

JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES

of the
KINGDOM OF BHUTAN

Mission report
11-15 December 2017



**World Health
Organization**

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Abbreviations

AMR	Antimicrobial Resistance
AUFI	Acute Undifferentiated Febrile Illness
BAFRA	Bhutan Agriculture and Food Regulatory Authority
BEMT	Bhutan Emergency Medical Team
BMHC	Bhutan Medical and Health Council
BOHSP	Bhutan One Health Strategic Plan
BPH	Bachelors in Public Health
BSL	Biosafety Level
CDC	United States Centers for Disease Prevention and Control
DOL	Department of Livestock
DOPH	Department of Public Health
DRA	Drug Regulatory Authority
EMT	Emergency Medical Team
EPI	Expanded Programme on Immunization
FAO	Food and Agriculture Organisation of the United Nations
FETP	Field Epidemiology Training Programme
GC/MS	Gas Chromatography/mass Spectrophotometry
GIS	Geographical Information System
HEDCP	Health Emergency and Disaster Contingency Plan
HPAI	Highly Pathogenic Avian Influenza
HPV	Human Papilloma Virus
IATA	International Air Transport Association
IHR (2005)	International Health Regulations (2005)
IHR NFP	National Focal Point for the IHR (2005)
ILI	Influenza-like Illness
INFOSAN	WHO International Network of Food Safety Authorities
IPC	Infection Prevention and Control
ISO	International Standards Organization
ISO/IEC	International Standards Organization/International Electrotechnical Commission
KGUMSB	Khesar Gyalpo University of Medical Sciences of Bhutan
MDR-TB	Multidrug Resistant Tuberculosis
MERS	Middle Eastern Respiratory Syndrome
MOAF	Ministry of Agriculture and Forests
MOH	Ministry of Health
MOU	Memorandum of Understanding
MPH	Masters in Public Health

NCAH	National Centre for Animal Health
NCC	National Codex Commission
NCCPE	National Commission for Certification of Polio Eradication
NEWARS	National Early Warning Alert and Response Surveillance
NFTL	National Food Testing Laboratory
NIPPP	National Influenza Pandemic Preparedness Plan
OHS	Occupational Health and Safety
OIE	World Organisation for Animal Health
OIE-PVS	OIE Performance of Veterinary Services (Evaluation)
POE	Point of Entry
PPB	Parts per Billion
QASD	Quality Assurance and Standardization Division, MOH
RCDC	Royal Centre for Disease Control
SAICM	Strategic Approach to International Chemicals Management
SOP(s)	Standard Operating Procedure(s)
TAD	Transboundary Animal Disease
TADInfo	Transboundary Animal Disease Information System
UNICEF	United Nations Children's Fund
VIS	Veterinary Information System
WTO	World Trade Organization

Executive summary

Findings from the joint external evaluation

The JEE team would like to express its appreciation to Bhutan for volunteering for a Joint External Evaluation: this shows a commitment, foresight and leadership from the highest levels of government that will be critical to success in building and maintaining Bhutan's core capacities under the International Health Regulations, or IHR (2005).

During the JEE mission, Bhutan's capacities in 19 technical areas were evaluated through a peer-to-peer, collaborative process that brought Bhutanese subject matter experts together with members of the JEE team in a week of collaborative discussion and field visits. This process led to consensus on scores and priority actions in 19 technical areas. The assessors concluded that Bhutan's commitment to building and/or maintaining capacities to detect, assess, notify and respond to major public health events is genuine and strong, and enjoys high-level political commitment and support.

Three overarching recommendations emerged from the week, intended to address challenges affecting Bhutan's capacities in a number of technical areas. These are outlined below.

Bhutan's national legislation and policies have been revised in recent times to incorporate strengthening of IHR (2005) core capacities, and the government is working to enhance the workforce. While existing good practice should be noted, and collaboration across sectors generally functions well, it is also apparent that the implementation of these core capacities could be better defined.

1. Update IHR-related laws, regulations, guidelines and standard operating procedures to provide clarity on roles, responsibilities and lines of communication.

It was also noted that while Bhutan's human and animal health sectors demonstrate progress and good practice, communication, collaboration between the two could be improved, with great consequent benefit for overall health security.

2. Implement joint mechanisms through which professionals from different sectors can adopt the One Health approach.

Finally, it was noticed that Bhutan's existing health security systems have not all been adequately validated and refined by a structured training and exercise programme.

3. Establish a multisectoral comprehensive training and exercise programme to test, validate and enhance preparedness and response operations.

In addition to these overarching recommendations, the JEE team developed 3-5 priority actions for each technical area of the JEE. These are listed in the table below.

Bhutan scores

Technical areas	Indicators	Score
National legislation, policy and financing	P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR (2005)	3
	P.1.2 The State can demonstrate that it has adjusted and aligned its domestic legislation, policies and administrative arrangements to enable compliance with IHR (2005)	3
IHR coordination, communication and advocacy	P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR	3
Antimicrobial resistance	P.3.1 Antimicrobial resistance detection	3
	P.3.2 Surveillance of infections caused by antimicrobial-resistant pathogens	2
	P.3.3 Health care-associated infection (HCAI) prevention and control programmes	3
	P.3.4 Antimicrobial stewardship activities	2
Zoonotic diseases	P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens	3
	P.4.2 Veterinary or animal health workforce	4
	P.4.3 Mechanisms for responding to infectious and potential zoonotic diseases are established and functional	3
Food safety	P.5.1 Mechanisms for multisectoral collaboration are established to ensure rapid response to food safety emergencies and outbreaks of foodborne diseases	2
Biosafety and biosecurity	P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities	1
	P.6.2 Biosafety and biosecurity training and practices	1
Immunization	P.7.1 Vaccine coverage (measles) as part of national programme	5
	P.7.2 National vaccine access and delivery	4
National laboratory system	D.1.1 Laboratory testing for detection of priority diseases	4
	D.1.2 Specimen referral and transport system	3
	D.1.3 Effective modern point-of-care and laboratory-based diagnostics	2
	D.1.4 Laboratory quality system	3
Real-time surveillance	D.2.1 Indicator- and event-based surveillance systems	3
	D.2.2 Interoperable, interconnected, electronic real-time reporting system	3
	D.2.3 Integration and analysis of surveillance data	2
	D.2.4 Syndromic surveillance systems	3
Reporting	D.3.1 System for efficient reporting to FAO, OIE and WHO	2
	D.3.2 Reporting network and protocols in country	3
Workforce development	D.4.1 Human resources available to implement IHR core capacity requirements	3
	D.4.2 FETP ¹ or other applied epidemiology training programme in place	2
	D.4.3 Workforce strategy	2
Preparedness	R.1.1 National multi-hazard public health emergency preparedness and response plan is developed and implemented	2
	R.1.2 Priority public health risks and resources are mapped and utilized	2

¹ FETP: field epidemiology training programme

Technical areas	Indicators	Score
Emergency response operations	R.2.1 Capacity to activate emergency operations	2
	R.2.2 EOC operating procedures and plans	2
	R.2.3 Emergency operations programme	1
	R.2.4 Case management procedures implemented for IHR relevant hazards	2
Linking public health and security authorities	R.3.1 Public health and security authorities (e.g. law enforcement, border control, customs) are linked during a suspect or confirmed biological event	1
Medical countermeasures and personnel deployment	R.4.1 System in place for sending and receiving medical countermeasures during a public health emergency	1
	R.4.2 System in place for sending and receiving health personnel during a public health emergency	1
Risk communication	R.5.1 Risk communication systems (plans, mechanisms, etc.)	1
	R.5.2 Internal and partner communication and coordination	2
	R.5.3 Public communication	2
	R.5.4 Communication engagement with affected communities	3
	R.5.5 Dynamic listening and rumour management	2
Points of entry	PoE.1 Routine capacities established at points of entry	3
	PoE.2 Effective public health response at points of entry	1
Chemical events	CE.1 Mechanisms established and functioning for detecting and responding to chemical events or emergencies	1
	CE.2 Enabling environment in place for management of chemical events	1
Radiation emergencies	RE.1 Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies	1
	RE.2 Enabling environment in place for management of radiation emergencies	1

Scores: 1=No capacity; 2=Limited capacity; 3=Developed capacity; 4=Demonstrated capacity; 5=Sustainable capacity.

PREVENT

National legislation, policy and financing

Introduction

The International Health Regulations (2005) provide obligations and rights for States Parties. In some States Parties, implementation of the IHR (2005) may require new or modified legislation. Even if new or revised legislation may not be specifically required, states may still choose to revise some regulations or other instruments in order to facilitate IHR implementation and maintenance more effectively. Implementing legislation could serve to institutionalize and strengthen the role of IHR (2005) and operations within the State Party. It could also facilitate coordination among the different entities involved in their implementation. See detailed guidance on implementing IHR (2005) in national legislation at: http://www.who.int/ihr/legal_issues/legislation/en/index.html. In addition, it is important to have policies that identify national structures and responsibilities, and allocate adequate financial resources.

Target

States Parties to have an adequate legal framework to support and enable the implementation of all of their obligations and rights to comply with and implement the IHR (2005). In some States Parties, implementation of the IHR (2005) may require new or modified legislation. Even where new or revised legislation may not be specifically required under the State Party's legal system, states may still choose to revise legislation, regulations or other instruments in order to facilitate their implementation and maintenance in a more effective manner.

States Parties to ensure the provision of adequate funding for IHR implementation, through the national budget or another mechanism.

Bhutan level of capabilities

Bhutan first implemented the IHR (2005) in 2006, by building them into the National Avian Influenza Preparedness and Response Programme of the Department of Public Health (DOPH), which is situated within the Ministry of Health (MOH).

The IHR (2005) were officially launched throughout Bhutan on 15 June 2007.

Since then, Bhutan has made remarkable achievements in implementing the IHR (2005). The need for a multisectoral approach was incorporated into the National Health Policy (2011), following which the National Multisectoral Plan of Action (December 2011—June 2014) was developed and implemented. Progress to date has been mainly due to Bhutan's high level of commitment and the high priority accorded to health security, in line with the requirements of the IHR (2005). Strengthening the implementation of the IHR (2005) is included in Bhutan's 11th Five Year Plan (2013-18), with the explicit goal of achieving 100% IHR core capacities.

Adequate national policies and legislation are in place that recognize and provide the necessary basis for implementing IHR (2005) in Bhutan. Legal provisions concerning water, food, medical assistance, disaster management, trade-related procedures, immigration and customs have all facilitated effective implementation. With WHO support, in July 2013, Bhutan completed an assessment of legislation for the purposes of documenting enabling laws for implementation of the IHR (2005). This assessment found that Bhutan's laws and regulations are functional and implemented diligently by the relevant ministries and agencies.

There are, however, some challenges to IHR implementation. These include the need to improve coordination and collaboration among stakeholders carrying out IHR-related activities, including through mainstreaming those activities in the relevant sectors.

Financial and technical limitations and competing sectoral priorities also affect Bhutan's abilities to meet the requirements of the IHR (2005).

Bhutan lacks a legal framework for early warning, reporting, response, and surveillance during public health emergencies, including for chemical and radiological events. There is also a need to strengthen systematic information sharing between relevant agencies and with the WHO IHR Focal Point, and to strengthen cross border collaboration for control of communicable diseases.

Recommendations for priority actions

- Review and revise existing national legislation/policies/regulations to ensure efficient early warning, detection, reporting and response for all hazards under the IHR (2005), and develop the necessary standard operating procedures (SOPs).
- Map, prioritize, and mainstream IHR-related activities into the plans and programmes of relevant sectors, in order to ensure multisectoral approaches and financial sustainability.
- Institute and organize clear lines of communication between relevant stakeholders, and define IHR-related roles and responsibilities, including at points of entry; advocate to increase awareness among these stakeholders of the need to mainstream systematic, sustainable implementation of the IHR (2005).
- Set up mechanisms to strengthen cross-border collaboration with neighbouring countries regarding public health hazards—for example, through memoranda of understanding (MOUs) on information sharing, and through developing official linkages such as formal intercountry policies.

Indicators and scores

P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of International Health Regulations (IHR) (2005) – Score 3

Strengths/best practices

- The Constitution of the Kingdom of Bhutan mandates free access to basic public health services, and a safe and healthy environment.
- An enabling legal, policy and administrative framework is in place to facilitate IHR implementation (examples of relevant legislation include the National Disaster Management Act; National Health Policy; and the One Health Strategic Plan 2017-2021).
- Advocacy takes place on all aspects of IHR (2005), including the state's obligations to politicians, policy makers and stakeholders, including the media.

- There is strong political commitment to promoting national and international health security (e.g. IHR implementation is incorporated into Bhutan's next five year plan).
- IHR-related programmes are included and implemented in the plans of relevant national sectors.
- Executive Orders are in place to facilitate response and control efforts during public health emergencies of national and international concern.
- A legal framework is in place for early warning, reporting, response, and surveillance during public health emergencies, including for chemical and radiological events.

Areas that need strengthening, and challenges

- The IHR (2005) need to be mainstreamed into relevant sectors, through clearly defining relevant roles and responsibilities.
- Policy and administrative structures are required to strengthen systematic information sharing between relevant agencies, and with the National IHR Focal Point.
- Cross-border collaboration for control of diseases of public health significance should be strengthened.
- There are competing financial and technical priorities in several sectors that can act as a brake on IHR implementation.
- Implementation of IHR (2005) is sometimes perceived as the sole responsibility of the Ministry of Health.

P.1.2 The state can demonstrate that it has adjusted and aligned its domestic legislation, policies and administrative arrangements to enable compliance with the IHR (2005) – Score 3

Strengths/best practices

- National and agency-specific preparedness and response plans are in place.
- The IHR (2005) are implemented using a multisectoral approach that is incorporated into National Health Policy.
- The draft National Health Bill incorporates some IHR (2005) requirements.
- Bhutan has a functional National IHR Focal Point.
- Some assessment of relevant legislation, regulation, administrative requirements and other government instruments for IHR has been carried out, and gaps identified.
- National and agency-specific sectoral preparedness and response plans have been implemented, and include SOPs and guidelines for early warning, reporting and response.
- IHR (2005) implementation is included in Bhutan's 11th and 12th five-year plans.

