the desired impact.*

## *Level of capabilities in Pakistan*

The Ministry of Law and Justice is responsible for the overall development of new laws or enacting existing laws. Pakistan's Constitution is the father of all laws, and any new law must conform with the constitution. A process is in place to avoid duplications or contradictions with other existing laws and involves several steps, namely: 1) the relevant sector develops the law or proposes amendments; 2) it is submitted to the cabinet of the parliament for discussion; 3) upon approval of the cabinet, it is submitted to the standing committee of the lower house; 4) upon approval from the lower house, it is then submitted to the upper house; 5) upon approval from the upper house, it is submitted to the president for final approval.

As of 2019, 25 amendments have been made to the Constitution of Pakistan. Among the most important of these are the 8th (1985) and 17th amendments (2004) which transformed the government from a parliamentary system to a semi-presidential system. The largest change to the constitution by far was the 18th amendment in 2010 which reversed the expansions of presidential powers, returning the government to a parliamentary republic. Federalism is the constitutional division of power between Pakistan's provincial governments and the federal government of Pakistan. The concurrent list of legislative powers was abolished after the 18th amendment, and most powers were transferred to provinces. Furthermore, the 25th Amendment Act (2018) was passed by the parliament of Pakistan and Khyber Pakhtunkhwa to merge the Federally Administered Tribal Areas (FATA) with the province of Khyber Pakhtunkhwa. The country is currently composed of four provinces: Punjab, Sindh, Baluchistan and Khyber Pakhtunkhwa and two area governments of Gilgit-Baltistan and the State of Azad Jammu and Kashmir. The Islamabad Capital Territory is the only federal territory.

Federal law is implemented only in the federal area and each province and area governments have the right to adopt federal laws or develop its own laws. While national law is implemented across the country, it is approved after development by the provincial government. The legal system is generally well developed and allows for complementarity, and some provinces are more advanced than others in the development of law.

The Pakistan NIH re-organization act 2021 provides the legal framework for IHR implementation and outlines the responsibilities of various authorities, including preventing and controlling the spread of communicable diseases. At the provincial level, the Khyber Pakhtunkhwa Public Health Act (2017), the [Punjab] national calamities (prevention and relief) act, 1958 (w.p. act xxxiii 1958) provides the legal framework for the implementation and enforcement of measures to prevent and control diseases including dengue in the province. In Sindh, a draft Public Health Act is under development which addresses engagement of communities, civil society, community organizations and networks, and private practitioners for early detection and immediate reporting of unusual public health events at the primary health care level. It states that provincial and district administrations should issue notifications on unusual public health events and compliance should be ensured by both public and private sectors. However, implementation of the Act will be challenging.

Additional legal instruments for the control of diseases exist at the provincial level for health sector – such as: the Khyber Pakhtunkhwa Epidemic Control and Emergency Relief Act (2020); the Sindh Disease Epidemic Act (2014); the Punjab Prevention and Control of Infectious Disease Act (2020); the Punjab Dengue Control Act 2014; and the Balochistan Epidemic Act. In Punjab, Sindh, Balochistan and KP legal instruments under One Health are in place to address livestock, poultry, food, climate change through various acts i.e. National and provincial acts including Punjab Livestock, Dairy and Poultry Development Board Act, 1974, the Punjab National Calamities (Prevention and Relief) Act (1958) and National/Provincial environmental acts.

Existing legal instruments provide clarity on the roles and leadership of emergency management. The NIH leads the disease outbreak response and, in accordance with section 13 of the NIH Reorganization Act 2021, it has the authority to declare and withdraw a national or local health emergency based on the surveillance data received from across the country. It provides the legal backing to coordinate the response with other sectors and provide support to the provincial governments, subject to adaptation and approval at the provincial level. Additionally, provincial secretaries are empowered to declare an emergency with approval of the provincial Chief Minister in accordance with the Punjab Infectious Disease Prevention and Control Act (2020) and the Khyber Pakhtunkhwa Public Health Act (2017). The National Disaster Management Authority (NDMA) Act (2010) provides for the establishment of a national disaster management system for Pakistan (Act No. XXIV, 2010) and, according to this Act, the NDMA takes the lead in managing natural disasters at the federal and provincial levels in collaboration with the provincial NDMAs under their own provincial acts.

The decision-making process during public health emergencies is articulated in these Acts for the National Institutes of Health 2021 (NIH), NDMA and the provincial secretaries, including the relevant delegation of authority. For example, the National Coordination Committee was established as an executive body for COVID-19 response and notified the National Command and Operation Centre (NCOC) on delegation of tasks and implementation of measures.

The following other specific legal instruments are in place to facilitate IHR (2005) implementation:

- The NIH Reorganization Act (2021) designates the NIH as the IHR national focal point (IHR NFP). As per the Act, provincial IHR NFPs were also identified in every province for human and animal sectors.
- The legislation concerning PoEs is not up to date or in full conformity with the IHR. The first drafts of these laws have been developed in line with WHO guidelines and currently being updated.

- The Khyber Pakhtunkhwa Vaccination Act (2015) aims to promote vaccine intake. No such acts exist at the federal or national levels.
- There is currently no national law on IPC and only national guidelines are available to enhance IPC programmatic implementation based on WHO core components approach. However, a law endorsed during COVID-19 in Punjab that addresses all IPC-related matters.
- For antimicrobial resistance (AMR), policy guiding documents were developed; however, only an Act on drug sales was developed by the Drug Regulatory Authority of Pakistan (DRAP) in 2012.
- Several Acts for the animal sector in Punjab are in place for animal and poultry production.
- Workforce laws allow the health authority in Pakistan to use the workforce for non-emergencies and to mobilize them during health emergencies. The workforce for the public health emergency response refers to a wide variety of specialties, such as biomedical engineers, logisticians, and information technology (IT) and procurement professionals and are not limited to epidemiologists or infectious disease specialists.
- During times of emergency, laws and rules in the Ministry of Information and Ministry of Telecommunication allow communication with all mobile telephones through messages in national and local languages to increase awareness. This facilitated a smoother process through the Pakistan Telecommunication Authority to debunk misinformation and handle infodemics during the COVID-19 response. The momentum of having new laws accepted and endorsed during the COVID-19 pandemic should be used to improve the legal process.
- Several Acts and procedures that address food safety, environmental health, climate change, and chemical and radiation emergencies are also in place. They are listed under the relevant sections of this report.

The Right to Information Act, National Accountability Ordinance of 1999 (amended in 2022), the Public Procurement Regulatory Authority rules, the Health Care Commission (HCC) Act in Punjab (2010), Khyber Pakhtunkhwa (2015) and Sindh (2013), Islamabad Healthcare Regulatory Authority (2018) and Balochistan (2019) are examples of legal instruments that safeguard and promote governmental transparency and accountability in ensuring quality of health services in both public and private health sectors both at the national and provincial levels.

Legal instruments to safeguard the protection of vulnerable and at-risk populations during public health emergencies at the national and provincial levels are also in place. For example, Chapter 2 on principles of policy and fundamental rights of the Constitution of Pakistan, the Protection of Rights Act (2018) for Transgender Persons, the protection of rights of persons with disabilities, and the Citizen Act (2021).

A formal mapping of IHR-relevant legal instruments was conducted in 2016 during the first round of the JEE while mapping of PoE legislation was conducted in 2018 for revision/updates and for the development of ground crossing rules for compliance with the IHR (2005). In 2021, the Planning and Development Board directed the Ministry of National Health Services Regulations and Coordination to map and report on IHR-relevant legislation in Pakistan. However, detailed assessments of IHR-relevant legal instruments in all relevant sectors have not been conducted and only need-based legal assessments were carried out for PoE legislation and the Pakistan Calamity Act 1958.

Close collaboration between the health, animal and environment sectors has helped in identifying needs to improve related legal instruments. As the country is progressing to further develop its legal system to facilitate IHR (2005) implementation, the primary focus of the legal instruments should be on all IHR-related areas, such as chemical events, radiation emergencies, and risk communication and community engagement – which are not addressed under the Public Health Act or under specific laws.

Legal capacities for assessment, revision and development of legal instruments are in place, but limitations exist at the federal and provincial levels due to the lengthy process of obtaining approvals. The process of developing a federal or provincial law includes clauses related to enforcement and compliance, which serve as additional challenges. Thus, building the capacity of the system to enforce laws and

regulations and enhance public awareness to improve compliance are vital steps for making tangible progress in these areas.

All legal instruments address equity, in line with Chapter 2 on principles of policy of the Pakistan Constitution, which ensures gender equality, fairness and indiscrimination in any law constituted in the country. Additionally, salaries are equal between the genders.

Data relevant to education, income and economic status, ethnic origin, geographical location, and disability are made available through periodic surveys. An analysis of gender ratios in the health workforce, including decision-making roles, is collected and reported under the UHC indicator. Tools are available to collect and report on age-sex disaggregated data for Vaccine Preventable Diseases, TB, malaria and HIV/AIDS, including geographical locations. Male, female and transgender data are also available. Action plans for dengue, malaria, TB, polio, cholera and typhoid draw on the gender and equity analysis to strengthen preparedness and response, with a targeted design of risk communication messaging to reach marginalized and vulnerable groups. Furthermore, Pakistan is currently in the process of digitalizing the District Health Information System (DHIS) through the DHIS2 platform, which will enhance the quality and derivations from the DHIS system including, but not limited to the availability of sex-disaggregated data from Punjab and Islamabad Capital Territory areas in the country.

Training of women health-care workers for surge deployment exists for polio and other outbreak responses. The delivery of essential reproductive health care in emergency settings, such as crises for internally displaced persons, is granted for all. The National Immunization Policy and COVID-19 vaccine deployment plan was developed for vaccine provisions, considering the gender difference in the uptake. The national plan for mass vaccination response to outbreaks of VPDs is free for all, including Afghan refugees. Vaccine outreach facilities are implemented to address barriers to vaccine access and uptake for marginalized and vulnerable groups and ensure equitable distribution and administration of vaccines.

Standard operating procedures (SOPs) have been developed for vulnerable groups (e.g. laboratory workers), IPC, patient safety, essential health services during COVID-19 and treatment protocols for case management. Prepositioning and the provision of free-of-cost personal protective equipment for health-care workers and patients was ensured. In addition, targeted campaigns were conducted during specific zoonotic disease transmission seasons for Crimean-Congo haemorrhagic fever (CCHF), malaria and other diseases.

## Indicators and scores

### P1.1. Legal Instruments

**Score 2: Limited capacity.** Legal instruments are in place and have been partially mapped at the federal and provincial levels. Formal assessments have not been conducted, but laws are revised when needed, particularly after the 18th Constitutional Amendment (e.g. Public Health Act of Khyber Pakhtunkhwa).

#### Strengths/best practices

- Pakistan's constitution and its amendments, and the rules of business developed in 1973, all define legal mandates.
- A legal system is in place for the development, review and enactment of legal instruments.
- Several laws (health and one health sectors) are in place at the federal and provincial levels to facilitate the IHR (2005) implementation.
- Multi-sectoral coordination and collaboration-related legal instruments avoid contradictions when updating instruments, or while new legal instruments are under development.
- National and provincial laws complement each other.

### Areas that need strengthening/challenges

- Detailed scoping review to prioritize followed by detailed legal assessments needs to be carried out for all relevant laws related to strengthening IHR (2005) core capacities.
- Implementation of laws and procedures is insufficient. There is a critical need to address law enforcement in order to enhance the level of implementation.
- The process for developing or enacting laws is lengthy. Expediting the process of finalizing laws on the public health response bill and the Islamabad Capital Territory food safety bill is a priority.
- Health is not addressed in all laws and policies of other sectors. A review of IHR-relevant policies is needed to ensure that health is properly addressed. This will further strengthen multisectoral coordination between stakeholders.
- There needs to be alignment and harmonization between national and provincial laws, polices and administrative arrangements.
- Sensitization and briefing of health-care workers are needed on IHR-relevant laws, including the strengthening of legal capacities in IHR-relevant ministries and departments.
- There is limited legal capacity in the health ministry and departments, including operational funding.
- Legislation on immunization, TB, HIV and other communicable diseases is still unaddressed.

## P1.2.: Gender equity and equality in health emergencies.

**Score 2: Limited capacity.** Chapter 2 on principles of policy in Pakistan's Constitution ensures gender equality, fairness and indiscrimination in any law constituted. Tools for collecting disaggregated data by gender is in place for a few IHR-related areas. Gender and equity gaps in data collection have been assessed in, for example, female health workers.

### Strengths/best practices

- Gender equality in health emergencies is addressed in the legal instruments.
- Data collection and reporting tools such as DHIS and the Health Management Information System address gender-based segregation of data.
- Costed action plans for Lady Health Workers, family welfare workers, dengue, malaria, TB, polio, cholera, typhoid and other diseases address gender equality.

### Areas that need strengthening/challenges

- The collection and utilization of data disaggregated by gender are not performed systematically.
- Data collection and reporting tools are not in place for all IHR technical capacities.
- Plans to address high priority gender-related gaps in IHR implementation have not been developed. However, some disease outbreaks and vaccine intake-related interventions were identified.

## Recommendations for priority actions

- Scoping review for prioritization of public health laws related to IHR (2005), for further legal analysis to update IHR-related legislation as per requirement. Examples are: legal instruments to ensure effective surveillance, prevention and control of priority diseases including zoonotic diseases, and legal instruments to ensure implementation of restrictions on over-the-counter sales of antibiotics.
- Utilize national and provincial legislation in health /one health for use in other provinces.
- Enhance advocacy and awareness of IHR (2005) legislation and establish a system to enforce compliance.
- Assess health and gender equity in IHR-related policies and technical areas.
- Draft legislation for public health emergencies, as in the bill passed for COVID-19 in Punjab.

# P2. Finance

## Introduction

At global level, all Governments are facing the need for sustained financial resources to ensure health security by investing in core capacities and enabling health sector and one health stakeholders to prevent, detect and respond to public health emergencies. Financial resources refer to resources planned, allocated, distributed and executed on activities and interventions outlined in the National Action Plan for Health Security. Governments are required to provide broad-based fiscal space funding to ensure that their systems are: strengthened in the delivery of essential public services that may be overburdened during public emergencies; equipped in meeting the new requirements and challenges regarding the delivery of IHR activities and emergency health services; capable of purchasing supplies and equipment; and enabled to provide the needed human resources to contain, monitor and mitigate issues of health insecurity and outbreaks. Furthermore, through public financing arrangements, it is important to assure the delivery of essential health service packages that may be jeopardized during public emergencies.

## Target

States Parties ensure the provision of adequate funding for IHR implementation through the national budget or other mechanisms. The country has access to financial resources for the routine implementation of IHR capacities, and financial resources that can be accessed on time and distributed in readiness for and in response to public health emergencies are available. Financial resources are available in all relevant sectors and public financial management systems enable IHR implementation, including core capacity development and maintenance as well as for the desired public health response.

## *Level of capabilities in Pakistan*

The Ministry of National Health Services Regulations and Coordination works closely with government sectors and partners to ensure the provision of funding for IHR implementation through the national budget or other mechanisms. Although the country has access to financial resources for some routine implementation of IHR capacities, financial planning is limited with a national-level budgetary allocation made for some of the relevant ministries and sectors.

Pakistan has a federal system whereby different levels of authority manage and fund different public programmes with a certain degree of overlap. In 2011, a constitutional amendment resulted in the devolution of the health sector from the federal to the provincial level, shaping the current architecture of the health financing system.

Health financing is a core function of health systems that can enable progress towards Universal Health Coverage (SDG 3.8) by improving effective service coverage and financial protection. It is based on a mix of publicly funded, privately funded, out-of-pocket and external funding. Taxation is the main sources of revenue for government including health sector. Health spending amounts to 3.2% of the gross domestic product, of which 53.16% is made up of out-of-pocket payments. Per capita expenditure stands at US$ 42.52., with a government expenditure of 38.6 % (US$ 16.44). In addition, the financial resources generated, allocated and used in Pakistan's health system remain low.

The total expenditure from health-care providers shows notable disparities between the provinces. Punjab has the highest share of 48% while Balochistan currently stands at the lowest with 2% of the total expenditure, and Sindh and Khyber Pakhtunkhwa range between 21% and 29% respectively. According

to *National Health Accounts 2019–2020* (Pakistan Bureau of Statistics, 2022), the current expenditures in Punjab made by the provincial government in its capacity as a financial agent stands at 19.4%, with a social security share of 1.45% and out-of-pocket expenditures in private households accounting for 57.53% of overall health expenditures. Meanwhile in Sindh, current expenditures stood at 32.38% of the total expenditures, with a social security share of 1.33% and private households' out-of-pocket expenditure at 52.72%. In Khyber Pakhtunkhwa, current expenditure is currently 18.92%. In Balochistan and Khyber Pakhtunkhwa, the social security share of expenditures fall to 0.34% and 0.7% respectively. Out-of-pocket expenditure in Khyber Pakhtunkhwa is approximately 64.14% and the donor share in total health expenditures in Khyber Pakhtunkhwa is 1.04%. In Balochistan, the share of expenditures of the provincial government is 30.96% (including district government expenditure), while the percentage share for out-of-pocket health expenditures is 63.06%.

Government programmes both at national and provincial levels that meet IHR requirements are funded through regular annual budget processes. The federal and provincial governments publishes annual departmental reports on plans and priorities which indicate programme budgets. There are two main tracks of financing health interventions and programmes: development budget and non-development budget. The development budget mechanism is used to develop, revise and approve budgets for the implementation of IHR core capacities and is utilized across the national and provincial governments. The Ministry and departments of Planning and Development approves the projects and the Finance Division and Departments provides the financing.

The Medium Term Budgetary Framework is a tool that is used to link the health intervention with the budgeting cycle. However, the use of Medium Term Budgetary Framework at the federal and provincial levels is limited because of inadequate and timely releases of finances and lack of training of finance staff to develop expenditure and revenue projections and to pursue the Medium Term Budgetary Framework with the Ministry and departments of Finance. Hence, the government's financing for IHR remains insufficient. Limited external financing is available for health security but depends on donor priorities. Around 97–98% of the IHR-related budget comes from domestic funding, while donor funding provides 1–3%.

Coordination of budget planning and development between different ministries and relevant departments is in place but is limited. Annual budgetary meetings are held regularly for planning, and different departments are usually part of these meetings for discussing and finalizing the budgets and allocating resources. The role of the Ministry of National Health Services Regulations and Coordination in budget formulation and execution is limited. There is usually no dialogue between the Ministry of Finance and health departments on refining the budget structure for health or costing for a specific policy change.

A health security financing assessment was conducted by the World Bank in 2021. It indicated that health security is financed through different sources at the federal and provincial levels. At the federal level, four different sources are used: 1) development budget (86.3%), regular budget (1.2%), external sources (8.6%) and own sources (3.8%). The latter refers to the implementing ministry or department that is generating the income from selling services and spending these funds on IHR technical areas. The NIH, for example, provides laboratory tests and charges a fee for them; the revenue collected from this service is then spent on the laboratory area. The share of development finance in health security is highest at the federal level because most of the Project Concept-1 (PC-1) is approved and implemented by the Ministry of National Health Services Regulations and Coordination. At the provincial level, health security is mainly financed through the regular budget (63.4%) and development budget (36.6%). Other sources such as foreign aid and own sources are not used to fund health security activities. Although donors provide financial support to strengthen the IHR technical areas, their support is usually off-budget and is not reflected in the government financial system. The donors mostly provide programme-based support, and currently there are no specific programmes running to address the IHR technical areas. Furthermore, there are no dedicated funds for national IHR focal points at provincial and federal levels.

The health security financing assessment also revealed that budget allocation is not aligned with health-sector priorities, including IHR. The current budgeting is a standardized process whereby a request is generated from the Department of Health to the Finance Department requesting funds. The funds are allocated to the spending entity according to approved budget heads (line items) and not by IHR priorities. Currently, a budget line is available only for Immunization out of the 19 IHR JEE technical areas and allocated budget is not available to the remaining 18 areas in the current public financial management system of Pakistan.

The monitoring and evaluation of financial performance for IHR implementation is in place but is limited. Financial audits are conducted by a third party for foreign-funded projects. Financial management reforms are underway and expenditure reporting is partial both at the federal and provincial levels.

Pakistan had developed and costed the five-year IHR National Action Plan 2017-21, based on JEE report 2016. This plan aimed to develop a strong public health system, in alignment with the standards and required competencies for IHR (2005) implementation. The National Action Plan served as an umbrella for a wide scope of implementation in multiple areas. These included : 1) closely following up on the recommendations stemming from the JEE through NAPHS; 2) the notification of multi-sectoral national IHR task forces to establish a coordination mechanism for the One Health approach; 3) developing an AMR National Action Plan; 4) defining the Integrated Disease Surveillance and Response (IDSR) framework; and 5) strengthening public health laboratories and the national health emergency response.

The five-year action plan in place at the federal and provincial levels was tested during the COVID-19 outbreak. While the lessons learned have not yet been incorporated into the plan, several challenges have been identified – such as ineffective financial resources and planning (NAPHS costing was never translated into Medium Term Budgetary Framework at the federal and provincial levels), and lack of training to apply the medium-term budgeting frameworks at provincial level.

A public-private partnership mechanism exists and was undertaken in response to COVID-19. Engagement of civil society, community-based organizations and the private sector (such as Agha Khan University Hospital, Shifa International Hospital and Shaukat Khanum Hospital) in health security activities is limited and confined to AMR, immunization and IPC-related work. Government notification is a mechanism through which stakeholders are taken on board and briefed about their roles and responsibilities to oversee and coordinate IHR implementation. The first IHR notification on 13 June 2014 laid the foundation for developing the structure necessary for implementing IHR; however, the notification did not address the role of civil society, community-based organizations and the private sector in implementing IHR. Further, the fact that some of the IHR areas are sensitive (e.g. chemical events, radiation emergencies, and biosafety and biosecurity) makes it difficult for civil society, community-based organizations and other private organizations to take an active part in the related IHR implementation process.

In the event of an emergency response, block funding is available for emergencies from the Prime Minister Office at federal level and the Chief Minister at the provincial level. The government can release special funds or reallocate resources between sectors or geographical areas. Resources from external partners are mobilized through Ministry of Foreign affairs and the Ministry of Economic Affairs, Economic Affairs Division and utilized through the NDMA or Provincial Disaster Management Authority (PDMA) on the directions of the NCOC.

The country has an agreement with the multilateral emergency funding mechanisms through the Economic Affairs Division at the federal level and planning departments at provincial level. These also have resource-raising responsibilities. Under the Calamity Act 1965, there is a mechanism by which processes such as procurement and hiring are relaxed. However, the process is considered cumbersome and untimely. There is a need to have a financial instrument through which funds can be swiftly transferred and utilized in a timely manner from federal to its federal entities as well as at provincial levels during emergencies.

Currently, there is no fixed structure in place to ensure coordination and allocation of funding related to response to public health emergencies. Cabinet committees were established for the response to COVID-19 for the purchase of COVID-19 vaccines and during floods. Monitoring was carried out quarterly during the response. Internal monthly reviews within the departments are also performed. For example, 2 billion dollars were allocated for COVID-19 vaccination on the basis of the review of the response and communication of the resource needs. Such a structure should be developed permanently to provide oversight of the allocation, execution and monitoring of financing in response to a public health emergency, as well as the coordination of the interventions of multi sectors involved in the response, and execution of and accounting for funds related to these emergencies at the federal and provincial levels.

## Indicators and scores

### P2.1. Financing for IHR (2005) implementation

**Score 2: Limited capacity.** Financial planning is limited, with a budgetary allocation or substantial external financing provided for some of the relevant ministries and sectors, to support IHR implementation at the national level. The national budget and external financings are available and managed under habitual rules and do not include the resources needed to build IHR core capacities. Budget allocation is not aligned and not identifiable for IHR implementation, except in regard to immunization. Resources needed for IHR implementation were not estimated and use of the medium-term budgetary framework at federal and provincial levels remains limited.

#### Strengths/best practices

- The current capital budgeting system is based on a bottom-up approach that remains consistent with the decentralization and existing framework of policy guidelines overall. Improvements in various areas have been evident, such as technical budgeting capacity (practical costing skills), collaboration, and federal, provincial and district management.
- The development of current and development budgetary mechanisms remains in place.
- Annual budgeting meetings were significant since multiple departments participated in budget discussions, developments and allocation. The partially funded and costed five-year National Action Plan is integrated within the federal component of the Health Security Plan which was updated in 2021.
- Reviews were conducted of Quarterly Public Sector Development Programme (PSDP) / provincial annual development plans, and internal and monthly financial monitoring reviews were carried out within departments.

#### Areas that need strengthening/challenges

- There is a significant lack of credible information on health needs and service costs in Balochistan, both of which serve as critical elements for the development of budgets and in resource allocation at the decentralized level. Therefore, there is a need to have robust information on the health needs and the service costs in Balochistan.
- After the 18th amendment was passed to transfer power to provincial governments, the provinces' autonomy in managing the pooling and purchasing arrangements for health was enhanced. However, accountability mechanisms at the provincial level need to be strengthened to improve performance and transparency in health-care financing.
- Public financial sources should serve as the cornerstone for funding IHR implementation and public health emergencies. In addition, the lack of budgeting skills at the service manager level at provincial levels (Balochistan and Khyber Pakhtunkhwa) are an important factor in budgeting failures.
- Public funds from federal or provincial levels are disbursed through a highly bureaucratic, time-consuming and antiquated process, resulting in delays and lapses of funds.

- Budget lines/cost centres of relevant ministries and sectors should be suitably aligned for IHR technical areas and activities, and financial gaps should be tackled to ensure adequate, sustained and aligned budget allocations for IHR implementation.
- The National Public Financial Management is particularly weak in Sindh and Khyber Pakhtunkhwa, and the entire budget cycle and rules on budget formulation, allocation, execution, reporting and monitoring should be revised to ensure efficiency in IHR spending at federal and provincial levels.
- Khyber Pakhtunkhwa's medical supply chain management lacks efficiency, leading to limited availability of essential drugs and medical consumables in secondary care hospitals and a reduced quality of care. Patients must buy drugs and consumables in private pharmacies, thereby increasing the financial burden, particularly for low-income families and individuals.
- The MoH has driven efforts towards producing a needs-based medium-term budget framework. However, this has not resulted in any budgetary change in the provincial departments of health.
- Gaps exist between the resource needs (in the context of IHR) and budgetary allocation.
- No dedicated funds are allocated for IHR focal points both at the provincial and national level to coordinate and execute a response.
- Funds are not distributed in a timely manner.
- No budget line or cost centres are available for JEE technical areas except for immunization.
- Limited external financing is available and depends on donor priorities.
- In the current government system of budgeting,, expenditures and revenues cannot be identified for JEE technical areas.

### P2.2. Financial resources for public health emergency response

**Score 2: Limited capacity.** An emergency public financial resources mechanism exists or is pre-specified. It can receive, distribute and use funds for public health emergency response, but activation and disbursement modalities are cumbersome and untimely. An emergency public financial resource mechanism exists, but timely disbursement and utilization continue to be major issues. The provision of adequate funding for public emergencies through the national budget or other mechanisms remains unpredictable and is implemented on an ad hoc basis.

#### Strengths/best practices

- There is public health emergency block funding for emergencies with discretionary powers, with the Prime Minister at the federal level and Chief Minister at the provincial level.
- In Sindh province, a budget head is in place with Secretary to deal with different kinds of emergencies.
- Reallocation mechanisms between current and development budgets can be done on the basis of needs through, for example, supplementary grants and re-appropriation decisions.
- Punjab, Sindh and Khyber Pakhtunkhwa have begun to strengthen the health financing component within the primary health care system.

### Areas that need strengthening/challenges

- Adjusting the formalization, alignment, tracking and reporting systems to ensure that budgets are allotted to public health emergencies under relevant heads and remain predictable, flexible and are distributed in a timely manner at the national and provincial levels to relevant ministries or sectors – all of which should be carried out through a transparent process ensuring accountability.
- Real-time monitoring during public health emergencies: mechanisms exist but there is limited functionality.
- No structure exists to ensure coordination and allocation of funding related to the response to public health emergencies.
- Legislation (where available) is limited to specific provincial jurisdictions and does not extend to the whole of the country.
- Digitalization efforts still face major challenges in relaying real-time data feedback in routine processes, let alone emergencies.

## Recommendations for priority actions

- Develop a national and provincial comprehensive health financing strategy to mobilize a sufficient and sustained budget (internal and external) for health security.
- Revamp and update the federal regulation of the financial health system to improve provinces' ability to forecast financial resources, allocate sufficient funds for health, and coordinate donors.
- Revise the public financial management for having cost centers for IHR core capacities and public emergencies to ensure flexible and transparent spending in alignment with national and provincial priorities.
- Track spending on IHR activities and public emergencies to inform budget allocations and funding decisions by policy-makers and international partners.

# P3. IHR coordination, national IHR focal point function and advocacy

## Introduction

The IHR (2005) implementation requires a multi-sectoral and multidisciplinary approach through national and subnational coordination and partnership mechanisms. This technical area addresses the designation of a National IHR Focal Point (IHR NFP) to lead the national coordination of IHR communication and Implementation, the multi-sectoral coordination through institutional arrangements and clear protocols for the multi-sectoral risk assessment, notification and information-sharing, and proper planning for IHR through the development of the multi-sectoral NAPHS and monitoring its implementation.

The advocacy for IHR and capacity-building activities are necessary to raise awareness and guarantee the availability of decision-making processes, resources and workforce for the implementation of IHR.

## Target

Multi-sectoral/multidisciplinary approaches through national partnerships allow efficient, alert and response systems for effective implementation of the IHR. Coordination of nationwide resources, including sustainable functioning of a National IHR Focal Point – a national centre for IHR communications which is a key obligation of the IHR – that is accessible at all times. States Parties provide WHO with contact details of National IHR Focal Points, and continuously update and annually confirm them. There is timely and accurate reporting of notifiable diseases, including the reporting of any events of potential public health significance according to WHO requirements and consistent relay of information to the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (WOAH). Planning and capacity development are undertaken and supported through advocacy measures to ensure high-level support for implementation of IHR.

## *Level of capabilities in Pakistan*

The Ministry of National Health Services Regulations and Coordination has designated the NIH as the IHR NFP in Pakistan since 2014, under the NIH reorganization Act 2021, the NIH has seven institutes. The Centers for Disease Control (CDC) is one of these establishments and has the mandate for IHR and health security roles and responsibilities. In principal, the chief of CDC Pakistan is the designated focal point for IHR; however, the Chief of the Public Health Laboratory Division in the NIH is currently serving as the primary IHR NFP. The Director of Public Health/CDC at the Departments of Health has been assigned as the IHR NFP at all the provincial and area levels, for coordinating with the IHR NFP at NIH and providing oversight of IHR planning and implementation. In addition, an IHR duty officer at CDC Pakistan at the federal level has been assigned to 24/7 urgent communications with WHO, while an IHR duty officer is not in place at the provincial levels.

The functions of the IHR NFP under the umbrella, guidance and support of Ministry of National Health Services Regulations and Coordination, include coordinating with all national One Health stakeholders/ provincial IHR FPs for the JEE missions, reviewing JEE draft reports, development and implementation of national plans for health security, policies and strategies for IHR implementation; eSPAR, facilitating communication and collaboration between different sectors and stakeholders involved in IHR implementation; establishing and maintaining surveillance systems for the early detection and reporting of potential public health emergency of international concern; ensuring that national health regulations

and guidelines are in line with IHR requirements; providing technical assistance and training to public health professionals involved in IHR implementation; and participating in global and regional networks for the exchange of information and best practices related to IHR implementation. However, there is no governance structure for IHR in the country at national (CDC Pakistan) and provincial levels, where a fully resourced and dedicated IHR secretariat exists with legal support to oversee the above terms of reference.

Moreover, there is no clarity on the roles and responsibilities of the IHR NFP at the provincial levels, as required for the national focal point for IHR. Institutional focal points for the IHR NFP communication and coordination with the other sectors are also not in place, and there are no SOPs or protocols for the functioning of the coordination between the IHR NFP and other relevant actors. Although, the IHR is included in the national health vision and provincial health sectors' strategies, the IHR NFP designation and functions are specified in law or rules of business. Consequently, the IHR is not aligned with or integrated into the national administrative system at all levels and between different sectors.

A national IHR multi-sectoral task force was established in 2016 to ensure a whole-of-government approach, chaired by the Secretary of Health of Pakistan at the federal level. The task force has members from line ministries, One Health stakeholders and provincial Directorates General of Health Services (DGHS). The terms of reference for this task force are in place. All four provinces and area governments have notified the IHR multi-sectoral task force, based on the recommendations of the JEE (i.e. the Directorate-General of Health Services in Sindh, Punjab, Balochistan constituted the Provincial Task Force for IHR) in June 2016 while KP has embedded IHR Committee within its public health act. The terms of reference of the task force and its 26 designated members include food, agriculture, livestock, and environment and information management sectors. The linkage between the federal and provincial task force needs further clarification.

In response to COVID-19, the government established the National Coordination Committee under the Prime Minister with an NCOC for national coordination and oversight of the COVID-19 pandemic response. This is a good example of multi-sectoral collaboration and a whole-of-government approach reflecting the potential national capacity and experience for effective management of public health events. Such structures need to be reviewed and updated to reflect adequately the mandate and functions of the IHR multi-sectoral task forces at federal and provincial levels.

The IHR NFP has access to the relevant information sources and decision-making levels, including senior government officials, within the national surveillance and response system. The IHR NFP also has the capacity to consolidate the surveillance data from different sources and programmes of the health sector such as IDSRS, vertical programmes and the public health laboratory network. However, this capacity is limited in terms of data from other sources as there is no mechanism in place for the systematic sharing of surveillance data from animal and other one health sectors with the IHR NFP at NIH, although it is done on an ad hoc basis.

The IHR NFP coordinates with the relevant officers at the line ministries and the provincial level and engages with other sectors for verification of alerts and reports generated from different sources for risk assessment, notification of national public health events and information-sharing with WHO. However, due to the absence of institutional focal points in the non-health sectors, the verification, risk assessment and notification are sometimes delayed. The IHR NFP has the necessary expertise to discuss notifiable events with the WHO IHR Focal Point.

The current administrative arrangements at national level in Pakistan enable the IHR NFP to obtain approval from the Ministry of National Health Services Regulations and Coordination for communication with WHO. For confirmation of a public health emergency of international concern or unusual national events, the approval of the Ministry of National Health Services Regulations and Coordination is required. Provinces communicate IHR-relevant information to the IHR NFP at federal level after approval of their health authorities. However, the IHR NFP is not provided with the legal authority to access all relevant

information sources and decision-makers, including ministries and agencies in related sectors outside of health. However, lack of awareness on IHR reporting obligations from other non-health sectors and coordination gaps between sectors with absence of institutionalized focal points in other sectors contributes to delays in notification.

Regular advisories, situation reports, bulletins, weekly reports, newsletters and official correspondence are developed and consolidated by CDC Pakistan at the NIH, except for chemical and radio nuclear hazards. The IHR NFP at national and provincial levels coordinates and takes necessary measures for further dissemination. However, no systematic information-sharing takes place but is mostly need-based, as in the case of dengue.

Advocacy plays an essential role in ensuring IHR implementation. Although it is prioritized at national level, there are limited sensitization and awareness-raising activities at the provincial levels. The NAPHS for 2017–2021 has been developed and its implementation is underway with domestic resources and the support of partners. However, eSPAR is not systematically used for updating the progress in NAPHS implementation while it is used for annual reporting to the WHO Regional Office for the Eastern Mediterranean. Increasing advocacy and awareness-raising activities are required at the provincial levels.

Currently, there is no plan in place to support the continuous development and learning of staff working in the IHR NFP. Additional IHR human resources with authority, skill set and financial resources are needed at the federal and provincial levels to operationalize IHR NFPs and to support their roles in facilitating the implementation of the IHR.

## Indicators and scores

### P3.1. National IHR focal point functions

**Score 2: Limited capacity.** The National IHR Focal Point is a designated centre with a duty officer system to ensure availability at all times for urgent communications with WHO. However, legal, normative and institutional instruments and arrangements, including Terms of References describing roles and responsibilities, are insufficient to communicate effectively with all levels and relevant sectors of the State Party's administration. The IHR NFP is also established at provincial levels but neither with terms of reference nor with a designated IHR duty officer.

#### Strengths/best practices

- Since 2014, the NIH has been designated as the IHR NFP in Pakistan with an assigned IHR duty officer. Information on the designated IHR NFP was disseminated to all stakeholders at the federal and provincial levels.
- Existing legislative tools and administrative mechanisms enable the IHR NFP to obtain timely clearance regarding urgent communications with WHO.
- The IHR NFP has access to surveillance data from the health sector at federal and provincial levels and has the technical expertise to conduct a risk assessment for public health events and discuss related matters with the different sectors including WHO.
- The IHR FP (PDSRUs ) are established at the provincial level to facilitate surveillance, IHR communication and implementation with a clear line of reporting to the Director Public Health / CDC - IHR Provincial FP & and onwards to NFP at the NIH.
- The NIH Reorganization Act 2021enables the IHR NFP to declare a public health emergency in the country if it is satisfied with the surveillance data showing evidence of a health emergency.

### Areas that need strengthening/challenges

- There is a need to establish an IHR governance mechanism both at the National and Provincial levels and a well-resourced IHR secretariat at CDC Pakistan – NIH and PDSRUs/DGHS offices. At NIH and at provincial levels the IHR cells/secretariat with authority, adequate resources and clear Terms of References are not in place. They may be made part of the NIH act 2021 or rules of business.
- Institutional focal points for the IHR communication between the IHR-NFP and the other sectors is not in place nor standard operating procedures for the communication and information-sharing.
- Development of a formal coordination mechanism and linkage with One health stakeholders for surveillance and public health laboratory.
- Limited capacity-building activities for IHR NFP and other focal points at the federal and provincial levels.
- Advocacy and sensitization activities targeting decision makers is also limited to federal level.

## P3.2. Multisectoral coordination mechanisms

**Score 2: Limited capacity.** Multisectoral coordination mechanisms for IHR implementation are developed at federal level but with neither clear terms of reference nor dissemination about their establishment to all stakeholders. Multisectoral coordination activities occur on an ad hoc basis. The level of this indicator is more advanced in Sindh Province as an IHR multisectoral mechanism with clear terms of reference is established there.

### Strengths/best practices

- A needs-based coordination mechanism exists at the federal and provincial levels with relevant ministries and departments. For example, the establishment of the National Coordination Committee under the Prime Minister's Office and the NCOC for national coordination and oversight on the COVID-19 response served as a positive example of multisectoral collaboration and a whole-of-government approach.
- The IHR multisectoral task force has been established at the federal level and in all provinces, including area governments.
- The capacity to perform risk assessment and onward timely notification and information-sharing with WHO is in place for public health events related to the health sector.

### Areas that need strengthening/challenges

- Terms of reference for the IHR multisectoral task force need to be reviewed and developed with a mirrored structure and clear roles and responsibilities and links with the provincial levels.
- The capacity to perform risk assessment and onward timely notification and information-sharing with WHO is limited for public health events that necessitate the engagement of different sectors. Consequently, this contributes to delaying the required response.
- Awareness of IHR among all sectors at national and provincial levels is limited and needs to be enhanced.

### P3.3. Strategic planning for IHR, preparedness or health security

**Score 2: Limited capacity.** The NAPHS has been developed at the federal and provincial levels, but its implementation is progressing slowly. The provinces that have made most progress are Punjab, KP and Sindh while in Balochistan it needs further efforts to show progress. The monitoring and evaluation mechanism for NAPHS implementation is not in place at either federal level or provincial levels.

#### Strengths/best practices

- Pakistan was the first country in the region to develop and cost the NAPHS with involvement of all stakeholders at federal and provincial levels.
- Implementation of the NAPHS is underway specially on key recommendations with varied levels of progress between provinces.

#### Areas that need strengthening/challenges

- The level of engagement of stakeholders at the federal and provincial levels needs to be enhanced to perform other activities of the IHR monitoring and evaluation framework, such as simulation exercises, after-action and intra-action reviews and eSPAR. The outcomes of these activities need to be adequately utilized in updating the progress of the NAPHS implementation.
- An accountability and oversight mechanism is not in place and is needed at both national and provincial levels to facilitate the implementation of the NAPHS.
- Progress reports on NAPHS implementation need to be developed to inform mobilization of internal and external resources.
- Engagement with partners needs to be enhanced and streamlined to mobilize resources to support the domestically allocated resources for NAPHS implementation.

## Recommendations for priority actions

- Establish a governance mechanism at strategic and operational levels for IHR both at the national and provincial levels for enhancing ownership and to provide oversight, resources, effective coordination and technical guidance while NAPHS in being implemented. Further monitoring and evaluation is needed to monitor the progress of NAPHS:
  - » at national level, chaired by the Prime Minister /Federal Minister for Health/Advisor; with federal and provincial secretaries as members from all stakeholders while at operational levels all DG/DGHS from relevant ministries/departments along with development partners be a part of such forums;
  - » at provincial level, high powered committee chaired by the Additional Chief Secretary (Dev), and Secretaries as members from health & all one health stakeholders, DGHS and development partners. The IHR Focal Point could provide secretarial support.
- Establish, enhance and empower the IHR NFP secretariat at the CDC Pak – NIH with adequate, competent and qualified human resources, level of authority and financing and ensure the availability of such a structure at the provincial level with defined terms of reference.
- Review and update the established IHR multisectoral task forces at federal and provincial levels and develop terms of reference to ensure clarity on institutional focal points, coordination, communication and information-sharing, and support IHR implementation for all IHR-relevant stakeholders at national and provincial levels.
- Build the technical and leadership capacities of the IHR NFP and IHR contact points in the other sectors at the federal and provincial levels by arranging regular training and providing the necessary infrastructure.
- Organize simulation exercises and after-action reviews to test the functionality of the IHR NFP and IHR multi-sectoral coordination and communication, and ensure that lessons learned during the -response to health emergencies are used to update the related terms of reference and SOPs.

# P4. Antimicrobial resistance

## Introduction

Antimicrobial resistance (AMR) is a major threat to human and animal health that will increase the risks and costs of providing care. The widespread indiscriminate use of antimicrobials in the formal and informal sectors as a substitute for good hygiene and prevention of infection, and in the absence of a diagnosis or clear indication, results in many medicines becoming less effective. The poor infection prevention and control measures mean that resistant strains may spread. Although these risk factors are not specific to Pakistan, their high prevalence means that the risks of drug-resistant infections and their potentially harmful impacts remain high. For example, extensively drug-resistant (XDR) typhoid, multidrug-resistant organisms (MDROs) and XDR tuberculosis (TB) demonstrate the impacts of resistance in terms of an increase in costs and the complexities of treatment. There is an urgent need to strengthen systems to prevent, diagnose and manage infections in human health and within food production, and to change the behaviour of health providers and patients and their expectations regarding antibiotics. However, for this to take place, provincial operational plans must be established to prevent and manage infections and decrease the unnecessary use of antimicrobials in health practice within health facilities and in food production.

