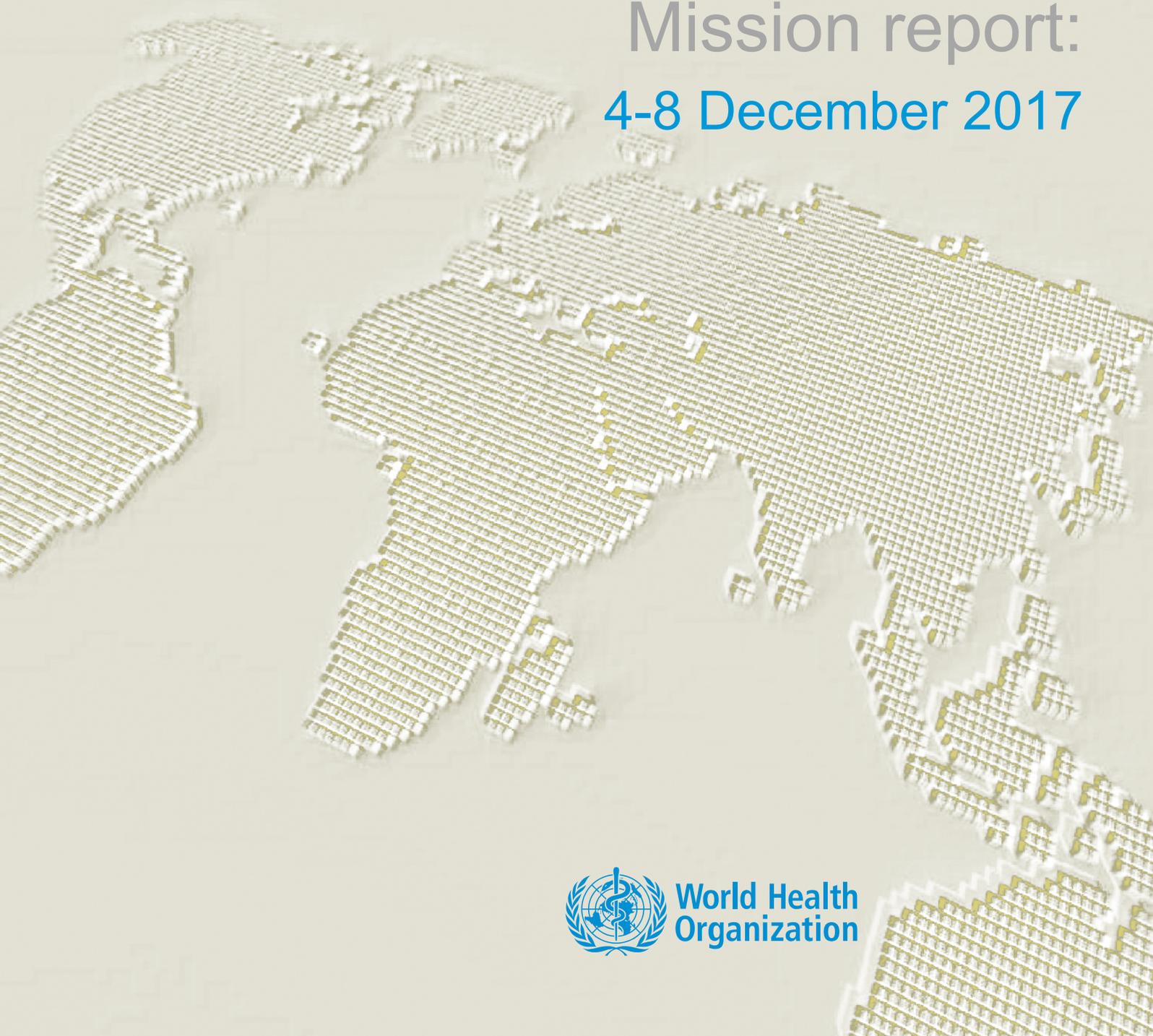


JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES

of the

REPUBLIC OF BOTSWANA

Mission report:
4-8 December 2017



World Health
Organization

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WHO/WHE/CPI/REP/2018.18

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Abbreviations

AEFI	adverse events following immunization
AMR	antimicrobial resistance
BDF	Botswana Defence Force
BPHI	Botswana Public Health Institute
CDC	United States Centres for Disease Control and Prevention
CMS	Central Medical Stores
DHIS	District Health Information System
DHMT	district health management team
DPSM	Directorate of Public Service Management
EOC	emergency operations centre
EPI	Expanded Programme on Immunization
FAO	Food and Agricultural Organization of the United Nations
FETP	Field Epidemiology Training Program
FSQMU	Food Safety and Quality Management Unit
HR	human resources
IAEA	International Atomic Energy Agency
ICT	Information and communications technology
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
ILO	International Labour Organization
INFOSAN	International Food Safety Authorities Network
ISO	International Organization for Standardization
MCM	medical countermeasures
MoHW	Ministry of Health and Wellness
MoU	Memorandum of Understanding
NDMO	National Disaster Management Office
NFP	national focal point
NGO	non-governmental organization
OIE	World Organisation for Animal Health
PoE	points of entry
RPI	Radiation Protection Inspectorate
RRT	rapid response team
SADC	Southern African Development Community
SAICM	Strategic Approach to International Chemicals Management
SOP	standard operating procedure
TB	tuberculosis
THIRA	Threat and Hazard Identification and Risk Assessment
WHO	World Health Organization

Executive summary

Botswana has not in the recent past witnessed major outbreaks to test its public health emergency preparedness and response systems. Like many neighbouring countries, the country developed preparedness plans during the Ebola Virus Disease outbreak in West Africa in 2014–2015 but fortunately never had to test them. The Government of Botswana volunteered to undertake take the JEE to identify its gaps in emergency preparedness, detection and response and improve on its strengths. The JEE external validation in Botswana has been witnessed by representatives from two observer countries: Rwanda and Swaziland. The external peer-to-peer review of Botswana's capacities in 19 technical areas of the International Health Regulations (IHR) commenced on 4 December 2017.

It is important to note that the scoring does not completely capture the capacity of Botswana in several technical areas, due to the fact that in some areas an overarching plan or policy has been drafted but not yet approved or ratified (for example, the national policy on the infection, prevention control programme). In other instances mechanisms for coordination just need to be formalized, for example there is a mechanism of collaboration between the Ministry of Health and Wellness (MOHW) and the Radiation Protection Inspectorate that just needs to be formalized and institutionalized. There are well-developed structures and linkages between the security services, the responsible agency for points of entry (PoE) and the National Disaster Management Office. However, linkages between these units with the national IHR focal point (NFP) in the MOHW need to be institutionalized and strengthened. The latter are “low-hanging fruits” that can be quickly addressed to increase the Botswana scores.