Areas that need strengthening, and challenges

- Advocacy is required on the requirements of IHR (2005) and the findings of the legal/policy/administrative assessments carried out to date.
- Technical requirements need to be adjusted and aligned with financial constraints.
- Making amendments to fit the requirements of the IHR (2005) into existing policies/legislation is a lengthy process.

IHR coordination, communication and advocacy

Introduction

The effective implementation of the IHR requires multisectoral/multidisciplinary approaches through national partnerships for efficient and alert response systems. Coordination of nationwide resources, including the designation of a national IHR focal point (which is a national centre for IHR communications), is a key requisite for IHR implementation.

Target

The national IHR focal point to be accessible at all times to communicate with the WHO regional IHR contact points and with all relevant sectors and stakeholders in the country. States Parties to provide WHO with contact details of their national IHR focal points, update them continuously, and confirm them annually.

Bhutan level of capabilities

Following the official launch of the IHR (2005) in Bhutan on 15 June 2007, the country has made remarkable achievements in implementing the regulations.

One of the first actions in this regard was the appointment of a National IHR Focal Point (IHR NFP); at time of writing in December 2017, Mr Jamtsho, Chief Programme Officer of the Department of Medical Services, holds this post.

A multisectoral coordination meeting to support the National IHR Focal Point takes place every six months, and procedures exist for coordination between the IHR NFP and relevant sectors. As these meetings take place exclusively among technical staff, however, it is recommended that existing systems for coordination be expanded to include executive-level staff. As the IHR (2005) are an international obligation, and are implemented in an increasingly multisectoral manner, these developments should be mirrored nationally, up to the executive levels of the relevant ministries and agencies. Executive-level staff should also be involved in regular IHR-related exercises, in order to maintain high levels of alert.

Focal points from different ministries tend to change regularly, so continuous refreshing of contacts and expertise is a necessity.

Bhutan has many remote areas, making direct communication and fast exchange of data a challenge. However, new information and communication and technologies (ICT) offer tremendous opportunities to improve fast data exchange.

Development of SOPs, incorporation of lessons learned and the implementation of a modern data exchange system for intersectoral communication can assist the IHR NFP and improve effective detection and response systems.

Recommendations for priority actions

- Establish a regular IHR coordination meeting mechanism at executive levels in relevant ministries and agencies, to achieve high-level sensitization regarding implementation of IHR (2005) core capacities.
- Organize regular capacity building for IHR focal points in different ministries, including yearly tabletop exercises.
- Develop SOPs and a data exchange system for inter-sectoral communication and coordination at national and sub-national levels.

Indicators and scores

P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR – Score 3

Strengths/best practices

- A national IHR focal point is in place in the Emergency Medical Services Division (EMSD), MOH, with relevant terms of reference (TORs).
- A secondary IHR focal point is in place in the MOH, with relevant TORs.
- IHR focal points are in place in various agencies.
- IHR focal points are in place at designated points of entry (POE).
- Relevant agencies are in close physical proximity, assisting communication.
- A regular multisectoral coordination meeting to support the IHR NFP takes place every six months.
- Information is provided to focal points in a timely manner.
- Capacity building of relevant stakeholders is carried out.
- IHR activities are implemented in relevant agencies.

Areas that need strengthening, and challenges

- Capacity building for focal points requires strengthening.
- Coordination at ground crossings should be improved.
- Cross-border collaboration should be improved.
- There is a need to strengthen coordination of multi-sector ownership of the process of IHR (2005) implementation.
- There is a lack of timely exchange of information across borders, with no regular meetings with national counterparts and no IHR (2005) contact points in neighbouring countries.

Antimicrobial resistance

Introduction

Bacteria and other microbes evolve in response to their environment and inevitably develop mechanisms to resist being killed by antimicrobial agents. For many decades, this problem was manageable, as the growth of resistance was slow and the pharmaceutical industry continued to create new antibiotics.

Over the past decade, however, this problem has become a crisis. Antimicrobial resistance is evolving at an alarming rate and is outpacing the development of new countermeasures capable of thwarting infections in humans. This situation threatens patient care, economic growth, public health, agriculture, economic security and national security.

Target

Support work coordinated by the FAO, OIE and WHO to develop an integrated global package of activities to combat antimicrobial resistance, spanning human, animal, agricultural, food and environmental aspects (i.e. a One Health approach). This would include: (i) having a national comprehensive plan for each country to combat antimicrobial resistance; (ii) strengthening surveillance and laboratory capacity at national and international levels following agreed international standards developed in the framework of the Global Action Plan; and (iii) improved conservation of existing treatments and collaboration to support the sustainable development of new antibiotics, alternative treatments, preventive measures and rapid, point-of-care diagnostics with systems to preserve new antibiotics.

Bhutan level of capabilities

Bhutan can be applauded for its efforts to reduce misuse and overuse of antimicrobials in the human and animal health sectors. Bhutan has voted in favour of AMR resolutions at FAO, OIE and WHO, and in 2017 delivered a National Action Plan on AMR that follows the WHO/FAO/OIE Global Action Plan. The challenge at the time of writing is to implement the NAP fully and to reach the goals required under the IHR (2005).

Bhutan has banned the use of antimicrobials as growth promoters in livestock production, and has organised a sustainable, multisectoral approach to AMR. Due to the enormous challenges the country faces, partially caused by geography, some aspects of this approach can be improved.

Bhutan has developed detection capacity, but designated laboratories can still improve and collaborate more closely. Surveillance of AMR and antimicrobial usage is essential in order to obtain data that can help monitor progress or setbacks. To obtain regular oversight, Bhutan needs to appoint designated national and sub-national sentinel sites in both the human and animal health sectors, and ensure that they conduct regular surveillance of infections caused by priority AMR pathogens.

Healthcare-associated infection prevention and control programmes should be a basic requirement for every hospital in Bhutan. Efforts to raise awareness in this area are conducted on a national scale, and the government takes a clear position by conducting antimicrobial stewardship initiatives such as broadcasting TV programmes during World Antibiotics Awareness Week.

The agricultural sector could, however, be involved more; and as progress on antimicrobial stewardship is currently driven by the public health sector, Bhutan could also decide to put more effort into a multisectoral approach to this global problem.

Recommendations for priority actions

- Implement the National Action Plan on AMR completely; establish a time limit of no more than five years for achieving this, and allocate the necessary budgets.
- Strengthen collaboration between stakeholders—particularly in the public health and animal health sectors—to implement the activities mentioned in the National Action plan on AMR (e.g. data sharing between public and animal health laboratories, and awareness raising on prudent use of antimicrobials and prevention of infections).
- Establish more designated AMR stewardship centres in the public and animal health sectors at national and subnational levels, and build the relevant multi-disciplinary capacity.
- Increase the number of designated sentinel sites at sub-national level that conduct regular surveillance of infections caused by priority AMR pathogens in the human health, livestock and food sectors; share data and strategies across sectors; and improve collaboration between stakeholders.

Indicators and scores

P.3.1 Antimicrobial resistance detection – Score 3

Strengths/best practices

- Bhutan's National Action Plan on AMR was endorsed and launched in November 2017.
- Molecular diagnostic capacity is in place: Bhutan has four Microbiology laboratories.
- The National Veterinary Laboratory has microbiology facilities.
- A quality manual is in place for the microbiology laboratories.
- Bhutan's National Referral Hospital is identified as a national reference laboratory, and three major hospitals are designated surveillance sites.
- The Royal Centre for Disease Control is a national laboratory.
- Animal feed samples are referred for screening for antimicrobial usage.
- Bhutan conducts routine lab-based AMR surveillance.

Areas that need strengthening, and challenges

- Sentinel sites should be designated in the human health and animal health sectors, and charged with conducting surveillance of infections caused by priority AMR pathogens, and regular reporting.
- The National Action Plan should be implemented and progress indicators developed.
- Bhutan should publish a national antibiogram and consumption pattern of antibiotics in human health.
- Capacity for AMR surveillance at veterinary laboratories should be expanded.
- There is a need for laboratory-based AMR information sharing.
- Bhutan's laboratories should be accredited.
- Laboratory capacity for AMR should be strengthened through regular training and external quality assurance (for human and animal health).
- Regular collection, analysis and dissemination of AMR data are required in the human health sector. Emerging infections should be detected through a national network.
- There is a need to expand Bhutan's 10 human and seven animal health microbiology lab facilities.
- A centralized system is required for AMR data sharing.

P.3.2 Surveillance of infections caused by resistant pathogens – Score 2

Strengths/best practices

- Bhutan participates in WHO's Global AMR Surveillance System.
- Laboratory technicians can upgrade their certificate course to diploma level.
- A point prevalence survey of AMR in three regional hospitals enables oversight of prescription patterns.
- Laboratory-based AMR surveillance capacity is in place in four human health microbiology laboratories, and in the National Centre for Animal Health (NCAH) for animal health.

Areas that need strengthening, and challenges

- Sentinel sites should be designated in the human and animal health sectors, and charged with conducting surveillance of infections caused by priority AMR pathogens, awareness raising, and regular reporting.
- Laboratory capacity should be reviewed to identify and address gaps and needs.
- Protocols for collecting and analysing data need to be developed.
- Human resources (HR) and laboratory capacity limitations must be addressed in order to support surveillance more effectively.
- No protocols and SOPs have been developed for antimicrobial resistance surveillance.
- Building AMR surveillance capacity will require technical and financial assistance.

P.3.3 Healthcare associated infection prevention and control programmes – Score 3

Strengths/best practices

- National guidelines on infection prevention and control have been developed and revised.
- Annual Surveillance of healthcare associated infections (HCAI) has been initiated in nine health facilities.
- Functional infection prevention and control committees have been established, and focal persons are place in health care settings.

Areas that need strengthening, and challenges

- Existing HCAI programmes should be implemented at sub-national level.
- HCAI programmes should be expanded in all health facilities, and supported by monitoring and evaluation.
- Capacity building in infectious diseases management is needed for surveillance sites in both the animal and human sectors.
- Capacity building is needed for infection control personnel (for human health).

P.3.4 Antimicrobial stewardship activities – Score 2

Strengths/best practices

- The Jigme Dorji Wangchuck National Referral Hospital has an AMR stewardship unit.
- Prevention of AMR enjoys high-level political commitment.
- A national multisectoral action plan is in place.
- The use of antibiotics as growth promoters in animal feed is prohibited.
- Bhutan has banned the sale of antibiotics in private pharmacies.

- There is nationwide advocacy on AMR.
- Pharmacy retailers are highly competent.
- There is routine ad hoc inspection of private pharmacies.

Areas that need strengthening, and challenges

- Sentinel sites should be designated in the human and animal health sectors, and charged with conducting surveillance of infections caused by priority AMR pathogens, awareness raising, and regular reporting.
- Policies in the animal health sector should be enforced.
- Infection control and waste management in hospital settings should be improved.
- Bhutan should strengthen and continue the AMR awareness programme in all relevant sectors, including for the public.
- A comprehensive AMR stewardship programme should be developed for healthcare personnel.

Zoonotic diseases

Introduction

Zoonotic diseases are communicable diseases that can spread between animals and humans. These diseases are caused by viruses, bacteria, parasites and fungi carried by animals, insects or inanimate vectors that aid in their transmission. Approximately 75% of recently emerging infectious diseases affecting humans were of animal origin; and approximately 60% of all human pathogens are zoonotic.

Target

Adopt measured behaviours, policies and/or practices that minimize the transmission of zoonotic diseases from animals into human populations.

Bhutan level of capabilities

Over 60% of human infectious diseases worldwide are caused by pathogens of a zoonotic nature, mostly originating from wildlife. These also have serious consequences for livestock.

Livestock are an important component of Bhutan's mixed farming systems, which consist mainly of smallholdings. The majority of the country's cattle (total 308,297 head) and pigs (15,324) are kept in the southern half of the country by mixed sedentary smallholders. Yak (40,458), sheep (11,277), goats (39,513) and horses (18,890) are evenly distributed throughout most regions, except in the northern areas, where migratory populations mainly own yak, and to some extent sheep and goats. Poultry (1,000,000) are kept as backyard birds and increasingly as semi-commercial flocks of up to 2,000 layers or broilers¹.

The most common diseases affecting large and small ruminants include intestinal parasites, fascioliasis, foot and mouth disease, haemorrhagic septicaemia, black quarter, and coenurus cerebralis. The most important zoonotic diseases occurring in Bhutan are Rabies (17 outbreaks in 2016) and Highly Pathogenic Avian Influenza (HPAI H5N1) (ten outbreaks since 2010), followed by anthrax, leptospirosis, scrub typhus, cystic echinococcosis and bovine brucellosis. Currently most reports of zoonotic disease in animals arise from passive reporting by farmers to field-based veterinary para-professionals working under the supervision of 17 district veterinarians.

There are a number of active surveillance programmes ongoing, principally to determine the prevalence of bovine brucellosis on government cattle farms, and for the surveillance of salmonella species as part of the AMR pathogen survey being conducted in partnership with the MOH.

Animal health services are provided by the 205-odd livestock service centres located in the sub-districts. These are backed up by 20 district veterinary hospitals, four regional livestock development centres, the National Centre for Animal Health (NCAH), and the National Veterinary Hospital. The Department of Livestock (DOL) under the Ministry of Agriculture and Forests (MOAF) is the technical department responsible for planning, technical monitoring and implementation of animal health services in Bhutan. The current workforce consists of approximately 70 veterinarians and 400 veterinary para-professionals.

The veterinary diagnostic laboratory network consists of the National Centre for Animal Health (NCAH)—the designated national reference laboratory for animal diseases—supported by four regional laboratories; 20 district laboratories based in district veterinary hospitals; and a further four satellite veterinary laboratories. The NCAH, regional and satellite laboratories are under the direct administration of the DOL,

¹ Source: Department of Livestock 2016 Livestock census

while district veterinary laboratories are under the control of their district, with further technical supervision and monitoring provided by DOL. The NCAH has developed an online database system to record, manage and analyse monthly animal health reports.