## Target

Implementation of provincial and national action plans on AMR at scale in the human health sector (public and private), animal health, plant health, food production and the environment, with coordinated One Health action where appropriate. Also: more appropriate use of antimicrobials; access to quality antimicrobials assured for use when necessary; reduced and more appropriate consumption in human animal and plant health; more than 60% of antibiotics used are in WHO's access category; effective surveillance to monitor trends in antimicrobial resistance in key pathogens and patterns of consumption; data used at local and national levels and submitted to GLASS and WOAH's ANIMUSE; high-quality data generated on infections acquired in secondary and tertiary care, and used for advocacy and to improve management.

## *Level of capabilities in Pakistan*

AMR is a global health concern and Pakistan's challenges in this area include a huge burden of multiple and resistant bacterial infections, leading to significant mortality and morbidity and limiting options for treating infectious diseases. For example, *S.* Typhi ceftriaxone resistance increased from 60% in 2019 to 79% in 2021; methicillin resistance reported in 65% of *S. aureus* isolates in 2021; and *A. baumannii*, resistance against carbapenems reached up to 70% in 2021. Other challenges include the use of broad-spectrum antibiotics in the human and animal sector without a regulatory framework, health care-associated infections, and limited implementation of IPC guidelines.

The government of Pakistan and health-care authorities have taken measures to address AMR through: the development of a National Action Plan on Antimicrobial Resistance in 2017; strengthening the health-care infrastructure; conducting public awareness campaigns to educate the general population about the responsible use of antibiotics; implementation of regulations to control the sale of antibiotics; and enhancement of surveillance systems to monitor the prevalence and patterns of AMR in Pakistan.

The National Action Plan (NAP) for Pakistan was developed in line with the Global Action plan (GAP), through a participative process with a coordination mechanism. It includes strategic and operational components as well as a framework for monitoring and evaluation. The multisectoral NAP was approved and adopted in December 2017. It clearly defined the roles and responsibilities of sectors and levels of

government. The NAP has expired and requires further revision and update. Operational provincial plans to drive AMR implementation through the relevant provincial institutions were drafted in 2018 and are still under discussion.

The Government of Pakistan has provided resources under the PSDP for the national programme on containment of AMR and IPC since 2020. The dedicated AMR coordination office under the project is being established at the NIH which is the national focal point for AMR. Some of the essential staff is onboard since 2021 and have been assigned different tasks in line with the NAP objectives. A complementary, animal health sector PSDP on AMR surveillance activities across Pakistan has been developed and is under the approval process. There are no projects/operational plans or resource allocation and investment at provincial level for implementing AMR activities. The fiscal targets of the federal PSPD project are achieved with sufficient spendings for Islamabad Capital Territory, Gilgit-Baltistan, and Azad Jammu and Kashmir. However, progress in National Action Plan for Health Security implementation varies for different objectives.

The Ministry of National Health Services Regulations and Coordination established a multisectoral National AMR Steering Committee in 2018 with Terms of References and representation from the areas of human health, animal health, agriculture and food production, and environment at the federal and provincial levels. Since its establishment, infrequent meeting have taken place. Three meetings were conducted and representatives from health, livestock & veterinary, and the environment sector at federal and provincial levels attended, along with partners. Provincial AMR task forces were established in Sindh and Khyber Pakhtunkhwa. This is an essential factor as it is deemed necessary, given the size and federal nature of Pakistan, to have similar structures in the all provinces.

There is a network of quality assured laboratories reporting to the GLASS which remains miniscule in relation to the size of the country. Although AMR surveillance is being piloted in key livestock areas and nine cities, particularly in Punjab, it lacks coordination and sustainability.

In the human health sector, a national reference laboratory for human health exists at the NIH with advanced diagnostic facilities and ISO 15189 accreditation. More than 80 laboratory sites that have the capacity to detect, isolate and identify AMR pathogens are either enrolled or approved by the NIH to participate in AMR sentinel surveillance. However, in 2021, only 20 laboratories shared data on GLASS pathogens, an increase from 4 in 2017. The NIH consolidates the data received in different formats (computer-based and manual) and transcribes it into the WHONET before uploading it to the WHO GLASS platform. Data quality checks are performed at the NIH before sharing with WHO. The summary of selected pathogens is shared in the AMR newsletter on a regular basis. These reports do not include a summary of the AMR burden. However, the data have been used to inform the ongoing review and to update the antimicrobials in the national essential medicines list (NEML). Data have also been used for developing testament guidelines, such as for TB, typhoid and malaria. A national expert committee has been established for adopting the access, watch and reserve (AWaRe) classification into the NEML.

The veterinary sector has 10 public sector laboratories, including the NVL, the National Agricultural Research Centre and provincial laboratories with the capacity to detect, isolate and identify priority pathogens. Provincial food authorities in Khyber Pakhtunkhwa, Punjab and Sindh have their own diagnostic set-up with some capacity to detect and confirm food-borne pathogens. Veterinary confirmatory testing is conducted on a limited scale as the referral system for isolates/samples is not functional. There is limited capacity in the environment sector to detect AMR pathogens; however, they contribute to and work with the health and livestock sectors on some projects for collection of samples for AMR testing and reference-testing laboratories have not been identified.

The NIH, as a reference laboratory, receives environmental samples from clinics, hospitals and public health authorities, although this is not the case for the animal health sector which participated only in pilot studies. In the environment sector, water testing is carried out only by Environmental Protection Agency (EPA) and Pakistan Council of Research in Water Resources (PCRWR) laboratories at both national and subnational levels

A range of 5–10% of all hospitals in Pakistan conduct antibiotic susceptibility testing. There are no national guidelines for testing and reporting of infections caused by AMR pathogens. Therefore, there is variation in specimens, pathogens and antimicrobials covered by the different facilities but most of the laboratories use CLSI standards for testing and reporting. The denominator data on the number of patients with a specific disease or syndrome, and the number of patients with samples taken is not collected routinely. Standardization of testing and reporting will take place upon the implementation of the AMR surveillance strategy developed by NIH and currently under piloting.

The AMR National Surveillance Strategy focuses on commensal bacteria of E. coli and Enterococcus spp. which are currently being piloted in five selected districts, one in each of Islamabad, Punjab, Sindh, Balochistan and Khyber Pakhtunkhwa. The pilot project is expected to be completed and results analysed by NVL and the National Reference Laboratory for Poultry Diseases (NRLPD) by the end of the project. The strategy also covers zoonotic foodborne bacteria of Salmonella and Campylobacter spp. in poultry and large ruminants (cattle and buffalo). This is currently piloted in Khyber Pakhtunkhwa and Punjab at different levels of development. The reports of the data are not finalized, however, and the data summary is given in the AMR Newsletter issued by the NIH. In addition, a pilot surveillance programme for AMR in clinically healthy animals from selected production systems, such as commercial broilers and bovines intended for slaughter, is also functioning. Community and outpatient surveillance are part of the strategy which is currently very limited to specific areas such as TB in human health. In the animal health sector, farms are identified for community surveillance through live bird market and slaughterhouse sample collection for testing zoonotic pathogens of Salmonella and E. coli.

Data on antimicrobial use/consumption is monitored through the Drug Regulatory Authority of Pakistan (DRAP) and in a point prevalence study in the human health sector conducted in 2018 and 2020. Currently, no systemic approach to the identification and management of drug-resistant infections exists, despite demonstrated good practice by some hospitals. A point prevalence study in the animal sector is not done according to WHO methodology but data are shared with WOAH.

Drinking water and wastewater rules are not implemented and effluents are not monitored at national level by the EPA. There is lack of capacity for structured surveillance of monitoring effluents at all levels. Liquid waste surveillance is monitored in large hospitals in Sindh and regular reports are produced. The Pharma industry's effluent is monitored through certified EPA laboratories in Sindh and Punjab.

Guidelines have been developed and the AWaRe classification has been adapted and reflected within the NEML. The roll-out and implementation of these guidelines has yet to take place. A standardized case definition of MDRO is not available and it is not used by all health-care facilities.

Guidance for the timely detection, reporting, risk assessment and monitoring of novel and emerging resistance is in place for some diseases as and when required (e.g. cholera and enteric fever). Some private and public-sector laboratories have the capacity to detect unlikely, unusual, and clinically and/or epidemiologically important findings, generate antibiogram and analyze unexpected bug-drug combinations. The capacity does not involve detecting resistance patterns not previously reported or only rarely reported. There are no predefined exceptional phenotypes in accordance with expert rules. There are designated expert laboratories – such as National Institute of Health (NIH), (Aga Khan University) AKU, SKMCH (Shaukat Khanum Cancer Hospital), Shifa International Hospital and AFIP (Armed Forces Institute of Pathology) – that provide confirmatory testing for unusual findings.

National IPC guidelines exist and include hand hygiene, surveillance (in particular, for carbapenem-resistant Enterobacteriaceae and other MDROs of special concern), contact precautions, patient isolation and environmental cleaning. However, the implementation of the guidelines to prevent and control MDRO infection or colonization is in its early phases at only selected health-care facilities. Surveillance cultures for asymptomatic colonization with MDRO are not systematically performed. Very few health-care facilities carry out risk assessments and consider patient populations for such surveillance.

National guidelines on the appropriate use of antimicrobials remain in place but are not updated on the basis of local antibiograms. The DRAP is regulating the complete lifecycle of medicines until use. DRAP has published guidelines with defined Pakistan Health Research Council (PHRC) criteria for a voluntary ethical marketing code. DRAP activities related to regulation and quality management have improved in the past three years.

The NAPHS includes components for antimicrobial stewardship, but implementation is challenging. The DRAP and NAPHS rules the prescription-only status of antibiotics; however, all antibiotics are available over the counter. The adherence of antibiotic use to national guidance is done partially by the TB and malaria programmes. All antimicrobials are registered and there are interprovincial committees linking manufacturers to ensure availability of alternatives. A task force for drug shortages also addresses access to antimicrobials to humans who are in need. For animals, prescriptions are required under the Act but this is not enforced. Prescriptions are based on WOAH guidelines.

No guidelines exist on the restriction of antimicrobial use in growth promotion. DRAP legislation covers the management of veterinary medicine through most aspects of the value chain, but the systems for their enforcement remain weak and the province of Punjab has developed more guidelines, including the restriction of therapeutics for animal feed formulation.

The guidelines for treatment of animals are required. National guidelines are issued by the Ministry of National Food Security & Research – usually in the poultry sector. Farmers do have access to veterinarians at government and private veterinary centres (varies between provinces) and obtain prescriptions for antibiotics and vaccines. However, local farmers buy over-the-counter antibiotics from local stores. The farmers also have access to veterinary physicians. Private farmers have hired monitoring systems. No price control exists for livestock and poultry medicines.

Testing of antimicrobial quality is in place. Pakistan has 11 drug-testing control laboratories at national and provincial levels in Punjab, Sindh, Khyber Pakhtunkhwa, Azad Jammu and Kashmir, and Gilgit-Baltistan with high levels of accreditation. The sampling target is based on testing for sub-standard/spurious/falsely-labelled/falsified/counterfeit medical products, and random sampling is usually carried out. When reports are substandard, DRAP recalls the products and undertakes an investigation and imposes penalties which include cancellation of registration and suspension of license. The national expert committee established for adopting the AWaRe classification into the NEML is also mandated to adopt the AWaRe classification into antimicrobial stewardship policies and plans.

Medical and pharmacy curricula include appropriate antibiotics for use in humans. Studies are being done by universities on the quality of prescription practices.

## Indicators and scores

### P4.1. Multisectoral coordination on AMR

**Score 2: Limited capacity.** A multisectoral AMR national action plan was developed at federal level and multisectoral coordination mechanism established at federal level with representation from provinces and other sectors. A National AMR Steering Committee was established in 2018 with clear terms of reference but has not been fully functioning. Only three meetings and one meeting on XDR typhoid took place at the federal level. A provincial action plan in line with the National Action Plan is needed to be developed and prioritized and linked to provincial sector plans.

#### Strengths/best practices

- The national action plan covers key sectors, was developed through a participative process and is aligned with the Global Action Plan on AMR.
- A multisectoral coordination mechanism for engagement from key stakeholders is in place.
- The government has provided resources under the PSDP for the National Programme of Containment of AMR and IPC since 2020. The dedicated coordination office is established under the NIH with a focal point for AMR and dedicated staff.
- An approved federal budget and costs plan for human health and AMR activities implementation remain in place. Furthermore, a complementary animal health sector plan has been developed and is currently in the process for approval.

#### Areas that need strengthening/challenges

- The national action plan should be revised on the basis of a systematic review of progress by all relevant stakeholders. It should be linked with other related plans (e.g. WASH, immunization, laboratory strengthening etc.) and should build on existing opportunities and capacities of key stakeholders (e.g. DRAP).
- Provincial plans need to be developed, prioritized and linked to provincial sector plans.
- A higher frequency of meetings is needed for the coordination mechanism, which should have an active role in monitoring the plan, reviewing progress and reviewing and using data that are being generated.

### P4.2. Surveillance of AMR

**Score 2: Limited capacity.** AMR data are collected from selected health-care facilities and laboratories for humans (20 sites, <5% hospitals). Data collection is standardized and reported to GLASS. Livestock and poultry AMR surveillance are being piloted in nine cities but lack coordination and sustainability.

#### Strengths/best practices

- A quality-assured network of laboratories has been established, with 80 laboratories able to undertake culture and sensitivity tests on some pathogens. Forty participate in the External Quality Assurance System and 20 report data to GLASS.
- Public, private and academic laboratories are engaged in AMR surveillance.
- In 2020, a project was initiated to assess the pattern and trends of AMR in commensal foodborne pathogens in healthy broilers and cattle (e.g. buffalo). Data on these findings as well as from other sources are shared in the AMR newsletter.
- Some 27 laboratories collect data for TB sensitivity patterns and there is substantial provision for rapid identification of resistance patterns (GeneExpert).
- Data on antimicrobial consumption are available in some provinces and could be systematically analyzed.
- The "tricycle protocol" that systematically analyses extended spectrum beta-lactamases (E. coli) resistance across human, animal and environmental health has been implemented.

### Areas that need strengthening/challenges

- Standardize surveillance approaches and develop an effective system for procurement, assurance and reporting, including population/denominator data to facilitate analysis.
- Automate systems and ensure that a suitable information technology (IT) infrastructure is in place to support laboratories in analyzing and referring to their own generated data.
- Maintain and expand the External Quality Assurance System and ensure that laboratories refresh registration when necessary.
- Most culture tests may be taken in association with treatment failures, and most laboratories undergo culture and sensitivity tests in specialized hospitals. This would ultimately mean that data generated on sensitivity patterns are less likely to be an accurate representation of the general population, and extreme caution should be exercised when formulating guidelines for treatment.
- AMR surveillance in food production should be sustained and expanded (e.g. E. coli and salmonella) and shared with veterinarians, farmers and policy-makers.
- Establish AMR surveillance and residues in the environment through sewage sampling and in high-risk areas (pharmaceutical production, feedlots and hospitals).
- Coordination between provinces and national level needs to be strengthened.
- With the provinces, multisectoral coordination needs strengthening for surveillance of AMR.
- Public and private laboratories' implementation plans for the External Quality Assurance System and laboratories reporting to GLASS need to be prioritized.

## P4.3. Prevention of multidrug-resistant organisms

**Score 1: No capacity.** Priority MDRO pathogens have not been identified at federal and provincial levels. National IPC guidelines for MDRO containment have been developed and laboratory capacity to detect MDROs is present at selected sites. SOPs for typhoid and TB have been drafted. These measures allow for limited detection of MDRO.

### Strengths/best practices

- Some hospitals (mainly private) carry out surveillance of health-care infections and active management of MDRO through, for example, isolation and cohort studies.

### Areas that need strengthening/challenges

- A standard list of priority MDRO pathogens with case definitions needs to be adopted.
- SOPs for MDRO management should be developed to influence swift action if a patient is found to have an MDRO.
- Close collaboration between laboratories, IPC staff and those working on prescription improvements is essential.
- Surveillance and prevention plans for MDRO need to be developed and implemented

## P4.4 Optimal use of antimicrobial medicines in human health

**Score 2: Limited capacity.** The WHO AWaRe (Access, Watch and Reserve) classification is adapted and finalization of NEML is in progress. National Antimicrobial Treatment Guidelines based on AMR data have been initiated recently. Guidelines for rationale use of antimicrobials and stewardship activities have been developed and issued by DRAP. Antimicrobial access is monitored through DRAP with limited data available on antimicrobial consumption.

### Strengths/best practices

- Guidelines and policies exist for appropriate use under the Drugs Act 1976 and DRAP Act 2012.
- DRAP has 11 laboratories, four of which have acquired WHO prequalification and authorization to test antimicrobial agents.
- There is a task force to address sub-standard/spurious/falsely-labelled/falsified/counterfeit medical products.
- Provincial data systems that track antimicrobial consumption could be analyzed and used to identify specific risks, demonstrate potential cost savings, and monitor progress.
- Implementation of national treatment guidelines and endorsement through the College of Physicians and Surgeons Pakistan and vertical programmes need to be developed in line with WHO guidelines.
- Legal cover to enforce restrictions on over-the-counter sales need to be promulgated.
- Dedicated programmes closely associated with IPC implementation should be established in hospitals of both departments Specialized HealthCare & Medical Education (SHC & ME) and Primary & Secondary Health Care (P & SHC).

### Areas that need strengthening/challenges

- The legislation and associated policies concerning antibiotic use need to be reviewed, in line with the WHO Essential Medicines list and Access, Watch and Reserve (AWaRe) index, with the aim of identifying practical approaches to decrease the unnecessary use of antimicrobials.
- National treatment guidelines should be developed in line with the WHO antibiotic book and widely disseminated.
- Although enforcing restrictions on over-the-counter sales will be challenging, DRAP should consider concerting its efforts towards parenteral drugs, particularly those in the Reserve and Watch groups within the AWaRe index.
- A total consumption of antibiotics in the human sector should be systematically analyzed at the provincial and federal levels.
- Stewardship programmes closely associated with IPC should be established in hospitals.
- Influencing private/informal sector behavior and enforcing restrictions on the sales of antibiotics is a major challenge. In this context, engagement with medical syndicates and the implementation of continuing professional development programmes should be encouraged.

## P4.5. Optimal use of antimicrobial medicines in animal health/agriculture

**Score 2: Limited capacity.** Currently, there is no national policy on the use of antibiotics in animal growth promotion. However, existing legislation covers some aspects of the use of antimicrobials in activities related to animal production. Drug testing laboratories (DTLs) of DRAP can perform drug quality testing. Guidelines are available for rationale use by Ministry of National Food Security & Research. Veterinarians are available and accessible to farmers at all levels. Punjab has guidelines for animal production and restricted use of therapeutics for animal feed formulation.

### Strengths/best practices

- DRAP remains assured that national legislation (Drug Act 1976, DRAP Act 2012 and the Food Act 2017) cover relevant aspects of veterinary medicines in value chains.
- The use of some antibiotics (e.g. fluoroquinolones and ciprofloxacin) have been banned in the animal health sector.
- Guidelines for the use of antimicrobial medicine in animals are currently under development, reflecting the risk of using medically important antibiotics with high resistance potential in animals.
- There is local production and use of vaccines in the animal sector to prevent infection.

### Areas that need strengthening/challenges

- Treatment guidelines for poultry and other sectors that are currently under development should be aligned with the WOAH and WHO guidance on medically important antibiotics. Additionally, the guidelines should be disseminated widely and monitored regarding their use.
- Regulations should be developed on the use of antimicrobial medicine in growth promoters and medicated feeds, and their implementation should be monitored.
- Regulations should be developed on the use of antibiotics in pesticides, and their implementation should be monitored.

## Recommendations for priority actions

- Undertake a systematic review and update the current plan (which expired in 2022) to develop a second NAP for AMR. This should be used as the basis for priority-setting and practical operational plans at the federal and provincial levels and should be linked to the health and food sector plans with fixed timelines and involving all relevant stakeholders.
- Promote the development of evidence-based policies and programmes in human and animal health to encourage the appropriate use of antimicrobials in hospitals and in the animal health sector and to ensure that data generated through AMR surveillance and targeted research is analyzed and disseminated to policymakers and practitioners, including between sectors to strengthen One Health collaboration.
- Review and update the list of priority pathogen/drug combinations according to WHO, WOAH, and the Food and Agriculture Organization (FAO) standards for AMR surveillance and develop standard guidelines and protocols for the management of patients with MDROs.
- Explore strategies for the enforcement of relevant laws to implement restrictions on over-the-counter sales of antibiotics under the Watch and Reserve groups in the AWaRe index for the human and animal health sectors. Develop rules and regulations on the use of antimicrobials in animals, including phasing out their use in growth promoters and monitoring their implementation.
- Incorporate AMR, the Antimicrobial Stewardship Programme practices and IPC into curricula for health and veterinary professionals, in collaboration with the Pakistan Medical Commission and Pakistan Veterinary Medical Council.
- Strengthen immunization in humans and animals and promote research on other interventions to decrease the reliance on antibiotics.
- A surveillance system for healthcare-associated infections needs to be established to provide evidence and data for advocacy and resource mobilization.

# P5. Zoonotic disease

## Introduction

Zoonotic diseases are communicable diseases caused by bacteria, viruses, parasites, and fungi which can be transmitted between animals and humans through direct contact, consumption of foods of animal origin or via vectors (e.g. ticks).

Approximately 75% of recently emerging infectious diseases affecting humans are of animal origin and approximately 60% of all human pathogens are zoonotic.

## Target

Functional multisectoral, multidisciplinary mechanisms, policies, systems, and practices are in place to minimize the transmission of zoonotic diseases from animals to the human population.

Measurables: 1) Agreement by the animal health and public health sectors on a common list of zoonotic diseases/pathogens that pose the greatest national public health concern; and 2) existence of functional capacities in the animal health and public health sectors and continued collaboration, coordination and communication between them to ensure satisfactory levels of preparedness, detection, assessment and response capacities for zoonotic diseases.

## *Level of capabilities in Pakistan*

Pakistan has identified a list of six priority zoonotic diseases: 1) anthrax; 2) brucellosis; 3) Crimean-Congo haemorrhagic fever (CCHF); 4) pathogenic influenza; 5) rabies; and 6) salmonellosis. This list has been jointly developed using a One Health approach through a process of consultation between human and animal health experts at the federal and provincial levels. However, experts from the environmental sector were not involved in the process.

One Health hubs and One Health task forces and steering committees have been notified at the federal and provincial levels across Pakistan but are currently not in operation. Upon their activation, the Ministry of National Health Services Regulations and Coordination will likely become the lead agency.

Until recently, passive surveillance and reporting has been almost entirely paper-based in the human and animal health sectors. However, in the human health sector, the DHIS, the IDSR, and the e-surveillance reporting system for communicable diseases have now been established in most districts (149/167 districts) of Pakistan. In the animal health sector, a similar e-surveillance system, the Animal Disease Reporting System, was developed in the province of Punjab in 2022 using a three-tiered mobile telephone application (Farmer App; Reporting Officer App; Vet Asst. App) which is now being used to report all suspected notifiable animal disease events to the provincial headquarters from the district level throughout the province. Livestock department in Balochistan as well had started electronic reporting which is not operational anymore because of financial constraints.

To support investigations of zoonotic and emerging diseases, personnel from the NIH, public health laboratories and Field Epidemiology and Disease Surveillance divisions have been deployed at district and community levels. In the provinces of Punjab and Sindh, disease investigation activities are being supported by the Provincial Reference Laboratories (PRLs) which now have the capacity for fully integrated surveillance and response programmes for emerging diseases. Through IDSR, surveillance of zoonotic diseases is continuously carried out in most of the district across the country and are reported on weekly basis.

Composition of the animal disease surveillance network in the animal health sector is the epidemiology unit within the Animal Husbandry Commission, the NVL for animal diseases, the NRLPD, epidemiology units at six Provincial Directorates of Livestock and Dairy Development , and 10 provincial Veterinary Diagnostic Laboratories; regional and district Veterinary Diagnostic Laboratories; and field officers deployed at district, subunits of districts (upazila) and union council levels.

Joint field epidemiology and laboratory training programme (FELTP) training of public health and veterinary officers has enhanced surveillance of brucellosis, prevention and control. An ongoing programme for the seroprevalence monitoring for influenza type A antibodies in poultry is being conducted by the National Reference Laboratory for Poultry Diseases/Pakistan Agricultural Research Council.

Some joint zoonotic disease surveillance activities have been undertaken at the federal and provincial levels to determine the prevalence of brucellosis and CCHF, and a joint human and animal health sector control programme is in place for CCHF in Balochistan.

On the human side, Integrated Disease Surveillance and Response system plays an important role in surveillance and management of zoonotic diseases across the country, operational in 149 out of 167 districts. The IDSR framework in equipped with continuous monitoring of at least 7 key zoonotic diseases; Anthrax, Influenza, Malaria, Rabies, Salmonellosis, CCHF and Brucellosis. This comprehensive surveillance covers a wide geographical area and facilitates timely detection and response to these diseases. Through the IDSR and FELTP programme, district health personnel are trained to identify and respond to the disease outbreaks.

Considerable capacity exists for undertaking research into the epidemiology of zoonotic diseases, especially on influenza A (H9N2), brucellosis and rabies. Publications include Monitoring and Research into Brucellosis, including risk analysis of transmission between infected animals and farm workers (2017, 2018, 2019); Research into epidemiology of Influenza A (H9N2) – Seroprevalence and risk factors of animal – human transmission (2019); Phylogenetics – evolution of isolates from humans and poultry (2015– 2019); Risk analysis of transmission at animal : human interface – wet markets (Chakwal, 2020); and Research into correlation between dog-bites and human cases of rabies (2004–2016).

Furthermore, the NVL and NRLPD have undertaken several continuous and ad hoc surveillance programmes for avian influenza, brucellosis, rabies and CCHF. An advisory note was circulated by NIH for CCHF prevention and control measures and information is promptly shared between the human and animal health sectors. Estimates of annual deaths caused by rabies in Pakistan (Ahmed et al. 2016) range between 2000 and 5000.

In the case of avian influenza, an active surveillance programme remains ongoing, and is collecting samples on a monthly basis from sentinel commercial poultry flocks, small-scale backyard poultry and wild bird/migratory bird localities. Laboratory diagnostic results are shared nationally (Animal Husbandry Commissioner/Chief Veterinary Officer and NIH) and internationally with the Centers for Disease Control (CDC), the FAO and the World Organisation for Animal Health (WOAH formerly OIE). A recent national survey for brucellosis (2017) found overall prevalence rates ranging between 1% in Gilgit/Baltistan and 38.75% in Punjab.

Information-sharing on all zoonotic events is not conducted regularly in all provinces between the human and animal health sectors, despite mechanisms being in place under the One Health hub. However, CCHF data, particularly in Balochistan, are shared with human animal health departments in all provinces.

## Indicators and scores

### P5.1. Surveillance of zoonotic diseases

**Score 3: Developed capacity.** Coordination of surveillance activities for listed priority emerging and endemic zoonotic diseases is formalized between the animal health, public health and environment sectors at the national level, ensuring exchange of information, joint assessment of risks and use of a One Health approach.

#### Strengths/best practices

- A gradual adoption of the One Health approach has been made through the official notification of One Health hubs and One Health Task forces and Steering Committees at the Federal and Provincial levels across Pakistan.
- In the human health sector, the adoption of best practices through compliance with the IHR (2005) and the training of personnel of the senior, mid-level and field-level community health workforce through the FELTP has strengthened the capacity to undertake disease surveillance, disease reporting, sample collection and handling.
- There are agreed lists of six priority zoonotic diseases between animal and public health at the national level.
- Established mechanisms for reporting and surveillance in all sectors are supported by logistics (government infrastructure and laboratories network) and skilled human resources across Pakistan.
- Passive surveillance for all diseases, including zoonoses, has been substantially improved through the development of web-based disease reporting systems in both the human health sector through DHIS and IDSR and the animal health sector through the Animal Disease Reporting System.
- Active surveillance for influenza A viruses (H5N1 and H9N2 strains) is being carried out by the veterinary authorities and some research is being undertaken jointly between human and animal health sectors on the epidemiology of transmission of avian influenza type A viruses. Similarly, some active surveillance has been carried out for brucellosis in dairy cattle particularly in Punjab. Joint research projects have been investigating the risk factors associated with transmission of brucellosis to animal health workers.
- Memorandum of Understandings contributing to the development of the One Health approach have been signed at the federal level between the Fleming Fund and the Ministry of National Food Security and Research MNFS&R for AMR; between the NIH and the Pakistan Agricultural Research Council for surveillance and response to zoonotic diseases; between the Pakistan Agricultural Research Council and the Eastern Mediterranean Public Health Network; and between the Pakistan Agricultural Research Council and National University of Science & Technology.
- The NVL and NRLPD are accredited by the Pakistan National Accreditation Council, ISO 9001 and ISO 17025.
- The Livestock Wing Ministry of National Food Security and Research acknowledges the activities of the One Health agenda.
- Animal health Punjab has the capacity for development of vaccines for a few zoonotic diseases such as anthrax, brucellosis and rabies for a better prevention strategy in case of an event.

### Areas that need strengthening/challenges

- So far the web-based reporting system for human health (DHIS/IDSR) is limited to selected districts and in the animal health sector the ADSR is functioning only in Punjab and needs to be expanded to each of the other provinces.
- The e-surveillance and reporting system in the animal sector should be established across the country, including at federal, district and community levels, with integration of both human and animal systems.
- Passive surveillance for brucellosis and many other zoonoses at the field level for humans is extremely weak since, in the case of brucellosis, the disease is frequently mistaken for other causes of pyrexia of unknown origin.
- Apart from avian influenza A viruses, there are no continuous active surveillance programmes for other zoonotic diseases. There is a need for senior managers in animal and human health sectors at the provincial level to develop joint surveillance and response programmes for the six identified prioritized zoonotic diseases.
- Significant gaps exist in the surveillance and reporting of zoonotic diseases by veterinary inspectors employed by local authorities on their findings of ante- and post-mortem inspection at slaughterhouses. Coordination and communication need to be strengthened between competent authorities with shared responsibilities for implementing food safety regulatory control.

## P5.2. Response to zoonotic diseases

**Score 2: Limited capacity.** Multisectoral national policy, strategy and/or plan for response to zoonotic events has been elaborated and is documented. Multisectoral contingency plans following a One Health approach have been developed for the most important endemic and epidemic zoonotic diseases.

### Strengths/best practices

- Multiple legislation and contingency plans are in place or in the process of approval for the effective response to zoonotic disease.
- Significant improvements have been made in providing appropriate responses to suspected outbreaks of avian influenza type A, rabies and anthrax.
- A joint risk assessment conducted under the One Health approach in April 2019 on rabies and influenza was shared with the Ministry of National Health Services Regulations and Coordination and public health professionals.
- Assessments for prevention and control of CCHF and mapping of slaughterhouses in selected districts of Pakistan.
- A One Health hub is working at federal and provincial levels through health departments. The One Health task force and steering committees have been notified across Pakistan.

### Areas that need strengthening/challenges

- Little progress has been made in the operationalization of One Health hubs at the provincial level through the establishment of technical working groups and by taking forward joint programmes for surveillance, prevention and control of all six prioritized zoonotic diseases. The One Health programme needs to become operationalized at the provincial and sub-provincial administrative levels across Pakistan.
- There are insufficient rules, regulations and guidelines for enforcement of compliance with legislation covering disease surveillance, prevention and control measures for priority zoonotic diseases.
- Exchange of biological isolates between human and animal departments is needed.
- Provincial zoonotic reference laboratories with linkages to the national reference laboratories in health (NIH) and animal health (National Agricultural Research Centre, NVL) need to be designated to strengthen surveillance of and response to priority zoonotic diseases.

- There is insufficient resource allocation at federal and provincial levels to planning and implementation of joint control programmes and sharing of information on priority zoonotic diseases.

## P5.3. Sanitary animal production practices

**Score 2: Limited capacity.** Some activities remain in place to develop and promote good sanitary practices in animal breeding and production of animal products, thereby limiting the risks of transmission of zoonotic diseases.

### Strengths/best practices

- In the animal health sector, there is compliance with the WOAH guidelines of the Terrestrial and Aquatic Animal Health Codes, the Manual of Terrestrial Animal Diagnostic Tests and Vaccines, the joint WHO/FAO Codex Alimentarius and the Sanitary and Phytosanitary Agreement of the World Trade Organization.
- Many activities are in place to develop and promote good sanitary practices in animal breeding and production that limit the spread of zoonotic diseases.
- Policies and legislation covering the regulation of animal health and production include the Pakistan Animal Quarantine (import and export of animals and animal products), Ordinance 1979 and Rules 1980; the National Poultry Policy, 2022 (under approval); the Punjab Animal Health Act 2019 and Rules, 2021; the Punjab Livestock Breeding Act, 2014; the Sindh Livestock Breeding Act, 2016; and the Punjab Poultry Production Act, 2016. The Balochistan & Khyber Pakhtunkhwa Animal Breeding Act is in progress, and the Pakistan Animal Health, Welfare & Public Health Bill is nearing completion at the federal level.
- The Sindh Animal Health Institute is developing bacterial vaccines to replace the prophylactic use of antimicrobials in poultry and dairy production.

### Areas that need strengthening/challenges

- There are poor standards of management and attention to good hygiene when handling milk from harvesting through transportation to the collection centre/retail outlets and processing premises.
- There is a lack of availability of guidelines for Good Animal Husbandry Practices and Good Management Practices along livestock value chains to limit the spread of zoonoses, particularly for brucellosis, CCHF and anthrax.
- Livestock keepers have insufficient awareness of good animal husbandry and animal breeding practices related specifically to the transmission of zoonotic diseases. There is a need to develop guidelines and SOPs to promote good sanitary practices in animal breeding and the production of animal products.

## Recommendations for priority actions

- The liaison between human health and animal health needs to be strengthened to alleviate public health risks. Activities should be sustainable.
- Extend and integrate e-surveillance and reporting systems (Integrated Disease Surveillance and Response system/Animal Disease Surveillance and Response system/ District Health Information System) in human and animal sectors at provincial and federal levels, utilizing the One Health approach.
- Designate provincial zoonotic disease reference laboratories and link with national reference laboratories to ensure reliability and consistency of diagnostic capabilities for human and animal health and strengthen diagnostic capacity of health workers at the field level.
- Develop operational plans at the provincial level for active surveillance and response to priority zoonoses and allocate sufficient budgets to support implementation, including for applied research related to the surveillance and control of priority zoonotic diseases.
- Strengthen capacity to undertake risk analysis, and use of risk communication to optimize the use of resources for surveillance, prevention and control of priority zoonotic diseases, and strengthen advocacy and awareness activities through the development of joint communication plans on best practices.
- Develop guidelines and standard operating procedures to promote good sanitary practices in animal breeding and production of animal products, and provide training to veterinary inspectors to record and report on ante- and post-mortem inspection findings to epidemiology units at provincial/federal levels.
- Capacity-building of the laboratory personnel handling zoonotic and emerging pathogens needs to be enhanced.
- Infrastructural improvement in accordance with international standards of biorisk and biosafety needs to be improved in core areas of zoonosis research-related laboratories and the development of laboratories.

# P6. Food safety

## Introduction

In the past, food safety was traditionally controlled and ensured through mass laboratory testing of final food products. Over the past three decades, this cumbersome system has progressively been replaced by a risk-based approach towards the identification of hazards and the adoption of risk assessment, risk communication and risk management procedures. This took place through the introduction of prerequisite and critical control point control measures to prevent the contamination of food with foodborne disease pathogens, and chemical contaminants along the animal product value chains from farm to fork.

The Hazard Analysis and Critical Control Point food safety management system is embodied in the ISO 22000/2018 accreditation for food businesses. The detection, prevention and control of foodborne diseases and contamination events relies on robust, well-coordinated and integrated human and animal health IPC management and environmental protection management systems.

## Target

A functional system is in place for the surveillance and response to foodborne diseases and food contamination risks or events with effective communication and collaboration among all the sectors responsible for food safety. The existence of functioning surveillance linked with laboratory; a national food safety emergency plan; and designated focal points for International Food Safety Authorities Network emergency and the World Organization for Animal Health are desired to achieve to facilitate timely detection and an effective response to potential food-related events in collaboration with other sectors responsible for food safety.

## *Level of capabilities in Pakistan*

A surveillance and monitoring system targeting priority foodborne diseases as well as priority hazards (chemical and microbiological) is partially in place at the federal level with the National Veterinary Laboratory (NVL) and National Reference Laboratory for Poultry Diseases (NRLPD). Identification capabilities for foodborne pathogens and a range of common chemical contaminants are available at the federal level and at provincial levels in Punjab, Sindh, Khyber Pakhtunkhwa and marginally in Balochistan.

Investigation and outbreak response teams are equipped to investigate suspected foodborne disease events and collect and transport appropriate specimens to the designated laboratories. Case definitions for commonly occurring food borne diseases are available and in use.

At present, food safety management regulatory functions along the livestock and animal product value chains are overseen by at least three separate competent authorities; the Provincial Food Authorities who hold overall responsibility for enforcing regulations to ensure the quality and safety of all foods, (licensing and inspection of food business operators); the Provincial Directorates of Livestock and Dairy Development or equivalent veterinary authorities, offering farm-level animal health services related to the prevention and control of foodborne zoonosis, with access to veterinary diagnostic laboratories and chemical analytical facilities; and local government authorities owning slaughterhouses and employing veterinarians on secondment from the Department of Livestock and Dairy Development (LADD) for ante- and post-mortem inspection of animals and meat. Additionally, commercial poultry producers and private veterinary service providers are other important stakeholders. The lack of coordination, communication and collaboration among the three competent authorities, leads to gaps and overlap in the regulatory functions along each of the major animal product value chains. The enforcement of regulations governing the sale and use of veterinary medicines, especially antimicrobials, is notably weak.

A foodborne disease event-based surveillance (EBS) system is established to detect foodborne disease organisms and chemical contamination, however an indicator-based surveillance (IBS) system for the detection of foodborne disease events has not been fully developed.

Antimicrobial resistance surveillance in the animal health sector is capable of sampling in various locations, including commercial poultry farms, in wet markets and on dairy farms in the dairy colonies as well as at abattoirs and smaller slaughter facilities. There is also capacity for the testing of micro-organisms and animal products for veterinary medicine and heavy metal residues at the NVL/NRLPD, the Sindh Animal Health Institute, and Provincial Reference Laboratories in Punjab and Sindh.

At the federal level, diagnostic laboratories are well-equipped for identifying foodborne pathogens and contaminants. There is an upgraded testing facility for foodborne diseases and chemical contaminants in the nutrition division at the NIH, and the NVL and NRLPD laboratories in Islamabad. At the provincial level, some laboratories possess microbiological capacity but lack the necessary analytical instruments for identifying and quantifying foodborne contaminants due to budgetary constraints. In addition, mobile laboratories are deployed by Provincial Food Authorities in Punjab and Khyber Pakhtunkhwa.

There is no effective formal mechanism for rapid information exchange between stakeholders during suspected foodborne disease outbreaks, and no effective system is in place to respond effectively to foodborne disease emergencies. While infectious disease surveillance and reporting, as well as provincial disease surveillance and reporting systems, provide effective mechanisms for rapid exchange of information during suspected foodborne disease events, formal coordination mechanisms between the Health Department and the provincial food authorities are lacking.

Legislative instruments, including acts and bylaws covering food safety, are developed at the central and provincial levels, and food safety standards are becoming harmonized gradually throughout Pakistan. In some cases, there are overlaps and errors within the legislation, particularly in the Punjab Pure Food Rules (2018) which require reviews and revisions before being replicated in other provinces.

In general, the capabilities for detection of, and early response to, foodborne disease incidents are significantly higher in Islamabad and in the provinces of Punjab and Sindh, where field-level service providers are better trained and equipped and have wider coverage where centres of excellence for laboratory diagnostics exist, where intersectoral coordination is better developed, and where vertical coordination of the chain of command from provincial headquarters down to the field level has been strengthened in both the human and animal health sectors, especially in the area of disease surveillance of foodborne pathogens and reporting and especially in the Punjab. Good coordination exists between the public health and veterinary authorities in Balochistan for the prevention and control of CCHF in animals and humans.

Pakistan Standards (harmonized) have been adopted and notified by all Provincial Food Authorities for a uniform set of standards and regulations across the country. However, Pakistan Standards are framed on the basis of the Punjab Pure Food Regulations, 2018, as a benchmark. It is therefore, necessary to provide explicit input regarding the overlaps and errors within the legislation which need to be reviewed and revised. It is important to note that the standards undergo continuous revisions, whenever necessary.

## Indicators and scores

### P6.1. Surveillance of foodborne diseases and contamination

**Score 2: Limited capacity.** The country has an IBS or EBS and monitoring systems in place to monitor and detect foodborne events (outbreak or contamination). The IBS system currently remains non-functional.

#### Strengths/best practices

- FELTP training has enhanced capacity of inspection and vigilance teams present in Punjab and Khyber Pakhtunkhwa.
- In line with their mandate, professional teams are working in all provinces to ensure food safety and to meet quality standards throughout the food chain, through establishment of provincial food authorities in all provinces which will implement the legislation by enacting and enforcing rules – primarily targeting the processing, packaging and labelling stages of preparation of food products, distribution and retail sale.
- Event-based monitoring system is in place to detect foodborne contamination.
- Response teams are trained to collect and transport appropriate specimens to the laboratory.
- There are upgraded laboratory facilities at the NIH for diagnosis of foodborne organisms and contaminants.
- Good diagnostic and analytical capacity exist at the NVL and NPRDL for identification and characterization of foodborne pathogens and detection of chemical residues.
- A draft National Animal Health and Veterinary Public Health Bill, which is nearing completion, makes provision for the establishment of subcommittees under a Veterinary Technical Committee, each with responsibility for the formulation of national standards for food safety and the regulation of veterinary medicines to be adopted by all provincial veterinary authorities. Once enacted, these provisions will strengthen the regulatory framework for the control of food safety of animal products and the prudent use of antimicrobials and other veterinary medicines.

#### Areas that need strengthening/challenges

- Basic food safety knowledge is missing from curricula at primary and secondary education levels and training institutes.
- There is incomplete coverage of FELTP trained personnel across all areas of Pakistan. Training at all levels needs to be extended to other provinces and districts
- There is an insufficient number of capacitated personnel at all levels of administration to manage human and animal disease surveillance, particularly for foodborne disease detection, forwarding of diagnostic samples to reference laboratories, and laboratory diagnosis and sharing/analysis of health records.
- Effective ante- and post-mortem inspection of animals and meat, and reporting of zoonotic pathogens detected in meat, are lacking.
- There is poor understanding of the prevalence and incidence of foodborne zoonotic pathogens.
- Health-care and food safety inspectors lack sufficient training in detection of foodborne diseases.
- Event-based surveillance and indicator-based surveillance need to be strengthened through training of all field-level personnel involved in implementation of food safety regulatory functions.
- Inconsistencies and inaccuracies are present in some legislation relating to food safety standards.
- Coordination and communication are lacking between competent authorities with shared responsibility for the management of food safety regulatory controls along each of the animal product value chains.
- There is a lack of integrated information management systems for recording, analyzing and sharing information on foodborne disease events at national and provincial levels.