An overarching public health emergency preparedness and response plan that considers the One-Health approach should be developed to guide the linkages between sectors. Before that can be done, however, the IHR NFP itself must be operationalized through a formal multisectoral coordination mechanism; at present, there is no dedicated centre for this capacity, and only a few persons currently fulfil the IHR NFP roles and responsibilities. Further, the necessary administrative requirements for the establishment of the Botswana Public Health Institute should be fast tracked. Not only would such an institute be of service to Botswana, but eventually could provide capacity to neighbouring countries. Once such plans or pieces of legislation are developed and formalized/enacted, the country scores in many areas will increase. In order to be true to the JEE tool, however, scores in certain technical areas were lowered due to the lack of a national plan or reporting structure to the health sector/IHR NFP.

Systems for sharing information and collaboration exist in Botswana, but most are informal and on an “as-needed basis”. During the discussions it was noted that government ministries in Botswana do not require Memoranda of Understanding to facilitate collaboration and information sharing between ministries, however it was noted in a few instances that the informal linkages, while often functioning, had resulted in delays or difficulties in finding information – for example in the area of food safety there is no single technical committee to address all food-related issues across sectors. It is therefore proposed to create a formal platform for information exchange between all relevant sectors.

In 2006 the country experienced a diarrhoea outbreak, which the Integrated Disease Surveillance and Response (IDSR) system detected, allowing for timely response. However, surveillance in Botswana is predominantly indicator based. Consequently, there is a need to establish and scale up event-based surveillance as part of that IDSR system to more fully capture signals in the community. Moreover, it is critical to appoint a district IDSR surveillance officer to serve as the IDSR focal person. There is also a need for the country to formally notify WHO of the 12 PoE that it has designated, and build and sustain those capacities.

It must be stressed that a number of important plans, policies and bills are awaiting final approval/ratification and need to be expedited, among them the Food Safety Act. As cattle are a main export and wildlife is a pillar for the tourism industry, there is a great deal of interaction between humans and animals in the country, which has implications on zoonotic disease risks. The last simulation exercise in this area was conducted five years ago, and there was no joint strategy (under a national one-health plan) for the two sectors. It is proposed that Botswana should conduct periodic simulation exercises to test the functionality of its systems.