The organizational structure of the human disease outbreak investigation and response system was developed within the Ministry of Health (MOH) in line with the Health Emergency Control Programme; the National Early Warning Alert and Response (NEWARS) Surveillance Guideline; and the National Influenza Pandemic Preparedness Plan (NIPPP); and in compliance with the 2013 Disaster Management Act of Bhutan. The Department of Public Health (DOPH) is responsible for surveillance, prevention and control of zoonotic diseases in humans, and works in close collaboration with the NCAH and DOL under a new mandate defined in the recently formulated Bhutan One Health Strategic Plan 2017–2021 (BOHSP).

Focal points for zoonotic disease prevention and control are identified within the DOL; the Department of Forest and Park Services for the wildlife sector; the Bhutan Agriculture and Food Regulatory Authority (BAFRA) for food safety; and the DOPH for the human health sector.

Bhutan's technical capacity for zoonoses includes a biosafety level 2 plus (BSL2+) animal laboratory; a BSL3 human laboratory; and an ISO/IEC 17025-accredited food laboratory. A laboratory proficiency testing scheme is in place for avian influenza. OIE PVS missions have been carried out to support veterinary services and laboratory services, and WHO missions support human health. Available human resources include epidemiologists (for both animal and human health); technicians trained on laboratory diagnostic tests; and trained human and animal health professionals and para-professionals working in all 205 sub-districts.

The BOHSP 2017-21 includes a functional mechanism for coordination between the human, animal and other relevant sectors.

Recommendations for priority actions

- Strengthen the epidemiological capacity of human, wildlife and animal health professionals through training, including joint FETP courses, and particularly in the technical areas of disease surveillance, risk analysis, disease modelling/forecasting, and geographic information systems (GIS).
- Strengthen human resources, infrastructure and laboratory capacity at human, wildlife and animal health laboratories for detection of high impact zoonotic diseases.
- Develop a real-time, web-based information management system across the human/animal/wildlife interface, incorporating mobile/smartphone technology.
- Undertake collaborative research on priority zoonotic diseases.

Indicators and scores

P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens – Score 3

Strengths/best practices

- A mechanism is in place for identifying priority zoonotic diseases.
- Surveillance systems are in place for animal and humans, with joint surveillance mechanisms for some diseases. Systems can also detect emerging diseases versus endemic diseases.
- Event-based surveillance and notifiable disease surveillance are in place. Information is shared through emails, e-bulletins, websites, meetings, recommendations/calls, outbreak investigation reports and publication of surveillance findings.
- A functional mechanism exists for sharing surveillance data (routine surveillance and outbreaks) between public health and animal health laboratories.

- Mechanisms are in place for deploying interagency response teams in the event of a suspected zoonotic outbreak.
- Notifiable disease reports are published annually; a comprehensive list of research publications is available; and One Health Workshops have produced recommendations.
- There is capacity for flash reporting through an online Veterinary Information System (VIS) and the TADinfo database system (TAD: transboundary animal disease).
- A multidisciplinary rapid response team is activated immediately on confirmation of zoonotic events.

Areas that need strengthening, and challenges

- There is a lack of legislation governing human disease surveillance (in the animal health sector, however, the Livestock Act and Livestock Rules and Regulations make all necessary provisions to cover disease surveillance).
- A joint surveillance system is required for real-time sharing of surveillance data between the human, animal and wildlife sectors.
- Linkages between public health laboratories and animal health laboratories should be enhanced.
- Sharing of specimens between public health and animal health laboratories should be improved.
- There is a need for cross-border harmonization of surveillance of transboundary diseases.
- Competing priorities can hamper technical and human resources capacity.
- There are no formal guidelines or SOPs for responding to outbreaks of zoonotic disease.
- Late reporting leads to late responses.
- Bhutan's border is porous, making control of zoonoses more difficult. Competing priorities hamper the resolution of this issue.

P.4.2 Veterinary or animal health workforce – Score 4

Strengths/best practices

- Trained veterinarians and animal health paraprofessionals are present in districts and sub-districts.
- Bhutan has a functional and effective passive surveillance system.
- Bhutan employs One Health approaches to capacity development of animal and human health staff for diagnosis, surveillance and response to zoonoses.
- Good quality, up-to-date data on livestock population are available for epidemiological analysis of disease status.
- Outbreaks of zoonoses are notified during high-risk periods, and active surveillance is done.
- Animal health professionals are offered public health training on diagnosis, surveillance and response to zoonoses (e.g. disease-specific training on leptospirosis, avian influenza, and Crimean-Congo haemorrhagic fever; and a One Health masters fellowship training programme).
- Human health professionals are trained in molecular diagnosis for avian influenza; the use of geographical information systems (GIS) and statistical tools; and on the One Health masters training programme.
- Simulation exercises are carried out.
- The DOL undertakes an annual livestock census in all twenty districts.

Areas that need strengthening, and challenges

- Training is needed on laboratory diagnostic techniques such as advanced molecular diagnosis, cell culture techniques, virus isolation, etc.
- Training is required on advanced epidemiological techniques (risk analysis, disease forecasting, use of GIS, etc.).
- Joint FETP training is needed that involves human, animal and wildlife health professionals.
- There is a need to build institutional capacity for training, through curriculum development in universities.
- Capacity building efforts are threatened by competing priorities and the need for greater funding.

P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional – Score 3

Strengths/best practices

- There is political commitment at all levels to controlling zoonoses, and a common understanding of the need to work together to manage zoonotic events.
- The One Health approach is used to respond to outbreaks of zoonotic disease.
- There is effective communication among key stakeholders on response activities.
- An MOU was signed on 6 November 2017 for the implementation of the BOHSP 2017-21.
- Prevention and control of avian influenza is set out in the 2014 NIPPP.
- Disease control strategies for zoonoses are developed jointly by the relevant stakeholders.
- Functional rapid response teams contain stakeholders relevant to each major outbreak of a zoonotic disease.
- At least 3-4 technical meetings take place between animal health, human health and regulatory authorities for each zoonotic event.
- Video/teleconferences allow experts and rapid response teams to communicate in real time.

Areas that need strengthening, and challenges

- Systematic real-time sharing of information between the human, animal and wildlife sectors should be improved.
- Disease detection at field level should be improved.
- Management of high-impact diseases like Ebola and Middle Eastern respiratory syndrome (MERS) should be improved.
- Late reporting can lead to late responses to outbreaks; there is a need to increase the speed of outbreak response.
- Current institutional structures and arrangements can act as a brake on progress, and there differences in the primary mandates of stakeholder agencies that impede headway. Decentralization and other competing priorities can hamper both infrastructural and human resource capacity.

Food safety

Introduction

Food- and water-borne diarrhoeal diseases are leading causes of illness and death, particularly in less developed countries. The rapid globalization of food production and trade has increased the potential likelihood of international incidents involving contaminated food. The identification of an outbreak's source and its subsequent containment are critical for control. Risk management capacity must be developed with regard to control throughout the food chain continuum. If epidemiological analysis identifies food as the source of an event, suitable risk management options that ensure the prevention of human cases (or further cases), based on risk assessments, must be put in place.

Target

States Parties to have surveillance and response capacity for risks or events related to food- and water-borne diseases, with effective communication and collaboration among the sectors responsible for food safety and safe water and sanitation.

Bhutan level of capabilities

Responsibility for food safety of imported and domestically produced food products has been mandated to the Bhutan Agriculture and Food Regulatory Authority (BAFRA), which resides within the MOAF. Under this mandate, BAFRA is responsible for implementing the Food Act (2005) and the more recently revised Food Regulations (2017).

The purpose of the Food Act is "*to protect human health and to regulate the import and trade of food in the Kingdom of Bhutan*". The Act establishes a National Food Quality and Safety Commission, which is comprised of representatives from:

- The Department of Livestock
- The Department of Agriculture
- The Codex Contact Point within the MOAF
- The MOH
- The Department of Trade and Industry under the Ministry of Economic Affairs
- The Department of Law and Order under the Ministry of Home and Cultural Affairs
- The Bhutan Chamber of Commerce and Industry
- The National Environment Commission
- The office responsible for legal affairs.

The effective mandate of this Commission is to formulate policy and coordinate the activities, roles and responsibilities of inspectors and staff of all agencies of the ministries and organizations mentioned above, in order to ensure that there are no overlaps or gaps in food control activities. The commission is also mandated to identify organizations/units responsible for taking action during food emergencies, and to coordinate a national response during such emergencies. In effect, this Commission has a similar role to that of the food control authorities that hold similar mandates in many other countries.

In addition, the Food Act also establishes a separate National Codex Commission (NCC), which is responsible for setting food safety standards, largely relying on the standards of the Codex Alimentarius. Bhutan is an observer at the WTO and as such is not bound by the WTO Sanitary and Phytosanitary Agreement.

Existing legislation gives BAFRA a mandate to act as an inspectorate and undertake border control inspections; to inspect wholesale and retail trade outlets for food safety; and to ensure that food processing businesses comply with food safety and hygiene standards. It does not, however, make provisions for undertaking surveillance of food hazards, or stipulate a risk-based approach to preventing, detecting or controlling food hazards (whether biological or chemical) upstream along the domestic food value chain.

Furthermore, there are no provisions in existing legislation that place responsibility for the safety and quality of food on the owner of food processing premises where animals, animal products or other fresh plant materials are processed for human consumption.

As such, the mandate of BAFRA is not fully compliant with IHR or OIE standards.

Recommendations for priority actions

- Review and revise the Food Act (2005) and Regulations (2017) to incorporate the full range of standards under the IHR (2005), and other relevant international standards, within the mandate of BAFRA.
- Develop and implement a training plan for induction and continuing education of all personnel employed within BAFRA, to ensure capacity to perform all core food safety functions in compliance with IHR, Codex and OIE standards.

Indicators and scores

P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination – Score 2

Strengths/best practices

- BAFRA is in the process of getting accredited for ISO/IEC 17065, and has an inspectorate consisting of 30 (mostly para-professional) inspectors stationed at 20 dzong-level offices and six major entry points. These inspectors are trained to carry out basic visual/sensory (organoleptic) inspection and testing of plant/fruit or animal products, and to test food samples at border control points and retail premises, using a limited range of test kits.
- A National Food Testing Laboratory (NFTL) is the designated national laboratory for testing for biological or chemical hazards in food samples collected by food safety inspectors. The NFTL has ISO 17025 accreditation for microbiological (seven tests), chemical (25 tests) and GMO (two) parameters, but lacks the equipment and capacity to test for heavy metals or radiological contamination.
- BAFRA works in close collaboration with other stakeholders, including the Royal Centre for Disease Control (RCDC) of the MOH during the investigation of suspected food poisoning events, and the NCC during policy formulation and standard setting. Other stakeholders with which BAFRA collaborates include focal points in the DOL and the NCAH. The latter is a central diagnostic laboratory responsible for surveillance, detection, prevention, control and diagnosis of animal diseases including zoonotic diseases, with which BAFRA coordinates during outbreaks of zoonotic diseases.
- A report on an investigation of a July 2017 food poisoning outbreak demonstrates close and effective collaboration between the MOH and BAFRA in outbreak investigation, as well as appropriate responses for the control of this outbreak and the prevention of future food safety events.

- BAFRA undertakes licensing of food processing establishments and enforces certain Food Safety Management System standards using a standardized checklist for conducting inspections, and—where necessary—issues improvement notices to ensure compliance by food establishment operators.
- Compliance with standards of hygiene is reinforced providing training for food establishment operators and food handlers.

Areas that need strengthening, and challenges

BAFRA

- BAFRA has insufficient human (technical) and financial resources to cover all the areas of risk-based food safety regulatory interventions (surveillance, data recording and analysis and monitoring) along the entire food production and processing continuum.
- Working with WHO, BAFRA should train food safety professionals in epidemiology, risk analysis and investigation of outbreaks of foodborne disease. Failure to provide such training will result in lack of capacity to undertake scientifically correct outbreak investigations.
- Technical and financial support is required for the following:
 - Food import control system
 - Food export inspection and certification system
 - Foodborne disease surveillance system
 - Food safety surveillance and monitoring system
 - Development of guidelines on good husbandry practices (particularly to control the indiscriminate use of veterinary drugs and thereby reduce the risk of AMR).
- Failure to implement a robust food safety control management system will hamper the ability to provide the data and information required for risk profiling of food safety hazard problems, leading to an inability of food safety and public health authorities to implement appropriate risk management practices.

National Food Testing Laboratory

- The NFTL's scope should be widened to cover all food safety parameters, particularly testing for residues and contaminants. Failing to strengthen the capacity of the NFTL to conduct a full range of tests would result in the need to sub contract food samples to reference laboratories, incurring heavy expense and delaying investigation of, and response to, outbreaks of foodborne disease.
- The necessary equipment needs to be procured: Atomic Absorption Spectrophotometry for detecting heavy metals; and gas chromatography (GC)/mass spectrophotometry (MS) for detecting pesticides/drug residues at parts per billion (PPB) level).
- Budgets should be put in place to maintain new and existing equipment.
- HR capacity building is required for laboratory analysts.
- Collaboration between the NFTL and Royal Centre for Disease Control (RCDC) should be strengthened. Use of RCDC and NFTL facilities and information exchange with minimum prior approval for collaboration would speed up laboratory testing and ensure faster generation of accurate results.

Biosafety and biosecurity

Introduction

It is vital to work with pathogens in the laboratory to ensure that the global community possesses a robust set of tools—such as drugs, diagnostics, and vaccines—to counter the ever-evolving threat of infectious diseases.

Research with infectious agents is critical for the development and availability of public health and medical tools that are needed to detect, diagnose, recognize and respond to outbreaks of infectious diseases of both natural and deliberate origin. At the same time, the expansion of infrastructure and resources dedicated to work with infectious agents has raised concerns about the need to ensure proper biosafety and biosecurity to protect researchers and the community. Biosecurity is important in order to secure infectious agents against those who would deliberately misuse them to harm people, animals, plants or the environment.