### P6.2. Response and management of food safety emergencies

**Score 1: No capacity.** No or limited response and management of food safety emergency mechanism in place.

#### Strengths/best practices

- National food safety regulatory standards are based on international standards (Codex Alimentarius/WOAH). The Punjab Pure Food Rules (2018) provide detailed standards for the quality and safety of all foods based on *Codex Alimentarius* standards.

#### Areas that need strengthening/challenges

- There is an insufficient number of certified/accredited laboratories, including reference laboratories, for the detection of foodborne pathogens, drug and chemical residues and AMR at the provincial level and lower levels of administration.
- There is a lack of clarity regarding the roles and responsibilities of regulatory officers (from farm to fork) and overlapping rules govern food safety regulatory functions along the food value chains.
- The mechanism for the implementation of effective responses to foodborne emergencies is uncoordinated.
- There is insufficient availability of laboratory technology for the detection of drug and chemical residues, toxins, heavy metals and adulterants.
- Overlaps, gaps and inconsistencies are found among legislative and regulatory instruments for the regulation of food safety.
- There is no intersectoral coordination mechanism for the implementation of an effective response to foodborne emergencies
- There is no intersectoral coordination mechanism for the implementation of an effective response to foodborne emergencies

#### Recommendations for priority actions

- Finalize National Food Safety Policy, National Healthy Diet Policy and National Nutritional Policy, and develop Good Animal Husbandry Practice/Good Management Practice guidelines and standard operating procedures and establish Food Courts to take appropriate and timely legal action for non-compliance of standards and rules in the area of food safety.
- Introduce food safety within the curricula of educational and training institutes, extend coverage of FELTP to all districts including veterinary inspectors and implement needs-based training programmes for food safety actors at all levels of health and food systems to ensure desired levels of competency.
- Extend surveillance capacity and strengthen provincial and district laboratories to identify pathogens and chemical contaminants linked to the investigation of cases and outbreaks of food borne illness events and establish real-time information exchange and regular formal coordination and communication meetings between the competent authorities with shared responsibilities.
- Strengthen documentation of detection, reporting and recording of foodborne diseases/contaminant events to inform a risk analysis and thus the planning of risk-based surveillance and control programmes and introduce risk analysis and risk- based management system based on Hazard Analysis and Critical Control Point/ISO 22000 for surveillance and control of food hazards along animal product value chains.
- Establish capacities for managing food safety emergencies through the utilization of the One Health approach.

# P7. Biosafety and biosecurity

## Introduction

When working with pathogens and toxins in the laboratory for diagnostic purposes or the development of medical countermeasures, it is fundamental to have biosafety and biosecurity measures to protect the workforce and the wider community against unintentional exposures or releases of pathogens and toxins. These activities are implemented by means of a risk assessment framework and through the development of a safety culture which ensures a safe workplace where adequate measures are applied to minimize the likelihood and severity of any potential exposure to pathogens and toxins. Biosafety and biosecurity awareness and expertise have been improving and new technologies have also been advancing to enhance the level of biosafety and biosecurity in laboratories and other research and institutions involved in possessing and handling pathogens and toxins.

Biosafety and biosecurity are assessed by the monitoring and evaluation framework of the IHR. This indicates that safe and secure operations are essential for the prevention, preparedness and response to acute public health threats. This includes sustainable developments in biosafety and biosecurity, including a national oversight system, training, best working practices and a risk assessment framework to promote a responsible safety culture that builds country capacity and complies with the IHR.

## Target

A whole-of-government multisectoral national biosafety and biosecurity system with high-consequence biological agents that are identified, held, secured and monitored in a minimal number of facilities according to best practices, biological risk management training and educational outreach conducted to promote a shared culture of responsibility, reduce dual-use risks, mitigate biological proliferation and deliberate use threats, and ensure safe transfer of biological agents. Country-specific biosafety and biosecurity legislation, laboratory licensing and pathogen control measures should be in place as appropriate. Implementation of a comprehensive, sustainable and legally embedded national oversight programme for biosafety and biosecurity is needed, with trained personnel and a monitoring system.

## *Level of capabilities in Pakistan*

High-consequence agents have been identified for bacterial and viral pathogens and toxins in the national control list issued by the Ministry of Foreign Affairs. However, the list needs to be reviewed and approved by the National Laboratory Working Group (NLWG). The list also includes goods, technologies, material and equipment. There is no systematic inventory of biohazards, although a patchy network exists of public health and/or veterinary laboratories that could maintain and control biohazard materials. An inventory of over 7000 laboratories/containment facilities for storage of poliovirus/infectious materials has been developed under the Polio Eradication Initiative (PEI).

Pakistan is a signatory of the Biological Weapons Convention. A national biosafety and biosecurity policy has been developed and endorsed in line with the Biological Weapons Convention requirement. National biosafety rules and guidelines 2005 are available and partially implemented. Legislation for biosafety is in place, although the legislation for the animal sector is more advanced as it also covers biosecurity. The policy and guidelines are comprehensive and, in accordance with guidelines, licenses or regulatory authorization for national and provincial public health reference laboratories, laboratories in academia, the private sector and research institutes are required to possess certain high-consequence agents. License conditions and safety and security requirements are available as part of the health

care commission's guidelines. These include several requirements such as those for human resources, equipment maintenance, waste management, and infection prevention and control. Compliance with licensing requirements is monitored through inspections conducted by federal and provincial health-care commissions/authorities. Biosecurity oversight of dual-use research and a code of conduct for Life Scientist has been developed with assistance from the Ministry of Foreign Affairs. These are not part of the policy and guidelines, but the Institutional Review Boards are responsible for review and oversight of dual-research projects.

There are several structures in place to monitor biosecurity and biosafety activities. These include federal and provincial health-care commissions, the National Biosafety Committee and institutional biosafety committees. Biosafety and biosecurity assessments utilizing a third party have taken place in the country for the Regional Reference Laboratory for Polio. This assessment was conducted by WHO in 2022, as well as for the microbiology laboratory in the NIH, the National Veterinary Laboratory, and the National Reference Laboratory for Poultry Diseases as part of ISO 15189. Reports are usually generated from these assessments for the actions to strengthen the biosafety and biosecurity in these facilities.

Laboratory licensing and pathogen control measures, including requirements for physical containment and operational practices, and containment and failure reporting systems are partially implemented in few facilities. These measures involve engineering, and administrative controls were observed in some laboratories to minimize potential inappropriate removal or release of biological agents (such as by theft, earthquake, flood). Policies and procedures are in place in most of the laboratories to manage/control access to sensitive information such as an inventory of agents and toxins. Standard operating procedures and trained staff are available for safe and secure transport of culture, specimens, samples and other contaminated materials of most priority diseases. However, implementation needs further strengthening. National legislation for the transportation of dangerous goods, including infectious substances, is also in place, and a mechanism to determine which personnel are authorized to access high-consequence agents is available and is supported by standard operating procedures.

Biosafety and biosecurity practices are not fully implemented at facilities housing or working with high-consequence agents. Site-specific biosafety and biosecurity management programmes are partially available as part of an ongoing Laboratory Quality Management System at the National Reference Laboratory handling high consequence pathogens but these do not include incident response and emergency plans; no dedicated biosafety and biosecurity personnel available, however, laboratory scientists are designated to perform additional duties on biosafety and biosecurity; biosafety and biosecurity risks have only been assessed for polio; government and institutional policies are applied for personnel management only but does not cover suitability and competency of personnel; a system is in place that conduct audits of laboratory facilities. Thirty-six laboratories are ISO 15189 certified in Pakistan, which are periodically audited by PNAC, and internal audits are regularly conducted by the safety officer. All other licensed laboratories including the polio, measles, rotavirus, and Influenza laboratories of the NIH (licensed by WHO) and NVL, NRLPD of National Agricultural Research Centre (licensed by FAO/WOAH) are also periodically inspected and audited by health-care commissions/authorities and best practices for biosafety and biosecurity are recommended through internal and external audits.

High-consequence agents are consolidated into a minimum number of facilities. These include the National Reference Laboratory/NIH (1), provincial public health reference laboratories (4), DESTO (1) in the public sector and a few laboratories in the private sector (Aga Khan University Hospital, Shaukat Khanum Cancer Hospital, Shifa International Hospital). Collections of high-consequence agents been consolidated in selective laboratories in the public and private sectors. Laboratories are utilizing molecular-based diagnostics without the need for culturing high- consequence agents.

Implementing oversight and enforcement mechanisms are in place and are regularly conducted by the health-care commissions/authorities with attribution for biosafety and biosecurity. Funding for monitoring and oversight-related activities, for procurement of equipment and establishment of new facilities, is made available but is not sustainable.

The EPA is responsible for the national policy development and implementation oversight for waste management at the national level, while facilities are responsible for waste management, with availability of guidelines and standard operating procedures. However, there is a limited but varied level of implementation of these standards.

Biological safety cabinets be serviced locally. Standard operating procedures and trained staff are available for safe and secure transport of culture, specimens, samples and other contaminated materials for most priority diseases. No national regulations are in place for the transport of infectious substances (categories A and B) but WHO and International Air Transport Association rules are applied for transport of infectious substances. Specialized infectious substance shipment training (ISST) has been conducted although not regularly.

Pre-exposure prophylaxis and vaccination guidelines are available in the national laboratory policy and relevant medical countermeasures are practiced for laboratory personnel for hepatitis B and other relevant diseases. Post-exposure prophylaxis treatment is provided to laboratory workers in the majority public sector and some private sector facilities

There is no national framework to document, report, investigate and address any incidents and accidents; however, documentation, reporting, and investigation to address any incidents and accidents is being implemented at the institutions and facilities at national and subnational levels.

Pakistan does not have training programmes for biosafety and biosecurity, but training activities have been conducted by the NIH and National Agricultural Research Centre in collaboration with the Pakistan Biological Safety Association (PBSA) and partners. Moreover, biosafety is included as an important component of curriculum at graduation and post-graduation level in several disciplines by the Higher Education Commission. Sustained academic training programmes at institutional level and in academic institutes are not in place. However, the Pakistan Biological Safety Association provides such a platform, including training material and exercises, and has the requisite expertise to support such a national initiative. Funding and capacity for biosafety and biosecurity training is in place but is not sustained.

Biosafety and biosecurity training has not been provided to staff at all facilities but is based on requests and as part of different projects and workplans implemented at the federal and provincial levels. This includes orientation sessions but not induction and refresher training. No formal in-service training monitoring system is in place to monitor staff competence and standards of training at all laboratories.

Testing or exercising of biosafety and biosecurity procedures are conducted. However, they are request-based and not a regular feature of laboratory operations. Further, a system for monitoring and assessment of such exercises is lacking. However, some of the accredited institutions carry out monitoring and assessment as part of the accreditation process and desk reviews and corrective actions take place on the basis of the findings.

## Indicators and scores

### P7.1. Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities

**Score 2: Limited capacity.** Pakistan has a comprehensive biosafety and biosecurity framework that includes policies, rules, guidelines and training manuals. Basic methods are in place for the safe handling, decontamination and disposal of infectious waste. The country has a priority disease list with human and animal sections; however, the approved list of high-consequence agents both for human and veterinary sectors needs finalization. There is need for continuous monitoring and evaluation of high-containment laboratories and adoption of a risk-based approach in the laboratories, academia and research institutes. The current Act addresses biosecurity only while Punjab has an Act that addresses biosafety and biosecurity for the animal sector.

### Strengths/best practices

- National biosafety rules were notified in 2005 and national laboratory and biosafety and biosecurity policies were developed in 2017.
- Dedicated personnel are appointed in some laboratories to ensure implementation of biosafety standards.
- A specimen referral system is in place at district and provincial levels, and reference laboratories remain available for some priority diseases. Safe transportation of potentially dangerous pathogens is conducted under special precautionary conditions according to the National Laboratory Biosafety and Biosecurity policy 2017; Collection, usage, storage and export of human biological materials, 2020; and the National TB control guidelines and WHO guidelines
- The list of operational BSL-3 laboratories in both the public and private sectors is shared with the Biological Weapons Convention as part of Confidence Building Measures vii. There are around 280 accredited laboratories (3 JCI, 33 ISO 15189 in human health, 239 food/agriculture/pharmaceutical) to ensure implementation of biosafety and biosecurity practices.
- The country has several successful examples such as the European Union chemical, biological, radiological and nuclear projects being implemented since 2017 with multisectoral engagement. WHO and International Air Transport Association rules are applied to the transport of infectious substances with the last set of training courses conducted in 2018. The poliovirus containment programme has established a laboratory database.

### Areas that need strengthening/challenges

- The biosafety rules do not include a biosecurity component.
- A mechanism for regular monitoring and surveillance of high-risk pathogens at facility levels is lacking.
- The list of high-consequence agents for both human and veterinary sectors has been discussed but is not yet finalized.
- A national database and inventory of laboratories based on containment levels has not been developed.
- Efforts have been made to promote a culture of biorisk management (BRM) at facility level but this needs further strengthening.
- Continuous monitoring and evaluation of high-containment laboratories and the adoption of a risk-based approach at the laboratories – including those in academia, research institutes and animal production facilities – is not in place.

## P7.2. Biosafety and biosecurity training and practices in all relevant sectors (including human, animal and agriculture)

**Score 2: Limited capacity.** A training needs assessment has been conducted by the Pakistan Biological Safety Association in collaboration with the NIH, academia and other stakeholders – including human, animal and agriculture sectors. Training sessions and workshops are conducted with the support of several partners. Pakistan has a high number of International Federation of Biosafety Associations (IFBA) certified trainers. Biosafety is also included as an important component of the curriculum in universities by the Higher Education Commission in several disciplines. A comprehensive training programme still to be established and informed by risk assessment.

### Strengths/best practices

- Biosafety is also included as an important component of the curriculum in universities; people in charge of safety protocols related to biological materials are trained at educational and international organizations.
- Multiple cascade trainings/workshops including simulation exercises have been conducted through engagement with the public sector and nongovernmental organizations (NGOs) such as the Pakistan Biological Safety Association.

### Areas that need strengthening/challenges

- There is a lack of regular assessments and the development of need-based training plans.

## Recommendations for priority actions

- Expand the national strategic action plan for biosafety to include biosecurity in all sectors.
- Develop an inventory of dangerous pathogen and facilities in all sectors.
- Develop control measures informed by regular risk assessments and implement methods for the safe handling and disposal of wastes.
- Develop a training programme with and for facilities that work with high-consequence agents.
- Implement the national laboratory biosafety and biosecurity policy.
- Finalize the list of high-consequence pathogens.
- Conduct monitoring and evaluation of all laboratories, including high-containment laboratories.
- Develop a sustainable programme for training, along with implementation.

# P8. Immunization

## Introduction

Immunization remains a leading success story in global health and development, saving millions of lives annually. It is considered a key pillar of primary health care (PHC) and one of the best health investments over the last decade. It is estimated that at least 3.5 million deaths from VPDs are prevented annually due to immunization. In addition to the crucial role that vaccines play in eradicating, eliminating and controlling different infectious diseases, they contribute significantly to global health security.

## Target

A national vaccine delivery system – with nationwide reach, effective distribution, easy access for marginalized populations, adequate cold chain and ongoing quality control – that is able to respond to new disease threats. Measles immunization is emphasized in this section because it is widely recognized as a proxy indicator for overall immunization against VPDs.

## *Level of capabilities in Pakistan*

As noted in the Pakistan demographic health survey, fully immunized child coverage increased from 54% (Pakistan Demographic Health Survey 2012–2013) to 66% (Pakistan Demographic Health Survey 2017–2018), and the Third-Party Verification Immunization Coverage Survey (TPVICS 2020) recorded FIC at 76% and 77% (TPVICS 2022). The EPI currently provides 13 vaccines at no cost to children under two years of age in Pakistan against the VPDs (childhood tuberculosis, rotavirus diarrhoea, diphtheria, hepatitis B, measles, meningitis, pertussis [whooping cough], pneumonia, polio, tetanus, rubella, hemophilic influenza-B virus infections and typhoid). From June 2022, the EPI shifted from the development budget to the recurrent budget. The target rates for coverage are to reach more than 90% coverage with all vaccines in the national programme. The province of Sindh is also in the process of approving an Immunization Act.

The country's national vaccine action plan is aligned with the WHO Global Vaccine Action Plan, but does not consider zoonotic diseases of national concern. The immunization is voluntary in the country; Khyber Pakhtunkhwa has passed an Immunization Act in 2017; however, it is yet to be implemented. Ultra Cold Chain equipment has been installed in megacities of all provinces to store vaccines requiring storage at further low temperatures. Under the pooled procurement mechanism, the provincial EPI programmes transfer their funds to the federal government and the Federal Directorate of Immunization (FDI) procures vaccines and logistics through local vendors and UNICEF on behalf of the provinces.

Different programmes and/or incentives are in place to encourage and support routine vaccination – including awareness, advocacy, communication and social mobilization interventions involving local communities, local influencers and religious leaders. Other prominent groups provide continuous encouragement and support to immunization. Enhanced outreach vaccination incentivizes frontline workers with operational support, 24/7 labour room vaccination ensures vaccination services round the clock in the vicinity of the birthplace. Evening shift vaccination and birth dose initiatives are also recent interventions to encourage vaccination.

Challenges faced by routine immunization (RI) are mainly due to misinformation, propaganda, religious beliefs, political instability, illiteracy, security, difficult geographical terrains, cultural barriers, and adverse events following immunization.

The Federal Directorate of Immunization and provincial EPIs – supported by WHO, UNICEF, PHC Global, Jhpiego, JSI and local CSOs – are involved in monitoring vaccine coverage for the country. The Pakistan

Bureau of Statistics – National Consensus 2017 is the source of the data used as denominator in coverage estimates for vaccination.

Supportive supervision activities, comprehensive EPI reviews (field activity) and data quality self-assessments, intra-campaign monitoring, post-campaign surveys and third-party survey monthly district reviews, quarterly provincial reviews and bi-annual national reviews are conducted to monitor progress and use the data for decision-making. The errors in data are discussed and training is conducted to improve the understanding of the staff while recording data on coverage.

Despite overall progress, wide disparities in vaccination coverage exist among provinces. For instance, FIC coverage reached 89% in Punjab in 2020–2021, achieving the disbursement linked indicators target set for year 3 by the National Immunization Support Project, whereas FIC is estimated at only 37% in Balochistan. Meanwhile, approximately 61% of eligible children in Sindh and 68% in Khyber Pakhtunkhwa were fully immunized against their provincial targets. In the federal regions, FIC coverage reached 89% in Azad Jammu and Kashmir, followed by 73% in Gilgit-Baltistan, 71% in Islamabad, and 43% in Khyber Pakhtunkhwa Newly Merged Districts/federally administered tribal areas (TPVICS, 2021).

Disparities in vaccination coverage also exist among districts within the same province. For instance, ≥ 80% coverage of Penta 3 immunization among children aged 12–23 months was reported in all districts in Punjab, compared to only 40% in Khyber Pakhtunkhwa districts, 24% in Sindh, and 6% in Balochistan (TPVICS 2021).

Immunization coverage in urban settings, particularly in mega-cities, is among the key challenges faced by the EPI. Coverage assessment in 10 urban cities indicate that FIC among children 12–23 months was lower in urban cities compared to the national coverage rate of 77% and ranged between 45.6% (in Quetta) to 97.1% (in Multan) (TPVICS 2021).

Despite intensified efforts to enhance the supply side of vaccines, the demand side is still suffering from several hindering factors – including misinformation, religious beliefs, security, difficult geographical terrain, cultural factors, and adverse events following immunization. The EPI exerted efforts to increase vaccine demand through awareness, advocacy, communication and social mobilization interventions involving local communities, local influencers, religious leaders, and other prominent groups and figures. Vaccination coverage has notably improved over the last few years and FIC at national level increased from 54% in 2012–2013 to 66% in the Pakistan Demographic Health Survey 2017–2018 to 76% in 2020 (TPVICS 2020), and 77% in TPVICS-2022. There is a need to strengthen VPD surveillance, monitoring and evaluation for routine immunization at all levels. EPI sites require refurbishment and rebranding with deployment of adequate human resources.

Vaccine acceptance varies between provinces: while refusals are not a major issue in Punjab, they are considered a major challenge in Khyber Pakhtunkhwa and Balochistan. Enhanced outreach vaccination provides the frontline workers with additional incentives and operational support; however, dependance on outreach and mobile teams versus fixed sites is a key sustainability issue over the long run. As an example, the administrative data from Sindh for 2022 showed that 79.5% out of 89% of the coverage depends primarily on outreach and mobile teams, and 10% on fixed sites.

The build capacity of fixed sites to deliver vaccination services through the establishment of vaccination facilities in union councils without EPI centres and operationalizing facilities with low performance, enabling them to offer 24/7 vaccination services (in maternity centres) or evening shift vaccination (especially in urban settings) and refurbishing and rebranding the EPI sites, with a focus on maintaining the cold chain infrastructure.

Provide support towards monitoring and evaluation for routine immunization activities at all levels and use the data for improvement of vaccination coverage. Disseminate and implement plans for mass vaccination response to outbreaks of VPDs.

Challenges faced by routine immunization are mainly due to misinformation, propaganda, religious beliefs, political instability, illiteracy, security, difficult geographical terrains, cultural barriers and adverse events following immunization.

For immunization supply chain systems (iSC), the EPI maintains a well-functioning system at all levels. All walk-in cold rooms/freezer rooms are equipped with a web-based central temperature monitoring system, and their capacity is also integrated in the Vaccine Logistics Management Information System, along with vaccines per dose volumes for all routine immunization and campaigns with provision of making shipment plans of vaccines according to available capacity and to avoid overstocking of vaccines.

A rigorous vaccine delivery system from the national level to the provinces is in place. The EPI Pakistan has completed the implementation of Cold Chain Equipment Optimization platform (CCEO) to ensure the adequate storage requirement for routine immunization, polio and COVID-19 vaccines. Punjab is already doing SIAs for routine immunization, polio and COVID-19 vaccination campaigns. Moreover, all health facilities are provided with passive cold chain equipment for the transportation of vaccines from district stores for vaccine administration during fixed and outreach sessions.

The FDI has refrigerated trucks for the transportation of vaccines from airport to the federal warehouse. In addition, FDI has a stringent system to deliver vaccines to the provinces by air (to Balochistan, Sindh and Gilgit-Baltistan) and by road to Punjab, Khyber Pakhtunkhwa, Azad Jammu and Kashmir, and Islamabad. The COVID-19 vaccine supply chain is also the responsibility of the FDI so 15 ultra-cold chain equipment has also been installed at the federal store to manage the storage and supply of COVID-19 vaccines requiring ultra-temperature for storage.

A pool procurement system has been established for traditional vaccines (BCG, OPV and Td vaccines bundle), and Gavi co-financing vaccines (pentavalent, pneumococcal conjugate vaccine 13, typhoid conjugate vaccine, measles-rubella, and rotavirus and IPV vaccine which is provided free of cost by Gavi. Provincial EPI programmes transfer their funds to the FDI who procure vaccines and logistics through local vendors and UNICEF on behalf of provinces. The traditional vaccines are procured 100% through government of Pakistan funds; however, Gavi vaccines are procured as country co-financing share as per Gavi vaccine policy. Currently Pakistan has entered the transition phase for Gavi vaccines and expected to be graduated from Gavi support in 2031.

A proper mechanism is established for the forecasting and procurement of vaccines and logistics based on the target population agreed with the provinces. Other parameters such as opening and closing balances of vaccines up to district levels, wastage multiplying factors of vaccines as per national EPI policy, and dropout rates from first dose to last dose are also considered for the forecasting of vaccines. The Gavi vaccines are procured on the basis of their decision letter as country co-financing share.

The FDI has developed a coordination system with DRAP to follow the regulatory rules and regulations for import of vaccine through UNICEF. The vaccine is supplied to the provinces in accordance with the agreed targets, and 25% buffer stock is also provided. The country has been fulfilling its Gavi co-financing share for the past 5–6 years and is procuring vaccines in line with the targets of provincial EPI programmes; almost zero stock-outs were reported in the last 5 years.

The sustainable supply is ensured by prior vaccine forecasting based on target population, its inclusion in UNICEF's SD demand plan, good coordination with relevant quarters, such as DRAP for approvals, and a timely vaccine shortage alert system. Hepatitis B birth dose for institutional deliveries is provided in Punjab only in the public sector.

In Punjab, the capacity of fixed sites to deliver vaccination services should be strengthened. Establishment of vaccination facilities should be established in union councils without EPI centres and facilities with low performance should be operationalized. EPI sites should be refurbished and rebranded with a focus on maintaining the cold chain infrastructure.

All parameters are considered for supplying the vaccines like target population annual births (for BCG and OPV), surviving infants (for Penta, PCV, IPV, TCV, MR and Rota vaccines), pregnant women (for TD vaccines) and wastage multiplying factors. In addition, the EPI-MIS, the Vaccine Logistics Management Information System and Electronic Immunization Registry (e.g. Sindh Electronic Immunization Registry, or SEIR) are in place for monitoring utilization of vaccines to ensure adequate supplies at all levels, including the population with higher zero-dose children and underserved and marginalized populations.

The cost of immunization delivery – such as service delivery, human resources, cold chain, surveillance, communication, monitoring, data management and reporting – is incurred by the Government of Pakistan. However, various donors occasionally support the service delivery, human resources, communication and vaccine transport such as cold chain equipment optimization plan, vaccinators and data operators' engagement, as provided for COVID-19 vaccination.

The national regulatory authority for pharmaceutical products has a policy for fast-track approval for new pharmaceutical products. DRAP has policy for the approval of experimental vaccines in epidemics of novel pathogens for those vaccines which have Emergency Use Listing from stringent regulatory authorities.

Pakistan has introduced four new vaccines (TCV, IPV, MR and Rota) in last 5 years. The hindrance in introducing future vaccines such as HPV is due to cultural norms in the community due the specific age group, insufficient epidemiological evidence, lack of cost-benefit analysis and paucity of funds.

Introduce innovative solutions and develop digital platforms for VPD surveillance

There are 12 VPDs in Punjab. The EPI in Punjab shifted to a recurrent budget in 2021 in comparison to the FDI programme which shifted in 2022. There are enhanced and integrated outreach activities in Punjab in comparison to other provinces that focus only on enhancing activities.

## Indicators and scores

### P8.1. Vaccine coverage (measles) as part of the national programme

**Score 2: Developed capacity.** Approximately 70–89% of the country's 12-month-old population has received at least one dose of measles-containing vaccine, as demonstrated by coverage surveys/ administrative data. A plan is in place to achieve 95% coverage within the next three years.

#### Strengths/best practices

- Vaccination coverage has notably improved over the last few years and FIC at national level increased from 54% in 2017–2018 to 66% in 2020 and 77% in 2022.
- A well-articulated and responsive policy formulation is in place (Policy 2022), and the comprehensive multi-year plan 2020–2024 is in alignment with Pakistan's National Health Vision 2025 and Immunization Agenda 2030. More domestic financial resources have been allocated for immunization, reflecting stronger political commitment.
- Donor support for priority areas is strong, timely and well-targeted.

#### Areas that need strengthening/challenges

- Vaccine coverage varies significantly across provinces where some provinces achieving higher rates (FIC in Punjab reported at 89%) while others lag behind (Balochistan stands at just 37%). Persistent coverage nationwide wil ensure equitable health outcomes.
- Strengthened demand creation is needed in low-coverage areas.
- Infrastructure is lacking in some union councils without EPI centers.
- There is a tendency for vaccination to be given in outreach and mobile teams rather than at fixed sites.

## P8.2. National vaccine access and delivery

**Score 4: Demonstrated capacity.** Vaccine delivery (maintaining cold chain) is available in 60–79% of districts within the country or vaccine delivery (maintaining cold chain) is available for 60–79% of the target population in the country. Functional vaccine procurement and forecasting take account of global stocks, lead to no stock-outs at the national level and rare stock-outs at the district level that are within their control.

### Strengths/best practices

- The iSC was established and well-functioning at national, provincial, district and health facilities.
- The EPI in Pakistan has completed the implementation of CCEO to ensure adequate storage requirements for routine immunization, polio and COVID-19 vaccines.
- Central, provincial and district levels have well-equipped vaccine storage warehouses with sufficient capacity for all routine and campaign vaccines equipped with web-based central temperature monitoring systems and are integrated in the Vaccine Logistics Management Information System.
- A pool procurement system has been adopted for traditional vaccines and Gavi co-financing vaccines.
- Wastage of vaccines is low.

### Areas that need strengthening/challenges

- Weak monitoring and evaluation for routine immunization at all levels.
- EPI sites require refurbishment and rebranding.
- The cold chain infrastructure should be strengthened at certain levels, particularly those not provided with refrigerated trucks for the transportation of vaccines.
- Full implementation and efficient maintenance of the Vaccine Logistics Management Information System and effective vaccine management systems are needed across the country.
- Practical integration of immunization within Essential Package of Health Services (EPHS) is lacking.
- The birth dose vaccination initiative should be enhanced and consolidated in public and private health facilities.

## P8.3. Mass vaccination for epidemics of VPDs

**Score 3: Developed capacity.** National plan for mass vaccination response to outbreaks of VPDs, including national guidelines for regulatory approval and acquisition of new and experimental vaccines, and relevant SOPS are disseminated and implemented at the national level.

### Strengths/best practices

- The well-functioning DRAP provides regulatory approvals based on stringent regulatory authorities or the WHO Emergency Use Listing procedure and has a policy for fast-track approval of new pharmaceutical products, including vaccines.
- The EPI has developed and disseminated mass vaccination policies, plans and guidelines for different mass vaccination responses at all levels.
- The polio eradication programme assets regarding human capacities and systems are a major strength for successful mass vaccination campaigns, as well as routine immunization through EPI/PEI synergy.

### Areas that need strengthening/challenges

- Ensure better utilization of PEI programme capacities, systems and lessons learned for other mass vaccination activities.
- Strengthen the adverse events following immunization reporting system to ensure the safety of vaccine products and their safe administration.
- Utilize mass vaccination activities as an effective mechanism to improve routine immunization.

## Recommendations for priority actions

- Improve immunization coverage by enhancing demand creation and implementing risk communication strategies with a particular focus on provinces and districts with low coverage, as well as in urban slums/rural/desert areas of provinces to address barriers to immunization among vulnerable groups.
- Establish a system of continuous training program for health-care workers on vaccination strategies, cold chain management and RCCE to address vaccine hesitancy.
- Integrate immunization within the essential package of health services and ensure data quality at all levels.
- Build capacity of fixed sites to deliver vaccination services through the establishment of vaccination facilities in union councils without EPI centers and operationalize facilities with low performance and refurbish and rebrand the EPI sites, with a focus on maintaining the cold chain infrastructure.
- Provide support towards monitoring and evaluation for routine immunization activities at all levels and disseminate and implement plans for mass vaccination response to outbreaks of VPDs
- Consolidate EPI/PEI synergy at all levels to develop a more integrated model of vaccine delivery and efficient utilization of resources and build technical and logistical capacity of human resources for timely resource mobilization and effective response to enable them in multitasking during emergency situations.

# Detect

# D1. National laboratory system

## Introduction

The national laboratory system is essential for disease and outbreak detection, emergency response, environmental monitoring, and disease surveillance. Public health laboratories serve the national system through core functions in multiple areas. These include human, animal and food safety; disease prevention, control and surveillance; integrated data management; reference and specialized testing; laboratory oversight; emergency response; public health research; training and education; and partnerships and communication.

The public health laboratories play a crucial role in protecting and promoting the health of populations. Disease surveillance, diagnostic testing, emergency response, environmental health monitoring, research and training cannot be done without the public health laboratories. Their infrastructure is critical for detecting and responding to public health threats, supporting evidence-based decision-making, and safeguarding the health of communities.

## Target

Surveillance with a national laboratory system, including all relevant sectors, particularly human and animal health, and effective modern point-of-care and laboratory-based diagnostics. A nationwide laboratory system able to support diagnostic testing on appropriately identified and collected specimens transported safely and securely to accredited laboratories from at least 80% of intermediate levels/districts in the country, and the availability of national quality laboratory standards and system for licensing laboratories.

## *Level of capabilities in Pakistan*

The capacity of the national laboratory network in Pakistan has been strengthened to enable testing for all endemic diseases, and most of the country's priority diseases. The National Laboratory Working Group was established to coordinate the work related to laboratories. The National Laboratory Policy developed in 2017, the National Laboratory Quality Standards, the National Strategic Framework for Containment of AMR, Good Clinical Laboratory Practices developed in 2019, National Genomic Surveillance Strategy for Priority Pathogens developed in 2023 and the National Veterinary laboratory policy and guidelines developed in 2022 are all in place and are being used.

National diagnostic algorithms for laboratory-testing for priority diseases such as polio, measles, rotavirus, TB, influenza, HIV and malaria are in place and are aligned with international standards.

A tiered laboratory network exists, including a laboratory network of vertical programmes (TB, malaria and HIV):

- tier-4 laboratories, including national reference laboratories (NIH, NVL, NRLPD);
- tier-3 laboratories, including provincial public health laboratories (Punjab, Sindh, Balochistan, Khyber Pakhtunkhwa); and
- tier-2 laboratories, including district/tehsil headquarters laboratory with limited public health testing facilities.

Six priority diseases (HIV, TB, malaria, hepatitis, typhoid, dengue) are tested effectively across the tiered laboratory network. Laboratory assessments are in process at provincial levels, but no plans or timelines are yet available to gain this capacity for other tests. Agreements with laboratories outside the country for specialized testing not available in the country are in place – such as with WHO, CDC and others for animal and environmental health. Quality assurance, control and management system plans are in place to ensure quality for these tests, though not across the tiers. Sending out samples for testing quality control to international reference laboratories is not a current practice national laboratories.

The Public Procurement Regulatory Authority is responsible for procurement of supplies for the whole country. In-country production and/or procurement processes for acquiring the necessary media and reagents for the performance of laboratory tests is in place for few reagents such as Viral Transport Media (VTM) and on a limited scale for rapid antigen test kits. Required equipment based on testing appropriate to the level in the tiered laboratory network to support laboratory tests is partially available for priority diseases. Maintenance contracts are not in place for key equipment. Preventive maintenance of equipment is implemented by operators in accordance with the manufacturer's instructions.

The Islamabad Healthcare Regulatory Authority (IHRA) at the federal level and the health-care commissions at the provincial levels (Punjab, Sindh and Khyber Pakhtunkhwa) are responsible for the licensing of laboratories and monitoring laboratory quality in Pakistan. However, health-care commissions are not available in Balochistan, Azad Jammu and Kashmir, and Gilgit-Baltistan. The federal IHRA and provincial health-care commissions are responsible for inspections of health-care facilities, including laboratories, at the time of registration and yearly afterwards. The inspection can be done for a health-care establishment, equipment and health-care services provided by health-care establishments for grant, renewal, suspension or cancellation of registration or licensing. It can also be done for any apparatus, appliance, equipment, instrument, product, goods or item used or found in, or any practice or procedure being carried out at, the health-care establishment. Allegations of maladministration, malpractice or failure in the provision of health-care services against a health-care establishment are assessed and a fine can be imposed upon a health-care professional who refuses or fails, without reasonable cause, to furnish any information to the inspection team, or gives any false or misleading information to the inspection team.

The PNAC is available for certification and for accreditation of laboratories. Currently, there are 33 accredited laboratories with ISO 15189 and 239 accredited laboratories with ISO 17025, including health, veterinary, agriculture, food, environment sectors and the pharmaceutical sector. In addition, the NIH laboratories are accredited by WHO for disease-specific testing of polio, measles and rotavirus.

The DRAP is the national regulatory authority responsible for the qualification or registration of in vitro diagnostic devices. The license validity is for 5 years. The qualification or registration process involves the following steps: 1) appointment of an authorized representative; 2) submission of an online application form for the license; 3) submission of a hard copy of the application to the Medical Devices Division of DRAP; 4) upon receipt of Form-1/Form-2 for an establishment license, the Medical Device Board(MDB) inspectors or auditors inspect the premises of the establishment as considered proper and necessary to verify any information, particulars, documents and other requirements; 5) MDB also inspects the premises, process of manufacture and the means employed in production and testing of the medical devices, and the inspectors take samples, where applicable, for test and analysis; 6) if approved, the MDB grants an establishment license. Otherwise, an application may be rejected if the applicant fails to deposit a specified fee or provide information, particulars, documents or samples of the medical device as required. The registration timeline is 6–8 months for Class A and 8–10 months for others.

The NIH provides partial supervision on influenza, rotavirus, congenital rubella syndrome and AMR sentinel sites. Standardized supervision checklists or procedures are in place for influenza, rotavirus and AMR, and reports are submitted after each supervisory visit

Pakistan uses the National External Quality Assessment Scheme (NEQAS) to ensure quality testing in laboratories as follows: NEQAS and NEQAPP (National External Quality Assessment Proficiency Panel) for bacteriology; NEQAPP for virology; (COVID-19 and intra-laboratory comparison for dengue, CCHF, rotavirus, influenza); serology, biochemistry and haematology. Descriptions of these programmes along with contact persons are in place. The NEQAS/PP is not being used for parasitology, anatomical pathology, or cytogenetic and transfusion medicine. It is important to note that participation in national NEQAS is not mandatory for public or private laboratories. Currently, less than 5% of laboratories are participating in the NEQAS (16 public, 06 Armed forces), while the proportion is 100% for rotavirus (9 laboratories) and influenza (12 laboratories). About 23% of public and private are laboratories participating in the NEQAS for COVID-19. Indicators are used to measure progress in laboratory test quality, such as: participation in EQA, turnaround time, training records, client feedback, reproducibility, staff competence. and corrective measures identified and communicated with the concerned facilities.

There is a functioning referral system in Pakistan for each of the tests necessary to detect and confirm etiologies of priority diseases such as polio, measles, rotavirus, TB, malaria, HIV, dengue, and viral haemorrhagic fever, COVID-19, influenza and rotavirus. Data on the number of isolates/samples submitted to the NIH is available for polio, COVID-19, CCHF, dengue, influenza, measles and rotavirus. The NIH provides reference testing for most of the priority diseases such as polio, COVID-19, CCHF, dengue, measles, rotavirus, influenza, TB, mumps, respiratory syncytial virus (RSV), typhoid, diphtheria and cholera. Provincial public health references laboratories also perform advanced testing. Moreover, in the private sector AKUH, Shaukat Khanum Hospital and Shifa Hospital also have the capacity to perform advanced testing.

Specimens and metadata are transported from districts to provincial public health reference laboratories via courier and/or are hand-carried in cold chain while adhering to biosafety and biosecurity protocols. Samples from provincial laboratories are referred to the national reference laboratory, NIH, in line with transportation standard operating procedures. The Ministry of National Health Services Regulations and Coordination and provincial health department support specimen transportation, while for polio, measles rotavirus, and Influenza specimen transportation is supported by WHO and CDC. For example, In the polio programme, a suspected case of acute flaccid paralysis is reported by clinician to a designated district surveillance officer assigned to polio virus surveillance. After investigation, samples are collected from the patient and transported to the NIH through the district health office using courier services holding long-term agreements with the polio programme.

The transport system includes motorcycles, cars and specialized courier services and is available for all types of specimens such as dried blood spots and stools. SOPs are in place at all laboratory facilities for specimen collection, packaging and transport. There is a way to rush/expedite high-priority specimens such as polio, COVID, CCHF, measles and rotavirus, where an urgent delivery courier service is requested to deliver specimens as early as possible by air or road. Transportation of priority specimens are sent by local hospitals to reference laboratories.

An online tracking service is available for all courier and laboratory postal services. Several training opportunities are in place to support the referral and shipment system for all laboratories. Examples are the infectious substance shipment training course (ISST) supported by WHO. Orientation on sample collection, packaging and transportation to laboratory is part of the induction and refresher training session conducted for polio, measles, rotavirus, influenza programmes. The FELTP and Pakistan Biological Safety Association also provide relevant training to provincial and federal Institutes and laboratories.

Guidelines for schedule and transit times are in place for most priority pathogens/diseases. Also, written protocols are available for some priority diseases such as COVID-19, influenza, CCHF, dengue, rotavirus and TB and shared with provincial laboratories and sentinel sites. Guidelines for expedited process/procedure are available at the NIH for sending samples outside the country. Ethical guidelines for collection, storage and export of human biological materials were developed in 2016 for research purposes.

Laboratory data and results linked with specimens are shared in soft and hard copies (Excel sheets, online Google sheets etc.) with relevant entities at the federal and provincial levels. Pakistan participates in international laboratory networks such as the Global Polio Laboratory Network, the National Influenza Centre in the Global Influenza Surveillance and Response System and the Global Influenza Hospital Surveillance Network. There is also the microbiology laboratory (NIH) in GLASS, and the National Rotavirus Laboratory in the Global Rotavirus Surveillance Network.

The specimen referral and transport networks are partially sustainable with country funding. Donor support such as from WHO, FAO, CDC, the United States Agency for International Development and the Fleming Fund is provided for some programmes such as polio, measles, rotavirus, influenza and in the animal sector. No formal strategy is available for conducting point-of-care/farm-based diagnostics; however, available on a needs basis for some diseases – including HIV, hepatitis, dengue and cholera. A plan is currently being discussed to improve the availability of point-of care diagnostics at clinical sites (primary, secondary and tertiary) across the country.

Based on the recommendations of the 2016 JEE , the Primary and Secondary Healthcare Department in Punjab established a biosafety level-3 laboratory in Lahore in 2017 at the Punjab AIDS Control Programme complex. This provides a complete package of services equipped with the latest flowcytometry machine, gene expert and CD4 counting machine, and performs viral genotyping or HIV resistance testing for initiating or switching to antiretroviral therapy. A large number of international publications came have resulted from research carried out in this laboratory.

Next-generation sequencing capacity has been enhanced at the federal level in Islamabad and at provincial levels, namely in Punjab and Sindh. The national genomic consortium of SARS-CoV-2 was also established, and the genomic surveillance strategy was developed.

With regard to the tiered laboratory network, according to the National Laboratory Quality Standards there are four tiers of laboratories from tier 1 to tier 4. Six priority diseases (HIV, TB, malaria, hepatitis, typhoid, dengue) that are tested effectively across the network. Importantly, three major techniques (polymerase chain reaction, C/S and serology/ELISA) for infectious disease diagnosis are available at national and provincial laboratories. Laboratories at the national level (NRLs-NIH and the National Agricultural Research Centre) have agreements with CDC and WHO regional laboratories for specialized testing of some pathogens. The scope of NEQAPP needs to be updated: it covers all the disciplines of pathology – i.e. clinical chemistry, haematology, histopathology, immunoassay and microbiology. Province/region-wide scoring and strengths/gaps would have provided a clearer picture.