Finally, the JEE has verified that the laboratory capacity in both the animal and human health sectors is quite good, though linkages between the two need to be strengthened. Nonetheless the collaboration to control rabies and avian influenza in the country is a best practice. Botswana has a dynamic, dedicated and relatively young health work force, which needs to be enhanced. This is particularly true within the district health management teams (DHMTs), for which more posts should be created. This is important because the multisectoral rapid response teams (RRTs) within the DHMT should include workers from human, veterinary, social science and environmental health and security agencies to embody the One-Health approach of the IHR. This will require updating the existing health workforce strategy into a Public Health Workforce strategy, underpinned by the One-Health approach, which includes re-launching/revitalizing the Field Epidemiology and Training Programme (FETP).

Botswana scores

Technical area	Indicators	Indicator description	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)	2
	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)	2
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	1
Antimicrobial resistance	P.3.1	Antimicrobial resistance detection	1
	P.3.2	Surveillance of infections caused by antimicrobial-resistant pathogens	1
	P.3.3	Health care-associated infection (HCAI) prevention and control programmes	1
	P.3.4	Antimicrobial stewardship activities	1
Zoonotic diseases	P.4.1	Surveillance systems in place for priority zoonotic diseases/pathogens	4
	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	1
Food safety	P.5.1	Mechanisms for multisectoral collaboration are established to ensure rapid response to food safety emergencies and outbreaks of foodborne diseases	1
Biosafety and biosecurity	P.6.1	Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities	2
	P.6.2	Biosafety and biosecurity training and practices	2
Immunization	P.7.1	Vaccine coverage (measles) as part of national programme	4
	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	4
	D.1.3	Effective modern point-of-care and laboratory-based diagnostics	3
	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	3
	D.2.4	Syndromic surveillance systems	4
Reporting	D.3.1	System for efficient reporting to FAO, OIE and WHO	2
	D.3.2	Reporting network and protocols in country	2

Technical area	Indicators	Indicator description	Score
Workforce development	D.4.1	Human resources available to implement IHR core capacity requirements	2
	D.4.2	FETP ¹ or other applied epidemiology training programme in place	1
	D.4.3	Workforce strategy	2
Preparedness	R.1.1	National multi-hazard public health emergency preparedness and response plan is developed and implemented	1
	R.1.2	Priority public health risks and resources are mapped and utilized	1
Emergency response operations	R.2.1	Capacity to activate emergency operations	1
	R.2.2	EOC operating procedures and plans	1
	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	3
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	3
	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	4
	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	3
	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.

¹ FETP: Field epidemiology training programme

PREVENT

National legislation, policy and financing

Introduction

The International Health Regulations (IHR) (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 a 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 in a more effective manner. Implementing legislation could serve to institutionalize and strengthen the role of IHR (2005) and operations within the State Party. It can also facilitate coordination among the different entities involved in their implementation. See detailed guidance on IHR (2005) implementation in national legislation at http://www.who.int/ihr/legal_issues/legislation/en/index.html. In addition, policies that identify national structures and responsibilities as well as the allocation of adequate financial resources are also important.

Target

Adequate legal framework for States Parties to support and enable the implementation of all their obligations, and rights to comply with and implement the IHR (2005). New or modified legislation in some States Parties for implementation of the IHR (2005). Where new or revised legislation may not be specifically required under the State Party's legal system, States may revise some legislation, regulations or other instruments in order to facilitate their implementation and maintenance in a more efficient, effective or beneficial manner. States Parties ensure provision of adequate funding for IHR implementation through the national budget or other mechanism.

Botswana's level of capabilities

The Public Health Act (2013), which is in alignment with the IHR (2005), shows the country's commitment to IHR implementation. During the formulation of the Public Health Act (2013), an assessment was done by the Attorney General's office to ensure that the Act is in alignment with other laws and to avoid potential contradictions and duplications. In addition, Botswana has a national health policy that provides a framework for collaboration among sectors, which is important for IHR implementation as well.

The country is signatory to a number of regional agreements and protocols that also emphasize IHR (2005). These include: the Elimination 8² (a technical committee comprising scientists from eight member countries to eradicate malaria in Southern Africa) and the Southern African Development Community Protocol on Health³.

Legislation concerning a number of other relevant sectors also supports IHR implementation, including: the Diseases of Animals Act (1977), the Botswana Defence Force Act (1977), the Food Control Act (1993) and the Agrochemicals Act (1999). The now aged Diseases of Animals Act and the Food Control Act are being assessed and reviewed; a bill on food safety has been drafted that will replace the Food Control Act of 1993 when enacted into law.