Target

A whole-of-government national biosafety and biosecurity system is in place, to ensure that: especially dangerous pathogens are identified, held, secured and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach are 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; and country-specific biosafety and biosecurity legislation, laboratory licensing and pathogen control measures are in place as appropriate.

Bhutan level of capabilities

National laboratories in Bhutan implement biosafety and biosecurity practices as part of daily practice. National laboratories—including animal health laboratories—generally demonstrate good practice for processing, storage and transport of dangerous pathogens within the country, using the standard triple packaging method. However, some of these laboratories lack proper documentation, and practices vary from one laboratory to another. A comprehensive national biosafety and biosecurity system is not in place in Bhutan.

A BSL2+ laboratory at the NCAH is used to process dangerous pathogens in animal samples. A BSL 3 laboratory at the Royal Centre for Disease Control (RCDC) was recently established, and—once certified by the supranational laboratory after a comprehensive assessment of its ability to meet international requirements for operation—will have the capacity to process dangerous pathogens from human samples.

The Bhutan Biosecurity Act came into effect in 2015, but this only focuses on control of genetically modified organisms, and does not cover aspects of biosafety and biosecurity practices in laboratories. The Waste Management Act 2009 and the National Health Policy cover some aspects of biosafety and biosecurity. Absence of legislation, policy, guidelines or procedures for biosafety and biosecurity practices poses the greatest challenge for implementation, hindering the management of biosecurity risks and the ability to ensure effective response to those risks.

Since biosecurity guidelines are of paramount importance, the RCDC is in the process of preparing national biosecurity guidelines. At time of writing in December 2017 these are at final draft stage, but not yet in place.

Bhutan has some relevant capacity, including: mechanisms for licensing private laboratories; pathogen control measures; International Air Transport Association (IATA)-certified laboratory personnel for shipment of infectious substances; and trained biomedical engineers to service biosafety cabinets used in laboratories. Demonstrated capacity also includes maintaining inventories of all pathogens within facilities storing and processing dangerous pathogens.

Although private health laboratories require licenses to operate and the Bhutan Medical and Health Council (BMHC) conducts periodic monitoring, neither animal nor public health government laboratories are required to obtain licenses; nor are they subjected to any biosafety/biosecurity monitoring. Some laboratory personnel are vaccinated on their own initiative, but there is no policy in place to protect them.

Bhutan has no biological biosafety and biosecurity training programme.

Recommendations for priority actions

- Evaluate the existing Biosafety Act 2015 for its ability to cover the regulations needed for a comprehensive national biosafety and biosecurity system in public and animal health laboratories.
- Conduct an assessment of biosafety and biosecurity requirements in national and sub-national public and animal health laboratories.
- Develop and implement a comprehensive national biosafety and biosecurity system in public and animal health laboratories, including a training programme with a common curriculum and a train-the-trainers programme.
- Improve biosafety of rabies investigation in the animal health system.

Indicators and scores

P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities – Score 1

Strengths/best practices

- The central laboratory of the Jigme Dorji Wangchuck National Referral Hospital and the national technical centres (RCDC & NCAH) maintain inventories of the pathogens they are storing and processing.
- A licensing system is in place for private laboratories, run by the BMHC. Licensing is not required for government laboratories.
- Pathogen control measures are in place, including physical, transportation and personnel security.
- All detected pathogens are stored and recorded by specialized laboratories.
- Records are maintained both in hard copies and in computerized databases.
- Physical security includes maintenance of user logs to monitor access to refrigerators. Organisms are kept under lock and key at all times.
- Standard operating procedures are in place for transporting pathogenic organisms, specimens, and other biologically contaminated items.
- Access to all relevant laboratories is biometrically controlled and CCTV-monitored.

Areas that need strengthening, and challenges

- There is insufficient technical capacity for biosecurity and biosafety in human and animal laboratories.
- There is a lack of awareness of the need for biosecurity assessment at health laboratories, both within the MOH and among laboratory personnel.
- There is a lack of adequate funding for developing and implementing laboratory biosafety and biosecurity practices.
- Bhutan has no comprehensive national biosafety and biosecurity system. Biosafety and biosecurity policy, legislation and/or regulations with human and animal health laboratory components are urgently required. Policies/guidelines are also required for access to information on pathogens and toxins in laboratories.

- A biosafety and biosecurity management programme is required for all laboratories dealing with dangerous pathogens.
- Guidelines and a responsible code of conduct are required for biosecurity oversight of dual use research of concern.
- Periodic monitoring of biosafety and biosecurity practices is required for all human and animal health laboratories.
- A programme of regular third party biosecurity assessments is required in all health laboratories dealing with pathogens and toxins.

P.6.2 Biosafety and biosecurity training and practices – Score 1

- Strengths/best practices
- Bhutan has the capacity to provide local servicing of biosafety cabinets, through the MOH Biomedical Engineering Division.
- A Waste Management Act and a National Health Policy are in place. Among other things, the latter acts as a guiding document for infection control, which is an important component of biosafety.
- Certified trainers are available to provide training on transport of infectious substances. IATA-certified laboratory and health personnel conduct this training when the budget is available.

Areas that need strengthening, and challenges

- Bhutan has no biosafety and biosecurity training in place. A regular training programme is urgently needed for all facilities housing or working with dangerous pathogens and toxins. Biosafety and biosecurity practices should be incorporated into the regular curriculum for training health professionals in Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB), and the programme made sustainable. Efforts to achieve this are impeded by a lack of stewardship.
- Policy/guidelines are needed for equal access to occupational/worker health services in all facilities.
- Biosafety and biosecurity stewardships are required.
- A train-the-trainers programme for biosafety and biosecurity should be implemented.
- Funding should be allocated to capacity development to sustain biosafety and biosecurity practices.
- National laboratory risk assessments should be conducted to assess the capacity of laboratories and ensure sufficient personal protective equipment is available.
- There are no policies, guidelines and/or SOPs for vaccinations and post-exposure prophylaxis. A vaccination policy and guidelines are required for laboratory personnel, covering pre-exposure prophylaxis for hepatitis B and other relevant diseases.
- National policy, guidelines and SOPs are required to ensure provision of rabies post-exposure prophylaxis treatment to laboratory workers in all facilities.

Immunization

Introduction

Immunizations are estimated to prevent more than two million deaths a year globally. Immunization is one of the most successful global health interventions, and one of the most cost-effective ways of saving lives and preventing disease.

Target

A functioning 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.

Bhutan level of capabilities

Vaccination was first introduced in Bhutan during the global drive to eradicate smallpox in the late 20th century. The Expanded Programme on Immunization (EPI) was launched in 1979, with the objective of reducing the incidence of six vaccine preventable diseases: tuberculosis, diphtheria, whooping cough, measles, polio and tetanus. In February 1988, Bhutan's 66th National Assembly passed a resolution calling for all children and pregnant mothers to have access to immunization services, and to be fully vaccinated. Bhutan achieved Universal Child Immunization in 1991, and has maintained maternal and neonatal tetanus elimination status since 1995, with the most recent re-validation in 2014. Bhutan has been polio-free since 1986, with polio-free certification acquired in 2014. Bhutan eliminated measles in 2017.

Bhutan has reported over 95% immunization coverage consistently over past years, and has high-level support for and commitment to immunization, along with committed, well-trained and dedicated primary health care workers. Three well-functioning regional EPI cold chain stores are manned by well-trained staff.

Bhutan has a multiyear action plan for immunization covering the period from 2014 to 2018.

Bhutan conducted a nationwide measles-rubella (MR) vaccination campaign in 2006 and a nationwide human papilloma virus (HPV) vaccination campaign for girls aged 12-18 in 2010. In 2014, HPV vaccination was integrated into the school-based vaccination program for grade six girls, and into the programme for out-of-school girls at age 12.

Bhutan has active committees that support the national immunization programme. These include the National Committee for Immunization Practice; the National Commission for Certification of Polio Eradication (NCCPE); the National Polio Expert Committee; a National Committee on Adverse Events Following Immunization, a national task force for laboratory containment activities for polio; and a National Verification Committee for Measles Elimination.

Vaccines are procured through the United Nations Children's Fund (UNICEF) to ensure quality, and relevant guidelines and SOPs are in place.

Recommendations for priority actions

- Conduct a vaccine coverage survey to verify reported coverage.
- Provide periodic training for health workers in cold chain and vaccine management, and equip the immunization programme with an EPI cold chain van and new WHO prequalified domestic refrigerators.
- Continue social mobilization and advocacy to increase community awareness, and enhance cross-border collaboration on immunization practices.
- Conduct a data quality assessment.

Indicators and scores

P.7.1 Vaccine coverage (measles) as part of national programme – Score 5

Strengths/best practices

- Bhutan has reported high immunization coverage (over 95%) since 2014.
- Immunization efforts enjoy high-level support and commitment.
- Primary health care workers are committed and dedicated, public health infrastructure is well established, and staff are well trained.
- National Immunization Policy requires mandatory immunization, free of cost.
- Vaccination coverage monitoring is in place through public health midwives and surveys.
- As a part of disease elimination strategies, supplementary immunization was conducted in September 2017 for people aged nine months to 40 years, targeting border areas, places where cases were reported, nomadic populations, and Dantak labourers (Project Dantak is a division of the Indian Border Roads Organisation, which develops and maintains road networks in India's border areas and friendly neighbouring countries).
- Coverage of this initiative was reported at 97%. A second phase was carried out in schools and high-risk areas and achieved 99% coverage.
- There is an ongoing monthly vaccination outreach programme.

Areas that need strengthening, and challenges

- Data management and reporting systems require strengthening.
- A risk assessment should be conducted at district and block level.
- Laboratory support is required for genotyping.
- Cross-border issues (e.g. disease cases imported from India) can complicate the immunization picture.
- Immunization is challenging in hard-to-reach rural areas.
- There is a need for data validation.

P.7.2 National vaccine access and delivery – Score 4

Strengths/best practices

- Bhutan has three Regional EPI cold chain stores.
- Bhutan has a well-established public health infrastructure and well-trained staff.
- Provisions are in place to ensure vaccine quality and safety, through the Drug Regulatory Authority (DRA).
- Vaccines are procured through UNICEF quality-assured firms.
- Relevant guidelines and SOPs are in place.
- A multiyear action plan for immunization is in place for 2014-2018.
- The Bhutan Health Trust Fund supports vaccine procurement.

Areas that need strengthening, and challenges

- There is a need to improve data quality and data management.
- Cold chain management should be strengthened.
- A web-based vaccine inventory system should be rolled out.
- An EPI cold chain van and new WHO prequalified domestic refrigerators are required.
- There is a need to address transportation of vaccines to far-flung areas with no road access.

DETECT

National laboratory system

Introduction

Public health laboratories provide essential services including disease surveillance; disease and outbreak detection; emergency response; and environmental monitoring. State and local public health laboratories can serve as focal points for a national system, through their core functions for human, veterinary and food safety. These include disease prevention, control and surveillance; integrated data management; reference and specialized testing; provision of laboratory oversight; emergency response; public health research; training and education; and partnerships and communication.

Target

Real-time biosurveillance with a national laboratory system and effective modern point-of-care and laboratory-based diagnostics.

Bhutan level of capabilities

Bhutan has three national laboratories: the Royal Centre for Disease Control (RCDC), the National Centre for Animal Health (NCAH), and the National Food Testing Lab (NFTL). These are located in close proximity to one another in Thimphu City. The presence of high containment units (BSL 3 in the RCDC and BSL2+ in the NCAH) enables Bhutan to handle detection of highly infectious specimens and materials.

Regarding documentation and SOPs, there is a discrepancy between documented national laboratory capacity and the technical area of biosafety and biosecurity, with SOPs for the latter not yet formalised. The human sector national laboratories are capable of performing five of the six obligatory core tests. Notably, the ability for polio culture, and therefore polio surveillance, is lacking.

Laboratory testing is free of charge for caregivers.

There is a system, documented by SOPs, for sample referral. Human resources are trained for sample preparation/packing according to WHO regulations both for road and air (IATA compliant) transport. There is, however, no designated courier service with trained safety advisors, and the relevant functions are lacking at Paro International Airport. In effect, suspected BSL4/Cat A classified pathogens cannot therefore be referred under current regulations. MOUs are in place for referral abroad for certain clinical tests and pathology not available in Bhutan.

Modern molecular techniques are implemented in the national laboratories. They are also available at point of care in the animal sector, to various degrees, through the four regional veterinary diagnostic laboratories, four satellite laboratories, and 19 basic diagnostic laboratories located in district veterinary hospitals. Rapid tests are also in place for field work, but it should be noted that such tests may suffer from low sensitivity, and always require standard confirmation by conventional techniques.

The human laboratories cannot yet offer point of care testing with molecular techniques, and lack internal validation of commercial kits for serology. One positive development is the implementation of virus culture at RCDC, which should enable a movement towards cost efficient in-house serological methods such as self-produced immunofluorescence and neutralization tests. Cross-reactivity between dengue and the presumed endemicity of Zika in the south require special attention. A future setup of platform standardized generic PCR assays and in-house serological methods may, after validation, allow substantially less costly assays, but at time of writing in December 2017 progress in this area is hampered by a lack of technical expertise.

Bhutan does not yet have any independent accrediting body to expedite accreditation of national and peripheral laboratories. However, the BMHC does issue licensing for laboratories, the Bhutan Standards Bureau oversees and coordinates accreditation, and the Quality Assurance and Standardization Division (QASD) of the MOH oversees methodological standardization.

Recommendations for priority actions

- Transfer capacity for modern efficient detection assays at point of care from RCDC to peripheral human clinical diagnostic laboratories, starting with the core tests needs to be implemented.
- Designate a national/international accrediting body for laboratories in Bhutan, and implement a systematic, timebound accreditation process starting with central national facilities and spreading out to the peripheral human and animal laboratories.
- Put the existing One Health plan into action through regular, high-level intersectoral meetings with the goal of achieving synergy in technical exchanges, surveillance, and the operation of the early warning system between the RCDC, NCAH, NFL and the Wildlife Laboratory.
- Identify and initiate human resources exchanges with regional international laboratories in training, protocol transfer and basic cost-sustainable techniques (laboratory twinning).