The laboratory working at the Punjab Aids control programme and the Institute of Public Health (IPH Lahore) serves as the provincial public health laboratory. The national reference and public health laboratory must support these units in establishing an efficient public health laboratory network for timely detection of outbreak and response. A provincial laboratory working group must be established in line with the National Laboratory Working Group which was established in the country to coordinate the work related to laboratories within Punjab Province. Provincial laboratory policy must be developed in line with the National Laboratory Policy that was developed in 2017, and the National Laboratory Quality Standards. Certification such as ISO and others related to laboratories may be initiated and implemented for quality assurance

## Indicators and scores

### D1.1. Specimen referral and transport system

Score – 3: Developed capacity. Referral and transport of specimens is organized for diagnostics and/or confirmation of most priority diseases from intermediate to national level.

#### Strengths/best practices

- A specimen referral system is in place at district and provincial levels, and reference laboratories remain available for some priority diseases.

#### Areas that need strengthening/challenges

- Comprehensive national guidelines for sample referrals and transport are unavailable and the challenges regarding sustainability are evident.
- Standardizing shipment protocols and logistical arrangements should be reinforced.
- Punjab need to Developed capacity for Referral and transport of specimens to be organized for diagnostics and/or confirmation of most priority diseases from district to provincial level.
- Lack of standardizing protocols and logistical arrangements for transportation of sample other than acute flaccid paralysis.

### D1.2. Laboratory quality system

**Score 2: Limited capacity.** National quality standards have been developed but have not been fully implemented. The level of implementation varies between provinces, with Punjab and Sindh provinces making most progress.

#### Strengths/best practices

- The federal and provincial health-care commissions are functional for the licensing of laboratories and monitoring of laboratory quality in Pakistan.
- The PNAC is responsible for the accreditation of laboratories with ISO 15189 (currently 33 accredited laboratories) and ISO 17025 (currently 239 accredited laboratories).

#### Areas that need strengthening/challenges

- The NEQAS is not available for all priority diseases.
- The health-care commissions are not established in some provinces and regions (e.g. Balochistan, Azad Jammu and Kashmir, and Gilgit-Baltistan).
- Limited funds are available for the implementation of quality management systems at all levels.

International accreditation is needed for the provincial reference level Regional reference laboratories are needed, along with an external quality assurance system.

### D1.3. Laboratory testing capacity modalities

**Score 3: Developed capacity.** The laboratory system can perform nucleic acid amplification testing, and bacterial culture with antimicrobial sensitivity testing with the quality assurance process is place with (or with access to) sequencing capacity.

#### Strengths/best practices

- Next-generation sequencing capacity is established at national and provincial levels.
- A National Genomic Consortium was established for SARS-CoV-2.
- A genomic surveillance strategy has been developed.

### Areas that need strengthening/challenges

- Sequencing capacity is not established in some provinces and regions (Balochistan, Azad Jammu and Kashmir, and Gilgit-Baltistan).
- A national genomic database is not available for priority pathogens.
- Meta- and genomic data are not available at national and provincial levels.

## D1.4. Effective national diagnostic network

**Score 2: Limited capacity.** Tier-specific diagnostic testing strategies are developed.

### Strengths/best practices

- A private and public network of polymerase chain reaction laboratories/facilities was established at federal, provincial and regional levels (Azad Jammu and Kashmir, and Gilgit-Baltistan) during the COVID-19 pandemic.
- A national programme for containment of AMR was established.
- A system for procurement of laboratory supplies exists in almost all public-sector laboratories/institutions through the Public Procurement Regulatory Authority.

### Areas that need strengthening/challenges

- Coordination mechanisms between the human and animal sector laboratories are limited.
- The availability of funds must be improved and the duration of procurement and approval must be reduced for surge testing capacity during outbreaks.
- The tier-specific diagnostic testing strategy need to be developed in Punjab.

### Recommendations for priority actions

- Finalize and endorse the national strategic plan for health laboratories, including the essential diagnostic list
- Expand the capacity of laboratories to test for all priority diseases/pathogens across the country while implementing and improving the Laboratory Quality Management System and establish a health-care commission in provinces and regions that lack this body (i.e. Balochistan, Azad Jammu and Kashmir, and Gilgit-Baltistan).
- Strengthen the national specimen collection and referral system, in line with national laboratory policy (for human and animal health).
- Expand the country's sequencing capacity and ensure connection and data-sharing with global systems.
- Develop and implement strategies for conducting point-of-care/farm-based diagnostics for all priority pathogens.

# D2. Surveillance

## Introduction

The purpose of real-time surveillance is to advance the safety, security and resilience of the country by leading an integrated biosurveillance effort that facilitates early warning and situational awareness of biological events. In the context of emerging diseases and evolving health risks, a strong and adaptable real-time surveillance system is vital. Due to the crucial elements of timely detection, assessment and response to potential threats, integration of diverse data sources and leveraging of advanced analytical techniques serve as key priorities.

## Target

Strengthened early warning surveillance systems that are able to detect events of significance for public health and health security; (2) improved communication and collaboration across sectors and between national, intermediate and primary public health response levels of authority regarding surveillance of events of public health significance; and (3) improved national and intermediate-level capacity to analyse data. This could include epidemiological, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; as well as advancement in fulfilling the core capacity requirements for surveillance in accordance with the IHR.

## *Level of capabilities in Pakistan*

Multiple disease surveillance systems are functioning in Pakistan in the human health and livestock sectors. Significant efforts have been exerted to strengthen these systems and multisectoral collaboration over the last few years through establishing and scaling up the IDSR system at primary and secondary level covering in some 80% of the districts in Pakistan with more than 80% reporting compliance. The program is implemented in phase wise manner initially focusing on primary and secondary level and subsequently will be extended at tertiary care health facilities in next two to three years in some 80% of the districts in Pakistan.

The early warning surveillance system exists in Pakistan at all levels (National, intermediate and primary/ district ) for all priority and emerging/reemerging diseases and threats. The public sector, private sector and public–private partnerships participate in the early warning surveillance system. The stakeholders of the system include the public sector, private sector and development partners like WHO, the United Kingdom's Health Security Agency (UKHSA), JSI, CDC, INDUS, the Global Fund etc. A total of 5262 surveillance sites at primary and secondary levels are reporting in national surveillance system through a digital software/platform DHIS2. This data is capture and maintain the national data repository through different tools and applications.

The sources utilized by the early warning system to collect information in Pakistan include the IDSR, which has both electronic and paper-based information system collected and disseminated on weekly basis. The electronic system (DHIS) is fully implemented in Punjab province while in rest of the provinces it is partially implemented. in public health laboratories, Laboratory Information Management Software (LMIS); the Communicable Disease – including VPD (childhood TB, polio, influenza, pneumonia, diphtheria, pertussis, tetanus, hepatitis B, measles, rotavirus, typhoid/TCV); the Integrated Disease Information Management System of the PEI for acute flaccid paralysis, adult TB, AIDS, Integrated Vector Management/vector-borne diseases (malaria, dengue); the Hepatitis Control Programme; leprosy; daily outpatient department registers; primary, secondary and tertiary health-care facilities in the public sector; private-sector health-

care facilities and laboratories for public health emergencies of national (measles, TB, dengue, tetanus, XDR typhoid) and international concern (polio, COVID-19, Mpox); electronic, social and print media; local influential/community members, local administrations; media cells, health departments; and the Animal Disease Surveillance Reporting and Response Unit (ADSRRU).

A National Data Centre has been established at the National Institute of Health, mandated to maintain the health related national data repository. Since, the establishment of National Health Data Center (NHDC) the IDSR data captured through DHIS2 is hosted at the data center, maintained and updated on regular basis

In addition, both EBS and IBS are available but are not fully integrated at all levels. Even though, EBS is implemented at national and intermediate levels, but it needs to be fully integrated with the IDSR at all tiers. Thresholds levels for alert generation and further dissemination are defined for all priority diseases. EBS includes multiple sources (e.g. media monitoring, community, call centres, health facilities). Some vertical programs and priority diseases like TB, HIV/AIDS, EPI, polio, COVID-19 have a strong community engagement component while rest of the priority diseases are lacking this.

The data collection system is mainly paper based, particularly at the lower level of the health system, except in Punjab where the system is electronic and utilized by early warning surveillance system, including EBS and IBS. Vertical programs like TB, HIV, measles, dengue, polio have case based surveillance system, even for any public health emergency of international concern like COVID-19 country has established case based surveillance system in all provinces and regions of the country, however it needs to be integrated with national surveillance system.

The EBS in Pakistan includes demographic trends, exposures and outcomes for use by public health decision-makers and shared with all stakeholders. Additional case-based data are available from communicable disease programmes, COVID-19, polio, and others. The outbreak investigation reports include descriptive (time, place, person) and inferential analysis. Weekly bulletins include trends and geographical analysis.

All the 129 IDSR implementing districts have reporting compliance of more than 80% with the early warning surveillance system; although all events are verified and responded but proper documentation like logbooks and alert management system is not fully operational in a systematic way except at federal level and some provinces. further improvement and proper documentation are required and should be incorporated into the IDSR system.

Additionally, monitoring and evaluation also require further enhancement in this regard. Informal sources of data collection, social media, electronic data, media cells of health departments, local influential/community, and local administration require more consolidation and institutionalization. This includes the establishment of functional social listening platforms at federal, provincial and district levels.

VPDs, vector-borne diseases, and waterborne and foodborne disease alerts are generated by public health laboratories but are not institutionalized/integrated within the IDSR system (DHIS2). However, polio, VPDS and COVID-19 are integrated within public health laboratories. The country has developed a list of priority diseases, conditions, syndromes, thresholds and case definitions which remain available at all levels of the health system.

Suspected disease outbreaks are verified in Pakistan through a well-defined process. After alert generation at federal, provincial or district level, events are verified from the respective source of data-generation. After confirmation, the federal/provincial disease surveillance and response unit teams are deputed to conduct the outbreak investigation which is further complimented with the laboratory confirmation.

The FELTP trained workforce, the health facility in-charges at primary and secondary health-care level, District Health Officers/Additional District Health Officers, the public health coordinator and disease surveillance coordinators at district level, directorate health services at provincial level and/or the NIH at federal level are involved in verifying suspected disease outbreaks. The data on events of suspected

outbreaks are managed by the DHO at the district level, the PDSRU at the provincial level, and the NIH at the national level.

There are dedicated and trained staff from multiple sectors available for verification of events – including event-specific teams, rapid response teams, and specific dedicated and trained staff available for COVID-19, polio, VPDs, VBDs, water and food borne diseases. Moreover, Guidelines, SOPs, case investigation form and trained multidisciplinary workforce for outbreak investigations is available at all levels. SOPs and guidelines are also available for risk assessment and communication pertaining to priority diseases or any public health emergency of international concern. Despite having trained workforce country still has a shortage of subject matter experts from all sectors at different levels (national, provincial and district) which needs to be enhanced both in term of expertise and numbers.

There is a partial analysis of surveillance data, geospatial mapping and trend analysis in IDSR data and trend analysis. Periodic time series analysis was conducted during the COVID-19 pandemic. Descriptive evaluation of risk factors was undertaken in outbreak investigation. Trained workforces are available at national and intermediate levels to analyse the data. There is a fragmented mechanism in place to link epidemiological and laboratory data, that is present only for COVID-19, TB, AIDS, hepatitis B and C, cancer, diabetes, dengue, malaria, polio and VPDs.

There is also limited capacity to conduct risk assessment at national, intermediate and/or primary public health response levels, and only at the national and intermediate levels for specific outbreaks or disasters.

The central mechanism for integrating data from clinical case reporting and data from clinical or reference microbiological laboratories is in process. A national data centre is established at the NIH as a centrally located mechanism for integrating data from clinical case reporting and clinical or reference microbiological laboratories. This is currently available for vertical programmes (e.g. for TB, HIV, malaria, hepatitis B and C, dengue, EPI).

Pakistan produces and publishes a public health bulletin and weekly epidemiological report available at NIH website and also disseminated to key stakeholders through email on regular basis. In case of any surge of cases or anticipated threat. information-sharing with public is done on needs basis through social and electronic media

Establishment of four provincial, three regional and one federal disease surveillance and response units. In addition, there are 159 district surveillance response units across the country. For the early warning system, both EBS and IBS are operational. The NCOC is established at federal level and PHEOCs at provincial/regional level for both public health emergencies of national and internal concern. Case-based surveillance is functional in all provinces for few priority diseases mainly under the vertical programs like , measles, TB, HIV AIDS, malaria, polio etc. Further involvement is needed of laboratory confirmation in the verification process and timely and accurate laboratory testing (limited capacity at intermediate and primary level). During floods 2022, country has efficiently used existing IDSR to activate Emergency based surveillance system to capture the data for all communicable diseases using DHIS2 platform.

The IDSR is implemented in approximately 80% of the districts in Pakistan, the remaining 20% will be covered with in few months as trainings are under way and Punjab is the only province to be completed.

In conclusion, Pakistan has made significant progress in strengthening its disease surveillance systems since 2016, particularly through the implementation of IDSR in most of the districts. Efforts are needed to strengthen monitoring and evaluation and to consolidate informal data sources. There is a dire need to integrate the vertical programs and laboratory data with IDSR to break the silos and to avoid the fragmentation in order to have a comprehensive and integrated system.

## Indicators and scores

### D2.1. Early warning surveillance function

**Score 3: Developed capacity.** National strategy, guidelines and/or SOPs for surveillance have been developed and are being implemented at the national level. The surveillance system provides immediate and weekly reporting of events and/or data with laboratory results integrated.

#### Strengths/best practices

- There is a s strong commitment to data collection through multiple formal sources to strengthen IDSR, DHIS2, LIMS, and various disease-specific programmes, ensuring the availability of robust data for early warning surveillance.
- The adoption of digital tools, such as DHIS2, mobile apps and android devices, enhances the efficiency, accuracy and timeliness of data collection and reporting processes.
- There is an early warning surveillance system, particularly at national and intermediate levels.
- There is recognition of the importance of community engagement and involvement of key stakeholders, including community influencers, local representatives, religious leaders and volunteers.
- The establishment of thresholds and case definitions for diseases contributes to timely alert generation and appropriate response measures. In Punjab alert generation is mainly for polio, COVID and dengue fever; however, capacity is available for alert generation and response for other diseases as well. Mechanisms need to be established with the support of the national data hub.
- There is over 80% IDSR reporting compliance in all the IDSR implementing districts (129 in May 2023) at CDC-Pak/NIH through provincial DGHS/PDSRUs.

#### Areas that need strengthening/challenges

- There is a lack of integration between the early warning components (EBS and IBS).
- The fragmentation of the EBS component may be addressed by strengthening the integration of EBS into IDSR across all administrative levels.
- Case-based surveillance remains functional for only a few priority diseases especially under the vertical programs such as , measles, polio, HIV, TB and dengue etc. Integration with IDSR is lacking for VPDs, vector-borne diseases, and waterborne/foodborne diseases. Case-based surveillance was available in Punjab through the DSS dashboard which can be replicated in DHIS2 depending upon the need and requirement There is also sentinel site surveillance system for few priority diseases (typhoid, cholera and influenza) which needs to be integrated with the existing surveillance system (IDSR).
- There is a lack of documentation like alert logbooks/alert management and event tracking at all levels which needs systematic and structured approach and system.
- The monitoring and evaluation mechanisms need to be a regular feature of the system and should include a more robust approach to ensure ongoing monitoring of the early warning function of the surveillance system.

## D2.2. Event verification and investigation

**Score 3: Developed capacity.** A method, process or mechanism for verifying and investigating detected events has been developed and is being implemented at the national and intermediate levels.

### Strengths/best practices

- Verification and investigation of events of suspected disease outbreaks are carried out in health facilities at the district, provincial and national levels in a coordinated approach.
- Trained teams for rapid response, disease surveillance and response units at provincial and district levels and EPI teams are involved in investigating VPD outbreaks. Moreover, trained workforce is available at national and provincial level to investigate other diseases like water and food borne, vector borne and respiratory infections.
- Outbreak investigations are conducted by trained personnel at various levels, including the Federal Disease Surveillance and Response Unit, the PDSRU, District Disease Surveillance and Response Unit (DDSRU), and those in charge of health facilities. These investigations are effectively coordinated with vertical lead by in-charge PDSRU/provincial coordinator surveillance under the supervision of DG Health.
- There is a trained multidisciplinary FELTP workforce for outbreak investigations
- SOPs are available for outbreak investigations, guidelines and protocols for conducting investigations at national and intermediate levels.
- A risk assessment strategy is available for priority diseases.
- Subject matter experts from multiple sectors are available to support the verification and risk assessment of events.

### Areas that need strengthening/challenges

- There is a need for further involvement of laboratory confirmation in the verification process and timely and accurate laboratory testing.
- Capacity-building, training and refresher courses are required for staff from different sectors to strengthen skills and knowledge of personnel involved in event verification and investigation.
- Coordination between district-level offices, provincial disease surveillance and response units, and the NIH to ensure integration of data management systems across all levels for the listed 34 priority diseases.
- There is a need to strengthen the evaluation and review mechanisms of the outbreak investigation process by conducting regular assessments to identify areas for improvement, optimize response strategies, and enhance the overall effectiveness of outbreak investigations.
- Multisectoral collaboration and coordination is needed during event verification and risk assessments.
- Incorporate technology and digital tools for event verification and investigation processes.

## D2.3. Analysis and information-sharing

**Score 3: Developed capacity.** Surveillance data are received regularly and analysed on some priority diseases, or unusual events, often with delay. Data are shared across sectors.

### Strengths/best practices

- The IDSR mechanism is in place in around 80% of the districts which have been trained on IDSR-DHIS2, with regular data collection and analysis on priority diseases and unusual events.
- Mapping and trend analysis capacities are available within the IDSR system, as well as geospatial mapping and disease forecasting capacities in vertical programmes.
- Epidemiological bulletins are generated and disseminated on a regular basis to stakeholders at national and intermediate levels.

- A mechanism is available for integrating epidemiological and laboratory data, although it is fragmented at this point of time.
- Integration of surveillance systems has been partially achieved for specific diseases across different provinces. Progress has been made in Punjab province, where vertical programmes for COVID-19, TB, AIDS, hepatitis B and C, and malaria are integrated. Similarly, in Sindh province, integration is underway for diseases such as TB, AIDS and malaria. In Khyber Pakhtunkhwa, integration efforts are underway, TB and AIDS. However, further efforts should be made to strengthen integration across all provinces and vertical programmes to develop a cohesive and harmonized surveillance system.
- SOPs are available on the dissemination of risk assessment information which includes a methodology for sharing information with relevant stakeholders at all levels.

### Areas that need strengthening/challenges

- All IDSR-districts except districts of Punjab province are sharing surveillance data of 34 priority diseases regularly with PDSRUs /DGHS offices at provincial levels and onwards with CDC-Pak at NIH to consolidate, analyze and generate weekly bulletins on the country's status. Punjab data should be integrated with IDSR-DHIS2 and incorporated in the weekly bulletin.
- Continuous capacity-building of all districts in the country is needed for reporting surveillance data and addressing delays in analysis, particularly for priority diseases and unusual events. There is a need to develop a district dashboard for timely review and analysis of data so that district team can generate and respond to alerts. This will strengthen the early warning system at source.
- Enhance capacity for advanced data analysis (e.g. geospatial analysis, modelling and time series analysis).
- Strengthen capacity for risk assessment, particularly at the intermediate and primary public health response levels.
- The linkage between epidemiological and public health laboratory data remains fragmented, particularly in the IDSR system across the country and needs to be integrated.
- Integration exists for specific vertical programmes such as, TB, AIDS, hepatitis B and C, dengue, malaria and polio, but is not fully extended in the IDSR system
- Increase information-sharing and collaboration between One Health sectors within the country (e.g. environmental agencies and animal health authorities).
- Enhance capabilities of the electronic tool used for data exchange to bring it in alignment with international standards and to improve interoperability of data systems.

## Recommendations for priority actions

- Establish a national data hub at CDC Pak NIH by linking with provincial, regional and district DSRUs to consolidate and links IDSR at all levels. Moreover, integration of different vertical surveillance programs and laboratory systems data to avoid fragmentation and establishing the linkage between epidemiological, clinical and laboratory data utilizing the DHIS2 as an integrated data management system.
- Strengthen monitoring and evaluation systems to ensure surveillance data quality and advance data management.
- Enhance data collection, analysis and reporting, and promote collaboration with the other One Health sectors through expanding existing platforms (for cholera, dengue and Severe Acute Respiratory infections ) for information-sharing, risk assessment and rapid investigation and response to cover all priority diseases.

# D3. Human resources

## Introduction

Human resources (HR) play a pivotal role in the effectiveness of the public health system, ensuring the availability of skilled professionals and support staff who serve as essential players in delivering quality health-care services and safeguarding public well-being. The effective functioning of any health system depends on having a well-trained, well-distributed and motivated health workforce. Strengthening human resources for health is a key part of improving health outcomes and achieving health equity. Investments in education and training, fair and effective deployment, and supportive work environments are all important strategies for building a strong health workforce.

## Target

States Parties should have skilled and competent health personnel for sustainable and functional public health surveillance and response at all levels of the health system and the effective implementation of the IHR (2005). A trained health workforce, existence of a corresponding workforce in the animal sector and existence of a multisectoral surge workforce strategy and plans for emergencies are desired to achieve the prevention, preparedness, detection and response to health threats.

## *Level of capabilities in Pakistan*

The human resources for health (HRH) situation in Pakistan present a complex picture. Despite certain strides, the country still faces critical challenges such as the uneven distribution of the health workforce, a large unregulated private health sector, and deficiencies in the quality and responsiveness of health-care service delivery.

In the past, Pakistan has experienced a severe shortage of health-care workers, with a doctor-to-population ratio of around 1:1000 in 2010, considerably lower than WHO's recommended standard of 1:600 (Pakistan Medical & Dental Council, 2010). The nurse-to-population ratio was even more alarming at 1:7700, a stark contrast to the WHO's suggested standard of 1:200 (Pakistan Nursing Council, 2010). By 2019 the ratio slightly improved to 1.1 0.8 doctors while there is significant decline 0.5 nurse per 1000 population (world bank 2019)

The health workforce distribution also has significant imbalances, with healthcare professionals predominantly clustered in urban areas, leaving rural regions underserved (WHO, 2019). Moreover, a gender-based divide of health workers is evident with female health professionals primarily limited to nursing and midwifery roles (The Network for Consumer Protection in Pakistan, 2018).

Workforce competencies for IHR implementation in Pakistan are available at all levels in both the public and private health and non-health sectors including legal and financial experts, epidemiologists, public health experts, IPC practitioners, infectious diseases (ID) physicians/ case management professionals, pharmacists, microbiologists, laboratory experts, veterinarians, nursing and paramedical staff, data analysts/IT experts, vaccinators, Lady Health Workers/LHVs/CMWs health education/community mobilizers, etc. Multisectoral workforce strategies for health and animal sectors are implemented through some programmes: e.g. IDSR, FELTP, AMR, College of Medical Laboratory Technology, Lady Health Worker programme, the FDI programme and other academic programmes and institutes (Institutes of Public Health (IPH), Health Services Academy, University of Veterinary and Animal Sciences.

The current capacity of epidemiologists in public health stands at more than 320 FELTP advanced course alumni, more than 340 frontline FELTP fellows, and more than 2000 trained in short-FELTP courses who are deployed at the national, intermediate and district levels in the country.

Health-care workers/public health professional deputed in remote and hard-to-reach areas are incentivized with the special allowances. These incentives and allowances include risk/hazard allowance, non-practicing allowances for medical doctors, scholarships, training, overtime, and paid study leave. The national public health workforce is financed primarily through regular government funding. In case of any public health emergency (e.g. floods, disasters, epidemic/pandemics), special financing streams known as public sector development program and emergency funds are also available for required allocations to provinces through project-based funding known as Planning Commission Form-1 (PC-1). Development partners also play important role to provide financial support to the government for the bridging period till the release and allocation of funds. A designated Department Centre of Occupation and Patient Safety is housed at the NIH. Although occupational safety and health is partially addressed in health-care facilities, in the case of disability and death, compensation is provided to health-care staff. For other workforce programs, the government has deputed a Provincial Health Developmental Sector (PHDS) and District Health Developmental Centre at the district level through PC-1 (in Sindh and Punjab).

Training programmes are established for some IHR capacities but not for all relevant capacities. However, curricula/modules have been developed and training sessions on some specific IHR core capacities have been conducted based on the need of government and development partners. Furthermore, a range of programmes are available for capacity-building. Continuing Professional Education programmes are available for public health officers, surveillance officers, nurses, midwives, physicians and veterinarians. Multiple mentorship programs in human sector like , IDSR, FELTP, Aspirating Lab leadership, etc. are available while for animal sector regular training sessions on foot and mouth disease and bird flu, one health mentorship and others capacity building programs are also available. There is significant contribution of academia in the field of public health specifically for the IHR core competencies and Global Health security in addition to scientific research. Academia offers a vast range of advanced degrees through public and private institutes for different cadres – , Epidemiology and diseases surveillance, healthcare financing, zoonotic diseases and one health, laboratory sciences, IPC, biosafety and biosecurity, AMR, risk communication, emergency preparedness and response , community medicine, case management, maternal and child health, nutrition and community midwife diplomas, etc. Theses all training programs/ modules are incorporated in the curriculum of under graduate and post graduate courses but there is no dedicated training program accept FELTP which covers some of the IHR core capacities.

The National Health Emergency Preparedness and Response Network exists with provision of an Emergency Preparedness Plan (a National Action Plan), but policy has not been approved or available for workforce surge during a public health emergency. The National Health Vision 2016–2025 envisages different provincial strategies and identifies IHR strengthening mechanisms but not for specific workforce surge during emergencies.

The contribution of private sector for mushrooming health workforce is quite significant both during peace and emergency time but partially regulated, subsequently leads to escalate the costs and compromising the health care standards. Retention of trained health workforce in public sector has remained a huge challenge as private sector offers higher remuneration and more professional development opportunities compared to public sector, leading further gap and shortage of HRH in the public sector (Asian Development Bank, 2019).

The quality and responsiveness of health-care service delivery is yet another area of concern. Due to inadequate pre-service and in-service training and weak regulatory oversight, health workers often lack the necessary skills and competencies (WHO, 2018). A survey by the Pakistan Medical Association (PMA, 2020) indicated that 50% of health workers believed their training was insufficient to meet their job requirements. However, responsiveness is compromised and not up to the mark due to high influx of patients and inadequate space and financial constraints.

So far, country has neither conducted a formal and structure Workforce surge capacity assessment nor HRH mapping, hence national repository/ inventory does not exist that may be used to develop and update the national surge strategy. Strengthening of existing academic and technical institutions is required and a future expansion policy needs to be prepared.

Recognizing these issues, the Government of Pakistan has launched several initiatives to strengthen HRH, increase the quantity and quality of the health workforce and improve service delivery. These are: the National Health Vision 2021–2026; the Pakistan Human Resources for Health Vision (2018–2030); Human Resource for Health and Sustainable Development Goals in Pakistan; Pakistan Multi-Sectoral Nutrition Strategy (2018–2025); Multi-Sectoral Rapid Need Assessment in Flood Affected Areas of Punjab, Sindh and Khyber Pakhtunkhwa (2022); and Health Worker Crisis in Pakistan.

Despite these efforts, much remains to be done. Further steps are required to enhance HRH planning, improve the regulation of the health sector, and increase the health budget to ensure adequate remuneration for health workers. The ability to address these HRH challenges is integral to the public health system's effectiveness and the overall health of Pakistan's population. While Pakistan has made strides in its HRH status, there are still significant challenges to address. Robust policy interventions, systematic planning, and improved regulation are crucial for building a strong and effective HRH system.

Based on situational analysis and key challenges faced by departments in Punjab Province a bold decision was taken to address these challenges to develop and implement a provincial action plan on IDSR. The draft plan is still in the process of approval. The challenges covered in this plan includes shortage of technical human resources, including experts for analysis and response, in both the main surveillance departments (Communicable Disease and Epidemic Prevention and Control Program) and those related to the vertical programmes. Issues of under-reporting from both public and private health facilities which was prevalent previously have been addressed. Due to limited and trained personnel at town level, timely investigation and confirmation – which were missing for most of the diseases because of the absence of standardized medical protocols for alert outbreak thresholds, absence of standardized sample material, means of transportation of sample media, feedback from public health laboratories, and coordination with line departments – are also addressed in this plan. Timely and immediate response as per standard protocols was added. Issues of under-reporting and even no reporting from private health facilities were also addressed. The directorate of Communicable Disease and Epidemic Prevention and Control Program have requested support from WHO and the letter is attached.

## Indicators and scores

### D3.1. Multisectoral workforce strategy

**Score 2: Limited capacity.** Pakistan has carried out an assessment of health workforce capacity implications and requirements for the implementation of health policies, strategies, plans and programmes to ensure sustained support, investment and their optimal utilization across the public and private sectors. A strategy to develop the health workforce exists but does not include all relevant sectors and cadres of public health professionals (e.g. epidemiologists, risk communication specialists, social scientists, IT specialists, legal/ policy experts, veterinarians/livestock specialists, and community health workers).

#### Strengths/best practices

- The execution of an assessment of health workforce capacity implications and requirements for the implementation of health policies, strategies, plans and programmes is a significant strength. It provides valuable data and insights to identify gaps and potential improvements within the system.
- The presence of a strategy for health workforce development is itself a strength. This demonstrates a level of commitment from the government to address health workforce challenges and to improve the health-care system.

- The assessment and strategy cover both public and private sectors, ensuring a comprehensive approach to addressing health workforce issues. The private sector plays a significant role in health-care delivery in Pakistan and its inclusion is critical for effective human resources management.

### Areas that need strengthening/challenges

- The strategy for health workforce is developed but it does not include all relevant sectors and cadres of public health professionals. Notably missing are epidemiologists, risk communication specialists, social scientists, information technology specialists, legal/policy experts, and veterinarians/livestock specialists, who have crucial role to play in public health, especially in managing outbreaks and pandemics.
- The need for improved training and professional development is apparent to ensure that the health workforce is equipped with the necessary skills and knowledge to deliver health-care services effectively. Limited capacity remained a significant challenge due to lack of structured training program in the health care services.
- While assessment and strategy are key steps, implementing these strategies effectively can pose a challenge. There may be a need for stronger systems for monitoring and evaluation to ensure the effective execution of the strategy.
- Attracting and retaining skilled health professionals, particularly in rural areas, is a major challenge. Addressing this issue will require innovative strategies to improve working conditions, offer competitive remuneration, and provide opportunities for career progression.

## D3.2. Human resources for implementation of IHR (2005)

**Score 2: Limited capacity.** Appropriate human resources are available in some sectors at the national level to detect, assess, notify, report on and respond to events according to IHR provisions. The workforce is available for implementation of IHR at all levels. However, no database on all IHR-relevant competencies is available.

### Strengths/best practices

- Trained human resource on disease surveillance, outbreak response, case detection and deployed both in land crossing, sea ports and airports Strengthening border surveillance indicates an increased level of vigilance and readiness to detect, assess, and respond to public health threats. This heightened preparedness can contribute to a more rapid response to potential health threats.
- The use of technology in border surveillance, such as thermal scanners to detect individuals with fever, Availability of rapid screening test to identify positive cases helps to take preventative action more timely, efficiently and effectively.
- The border health agency (Airport and port Health authority) has been strengthened over the period of three years since COVID-19 pandemic and a sufficient number of trained staff has been deployed on airports and land borders. The designated staff conducts cross border meetings with the neighbouring countries, especially during outbreaks/epidemics.
- Disease surveillance and response units are established at national, intermediate and district level across the country with 100% coverage. District Disease Surveillance and Response Units (DDSRUs) , Provincial Disease Surveillance and Response Units (PDSRUs), Regional Diseases Surveillance and Response Units (RDSRUs) and Federal Disease Surveillance and Response Units are established at district, provincial, regional and federal level respectively.
- Staff in 136 districts have been trained on disease surveillance, data reporting and outbreak response. Further trainings is in progress.

### Areas that need strengthening/challenges

- There is limited human resource capacity at the district level due to staffing shortages, frequent and unplanned transfers/postings, high turnover of project-based employees, and inadequate trainings etc. This has a negative impact on the effectiveness of disease surveillance and response.
- In some districts, particularly in rural or remote areas, there is inadequate infrastructure, such as lack of reliable transportation or communication systems to ensure effective disease surveillance and outbreak response.
- Data collection and reporting in IDSR-implemented districts is consistent. The staff are trained to monitor disease trends and implement appropriate responses.
- Expansion and integration of public health laboratory network to get lab based data is also a challenge.
- Resource constraints can limit the ability to recruit, train and retain sufficient human resources at the district level.

## D3.3. Workforce training

**Score 2: Limited capacity.** Regular and routine competency-based training programmes and standards, including the One Health approach, are available in some professions, cadres or sectors at the national level. In addition, one level of FELTP (basic, intermediate or advanced) or comparable applied epidemiology training programmes, are in place in the country or in another country through an existing agreement.

### Strengths/best practices

- The existence of competency-based training in some professions or sectors is a positive element. This approach ensures that the training received is not only academic but also equips the workforce with practical skills needed to perform their roles.
- Pakistan's Field Epidemiology Training Programme (Pakistan FETP) has been working since 2006 and training health-care workers in the areas of disease surveillance, outbreak investigation and public health response. Currently Pakistan FETP is offering two levels of training – frontline (3 months) and advanced (2 years). Pakistan FETP has trained more than 320 professionals through its 02 years' advanced course and more than 340 professionals through frontline training. The advanced and frontline courses are conducted regularly and consistently. This is an important step towards workforce development as it helps upscale and enhance the critical skills required in the field of public health specifically in disease surveillance, outbreak investigation and response and research. Human Resource Development Centres play a vital role in building the capacities of health professionals in various aspects of health care and public health. In Pakistan, numerous such centres are working on training different cadres of health professionals and contribute to health workforce training and development.
- Institutes such as the Health Services Academy in Islamabad and the Institute of Public Health in Lahore offer specialized programmes in public health and epidemiology, training the next generation of public health professionals.
- Specialized institutions such as the College of Physicians and Surgeons Pakistan offer postgraduate medical and dental education, with over 20,000 fellows and more than 25,000 members.

### Areas that need strengthening/challenges

- Competency-based training is limited to some professions and, cadres or sectors. There is a need to expand this training to include all health professions across sectors.
- The availability of training programmes might be unevenly distributed across geographical regions or between different health professions. Expanding access to training, particularly in underserved areas or among undertrained professions, is crucial.
- The training programmes need to be strengthened to ensure that the health workforce is up to date with the latest knowledge and best practices in their field.
  - » Two levels of FETP training are already being offered by Pakistan FETP. The incorporation of an intermediate level will further strengthen the training capability and will provide a well-rounded training in epidemiology.
  - » Specialized training in areas of One-Health and AMR needs to be incorporated.
- While one level of FELTP is present, the incorporation of basic and intermediate levels will provide a more comprehensive and well-rounded training in epidemiology.

## D3.4. Workforce surge during a public health event

**Score 1: No capacity.** A national multisectoral workforce surge strategic plan in emergencies is unavailable or remains under development. There is no approved policy available for public health emergencies, although a national health emergency preparedness and response plan is in place. During emergencies, some informal assessments regarding human resources surge planning have been carried out. The National Health Vision 2016–2025 and different provincial strategies for identifying human resources strengthening mechanisms remain unavailable. Informal assessments have been implemented, although not specifically for the workforce. There is no formal workforce surge strategy, but ad hoc arrangements remain available in the case of a public health emergency, and the decision to deploy rests with the administrative ministries on needs basis.

### Strengths/best practices

- There is a trained workforce in field epidemiology at all levels for multiple sectors and cadres (>280 alumni for a 2-year advanced FELTP course), 340 alumni for frontline courses, over 2000 trained professionals in different capacities of public health including rapid response team, contact tracing, outbreak investigation, disease surveillance and more.
- The government provides funding for most of the training programmes.
- The Pakistan FETP transition to the NIH has helped in the sustainability and continuation of the programme.

### Areas that need strengthening/challenges

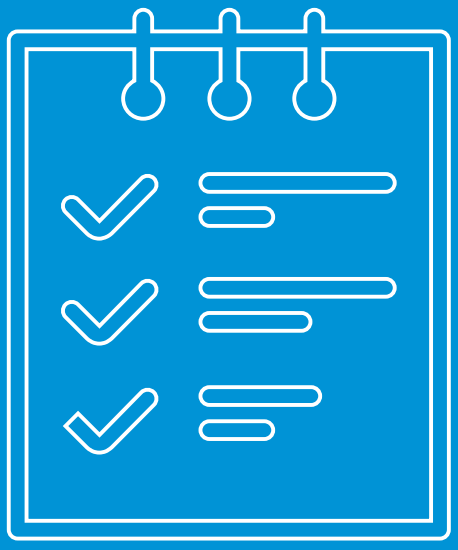
- Formal approved HRH policies for recruitment, deployment and career development are not in place, and there is a weak monitoring and evaluation system for HRH.
- A structure for sustainable financing for recruitment and retention of health workforce neither identified nor developed, subsequently, resulting in serious multiple implication due to such financial constraints.
- IHR requirements for different competencies, including human resources surge policies, are not available and there is a lack of electronic databases.
- Workforce governance structures are weak. For example, legislative strengthening in terms of workforce is needed, provincial HRH framework adaptation needs to be ensured, fragmentation of governance regulators and insufficient regulatory power need to be addressed, and the inefficient data quality needs to be improved).

- Formal workforce surge capacity assessments should be conducted taking in account COVID-19, floods and other emergencies recently experienced by the country. There is inadequate research for workforce planning, implementation and monitoring.
- Mapping of the health workforce needs to be carried out and national and provincial data base/ inventory needs to be maintained and updated on regular basis.

## Recommendations for priority actions

- Conduct workforce surge capacity assessment at national and provincial level, develop, review and update the workforce strategy for health to ensure addressing all IHR disciplines across the different sectors
- Strengthen the existing academic and technical institutions; a future expansion policy needs to be prepared.
- Develop and implement plans for retainment, career path and performance-based incentives.
- Develop and implement policies and plans for surge capacities and mobilize sufficient resources for their implementation.
- In Punjab Province:
- Strengthen the surveillance system in PDSRU Punjab for data analysis and preparation of situation reports as there is a shortage of human resources, including epidemiologists and data analysts.
- Personnel support and training are required at PDSRU and DDSRU in analysis of DHIS2 data IDSR.
- Analysis of provincial and district AWD data from the disease surveillance system's dashboard data for 36 district DDSRU.
- Support daily data analysis for dengue components,
- Support analysis of data for COVID-19, Severe Acute Respiratory Illness/Influenza Like Illness.
- Support analysis of SMOG data.
- Support any upcoming health emergency data or event and field response for 36 districts.
- Provide human resources support and capacity-building on IHR based at PDSRU.

# Respond



# R1. Health emergency management

## Introduction

This technical area focuses on health emergency management and systems for enabling countries to be prepared and operationally capacitated in responding to public health events, in accordance with the all-hazards requirements of the IHR. Ensuring risk-based plans for emergency preparedness, readiness and response, robust emergency management structures, and mobilization of resources during an emergency is critical for a timely response to public health emergencies.

## Target

Existence of national strategic multi-hazard emergency assessments (risk profiles) and resource mapping, existence of emergency readiness assessment, development of national health EOC81 plans and procedures, establishment of an emergency response coordination mechanism or incident management system, evidence of at least one response to a public health emergency within the previous year that demonstrates that the country sent or received medical countermeasures and personnel according to written national or international protocols, existence of an emergency logistic and supply chain management system/mechanism and existence of policies and procedures for research, development and innovation for emergency preparedness and response are desired to achieve.

## *Level of capabilities in Pakistan*

In Pakistan, health emergencies are mostly lead and managed by the Ministry of National Health Services, Regulations and Coordination in collaboration with relevant ministries, organizations and institutes like the National Institute of Health (NIH), the National Disaster Management Authority (NDMA), Ministry of Planning Development and Special Initiatives, ministry of Finance, ministry of Interior , ministry of Environment and Climate Change, Animal Husbandry Commission, Border Health Services, Polio Eradication Initiative (PEI), provincial and regional relevant departments and development partners and donors at the provincial and federal level depending upon the nature and scale of emergency.

In Pakistan, the Ministry of National Health Services Regulations and Coordination is responsible for governing and strengthening health emergency management at national level, in coordination with provincial health departments. On public health surveillance, the NIH is supported by its provincial counterparts through the Integrated Disease Surveillance and Response System (IDSRS) and District Health Information System (DHIS2).

The NDMA and the Provincial and District Disaster Management Authorities (PDDMA) possess a well-established and functional capacity for supporting shared health emergency management objectives. The NDMA established a 10-year National Disaster Management Plan (2012–2022), prioritizing areas and interventions, including to the lowest administrative tier of the union council.

The Ministry of National Health Services, Regulation and Coordination performed a comprehensive national risk profile during 2018 all hazards risk assessment. The country risk profile of Pakistan based on the desk review of earthquakes and flood events occurring from 1900 to 2019 and priority infectious diseases occurring from 1957 to 2021 was conducted in 2021. A situational analysis on multi-criteria

evaluation technique (floods, earthquakes and infectious diseases) was conducted between 2009 and 2012 by NDMA with engagement of all stakeholders. Sectors made contributions in development of the risk assessment report: federal and provincial government agencies provided relevant data for hazards and vulnerabilities; technical support was provided by researchers and academia in report analysis and recommendations; international organizations (United Nations Development Programme, the World Bank and the Asian Development Bank) provided technical assistance in disaster reduction; civil society organizations provided support in the report's findings and recommendations related to community-based disaster risk reduction; macro and micro level seismic hazard assessment was conducted in 2014; and WHO provided a national and Punjab risk profile in 2019.

The national risk profile conducted in 2018 has provided valuable information on the country's hazards profile and vulnerabilities, and provides guidance to develop effective strategies, including: national strategic emergency risk assessment has prioritized natural hazards (comprising earthquakes, floods, droughts and landslides which can damage the society, infrastructure and economy); man-made hazards pose significant threats to country stability and security especially in the areas of conflict and political instability such as terrorism, sectarian violence and cyber-attacks; critical infrastructures including hospitals, airports, power plants and transportation networks need to be protected against different hazards and should be prepared in a manner that minimizes the effects of a disaster; and a coordinated mechanism among responding agencies is present. In line with the country Risk Profile Pakistan (ADB, 2021), priority natural hazards were earthquakes, floods, drought, heat waves and extreme cold. The infectious disease hazards included pandemic influenza, CCHF and COVID-19.

NDMA and PDMAs conduct risk assessments and the sectors involved were health, animal health, and food security. Risk assessment is conducted not as a measure of preparedness but to assess needs as part of the response to a public health event. The health sector has not conducted planned and regular risk assessment. However, risk assessment was done regularly during the COVID-19 pandemic to develop and update COVID SOPs. Strategic risk assessments have been conducted partially in different geographical areas.