Further, Botswana has well-functioning Port Health services at designated points of entry, which are guided by the Public Health Act, 2013.

2 <https://malariaelimination8.org>

3 <http://www.ifrc.org/docs/IDRL/Southern%20African%20Development%20Community.pdf>

Recommendations for priority actions

- Conduct adjustments, where needed, to the existing laws and legislation based on the findings of the assessment that was conducted by the Attorney General's office.
- Expedite the amendment of the out-dated pieces of legislation such as the Diseases of Animals Act and the ratification of the Food Safety Bill.
- Fast track the necessary legislation/administrative requirements for the establishment of the Botswana Public Health Institute.
- Establish a formal multisectoral coordination mechanism for oversight of IHR implementation.
- Fast tract the administrative requirements to strengthen and capacitate the IHR national focal point (NFP) to function as a centre as well as to strengthen the linkage with the World Organisation for Animal Health (OIE) delegate.

Indicators and scores

P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR (2005) – Score 2

Strengths/best practices

- Assessment of the relevant legislation, regulation, administrative requirements and government instruments for IHR (2005) has been carried out.
- The Public Health Act (2013) provides an enabling framework for the implementation of IHR (2005). In addition there are several laws, regulations, administrative requirements, and policies that are aligned to IHR (2005). Moreover, laws and acts in other sectors support IHR implementation.

Areas that need strengthening/challenges

- Some relevant pieces of legislation such as the Diseases of Animals Act, and the Food Safety Act are outdated.
- The enabling policy framework for the Botswana Public Health Institute is not yet in place – and is urgently required.
- Policies to facilitate the IHR NFP centre, expand its functions and strengthen its core capacities need to be incorporated into sector plans.
- There are currently inadequate formal frameworks to guide multisectoral collaboration (presently most of the mechanisms are weak and ad hoc).
- There is no specific budget allocated for IHR, though it is priority for the Government of Botswana.
- There is a need for permanent structures to support the implementation of IHR and better guiding frameworks to facilitate collaboration of the relevant stakeholders, underpinned by the One-Health approach.
- There is a need for regulations to guide countrywide IHR implementation.

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 2

Strengths/best practices

- Botswana Health policy (2011) specifically supports IHR (2005) and the One-Health approach.
- Laws and regulations are harmonized with the IHR (2005)

Areas that need strengthening/challenges

- The country needs to ensure the coordination of the legal and regulatory frameworks between sectors so as to streamline multisectoral collaboration and communication.

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

Multisectoral/multidisciplinary approaches through national partnerships that allow efficient, alert and responsive systems for effective implementation of the IHR (2005). Coordinate nationwide resources, including sustainable functioning of a national IHR focal point – a national centre for IHR (2005) communications which is a key requisite for IHR (2005) implementation – that is accessible at all times. States Parties provide WHO with contact details of national IHR focal points, continuously update and annually confirm them.

Botswana's level of capabilities

Botswana has a national IHR focal point (NFP) that includes the Deputy Permanent Secretary of the MoHW and one designated IHR focal person at the MoHW. At the Ministry of Agriculture and Food security there are two World Organisation for Animal Health (OIE) focal persons, as well as the lead OIE delegate who is the Director of Veterinary Services. The IHR NFP at present does not function as a centre as required under IHR (2005). There is no formal platform for information exchange and sharing between the human and animal sectors. However, the country has a conducive enabling environment and the IHR (2005) has been fully domesticated into the Public Health Act (2013).

Ad hoc arrangements for coordinating stakeholders to respond to public health risks exist at the national level, as was witnessed during the H1N1 outbreak. Importantly, at subnational level, there are multisectoral rapid response teams.

Botswana has not experienced a major public health event or conducted a simulation exercise in the recent past. Consequently, the existing mechanisms and standard operating procedures (SOPs) for stakeholder and partner coordination have not been tested. However, during the Ebola virus disease outbreak in West Africa (2014–2015) and recently in the Democratic Republic of the Congo, there were efforts to establish a national task force as a means for preparedness for such an outbreak in the country.

Recommendations for priority actions

- Restructure, train and capacitate the IHR NFP to function as a centre with the necessary logistics, information and communications technology (ICT) support to perform the NFP functions.
- Establish a multisectoral and multidisciplinary body, committee or task force to address IHR requirements on surveillance and response for public health emergencies of national and international concern and test the functionality of the mechanism through either an after action review, in case of a real event, or through a simulation exercise in the absence of a real event.
- Develop standard operating procedures (SOPs) for systematic information sharing and exchange between animal and human health sectors, as well as other relevant sectors at all administrative levels.
- Provide annual updates on the status of IHR implementation to stakeholders across all relevant sectors.