Indicators and scores

D.1.1 Laboratory testing for detection of priority diseases – Score 4

Strengths/best practices

- BSL-3 laboratory capacity enables Bhutan to handle highly infectious samples. Multidrug resistant tuberculosis (MDR-TB) drug susceptibility testing is done in this laboratory, as well as subtyping of certain strains of influenza.
- Disease-specific international reference laboratories have been identified and a referral system is in place for tests not currently available nationally.
- The One Health Strategic Plan provides formal direction for the sharing of information and technology between the human and animal health sectors, in order to detect zoonotic diseases early and thereby enable rapid response and mitigation.
- Molecular testing capacity is place in at both RCDC and NCAH.
- All national reference labs participate in external quality assessment through collaboration with several external laboratories. This is not, however, mandatory or enforced.

Areas that need strengthening, and challenges

- Human laboratory capacity building in peripheral laboratories should be enhanced, at least for detecting the top ten priority diseases of public health importance.
- There is a need to build certified domestic human resource capacity for equipment maintenance.
- Based on the existing One Health framework, Bhutan should formalise the sharing of disease information/technology between human, animal and food laboratories. There are likely synergies in a number of technical areas, including surveillance, biosafety, biosecurity and early warning.
- There is a need to build technical capacity and experience in existing human resources through laboratory twinning and exchange training.
- Quality-assured mechanisms of in-house test kit validation should be established through international exchange or formalised programmes.

D.1.2 Specimen referral and transport system – Score 3

Strengths/best practices

- Samples are transported between the health facilities following established SOPs.
- IATA-certified laboratory personnel are available and provide training to other health workers annually on preparation for air transport packing.
- National laboratories are in close proximity, so sample referral is uncomplicated.
- Training on preparing and packing samples for road/mail is provided through agreement with the United States Centers for Disease Prevention and Control (CDC).
- Transportation of category B/BSL 1-3 samples is partly undertaken through a contract with the Bhutan postal service.
- MOUs are in place for international referrals of pathogen detection not performed within Bhutan.

Areas that need strengthening, and challenges

- WHO guidelines require a designated road courier and, in case of air transport, airport-stationed safety-trained human resources for the transportation of category A/BSL4 suspected pathogens. These are not in place, and referral of such samples is therefore not currently possible in Bhutan.
- Dedicated funds must be earmarked for sustainable and stable sample referral.

D.1.3 Effective modern point-of-care and laboratory-based diagnostics – Score 2

Strengths/best practices

- National laboratories have access to modern technology such as real-time/multiplex PCR and equipment to test for MDR-TB.
- In the human sector, these technologies have been made available in a strategic district hospital.
- Modern molecular based techniques are implemented in the national laboratories and, in the animal sector, at point of care.
- Rapid test kits are available for some priority diseases such as malaria, rabies, dengue and scrub typhus, in all tiers of laboratories and in both the human and animal settings. Conformational testing is, however, required, and uses methods of inherent lower sensitivity than standard techniques.

Areas that need strengthening, and challenges

- Minimal laboratory diagnostic capability exists within Bhutan, but no tier specific diagnostic testing strategies are documented. Point of care diagnostics are being used for country priority diseases.
- Bhutan has limited capacity for undertaking human health core tests.
- Viral culture capacity for polio surveillance (one of the six obligatory core tests) is lacking.
- There is a need to replicate capacity currently at RCDC at point of care (primarily for country specific core tests)—as is already done in the animal sector.
- Procurement systems should be streamlined to provide flexibility for users and fast-track procurement in urgent situations.

D.1.4 Laboratory quality system – Score 3

Strengths/best practices

- The BMHC issues licensing for laboratories.
- National standards are developed through the QASD.
- Most laboratories participate in disease specific external quality assurance programmes.

Areas that need strengthening, and challenges

- No quality assurance or accreditation is mandatory.
- A national independent accrediting body must be designated. Accreditation of all labs should follow a time plan and be mandatory.
- There is a need to build certified human resource capacity for maintenance of equipment.
- Laboratory human resource exchange and twinning with international labs is likely to increase quality and technology transfer.

Real-time surveillance

Introduction

The purpose of real-time surveillance is to advance the safety, security and resilience of the nation by leading an integrated biosurveillance effort that facilitates early warning and situational awareness of biological events.

Target

Strengthened foundational indicators, and event-based surveillance systems that are able to detect events of significance for public health, animal health and health security; improved communication and collaboration across sectors and between subnational, national and international levels of authority regarding surveillance of events of public health significance; and improved country and regional capacity to analyse and link data from and between strengthened, real-time surveillance systems, incorporating interoperable, interconnected electronic reporting systems. Epidemiologic, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; and advancement in fulfilling the core capacity requirements for surveillance in accordance with IHR and OIE standards.

Bhutan level of capabilities

Bhutan has a health staff complement that exceeds the recommended per capita ratio. There are established surveillance systems, active and passive, at all levels of the health system. In particular, there is the National Early Warning, Alert and Response Surveillance system (NEWARS), a nationwide system that includes both indicator and event-based surveillance. There is also separate laboratory-based sentinel surveillance for influenza-like illness (ILI)/severe acute respiratory illness (SARI), measles, rubella, diarrhoea and acute undifferentiated febrile illness (AUFI).

The Veterinary Information System (VIS) and the event-based TADinfo system exist for animal health.

In both the human and animal sectors, health professionals are trained on detection, surveillance and response to public health events. They can report either through SMS or through the web. The electronic reporting system allows data to be gathered in real time and analysed to generate reports in the shortest possible time, which is most useful for event-based surveillance. For animal health, epidemiological analysis and dissemination is done through quarterly bulletins. In human health, there is an e-bulletin. Monitoring and evaluation systems are in place, and there is inter-sectoral collaboration with relevant agencies and with WHO.

Underreporting, timeliness and acceptability are the main challenges faced by the surveillance system. While data and reports are shared among relevant agencies, these agencies still have separate, stand-alone systems that should be interconnected, in the interests of timely reporting and immediate response.

Recommendations for priority actions

- Implementation of the disease surveillance system at all levels needs to be incorporated into all relevant existing acts and laws, including the National Health Policy 2011 and the Public Health Legislation for the Implementation of IHR (2005) in the Kingdom of Bhutan 2013.
- Establish and make functional the interoperability of information systems of relevant agencies.
- Conduct NEWARS/VIS TAD info sensitization/refresher courses for all relevant health professionals, to improve detection and reporting of cases/events, thereby facilitating timely response and implementation of control measures.

Indicators and scores

D.2.1 Indicator- and event-based surveillance systems – Score 3

Strengths/best practices

- A NEWARS guideline is in place and was revised in 2014.
- Functional event based surveillance is in place, supported by rapid response teams. SMS and web-based reporting is possible, allowing timely feedback and response.
- Designated surveillance focal points (SFPs) are in place at all health centres and at national level. Village health workers (VHWs) are active in communities and report on public health events. All health professionals are trained on detection, surveillance and response.
- At national level, the RCDC and NCAH can detect and identify priority diseases.
- A functional animal health reporting system is in place, with flash reporting and an online database.
- Laboratory networking is in place.
- RCDC issues an epidemiological bulletin.
- The MOH and MOA collaborate on surveillance with NCAH, NEC and BAFRA.

Areas that need strengthening, and challenges

- The National Disease Surveillance and Epidemiology Unit needs to be strengthened.
- Surveillance data quality needs to be improved.
- Communities should be sensitized to the need for event reporting.
- Statutory legislation is required for surveillance.
- Poor reporting compliance must be addressed.
- Not all events are reported as required by the guideline.

D.2.2 Interoperable, interconnected, electronic real-time reporting system – Score 3

Strengths/best practices

- An electronic reporting system is in place (Both SMS and web-based), with reports produced weekly, quarterly and yearly in addition to real time feedback. Disease alerts are auto-generated.
- Surveillance data is routinely analysed, and systems are in place for data verification and follow-up.
- Animal disease reporting is web-based but there is no facility for SMS reporting.
- A programme is in place for yearly sensitization of health professionals.

Areas that need strengthening, and challenges

- A joint real time surveillance system is required for humans, animals and wildlife.
- Surveillance is generally not prioritised by financial decision-makers.
- The animal health sector should have SMS and mobile app reporting.
- Existing surveillance and reporting systems are standalone and do not interact.

D.2.3 Analysis of surveillance data – Score 2

Strengths/best practices

- Surveillance data collection and reporting tools are available online.
- Electronic data management is in place for both human and animal health.
- All health professionals are given the form for collecting and reporting cases.
- Data are routinely analysed.
- Reports are generated weekly, quarterly and annually.
- Feedback is disseminated in a timely manner.

Areas that need strengthening, and challenges

- There is a need for a field epidemiology training programme (FETP) for health professionals.
- Data management should be improved.
- NEWARS should be integrated with the Health Management and Information System; the Electronic Patient Information System; and the Laboratory Information System.
- The animal disease database system, currently consisting of VIS and TADinfo, should be integrated.
- Existing surveillance systems are standalone (both within the ministry and in other sectors).
- There is a need to build technical, financial and human capacity for surveillance.

D.2.4 Syndromic surveillance systems – Score 3

Strengths/best practices

- All health centres report notifiable diseases.
- Notifiable diseases are efficiently detected using existing systems.
- Laboratory-based ILI, SARI, diarrhoea and AUFI surveillance is available in sentinel sites.
- Rabies and foot and mouth disease (FMD) reporting is available in VIS for animal health.
- Health centres report notifiable syndromes weekly online or via SMS.
- Sentinel sites for ILI, SARI, diarrhoea and AUFI collect detailed patient information, including clinical samples.
- ILI and SARI surveillance has a web-based and SMS reporting system in addition to paper-based approaches.
- Supervision is done to monitor the quality of each surveillance system.
- All animal health centres report rabies and FMD monthly.

Areas that need strengthening, and challenges

- Data quality needs to be improved (to improve reporting of cases).
- Timeliness of reporting by health centres needs improvement.
- There is a need for statutory legislation for surveillance.
- Not all health centres report cases as required by the guideline.
- There are widespread delays in the reporting of cases by health centres.

Reporting

Introduction

Health threats at the human–animal–ecosystem interface have increased over the past decades, as pathogens evolve and adapt to new hosts and environments, imposing a burden on human and animal health systems. Collaborative multidisciplinary reporting on the health of humans, animals and ecosystems reduces the risk of disease.

Target

Timely and accurate disease reporting according to WHO requirements, and consistent coordination with FAO and OIE.

Bhutan level of capabilities

Bhutan's IHR NFP is the Chief of the Emergency Medical Services Department (EMSD), and the RCDC is the secondary NFP. The NCAH serves as the national OIE Focal point, and BAFRA is the national INFOSAN focal point.

To understand the burden of existing communicable diseases and their trends, as well as the emergence of new diseases, the MOH established NEWARS and published NEWARS guidelines in 2014. These guidelines lay out protocols, procedures and a hierarchy of reporting.

In both human and animal health, there are online reporting platforms in each agency. These are not, however, currently interoperable, and there is no means of information exchange between existing online platforms.

Bhutan has developed sufficient capacity to report significant public health events to WHO, FAO and OIE contact points. The IHR NFP maintains and regularly updates the list of contact points for IHR reporting, and has SOPs in place for reporting public health events of international concern (PHEIC) to WHO. The IHR focal points have access to WHO's emergency web based reporting system for collaboration and information exchange.

In 2015, Bhutan developed a disease outbreak investigation and control manual, as well as preparedness plans for pandemics and avian influenza. SOPs were also developed for management of public health threats at Paro International Airport.

Once a suspected event that poses a public health risk is detected through NEWARS, the procedure is to call a health emergency operation meeting involving relevant stakeholders. Internal stakeholders are alerted, and the event is reported to the appropriate international organizations.

Recommendations for priority actions

- Establish a simulation exercise with relevant stakeholders in order to review and test existing protocols and procedures for reporting to WHO/OIE.
- Formalize clear protocols for reporting potential PHEICs to WHO and OIE within 24 hours.

Indicators and scores

D.3.1 System for efficient reporting to WHO, FAO and, OIE – Score 2

Strengths/best practices

- Bhutan has an IHR NFP appointed in the MOH.
- IHR focal points are in place in all relevant stakeholder organizations.
- The Royal Centre for Disease Control has established a national surveillance unit.
- Bhutan's One Health Strategic Plan mandates sharing of information between human and animal health.
- NEWARS is in place, with online reporting systems.

Areas that need strengthening, and challenges

- An online reporting platform should be developed that allows exchange of information between the human and animal health sectors, and BAFRA.
- A lack of human resource capacity for reporting needs to be addressed.

D.3.2 Reporting network and protocols in country – Score 3

Strengths/best practices

- Different agencies have their own reporting protocols.
- Bhutan has a designated IHR NFP. In addition to reporting to WHO, the NFP distributes pertinent IHR-related information to its ministerial partners.
- IHR focal points are in place in all relevant sectors, so there are good working relationships and networks between stakeholders.

Areas that need strengthening, and challenges

- There are no formalized protocols for multisectoral coordination in reporting for health events.
- Outside of national emergencies, inter-ministry and interagency coordination occurs only on an ad hoc basis.
- There is a need to strengthen national capacities in alert and response.
- There is a need to strengthen reporting mechanisms at airports and ground crossings.
- Capacity building is required; Bhutan currently has inadequate technical expertise.

Workforce development

Introduction

Workforce development is important in order to develop a sustainable public health system over time. A highly qualified public health workforce should be developed and maintained with appropriate technical training, scientific skills and subject matter expertise.

Target

State Parties to 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). Workforce should include physicians, veterinarians, biostatisticians, laboratory scientists and farming/livestock professionals, with an optimal target of one trained field epidemiologist (or equivalent) per 200,000 population. This workforce should cooperate systematically to meet relevant IHR and Performance of Veterinary Services core competencies.

Bhutan level of capabilities

Bhutan has multidisciplinary human resources available to implement IHR (2005) core capacity requirements. The workforce includes epidemiologists, clinicians, veterinarians, and laboratory professionals at national level, and varying combinations of these at different sub-national levels.