NDMA has the capacity to monitor emerging or priority risks with the support of other line ministries/departments through different mechanisms and has devised an early warning system to provide real-time information and data on potential hazards based on interconnected system of sensors, monitoring stations and communication. Additionally, NDMA works with national and international organizations to monitor emerging risks and develop response strategies. National emergency risk profiles are being reviewed and updated to accommodate emerging threats or changing risks on a needs basis. NDMA conducts regular hazard mapping and risk assessments to identify high-risk areas and to prioritize risk reduction measures. The authority uses advanced geospatial tools and technologies to map hazard zones and to analyse risk exposure and vulnerability. The national risk profiles for disasters such as floods, earthquakes and drought with health sector capacity assessment are periodically conducted by NDMA and PDMA and are shared with relevant stakeholders and partners during the response phase for resource mobilization. Several IT capacities such as the GIS platform, Geoknot technology, Standardized Precipitation Index (SPI), NDVI (Normalized Difference Vegetation Index ), Thermal Index (TI), District Health Information System -2 (DHIS2) are used for reporting and sharing risk assessments.

Readiness assessments of potential public health emergencies have been conducted and a comprehensive national health emergency preparedness and response plan is available, defining responsibilities of different stakeholders, potential hazards and response strategies. However, holistic national readiness assessment for all priority hazards is not conducted. It is limited only to floods emergency/monsoon readiness with development of a national monsoon contingency plan 2022, including identified targeted priority operational readiness interventions with clear triggers for activation/scale-up of preparedness and response measures.

The PHEOC and the NCOC serve as the coordinating mechanisms at national level, while Emergency Operations Centres (EOCs) are present at the provincial level. SOPs for the activation and deactivation of EOCs facilitating multisectoral engagements are in place and were activated during multiple emergencies (e.g. COVID-19, the 2022 Pakistan flood response, dengue, Mpox). All equipment is available with power backup at national level and communications structure for the PHEOCs such as Internet, email and telephone services are available. Furthermore, the PEI also maintains well-functioning and equipped EOCs at national and provincial levels in the health sector, with contributions from various development partners. The PEI infrastructure was utilized in the response to public health events/emergencies, such as the 2022 floods in Pakistan.

The health department NCOC and NDMA are able to convene participants from ministries and agencies of all relevant sectors, national health departments, appropriate ministries, agriculture, secretariat, finance and multinational partners. SOPs and terms of reference are available at NCOC to support decision-making. The PDSRU takes decisions at the provincial level. The national EOC has epidemiologists, medical specialists, subject matter experts and communication experts. Roles for staff are identified in the SOPs at the national level and training of EOC personnel has been conducted at national level. Standardized forms and templates for data/information management, reporting and briefing are used at both national and provincial levels. The EOC was activated two times in last five years for dengue and COVID-19.

The incident management structure is partially experienced in managing health emergencies, and it is partially integrated within the EOCs. Promoting the understanding of the incident management system and building capacity of relevant personnel is ongoing at national and provincial levels. The current baseline for managing health emergencies and the relevant scores below do not reflect the well-developed capacity for managing nuclear and radiological events in Pakistan.

The DRAP addresses regulatory concerns related to requesting, accepting and receiving drugs or devices from an international source. A fast-track procurement provision is available in case of public health emergencies such as COVID-19. There are also provisions for the temporary importation of medical products during public health emergencies, provided that certain conditions are met – such as ensuring the safety, efficacy and quality of the products and complying with relevant national and international regulatory requirements.

Procedures and mechanisms are not in place regarding the engagement and disengagement of health workforce during emergencies. However, some departments such as NDMA, PDMA and health departments have plans that address liability concerns. Through these arrangements, Pakistan has received several international teams from different organizations to support the response to health emergencies. Sending teams to support national health emergencies across the country has happened frequently and is covered by the existing plans. Sending teams to support international health emergencies has never taken place except for accompanying Hajj missions by the health department and by the rescue department in Punjab, which managed to send teams to support the response to the earthquake in Syria/Turkey.

Surge staffing for public health emergency response has also been taking place in the country without predeveloped plan or a formal structure/mechanism. The surge support has included national teams (through a roster of experts). Surge deployment has taken place during the past year for the COVID-19 pandemic when extra personnel were required at points of entry for screening and surveillance, and during floods when health personnel were deployed from Punjab, Khyber Pakhtunkhwa and Islamabad Capital Territory to Balochistan's affected areas. The surge support also includes international teams through existing international organizations and links with international networks. Pakistan is a member of the Global Outbreak Alert and Response Network and is committed to sharing information and expertise with other members of the network and to collaborating on response efforts.

At the policy level, the NDMA is the designated focal point for medical teams in Pakistan and is responsible for coordinating and managing emergency response efforts in the country, including the deployment of

teams. At the operational level, the Pakistan Armed Forces Medical Services are the primary organization responsible for deploying medical teams during emergencies. The Pakistan Armed Forces Medical Services have established specialized medical teams that are trained and equipped to provide emergency medical care in disaster settings, including earthquake, floods and other emergencies. The teams include surgical teams, medical teams, and rapid response teams. Organizations such as the Pakistan Red Crescent Society and other NGOs have also established medical teams in the country. These organizations work in close coordination with the NDMA and the Pakistan Armed Forces Medical Services to ensure that emergency response efforts are well-coordinated and effective.

The rescue departments demonstrated great success examples. The Punjab rescue department includes a training centre to provide different types of training and capacity-building of personnel under the main mandate of the department which are rescue, safety and medical. Enrolment in the centre has been taking place from across the country. The centre also managed to enroll and train personnel from other countries with a potential to expand further following certain criteria for registration and screening of potential candidates. Other rescue departments exist in the other provinces with similar mandates but do not include the training arm or do not have the same capacity as the Punjab department.

The rescue department works under the overall coordination of the NDMA and PDMA to respond to emergencies such as floods, earthquakes etc. The department has functioning EOCs that are connected with each other to facilitate communication, coordination and also deployment of support between provinces. The rescue department has also been heavily engaged in the response to COVID-19 utilizing its volunteers' network and personnel in the provision of COVID-19-related services and in repurposing some of the facilities for the use in the COVID-19 response in coordination and collaboration with the health departments. The risk communication and community engagement programme established for COVID-19 has also been of great value in producing material and social mobilization towards accepting public health interventions. The programme has been expanding and is currently dedicated to other priority diseases with a potential for more expansion.

The medical arm of the department has been included a few years ago to provide the needed support during emergencies at the individual, community and country level. In 2019, the department has its rescue team classified by the United Nations International Search and Rescue Advisory Group (INSARAG) and has just established the process of WHO classification for its Emergency Medical Team (EMT). Pakistan has participated in several activities conducted by WHO on EMT and has recently taken an active role in the EMT capacity-building and classification in accordance with WHO standards.

The department has a well-trained HAZMAT (hazardous material) team with specialized equipment to manage chemical, biological, radiological and nuclear-related events and emergencies. Within the mandate of the department, it has also provided rescue activities such as drowning, fires, falling buildings, missing individuals and uniting families. The interventions run by the department are evidence-based as the centre has a platform of data on emergencies and disasters. The data are presented in a disaggregated manner to identify root causes and inform interventions. For example, the data has been used to identify types of traffic injuries and has designed targeted interventions.

The NDMA addresses logistical concerns related to sending, receiving and distributing medical countermeasures during a public health emergency both internally and internationally. Arrangements are in place to receive and send international equipment by the air force and Civil Aviation Authority on the orders of the prime minister of Pakistan. Concerns related to sending, receiving and distributing medical countermeasures during a public health emergency are present but need to be aligned as part of the emergency preparedness and response plan, taking account of recent experiences of COVID-19 and floods. Security concerns are covered in the emergency preparedness and response plan. Simulation exercises and drills are needed to test and improve the emergency preparedness and response plans and capabilities, including those related to the management of medical countermeasures.

Pakistan has a pharmaceutical industry that produces a range of medicines, including antibiotics and vaccines. Several companies produce laboratory supplies and equipment. In terms of vaccine production, Pakistan has a few local manufacturers that produce a limited range of vaccines, such as hepatitis and typhoid vaccines. However, the country still relies heavily on imported vaccines for its immunization programmes. Several pharmaceutical companies in Pakistan manufacture a range of antibiotics. These companies operate under strict quality control regulations and are subject to oversight by regulatory bodies such as the Pakistan DRAP. Overall, Pakistan has some capacity to produce antibiotics, vaccines and laboratory supplies and equipment; however, there is still a significant reliance on imported products, particularly for high-technology medical products and devices.

Pakistan has developed policies and procedures for the use of personal protective equipment, including for animal culling and for disposal during outbreaks of infectious diseases. The National Disaster Management Plan developed by the NDMA includes provisions for stockpiling essential medicines and medical supplies in anticipation of disasters or emergencies. A stockpile for drugs and equipment is not available but a budget is allocated and fast-track procedures are in place for rapid purchase and distribution. Furthermore, the country has agreements with manufacturers and importers to facilitate the process.

Neither adequate resources nor dedicated staffing are identified for delivery of logistics and receipt of countermeasures through the regular system but available for tracking and distribution. DRAP has a legal framework for procuring medical countermeasures, and legal provisions are in place for procuring animal countermeasures through the Animal Husbandry Commissioner or provincial animal health departments.

Pakistan has no national strategic framework for operational research in health emergencies except for polio. The country has identified institutions with research in a wide range of areas, including epidemiology, laboratory diagnostics, clinical research and vaccine development. In addition to academic institutions and research organizations, partnerships may also be established with public health agencies, NGOs and other stakeholders through agreements or memoranda of understanding that outline the roles and responsibilities of each partner. Very limited resources are available for research, development and innovations within the Health Research Institute (HRI). The Health Research Institute department produces journals, a public health bulletin, multiple programmes, ministry reports and peer-reviewed journals. These have not been used as platform to set the research agenda for health emergencies, but the knowledge hub dashboard can facilitate this. There are many capacitated personnel to conduct research and regulatory review, but these have not been directed towards developing and implementing a research agenda for the country.

Pakistan demonstrated strengths in conducting risk assessments, maintaining EOCs, surge capacity and dissemination of research findings. There are gaps in risk profile updates, EOC scope, personnel surge planning, logistics and research coordination. Risk assessment updates, EOC enhancement, surge capacity planning, research framework development, logistics strengthening and sustainable funding are highly recommended. Addressing these gaps and implementing the recommendations will lead to a more robust and comprehensive health emergency management system in Pakistan. Continuous evaluation, training, and collaboration are crucial for success. By addressing these gaps and implementing recommendations, Pakistan can enhance its readiness and response capabilities, ensuring effective management of public health emergencies and safeguarding the health and well-being of its citizens

## Indicators and scores

### R1.1. Emergency risk and readiness assessment

**Score 1: No capacity.** Pakistan is lacking updated national risk profiles based on all hazards risk assessments and the interagency consultative process. At provincial level, only Punjab conducted provincial risk profiling based on all hazards approach on the STAR tool in 2019.–2019.

The NDMA published a brief national risk assessment of natural and technological hazards and threats during 2018. Multi-hazard vulnerability risk assessment exercises were also conducted in Sindh (2017, 2021) and in two districts of Balochistan (2019) by engaging all stakeholders. The NDMA has formulated a 10-year comprehensive National Disaster Management Plan 2012–2022 prioritizing areas and specific interventions up to the last administrative tier of the union council in accordance with Pakistan Vision 2025 and global commitments of MDGs, SDGs and the Sendai Framework for Disaster Risk Reduction. Nationally the NIH is performing surveillance through DHIS2/IDSRS with provision of the Early Warning Alert and Response Network system which can generate alerts for communicable diseases. Alerts are disseminated at the national and subnational levels with decision-making authorities of the relevant stakeholders

#### Strengths/best practices

- Different departments in Pakistan have capacity for conducting multi-hazard vulnerability and risk assessment at national and provincial levels and also at departmental level.
- Readiness assessments for a few potential public health emergencies have been conducted in last five years.
- At the national level, the NIH has implemented National surveillance system (IDSR) with provision of the Early Warning Alert and Response Network system using DHIS2 that can generate alerts for communicable diseases. Alerts are disseminated at national and subnational levels for timely action and response.

#### Areas that need strengthening/challenges

- Updated national and provincial risk profile strategy and conducting regular national and provincial risk profiling.
- A multi-hazard public health preparedness plan, along with the concept of operations, should be developed with sustainable resource allocation at national and intermediate levels.
- Multisectoral coordination has yet to be formalized for joint risk assessment and joint planning for the management of public health emergencies.

### R1.2. Public health emergency operations centre

**Score 3: Developed capacity.** A national-level PHEOC is established with SOPs and a plan of operations. The operational cost of the PHEOC is covered through the annual budget of the NIH. PHEOC activation and deactivation SOPs are available, and a coordination mechanism is established. Staff are identified for PHEOC administration, management, planning and operations and are trained in Public Health Emergency Management competencies. Additionally, a dedicated network of national and provincial EOCs for PEI is also operational with major contributions from health development partners. These EOCs contributed during the COVID-19 response.

#### Strengths/best practices

- National-level PHEOCs have been established with SOPs and staff are available to perform basic functions (e.g. activation, planning, operations, deployment) with clear roles and responsibilities.
- The NDMA has developed a concept of operations and the authority actively coordinates with other stakeholders according to the level of emergency.

- A network of EOCs at national and provincial levels for PEI is in place, with contributions from health development partners. These EOCs have contributed to the COVID-19 response.
- A network of EOCs within the rescue department that are fully functioning and connected.

### Areas that need strengthening/challenges

- There are two parallel emergency operation center networks functioning in the country. One is under the PEI programme and the other is for rest of the emergencies established during COVID-19 pandemic. These EOCs should be integrated with clear, precise and broadened scope. The functions of these EOCs should be aligned with other core areas of IHR e.g., chemical and radiological events.
- Although PHEOC structures at Azad Jammu and Kashmir and at Gilgit-Baltistan remain in place, they are not fully operational for managing emergencies.
- There is a lack of sustainability and no dedicated budget of existing resources.

## R1.3. Management of health emergency response

**Score 3: Developed capacity.** The incident management system structure exists at national-level PHEOCs and is partially operational with command and general staff with dedicated roles and responsibilities. Staff are receiving training at national and subnational levels for the incident management system during public health emergency response, and are also being trained in administration, management, planning, operations and communication for emergency response. Need-based support is available for the subnational level.

### Strengths/best practices

- An incident management system has been integrated into the national PHEOC and is partially operational with general staff with dedicated roles and responsibilities.
- All sectors from national (Islamabad/capital) to subnational levels have experience in responding to various emergencies.
- Staff receive the incident management system training at the national and subnational levels during a public health emergency response.
- The rescue department is the operational arm and is well equipped with resources to provide response interventions in coordination with NDMA for natural disasters and with health departments for disease outbreaks.
- Capacity-building is ongoing by different departments.

### Areas that need strengthening/challenges

- The response plan for all priority hazards and risks after updating comprehensive risk profiling needs to be developed and updated.
- Mapping resources and surge capacity arrangements are performed on an ad hoc basis.
- There is a lack of established multisectoral coordination (as well as within sectors).
- Several EOCs are in place that are partially connected. Revising their mandate and connectivity is needed for enhanced management of health emergencies.

## R1.4. Activation and coordination of health personnel during a public health emergency

**Score 1: No capacity.** In the absence of a national personnel surge plan, many ad hoc efforts are in place for robust emergency surge capacity, deployment and mobilization of resources during an emergency at different levels – including the Ministry of Health, NIH, National Emergency Operations Centre (NEOC), NDMA, PDMA and provinces. Surge for personnel is being exercised at intermediate-level EOCs for workforce development and deployment for emergencies.

### Strengths/best practices

- Pakistan has experience of overseas deployment, and some institutes are part of the Global Outbreak Alert and Response Network.
- There is experience of deployment of personnel during various emergencies at the national and subnational levels.
- The rescue team is classified by the International Search and Rescue Advisory Group and has managed to deploy support across Pakistan and externally to the earthquake in Syria/Turkey.
- There is a trained and equipped HAZMAT team for the response to chemical, biological, radiological and nuclear-related emergencies.

### Areas that need strengthening/challenges

- Currently, there is no formal national/provincial plan for pre-deployment, deployment and post-deployment of surge teams during the different phases of emergencies.
- Several medical teams are in place Included under the rescue department. The process has been initiated for notification and classification of EMTs, which should be aligned with the WHO standards. Political expediency and strong commitment from all stakeholders will be required to follow up on this process and to classify the EMT.

## R1.5. Emergency logistic and supply chain management

**Score 2: Limited capacity.** The supply chain management system and medical counter measures are available at national and intermediate levels. The production of antibiotics, medications and medical supplies is partially limited for vaccines and reagents and equipment etc. At national and subnational levels medical countermeasures and a supply chain management system are available to regulate the supplies, stocks, warehousing etc., but are not adequate to fully support the health emergencies with necessary financial means. National Disaster Management Authority is the leading organization for managing supply chain and logistics during emergencies.

### Strengths/best practices

- A supply chain management system and medical countermeasures are available at national and intermediate (provinces and beyond) levels.
- Capacity exists at national and subnational levels to regulate matters pertaining to, for example, supplies, stocks and warehousing, among others.

### Areas that need strengthening/challenges

- A logistics infrastructure to support health emergencies with necessary financial means remains limited.
- Surge capacity and resource deployment plans at the national and intermediate level remain undeveloped.
- Public health response operations hindered due to procedural delays like prolonged procurement process, logistical arrangements, mobility, documentation and approvals) during public health emergencies.

## R1.6. Research, development, and innovation

**Score 1: No capacity.** CDC, Public Health Laboratories Division, Biological Production Division, Health Research Institute at the NIH and the polio programme can facilitate and conduct implementation research activities for laboratory diagnostics, vulnerability assessment, target interventions, clinical trials etc., but not under one framework. Pakistan has various means of disseminating findings such as the Health Research Institute journal, the I Journal, JPMA, PHB at NIH, reports from programmes, peer-reviewed journals, and the MoH knowledge hub dashboard platform.

### Strengths/best practices

- The CDC, Public Health Laboratories Division, Biological Production Division and Health Research Institute at the NIH polio programme facilitate and conduct implementation research activities for laboratory diagnostics, vulnerability assessments, target interventions, and clinical trials, among other activities.
- There is a positive track record of dissemination and sharing of research experiences in peer-reviewed journals and through the MoH knowledge hub platform.

### Areas that need strengthening/challenges

- The research infrastructure and coordination remain weak in government policy, planning and budgetary support.

## Recommendations for priority actions

- Plan and develop a 5-year national and intermediate (provinces and beyond) all-hazards risk profiling strategy based on multisectoral multi-hazard risk assessments. Moreover, develop and update necessary Emergency Preparedness and Response plans with a clear incident management governance structure. These plans should be reviewed annually and updated to accommodate emerging threats and shared regularly with the relevant sectors and stakeholders.
- Assess the existing PHEOC structures and develop a sustainable and well-functioning governance structure for Emergency Operation Centres across the provinces and regions along with strong linkages among all EOCs. Institutionalization of EOCs with the provision of essential equipment, infrastructure, logistics, supplies, human resources and continuous capacity -building of EOC staff including all cadres.
- Develop national and intermediate levels of surge capacity and resource deployment plans, outlining a system for pre-deployment, deployment, and post-deployment of surge personnel, including sending and receiving personnel and teams during public health emergencies to encompass the development of plans for EMTs and rapid response teams.
- Develop and institutionalize a public health emergency research and development framework underpinned by policy and ethics (including financing, mapping institutions and implementation mechanisms), and with provision for expedited regulatory review for emergency preparedness and response and related fields.
- Review and strengthen the emergency logistics and supply chain management system at national and provincial levels.
- To ensure sustainability, regular programme funding and available human resources should be warranted as currently existing public health infrastructures at national and intermediate levels (human resources, logistics and financing) are largely dependent on funding from time-bound projects.

# R2. Linking public health with security

## Introduction

Public health emergencies pose unique challenges for law enforcement. During public health emergencies, the multisectoral engagement, including law enforcement, need to coordinate the response in a timely manner with public health and medical officials, irrespective of whether threats are of suspected or confirmed deliberate origin. Enhancing the capacity to link public health and law enforcement and to provide timely international assistance will be also needed.

## Target

The country conducts a rapid, multisectoral response to any event of suspected or confirmed deliberate origin, including the capacity to link public health and law enforcement, and to provide timely international assistance. Evidence of at least one response in the previous year, that effectively links public health and law enforcement, or a formal exercise or simulation involving leadership from the country's public health and law enforcement communities, is desired to achieve through the development and implementation of agreements that outline roles and responsibilities, and validation of these agreements through real events or exercises.

## *Level of capabilities in Pakistan*

Pakistan is prone to various natural calamities and disasters (e.g. floods, earthquakes, heat waves, droughts, mudslides), as well as infectious disease outbreaks (e.g. dengue, COVID-19, bird flu, measles, polio). These events have necessitated the authorities Ministry of National Health Services Regulations and Coordination, NIH, NDMA and PEI, to encompass their provincial arms to mobilize multisectoral responses by drawing from their respective assets and experiences. Moreover, polio transmission remains active in parts of the country, compounded with vaccine hesitancy, access problems and long porous borders with a neighboring country. In addition, several deliberate attacks on polio health workers have occurred, requiring the direct involvement of security agencies. The NDMA, with its subnational arms, serves as the lead agency mandated to coordinate and manage activities in response to a wide spectrum of disasters and emergencies. All stakeholders, including government ministries and departments, the armed forces, international and other NGOs and United Nations agencies, work through and form part of the NDMA to conduct a "single window" operation.

The Ministry of National Health Services Regulations and Coordination is responsible for coordinating and implementing public health surveillance and response activities in collaboration with other relevant sectors, thus the Ministry of Interior and other security agencies are responsible for ensuring the safety and security of public health personnel and facilities. In reference to the IHR, the NIH, under the guidance of the Ministry of National Health Services Regulations and Coordination, plays a key role in implementing the core surveillance and monitoring capacities of public health events to research on public health issues, and provides technical support and guidance to public health and security authorities.

Pakistan is advancing collaboration with the security agencies to be able to conduct a rapid, multisectoral response to any event of suspected or confirmed deliberate origin, including the capacity to link public health and law enforcement, and to provide timely international assistance. There is lack of legislation, relationships, protocols, or other agreements exist between public health, animal health, radiological

safety, chemical safety and security authorities to address all hazards. However, informal linkages and coordination are exercised on a needs basis.

Needs-based working protocols for polio and COVID-19 were established with the designation of focal points between public health, the Ministry of Interior and General Headquarters. The polio program has established formal arrangements between public health and security authorities at the provincial, district and primary public health response levels. The formal notification of the National Coordination Committee and NCOC by the prime minister's secretariat during the COVID-19 response also included linking with civil and military security. The notifications and information-sharing between various sectors (including security sectors) is event-based and public health authorities are part of the response plan. On the other hand, a memorandum of understanding between the public health (NIH) and MoNFSR (Ministry of National Food Security and Research) was signed. Pakistan has identified contact agencies for any biological and other hazardous events.

Needs-based trainings have been conducted jointly (at an intermediate or national level), including for both public health and security authorities, on topics related to information-sharing and joint investigations/responses. For example, joint training was conducted for points of entry, Civil Aviation Authority, Airport Security Force, customs and immigration personnel on screening and management of COVID-19. SOPs and agreements are in place for coordination of a joint response to public health and other emergencies at official locations, such as PoEs where both public health and security authorities have operational safety and health security responsibilities. However, this has not been implemented at all ties. l. Additionally, there is a formal agreement for joint risk assessment during events of public health and security significance. This applies only to polio.

The Pakistan Public Protection Quarantine Act, 1976, and standard operating procedures issued by NCOC during emergencies such as COVID-19, allows the government to detain/quarantine an individual who presents a public health risk. The implementation of such an Act has been taking place through collaboration between the public health and security sectors.

The Strategic Planning Division regularly identifies potential biological, chemical and radiological events that may have deliberate motives in Pakistan. The division is also responsible for developing plans for the response to possible biological, chemical and radiological events. However, information about hazards and plans are not widely disseminated among the concerned sectors.

Several challenges and gaps were identified as there is lack of legislative cover due to non-availability or upgradation of public health law pertaining to public health linking with security, relationships, protocols or other agreements between public health, animal health, radiological safety, chemical safety and security authorities to address all hazards.

Public health experts are involved in emergency response linked to the Biological and Toxin Weapons Conventions and reports are regularly shared between public health and security authorities within Pakistan. Additionally, the national government is connected to INTERPOL through the Ministry of Interior and Foreign Affairs. Lack of training at national and provincial levels – including both public health and security authorities – on topics related to specific roles and responsibilities, information-sharing, and joint investigations and responses, highlights the need to provide in-service training for public health and security personnel at all levels, to establish SOPs for coordination across public health and security sectors within the framework of the National and Provincial Health Emergency Preparedness and Response Plans and to conduct simulation exercises to test functionality.

## Indicators and scores

### R2.1. Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspected or confirmed biological, chemical, or radiological event

**Score 2: Limited capacity.**

#### Strengths/best practices

- There is existing capacity and experience in linking and establishing operational mechanisms between public health and security authorities during public health emergencies. Additionally, formalizing and institutionalizing this mechanism would provide long-term benefits.
- Administrative coordination mechanisms between all tiers of the health system (capital, provincial, district) were applied during the COVID-19 pandemic, as well as during other emergencies.
- The defense sector maintains a well-developed medical infrastructure, including for radiological events, which remains on standby for major humanitarian and public health emergency responses.

#### Areas that need strengthening/challenges

- Existing mechanisms for cooperation, information-sharing and notifications between public health and security authority entities remain primarily reactive and event-based.
- Sustainability in cooperation and good practices during post-emergency periods remains a challenge due to a lack of dedicated and sustained resources for preparedness, response and recovery from public health events.
- No legislation or formal MoU is currently in place between public health and security authorities underpinning priorities for all hazards.

## Recommendations for priority actions

- Establish an apex body to formalize a cooperation and information-sharing mechanism between public health and security authorities at the national and provincial levels, with clear SOPs and dedicated resources for preparedness and response.
- Conduct regular joint training sessions, orientations and discussions between public health and security authorities to reach a mutual understanding of their expected roles and responsibilities.
- Leverage, build upon and institutionalize existing functioning mechanisms by utilizing the experiences of the polio program and the COVID-19 response.
- Development and promulgation of relevant legislation or amendments in existing law to ascertain the legislative cover

# R3. Health service provision

## Introduction

Health systems resilience focuses on a system's preparedness for, and response to, severe and acute shocks, and the system's capability to prepare for, manage (absorb, adapt, and transform) and learn from shocks to cope with abrupt changes due to public emergency events. It is essential for policy-makers to review their health systems in order regularly to assess their resilience, address any weaknesses and identify possible public health risks. Developing resilient health systems ensures that countries can effectively maintain essential quality and routine health services in all contexts and can improve responses to future public health emergencies.

Health service provision continues to be a common concern for emergency events. One of the most vital factors affecting patients' use of health services during a public health emergency is the physical accessibility of health facilities. Health service provision is influenced by a variety of factors, such as the ease of access to essential health services and the level of health care.

## Target

Resilient national health systems are essential for countries to prevent, detect, respond to and recover from public health events, while ensuring the maintenance of health system functions, including the continued delivery of essential health services at all levels. Particularly in emergencies, health services provisions for both event-related case management and routine health services are equally as important. Moreover, ensuring minimal disruption in health service utilization before, during and beyond an emergency and across the varied contexts within a country is also a critical aspect of a resilient health system. These are all desired to be achieved through having evidence of demonstrated application of case management procedures for events caused by IHR-relevant hazards, optimal utilization of health services, including during emergencies and continuity of essential health services in emergencies.

## *Level of capabilities in Pakistan*

Pakistan has a substantial national and provincial legal framework to support and enable the implementation of IHR and Global Health Security technical areas/targets and demonstrates a commitment for IHR (2005) implementation, managing emergency events and providing essential health services. The current UHC index score (SDG 3.8.1) for Pakistan is 52 in 2022, while the intended target is to achieve 80 by 2030.

In Pakistan, policy-makers and various stakeholders are committed to ensuring availability and accessibility for the minimum set of essential services of primary and secondary care during emergencies/disasters at the district level. The country has developed and adopted a UHC  EPHS in national and provincial areas/regions, based on Disease Control Priorities 3 (DCP3), generating localized scientific evidence and using a criterion to prioritize health services at five service delivery platforms. Health services provision is premised to be in line with UHC EPHS health interventions and intersectoral interventions at all levels.

Pakistan's experience has shown that priority-setting and package design have been at the centre of the national initiative on UHC. Political will and government ownership of health-care reforms through UHC were evident at the national and subnational levels.

In 2016, Pakistan's social protection programme, *Sehat Sahulat,* was launched to improve access for poor and vulnerable groups to quality and affordable medical services from both the public and private sectors.

Provincial social health protection schemes exist in the Punjab Employees Social Security Institution and the Khyber Pakhtunkhwa Employees Social Security Institution.

Furthermore, health system reforms have been attempted in all provinces and remain congruent with Pakistan's national health vision to move closer towards UHC. National case management guidelines were developed between 2017/2018 and 2021. The national and provincial guidelines cover infectious diseases only (32 priority diseases) and radiation (with the relevant authorities). However, these do not yet cover all hazards under the IHR. Health services for case management are documented separately in policy/planning for event-based case management and within policy priorities. The development of the EPHS was based on the DCP3/UHC reform agenda at national and provincial levels (guidelines are aligned with the national health vision and provincial health strategic plans). A mapping and gap analysis was conducted in 12 districts for case management of priority conditions at primary health-care and first-level hospital care using the WHO Service Availability and Readiness Assessment tool.

Pakistan has developed good practices in public health laboratories, ensuring essential services for disease surveillance and outbreak detection, and emergency response. Although provincial disparities remain apparent, these laboratories served as a focal point for the national system's core functions for human health, veterinary, food safety, and disease prevention, control and surveillance. The laboratories developed an integrated system of data management, reference and specialized testing, emergency response, public health research, training and education, and partnerships and communication.

Through functional mechanisms (monitoring cell/units, hospital-based MIS, District Health Information Software 2) the DGHS remains responsible for monitoring performance (e.g. utilization of services during and beyond emergency events). During emergencies (i.e. COVID-19 and floods), policy-makers and health managers at all levels recognized the low utilization of health services (e.g. 2022 Pakistan floods, COVID-19). Consequently, they planned and took appropriate measures to ensure the availability and accessibility of essential services (e.g. allowing transport, triage and zoning of health facilities and prioritizing health services such as emergency operations, intensive care units, and the availability of Maternal and Child Health services in camps and hospitals during floods).

Data on health services are regularly collected, analysed and shared with policy-makers and hospital managers. In Punjab, DHIS2 is used for daily reporting of health services data, including emergency events (e.g. data on admission, severity/status, discharges, deaths). During emergencies, the Ministry of National Health Services Regulations and Coordination and Department of Health worked to ensure the provision of essential health services within the public and private sectors and met the minimum service delivery standards at the national level and in three provinces, excluding Balochistan, to regulate and validate services in the public and private sectors. Health Insurances, Pakistan Nursing Council, the Pakistan Medical and Dental Council, the Pharmacy Council, the Tibb Council and Homeopathic Council are responsible for health facility licensing and accreditation, including of private service providers.

Updated national and provincial case management guidelines cover only infectious diseases of 32 priority diseases. Other guidelines (e.g. Integrated management of neonatal and childhood illnesses , Integrated management of pregnancy and childbirth care family planning etc.) also provide case management information for which training is organized. Case management guidelines for radiation emergencies are in place but are not accessible to the health sector. Mapping of resources for case management for the emergency priority conditions has been done at the national and provincial levels. Case management referral protocols are embedded in the guidelines. Training has been provided to health-care workers at the facility level but not in all facilities. The level of implementation of these guidelines, including the referral system, is significantly varied among provinces and districts, highlighting challenges in this area.

## Indicators and scores

### R3.1. Case management

**Score 3: Developed capacity.** National clinical case management guidelines for priority health events are developed and are being implemented at the national level. An initiative to develop national case management guidelines was carried out between the years 2017/2018 to 2021. National and provincial guidelines cover infectious diseases only (32 priority diseases) and radiation (with the relevant authorities). However, these do not yet cover all hazards under the IHR.

#### Strengths/best practices

- Case management guidelines have been developed. Based on the DCP3/UHC EPHS at all five platforms, essential services have been prioritized Guidelines on priority notifiable diseases, including polio, are available but exclude emergency events and IHR-relevant hazards.
- Procedures are in place to manage cases of priority illnesses that have epidemic potential (e.g. COVID-19, pandemic influenza, or vaccine-preventable diseases).
- The private sector has improved health delivery services in Sindh and Khyber Pakhtunkhwa through the development of service packages and regulations.

#### Areas that need strengthening/challenges

- Over time, responsibilities have shifted between the federal, provincial and district levels. As a result, the health system has suffered due to a lack of experience, an absence of responsibilities, a lack of funds for proper functioning of health programmes, on drug regulation, and a non-existing mechanism to involve communities in the decision-making process.
- Non-communicable disease programmes are currently not present at the provincial or federal levels.
- EPHS has been developed but should be revised include guidelines on emergency preparedness plans.
- Guidelines cover only 32 priorities of infectious diseases and radiation at the national level. Additionally, guidelines should be developed at all levels of health system at the national and provincial levels to manage cases of priority illnesses and IHR-relevant hazards.
- Enhanced multisectoral coordination and information-sharing is needed.
- A mapping of available resources of PHC facilities in 12 districts was carried out using the Service Availability and Readiness Assessment tool. However, it should be extended to cover emergency priority conditions for all facility levels.

### R3.2. Utilization of health services

**Score 2: Limited capacity.** Low levels of service utilization (number of outpatient department visits $1.0 \geq X < 2.0$ visits/person/year, in urban and rural areas). A dedicated responsible authority (medical superintendents, DGHS, Secretary) and functional mechanism (monitoring cell/units; hospital-based MIS; DHIS2) exists to monitor health system performance, including for the utilization of services during and beyond emergency contexts.

During emergencies, the Ministry of National Health Services Regulations and Coordination and Department of Health ensure the provision of essential services daily. Health care commissions are functional and maintain the minimum service delivery standards at the national and provincial levels (excluding Balochistan) to regulate and validate services in the public and private sectors. Data analysis and regular reports are produced and shared with policy-makers and hospital managers. Punjab is currently using DHIS2 for daily data (admission, severity/status, discharges and deaths) and emergency situations.

### Strengths/best practices

- Health facilities and equipment to ensure first responders are enabled in responding to emergency events have been identified.
- Health systems' monitoring, performance (including the utilization of services during and beyond emergency contexts) is ensured by the medical superintendents, DGHS and the Secretary through mechanisms such as monitoring cells/units, hospital-based MIS and the DHIS2.
- In the province of Punjab, a coordination mechanism was established for systematic information-sharing between sectors involved in chemicals, surveillance, emergency response and health services.
- Province-specific health sector strategies have been developed. Punjab and Khyber Pakhtunkhwa included the improvement of public service delivery using defined targets, regular stock-taking and investment in data. Sindh and Khyber Pakhtunkhwa have moved towards the development of district health plans.
- Reforms to improve health service delivery have been attempted in all provinces and are more focused in Khyber Pakhtunkhwa and Punjab. For example, Khyber Pakhtunkhwa remains ahead of Punjab and Sindh in the areas of planning, service delivery and contracting with the private sector.

### Areas that need strengthening/challenges

- High disparities exist between high-income and low-income families regarding access to health services. In Balochistan, a high level of inequity is evident for postnatal consultations, institutional delivery, and tetanus toxoid injections for pregnant women.
- Provinces have taken measures to ensure efficiency of public health systems at the district and subdistrict (tehsil) levels. However, challenges in supply persist. In Khyber Pakhtunkhwa and Balochistan, there is a greater need for resource allocation, strengthening primary health care services, and motivating staff employed in the health sector through strong leadership.
- During emergencies (e.g. COVID-19 and the 2022 Pakistan floods) policy-makers at all levels became aware of the low utilization of health services and took action to ensure essential services, triage and zoning of health facilities and the prioritization of essential services (e.g. emergency operations and intensive care units.
- In Punjab, the DHIS2 is used for daily reporting of health services, including during emergency events. It includes disaggregated data (except for incomes and the private sector) on matters such as admission, severity/status, discharges and deaths, as well as other data.
- The national authority for health facility licensing, accreditation, regulation and validation should be reinforced and extended to cover the province of Balochistan.
- Utilization of the public health system in Sindh remains lower than other provinces. Strengthening is needed for public health services and infrastructure for maternal/child health, women primary care services, and for the rural and poorer population.
- Karachi has a robust private sector but suffers from a significant burden of noncommunicable diseases and polio. Engaging the private sector is recommended to improve treatment and control of noncommunicable diseases by promoting regulation, incentivizing accreditation, high quality care, and provision of priority services.

## R3.3. Continuity of Essential Health Services

**Score 2: Limited capacity.** A package of EPHS is defined and is currently in the process of being implemented in 40 districts throughout Pakistan. However, plans and guidelines on the continuity of essential health services for emergencies have not been developed. EPHS has been developed based on DCP3 (generating localized scientific evidence and using a criterion to prioritize health services at five service delivery platforms) for ensuring access to UHC (reproductive, maternal, newborn, and child health/RMNCH/infectious diseases/noncommunicable diseases/service access) have been developed, and essential health services for polio have been defined for high-risk union councils. Emergency services

are required to be defined as a Basic Package of Health Services for emergency situations. At the tertiary hospital, the triage system refers patients to take care of vulnerable populations (women and children). During the 2022 Pakistan floods, emergency services were ensured through medical camps and hospitals.

### Strengths/best practices

- Communication and coordination of provinces on matters related to public health emergencies remain supportable overall.
- During the COVID-19 pandemic and the 2022 Pakistan floods, the country's capacity to coordinate, plan and manage the provision of essential health services was demonstrated
- During emergencies, essential health services, transportation, tertiary hospitals triaging, and zoning were considered and delivered in medical camps and hospitals to respond to vulnerable populations' needs (women and children).
- Development of EPHS and information availability with clear duties and responsibilities at the district, provincial, and federal levels has improved the continuity of service delivery, particularly in Punjab.
- The provincial health sectors in Punjab and Khyber Pakhtunkhwa have undergone a significant transformation, leading to the growth of primary health care, an accountable system, and public–private partnerships, thereby promoting availability and accessibility of health services.
- The role of general practitioners in the private sector is significant for provision of essential health services in both routine and emergency situations.

### Areas that need strengthening/challenges

- Emergency response should be integrated into regular health service delivery systems, particularly PHC.
- The Basic Package of Health Services for emergency situations should be developed and aligned with the EPHS/DCP3 EPHS. The Basic Package of Health Services of priority emergency situations should apply both prior to and during emergencies.
- To ensure availability and affordability of EPHS, EOCs at national and provincial levels should be kept abreast of their mandate with clear protocols, effective funding, and functions (e.g. running simulation services).
- As in the province of Punjab, multiple data sources should be integrated and analysed.

## Recommendations for priority actions

- Bridge health gaps in service delivery by restructuring public facilities with regular quality monitoring, and incorporate national public health and emergency programmes at the district and provincial levels.
- Expand the integrated PHC model of care to improve health service utilization.
- Revise the essential package of health services to include emergency management interventions (a separate Basic Package of Health Services is proposed to be developed in line with DCP3-UHC EPHS).
- Develop case management guidelines for priority events other than infectious diseases (other guidelines – such as for IMPAC, IMNCI etc. – need to be reviewed before making such recommendations.

# R4. Infection prevention and control

## Introduction

In Pakistan, the systems designed to prevent infection within the health-care settings generally remain weak, placing the patients at risks of acquiring infection, resulting in an increase in suffering, and ultimately increasing the costs and complexity associated with health care provision. In addition, poor infection prevention and control (IPC) contributes to increased dependency on antibiotics among healthcare providers, contributing to the growing challenge of antibiotic resistance.

Unfit and unsafe injection and infusion practices put patients at a risk of bloodborne viruses including HIV and hepatitis, augmenting public health challenges. Although no reliable healthcare associated infection surveillance is available, evidence from some studies suggest that between 20 and 25% of hospital admissions may result in a healthcare-associated infection. Although national IPC guidelines, national strategic framework have been developed by the country achieving consistent, large-scale implementation remains a challenge. The COVID-19 pandemic has highlighted importance of robust IPC measures, the lessons learned from training and capacity-building undertaken during the COVID-19 pandemic need to be maintained and integrated into routine practice to improve patient safety and quality of healthcare.

## Target

Strong effective IPC programmes at federal, provincial and health-facility level are implemented at scale and ensure safe care and minimize risks of health care-acquired infection and antimicrobial resistance. These programmes should incorporate WHO core components for IPC.

## *Level of capabilities in Pakistan*

Pakistan has intensified its efforts to establish strong and effective IPC programmes that enables delivery of safe health care through prevention and control of healthcare-acquired infections. These efforts are evident from the development of: the National  guidelines in 2020; the National IPC Strategic Framework in 2021; national SOPs on IPC practices derived from these guidelines. A strong multisectoral coordination mechanism is in place, with formation of National IPC Steering Committee in 2019, alongside technical working groups in some provinces. Multisectoral IPC committees have been constituted and notified at both national (2019) and provincial levels (Sindh 2019, Punjab 2020), coupled by self-evaluation and national progress review in 2021.

Approximately 20 IPC sentinel sites have developed IPC plans for the COVID-19 pandemic, based on the baseline assessment. An active national IPC programme or operational plan exists, aligned with WHO's minimum requirements and national IPC guidelines and, though complete implementation is pending. Punjab province has developed IPC plans for hospitals through the Punjab Provincial Health Care Commission. Sindh has drafted a Provincial IPC strategic Framework. Gilgit-Baltistan has developed IPC-specific guidance.

The national IPC strategic framework includes activities/IPC components to strengthen IPC programmes across all tiers of the health-care system, ensure a competent health workforce adheres to best IPC practices. It aims to establish a system for auditing and monitoring IPC practices, optimize conducive

environment, materials and equipment for IPC in health-care settings and the community, and promote occupational safety of health-care workers in all health-care facilities.

Hospital IPC plans, including prioritized interventions based on assessments, only partially address all the IPC core components. Surveillance, staffing according to the workload and the built environment are overlooked in most health-care facility plans.

Only a few tertiary care private hospitals have partially established IPC structures such as IPC teams and focal points. Unfortunately, not all hospitals comply with IPC practices, especially concerning monitoring and feedback. IPC committees were established at the DHQ and THQ levels, particularly as part of the sensitization during the HIV outbreak and COVID-19 pandemic response. However, notified and functioning IPC committees and teams are limited to a few tertiary and secondary care hospitals in Pakistan.

A total of 134 IPC focal points were notified in Sindh, Punjab and Islamabad Capital Territory during COVID-19 pandemic. However, formally trained IPC FPs with sustained resources is not available at any level except for few private tertiary care hospitals. A series of IPC orientation trainings and standardized in-service trainings were also conducted during the COVID-19 response to improve IPC implementation at the health-care facilities.

A national healthcare-associated infection surveillance programme or national strategic plan for healthcare-associated infection surveillance, including antimicrobial resistant pathogens prone to outbreaks is either not in place or still under development. Currently, only 15–20% of hospitals in Pakistan, primarily in the private sector, are capable of conducting healthcare-associated infection surveillance including infections caused by antimicrobial-resistant pathogens among humans, such as the Agha Khan Karachi, Shaukat Khanum Lahore, Indus Hospital Karachi, Rehman Medical Institute, Peshawar and Shifa International Hospital, Islamabad.