Indicators and scores

P.2.1 A functional mechanism established for the coordination and integration of relevant sectors in the implementation of IHR – Score 1

Strengths/best practices

- There are focal persons assigned to the role of coordinating IHR and there is an OIE delegate.
- There is a coordination mechanism at health district level.
- There are efforts to establish a multisectoral coordination mechanism at national level.
- When in need the country has been able to coordinate a multi-stakeholder response.
- There is a robust notification system in the animal health sector.

Areas that need strengthening and challenges

- There is a need to build capacity of the IHR NFP and the OIE delegate and to develop SOPs to facilitate the robust coordination of IHR implementation.
- There is a need to assign sectoral focal persons and to establish a multisectoral and multidisciplinary platform (political and technical) for IHR.
- There is a need to formalize and make systematic the sharing and exchange of information between the animal and human health sectors, with a clear framework for joint collaboration.
- There is a need to develop strategies for advocacy and communication to raise the profile of IHR, foster ownership of the IHR by all key players within and beyond the health sector and garner political will, including among legislators.
- There is a critical need to minimize the current "silo" approach to working and uncoordinated response actions.

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, the 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 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). Each country has: (i) its own national comprehensive plan to combat antimicrobial resistance; (ii) strengthened surveillance and laboratory capacity at the national and international levels following international standards developed as per 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, including systems to preserve new antibiotics.

Botswana's level of capabilities

In accordance with the World Health Assembly resolution WHA68.7, Botswana held a consultation and drafted a national action plan for combating antimicrobial resistance that includes a plan for surveillance of antimicrobial resistance, infection prevention and control, and antimicrobial stewardship. The national action plan is now in the final stages of approval at the government ministerial level. The national action plan identifies priority pathogens for surveillance, and laboratory capacity exists at the National Health Laboratory to conduct antimicrobial susceptibility for these pathogens, but such activities are not being conducted. Researchers at referral hospitals have conducted occasional cross-sectional surveys on antimicrobial resistance.

A national policy for infection prevention and control has recently been approved and signed. A national infection prevention and control plan is drafted and awaiting approval. Health professionals are trained on infection prevention and control, but the training is not mandatory or standardized. The Public Health Act (2013) requires a prescription for the purchase of antibiotics. Similarly, antibiotics (with the exception of tetracyclines) are not legally sold for use in animals without veterinarian oversight. However, this does not preclude accessing antibiotics illegally; enforcement of laws preventing such use needs to be strengthened. It was noted that the scores for most of the indicators in this technical area will increase once the various national action plans are implemented.

Recommendations for priority actions

- Approve and implement the national action plan for combating antimicrobial resistance.
- Develop and implement a national surveillance programme for antimicrobial resistance.
- Approve and implement the national infection prevention and control plan.
- Institute the One-Health approach to coordinate activities across human, animal and food production sectors.

P.3.1 Antimicrobial resistance (AMR) detection – Score 1

Strengths/Best Practices

- A national action plan for combating antimicrobial resistance is drafted.
- The technical capability of reference hospital laboratories and the National Health Laboratory to detect antimicrobial resistance is present.

Areas which need strengthening/Challenges

- There is a need to standardize antimicrobial resistance testing at selected hospital laboratories.
- The National Health Laboratory needs to be strengthened so it can undertake antimicrobial resistance testing.

P.3.2 Surveillance of infections caused by AMR pathogens – Score 1

Strengths/Best Practices

- The final draft of the national action plan for combatting antimicrobial resistance discusses conducting national surveillance for antimicrobial resistance, including identifying priority pathogens and antimicrobials.
- A technical working group has been appointed tasked with implementing the national action plan.
- Sentinel sites are conducting surveillance of some pathogens of public health importance in Botswana, supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Areas which need strengthening/Challenges

- There is no comprehensive plan for national antimicrobial resistance surveillance.

P.3.3 Health care-associated infection (HCAI) prevention and control programmes – Score 1

Strengths/Best Practices

- A national policy for infection prevention and control is drafted.
- Health care professionals receive some training on infection prevention and control.
- Infection prevention and control programmes are established at the largest referral hospitals as well as the major private hospitals.