Across the country, a three-tier health service system is in place, staffed with 287 clinicians; 1,098 nurses; 69 veterinarians; 270 medical laboratory technicians and technologists; 19 pharmacists; and 618 health assistants.

There are also 15 epidemiologists, 103 staff with Masters (MPH) or Bachelors (BPH) level of public health training, and six recent graduates of a One Health Fellowship. Although there is no FETP in place, all health assistants and BPH students are trained in basic epidemiology. While Bhutan has technically met the target of one epidemiologist per 200,000 population, in the context of the country's needs, further workforce capacity is still required.

A number of stakeholders support workforce development, and the MOH, as the IHR NFP, serves as the champion in this area. There is a national human resource plan already in place, but this is mostly focused on the healthcare workforce. National and sub-national staffing rosters are in place, and provide targets for long-term enhancement of workforce staffing levels. The Royal Civil Service Commission is the focal point for recruitment of staff; the Khesar Gyalpo University of Medical Science of Bhutan is responsible for educational programmes; and the Bhutan Medical and Health Council addresses workforce certification.

Recommendations for priority actions

- Building on the existing healthcare workforce strategy and the Bhutan One Health Strategy Plan, create an integrated national public health workforce strategy that includes considerations for One Health and allied disciplines such as logistics, communications, and emergency management.
- Develop a multi-tier and multisectoral field epidemiology training programme (and/or a related MOU with other countries) to support this workforce strategy. This programme should include appropriate annual continuing education and refresher training courses on basic epidemiology and disease outbreak control measures for both the human and animal health sectors.

Indicators and scores

D.4.1 Human resources are available to implement IHR core capacity requirements – Score 3

Strengths/best practices

- Bhutan has a number of health professionals working across national, intermediate, and local levels. While the numbers of individuals in different disciplines vary across districts, the national healthcare workforce strategy is currently addressing shortages that have been identified. Public health staffing follows authorized staffing documents, which exist for both the national and district levels.
- Rapid response teams have been formed at all levels, are multidisciplinary in nature, and are tailored to the needs of each response.

Areas that need strengthening, and challenges

- The rapid reassignment of staff between national and district levels in order to meet surge demands is not routinely exercised.
- The existing training model currently underserves several functional areas that could benefit from staff with field epidemiology training (e.g. food safety at BAFRA).
- Workforce development is hampered by financial & technical constraints.
- Coordination among stakeholders should be strengthened.
- Retention of professionals is a challenge.

D.4.2 Field epidemiology training programme or other applied epidemiology training programme in place – Score 2

Strengths/best practices

- Although there is currently no separate training programme for field epidemiologists in Bhutan, basic field epidemiology training is provided at KGUMSB. All health assistants and BPH graduates receive basic epidemiology training. KGUMSB also provides a refresher course in epidemiology, which is available for all health professionals.
- Regular meetings, trainings, and workshops on epidemiology are held during various public health events. SOPs exist that enable communications and reporting between national, intermediate, and local levels.

Areas that need strengthening, and challenges

- There is no tiered epidemiology training programme in place to meet different competency needs at different levels of government.
- Only some health discipline curricula include field epidemiology training; field epidemiology courses are also not included in animal health curricula.
- Epidemiology capacity development is hampered by financial & technical constraints.

D.4.3 Workforce strategy – Score 2

Strengths/best practices

- Bhutan has a 12-year human resource master plan for the healthcare sector, which includes reference to some public health disciplines such as epidemiology; this plan has been followed since 2011, resulting in increases in capacity for some of these disciplines.
- Civil servants have career tracks that they can follow. This promotes professionalization of their fields.
- There are several incentivization programmes in place such as difficulty allowances, high altitude allowances, technical and scarcity allowances, and meritorious promotion.

Areas that need strengthening, and challenges

- The current human resource master plan does not comprehensively cover public health disciplines or address training programmes (such as FETP) that contribute to the development of this workforce. This plan also does not explicitly address a One Health approach to the government's workforce. Although periodic update reports are published to measure progress against this plan, these are not used to address further workforce development needs.
- Although many international academic and training programmes are utilized to build the healthcare workforce, these are not systematically pursued as part of the workforce strategy, nor are they leveraged to build a sustainable domestic training programme.
- There are a number of technical and fiscal constraints in place that limit rapid development of the public health workforce.

RESPOND

Preparedness

Introduction

The effective implementation of the IHR (2005) requires multisectoral/multidisciplinary approaches through national partnerships for effective alert and response systems. It requires coordination of nationwide resources, including the sustainable functioning of a national IHR focal point that is accessible at all times to communicate with WHO IHR regional contact points and all relevant sectors and stakeholders in the country. (The IHR focal point is a national centre for IHR (2005) communications, and a key requisite for implementing the IHR (2005)). States Parties should provide WHO with contact details for their national IHR focal points, update them continuously, and confirm them annually.

Target

Preparedness includes the development and maintenance of national, intermediate and local or primary response level public health emergency response plans for relevant biological, chemical, radiological and nuclear hazards. These will cover mapping of potential hazards, identification and maintenance of available resources—including national stockpiles—and the capacity to support operations at intermediate and local or primary response levels during a public health emergency.

Bhutan level of capabilities

In 2016, Bhutan upgraded its pre-existing Emergency Medical Services Programme (EMSP) to a full division under the Department of Medical Services: the EMSD.

A Health Emergency and Disaster Contingency Plan (HEDCP) was developed according to the requirements laid out in the 2013 Disaster Management Act of Bhutan (a working document). In 2016 the HEDCP was presented to various stakeholders—including the Secretary of the Ministry of Home and Cultural Affairs and the Prime Minister—and finalized with high-level consensus.

Under the HEDCP, the Health Emergency Management Committee (HEMC), headed by the Health Secretary, is the highest decision-making body.

Contingency for health emergencies and disasters has been developed in hospitals as per the requirements of the Disaster Management Act, which also ensures that funding resources are available for disaster responses in affected areas, and which requires all relevant sectors to have contingency plans. However Bhutan still lacks an emergency contingency fund with pre-defined and available resources.

Recommendations for priority actions

- Conduct an all-hazard, multisectoral risk assessment, which includes resource mapping as well as ranking and prioritization of risks².
- Review and update the National Public Health Emergency Response Plan, and include points of entry (POE).
- Establish an exercise programme to test and validate preparedness and response operations.

² WHO has various guidance and tools on risk mapping, including the WHO Programme on Vulnerability and Risk Analysis & Mapping and Strategic Tool for Assessing Risks.

Indicators and scores

R.1.1 Multi-hazard national public health emergency preparedness and response plan is developed and implemented – Score 2

Strengths/best practices

- The HEDCP has a national mandate and high-level approval and commitment.
- Bhutan has developed health emergency and disaster contingency plans for all national and regional hospitals, and 26 district hospitals.
- The Health Emergency Management Committee is mandated to conduct mock drills twice a year to test plans.

Areas that need strengthening, and challenges

- The Health Emergency Management Committee should ensure that it conducts mock drills twice a year to test plans, as per its mandate.
- There is a need to strengthen referral hospitals and surge capacity
- There is a need to build human capacity in this technical area.
- A lack of financial resources hampers preparedness.
- Bhutan does not have prepositioned, pre-fabricated buildings to store buffer stocks at identified hubs.

R.1.2 Priority public health risks and resources are mapped and utilized – Score 2

Strengths/best practices

- General risk profiling and mapping has been done and has elucidated the risk level for communicable diseases, zoonotic diseases, food safety, chemical and radiological events, and natural disasters.
- Risk mapping was done through a joint venture involving representatives from the MOH; health centres; the NCAH; the DOL; BAFRA; Department of Disaster Management; and a number of WHO consultants.

Areas that need strengthening, and challenges

- There is a need for comprehensive risk profiling, to provide greater accuracy around risk.
- A general lack of resources and technical expertise hampers preparedness.

Emergency response operations

Introduction

A public health emergency operations centre (PHEOC) is a central location for coordinating operational information and resources for strategic management of public health emergencies and emergency exercises. Emergency operations centres provide communication and information tools and services, and a management system during responses to emergencies, or during emergency exercises. They also provide other essential functions to support decision-making and implementation, coordination and collaboration.

Target

Country has capacity for: a public health emergency operations centre functioning according to minimum common standards and maintaining trained, functioning, multisectoral rapid response teams; real-time biosurveillance laboratory networks; information systems; and trained PHEOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency.

Bhutan level of capabilities

Bhutan is currently actively pursuing the procurement and installation of a pre-fabricated national public health emergency operations centre (PHEOC). An initial Health Emergency Operations Centre Guideline and SOP has been developed, which contains many of the elements of a comprehensive PHEOC Handbook. EOC-related functions of routine event-based surveillance and reporting are already carried out by the RCDC.

Although mandated, relatively few public health-related exercises have been conducted within Bhutan. Because the national PHEOC is not yet in place and staff have not yet been identified and trained on the initial guidelines, no exercises of the EOC functions have yet been conducted.

Although some case management guidelines are in place, no comprehensive set of case management guidelines has yet been developed to address all relevant national priority public health threats and IHR-relevant hazards.

Recommendations for priority actions

- Install infrastructure for an interim national PHEOC and identify a location at which to build a permanent establishment within five years. Identify locations for on-demand PHEOCs at sub-national levels and develop a long-term plan for the infrastructure enhancement of these locations.
- Update the national PHEOC Handbook ("HEOC SOP") following the guidance contained in the WHO Framework for a Public Health EOC and the associated WHO handbooks.
- Implement a national training and exercise programme for core and surge PHEOC staff at national and sub-national levels.
 - Include position-specific training and multisectoral exercises that address all IHR-relevant hazards.
 - Roster core and surge staff against the PHEOC's identified IMS structure and maintain training records at all levels of government.
 - Consider sending the PHEOC manager for advanced emergency management training.

- Develop and distribute emergency case management guidelines, and train clinical staff for all priority infectious diseases and IHR-relevant hazards.
- Develop and implement an emergency communications plan.

Indicators and scores

R.2.1 Capacity to activate emergency operations – Score 2

Strengths/best practices

- Staff are available on call within the MOH to initiate response operations. An initial PHEOC manager has been appointed to guide this initiation of operations. Event-based surveillance functions conducted by RCDC provide some early warning that can inform decision-making around activation.
- The Health Emergency Management Committee, led by the Health Secretary, will determine the activation of the national PHEOC, and also the escalation of activation levels, and deactivation.
- The PHEOC can be activated for type 2 and 3 disasters, and will link with the National EOC run by the National Disaster Management Authority to coordinate any needed international assistance.

Areas that need strengthening, and challenges

- Although they have been requested from the Royal Civil Service Commission, no dedicated core staff are currently employed to run the PHEOC 24/7.
- None of the staff identified as PHEOC surge staff have received position-specific emergency management training. The designated PHEOC manager has not received any advanced public health emergency management training.
- No risk assessment process is in place for use in decision-making for activation and for escalation/de-escalation of the PHEOC.

R.2.2 Emergency operations centre operating procedures and plans – Score 2

Strengths/best practices

- An initial PHEOC Handbook (the Health Emergency Operations Centre Guideline and SOP, 2017) has recently been published. This PHEOC Handbook contains many of the elements recommended by the WHO in its *Framework for a Public Health Emergency Operations Centre* and the associated guidance handbooks. These elements include IMS Structure, key elements of some IMS functions (management, operations, logistics, and finance/administration), and public health functions.

Areas that need strengthening, and challenges

- The existing PHEOC Handbook is missing key required elements such as the IMS planning function; the concept of operations (CONOPS) that defines roles and relationships between sectors and between levels of government; and job aids for key functions. (To be fully compliant with a score of 2, the PHEOC Handbook needs to be updated with at least the planning function).
- There is no communications plan in place to identify communications infrastructure and redundancies for use in emergencies.

R.2.3 Emergency operations programme – Score 1

Strengths/best practices

- Requirements are already in place to exercise emergency functions.
- A drill was conducted at Jigme Dorji Wangchuck National Referral Hospital, Thimphu, in September 2017. This drill was observed by His Excellency the Health Minister, the Health Secretary, and other Heads of the MOH.

Areas that need strengthening, and challenges

- The health sector currently has no comprehensive exercise programme that includes tabletop exercises, drills, and functional exercises. It is not clear who would have control of this programme within the MOH, or how health sector exercises would fit into an integrated national multisectoral training and exercise programme.
- Because the national PHEOC has not yet been built, because core PHEOC staff have not yet been authorized (let alone trained), and because the PHEOC handbook has just recently been drafted, public health emergency management functions have not yet been exercised.

R.2.4 Case management procedures are implemented for IHR relevant hazards – Score 2

Strengths/best practices

- Standard treatment guidelines currently exist for many of the diseases on the nationally notifiable disease list.
- A Contingency Plan for Public Health Preparedness for Paro International Airport was developed in 2016. This plan has good patient referral systems and facilities through land ambulances and air evacuation.
- Dedicated health staff are positioned at the airport.
- Rapid response teams are in place, and are capable of using existing treatment guidelines.
- The government covers costs for all facilities and functions supporting case management.

Areas that need strengthening, and challenges

- Priority diseases have not yet been systematically identified (see JEE indicator R.1.2). To be fully compliant with a Level 2 score for this indicator, the current standard treatment guidelines would need to be supplemented for any diseases on the national risk-based priority list. Case management guidelines also are needed for IHR-relevant hazards.
- Clinical staff need to be trained on the resulting case management guidelines.
- No SOPs exist for the transportation of infectious patients.

Linking public health and security authorities

Introduction

Public health emergencies pose special challenges for law enforcement, whether the threat is manmade (e.g. anthrax terrorist attacks) or naturally occurring (e.g. flu pandemics). In a public health emergency, law enforcement must coordinate its response quickly with public health and medical officials.

Target

In the case of a biological event of suspected or confirmed deliberate origin, a country should be able to conduct a rapid, multisectoral response, with the capacity to link public health and law enforcement, and to provide and/or request effective and timely international assistance (for example, to investigate instances of alleged use).