The healthcare-associated infection surveillance capacity for tertiary care health-care workers exists in the public and private sectors, but requires sustainable financial and human resources. WHO and Pakistan Institute of Medical Sciences collaborated to develop an application for healthcare-associated infection surveillance of healthcare-associated infections in 2022 as pilot implementation at one of the largest tertiary care public sector hospitals in Islamabad.

Despite the existence of an IPC programme and infrastructure at the national level and series of IPC trainings conducted during the COVID-19 pandemic, the implementation of effective infection prevention and control remains unsystematic. National IPC guidelines cover the essential elements of a safe environment in health-care facilities exists but national ownership is weak with no provincial and few hospital committees to manage or monitor their implementation. Given the vast size of Pakistan and the significant weakness in the health infrastructure, including limited access to clean water in health-care facilities (41% people have no access to safe water in health-care facilities in Pakistan), action and sustained investment at the federal level are crucial.

Pakistan has developed national IPC guidelines and SOPs based on WHO's minimum requirements but country wide uptake and implementation is sub-optimal. Monitoring of IPC practices by provincial focal points and regulatory bodies, such as Health Care Commissions, is underway. The MoH launched IPC and healthcare-associated infection mobile applications in 2022, with establishment of dedicated isolation wards in designated health-care facilities for COVID-19 and Mpox case management and developed an indigenous manufacturing capacity for personal protective equipment supplies and hand sanitizers. Furthermore, the country created advanced training opportunities (standardized IPC certificate courses, online courses, one-year diploma course), and enhanced its capacity for monitoring IPC practices at the provincial focal points through established regulatory bodies.

Partial dedicated Central Sterile Services Department and sterilization services are accessible in most health-care facilities. Autoclave and steam/electric sterilizers are widely available, ensuring essential sterilization capabilities across the country. Despite these provisions, there is notable absence of a continuing professional development programme at the provincial or health-care facility level. However, induction training programmes and ad hoc training courses are conducted on safe environment in health-care facilities at various levels. The EPHS for Primary Health Care Punjab includes IPC and safe environment components.

Despite these efforts, Pakistan faces significant challenges in establishing national standards and resources for a safe built environment. There are limitations in access to water, sanitation and hygiene (WASH), screening, isolation areas and sterilization services in health-care facilities. The infrastructure, materials and equipment for IPC are insufficient and the initiatives for IPC WASH in health-care facilities and communities are weak. IPC programme budgets are constrained and there is a lack of national quality standards and approvals for IPC supplies, including hand sanitizers. The situation demands urgent need for concrete actions to address these critical gaps and to strengthen IPC framework.

## Indicators and scores

### R4.1. IPC programmes

**Score 2: Limited capacity.** An active national IPC programme or operational plan according to WHO minimum requirements exists but is not fully implemented. National IPC guidelines/standards exist but are not fully implemented.

#### Strengths/best practices

- National IPC guidelines with SOPs are in place and disseminated.
- The development of an IPC strategic framework plan 2021 and the Public Health Act on IPC in Khyber Pakhtunkhwa and Punjab. At the moment, notified national and provincial steering committees, IPC teams and committees in some health-care facilities' technical working groups for technical review in the NIH remain in place.
- Many tertiary health-care facilities have IPC plans and policies, and most of the WHO core components are present.
- In-service training modules exist for nurses, doctors and housekeeping staff. For IPC specialists, standardized IPC certificate courses, online courses and one-year diploma courses are available.
- Health-care workers were trained during the COVID-19 pandemic, with over 10 000 receiving a basic module training. Over 500 different categories of health-care workers were trained on standardized IPC modules.
- Standardized assessment tools – Infection prevention and control assessment framework– as well as customized tools (pandemic, cholera and flood response) were used.

#### Areas that need strengthening/challenges

- Implementation remains irregular; isolated facilities ensure that IPC standards are met and offer adequate care. However, stronger leadership commitment and engagement by practitioners or preventive action in facilities are needed.
- Hand hygiene remains unmonitored.
- Training is not standardized and has not been implemented on a larger scale.
- Data from assessment tools such as the Infection prevention and control assessment framework should be used to influence practice and policy.

Although there are plans and policies in many tertiary facilities, provision in secondary and primary care remains limited to a larger extent.

## R4.2. Surveillance of healthcare-associated infections

**Score 1: No capacity.** No national healthcare-associated infection surveillance programme or national strategic plan for healthcare-associated infection surveillance, including pathogens that are antimicrobial resistant and/or prone to outbreaks, is available or under development.

### Strengths/best practices

- A few hospitals undertake healthcare-associated infection surveillance (within the private sector only) and the healthcare-associated infection pilot initiated in few tertiary care hospitals in the public sector, monitoring healthcare-associated infections.
- High-quality microbiology laboratories exist but are limited to a few health-care facilities, primarily in the private sector.

### Areas that need strengthening/challenges

- An approach to monitor healthcare-associated infections in secondary and tertiary hospitals needs to be developed and advocated to monitor and manage the IPC programme. Given the complexity of continuous monitoring of all healthcare-associated infections, and the need to monitor nosocomial infection through the whole health system, periodic studies of surgical site infection may be appropriate.
- There is a need to develop a National Strategic Framework on healthcare-associated infections.
- Adopt a standard priority list of pathogens case definitions and methodologies for undertaking surveillance.
- Good quality microbiology laboratories for pathogen detection, sensitivity and genotype sequencing must be included in the national plan.

## R4.3. Safe environment in health-care facilities

**Score 1: No capacity.** National standards and resources for a safe built environment (e.g. WASH, screening, isolation areas and sterilization services in health-care facilities, including appropriate infrastructure, materials and equipment for IPC, as well as standards for reduction of overcrowding and for optimization of staffing levels in health-care facilities) are not available or are under development.

### Strengths/best practices

- National IPC guidelines for a safe environment in health-care facilities are developed with SOPs but require dissemination and implementation.
- The National Standards on Quality of Healthcare Services and Patient Safety 2022 are drafted, although the draft requires additional endorsement.
- The environmental protection hospital waste management rules remain available.
- Some hospitals, particularly private and tertiary institutions, provide high-quality environments and are in full compliance with cleaning and sterilization standards.
- A framework and action plan for WASH in health-care facilities is available for Punjab
- During COVID-19, WASH assessments were completed in hospitals, and cleaning and disinfection SOPS were adopted and implemented.

### Areas that need strengthening/challenges

- Although water in most facilities (60%) is available, its safety is not guaranteed and it requires subsequent chlorination.
- Investment in cleaning remains low, without adequate training and monitoring of standards.
- There is little control over private and informal facilities (the main providers of health care).
- There is a lack of standardization in sterilization services.
- There is a need to have standards on WASH, sterilization and the build environment with regard to safe health facilities

## Recommendations for priority actions

- Establish comprehensive IPC program. Establish IPC programmes that incorporate all WHO core components, with dedicated staff and budgets at national and facility levels. Ensure monitoring of their implementation.
- National, provincial IPC cadre/positions must be sanctioned.
- Implement IPC and WASH standards within health-care facilities and communities.
- Develop and implement infection prevention guidelines at veterinary hospitals, and for hygiene and biosecurity on farms, with One Health approach.
- Conduct specific studies/surveillance (when relevant) of healthcare-associated infection in secondary and tertiary care facilities, and ensure data are analysed, widely disseminated and utilized.
- Establish and enforce accountability mechanisms through regulatory bodies and enhance awareness to reduce the use of inappropriate and unsafe injections and infusions in health-care settings.
- Sustain and build on good practices and positive behaviour changes adopted during COVID-19.
- Review and revise national IPC guidelines to include provisions for ensuring a safe environment for health facilities guidelines.
- Develop and mandate Continuous Development Programmes for health-care workers at the facility level to introduce high standards of IPC knowledge and practices
- Address gaps in IPC infrastructure
- Develop and enforce national quality standards and provision of IPC supplies

# R5. Risk communication and community engagement

## Introduction

Risk communication should function as a multilevel and multifaceted process with the aim of supporting stakeholders in defining risks, identifying hazards, assessing vulnerabilities and promoting community resilience, thereby enhancing the capacity to cope with an unfolding public health emergency. An essential component of risk communication is the dissemination of information to the public about health risks and events (e.g. disease outbreaks). Implementation of effective risk communication should consider the social, religious, cultural, political and economic issues associated with an event, including the voice of the affected population. Communications of this kind promote appropriate prevention and control action through community-based interventions at the individual, family and community levels. Disseminating information through the appropriate channels is essential. Adopting innovative new approaches, including the use of digital platform and social media may add great value and shall be coupled with a feedback mechanism from the community. Communication partners and stakeholders in the country need to be identified and functional coordination and communication mechanisms should be established. Continuous training and capacity building of all stakeholders involved in risk communication will enable them to deliver timely, effective and accurate information. Timely release of information and transparency in the decision-making process are essential for building trust between authorities, populations and partners, and emergency communication plans should be tested and updated as needed. On the other hand, disinformation and rumors pose a significant challenge to public health initiatives and therefore, strategies shall be developed to counteract the myths and misinformation in the community.

## Target

State Parties' risk communication capacity should be strengthened and incorporate a multilevel and multifaceted process with real-time exchange of information and by seeking out expert advice and consultations with officials or people who face threats/hazards. Furthermore, it should consider the health, economic and social well-being of the population for better informed decisions to mitigate the effects of threats/hazards and take protective and preventive action. It should incorporate a combination of communication and engagement strategies such as social media communication, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement and community engagement.

## *Level of capabilities in Pakistan*

Although Pakistan's capacity in risk communication and community engagement (RCCE) has evolved, the considerably, overall capacity remains limited and no formal systems or mechanisms are in place. Additionally, most activities have been implemented on an ad hoc basis. However, the COVID-19 pandemic has elevated the need for RCCE at national and subnational levels, and capacity-building in this regard has seen advancements. This includes the provision of human resources to some extent, and better intergovernmental and developmental partner coordination for RCCE support. Some provinces and agencies have developed their own RCCE plans and outlined the roles and responsibilities of various stakeholders, including the government, private sector, and civil society organizations. However, resources remain scarce, and coordination is lacking in this area.

Pakistan has developed a communication strategy that proactively reaches out to a variety of media platforms (newspapers, radio, television, social media) to target communication messages towards specific audiences. Mechanisms for public communication, infodemic management, and behavioural and cultural insights are under development. SOPs and guidelines for RCCE activities are in place and public information is available at the NIH, NCOC and NOEC at the provincial levels. However, a national plan with sustainable resources is lacking.

Risk communication and community engagement is not embedded within the National Emergency/ Disaster Preparedness and Response Plan and the Ministry of National Health Services Regulations and Coordination capacity remains inadequate in this area. The COVID-19 pandemic has elevated the need for RCCE at the national and subnational levels and capacity-building in this regard has seen significant advancements. Although Pakistan's capacity in RCCE has evolved, the overall capacity remains limited and no formal systems or mechanisms are in place. Despite efforts to develop a federal-level multi-hazard, multisectoral RCCE strategic framework in 2021, the strategy has not yet been endorsed by stakeholders. Accordingly, most RCCE activities are implemented on an ad hoc basis, mainly at the onset of emergencies with no formal mechanisms for monitoring success or impact of activities and campaigns. Community engagement activities are also conducted on an ad hoc basis and, despite the distribution of community mobilization teams across all provinces, community engagement activities are not well integrated within the overall emergency response. Furthermore, capacities for risk communication, community engagement, infodemic management and rumour tracking, and coordination and integration of activities within the emergency response and management cycle are not consistent between the provinces.

Considering the decentralized system and semi-autonomous relationship the provinces have with the federal level, RCCE strategy-building capacities also vary at the provincial level. Punjab province has a functioning and fully operative health communication strategy issued under the directive of the Public Health Legislation Act, with SOPs and guidelines for proper implementation of RCCE activities. Sindh and Balochistan are currently developing their RCCE strategies, and most communicable disease programmes across the provinces have RCCE activities embedded in them. Furthermore, RCCE activities are included in the NAPHS (2017–2021).

The general absence of RCCE strategies extends to and compounds the limitations in RCCE response due to the absence of infodemic management strategies and capacities. Infodemic management is weak and sporadic at both provincial and regional levels, relying mainly on rumour tracking and verification under event-based surveillance conducted through PDSRUs. Media management and health education cells are established at the federal (NIH) level as well as the provincial levels in Punjab, Sindh, Khyber Pakhtunkhwa, and Azad Jammu and Kashmir.

There are active steps towards building RCCE capacities and the provision of human resources. Roles and responsibilities of RCCE staff are defined, but are not reflected in the National Response Plan. However, other ministries and entities, including the Ministry of Information and Technology, Ministry of Animal and Agriculture, the Environment Protection Agency, and NDMA/PDMA do lead the work on RCCE depending on the type of emergency. Accordingly, RCCE resources remain scarce, no permanent staff is allocated at federal or provincial levels, capacity-building is limited and focuses on limited scenarios, and coordination mainly takes place during emergency events.

During emergencies, coordination mechanisms are initiated at the federal level, where NIH (or the provinces themselves) issue alerts, activate SOPs, plan campaigns, and develop and disseminate messages. At provincial level, the same is shared with the districts. The national communication strategy includes mechanisms for proactively reaching out to a variety of media platforms (newspapers, radio, television, social media) to target communication messages to specific audiences. During COVID-19 and polio vaccination campaigns, sentiment analysis, media monitoring and rumour tracking are conducted through a real-time tracking system, and daily EOC meetings at the NIH act as an official platform for information-sharing. Similar mechanisms are available in Punjab province, where regular meetings of

the district health officials take place monthly. For non-emergency response activities, communication strategies are developed for the communicable disease interventions and regular public health events, including dengue, floods etc.

The experienced workforce and established community engagement mechanisms from the RCCE legacy polio programme and the recent mechanisms adopted for the COVID-19 response are vital and should be used a lesson learned and for future planning. Experiences in engaging religious leaders, ambassadors/ community influencers, and community volunteers such as the Lady Health Workers to provide information and address concerns, together with the various SOPs from other vertical programmes (e.g. vector-borne diseases, tuberculosis), should be used as baseline approaches to establish a national RCCE system.

Mechanisms, guidelines and SOPs for systematic community engagement in public health emergencies have been developed for polio and COVID-19 response. RCCE was included as a main pillar in the COVID-19 PPRP for 2020 and 2021. Community stakeholders were mapped by the Ministry of National Health Services Regulations and Coordination , with support from the NEOC, the NCOC, and provincial health departments for engagement in emergency response operations (e.g. dengue, COVID-19, polio, floods, XDR typhoid) and communities have been actively involved in emergency response. The nationwide Lady Health Workers programme, rapid response teams, surveillance officers and health education officers play an active role in multiple community engagement activities. Training is provided to most of those volunteers, although not on a regular basis.

A public health event verification system is in place and remains effective at all levels with the development of relevant SOPs. Additionally, the working group notification for RCCE at the national level has been implemented, as have some capacity and system-building activities. The country utilized its available resources and mechanisms for RCCE activities during different emergencies (e.g. dengue, COVID-19, floods).

A system was initially introduced under an EOC platform with a special focus on strengthening Public Information and Community Engagement for the PEI. A proper system was later developed during the COVID-19 pandemic and guidelines developed by WHO and UNICEF under the NCOC platform. However, this system faced sustainability issues once resources allocated for the COVID-19 emergency started to shrink. Post-pandemic, new issues emerged like Punjab operating three helplines (0800 99000 and 1033 besides 1166 managed by the NCOC) resulting in duplication and wastage of resources.

There are, however, no dedicated communication units in the provincial health departments or systems to deal with infodemics. Similarly, for capacity-building and training of health-care staff, limited internet platforms with technical and resource material are available. Audio-visual content has been developed for some emergencies such as polio, COVID-19, dengue and malaria, including vertical health programmes such as EPI, tobacco control, TB control and WASH interventions.

On the basis of the above overview, there have been significant gains from the experiences of the polio and COVID-19 responses that should serve as a basis for investing in and building permanent RCCE structures and capacities at national and provincial levels. Some missing elements would include investments in dedicated media and social media teams, assignments of a trusted and permanent spokesperson for health to ensure continuity and trust-building, and investing in mechanisms to fast-track clearance processes while SOPs are being finalized and endorsed. All relevant actors and stakeholders agree on the critical need for the Ministry of National Health Services Regulations and Coordination to address challenges in RCCE at the national level due to its vital role in emergency preparedness and response.

## Indicators and scores

### R5.1. RCCE system for emergencies

**Score 1: No capacity.** Mechanisms for RCCE functions and resources, including relevant aspects of infodemic management, and behavioural and cultural insights, are under development. Implementation and coordination of RCCE activities continue to be conducted on an ad hoc basis.

#### Strengths/best practices

- During the COVID-19 pandemic, a task force from the Ministry of National Health Services Regulations and Coordination and other partners was established for the sole purpose of working on risk communication activities.
- The polio response communication team was repurposed during the pandemic to support the COVID-19 risk communication strategy.
- An ad hoc mechanism was established for coordination with developmental partners during the COVID-19 pandemic.
- An RCCE plan is in place in Punjab and Balochistan with dedicated staff to implement RCCE activities.
- Different emergencies (e.g. dengue, COVID-19, floods) illustrated good examples of utilizing available human resources and mechanisms for RCCE activities.
- A multi-hazard and multisectoral risk communication framework for Pakistan was developed by the Ministry of National Health Services Regulations and Coordination in 2021, with the support of the World Bank.

#### Areas that need strengthening/challenges

- Based on experiences and existing structures, RCCE mechanisms and systems, infodemic management and behavioural insights should be developed at the national level.
- A national multi-hazard and multisectoral RCCE (including infodemic management and behavioural insights) strategy for health emergencies is not in place, and SOPs in this area have not been established. However, there are good examples from the provincial level that should be reviewed and considered, as well as other health and risk communication plans from the polio, vector-borne diseases, and TB programmes, as well as others.
- At the national and subnational level, no dedicated staff or unit for RCCE are in place. In the case of outbreaks or emergencies, it is primarily assigned or repurposed from other teams, particularly from public communications. Activities of RCCE are also supported by developmental partners or other programmes (e.g. polio).
- RCCE/communication for behavioural change is included within the NEOC's plan for polio. However, it is implemented only on an ad hoc basis within the public health EOCs.
- Punjab is setting up dedicated communication units that perform all the above tasks (print, electronic and social media monitoring and response plans). Streamlining of the helpline and its analysis to improve systems are underway.

### R5.2. Risk communication

**Score 2: Limited capacity.** Mechanisms for public communication, including infodemic management, are developed but not fully implemented, with significant gaps by specialists with minimal online and social media presence.

### Strengths/best practices

- Capacity-building activities in RCCE for the health workforce have been conducted at the national and subnational levels by vertical programmes, with support from development partners.
- Public communication is organized through the NIH, NCOC and NEOC, and is used to inform the public promptly with relevant information during major emergencies. Content development and message dissemination are well organized and coordinated across the sectors.
- There is strong communication coordination with development partners at the national and subnational levels during emergencies, although it falls short outside the context of specific events.
- Formal and informal community feedback mechanisms are available at the national and subnational level, including the 1166 hotline, media pools and two-way social listening activities, all of which are supported by development partners.
- Technical units are capacitated in the development of information, education and communication materials for different diseases/public health events, including the Rescue Department.
- At the provincial level, health authorities maintain collaboration with partners to report on and regularly monitor and address rumours and misinformation.

### Areas that need strengthening/challenges

- At the national and subnational levels, knowledge on infodemic management and the utilization of adequate tools remains limited. There is a need for infodemic management capacity-building at all levels of the government and sectors in order to build national social listening and an infodemic management system for health emergencies.
- Knowledge on the use of different social media platforms and new technology channels should be increased to raise public awareness and leverage risk perceptions, as well as to use available tools for the monitoring of behavioural and infodemic insights.
- Although capacity for producing communication materials and content exists, no systematic monitoring and evaluation of these activities is in place. The national RCCE plan should be based on strong coordination for the implementation of RCEE activities at all levels and between partners, with an effective monitoring and evaluation framework and collection of data relevant to the targeted RCCE response.

## R5.3. Community engagement

**Score 2: Limited capacity.** Mechanisms for systematic community engagement in public health emergencies, including guidelines and/or SOPs, have been developed. Community engagement activities involve some community participation, including consulting and gathering feedback on decisions and actions.

### Strengths/best practices

- Community stakeholders have been mapped by the Ministry of National Health Services Regulations and Coordination with the support of the NEOC, NCOC and provincial health departments for engagement in emergency response operations.
- The experienced workforce and establishment of community engagement mechanisms form the RCCE legacy from the polio programme.
- A community feedback mechanism established through other programmes and departments may easily be used for all kinds of emergencies.
- There is good rapport between the local authorities, provincial departments of health, security forces, and developmental partners to implement community engagement actions.
- The role of the Lady Health Workers programme and the community engagement programme within the Rescue Department have been essential in disseminating health messages and working with communities.

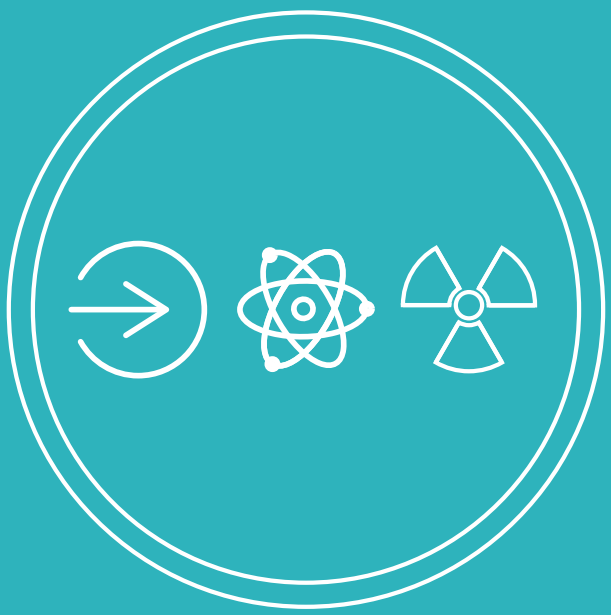
### Areas that need strengthening/challenges

- To strengthen community engagement at the national, subnational and local levels, SOPs for community engagement in health emergencies should be developed, leveraging experiences and existing structures for community engagement from health authorities and other partners.
- Although collecting insights from the community may be carried out informally, there is a need to systematize social listening feedback and insights and utilize them to adjust RCCE actions and re-strategize the overall emergency preparedness and response activities.
- Community engagement is deeply embedded in countries' different emergency response efforts and its coordination, collaboration and communication methods should be maintained and strengthened. It is pivotal to consider risk communication but also community engagement activities in any simulation exercise that is organized at the national, subnational and local levels to evaluate emergency or disaster systems.
- In Punjab, enhance social listening and develop content accordingly with a development of web platforms.

## Recommendations for priority actions

- Prioritize RCCE (including infodemic management and behavioural insights) and integrate RCCE activities as key elements for preparedness, readiness and response mechanisms for emergencies and position it within the public health emergency operating centre structure.
- Develop a fully resourced RCCE system, leveraging on existing mechanisms and structures in the Ministry of National Health Services Regulations and Coordination and NIH, and best practices and experiences from the national and subnational level.
- Set up a dedicated RCCE team/unit based on the RCCE infodemic management competency framework and provide them with formal trainings and adequate resources.
- Develop a national multi-hazard and multisectoral RCCE (and infodemic management) strategy/action plan and SOPs for its operationalization that is endorsed by high level officials and implemented, in collaboration with partners, and ensure that it is regularly tested and updated.
- Establish SOPs for community engagement as a guiding document to manage activities related to strengthening community engagement, including systematic social listening, community feedback and infodemic insights collection during health emergencies, leveraging on lessons identified from other health programmes (e.g., polio, vector-borne diseases, COVID-19 and immunization).

# IHR-related hazards and points of entry and border health



# PoE. Points of entry

## Introduction

All core capabilities and potential hazards apply to "points of entry" (PoEs), thereby enabling an effective enforcement of measures to prevent the international spread of disease. States Parties must maintain key capabilities at designated airports, ports and land borders to implement specific measures needed in managing a variety of public health risks.

## Target

States Parties designate and maintain core capacities at international airports and ports (and, where justified for public health reasons, a State Party may designate ground crossings) that implement specific public health measures required to manage a variety of public health risks. Timely detection of and effective response to any potential hazards that occur at PoEs are desired.

## *Level of capabilities in Pakistan*

Pakistan shares borders with four countries – India to the east, Afghanistan to the west, Iran (Islamic Republic of) to the south-west and the People's Republic of China in the far north-east – and has a 990 km coastline along the Arabian Sea and the Gulf of Oman in the south. Pakistan is a signatory to all International Sanitary Regulations, including the IHR (2005). The country is also a signatory to regulations under the International Civil Aviation Organization and International Maritime Organization. The relevant legislation on airports and ports, namely Aircraft Public Health Rules (1970) and Port Health Rules (1974), have been promulgated by the country in this regard. Pakistan has intensified its efforts to fulfill its responsibilities for IHR implementation and to enforce compliance

Pakistan designated and maintained core capacities at 18 PoEs – nine airports (Islamabad International airport, Jinnah International Airport Karachi, Allama Iqbal International Airport Lahore, Bacha Khan International airport Peshawar, Quetta International Airport, Multan International Airport, Sialkot International Airport, Faisalabad International Airport, and Gawadar International Airport), six ground crossings (Chaman, Khokarapar, Sost, Taftan, Thurkum and Wagah) and three international seaports (Bin Qasim, Gawadar, Karachi) and Keemari) – that implement specific public health measures required to manage a variety of public health risks. Eight international airports (Faisalabad, Islamabad, Karachi, Lahore, Multan, Peshawar, Quetta and Sialkot) are operational to date.

As reported in the 2022 IHR States Parties Self-Assessment Annual Reporting Tool (SPAR) and according to the IHR definition, three international seaports have been added to the IHR list of authorized ports to issue Ship Sanitation Certificates. Several efforts are in place to implement core capacity requirements at all times for PoEs since some designated PoEs are implementing all routine core capacities, including reporting on biological hazards (event-based and early warning surveillance) and data integration into the national surveillance system.

In Pakistan, the capacity required at all times for the PoE is developed but not sustained. Some designated PoEs are implementing all the routine core capacities and these designated PoE are integrated into the national surveillance system for biological hazards/all hazards (e.g. event-based and early warning surveillance). The airports at Karachi, Lahore and Islamabad and the Karachi seaports are implementing all the routine core capacities and sharing regular information with the National Surveillance System through the Border Health Services Focal Point. On other hand, no land crossing is implementing the routine core capacities. Services provided include a range of medical services through available medical and

paramedical staff; initial assessment and care of ill travellers; provision of immunization services (all age polio and yellow fever) and specific measures for specific threats/alerts. Additionally, a wide range of data management activities that cover epidemiological surveillance of important/notifiable diseases/events have been implemented since 2021 but the sustainability is challenging following withdrawal of WHO supported human resource (data entry operators).

The designated PoEs in Pakistan have access to appropriate medical services, including diagnostic facilities for the prompt assessment and care of the sick. This was noticed mainly in the airports, however, as all the ground crossing points lack isolation facilities, have no diagnostics (only a rapid antigen test in COVID-19), and have no or limited services for transportation to referral facilities. Designated PoEs have limited access to equipment and personnel for the transport of sick travellers to an appropriate medical facility; additionally, the designated hospitals identified in respective contingency plans. Few of the designated PoE have written multisectoral procedures for detecting, notifying and responding to ill travellers and PoE workers, particularly in Islamabad, Lahore and Karachi airports. Similarly, the referral facilities are to be identified and notified through a collaborative mechanism with provincial health departments at the respective PoE. Additionally, the port health rules of 1974 also define procedures that are applicable at all ports in Pakistan. Part of the designated PoEs in Pakistan carry out inspection programmes to ensure a safe environment at PoE facilities, especially in the seaports where the inspections programmes are carried out smoothly since the ships require health clearance certificates and ship sanitation certificate from port health officers.

Staff, facilities and equipment are available for safe transportation of sick travellers to medical facilities at three major airports (Islamabad, Karachi and Lahore), and to the quarantine and isolation hospital at Karachi airport for suspected sick travellers. Additionally, the Border Health Services of Pakistan has a comprehensive data collection, analysis and interpretation system at the PoE for sharing with the national dashboard. There is evidence of control of vectors and reservoirs in and near PoEs. This was documented at airports and seaports and this is implemented by the Border Health Services and the provincial health authorities.

The designated PoEs in Pakistan have some capacities to apply recommended measures to disinfect, decontaminate or otherwise treat baggage, cargo, containers, conveyances, goods or postal parcels, including when appropriate, at locations specially designated and equipped for this purpose. Good practices include random inspection of aircraft by airport health authorities. As well as inspections of every ship on a regular basis, at seaports fumigation and de-ratting are carried out by licensed private companies. Some designated PoEs have developed a PoE multisectoral public health emergency contingency plan for events caused by biological hazards; these PoEs have an emergency contingency plan for accidental emergencies at airports, and a COVID-19 Response Plan at Karachi Port and Port Bin Qasim. Although some designated PoE have developed a Multisectoral Public Health Emergency Contingency Plan for events caused by biological hazards, Pakistan has yet to develop PoE public health emergency contingency plans for events caused by all hazards at all designated PoEs. These plans will need to be implemented , reviewed, evaluated and updated on a regular basis. Additionally, border health authorities integrate activities concerning PoEs (such as for early detection, assessment, notification, report of events) into national emergency response plans and the SoPs derived from the plan. Additionally, the border health authorities disseminated the public health emergency contingency plans to all relevant stakeholders, including national-level authorities.

The designated PoEs in the country have capacity to apply recommended health measures related to travellers at PoEs (such as a system in place for safe referral and transfer of sick travellers to appropriate medical facilities, with MoUs, SOPs, trained staff, equipment, and regular exchange of information between PoEs, health authorities and facilities for all designated PoEs). The country has well defined Mechanisms and SOPs in plans for identification of sick travellers and referral to concerned health facilities however the formal MoU is not existent between PoE and health-care facilities and there is no exchange of information between the health facilities and PoEs.

In Pakistan, there is no national multisectoral mechanism to conduct risk-based approaches for strategic planning for international travel-related measures, including prevention, detection/investigation, response and recovery. However, a multisectoral process to determine the adoption of international travel related measures on a risk-based manner includes mechanisms to conduct risk assessments and implement risk mitigations measures at national, intermediate and local levels, including within the PoE premises, for prevention, detection/investigation, response and recovery, which may be operationalized through national plans, guidelines and SOPs.

The country has a national multisectoral process (event-based) with mechanisms in place, involving all relevant sectors (i.e. health, transportation, migration, customs), to make policy decisions on international travel-related measures to respond to public health events (i.e. exit/entry screening, contact tracing, testing, quarantine).

Pakistan conducted a risk assessment to ensure that decisions on international travel-related measures are commensurate with the public health risk, however, the risk assessment not in structured manner and PoEs authorities follow the NCOC advisories based on the global situation (contextualized). There are systems and staff in place to collect, compile, manage, analyse, interpret and act on data related to travellers or population mobility at national, intermediate, local and/or PoE levels to identify areas at increased risk for spread of communicable disease. Several good practices were identified, including the Travellers Surveillance Management Information System operated by Data Entry Operators (WHO-supported) at the major Points of Entry in Lahore, Peshawar, Quetta, Karachi and Islamabad. However, sustainability of this system faces a looming challenge following the withdrawal of WHO-supported trained and experienced DEO. Non-availability of staff could potentially create gaps in the existing surveillance systems, jeopardizing the continuity and effectiveness of data management activities including accurate and precise reporting.

There is need to direct efforts towards enhancing departmental capabilities for epidemiological surveillance to reduce reliance on external support in the longer term. This could involve developing a cadre of skilled professionals and establishing robust systems for data collection and analysis.

The information gathered by PoE staff about international traffic associated with public health events detected at PoEs and at local health-care facilities is sent to local health authorities for surveillance action, contact tracing and other response measures. However, data from local health authorities are not in place. Pakistan has specific mechanisms and tools, such as guidelines and SOPs, which are developed for the implementation of international travel-related measures. The assessment revealed that there are guidelines and SOPs issued by NCOC, Federal Ministry for important events such as COVID-19. There are also rules providing guidance on implementation of international travel-related measures like port health rules, aircraft rules, and the SOPs were also outlined in the contingency plans of airports and seaports.

A systematic national multisectoral process to consider the application of measures at national, intermediate and local levels is not in place. The relevant department usually conveys the measures to be implemented (e.g. livestock, plant protection). There is some provision available regarding human health. Deficient port health rules (can detain aircraft or ship provided strong diagnosis is available). Example Culling of Sheep herd from Australia, Decision of 2% passengers of all in-bound flights for COVID-19.

At PoE level, stakeholders have been identified. However, some essential capacities and aspects of intersectoral collaboration/coordination should be strengthened in the provinces. For example, in Sindh, positive collaboration was demonstrated in the Karachi seaport while evaluating site capacities. The Islamabad International Airport also maintains a positive relationship with immigration professionals and with airport management. At the Wagah land border, capability development began during the COVID-19 pandemic, and is currently at the same level as at other PoEs.

## Indicators and scores

### PoE1. Core capacity requirements at all times for PoEs (airports, ports and ground crossings)

**Score 2: Limited capacity.** Some designated PoEs are implementing some of the routine core capacities based on a completed associated strategic risk assessment.

#### Strengths/best practices

- There is sustained implementation of some routine core capacities under the IHR (2005), including screening and surveillance activities at some PoEs.
- Digitalization of the Travellers Surveillance Management Information System, the National Immunization Management System, polio at all ages, and yellow fever vaccine reporting (software applications) introduced in June 2022.
- A single window system is available.
- Quarantine facilities are available and were appropriated for legal imports of animals and follow the World Organisation for Animal Health (WOAH) guidelines.
- There is a positive change in mindset on the importance and advantages of articulation/ collaboration between different stakeholders.
- The designated seaports are enlisted in the IHR list of authorized ports for issuance of Ship Sanitation Certificates.

#### Areas that need strengthening/challenges

- Currently, no PoE is implementing all routine core capacities, which would enable them to move towards a score level of 3 upon implementation.
- The relationship with all stakeholders should be strengthened at local, regional and national levels through the creation of an intersectoral coordination mechanism (including referral laboratories for the collection and identification of biological human, animal and environmental samples).
- Appropriate quarantine facilities need to be established for sick or suspected travellers or workers at each PoE (e.g. decent water supply and dedicated toilet facilities).
- Most animal crossings are illegal and the animals do not come through border PoEs.
- Integrate the public health PoE component within the existing single window system.
- Ensure cross-border collaboration at ground crossings.
- Digitalization of the Travellers Surveillance Management Information System needs sustainable support from the government.

### PoE2. Public health response at PoEs

**Score 2: Limited capacity.** Some designated PoEs have developed a PoE multisectoral public health emergency contingency plan for events caused by biological hazards.

#### Strengths/best practices

- Some PoEs have developed a COVID-19 response plan, including a 100% rapid antigen test and polymerase chain reaction testing of all in-bound passengers for the five waves of COVID-19.
- Staff are present round the clock.
- Staff show dedication and commitment to respond to public health emergencies.
- Screening and surveillance activities are established.
- Pakistan is the first country in the Eastern Mediterranean Region to digitalize the Travellers Surveillance Management Information System, the National Information Management System, polio at all ages, and yellow fever vaccine reporting (software applications).

### Areas that need strengthening/challenges

- Articulation/coordination with other stakeholders should be strengthened.
- Ensure a public health response plan for all-hazards is in place (One Health approach) and is tested at each PoE.
- Carry out emergency exercises with other stakeholders involved in public health emergencies.
- Include a public health representative in the PoE emergency committee, and in the facilitation committee at designated airports.
- Sustainability of the Travellers Surveillance Management Information System is challenging due to its being donor-funded.
- There is need to direct efforts towards enhancing departmental capabilities for epidemiological surveillance to reduce reliance on external support in the long term. This could involve developing a cadre of skilled professionals, establishing robust systems for data collection and analysis.
- Establish a facilitation forum/committee at designated seaports with all relevant stakeholders.

## PoE3. Risk-based approach to international travel-related measures

**Score 1: No capacity.** A national multisectoral mechanism to conduct risk-based approaches for strategic planning for international travel-related measures, including prevention, detection/investigation, response and recovery, is under development.

### Strengths/best practices

- A draft for a revised IHR-compliant PoE legislation has been completed.
- A clear understanding has been made on the importance of a multisectoral process to determine the adoption of international travel-related measures through a risk-based manner and its essential elements.

### Areas that need strengthening/challenges

- Outdated rules (port health/aircraft rules) remain in place.
- Ground crossing rules are non-existent.
- Endorsement of rules and regulations from 2021 are pending.
- A multisectoral national strategy is needed to conduct risk-based approaches.

## Recommendations for priority actions

- Continue to build surveillance and response core capacities at designated PoEs integrated with the national system.
- Develop the infrastructure for the use of digital applications in the context of travel.
- Establish quarantine facilities for sick or suspected travellers or workers at each PoE with appropriate facilities.
- Enter in cross-border collaboration to ensure minimum capacities at ground crossings.
- Develop public health contingency plans for designated PoEs and test their functionality.
- Promote understanding and use of a risk-based approach to inform travel advice and sanitary measures.

# CE. Chemical events

## Introduction

Uncontrolled chemical events can constitute a significant threat to public health, service sectors and infrastructure unless coordinated multi-agency responses are mobilized in a timely manner.

## Target

State Parties with surveillance and capacity for chemical risks or events. This requires effective communication and collaboration among the sectors responsible for chemical safety, including health, occupational health, emergencies, environment, transportation and safe disposal in agriculture/veterinary as well as industries.

**Desired impact**

Timely detection of and effective response to potential chemical risks and/or events in collaboration with other sectors responsible for chemical safety, industries, transportation and safe disposal.

## *Level of capabilities in Pakistan*

Pakistan embraces industrialization, recognizes common security treats, and acknowledges the need to protect the environment and population health from chemical hazards of unknown, diffused and unpredictable sources.

Pakistan is a signatory of various international agreements (multilateral environmental agreements, or MEAs) and chemical conventions. SOPs/guidelines/rules are available for surveillance and assessment of chemical events but are not available for intoxication and poisoning. The Ministry of Climate Change has an international cooperation wing that deals with issues related to hazardous chemicals, in collaboration with the relevant authorities. The list of legal acts assigned by the country to support chemical events include: Import Policy Order, 2022; Sindh Hazardous Substance Rule, 2014; Punjab, Sindh Hospital Waste Management Rules, 2014; National Hazardous Waste Management Policy, 2022; Pakistan Environmental Protection Act, 1997; Azad Jammu and Kashmir Environmental Protection Act, 2000; Punjab Environmental Protection Act, 2012; Balochistan Environmental Protection Act, 2013; Sindh and Khyber Pakhtunkhwa Environmental Protection Act, 2014; Gilgit-Baltistan Environmental Protection Act, 2015; Pakistan Climate Change Act, 2017; Major Multilateral Environmental Conventions/ Agreements like the Rotterdam convention, Stockholm convention and Basel convention where Pakistan is a Party; Punjab and Sindh Environmental Quality Standards (PEQS) for Treatment and Disposal of Bio-Medical Waste by Incineration, Autoclaving, Microwaving, and Deep Burial, 2016; Pakistan Nuclear Regulatory Authority Ordinance, 2001; The Punjab Healthcare Commission Act, 2010; Sindh Healthcare Commission, 2013; and National/ The (Punjab) National Calamities (Prevention and Relief) Act, 1958.

These SOPs and guidelines are implemented under the above-stated laws by the Ministry of Commerce, Ministry of Climate Change, provincial and federal EPAs of Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan and autonomous areas of Azad Jammu Kashmir and Gilgit Baltistan, national and provincial disaster management authorities, and provincial health-care commissions/health departments.

Concerns about chemical risks and safety have traditionally focused on the use of agrochemicals in the large agriculture sector and, more recently, on air pollution, particularly in large cities such as Lahore. Laboratory facilities exist within academic and government research sectors and have the capacity to

detect the environmental presence of some chemical substances in air, water and wastewater. The provinces of Punjab, Sindh and Khyber Pakhtunkhwa have significant industrial entities, ranging mostly from small to medium as well as a few large-scale entities, and all export-oriented industrial units comply with international standards.

Pakistan's national EPA is responsible for the protection and well-being of the environment while the National Disaster Management Authority (NDMA) is the lead authority for coordinating multi-agency responses to major disasters, including significant chemical events. Concerned agencies and authorities carry out assessments of chemical management according to their respective rules and regulations.

EPAs, agriculture and industries within their own spheres are the authorities/agencies with primary responsibility for chemicals management and surveillance/monitoring of chemical events in Pakistan; while others such as the Home department and Petroleum ministry deal with explosives and Anti-Narcotics (drugs). Laws include the Federal Plant Protection and Agriculture extension Agriculture under the Pesticides ordinance 1971 and Rules 1973; the Punjab Pesticide Act 2012 and amended rules 2018; the Sindh Fertilizer Control Act 1994 and Rules 1999. Unfortunately, surveillance and information flow from line departments and ministries are inefficient due to lack of coordination.

National and provincial Consumer Rights Protection Acts and provincial Food Authorities play the role of monitoring consumer products (foodstuffs and goods) in relation to chemical hazards. Provincial labour departments – e.g. Sindh occupational Safety and Health Act, 2017 – are the procedures for health risk assessment in chemicals surveillance/monitoring to inform a chemical event response. National and provincial EPA laboratories and their private certified laboratories have the capacity for systematic analysis; Health Department (Forensic laboratories). However, the existing analytical laboratories need to be strengthened and their number enhanced.

The current human resources are not sufficient to meet the needs for managing chemical events, and the current financial resources are not sufficient to meet the needs for chemical safety. Reports of investigations into chemical events are produced but not disseminated, and the feedback on data and response activities in chemicals surveillance/monitoring is not regular.

There is only one poison centre at Jinnah Postgraduate Medical Hospital, Karachi, Sindh, Pakistan.

There is no strategic plan to strengthen the assessment and management of chemicals. The authorities need to prepare strategic plans based on the national chemical profile to strengthen the assessments, classification and management of chemicals with a multisector approach.

The Ministry of Climate Change, Ministry of Commerce and NDMA form the national coordinating body with regard to the assessment and management of chemicals and chemical events. There is no public health plan for chemical incidents/emergencies in the country.

The response levels of the agencies and authorities in Pakistan are adequate. However, limited budget can be mobilized for an event of a public health emergency of chemical origin and they are lagging in pre-emptive and precautionary planning. A systematic approach should be adopted in the management of chemical sectors by utilizing infrastructure and available experience in the country.