Areas which need strengthening/Challenges

- A national policy on infection prevention and control needs to be approved and implemented.
- Capacity for infection prevention and control needs to be strengthened (including logistics).

P.3.4 Antimicrobial stewardship activities – Score 1

Strengths/Best Practices

- Antimicrobial stewardship is included in the draft national action plan on combating antimicrobial resistance.
- The Public Health Act (2013) requires that a prescription be shown before antibiotics are dispensed.

Areas which need strengthening/Challenges

- Training of health workers on rational and responsible use and monitoring of antimicrobials needs to be strengthened.
- Enforcement of existing laws on access to antimicrobial agents needs to be strengthened.

Zoonotic diseases

Introduction

Zoonotic diseases are communicable diseases and microbes spreading between animals and humans. These diseases are caused by bacteria, viruses, parasites, and fungi that are carried by animals and insects; sometimes inanimate vectors may be needed to transfer the microbe. Approximately 75% of recently emerging infectious diseases affecting humans is of animal origin; approximately 60% of all human pathogens are zoonotic.

Target

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

Botswana's level of capabilities

More than half of emerging diseases in humans are zoonotic. It is likely that zoonotic diseases will continue to emerge in areas where human population is dense and biodiversity is high, as in parts of Botswana. The diverse ecosystems in Botswana facilitate the human–animal interface and predispose humans and animals to be at risk for zoonotic diseases. The Diseases of Animals Act (1977) gives the authority to the Department of Veterinary Services of the Ministry of Agricultural Development and Food Security to manage the control of animal diseases. The Department of Veterinary Services has identified seven zoonotic diseases of particular interest: avian influenza, rabies, brucellosis, bovine tuberculosis, cysticercosis, Rift Valley fever and anthrax. There are focused disease control efforts for selected zoonotic diseases. The Department of Veterinary Services conducts annual immunization of cattle against anthrax and rabies countrywide and conducts general surveillance for all the seven identified diseases. A National Technical Committee for Highly Pathogenic Avian Influenza exists, which includes colleagues from the Department of Veterinary Services of the Ministry of Agricultural Development and Food Security, MoHW and the Wildlife Department.

Although there is no veterinary school in Botswana, veterinarians are employed in the Department of Veterinary Services, the private sector, Wildlife department and the Botswana University of Agriculture and Natural Resources at the national level. There are also veterinarians in each of the 10 Department of Veterinary Services districts, and at some of the sub-districts. There is regular training available for veterinarians and para-veterinarians on meat inspection (i.e. determining bovine tuberculosis and cysticercosis and other zoonotic diseases in slaughterhouses).

The following four potential zoonotic diseases in humans are reported at least weekly to the MoHW through the national Integrated Disease Surveillance and Response (IDSR) system: human rabies (including rabies exposure), acute haemorrhagic fever syndrome, yellow fever and plague. Potential zoonotic diseases in animals are also reported to the Department of Veterinary Services of the Ministry of Agricultural Development and Food Security. Apart from ad-hoc arrangements, there is no formal policy, strategy or plan for arranging a multidisciplinary team for responding to zoonotic outbreaks. There has not been an outbreak response in the past five years that has included both the health and animal sectors; an exercise on responding to avian influenza, which involved both human and animal sectors, was held approximately seven years ago.

A number of agencies are involved in zoonotic disease-related issues including the MoHW, Ministry of Agricultural Development and Food Security, and Ministry of Environment, Natural Resources Conservation and Tourism. There are no formal channels between the public health and animal sectors to share information

or collaborate – indeed the presentation on the zoonoses technical area only contained information from the animal sector.

Recommendations for priority actions

- Establish a One-Health approach with routine collaboration between the MoHW and the Department of Veterinary Services of the Ministry of Agricultural Development and Food Security for the purposes of continuous improvements and systematically sharing data.
- Enhance surveillance and outbreak response by coordination and information-exchange between the MoHW and the Ministry of Agricultural Development and Food Security.

Indicators and Scores

P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens – Score 4

Strengths/Best Practices

- The Department of Veterinary Services has a national animal disease surveillance plan that includes seven zoonotic diseases.
- The Department of Public Health coordinates the IDSR public health surveillance programme that includes four zoonotic diseases.

Areas which need strengthening/Challenges

- Robust and well-defined linkages and mechanisms for inter-sectoral collaboration are needed.
- Sharing of surveillance data between animal and public health sectors needs to be formalized.
- Interagency multisectoral rapid response teams (RRTs) in disease outbreak management are needed.