Bhutan level of capabilities

Bhutan's security authorities include the Royal Bhutan Police, the Royal Military, border control authorities, and customs. Bhutan's Department of Disaster Management is the responsible authority in any disaster response, whether the disaster is man-made, natural or deliberate. The 2013 National Disaster Management Act (NDMA) requires all sectors to have contingency plans in place.

The Royal Bhutan Police shall "in times of threatening disaster situation or disaster, provide support to maintain law and order" (NDMA).

The Police must also "provide enforcement of disease control measures and regulations during [the] influenza pandemic phase" (National Pandemic Influenza Preparedness Plan/NPIPP 2016).

No formal MOU or agreement is currently in place linking public health and security authorities during a suspect or confirmed biological event.

It is noted that Bhutan's public health and security authorities have worked together successfully ad hoc during emergency response operations in the past without agreements and plans in place—though not in response to an intentional biological attack, or in an exercise simulating such a scenario.

Recommendations for priority actions

- Revisit Bhutan's legal framework for close collaboration under the IHR (2005) between security authorities and public health authorities (e.g. animal and human health and food safety).
- Develop a formal agreement (MOU or equivalent) between public health and security authorities that clarifies different roles and responsibilities in the case of suspected or confirmed intentional biological events or terrorist attacks.
- Implement the agreement, and familiarize public health and security stakeholders with it through an exercise including all stakeholders.

Indicators and scores

R.3.1 Public health and security authorities (e.g. law enforcement, border control, customs) are linked during a suspect or confirmed biological event – Score 1

Strengths/best practices

- The NDMA and the NPIPP mention the role of the Police in maintaining law and order during disaster response, and in helping the MOH enforce infectious disease control measures during a pandemic.

Areas that need strengthening, and challenges

- Points of contact and triggers within public health, animal health and security authorities for use in the event of a deliberate/terrorist biological attack are not clearly identified in the NDMA 2013 or the HEDCP 2016.
- No formal MOU or agreement is currently in place linking public health and security authorities.
- The relative roles and responsibilities of public health and security authorities require clarification, an agreement between sectors, and testing through exercises.
- Experience and lessons—particularly concerning deliberate biological events and terrorist attacks—should be shared with other countries.

Medical countermeasures and personnel deployment

Introduction

Medical countermeasures are vital to national security. They protect nations from potentially catastrophic infectious disease threats. Investments in medical countermeasures create opportunities to improve overall public health. It is also important to have trained personnel who can be deployed in case of a public health emergency for response.

Target

A national framework for transferring (sending and receiving) medical countermeasures and public health and medical personnel between international partners during public health emergencies.

Bhutan level of capabilities

The rules and regulations of Bhutan's National Disaster Management Act define the roles and responsibilities of IHR-relevant stakeholders. Articles 14-18 of the Act make provisions for the Disaster Management Authority to (a) initiate and terminate international disaster response, relief and recovery assistance; (b) accept international disaster response, relief and recovery assistance; and (c) conduct international disaster response, relief and recovery operations.

The Health Emergency Disaster Contingency Plan (HEDCP) also briefly addresses international emergency relief and provision of national assistance to disaster-affected countries abroad (page 74).

Any foreign health relief assistance coming into Bhutan from international organisations or other countries will be routed through the MOH and the Ministry of Foreign Affairs. International emergency relief should complement, not duplicate, the measures taken within Bhutan's health sector. Country stakeholders will inform donors as to what is needed.

For providing assistance abroad, the MOH intends to form the Bhutan Emergency Medical Team (BEMT), which will be dispatched to other disaster-affected countries as part of Bhutan's support to humanitarian initiatives. The criteria and terms of reference for selecting health professionals for the BEMT shall be developed accordingly.

No specific countermeasures are currently described, as most of Bhutan's response and countermeasures plans are disease-specific. Any medical emergency in the country involves responses from different stakeholders across the country.

Recommendations for priority actions

- Develop and implement a plan and SOPs for sending and receiving medical countermeasures during a public health emergency.
- Finalize the establishment of the Bhutan (inter)national Emergency Medical Team, in line with WHO EMT guidance, and ensure that plans are in place for sending and receiving international health personnel.
- Establish formal agreements with relevant stakeholders (including private sector manufacturers/distributors and national and international NGOs and CSOs) for the delivery of medical services and supplies during a public health emergency.

Indicators and scores

R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency – Score 1

Strengths/best practices

- Bhutan has a National Disaster Management Plan, a National Emergency Operations Plan, and disease-specific response plans.
- A national technical team has been formed, and a Health Emergency Management Committee (HEMC) is in place.
- Drug regulation is in place, all medicinal products are registered, and a stockpile of essential medical supplies is maintained.
- Bhutan has a resource mobilization plan.
- WHO provides timely technical backup.

Areas that need strengthening, and challenges

- A plan is needed for receiving and sending medical countermeasures. International agencies should be involved, and plans should be tested with drills and exercises.
- Agreements should be signed with manufacturers or distributors to procure medical countermeasures during public health emergencies. Regional/international countermeasures procurement and distribution agreements should also be put in place.
- There is no institutional system for receiving and sending medical countermeasures.
- Bhutan does not produce vaccines or any other medical products.
- Capacity in this area is weakened by high turnover of human resources.

R.4.2 System is in place for sending and receiving health personnel during a public health emergency – Score 1

Strengths/best practices

- The establishment of emergency medical teams (EMTs) is ongoing, with a guidance document in draft at time of writing in December 2017. The plan includes procedures for sending health personnel to other countries, but lacks any guidance for receiving health personnel from other countries. This guidance should be included.
- Every professional joining the health workforce in Bhutan must register with the BMHC, including health personnel visiting Bhutan from outside.

- Though there was no plan in place, Bhutan did send a team of health personnel to Nepal during the 2015 earthquake. Such teams can be formed from the existing pool of health professionals.
- In 2003, more than 200 health workers were trained as EMTs and deployed during insurgencies in areas affected by conflict.

Areas that need strengthening, and challenges

- A consolidated plan is required in this technical area that also includes security authorities and the animal health sector.
- Training criteria and standards should be identified for health personnel who will be sent or received during a public health emergency. Training protocols should be developed for arriving health personnel.
- Bhutan should address liability, safety and financial concerns associated with medical personnel on international deployments.

Risk communication

Introduction

Risk communication should be a multilevel, multifaceted process that helps stakeholders define risks, identify hazards, assess vulnerabilities and promote community resilience—thereby promoting the capacity to cope with an unfolding public health emergency. An essential part of risk communication is disseminating information to the public about health risks and events, such as disease outbreaks. For communication about risk to be effective, the social, religious, cultural, political and economic effects of the event should be taken into account—including the voice of the affected population.

Communications of this kind promote appropriate prevention and control action through community-based interventions at individual, family and community levels. Disseminating information through appropriate channels is essential. Communication partners and stakeholders need to be identified, and functional coordination and communication mechanisms should be established. In addition, the timely release of information and transparency in decision-making are essential for building trust between authorities, populations and partners. Emergency communications plans should be tested and updated as needed.

Target

States Parties should have risk communication capacity that includes multilevel, multifaceted real-time exchange of information, advice and opinion between experts and officials and people who face a threat or hazard to their survival, health or economic or social wellbeing. This information should enable them to take informed decisions to mitigate the effects of the threat or hazard, and to take protective and preventive action). It should consist of a mix of communication and engagement strategies such as media and social media communication, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement, and community engagement.

Bhutan level of capabilities

Mass media in Bhutan is at a very early stage, and is currently developing. There is consistent growth in use of all forms of mass media, including print, broadcast, film, music, mobile phones, and the internet.

Bhutan recognizes that risk communication plays a key role in responding to public health emergencies and disasters, and this is well reflected in the Disaster Management Act 2013.

The Health Emergency & Disaster Contingency Plan (HEDCP) 2016 describes different communication approaches to different target populations, including vulnerable and at-risk groups.

The Chief Planning Officer of the Policy and Planning Division of the MOH shall be the media spokesperson for disasters and emergencies at national level. The media spokesperson shall appoint other relevant spokespersons to talk publicly about the technical aspects of emergencies and disasters when required.

The National Preparedness and Response Plan 2013 and the draft Risk Communication Strategy 2016 of the NIPPP incorporate some risk communication procedures for avian influenza, but there is no integrated multi-hazard risk communication strategy and a plan is required for all IHR-related hazards. Health promotion activities are conducted at national and community levels by the MOH Health Promotion Unit.

Risk communication was successfully used to prepare for and prevent Ebola (2014) and Zika virus (2015). Officials from the MOH and other stakeholders were trained on risk communication. The MOH used various media, including print, visual, audio and mobile phone (text) methods, to disseminate risk communication messages.

Designated focal points for risk communication at district level are mandated by the Disaster Management Act 2013, with District Health Officers holding primary responsibility, supported by the Department of Disaster Management and charged with preventing, mitigating and responding to disasters.

Risk communication training is still not done at field level, but a plan is in place to begin.

Recommendations for priority actions

- Develop one integrated multi-hazard risk communication strategy and plan for all IHR-related hazards; develop and regularly update SOPs for implementing the strategy.
- Establish a common platform or group to take the lead role in coordinating different risk communication stakeholders, and develop clearly defined roles and responsibilities for each stakeholder.
- Strengthen pre-service and in-service training programmes on risk communication for basic health workers and rapid response team members, to enhance community engagement.

Indicators and scores

R.5.1 Risk communication systems (plans, mechanisms, etc.) – Score 1

Strengths/best practices

- Risk communication is part of the NIPPP. This helped prevent H5N1 outbreaks among humans in 2010, 2012 and 2013.
- Designated spokespersons are in post in the human and animal health sectors. District Health Officers are risk communication focal points in their districts.
- Bhutan's One Health Strategic Plan has been endorsed, with an MOU signed between the MOH and the MOAF.
- All health sector leaders and staff can be reached within a short period of time (by phone and email).
- There is joint cross-sectoral collaboration in responding to zoonotic disease outbreaks.
- Health teams at local level work in partnership with other sector heads.

Areas that need strengthening, and challenges

- Bhutan should develop an integrated multi-hazard risk communication plan, test it, and update it regularly.
- There is a need to identify risk communication focal points as well as media focal points.
- Risk communication training and refresher training is required for spokespersons and health personnel.
- There is a need to strengthen financial and technical resources in this area.

R.5.2 Internal and partner communication and coordination – Score 2

Strengths/best practices

- Some disease-specific communication materials are available.
- Identification of stakeholders is complete.
- A health EOC will soon be established and will function as the centre for communication and coordination.
- Communications are done via websites, social media, personal contacts, phones and other channels.
- Several awareness programmes are in place, including high-level advocacy on HIV, hand washing, exercise, nutrition and other health topics.

Areas that need strengthening, and challenges

- Either the Health Promotion Division or the Emergency Medical Services Division should be lead agency for most risk communication activities.
- There is a need to build the risk communication capacity of media focal points and District Health Officers.
- The risk communication structure is not well established. There is no clear-cut chain of command, and roles and responsibilities are not well defined.
- There is a need for SOPs that define roles and responsibilities for communication partners, and which strengthen coordination and collaboration across sectors.

R.5.3 Public communication – Score 2

Strengths/best practices

- Several media (e.g. print, television, radio, internet and web pages) are available at national level for disseminating risk communication messages.
- Literacy rates are increasing.
- Social media is used for health and risk communication.
- Community and village health workers are in place to disseminate messages to the community.

Areas that need strengthening, and challenges

- Regular trainings, seminars and exchanges are required to improve procedures and update risk communication skills.
- There is a need to assess and evaluate public communication, to identify gaps and strengths of existing mechanisms.
- The use of social media for health and risk communications should be streamlined.
- There is no tangible, efficient infrastructure for risk communication.

R.5.4 Communication engagement with affected communities – Score 3

Strengths/best practices

- Two health workers are available at each community health centre to support risk communication activities.
- SMS can be used for community awareness campaigns on priority health topics or emergencies.
- There is a free hotline number (112) operational 24/7.

Areas that need strengthening, and challenges

- Pre-service and in-service training programmes for health personnel should emphasize counselling skills, risk communication skills and the provision of psychological first aid.
- The use of 112 (HHC) in health emergencies should be optimized.
- Evaluation tools are needed for communication engagement with affected communities during disasters or health emergencies.
- Resources and capacity for disseminating risk communication messages are limited at district level.

R.5.5 Dynamic listening and rumour management – Score 2

Strengths/best practices

- The 112 hotline is an effective channel for providing information and addressing rumours and misinformation.
- The Director General of Medical Services, the Health Secretary and the Minister of Health give on-the-spot media briefings and issue press releases to address any observed misunderstandings.

Areas that need strengthening, and challenges

- Media monitoring should be strengthened to improve the ability to identify or respond to rumours and misinformation in a timely manner.
- The monitoring of communications through social media should be emphasised.
- Rumour management should be expanded to regional and district levels.
- There is no robust system or mechanism to track rumours.
- Risk communication staff levels are inadequate to provide the necessary information and monitor public responses.

OTHER IHR-RELATED HAZARDS AND POINTS OF ENTRY

Points of entry

Introduction

All core capacities and potential hazards apply to points of entry, and thus enable the effective application of health measures to prevent the international spread of diseases. States Parties are required to maintain core capacities at designated international airports and ports (and, where justified for public health reasons, a State Party may also designate ground crossings as points of entry). These should implement specific public health measures to manage 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, designated ground crossings), which implement specific public health measures to manage a variety of public health risks.

Bhutan level of capabilities

Bhutan has two designated points of entry under the IHR (2005): Paro International Airport and Phuentsholing Ground Crossing. There are four other non-designated ground crossings: Gelephu, SamdrupJongkhar, Samtse (including Gomtu), and Nganglam. Most visitors use Phuentsholing Ground Crossing.

Two airlines, both national carriers, frequent Paro airport, serving eight cities in five countries.

Phuentsholing Ground Crossing, which borders with India, is Bhutan's main gateway and its biggest commercial hub.