## Indicators and scores

### CE1. Mechanism established and functioning for detecting and responding to chemical events or emergencies

**Score 2: Limited capacity**

Strengths/best practice

- Some guidelines and supporting information are available to assess and manage chemical events, intoxications and poisonings, with information being variable between provinces. Some information is recorded in some of the provinces (Sindh and Punjab) through primarily paper-based systems. Some capability exists in hospital wards to treat poisoned patients (e.g. in Karachi).
- Surveillance is done through EPA staff based on rules/guidelines, as per their legal instruments and rules. SOPs and guidelines are available for surveillance and assessment of chemical events.
- The Civil Defence and the Emergency Services Department (Rescue 1122) take part in incident response.
- Some capabilities exist for analysing air concentrations of certain pollutants (e.g. SO2, NOx, O3 and particulate matter) and pollution levels in water and wastewater emitted by industries (e.g. heavy metals). Information on air pollution is available in large cities (e.g. Lahore) where improving air quality is a key priority due to high levels of air pollution.

#### Areas that need strengthening/challenges

- Regulatory inspections of sensitive industrial facilities, leftover stockpiles and chemical wastes are conducted on an ad hoc basis and are limited. In addition, no integrated surveillance or early alert protocol exists between relevant industries, regulatory authorities, emergency responders/services and health sectors to rapidly detect and contain accidental, natural or deliberate releases.
- Discharges of untreated waste waters into surface water bodies are affecting the food chain/food webs.
- Health hazards due to a lack of health and safety measures and equipment should be addressed.
- Poisoned patients can be treated in some hospitals (e.g. Karachi), but poisons information centres in Pakistan have yet to be established.
- Chemical incident surveillance is limited, and a lack of coordination limits information flow from the relevant departments to ministries. Surveillance of sentinel health events that may signal a hazardous chemical exposure is also limited.
- National laboratory capacity should be strengthened, and laboratory numbers increased.

### CE2. Existence of an enabling environment, including national policies, plans or legislation in place for management of chemical incidents

**Score 2: Limited capacity**

Strengths/best practice

- Sufficient legislation is available to implement the provisions of relevant legislation, including the backing of courts and dedicated tribunals. Most legislation has framework regimes, including special laws and dedicated infrastructures for implementation, as well as dedicated courts and tribunals to move forward with the prosecution of polluting industries.
- National and provincial environmental quality standards and multisectoral strategic plans are available to strengthen the assessment and management of chemicals.
- Pakistan has developed the National Profile for Chemicals Management 2020 (Ministry of Climate Change).
- Several authorities (e.g. Rescue 1122, Civil Defence, EPA and Disaster Management Authorities) respond to chemical events and accidents in a coordinated manner.

### Areas that need strengthening/challenges

- Authorities should prepare strategic plans based on national chemical profiles to strengthen the assessment, classification and management of chemicals through a multisectoral approach.
- A public health plan for chemical incidents and emergencies that takes account of the range of functions needed during a crisis has not been developed.
- There are no multisectoral/interdisciplinary coordination mechanisms in place with respect to chemical management among the relevant agencies/authorities.
- An awareness programme is needed to familiarize the population on the health impacts of chemical exposures and methods of reducing their effects.

## Recommendations for priority actions

- Identify priority chemicals and national inventory of facilities of chemical storage and develop health plans for managing chemical incidents.
- Develop poisons information centres for the provision of clinical management advice and enhance laboratory testing.
- Develop a mechanism to collate data on chemical exposures for toxicovigilance and surveillance.

# RE. Radiation and nuclear emergencies

## Introduction

A lot of nuclear and radiation facilities operate in Pakistan that are involved in production, use, operation or storage of nuclear or radioactive material, and radiation-generating apparatus in various fields such as energy, health, agriculture, industry, education and research. The Pakistan Atomic Energy Commission is the major stakeholder in the country that owns and operates several nuclear and radiation facilities and accordingly manages various aspects related to surveillance, preparedness and response for radiation safety.

In the area of emergency preparedness and response in relation to nuclear or radiation emergencies that might occur in the said facilities and installations, Pakistan has established a multi-dimensional mechanism. Key elements in this mechanism are based on the roles of a national nuclear regulator, operator of the facility, national-level emergency management system and its stakeholders, as well as on emergency response and protection arrangements that are in place on the site and in the nearby (off-site) areas, if so required. Under this mechanism, Pakistan has adequate available resources, performs safety assessments of medical and other radiation facilities, and the nuclear and radiation facilities provide annual safety reports that are reviewed by the PNRA in its role as a national nuclear regulator. The National Radiation Emergency Plan has been devised as part of the Nuclear Emergency Management System that falls under the National Disaster Management Authority and addresses all radiation and nuclear emergencies. Adequate legislation, policies and plans are in place at all levels, and the country has sustainable capacity to respond to all types of radiation and nuclear emergencies. Mechanisms have been established for detecting and responding to radiation and nuclear emergencies, and emergency plans are revised and updated regularly. Furthermore, adequate resources are available for surveillance, laboratory analyses, hazard assessments and conduct of exercises and drills. Medical facilities for treating contaminated individuals or victims of radiation emergencies are enlisted and remain available with adequate resources. Additionally, a coordination mechanism with relevant stakeholders is in place, and international standards and guidance are closely followed and regularly evaluated.

## Target

States Parties should have surveillance and response capacity for radiological emergencies and nuclear accidents. This requires effective coordination among all sectors involved in radiation emergencies preparedness and response.

## *Level of capabilities in Pakistan*

Several efforts in Pakistan are ongoing to have enabling environment in place for management of radiological and nuclear emergencies: for instance, the National Radiation Emergency Plan exists, plans for Radioactive Material Transport Safety and Radioactive Waste Management are prepared and approved. Additionally, national regulations, plans, procedures and guidelines exist; radiation monitoring mechanisms exist at facility, district, provincial and national levels; SOPs for hazard assessment, notification, reporting etc. are developed; interagency coordination and information exchange mechanisms exist under the National Radiation Emergency Plan; and a mechanism is in place to access health facilities for management of radiation victims

There is a mechanism is in place to access health facilities with capacity to manage patients of radiation emergencies. Several good practices were noticed during the assessment – including, national regulations, plans, procedures and guidelines for nuclear/radiological emergencies. The radiation monitoring mechanisms exist at facility, district, provincial and national levels. The SOPs for various aspects like hazard assessment, notification, reporting etc. are developed and included within the emergency plans. Interagency coordination and information-exchange mechanisms exist under the National Radiation Emergency Plan, and a mechanism is in place to access health facilities with capacity to manage radiation victims in case of radiation emergencies.

There are national policies, strategies or plans available for detection, assessment, response and recovery after radiation emergencies, as the government of Pakistan has defined the responsibilities for managing nuclear or radiological emergencies through the Pakistan Nuclear Regulatory Ordinance, 2001, National Disaster Management Act, 2010 and National Command Authority Act, 2010. Accordingly, a National Radiation Emergency Plan (NREP) has been established for detection, assessment, response, and recovery after radiation emergencies. The National Radiation Emergency Plan is implemented, with verification undertaken during periodic inspections and regular mock-up exercises. Furthermore, the plan is updated regularly, and such revision incorporates experience and feedback on any real events and lessons learned during the exercises. Additionally, feedback from international experience is also considered during revision.

In accordance with the regulatory framework established by the PNRA, the operating entities are responsible for preparation of emergency plans. These plans include arrangements for emergency preparedness and response, including radiation monitoring at facility level. The PNRA oversees implementation of this requirement. At national level there is a mechanism established under the National Radiation Emergency Plan for radiological monitoring. This mechanism operates with support from all relevant organizations and agencies at federal, provincial and district levels. Regulations notified by PNRA take care of the undue radiation exposure from consumer products. These regulations establish criteria for, inter alia, import/export and domestic use of such products. In case the presence of radioactive contamination/material is detected at border PoEs, PNRA regulations have provision for declining such trade transfers. In addition, the PNRA can impose restrictions on import of edible or other goods from any specific country based on radiation concerns. However, the capacity of the border-control authorities needs improvement in terms of scanning and monitoring cross-border trade.

In Pakistan there are procedures for risk assessment in radiological surveillance/monitoring in order to trigger/mount a response of suitable composition and magnitude, as per the regulatory framework established by the PNRA. The operating entities are responsible for preparation of emergency plans. These plans also include various procedures to be carried out at the preparedness and response stages under the plan, such as environmental radiological monitoring and risk assessment. The emergency response is initiated, managed and coordinated in line with this plan at the facility level. The emergency response arrangements are made according to the hazard associated with the facilities.

The country has laboratory capacity for monitoring and assessment of radioactive contamination of the environment. In case of a radiation emergency, Pakistan has established several laboratories for environmental monitoring throughout the country. These laboratories have the capacity to perform radiological environmental monitoring based on sample analysis. Their capability is regularly tested during the conduct of various mock-up exercises. In addition, Pakistan has access to international assistance for radiological environmental monitoring under the International Atomic Energy Agency (IAEA) Response and Assistance Network. Additionally, Pakistan has arrangements for monitoring of internal contamination, e.g. in the form of whole-body counters and through bioassay.

Pakistan is advanced in having surveillance and response capacity for radiological emergencies and nuclear accidents. To achieve this, Pakistan developed effective coordination among all sectors involved in radiation emergencies preparedness and response by developing strong interagency coordination and information-exchange mechanisms implemented under the National Radiation Emergency Plan.

Timely detection and effective response to potential radiological emergencies and nuclear accidents in a cross-sectoral coordinated manner is ongoing and involves a wide range of stakeholders – e.g. federal and provincial government departments and organizations, including Ministry of National Health Services Regulations and Coordination, provincial health ministries, district management authorities, provincial food authorities and departments, and the Nuclear Regulator. Additionally, the federal and provincial emergency services organizations – such as the police, Rescue 1122, the fire service, the Meteorological Department, Customs and other border-control authorities, as well as federal and provincial departments of transportation etc. – are involved.

In the matter of training programmes available for emergency responders in the country or abroad, the assessment revealed that, under the National Radiation Emergency Plan and organizational plans, a training programme exists for capacity-building of emergency responders. This programme encompasses training at national and international levels through IAEA, the World Association of Nuclear Operators (WANO) etc. Pakistan is advancing to make the current human resources sufficient to meet the needs of radiation protection and safety. In line with PNRA regulations, the operating entities are required to ensure the availability of sufficient human resources for safe operation and responding to any nuclear or radiological emergency. However, Pakistan can request international assistance in this regard under the IAEA Response and Assistance Network , if required.

An inventory of reference/designated health-care facilities for radiation emergencies exists at national level, and guidelines for handling/management of contaminated or over-exposed individuals are available that are issued by the PNRA. Accordingly, all the relevant health-care facilities have protocols for treatment of over-exposed persons in case of radiation emergencies. Among best practices in Pakistan are the existence of national regulations, plans, procedures, guidelines, interagency coordination and communication mechanisms, independent national nuclear regulatory, plans for radiation emergencies, and radioactive material transport safety and radioactive waste management. Additionally, Pakistan regularly conducts simulation exercises and has participated in international exercises and hosted international review missions.

Furthermore, in Pakistan, radiation emergency response drills and other exercises are carried out regularly, including the requesting of international assistance (as needed) and international notification. The National Radiation Emergency Plan exists with the Ministry of National Health Services Regulations and Coordination as a stakeholder.

In Pakistan, there is a policy or strategic plan for ensuring safe use of radiation. Compliance with these regulations ultimately ensures safe use of radiation in the country. These regulations are revised and updated in accordance with the safety standards adopted by the IAEA. The licensed facilities prepare and implement their respective radiation protection plans in accordance with PNRA regulations to ensure radiation safety and protection. At national level, a high-level Oversight Committee has been established, comprising of members from all relevant organizations, for taking critical decisions and coordination in case of a nuclear or radiological emergency. There is an emergency response plan for radiological and nuclear emergencies, and a National Radiation Emergency Plan has been prepared for this purpose, considering the IAEA safety standards GSR Part 7 and National Regulations on Management of a Nuclear or Radiological Emergency – (PAK/914). The national emergency plan covers the range of functions required in a crisis, taking account of the availability of resources and SOPs, roles and responsibilities, public communication, referral, transport and treatment of large numbers of affected individuals, stockpiling of equipment and medication, decontamination of people, premises and environment, restrictions, evacuation, and emergency funds.

## Indicators and scores

### RE1. Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies

**Score 5: Sustainable capacity**

#### Strengths/best practices

- Adequate national regulations, policies, plans, procedures and guidelines are in place.
- Radiation monitoring mechanisms are in place at all levels (facility, district, provincial and national).
- SOPs have been developed and are regularly updated for hazard assessments, notifications and reporting.
- Interagency coordination and information exchange mechanisms exist under Pakistan's National Radiation Emergency Plan.
- Mechanisms have been established for access to health facilities to manage individuals exposed to radiation.

#### Areas that need strengthening/challenges

- There is a need to enhance the number of state-of-the-art medical facilities, laboratories, and inventories of pharmaceutical agents, along with other necessary equipment for radiation emergencies at national level.

### RE2. Enabling environment in place for management of radiological and nuclear emergencies

**Score 5: Sustainable capacity**

#### Strengths/best practices

- National radiation emergency plans are well established.
- Radioactive material transport safety and radioactive waste management are prepared and approved before transporting radioactive waste.
- Interagency coordination and information exchange mechanisms exist under the National Radiation Emergency Plan.
- Emergency preparedness drills and exercises are conducted at facility and national levels.
- Radiation experts participate in the IAEA emergency exercises.
- Pakistan is State Party to the Early Notification and the Assistance Conventions as well as a part of the IAEA Response and Assistance Network.

#### Areas that need strengthening/challenges

- Increase training of emergency medical response and consequence management teams to deal with radiation emergencies at national level.
- Increase awareness of radiation safety among the public at national level.

## Recommendations for priority actions

- Build medical response capacity for upgrades of health-care facilities and expanding laboratory capabilities at national level.
- Enhance the inventory of pharmaceutical agents, training medics and paramedics to deal with radiation accidents, and strengthen the provision of equipment at national level.
- Increase awareness of radiation safety measures for the public at national level.

# Report on provinces and federating areas

Given the remarkable differences in the level of achievement of IHR core capacities between different provinces in the federal system of government of Pakistan, the mission members dedicated particular attention to capturing provincial capabilities. This was realized through a provincial visit to Punjab and Sindh provinces and a separate session that was held with Balochistan and Khyber Pakhtunkhwa provinces through a teleconference to assess their capacities.

*Note:* Provincial chapters focus on specific technical areas identified by each province as representing their major priorities.

## Punjab

**Technical areas assessed:** Legal instruments, IHR coordination, Antimicrobial Resistance, Zoonotic diseases, Food Safety, National Laboratory System, Surveillance, Health Emergency Management, Health Service Provision, Infection Prevention and Control, Risk Communication and Community Engagement, Points of Entry and Border Health, and Chemical events.

Situated in the heart of Pakistan, Punjab province is the country's most populous and economically vibrant region. With a rich historical tapestry that dates back centuries, Punjab played a pivotal role in shaping the country's cultural, economic and political landscape. It has an area of 205 344 km$^2$ (79 284 square miles) and a population of 110 million in 2021 – 56% of the country's total population. Its capital city, Lahore, is not only a historical treasure trove but also a dynamic centre of arts, education and commerce.

In Punjab province, agriculture is the major source of income and employment, with wheat and cotton being the principal crops. Punjab's diverse population encompasses a blend of ethnicities, languages and traditions, reflecting the nation's multicultural essence. During the monsoon of 2023, Lahore City witnessed an exceptional volume of rainfall, setting a record for the highest levels observed in the past three decades. Waterborne and vector-borne diseases remain a significant concern in flood-affected districts.

The JEE in 2023 identified progress made since the first JEE of 2016. Punjab province demonstrated advanced capacities in terms of the JEE technical areas that have provincial implications, roles and responsibilities. Punjab also provides in-country many best practices for other provinces/areas to learn from and replicate. Key IHR health security areas such as surveillance, national laboratory system, zoonosis, health emergency preparedness, IHR coordination and immunization are better addressed in the province in comparison with the other provinces although substantial strengthening and improvement are still necessary.

**Legal instruments** exist in Punjab for the control of diseases, such as the Punjab Prevention and Control of Infectious Disease Act (2020) and the Punjab Dengue Control Act. Other legal instruments to address climate change remain advanced through the Punjab National Calamities (Prevention and Relief) Act (1958). Provincial secretaries are empowered to declare an emergency with the approval of the provincial Chief Minister, in accordance with the Punjab Infectious Disease Prevention and Control Act (2020).

The total expenditure from health-care providers shows notable disparities between the provinces with Punjab having the highest share. The current expenditures in Punjab made by the provincial government in its capacity as a financial agent stands at 19.4%, with a social security share of 1.8% and out-of-pocket expenditures in private households accounting for 52.27% of overall health expenditures.

The Director of CDC at the Department of Health has been assigned as the IHR Focal Point at the provincial level in Punjab, for coordinating with the NIH, One Health stakeholders and providing oversight on IHR implementation in the province. The National Action Plan for Health Security, including the provincial chapter, has been developed at provincial level and its implementation is at a more advanced stage in Punjab than in the rest of the provinces. However, considerable work needs to be done on key recommendations through adequate financing to improve the country's IHR index from the existing 43.6 to 60 within five years.

Although AMR surveillance is being piloted in key livestock areas in Pakistan, particularly in Punjab, it lacks coordination and sustainability. The AMR National Surveillance Strategy focuses on commensal bacteria of E. coli and Enterococcus species. And is currently being piloted in one district in Punjab. Provincial food authorities in Punjab have their own diagnostic set-up with some capacity to detect and confirm foodborne pathogens. Pharmaceutical industry effluent is monitored through certified EPA laboratories in Punjab province.

DRAP legislation covers the management of veterinary medicine through most aspects of the value chain, but the systems for their enforcement remain weak and Punjab has developed more guidelines, including restriction of therapeutics for animal feed formulation. Pakistan has drug-testing control laboratories at provincial level in Punjab with high level of accreditation. Punjab has guidelines for animal production and has restricted the use of therapeutics for animal feed formulation.

In the **animal health sector**, an e-surveillance system, the Animal Disease Reporting System, was developed in the province of Punjab in 2022 using a three-tiered mobile telephone application (Farmer App; Reporting Officer App; Vet Asst. App), which is now being used to report all suspected notifiable animal disease events to the provincial headquarters from the district level throughout the province. Some active surveillance has been carried out for brucellosis in dairy cattle in Punjab and a recent national survey for brucellosis (2017) found overall prevalence rates of 38.75% in the province.

In Punjab, some **policies and Legislation** covering the regulation of animal health and production include the Punjab Animal Health Act, 2019 and Rules, 2021; Punjab Livestock Breeding Act,2014; Safe Blood Transfusion Act, 2016, Punjab Hepatitis Act, 2018; and Punjab Poultry production Act, 2016. The disease investigation activities are being supported by the Provincial Reference Laboratories (PRLs) which now have the capacity for fully integrated, surveillance and response programmes for emerging diseases.

Facilities are in place for the identification of foodborne pathogens and a range of common chemical contaminants at the provincial level in Punjab. Regarding the antimicrobial resistance surveillance in the animal health sector, capacity exists for sampling of poultry at commercial poultry farms, in vet markets, on dairy farms, dairy colonies as well as at abattoirs and smaller slaughter facilities. The testing of micro-organisms and animal products for veterinary medicine and heavy metal residues is carried out at the Punjab Provincial Reference Laboratories.

The capabilities for detection and early response to foodborne disease incidents are significantly higher in Punjab, where field-level service providers are better trained and equipped and have wider coverage, where centres of excellence for laboratory diagnostics exist, where intersectoral coordination is better developed, and where vertical coordination of the chain of command between provincial headquarters down to the field level have been strengthened in both the human and animal health sectors, especially in the area of disease surveillance of foodborne pathogens and reporting.

For immunization, FIC coverage reached 89% in Punjab in 2020–2021, achieving the disbursement linked indicators target set for year 3 by the National Immunization Support Project. More than 80% coverage of Penta 3 immunization among children aged between 12 and 23 months was reported in all districts in Punjab. The FDI has a stringent system for delivering vaccines to the provinces by road in Punjab.

A tiered laboratory network exists, including a laboratory network of vertical programmes (TB, malaria and HIV), and tier-3 laboratories, including the provincial Public Health Reference Laboratory (PHRL) in Punjab. The Healthcare Commissions at the provincial level in Punjab are responsible for the licensing of laboratories and monitoring of laboratory quality.

Based on the recommendations of the 2016 JEE, the Primary and Secondary Healthcare Department in Punjab established a biosafety level-3 public health laboratory in Lahore in 2017 at the Punjab AIDS Control Programme complex. This provides a complete package of services equipped with the latest flow cytometry machine, gene expert, CD4 counting machine, and performs viral genotyping or HIV resistance testing for initiating or switching to antiretroviral therapy. COVID-19 testing, next-generation sequencing, and genotyping capacities have been enhanced at the provincial level in Punjab. However, the capacity needs to be enhanced for testing of other pathogens as per the prioritized list of 34 from the current 4–5 pathogens, including sustainable regular funding.

For medical countermeasures, provinces have been able to send emergency teams to support international health emergencies as well as to accompany Hajj missions by the Health Department and by the Rescue Department in Punjab. Punjab sent teams to support the response to the earthquake in Syria/Turkey. Surge deployment has taken place during the last year for the COVID-19 pandemic when extra workforce was required at PoEs for screening and surveillance. During floods, health personnel were deployed from Punjab to the affected areas. The Punjab Rescue Department includes a training centre to provide different types of training and capacity-building of personnel under the main mandates of the department which are rescue, safety and medical.

Punjab province has developed IPC plans for hospitals through the Punjab HCC. The EPHS for Primary Health Care Punjab, contains IPC and a safe environment component.

PoEs in Lahore are implementing all the routine core capacities and sharing regular information with the National Surveillance System through the Border Health Services Focal Point. The designated PoEs have written multisectoral procedures for detecting, notifying and responding to ill travellers and PoE workers, particularly at Lahore Airport and the Wagha border crossing, with staff, facilities and equipment available for safe transportation of sick travellers to medical facilities.

Punjab province has a functioning and fully operative health communication strategy issued under the directive of the Public Health Legislation Act, with SOPs and guidelines for proper implementation of RCCE activities. Media management and health education cells are established at the federal (NIH) level as well as the provincial level in Punjab.

Concerns about chemical risks and safety have traditionally focused on the use of agrochemicals in the large agriculture sector and, more recently, on air pollution through the Environmental Protection & Climate Change Agency due to traffic and smog, particularly in large cities such as Lahore.

### Strengths/best practices

- Legal instruments exist at the provincial level for the control of diseases, such as the Punjab Prevention and Control of Infectious Disease Act (2020), and the Punjab Dengue Control Act.
- Punjab's other legal instruments to address climate change remains advanced through the Punjab National Calamities (Prevention and Relief) Act (1958).
- Punjab province has begun to strengthen the health financing component within the PHC systems needed for IHR capacities.
- Provincial secretaries are empowered to declare an emergency with the approval of the provincial Chief Minister, in accordance with the Punjab Infectious Disease Prevention and Control Act (2020).
- Several Acts for the animal sector in Punjab are in place for animal and poultry production.

- Currently, Punjab province has shifted from the District Health Information System (DHIS) to the DHIS2 web-based reporting platform, enabling daily, weekly and monthly reporting from all public-sector health facilities, including the availability of sex disaggregated data.
- IDSR-DHIS2 training is underway. The trained districts have started sharing surveillance data on the list of 34 priority diseases with the DGHS office for coalition, analysis, feedback and issuance of weekly bulletins. Case definitions are available for physicians as a ready reference
- Punjab has guidelines for animal production and has restricted the use of therapeutics for animal feed formulation.
- Policies and legislation covering the regulation of animal health and production include the Punjab Animal Health Act, 2019 and Rules, 2021; Punjab Livestock Breeding Act, 2014; and Punjab Poultry Production Act, 2016.
- FELTP training has enhanced the capacity of inspection and vigilance teams in Punjab where trained persons are placed within the polio programme and other surveillance activities. Disease surveillance officers have been appointed at all districts in the province to coordinate IHR-related activities and to coordinate any response required
- The Punjab Pure Food Rules (2018) provide detailed standards for the quality and safety of all foods based on Codex Alimentarius standards.
- Punjab has an Act that addresses biosafety and biosecurity for the animal sector.
- Integration of surveillance systems has been partially achieved for specific diseases across different provinces. Progress has been made in Punjab province, where vertical programmes for COVID-19, TB, AIDS, hepatitis B and C, and malaria are integrated. However, steps for integration of VPD/EPI, polio, ATM on IDSR-DHIS2 dashboard are being undertaken which will enable policy-makers and health managers to take decisions where all VP surveillance systems are converged to give an overall picture of reportable priority disease.
- Punjab has performed multi-hazard risk assessment during 2018–2019.
- For better coordination among all One Health stakeholders, the province appointed an IHR task force to provide oversight and a coordination mechanism for systematic information-sharing between various sectors involved in chemicals, surveillance, emergency response and health services.
- The provincial health sector in Punjab has undergone a significant transformation in order to provide access to essential health services, leading to the growth of primary health care, an accountable system, and public–private partnerships, thereby promoting availability and accessibility of health services.
- An IPC strategic framework plan 2021 is developed and the Public Health Act on IPC is in force in Punjab.
- An RCCE plan is in place in Punjab with dedicated staff to implement RCCE activities.
- Some guidelines and supporting information are available to assess and manage chemical events, intoxications and poisonings; this information is recorded in Punjab through primarily paper-based systems.
- Institutes such as the Health Services Academy in Islamabad and the Institute of Public Health in Lahore offer specialized programmes in public health and epidemiology, training the next generation of public health professionals.

### Areas that need strengthening/challenges

- In order to establish and fully integrate the IDSR-DHIS2 mechanism across the province, continuous capacity-building, skilled human resource and its sustainability within health systems is needed through regular funding modality. Moreover, there is a need to link up all three levels from districts to province and national levels at CDC Pakistan ensuring a national picture with provincial variation to oversee trends for priority diseases.

- AMR surveillance in Punjab lacks a costed action plan, along with a coordination mechanism for engaging the human sector for its long-term sustainability.
- The Punjab Pure Food Rules (2018) require reviews and revisions before being replicated in other provinces.
- In Punjab, the DHIS2 is used for daily reporting of health services, including during emergency events. It includes disaggregated data (except for incomes and the private sector) on matters such as admission, severity/status, discharges and deaths, as well as other data.

### Recommendations for priority actions, apart from key recommendations, for the country following recommendations are outlined for appropriate measures:

- Utilize provincial legislation from Punjab for use in other provinces and conduct a systematic assessment of all IHR-related acts.
- Assess health and gender equity in IHR-related policies and technical areas in Punjab.
- Develop a provincial comprehensive health financing strategy to mobilize a sufficient and sustained budget for health security.
- Review and update the established IHR multisectoral task forces at the provincial level and develop terms of reference to ensure clarity on institutional focal points, coordination, communication and information-sharing.
- For AMR, explore strategies for the enforcement of relevant laws to implement restrictions on over-the-counter sales of antibiotics under the Watch and Reserve groups in the AWaRe index for the human and animal health sectors at the provincial level.
- A governance mechanism should be defined for IHR, along with establishment of well-resourced IHR section under Director CDC to liaise with One Health stakeholders and manage implementation of an IHR action plan to strengthen core capacities.
- The IDSR-DHIS2 mechanism should be established with appropriate training, and with resources in a regular budget to sustain it within health systems. Integrate all VP surveillance systems and data from public health laboratories on a single IDSR-DHIS2 dashboard for analysis, alert generation, feedback and data-sharing with CDC Pakistan at NIH. Extend and integrate e-surveillance and reporting systems in the human and animal sectors at provincial level, utilizing a One Health approach.
- Introduce food safety into the curricula of educational and training institutes, extend coverage of FELTP to all districts including veterinary inspectors, and implement needs-based training programmes for food safety actors at all levels of the health and food systems to ensure desired levels of competency.
- Develop an inventory of dangerous pathogen and facilities in all sectors.
- Provide support for monitoring and evaluation for routine immunization activities at all levels and disseminate and implement plans for mass vaccination response to outbreaks of VPDs.
- Develop and implement strategies for conducting point-of-care/farm-based diagnostics for all priority pathogens.
- Strengthen monitoring and evaluation systems to ensure the quality of surveillance data and advance data management.
- Map the existing multidisciplinary workforce for health security, identify gaps and update the health workforce strategy.
- Review and strengthen the emergency logistics and supply chain management system at the provincial level.
- Leverage, build upon and institutionalize existing functioning mechanisms by utilizing the experiences of the polio programme and COVID-19 response.
- Expand the integrated PHC model to improve health service utilization, especially during emergencies, ensuring provision of essential services to the community.

- Establish and enforce accountability mechanisms through regulatory bodies and enhance awareness to reduce the use of inappropriate and unsafe injections and infusions in health-care settings.
- Set up a dedicated RCCE team/unit based in Punjab on the RCCE infodemic management competency framework and provide the team with formal training and adequate resources.
- Develop SOPs and capacity-building for relevant workers, health-care providers and first responders, and develop a mechanism to collate data on chemical exposures for toxicovigilance and surveillance at the provincial level.
- Increase awareness of radiation safety measures for the public in districts in the areas surrounding such facilities.

### Field visits in Punjab:

- Health Information Surveillance and Disease Unit (HISDU).
- Provincial Disease Surveillance and Response Unit (PDSRU).
- Emergency Operations Centre (EOC).
- Expanded Programme for Immunization.
- Wagah border crossing.
- University of Veterinary and Animal Sciences.
- Laboratory Livestock and Dairy Department.
- Pakistan Kidney and Liver Institute (PKLI).
- Environmental Protection Agency (EPA).
- Punjab Food Authority and Laboratory, Provincial Reference Laboratory (Punjab AIDS Control Programme) & IPH Laboratory.
- Punjab Emergency Services (Rescue 1122).
- Provincial Disaster Management Authority (PDMA).

## Sindh

**Technical areas assessed:** Legal instruments, Financing, IHR coordination, Antimicrobial Resistance, Zoonotic diseases, Food Safety, National Laboratory System, Surveillance, Human Resources, Health Emergency Management, Health Service Provision, Infection Prevention and Control, Risk Communication and Community Engagement, Points of Entry and Border Health, and Chemical events.

Sindh is the second-largest province by population and is situated in the south-eastern part of Pakistan with the Arabian Sea to the south. The provincial capital and its largest city is Karachi – the country's financial and economic hub and a major seaport. The province has an industrialized economy with manufacturing, education and agriculture as its three major economic and income-generating activities. Sindh has a deep-rooted history that dates back to ancient civilizations.

Sindh's economy is significant for Pakistan, especially due to its role in agriculture. The fertile plains of the Indus River basin make it a major agricultural hub, producing crops like rice, wheat, cotton and sugarcane. Karachi, the provincial capital, is also the economic hub of Pakistan and a major port city.

In Sindh, a draft Public Health Act is under development. Engagement of communities, civil society, community organizations and networks, and private practitioners for early detection and immediate reporting of unusual public health events at the primary health-care level is addressed in the Public Health Act. It states that provincial and district administrations should issue notifications of unusual public health events and compliance should be ensured by both public and private sectors. However, its implementation remains challenging. Additional legal instruments exist at the provincial level for the control of diseases, such as the Sindh Disease Epidemic Act (2014).

According to *National Health Accounts 2019–2020* (Pakistan Bureau of Statistics, 2022), the current expenditures in Sindh stood at 32.38% of the total expenditures, with a social security share of 1.10% and private households' out-of-pocket expenditure is 52.5%. The Director of Health at the Department of Health has been assigned as the IHR National Focal Point at the provincial level and for coordinating with the NIH to provide oversight on IHR implementation.

An IHR multisectoral task force was established in 2016 at the provincial levels to ensure a whole-of-government approach, chaired by the Secretary of Health of the Sindh Department of Health. The Directorate-General of Health Services in Sindh constituted the Provincial Task Force for IHR in June 2016.

A provincial AMR task force was established in Sindh. This is an essential factor that is deemed necessary, given the size and federal nature of Pakistan which requires similar structure in other provinces. Provincial food authorities in Sindh have their own diagnostic set-up with some capacity to detect and confirm foodborne pathogens. Veterinary confirmatory testing is conducted on a limited scale as the referral system for isolates/samples is not functional.

Drinking water and waste water rules are not implemented and effluents are not monitored by the EPA, and there is lack of capacity for structured surveillance of effluents monitoring at all levels. Liquid waste surveillance is monitored in large hospitals in Sindh and regular reports are produced. Pharma industry effluent is monitored through certified EPA laboratories in Sindh. Testing of antimicrobial quality is in place. Pakistan has 11 drug testing control laboratories at national and provincial levels including in Sindh with high level of accreditation.

In the province of Sindh, disease investigation activities are being supported by the Provincial Reference Laboratories which now have the capacity for fully integrated, surveillance and response programmes for emerging diseases. Facilities are in place for the identification of foodborne pathogens and a range of common chemical contaminants at the federal level and at provincial levels in Sindh.

In regard to AMR surveillance in the animal health sector, capacity exists for sampling of poultry at commercial poultry farms, in vet markets, dairy farms, dairy colonies as well as at abattoirs and smaller slaughter facilities. The testing for micro-organisms and animal products for veterinary medicine and heavy metal residues takes place at the National Veterinary Laboratory / National Reference Laboratory for Poultry Diseases, the Sindh Animal Health Institute, and the Sindh Provincial Reference Laboratories.

Approximately 61% of eligible children in Sindh were fully immunized against their provincial targets. Coverage of Penta 3 immunization among children aged between 12 and 23 months was reported as 24% in Sindh. The administrative data from Sindh for 2022 showed that 79.5% out of 89% of the coverage depends primarily on outreach and mobile teams, and 10% through fixed sites.

The Health Care Regulatory Authority at the federal level and the healthcare commissions at the provincial level (Sindh) are responsible for the licensing of laboratories and monitoring of laboratory quality in both the public and private sectors in Pakistan. Next-generation sequencing capacity has been enhanced at the provincial level in Sindh.

Case-based surveillance on a many diseases such as measles, hepatitis, TB and dengue, remains functional in the province of Sindh.

The National Disaster Management Authority has published a comprehensive national risk profile during 2018 for multi-hazard risk assessment. Multi-hazard vulnerability risk assessment exercises were also conducted in Sindh (2017, 2021).

Sindh has drafted a Provincial IPC Strategic Framework for implementing IPC.

Sindh is currently developing its RCCE strategies, and most communicable disease programmes across the provinces have RCCE activities embedded in them. Media management and health education cells are established at the provincial level in Sindh.

At PoEs, stakeholders have been well-identified. However, some essential capacities and intersectoral collaboration/coordination elements should be strengthened in the provinces. For example, in Sindh, positive collaboration was demonstrated in the Karachi seaport whilst evaluating site capacities.

The list of legal acts assigned by the country to support chemical events include: Sindh Hazardous Substance Rule, 2014; Sindh Hospital Waste Management Rules, 2014; Sindh Environmental Protection Act, 2014 ; Punjab and Sindh Environmental Quality Standards (PEQS) for Treatment and Disposal of Bio-Medical Waste by Incineration, Autoclaving, Microwaving, and Deep Burial, 2016; and Sindh Healthcare Commission, 2013.

The province of Sindh has significant industrial entities, ranging mostly from small to medium as well as a few large-scale entities, and all export-oriented industrial units comply with international standards. There is only one poison centre at Jinnah Postgraduate Medical Hospital, Karachi.

### Strengths/best practices

- In Sindh province, a budget head is in place to deal with different kinds of emergencies.
- The IHR multisectoral task force has been established at provincial (Sindh) level with terms of reference.
- The Sindh Livestock Breeding Act of 2016 includes policies and legislation covering the regulation of animal health and production.
- Sindh Animal Health Institute has the capacity to develop the bacterial vaccines to replace prophylactic use of anti-microbials in poultry and dairy production.
- Integration of surveillance systems has been partially achieved for specific diseases across different provinces. Progress has been made in Sindh province where integration is observed for diseases such as TB, AIDS and malaria, while VPD, HIV/AIDS, TB and Malaria, and hepatitis, dengue have to be integrated within the IDSR-DHIS2 webpage platform enabling all priority diseases to be reflected on a single dashboard for feedback and decision-making. Sindh has also established event-based surveillance system to detect, report and respond to any public health emergency of national and international concern.
- The private sector has improved health delivery services in Sindh through the development of service packages and regulations.
- Some guidelines and supporting information are available to assess and manage chemical events, intoxications and poisonings, with information being variable between provinces. Some information is recorded in some of the province (Sindh) through primarily paper-based systems. Some capability exists in hospital wards to treat poisoned patients (e.g. Karachi).

### Areas that need strengthening/challenges

- The National Public Financial Management is particularly weak in Sindh and the entire budget cycle and rules on budget formulation, allocation, execution, reporting and monitoring should be revised to ensure efficiency in IHR spending at provincial levels. Although Sindh has an emergency funding mechanism on an ad hoc basis, it needs to be incorporated in the regular funding mechanism.
- Case-based surveillance remains functional in Sindh for a few diseases such as viral hemorrhagic fevers, diseases included in EPI programme, TB, AIDS, malaria, hepatitis and dengue. Integration with IDSR is lacking for VPDs, vector-borne diseases and waterborne/foodborne diseases which would give an overall picture of priority diseases within the province with close monitoring and decision-making. All three levels are to be linked up to provide coordinated decision-making and response.
- The province needs to develop essential packages of health services for emergencies. Karachi and other major cities have a robust private sector but suffer from a significant burden of noncommunicable diseases. It is recommended to engage the private sector to improve treatment and control of noncommunicable diseases by promoting regulation, incentivizing

accreditation, high-quality care and provision of priority services.

- The EOC in Sindh province is designated only for polio. The PDSRU is designated as the EOC for other diseases and disasters, but needs formal structure with provision of sustainable resources. Regular positions are required for district disease surveillance officers in all districts in order to coordinate surveillance and response in liaison with One Health stakeholders.

## Recommendations for priority actions

- Review and update the established IHR multisectoral task forces in Sindh and develop terms of reference to ensure clarity on institutional focal points, coordination, communication and information-sharing.
- Explore strategies for enforcement of relevant laws to implement restrictions on over-the-counter sales of antibiotics under the Watch and Reserve groups in the AWaRe index for the human and animal health sectors at the provincial level. Strengthen AMR surveillance system in the human and animal health private and public sectors. Strengthen the public health laboratories for antibiotic susceptibility testing with development of standardized guidelines.
- Extend and integrate e-surveillance and reporting systems in the human and animal sectors at provincial level, utilizing a One Health approach. The environmental sector should also be part of the integrated surveillance system.
- Integration of all programme (CDC I, II, III, IV) with existing IDSR to avoid fragmentation.
- Provide a budget allocation for a public health laboratory at Ojha campus to enhance its capacity for testing 34 priority pathogens. Develop an inventory of dangerous pathogens and facilities in all sectors.
- Provide support towards monitoring and evaluation for routine immunization activities at all levels and disseminate and implement plans for mass vaccination response to outbreaks of VPDs.
- Develop and implement strategies for conducting point-of-care/farm-based diagnostics for all priority pathogens.
- Map existing multidisciplinary workforce for health security, identify gaps and update the health workforce strategy.
- Review and strengthen the emergency logistics and supply chain management system in Sindh province.
- Leverage, build upon and institutionalize existing functioning mechanisms by utilizing the experiences of the polio programme and the COVID-19 response.
- Establish and enforce accountability mechanisms through regulatory bodies and enhance awareness to reduce the use of inappropriate and unsafe injections and infusions in health-care settings.
- Set up a dedicated RCCE team/unit in Sindh based on the RCCE infodemic management competency framework and provide the team with formal training and adequate resources.
- Develop a mechanism to collate data on chemical exposures for toxicological-vigilance and surveillance in Sindh.
- Increase awareness of radiation safety measures for the public.

## Field visits in Sindh:

- Karachi seaport, Kemari.
- Provincial Disease Surveillance and Response Unit (PDSRU).
- Poison Centre.
- Jinnah Postgraduate Medical Centre (JPMC).
- Public Health Laboratory.
- Dow University of Medical and Health Sciences (DUMHS).

## Khyber Pakhtunkhwa

Khyber Pakhtunkhwa is the northwestern province with an estimated population of 35.5 million. Historically, Khyber Pakhtunkhwa has been the trade route from the Indian subcontinent to central Asia. In 2018, the 25th Constitutional Amendment Act merged the Federally Administered Tribal Areas – on the western boundary, along the Afghan border – with Khyber Pakhtunkhwa province to start an era of development and prosperity. Khyber Pakhtunkhwa shares an international border with Afghanistan. In last two decades, the province has faced a major challenge of terrorism causing loss of lives, business and infrastructure. In 2017, a dengue fever epidemic affected more than 100 000 people in the provincial administrative city, Peshawar. The province has experienced a unique set of health challenges attributable to poor social determinants of health.

After the JEE of 2016, the Khyber Pakhtunkhwa Health Department worked on recommendations and took initiatives to improve human resources compliance. In this regard, the provincial assembly promulgated the Public Health Surveillance Act in 2017. The Act legally bound public and private health care providers and health facilities to report notifiable communicable diseases to Provincial and District Disease Surveillance and Response Centres. In response to the COVID-19 pandemic, the COVID -19 (Prevention of Hoarding) Act, 2020, was passed for effective prevention and control of the pandemic. In line with the JEE's 2016 recommendations, the Khyber Pakhtunkhwa Health Department established the provincial PHRL at Khyber Medical University in 2017–2018, to test priority pathogens and reference testing in outbreak scenarios. The provincial PHRL was the second public health reference laboratory after the NIH which complemented disease surveillance across the province. Also, the Khyber Pakhtunkhwa Integrated Disease Surveillance and Response PC-1 was approved and implemented in 2017–2018 to establish integrated real-time surveillance of priority notifiable diseases in the province with appointment of disease surveillance officers at district levels to coordinate and report surveillance activities in their respective districts.

After the dengue fever epidemic of 2017, the dengue action plan was developed by the Health Department, highlighting the role and responsibilities of multiple sectors for effective prevention and control of dengue fever. With the support and cooperation of development partners, the Department of Health of Khyber Pakhtunkhwa also developed a multisectoral outbreak plan, highlighting the coordination mechanisms between different sectors during outbreaks. The work on AMR and One-Health action plans is in its second phase ?? following detailed deliberations among stakeholders. The AMR secretariat is notified in the province. Three sentinel sites are established in public-sector health facilities while three are being established in the private sector. The sentinel sites are linked with the provincial PHRL and NIH.

Before JEE 2016, the legal instrument in Khyber Pakhtunkhwa province was subject to the administrative powers of provincial secretaries, who are empowered to declare an emergency ?? with the approval of the provincial Chief Minister.

The National Disaster Management Authority (NDMA) Act, 2010 provided the legal right to NDMA at national and provincial levels to take the lead. The NIH leads the disease outbreak response and, in accordance with Section 13 of the NIH Reorganization Act (2021), it has the authority to declare a national, provincial or regional emergency. The Public Health Surveillance Act (2017) of Khyber Pakhtunkhwa provides the legal framework for the implementation and enforcement of measures to prevent and control priority notifiable infectious diseases in the province. The act focuses on engagement of communities, civil society, community organizations, networks and private practitioners for early detection and immediate reporting of unusual public health events and diseases. It states that provincial and district administrations should issue notifications on unusual public health events and compliance should be ensured by the public and private sectors. The Khyber Pakhtunkhwa Food Safety Authority Act of 2014 deals with the provision of safety and standards of food items along with the promotion of interprovincial commerce and trade in food items.