P.4.2 Veterinary or Animal Health Workforce – Score 3

Strengths/Best Practices

- There is extensive country coverage by veterinary personnel, resulting in an animal health workforce capacity within the national public health system and more than half of subnational levels.
- In-service training of veterinarians and para-veterinarians is conducted.

Areas which need strengthening/Challenges

- Linkages for multisectoral collaboration are not defined.

P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional – Score 1

Strengths/Best Practices

- Joint planning activities exist between animal health, public health and wildlife sectors for anthrax, rabies, cysticercosis, rift valley fever and avian influenza.
- There are qualified animal health personnel, with extensive coverage of human resources throughout Botswana.

Areas which need strengthening/Challenges

- The One-Health approach needs to be implemented to include standard operating procedures for management of zoonotic events by the Department of Veterinary Services and the MoHW.

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 the source of an outbreak and its containment is critical for control. Risk management capacity with regard to control throughout the food chain continuum must be developed. If epidemiological analysis identifies food as the source of an event, based on a risk assessment, suitable risk management options that ensure the prevention of human cases (or further cases) need to be put in place.

Target

Surveillance and response capacity among States Parties for food- and water-borne disease risks or events by strengthening effective communication and collaboration among the sectors responsible for food safety, and safe water and sanitation.

Botswana's level of capabilities

The Food Control Division of the Department of Public Health of the MoHW is responsible for food safety under the Food Control Act (1993). The Food Safety and Quality Management Unit (FSQMU) is responsible for facilitating the licensing of food manufacturing facilities and providing national food safety education. The FSQMU also serves as the secretariat and technical wing of the inter-ministerial National Food Control Board. The FSQMU links with the National Food Control Laboratory of the Nutrition and Food Control Division, which is responsible for monitoring food and water available to consumers. Additional agencies involved in food safety include the Environmental Health and Occupational Health Division of the Department of Public Health, the Bureau of Standards of the Ministry of Investment, Trade and Industry, Ministry of Agricultural Development and Food Security, and Ministry of Local Government and Rural Development.

The Food Control Act (1993) provides the parent legislation on food safety and has six subsidiary regulations: (1) maximum levels of melamine in food; (2) maximum levels of aflatoxins in foods; (3) marketing of foods for infants and young children; (4) food grade salt regulations; (5) labelling of pre-packaged food regulations; and (6) labelling of food additives. The Food Control Act (1993) is considered out-dated and a new Food Safety and Quality bill, which would repeal and replace the out-dated act has been drafted and submitted to the Attorney General's Chambers. Botswana also has national food standards published by the Botswana Bureau of Standards; some are compulsory, such as standards for bottled water, and there are ongoing discussions on referencing the standards in the technical regulations.

Botswana has 4 INFOSAN registered members - 1 Emergency focal point from Department of Public health and (3) Focal Points from each of Animal health, Plant protection and Food Safety and Quality Management units. Focal points do online courses and have an online information sharing platform.

Save for abattoir controls for the production of beef for export markets, Botswana does not have a well-structured food inspection system. The Ministry of Agricultural Development and Food Security has authority over meat inspection but there is minimal oversight in slaughterhouses for national consumption, particularly outside the capital Gaborone. This is due largely to the limited human resource capacity to man the facilities. There is also no consistency in the application of rules that govern meat inspection and processing across the country. This area needs to be strengthened through the modernisation and harmonisation of legislation as well as human resource capacitation.

Public health surveillance for cholera and dysentery, which may be foodborne, are included in the national IDSR system. There is no formal system, however, for reporting foodborne outbreaks specifically. When foodborne outbreaks are detected, environmental health officers under the Ministry of Local Government and Rural Development participate in the field investigations but there is no system of rapid information exchange during suspected foodborne outbreaks, and between focal points for food safety. The National Food Control Laboratory has limited laboratory capacity to support foodborne outbreak investigations for the testing of specimens from humans, food or the environment.

Recommendations for priority actions

- Approve and implement the proposed Food Safety and Quality bill (which repeals and replaces the Food Control Act, 1993).
- Develop and implement the envisaged food safety strategic plan.
- Enhance national public health surveillance to include outbreaks of foodborne diseases, and increase laboratory support for foodborne outbreak investigations.
- Improve the quality of foodborne disease outbreak investigations by increased training, improved collaboration and increased sharing of information, with the goal of routine investigation of foodborne outbreaks and sustainable collaboration between sectors.

Indicators and scores

P.5.1 Mechanisms for multisectoral collaboration established to ensure rapid response to food safety emergencies and outbreaks of foodborne diseases – Score 1

Strengths/best practices

- There are designated INFOSAN focal points.