Paro International Airport is operated by the Department of Air Transport, which is situated in the Ministry of Information and Communication.

Airport medical services are provided by the MOH. Two health officers currently work at the airport health office. Paro airport has access to medical services, equipment and personnel for transporting ill travellers.

Phuentsholing Ground Crossing is located on the border with West Bengal, India, 175 kilometres from Bhutan's capital, Thimphu. There is no medical facility at Phuentsholing Ground Crossing, but Phuentsholing Hospital is nearby.

During public health emergencies, screening of visitors/tourists entering and exiting Bhutan could be a challenge, owing the high number of informal entry points.

Sanitation and waste management is in place at the points of entry.

Functional animal quarantine stations are in place at the points of entry.

Vector surveillance activities are carried out, and some staff are trained in vector surveillance, but this activity is not done routinely due to a lack of staff at Paro International Airport.

Paro International Airport has a draft public health emergency preparedness plan, and Phuentsholing Hospital has a contingency plan for public health emergency preparedness and response. The Phuentsholing hospital plan does not, however, contain explicit SOPs for accessing medical services from ground crossing points.

Recommendations for priority actions

- Finalize the Public Health Emergency Preparedness Plan for Paro International Airport and develop a similar plan for Phuentsholing Ground Crossing.
- Review and implement the recommendations of the 2015 assessment conducted at Paro International Airport and the 2011 assessment conducted at Phuentsholing Ground Crossing, incorporating capacity building of conveyance inspection.
- Develop a memorandum of understanding for collaboration and coordination between the Ministry of Health and relevant stakeholders regarding implementing and sustaining IHR-related activities and health readiness and response capacities at points of entry.
- Conduct meetings with neighbouring countries to update and harmonize public health policies and response plans at points of entry.

Indicators and scores

PoE.1 Routine capacities are established at points of entry – Score 3

Strengths/best practices

- Coordination and communication at POEs is strong, and involves IHR stakeholders from different agencies. A communication flowchart for relevant POE stakeholders is in place for medical and public health emergencies. Airport agencies also use instant messaging/smartphone app communications groups.
- Protocols are in place for access to medical facilities and referral of patients at POEs.
- Paro airport has a room for passengers who are infected or suspected of being infected.
- Frequent IHR stakeholder meetings are conducted to improve POE-related coordination and support.

Areas that need strengthening, and challenges

- Inspection of imported goods is carried out by customs and BAFRA, but there is no mechanism in place to meet the requirements of the IHR (2005). Activities such as disinsection, disinfection and decontamination of aircraft and baggage are not carried out, as there are no personnel trained on conveyance inspection.
- There are designated staff for vector surveillance at Phuentsholing Ground Crossing, where malaria control activities are carried out routinely. However, vector surveillance is not routinely done at Paro Airport, due to lack of staff.
- The Phuentsholing Ground Crossing does not have rapid access to medical facilities.
- IHR stakeholders at POEs lack capacity for case detection, assessment, and management.
- Entry screening at ground crossings during public emergencies remains a challenge for the MOH.
- To implement and sustain IHR activities, additional human resources are required. Paro Airport currently has only two health staff.

PoE.2 Effective public health response at points of entry – Score 1

Strengths/best practices

- POE contingency plans for public health emergencies are in place. Phuentsholing Hospital tested the plans in 2016.
- Functioning animal quarantine stations exist at POEs. Imports of plants and animals are regulated by BAFRA.
- Standard operating procedures on arrival screening are in place.
- A facility for assessing suspected/infected travellers is in place at Paro Airport.
- Periodic consultative meetings of relevant POE stakeholders are conducted to strengthen coordination on IHR (2005) activities.

Areas that need strengthening, and challenges

- The draft plan for Paro Airport needs to be revisited and finalized, specifying needs in terms of technical expertise.
- Collaboration between animal quarantine stations and the MOH should be more focused on preparedness and response during emergencies.
- Capacity building is required for POE staff on conveyance inspection, preparedness and response to all hazards. The necessary equipment and logistic support should be provided.
- The MOH takes the lead in implementing the IHR (2005) at points of entry. To sustain IHR activities, the MOH should sign MOUs with all relevant stakeholders.
- There is a need for an allocated budget for IHR activities at POEs, including for coordination meetings with IHR stakeholders; training on use of personal protective equipment; sanitation and waste management; communication; and transport and handling of suspected patients.
- Guidelines must be developed on the handling of dead bodies (including referred patients, accident cases on international highways, and bodies entering through designated POEs).

Chemical events

Introduction

States Parties should have surveillance and response capacity for chemical risks or events. This requires effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation and safe disposal.

Target

States Parties should have surveillance and response capacity for chemical risks or events, with effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation and safe disposal.

Bhutan level of capabilities

Bhutan has no indigenous chemical industry, and imports all chemicals used within the country. A national chemical profile of a handful of carcinogenic chemicals was conducted in 2012, but there is no national inventory of toxic chemicals. A public poison information centre is authorized within the MOH, but currently does not exist.

The country is party to several international treaties related to chemicals, such as the Basel Convention and the Montreal Protocol. National policy documents and disaster management plans mention chemicals among the potential threats to public health, and legislation addresses occupational exposures. However, there is no comprehensive set of policies, plans, and procedures across all sectors for chemical event surveillance, assessment, alert, and response. Roles and responsibilities across organizations are unclear and often assumed.

Guidelines on the public health management of chemical incidents exist, but there are no public health contingency plans for response to chemical events, nor are there any SOPs for conducting surveillance or risk assessments for chemical events.

No chemical surveillance programme is in place, and laboratory capacity is very limited. What capacity there is is focused on food safety.

Very few MOH staff have received any training on relevant functions such as risk assessment and risk management for chemicals. Bhutan has only one trained toxicologist, and that individual works in a hospital.

Recommendations for priority actions

- Develop national multisectoral policies, plans, and procedures for chemical event surveillance, assessment, alert and response. Include clarification of organizational roles and authorities.
- Develop an integrated national chemicals database and conduct an inventory of major chemical hazards and facilities.
- Include chemical events in the national public health emergency training and exercise programme.
- Establish a national poison information centre.

Indicators and scores

CE.1 Mechanisms are established and functioning for detecting and responding to chemical events or emergencies – Score 1

Strengths/best practices

- Some limited chemical monitoring is in place, including environmental monitoring for PM10 and monitoring of food products.
- Guidelines exist for the public health management of chemical incidents.
- Bhutan does carry out monitoring and visits to industries to ensure sound management of chemicals, following occupational health and safety (OHS) assessment guidelines.
- The national event based surveillance system (NEWARS) is capable of detecting chemical exposures.

Areas that need strengthening, and challenges

- There are no standard operating procedures for chemical surveillance or for risk assessment of chemical events.
- Although authorized, the national poison control centre at RCDC is not functional.
- The National Disaster Management Plan currently does not include an explicit chemical response plan.
- No exercises are conducted to test responses to chemical events.
- There are no risk assessment procedures to trigger a response to a chemical event, and MOH staff lack the training to conduct such risk assessments.
- Few people in Bhutan have specialized skills in toxicology; only one person within the MOH is a trained toxicologist.
- No toxidrome-based case management guidelines exist.

CE.2 Enabling environment is in place for management of chemical events – Score 1

Strengths/best practices

- A national chemicals profile has been conducted, based on UNITAR guidelines.
- A national technical working group for chemicals management is in place.
- Bhutan is a member of the WHO Chemical Risk Assessment network.

Areas that need strengthening, and challenges

- Bhutan has no comprehensive legislation for chemical safety or for responses to chemical events.
- There is no multisectoral/interdisciplinary coordination mechanism with regard to chemical safety; organizational roles and responsibilities are unclear.
- No chemical database exists to assist first responders in identifying the threats faced during a chemical event.

Radiation emergencies

Introduction

State Parties should have surveillance and response capacity for radionuclear hazards/events/emergencies. This requires effective communication and collaboration among the sectors responsible for radionuclear management.

Target

State Parties should have surveillance and response capacity for radionuclear hazards/events/emergencies, with effective communication and collaboration among the sectors responsible for radionuclear management.

Bhutan level of capabilities

Bhutan has no nuclear power plants or medical radioisotope sources, but these sources are found in neighbouring states. Medical radiation operations depend on artificially generated radiation rather than on natural radiation sources.

It is not clear if any radioisotopes are used in Bhutan in other industries, such as construction.

There is no health physics or radiobiology expertise in country. There is no response contingency plan for a radiological emergency in Bhutan or in any neighbouring country.

There are no SOPs for radiation detection, assessment, or response operations.

Recommendations for priority actions

- Create a national profile of radiation sources and a risk assessment of radiation threats to the nation.
- Develop national multisectoral policies, plans, and procedures for radiation event detection, assessment, alert, and response. Include clarification of organizational roles and authorities.
- Consider implementing radiation emergency assistance MOUs with neighbouring countries, and consider membership of the IAEA.
- Include radiation events in the national public health emergency training and exercise programme.

Indicators and scores

RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies – Score 1

Strengths/best practices

- There is some limited CBRN training in place.

Areas that need strengthening, and challenges

- There are no national policies, plans, or procedures for detection and assessment of, and response to, radiation emergencies.
- No exercises are held to test responses to radiation emergencies.
- There are no SOPs for managing radiation emergencies—including for risk assessment, reporting, event confirmation, notification, or investigation.
- There are no MOUs for detection, alerting, and response assistance in place with neighbouring countries that have radiation sources.

RE.2 Enabling environment is in place for management of radiation emergencies – Score 1

Strengths/best practices

- National disaster management plans do acknowledge that radiation emergencies are a potential public health threat.

Areas that need strengthening, and challenges

- National authorities responsible for managing radiological and nuclear events need to be designated.

Appendix 1: JEE background

Mission place and dates

Thimphu, Bhutan, 11-15 December 2017

Mission team members:

- Team lead: Bardan J Rana, WHO Regional Office for South-East Asia
- Team co-lead: Henk Ormel, UN Food and Agriculture Organization (FAO)
- Frederick Copper, WHO headquarters
- Maung Maung Htike, WHO Regional Office for South-East Asia
- Merita Monteiro, IHR National Focal Point, Timor-Leste
- Mark Nunn, independent technical writer and editor
- Maria Consorcia Quizon, South-East Asia Field Epidemiology and Technology Network (SAFETYNET)
- Peter Rzeszotarski, Division of Emergency Operations, Centers for Disease Control and Prevention, USA
- Thomas Tolfvenstam, Public Health Sweden
- John Woodford, OIE representative

Objective

To assess Bhutan's capacities and capabilities relevant to the 19 technical areas of the JEE tool for providing baseline data to support Bhutan's efforts to reform and improve their public health security.

The JEE process

The JEE process is a peer-to-peer review. The entire external evaluation, including discussions around the scores, the strengths, the areas that need strengthening, best practices, challenges and the priority actions should be collaborative, with JEE team members and host country experts seeking full agreement on all aspects of the final report findings and recommendations.

Should there be significant and irreconcilable disagreement between the external team members and the host country experts, or among the external, or among the host country experts, the JEE team lead will decide the outcome; this will be noted in the final report along with the justification for each party's position.

Preparation and implementation of the mission

- In September 2017, the team lead of the JEE mission visited Bhutan to deliver a two-day briefing on the JEE process to all relevant stakeholders, as part of WHO's support to the preparation for the JEE mission in December 2017. A timeline was drafted to plan the period up until the arrival of the JEE assessors.
- Prior to the visit, periodic teleconferences were held to review the agenda, responsibilities and logistics of the JEE process. These calls involved members of the assessment team; focal persons in the WHO Regional Office for South-East Asia in New Delhi; the JEE secretariat in Geneva; the WHO Country Office for Bhutan; and the Bhutanese government.
- On three further occasions, the team lead met the Bhutan IHR NFP during different regional meetings, and discussed the preparation, agenda and logistics face to face.

- Bhutan's self-assessment documents were delivered to the external experts approximately three weeks prior to the JEE mission.
- On the Sunday before the JEE meetings, the team lead and co-lead met with all the external assessors to review the agenda and process for the coming week. This allowed a more detailed face-to-face briefing on the JEE methodology for those assessors who were participating in their first JEE mission.
- Later the same day, the team also met with the Bhutanese organizers and the staff of the WHO Country Office for Bhutan, to finalize the agenda and review the preparation and logistics.
- The JEE started at 0900hrs on Monday 11 December 2017, and was officially opened by His Excellency the Secretary of Health of Bhutan.

Limitations and assumptions

- The evaluation was limited to one week, which limited the amount and depth of information that could be managed.
- It is assumed that the results of this evaluation will be publically available.
- The evaluation is not just an audit. Information provided by Bhutan will not be independently verified but will be discussed and the evaluation rating mutually agreed to by the host country and the evaluation team. This is a peer-to-peer review.

Supporting documentation provided by host country

File names listed as provided

National Legislation, Policy and Financing

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- ToR_Technical Team.pdf
- Guide for National IHR Focal Points
- All-hazards assessment of four border hospitals
- IHR implementation status reports

Antimicrobial Resistance (AMR)

- National Action Plan on AMR 2018-2022
- National Standard Treatment Guideline (animal and human health)
- National Infection Control Guideline (human health)
- National Antibiotics Guidelines (animal and human health)
- National Essential Drug List
- Laboratory Quality Manual
- Protocols for HCAI and AMR Point Prevalence Survey

- The Medicines Act of Kingdom of Bhutan 2003
- Bhutan Medicines Rules And Regulations 2012
- National Essential Medicines Formulary
- National Drug Policy 2007
- Bhutan-Medicines-Rules-and-Regulation-2012.pdf
- Final HAI _AMU PPS 2017.pdf
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- Medicines-Act-2003-English-Version.pdf
- NATIONAL ACTION PLAN ON AMR.pdf
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- National-Essential-Medicines-Formulary-2016.pdf
- National-Essential-Medicines-List-2016.pdf

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- 1st National Influenza Coordination Committee minutes of meeting oct 2016.docx
- 3rd National Influenza Coordination Committee minutes of meeting.docx
- Annual report_NCAH 2015-2016_Tenzin.pdf
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