The Director General of Health Services of Khyber Pakhtunkhwa is looking after IHR implementation in the province and assigned the Director of Public Health the role of IHR focal person to coordinate the activities with the help of WHO and partners to ensure IHR compliance.

Testing laboratories are also working in non-health sectors. For example, veterinary laboratories of the Livestock Department are testing priority pathogens, and food-testing laboratories under the Khyber Pakhtunkhwa Halal Food Authority are periodically testing the commercial food items to assess safety and standards. Also, the Public Health Engineering Department has a network of water-testing laboratories to check the water quality across different geographical areas.

The EPI programme in Khyber Pakhtunkhwa is working with partners to ensure routine immunization coverage in a complex cultural, political and administrative environment. The province's long battle to eradicate polio has been affected by security related incidents however with coordination with all stakeholders including security personel very small pockets remain when polio vaccination is a bit challenging. The EPI programme is now working closely with polio EOCs to identify pockets of unvaccinated population and is implementing joint interventions in the field. In 2017, the Khyber Pakhtunkhwa Immunization Act was passed to legally address communities that are reluctant to vaccinate their children.

IDSRS Khyber Pakhtunkhwa is being implemented in the province since 2017 with the support of development partners – including WHO, the United Kingdom's Health Security Agency and John Snow International – United States Agency for International Development – to ultimately establish a real-time disease surveillance system for detection and response to infectious disease. As of today, all of Khyber Pakhtunkhwa's settled districts have been trained on IDSR with an established disease data flow on digital platform DHIS V2. Reporting compliance is more than 85%. Weekly aggregated disease data on 42 priority infectious diseases have been uploaded from public-sector health facilities with a case-based surveillance mechanism for diseases such as dengue fever, typhoid, crimean congo haemorrhagic fever, acute watery diarrhoea and chickenpox.

During the 2022 flood the IDSR system was also modified and used as emergency health information system for real-time collection of disease and injuries data from flood-affected health facilities and flood relief camps. In addition Vertical programmes surveillance and information systems are also working in the province – i.e. the EPI programme, the Integrated Vector Management (IVM) programme, TB control programme, Integrated Hepatitis, HIV/AIDS & thalassemia programme, MNCH and Nutrition programmes are collecting information on their standard variables. The integration of surveillance part of all vertical programmes with IDSRS and DHIS2 is currently being piloted in four districts under the supervision of DGHS Khyber Pakhtunkhwa.

Concerns about chemical risks and safety have traditionally focused on the use of agrochemicals in the large agriculture sector and, more recently, on air pollution – particularly in large cities such as Peshawar has emerged as threat to health. Laboratory facilities exist within academic and government research sectors and have the capacity to detect the environmental presence of some chemical substances in air, water and wastewater. The provinces of Punjab, Sindh and Khyber Pakhtunkhwa have significant industrial entities, ranging mostly from small to medium as well as a few large-scale entities, and all export-oriented industrial units comply with international standards.

## Strengths/best practices

- The Public Health Surveillance Act was approved in 2017 and established the Public Health Committee under the Act with multisectoral secretaries as committee members to coordinate actions in the event of a public health emergency.
- The COVID-19 (Prevention of Hoarding) Act, 2020, and setting up the COVID EOC enabled much to be learned to use for the prevention and control of other priority infectious diseases.
- The Khyber Pakhtunkhwa Vaccination Act, 2015, serves as a legal instrument to improve vaccination coverage in the province.

- Public health emergency block funding can be provided for emergencies through discretionary powers of the Chief Minister at the provincial level.
- The Health Department funded IDSRS system is implemented across all districts, including merge districts with established digital disease data flow on DHIS2 with trained human resources at health-facility level.
- There are functional provincial and district disease prevention and control centres serving as hubs to monitor the disease burden and trends and responding to any alert, cluster or outbreak.
- The IDSR has a cascade training manual to built the capacity of surveillance and IT staff working in IDSRS.
- There is a piloted start of UHC and EPHS through NHSP in selected districts.
- The provincial PHRL and regional laboratories are available for testing of priority pathogens
- Regional public health reference laboratories were established during the pandemic. An network is established of public health laboratories between provincial and regional laboratories to serve as quality testing facilities in any disease alert, cluster or outbreak
- A multisectoral outbreak containment plan has been developed by the Health Department with the support of development partners.
- Human resources are trained in IPC at secondary- and tertiary-level health facilities. IPC committees are appointed at provincial and all tertiary- and secondary-level hospitals.
- There is a dengue action plan for prevention and control of dengue fever.
- Initial work on AMR and One Health action plans serves as a platform to build on for a comprehensive AMR and One Health system in the province.
- There was a good coordination mechanism between multiple sectors during the dengue epidemic, COVID-19 pandemic and floods. Lessons learned from this should be used as regular coordination practice for other diseases and events
- Khyber Pakhtunkhwa is the only province with an established Department of Rescue and Relief with PDMA working as an establishment of the Department. Close coordination exists between sectors and the PDMA during disasters and natural emergencies.

### Areas that need strengthening/challenges

- There is a need for regular and improved funding for health programmes to contribute to national and provincial health security. Specifically in the short term, a regular funding mechanism is needed for IDSRS and the provincial PHRL.
- The provincial government with support of the law department should develop a strategy and plans to implement different acts developed over time to ensure health security in the province.
- Emergency Preparedness and Resilience Planning is needed to tackle public health emergencies and natural disasters by involving all relevant sectors under the umbrella of the PDMA.
- The next phase of provincial AMR and One Health action plans should start to address rising antimicrobial resistance and One Health challenges in the province.
- The Antibiotic Stewardship Programme and policies should be initiated in all public- and private-sector health facilities.
- There should be data integration of vertical programmes relevant to list of 34 priority diseases with IDSR (DHIS2) at PDSRU hub to avoid duplication of information and linking up with CDC Pak at NIH. The integration will be beneficial for all sectors to obtain the quality evidence to enable them to take informed decisions.
- On the basis of what was learned from CCHF prevention and control and coordination between health and livestock departments, an animal IDSR strategy should also be adopted for other zoonotic diseases.
- There should be a mechanism for integration of multisectoral laboratories the and regional laboratories, and also with IDSR hub at PDSRU.

- IHR/IDSR workforce strategy development should address the scarcity of trained human resources in IDSR and IHR.
- Academic and other institutions should be engagement to counter public health challenges in the province.
- Leadership and mentoring programmes are needed to build the softer skill of human resources involved in IHR implementation.

## Recommendations for priority actions

- Following the JEE recommendations of 2016 and 2023, a provincial action plan for health security should be developed following the National Action Plan for Health Security
- Develop and implement a provincial health financing strategy to mobilize sufficient financial resources for programmes and projects contributing to provincial action plan for health security.
- Develop regular funding mechanisms to strengthen IDSRS and the PHRL in the province. Currently most resources for both of these programmes are being provided by donors and partners. The regular budget to IDSRS and PHRL will improve government ownership of, and confidence in, partners and donors to bring more advanced technical expertise, ultimately achieving IHR compliance.
- The emergency response to public health emergencies and natural disasters is currently reactive with ad hoc arrangements. Using lessons learned from multiple public health emergencies and disaster responses in previous years, a provincial Emergency Response and Resilience Action Plan (ERRAP) should be developed. The ERRAP should use the experience of responses to COVID-19, the dengue and polio epidemics, floods and terrorism.
- The Health Department may also ask the technical support from donors and partners to bring in technical support from countries with an excellent ERRAP strategy in place. The health sector should be a core part of the ERRAP.
- Provincial One Health and AMR action plans were started with the support of partners. Considering the current high burden of AMR, XDR typhoid, CCHF and cutaneous leishmaniasis outbreaks, a well-developed and operational AMR and One Health approach is needed by the provincial government. The provincial government should build on work done by multiple partners on AMR and One Health and should commit more resources and should ask for technical advice from international agencies with global AMR and One Health mandates.
- The workforce development strategy to build a multidisciplinary sustainable workforce for health security, IHR and IDSRS is the need of the hour. In a changing public health landscape with new pathogens and climate change, the provincial Health Department needs a workforce strategy to develop a pool of multidisciplinary experts to achieve the objectives of the health security action plan.
- The provincial Health Department needs to strengthen disease surveillance and laboratory capacities by focusing more on IDSRS and PHRL. The IDSRS and PHRL proved their worth in the COVID-19 pandemic by effectively managing the pandemic in the province. Now it is time to expand the IDSR and PHRL network to establish a real-time surveillance system to detect, prevent and respond to 41 priority infectious diseases.
- Khyber Pakhtunkhwa has a long history of troubled community participation in different public health programmes and interventions due to local culture and tribal background. The polio programme is still struggling to get communities on board to vaccinate their children. In the COVID-19 pandemic, the Health Department faced community resistance in case finding, contact tracing and also later during the COVID vaccination derive. Now it is time for provincial health departments and other departments to start a two-way communication strategy to build the trust of communities in public health programmes. The current two-way communication strategy for polio, EPI and dengue fever should be redesigned to engage vulnerable communities by designing bespoke community engagement plans and materials.

- The role of established health facility management committees at primary and secondary levels should be enhanced to health promotion and prevention.

### Relevant documentation

- The Khyber Pakhtunkhwa Vaccination Act (2015) to promote vaccine intake. No such Acts exist at the federal or national level.
- The Balochistan & Khyber Pakhtunkhwa Animal Breeding Act is in process.
- Punjab Animal Slaughter Act (1996); Khyber Pakhtunkhwa Food Safety and Halal Food Authority Act (2017).
- The Multi-Sectoral Rapid Needs Assessment in Flood-Affected Areas of Punjab, Sindh and Khyber Pakhtunkhwa (2022).
- Health Policy, Khyber Pakhtunkhwa, 2018–2025.
- Khyber Pakhtunkhwa Environmental Protection Act (2014).

## Balochistan

Balochistan, Pakistan's largest province by area, represents a significant and diverse region of strategic importance in the Joint External Evaluation (JEE) of the International Health Regulations (IHR) 2005, conducted in 2023. Encompassing a vast, rugged terrain with a sparsely distributed population, Balochistan poses unique challenges in public health and healthcare delivery. Its diverse population, comprising various ethnic groups and communities, adds to the complexity of implementing IHR-2005. The province's geographic location, bordering Iran and Afghanistan, further underscores its critical role in regional and cross-border health security. In 2023, the JEE aims to assess Balochistan's progress in strengthening core capacities for disease surveillance, response, and preparedness, focusing on areas such as emergency response, laboratory capacity, zoonotic disease, and health system resilience. The evaluation also aims to identify gaps and recommend strategies for improvement, with a particular emphasis on enhancing coordination among various levels/departments of government, local communities, and international partners. This assessment is crucial for understanding Balochistan's role in not only national but also global health security, particularly in managing emerging health threats in this geopolitically sensitive region. The findings and recommendations of the JEE in Balochistan will be pivotal in shaping Pakistan's overall progress in aligning with IHR-2005, promoting a safer, more secure health future for the region and beyond.

The social security share of expenditures, in Balochistan, dropped to 0.23% and 0.20% respectively And out-of-pocket expenditure is approximately 64.14%. The donor shares in total health expenditures are 1.04%. The share of expenditure of the provincial government is 30.96% (including district government expenditure), while the percentage share for out-of-pocket health expenditures is 62.92%.

Despite an overall progress, wide disparities in vaccination coverage exist between the provinces. For instance, FIC coverage reached 89% in Punjab in 2020–2021, achieving the disbursement linked indicators target set for year 3 by the National Immunization Support Project, whereas FIC is estimated at only 37% in Balochistan. Meanwhile, approximately 61% of eligible children in Sindh and 68% in Khyber Pakhtunkhwa were fully immunized against their provincial targets. In the federal regions, FIC coverage reached 89% in Azzad Jamu and Kashmir, followed by 73% in Gilgit-Baltistan, 71% in Islamabad, and 43% in the Khyber Pakhtunkhwa newly-merged districts (Federally Administered Tribal Areas) (TPVICS, 2021).

Disparities in vaccination coverage also exist among districts within the same province. For instance, ≥ 80% coverage of Penta 3 immunization among children aged 12–23 months was reported in all districts in Punjab, compared to only 40% in Khyber Pakhtunkhwa districts, 24% in Sindh, and 6% in Balochistan (TPVICS, 2021).

During emergencies, the Ministry of National Health Services Regulations and Coordination and Department of Health ensure the provision of essential services daily. Health care commissions are

functional and maintain the minimum service delivery standards at the national and provincial levels (excluding Balochistan) to regulate and validate services in the public and private sectors. Data analysis and regular reports are produced and shared with policy-makers and hospital managers. Punjab is currently using DHIS2 for real time data (type of diseases, admissions, severity/status, discharges and deaths) and emergency situations, Balochistan has piloted DHIS-2 in two districts (Lasbela and Hub) followed by 4 more districts (all levels of health facilities included to be sharing daily disease data)

The total health expenditure shows notable disparities between the provinces. Punjab has the highest share of 48% whilst Balochistan currently stands at the lowest of 2% of total expenditure, and Sindh and Khyber Pakhtunkhwa range between 21% and 29% respectively.

The AMR National Surveillance Strategy, which focuses on commensal bacteria of E. coli and Enterococcus spp., is currently being piloted in Balochistan.

The Balochistan Animal Breeding Bill is in process, and the Pakistan Animal Health, Welfare & Public Health Bill is nearto completion at the federal level.

Good coordination exists between the public health and veterinary authorities in Balochistan for the prevention and control of CCHF in animals and humans. One Health Committee is soon to be notified including the environment department and to be lead by the Provincial IHR Focal Person.

On account of the decentralized system and semi-autonomous relationship the provinces have with the federal level, RCCE strategy-building capacities also vary at the provincial levels. Though, most of the communicable disease programmes across the provinces have RCCE activities embedded within them. However, Punjab province has a fully operational health communication strategy, issued under the directive of the Public Health Legislation Act, with SOPs and guidelines for proper implementation of RCCE activities. Sindh and Balochistan are currently developing their RCCE strategies. Furthermore, RCCE activities are included in the NAPHS (2017–2021).

These SOPs and guidelines are implemented under the above laws by the Ministry of Commerce, the Ministry of Climate Change, and provincial and federal EPAs of Balochistan.

## Strengths/best practices

- Province has taken measures to ensure the efficiency of public health systems at the district and subdistrict (tehsil) levels. However, challenges to maintained uninterrupted supplies persist.
- An RCCE plan is in place in Balochistan at the Health Education Cell situated in the DG Health Office with dedicated staff to implement RCCE activities, usually in emergencies and large scale epidemics
- Surge deployment has taken place during the last year for the COVID-19 pandemic when extra workforce personnel were required at PoEs for screening and surveillance. During floods, health personnel were deployed from Punjab, Khyber Pakhtunkhwa and Islamabad Capital Territory to the affected areas of Balochistan to do flash-flood devastation assessments especially in the Naseerabad Division through NDMA and NIH, followed by logistical support
- During emergencies, PDMA, Health Department, DG Health Services, Ministry of National Health Services Regulations and Coordination, NIH and Health partners ensure the provision of essential daily services.
- Additional legal instruments exist at the provincial level for the control of diseases, such as Balochistan Epidemic Act.
- Public health: the province has implemented strategies like periodic reviews of PHC services, regular monitoring etc. to enhance the operational effectiveness of public health systems at the district and subdistrict (tehsil) levels.
- Surveillance: the training provided by FELTP has enhanced the capabilities of the province in developing surveillance system and trained teams that are further augmented by government

surveillance officers in 19 districts. There is a functional Provincial Disease Surveillance and Response Unit (PDSRU) in DG Health Office at Quetta, supported by an IDSR Project and health partners playing crucial role in health emergencies.

- Data: IDSR is implemented in all 36 districts and data flow has started. , with a compliance rate above 80%, helping in timely identification of alerts breaching the thresholds followed by coordinated response including investigation and recommendations for prevention lead by District Disease Surveillance and Response Unit (DDSRU) under supervision of DHO office and PDSRU
- With regard to multisectoral collaboration, efficient collaboration is established under the IHR Committee among the health department, PDMA, EPA, PHE, PoEs, Livestock, agriculture authorities and health partners in Balochistan to address effectively all emergencies that necessitate interagency coordination.
- A Risk Communication and Community Engagement (RCCE) plan has been prepared with a specialized team, assigned to carry out RCCE initiatives.
- The Healthcare Commission is established and started to work. With appointment of Chief executive Officer and members.
- Efforts have been initiated in Balochistan to address AMR. There is one operational AMR sentinel site located at Bolan Medical Complex Hospital in Quetta. Awareness campaigns are being conducted in various districts, and collaboration has been established between the livestock and health departments to address AMR.
- With regard to IPC, the provincial-level committee has been duly notified and has commenced operations with hospital IPC committees to be revamped soon

### Areas that need strengthening/challenges

- In Balochistan, there is a greater need for resource allocation, strengthening primary health-care services, and motivating staff employed in the health sector through strong leadership and governance structures based on the EPHS
- There is a significant lack of credible information on health needs and service costs in Balochistan, both of which are key elements for the development of budgets and for resource allocation at the decentralized levels the new DHIS-2 implementation will address the same having several different modules based to answer this need
- Public financial sources should serve as the cornerstone for funding of IHR implementation and public health emergencies. In addition, the lack of financial management and budgeting skills of the managers at provincial/ district levels (Balochistan) are important factors in inappropriate budgeting.
- The Public health Laboratory network having a BSL-3 laboratory at Provincial level and 15 BSL-2 at divisional/district level are established but needs strengthening to enhance and broaden the testing capacities including all prevalent communicable diseases with the provision of designated staff without interruption of salaries and all required logistics.
- High disparities exist between high-income and low-income families regarding access to healthcare services. In Balochistan, a high level of inequity is evident for postnatal consultations, institutional deliveries, and tetanus toxoid injections for pregnant women.
- The Provincial authority (Balochistan Healthcare Commission) for health facility licensing, accreditation, regulation and validation should be reinforced and extended to whole of the province.
- Balochistan continues to encounter challenges in the value chain of logistics, which pose a barrier to the efficiency of the public health system.
- There is a lack of strategies to incorporate RCCE activities into various communicable disease programmes that are implemented in the province. The Health Education Cell should be strengthened by provision of designated 2 years PC-1.

- With regards to surveillance, DDSRUs in many(3 new districts and 7 damaged during floods while 1 hit by a bomb blast) districts are nonfunctional. No surveillance system is in place for non-communicable diseases.
- There is lack of strategic plans to reduce AMR, as well as lack of funding and human resource. Sentinel sites for AMR are lacking at district level.
- The healthcare commission is in initial stages of implementation and will take time to be fully operational throughout the province.
- As yet there is no genome sequencing capacity established in Balochistan.
- There is a lack of implementation of Infection Prevention and Control measures at all teaching/ District hospitals. There is also lack of incinerators and implementation of waste management strategyin majority of the hospitals. The November 2023 Nosocomial Outbreak of Crimean Congo Hemorrhagic Fever investigation found out an IPC failure to be the major reason.
- At the provincial level, develop a joint surveillance programme for the prioritized zoonotic diseases in the province involving health and livestock department.
- Establish One-Health Laboratory for surveillance of Emerging Infectious Diseases involving health, livestock environment and food sectors to facilitate integrated surveillance efforts for multispectral collaboration.
- Develop provincial reference zoonotic lab with linkages to the national health data center (NIH) and Livestock sector (National Veterinary Laboratory) to strengthen surveillance and response of priority zoonotic disease.
- Develop a muiltisectoral one health operational plan and ensuring sustained commitment and resource allocation across sectors for Emerging Infectious Diseases.
- Establish a surveillance mechanism for zoonotic diseases which includes specific component focusing on high risk areas or population and an integrated multisectoral E-Surveillance system at federal and provincial.
- Coordination of surveillance activities for list priority emerging and endemic zoonotic disease is formalized between the animal health sector and public health.
- To strengthening the Surveillance system for zoonotic diseases, Animal Health Information System (AHIS) in livestock department will be linked with DHIS/IDSR for data sharing under one health approach.

### Recommendations for priority actions

- Finalize and endorse the costed national strategic plan for health security on the basis of priority recommendations of the JEE 2016 and JEE 2023 reports.
- Provide adequate public financing to expand the capacity of public health laboratories to run tests for all priority diseases/pathogens while implementing and improving the Laboratory Quality Management System and information management system (LIMS) through healthcare commission.
- Expanded program for immunization needs to achieve all the indicators by incorporating strategies that can produce demand for immunization in the communities.
- Strengthen the national specimen collection and referral system in line with national laboratory policy (for human and animal health).
- Expand the province's genomic sequencing capacity and ensure connection and data-sharing with global systems.
- Develop and implement strategies for conducting point-of-care/farm-based diagnostics for all priority pathogens.
- Bridge health gaps in service delivery by restructuring public facilities with regular quality monitoring and incorporate national public health and emergency programmes at the district and provincial levels.
- Expand the integrated PHC model to improve health service utilization.

- Revise the essential package of health services to include emergency management interventions.
- Develop case management guidelines for other priority areas other than infectious diseases.
- Integration of all vertical surveillance systems into a provincial dashboard utilizing data flow of the newly established DHIS2 web-based platform to avoid duplication of work at the health facility level and for the timely and evidence based decision-making and linking with National Health Data Center at NIH.
- A designated budget must be allocated to address various types of health emergencies only.
- To address the public health issues, there is a pressing need for the allocation of required resources, strengthening & expansion of PHC services, and the provision of effective leadership with governance structure.
- A province-level multisectoral task force should be established to effectively address health emergencies that necessitate a multisectoral approach and to enhance the implementation of the One Health concept or revitalization of the Provincial IHR Committee within the IHR Secretariate.
- The implementation of integrated surveillance systems for targeted diseases throughout the province is necessary to enhance the oversight of disease burden. DDSRUs needs to be functional and equipped for better data reporting and emergency response.
- The implementation of DHIS2 is required to acquire comprehensive data on health events, which will facilitate the development of more effective health policies.
- Strategies are required for integrating RCCE operations with communicable disease programmes working in the province.
- The healthcare commission needs to be fully operationalized in the province at the earliest.
- Finalize and endorse the national strategic plan for health laboratories. Expand the capacity of laboratories to test all priority diseases/pathogens while implementing and improving the Laboratory Quality Management System and strengthen the national specimen collection and referral system in line with national laboratory policy (for human and animal health). The initiation of environmental testing is necessary to integrate the One Health concept.
- Bridging health delivery gaps and expanding the integrated PHC model to promote health service utilization can be achieved through redesign of public facilities with frequent and regular quality monitoring and the incorporation of national public health and emergency initiatives at the district and provincial levels. Revise the essential package of health services to include emergency management interventions.
- There is a need to establish additional sentinel sites for AMR surveillance at the provincial level. Capacity-building training is required to enhance skills in AMR. The livestock industry should establish sentinel sites dedicated to AMR and should ensure their operational effectiveness.
- There is a need for routine capacity-building, assessment and monitoring activities at health-care facility level to ensure implementation of IPC measures. IPC Committee structures should be in place at all tertiary care and district headquarter hospitals. Provincial committees should meet regularly to enhance support, surveillance and monitoring of IPC activities and progress.

### Relevant documentation

- Risk Communication and Community Engagement Plan, Balochistan, 2021.
- Balochistan & Khyber Pakhtunkhwa Animal Breeding Act is in process.
- Balochistan Clinical Laboratory Regulatory Authority Act, 2001.
- Balochistan Strategic Health Policy, 2018–2030.
- Balochistan surveillance case definition document (PSD-IDSR).
- PC-1 IDSR Balochistan document.
- FELTP Implementation memorandum of understanding document.
- Priority diseases and thresholds, Balochistan document.

- Provincial Rapid Response Team framework, Balochistan document.
- Rapid response teams training and implementation documents.
- COVID-19 Provincial Communication Task Force notification.
- Multi-sector approach for COVID-19 document.
- Balochistan smart lockdown strategy for COVID-19.
- CCHF District Task Force document.
- Divisional EOCs for Flood Response document.
- Outbreak investigation documents 2014–2022.
- Balochistan Health Policy 2018–2030.
- Balochistan Environmental Protection Act, 2013.
- Balochistan Industrial Relations Act, 2010.
- Balochistan Industrial Relations Rules, 1973.

### Balochistan: key participants and institutions

- Bolan Medical Complex Hospital, Quetta.
- Government of Balochistan, Department of Agriculture and Cooperatives.
- Government of Balochistan, Department of Environment Supports and Youth Affairs.
- Government of Balochistan, Department of Food.
- Government of Balochistan, Department of Forests and Wildlife.
- Government of Balochistan, Department of Health, Emergency Operations Cell.
- Government of Balochistan, Department of Health, Provincial EPI Programme.
- Government of Balochistan, Department of Industries and Commerce.
- Government of Balochistan, Department of Planning and Development.
- Government of Balochistan, Ministry of Livestock and Dairy Development.
- Provincial Disaster Management Authority.
- Provincial Disease Surveillance and Response Unit.
- Provincial IHR Focal Point.
- Quetta Airport.

# Annex: Joint external evaluation background

| Capacities | Indicators | 2023 scores | 2016 scores |
|---|---|---|---|
| P1. Legal instruments | P1.1. Legal instruments | 2 | 2 |
| | P1.2. Gender equity and equality in health emergencies | 2 | New |
| P2. Finance | P2.1. Financing for IHR (2005) implementation | 2 | New<br>Narrative included in the JEE report indicates a level of 2 in 2016 as well |
| | P2.2. Financial resources for public health emergency response | 2 | New<br>Narrative included in the JEE report indicates a level of 2 in 2016 as well |
| P3. IHR coordination, National IHR Focal Point functions and advocacy | P3.1. National IHR Focal Point functions | 2 | 3 |
| | P3.2. Multisectoral coordination mechanisms | 2 | 2<br>(was under reporting) |
| | P3.3. Strategic planning for IHR, preparedness or health security | 2 | 2<br>(was under reporting) |
| P4. Antimicrobial resistance | P4.1. Multisectoral coordination on AMR | 2 | 1 |
| | P4.2. AMR surveillance | 2 | 1 |
| | P4.3. Prevention of multidrug-resistant organisms | 1 | New |
| | P4.4. Optimal use of antimicrobial medicines in human health | 2 | 1<br>These two indicators were addressed under one stewardship indicator |
| | P4.5. Optimal use of antimicrobial medicines in animal health/ agriculture | 2 | |
| P5. Zoonotic disease | P5.1. Surveillance of zoonotic diseases | 3 | 3 |
| | P5.2. Response to zoonotic diseases | 2 | 2 |
| | P5.3. Sanitary animal production practices | 2 | New |

| Capacities | Indicators | 2023 scores | 2016 scores |
|---|---|---|---|
| P6. Food safety | P6.1. Surveillance of foodborne diseases and contamination | 2 | 2 Both surveillance and response were merged into one indicator in 2016 |
| | P6.2. Response and management of food safety emergencies | 1 | |
| P7. Biosafety and biosecurity | P7.1. Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities | 2 | 2 |
| | P7.2. Biosafety and biosecurity training and practices in all relevant sectors (including human, animal and agriculture) | 3 | 2 |
| P8. Immunization | P8.1. Vaccine coverage (measles) as part of the national programme | 2 | 2 |
| | P8.2. National vaccine access and delivery | 4 | 4 |
| | P8.3. Mass vaccination for epidemics of VPDs | 3 | New |
| D1. National laboratory system | D1.1. Specimen referral and transport system | 3 | 3 |
| | D1.2. Laboratory quality system | 2 | 2 |
| | D1.3. Laboratory testing capacity modalities | 3 | 4 |
| | D1.4. Effective national diagnostic network | 2 | 2 |
| D2. Surveillance | D2.1. Early warning surveillance function | 3 | 3 |
| | D2.2. Event verification and investigation | 3 | 2 |
| | D2.3. Analysis and information-sharing | 3 | 2 |
| D3. Human resources | D3.1. Multisectoral workforce strategy | 2 | 2 |
| | D3.2. Human resources for implementation of IHR | 2 | 3 |
| | D3.3. Workforce training | 2 | 3 |
| | D3.4. Workforce surge during a public health event | 1 | New |

| Capacities | Indicators | 2023 scores | 2016 scores |
|---|---|---|---|
| R1. Health emergency management | R1.1. Emergency risk and readiness assessment | 1 | 1 (R1.1 and R1.2) |
| | R1.2. Public health emergency operations centre | 3 | 2 |
| | R1.3. Management of health emergency response | 3 | 2 |
| | R1.4. Activation and coordination of health personnel during a public health emergency | 1 | 4 |
| | R1.5. Emergency logistic and supply chain management | 2 | New |
| | R1.6. Research, development, and innovation | 1 | New |
| R2. Linking public health with security | R2.1. Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspected or confirmed biological, chemical, or radiological event | 2 | 3 |
| R3. Health service provision | R3.1. Case management | 3 | 2 |
| | R3.2. Utilization of health services | 2 | New |
| | R3.3. Continuity of essential health services | 2 | New |
| R4. Infection prevention and control | R4.1. IPC programmes | 2 | New |
| | R4.2. HCAI surveillance | 1 | 1 (was P3.3 in 2016 JEE) |
| | R4.3 Safe environment in health-care facilities | 1 | New |
| R5. Risk communica-tion and community engagement | R5.1 Risk communication systems | 1 | 1 |
| | R5.2 Risk communication | 2 | 2 (R5.2 and R5.3 in 2016) |
| | R5.3 Community engagement | 2 | 2.5 (R5.4 and R5.5 in 2016) |
| PoE. Points of entry | PoE1. Core capacity requirements at all times for PoEs (airports, ports and ground crossings) | 2 | 2 |
| | PoE2. Public health response at PoEs | 2 | 2 |
| | PoE3. Risk-based approach to international travel-related measures | 1 | New |

| Capacities | Indicators | 2023 scores | 2016 scores |
|---|---|---|---|
| CE. Chemical events | CE1. Mechanism established and functioning for detecting and responding to chemical events or emergencies | 2 | 2 |
| | CE2. Existence of an enabling environment, including national policies or plans or legislation in place for management of chemical incidents | 2 | 2 |
| RE. Radiation and nuclear emergencies | RE1. Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies | 5 | 5 |
| | RE2. Enabling environment in place for management of radiological and nuclear emergencies | 5 | 5 |

## Mission place and dates

This mission took place from 15 to 24 May 2023. The team held multisectoral discussions and made site visits in the capital city of Islamabad (federal territory), the administrative territories of Azad Jammu and Kashmir and Gilgit-Baltistan, and in the provinces of Punjab and Sindh. Field visits did not take place in the provinces of Balochistan and Khyber Pakhtunkhwa.

## Objective

- Access country capacity to prevent, detect and rapidly respond to public health threats independently and further characterize the functionality of the country's IHR core capacities for ensuring health security, taking into account the One Health approach.
- Review all related documents.
- Develop a report describing the progress and gaps in implementing the IHR capacities.
- Recommend priority actions to achieve and maintain IHR capacities for global health security.
- Review progress made in all technical areas since the first round of the JEE in 2016.

## Limitations and assumptions

- The assessment was of two weeks' duration, which limited the amount and depth of information that could be managed.
- Field visits to Balochistan and Khyber Pakhtunkhwa could not take place due to security reasons.
- The assessment is not an audit, and information provided by Pakistan will not be independently verified. Information provided by Pakistan was discussed and an assessment rating was mutually agreed between the host country and assessment team. This is a peer-to-peer review.

## Mission team members

1. Dr Dalia Samhouri (Mission Lead), Regional Manager, Emergency Preparedness and IHR, WHO Regional Office for the Eastern Mediterranean.
2. Dr Mohannad Al Nsour (Mission Co-Lead), Executive Director, Eastern Mediterranean Public Health Network.
3. Dr Elizabeth Tayler, Technical Specialist, AMR and Communicable Diseases, WHO Regional Office for the Eastern Mediterranean.
4. Dr Mohamed Elhakim, IHR Technical Officer, WHO Regional Office for the Eastern Mediterranean.
5. Dr Ljubica Latinovic, Science Communication Officer, WHO Headquarters.
6. Dr Sohel Saikat, Lead and Technical Specialist, Health System Resilience and Essential Public Health Functions, WHO Headquarters.
7. Dr Raquel Duarte-Davidson, Head of Chemical and Poisons Department, United Kingdom Health Security Agency.
8. Dr John Woodford, Veterinary Services, World Organisation for Animal Health (WOAH).
9. Dr Magid Al-Junaid, Public Health Programmes Director, Eastern Mediterranean Public Health Network.
10. Dr Maria João Martins, Coordinator, EUR PoE Network, Public Health Authority, Public Health Department, Portugal.
11. Mr. Chokri Arfa, Health Economist professor, Tunisia University, Tunisia

## Specifics of the mission

### General observations (introduction, background, situation analysis):

- Under the IHR (2005), countries have an obligation to ensure their capacities to detect, prevent and respond to national and international public health risks such as infectious diseases and chemical and radiological events.
- The IHR Review Committee on Second Extensions for establishing National Public Health Capacities and on IHR implementation (Sixty-eighth World Health Assembly, document WHA68.22) recommended, "to move from exclusive self-evaluation to approaches that combine self-evaluation, peer review and voluntary external evaluations involving a combination of domestic and independent experts".
- The JEE allows countries to identify their most urgent needs and to prioritize opportunities for enhanced preparedness, response and action, and to engage with current and prospective donors and partners to target resources effectively.
- WHO coordinates the IHR implementation and monitoring helps countries to build the core capacities that will strengthen their health security.
- The Regional Health Emergency Programme from WHO's Regional Office for the Eastern Mediterranean supported the JEE in Pakistan in 2016 and this second round of the JEE. The self-assessment phase of the second round started in October 2022 and concluded with a national workshop in February 2023.
- The present mission is the external phase of the JEE following the preparation workshop and the self-assessment done by the country.

## List of key meetings (who, what organization and location):

- The mission was conducted in Pakistan between 15 and 24 May 2023, as follows:
  - **Islamabad: 15–18 May.** The mission started with opening remarks by the Dr Baseer Achakzai, Director General, MoNHSR&C; Dr Palitha Mahipala, WHO Representative, Pakistan; Dr Dalia Samhouri and Dr Mohannad Al Nsour, JEE Team Leads; Dr Malik Safi, Ministry of National Health Services Regulations and Coordination; Dr Muhammad Salman, IHR NFP, NIH. This was followed by introduction of the JEE team, discussion across the 19 technical areas with representations from all sectors, including provinces, and reaching decisions on the scores and recommendations.
  - **Punjab (Lahore): 19–20 May.** The JEE lead provided a summary of findings from the Islamabad discussion and then discussion took place across the 19 technical areas with representations from all sectors in order to obtain feedback on the proposed scores and recommendations.
  - **Sindh (Karachi): 21–22 May.** The JEE lead provided a summary of findings from the Islamabad discussion and then discussion took place across the 19 technical areas with representations from all sectors to obtain feedback on the proposed scores and recommendations.
  - **Balochistan and Khyber Pakhtunkhwa: 23 May.** The JEE lead provided a summary of findings from the Islamabad discussion and then discussion took place across the 19 technical areas with representations from all sectors to obtain feedback on the proposed scores and recommendations.
  - Consensus was achieved at the end of the discussion with all provinces on scores and recommendations.
- National Debrief in Islamabad: 24 May 2023. The meeting started with opening remarks by H.E. Minister of Health, MoNHSR&C; Dr Palitha Mahipala, WHO Representative Pakistan; Dr Richard Brennan, WHO Regional Office for the Eastern Mediterranean, Director of Health Emergencies Programme; Dr Malik Safi, Ministry of National Health Services Regulations and Coordination; Dr Muhammad Salman, IHR NFP, NIH; and xx, Ministry of Agriculture. Dr Dalia Samhouri provided a summary of the JEE process followed by a summary of scores and recommendations made by the JEE team. A brief discussion then took place confirming the findings for the JEE.
- Field visits took place for the different technical areas as follows:
  - **Islamabad:** Disaster Management Centre, Emergency Operation Centre, National Institute of Health. Final debriefing meeting with officials, stakeholders at federal and provincial levels, and the field epidemiology training programme.
  - **Punjab:** Health Information Surveillance and Disease Unit (HISDU); Provincial Disease Surveillance and Response Unit (PDSRU); Emergency Operations Centre (EOC); Expanded Programme for Immunization; Wagah Border Crossing; University of Veterinary and Animal Sciences; Laboratories, Livestock and Dairy Department; Pakistan Kidney and Liver Institute (PKLI); Environment Protection Agency (EPA); Punjab Food Authority & Laboratory; Provincial Reference Laboratory (PRL) (Punjab AIDS Control Programme) & Institute of Public Health (IPH) Laboratory; Punjab Emergency Services (Rescue 1122); Provincial Disaster Management Authority (PDMA).
  - **Sindh:** Kemari Seaport; Provincial Disease Surveillance and Response Unit (PDSRU); Poison Centre, Jinnah Postgraduate Medical Centre (JPMC); Public Health Laboratory, Dow University of Medical and Health Sciences (DUMHS).

## Key accomplishments

### Findings (strategy, planning, tactics, implementation, flexibility, supervision, training, mission logistics, partners, trends, etc.):

- The members of the National Technical Team presented each technical area, drew attention to strong points, best practices and areas needing improvement and proposed the scores.
- Each technical area had a leader and one or two co-leaders from among the team of external experts.
- Whenever needed, the experts asked for clarifications and the scores were decided in plenary by consensus.
- The documents referred to during the presentations were delivered to the expert team.
- By the end of each day, the members of the external team held a meeting to recap the day and prepare the next steps: the mission co-leaders helped to coordinate the process with competence and professionalism, further motivating the overall process.
- The experts from the external team worked together in a coordinated and proactive manner.
- The briefing and debriefing meetings took place at the provincial level and were facilitated to reach to a consensus on scores and recommendations. These were presented and fully supported on the last day of the mission in a debriefing meeting in Islamabad with the involvement of senior officials and technical and operational leads from the federal and provincial levels.

The WHO Pakistan Country Office, under the guidance and leadership of the WHO Representative, Dr Palitha Mahipala, facilitated the travel, accommodation, meeting facilities, field visits and all related logistics.

## Key host country participants and institutions

### Pakistan Core Team

Dr Safi Malik

Dr Mohammed Salman

Dr Atiya Aarboo

### WHO Country Office Pakistan and sub-office Team

Dr Palitha Mahipalal

Dr Farah Sabih

### Participating institutions

**Federal level**

- Central Health Establishments.
- Directorate Health Services, Capital Development Authority.
- District Health Office, Islamabad Capital Territory.
- Expanded Programme on Immunization.
- Ministry of Climate Change.
- Ministry of Food Security and Research.

- Ministry of Law and Justice.
- Ministry of National Health Services Regulations and Coordination.
- National Agricultural Research Council.
- National Disaster Management Authority.
- National Emergency Operations Cell.
- National Health Emergency Preparedness Response Network.
- National Institute of Health.
- National Tuberculosis Control Programme.
- Pakistan Atomic Energy Commission.
- Pakistan Nuclear Regulatory Authority.
- Social Security Hospital, Rawalpindi.
- Strategic Planning Department, General Headquarters, Rawalpindi.

### Health development partners

- Food and Agriculture Organization of the United Nations.
- United Nations Children's Fund.
- United Nations Population Fund.
- United Nations Programme for HIV/AIDS.
- United States Agency for International Development.
- The World Bank.

## Provincial and regional levels

### 1. Punjab

- Allama Iqbal International Airport, Lahore.
- Government of Punjab, Department of Agriculture.
- Government of Punjab, Department of Environment Protection.
- Government of Punjab, Department of Health.
- Government of Punjab, Provincial EPI Programme.
- Government of Punjab, Ministry of Livestock and Dairy Development.
- Institute of Public Health, Lahore.
- Mayo Hospital, Lahore.
- Provincial Disease Surveillance and Response Unit.
- Provincial Emergency Operations Cell.
- Provincial Focal Point for Risk Communication.
- Provincial IHR Focal Point.
- Shaukat Khanam Memorial Hospital, Pathology Unit, Lahore (private-sector laboratory).
- Shaikh Zayed Hospital, Lahore.
- University of Veterinary and Animal Sciences, Department of Livestock, Lahore.
- Wagah Border, Lahore (land crossing between Pakistan and India) including Wagah Railway Station (Samjhota Express railway service operating between Pakistan and India).

### 2. Sindh

- Directorate of Central Health Establishments.
- Emergency Operations Cell.
- Government of Sindh, Department of Health.
- Government of Sindh, Department of Health, Provincial EPI Programme.
- Provincial IHR Focal Point.
- Government of Sindh, Department of Agriculture, Supplies and Prices.
- Government of Sindh, Department of Food.
- Government of Sindh, Department of Forest, Environment and Wildlife.
- Government of Sindh, Department of Industries and Commerce.
- Government of Sindh, Department of Planning and Development.
- Government of Sindh, Jinnah Post Graduate Medical Centre, Karachi.
- Government of Sindh, Ministry of Livestock and Fisheries, Sindh Poultry Vaccine Centre, Karachi.
- Government of Sindh, Ministry of Livestock and Fisheries, Tando Jam Agriculture University.
- Quaid e Azam International Airport, Karachi.
- Seaport, Karachi.

### 3. Khyber Pakhtunkhwa

- Director General of Health Services, Health Emergency Preparedness and Response Unit.
- Director General of Health Services, Provincial EPI Programme Emergency Operations Centre, Peshawar.
- Government of Khyber Pakhtunkhwa, Department of Agriculture and Livestock.
- Government of Khyber Pakhtunkhwa, Department of the Environment.
- Government of Khyber Pakhtunkhwa, Department of Food.
- Government of Khyber Pakhtunkhwa, Department of Health.
- Government of Khyber Pakhtunkhwa, Department of Planning and Development.
- Government of Khyber Pakhtunkhwa, Provincial Disaster Management Authority.
- Hayatabad Medical Complex, Peshawar.
- Integrated Disease Surveillance and Response Unit/Provincial Disease Surveillance and Response Unit,
- Khyber Medical University, Peshawar.
- Provincial IHR Focal Point.
- Provincial TB Control Programme, Laboratory Section (BSL-3 laboratory).

### 4. Balochistan

- Bolan Medical Complex Hospital, Quetta.
- Government of Balochistan, Department of Agriculture and Cooperatives.
- Government of Balochistan, Department of Environment Supports and Youth Affairs.
- Government of Balochistan, Department of Food.
- Government of Balochistan, Department of Forests and Wildlife.
- Government of Balochistan, Department of Health, Emergency Operations Cell.
- Government of Balochistan, Department of Health, Provincial EPI Programme.
- Government of Balochistan, Department of Industries and Commerce.
- Government of Balochistan, Department of Planning and Development.
- Government of Balochistan, Ministry of Livestock and Dairy Development.
- Provincial Disaster Management Authority.
- Provincial Disease Surveillance and Response Unit.
- Provincial IHR Focal Point.
- Quetta Airport.

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