Areas which need strengthening/challenges

- The food control act needs to be updated.
- The national surveillance system must be enhanced to ensure outbreaks of foodborne diseases are captured.
- Training of foodborne disease investigations needs to be enhanced.
- Laboratory capacity must be increased to include testing of specimens from humans and food in support of outbreak investigations.
- Roles and responsibilities between public health partners involved in food safety need to be clarified and collaboration improved, particularly information sharing on foodborne disease outbreaks.

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 have raised concerns regarding 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 with especially dangerous pathogens identified, held, secured and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach conducted to promote a shared culture of responsibility, reduce dual-use risks, mitigate biological proliferation and deliberate use threats, and ensure safe transfer of biological agents; and country-specific biosafety and biosecurity legislation, laboratory licensing and pathogen control measures in place as appropriate.

Botswana's level of capabilities

Botswana has a well-developed biosafety system. Biosafety manuals are available and elements of biosafety are included in the quality management system. Good laboratory practice is followed, ensuring that all staff are vaccinated for Hepatitis B and those working with tuberculosis are provided with full personal protective equipment in addition to standard protective equipment – laboratory coats and gloves. Access to laboratories is not always restricted, due, in part, to their design.

Biosafety standards are implemented in all government laboratories, and biosafety audits to review whether laboratories are implementing and maintaining biosafety are required for accreditation. Private laboratories must comply with biosafety standards in order to be licensed in the country. There are safety officers in most laboratories and safety committees implement biosafety requirements.

While some staff have undergone biosafety training, there is, however, the need to develop a national biosafety training curriculum to ensure all laboratories are following similar procedures.

In terms of biosecurity, the system in Botswana is still undergoing initial development. While there are well-documented repositories for HIV and suspected poliomyelitis specimens, there is no collation of other pathogens stored throughout the country. Reference specimens for *E. coli* are kept in the animal health laboratory. There are also few protocols for the use and management of isolates for research purposes.

Recommendations for priority actions

- Develop guidelines and protocols for biosecurity across all laboratories.
- Establish a national curriculum for biosafety training, along with an implementation plan.
- Establish a national inventory of stored pathogens and consolidate holdings where appropriate.
- Develop protocols for research use of pathogens.
- Integrate biosafety and biosecurity to the appropriate pieces of legislation or draft a new bill to address the issues.

Indicators and scores

P.6.1 Whole-of-government biosafety and biosecurity system in place for human, animal and agriculture facilities – Score 2

Strengths/best practices

- Biosafety procedures are implemented across all MoHW laboratories.
- Generic and laboratory-specific biosafety manuals are available in all facilities.
- Each laboratory has a biosafety officer and biosafety committee.
- Most laboratories have physical security within their premises.
- Biosafety audits are routinely conducted ensuring biosafety requirements are met for accrediting authorities.
- There is access for support from other laboratories to further develop skills in biosafety (Uganda for tuberculosis, and CDC).

Areas that need strengthening/challenges

- There is a need to inventory pathogens and consolidate the collections into a few designated centres.
- Controlled access to laboratories needs improvement.

P.6.2 Biosafety and biosecurity training and practices – Score 2

Strengths/best practices

- Most laboratory personnel have been trained in biosafety.
- Appropriate personal protective equipment is available for specific conditions, for example in the tuberculosis laboratory.

Areas that need strengthening/challenges

- A national curriculum for biosafety training needs to be developed.
- There is no local capacity in country to maintain biosafety cabinets and biosafety level 3 laboratories.
- Training on specimen shipment and handling needs to be expanded countrywide.
- Appropriate monitoring of personal protective equipment for highly pathogenic organisms (for example Ebola virus) and other emergencies is lacking.

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 cost-effective ways to save lives and prevent disease.

Target

A national vaccine delivery system – with nationwide reach, effective distributions, access for marginalized populations, adequate cold chain and on-going quality control – that is able to respond to new disease threats.

Botswana's level of capabilities

The Expanded Programme on Immunization (EPI), whose primary goal is to reduce infant and childhood illness and deaths from vaccine-preventable diseases, was formally established in Botswana in 1979. Currently, 12 vaccine-preventable diseases are included in EPI (tuberculosis, hepatitis, diphtheria, tetanus, pertussis, polio, measles, rubella, Haemophilus influenza type b, human papilloma virus, pneumonia and rotavirus). A National Immunization policy document has been developed to guide immunization for national delivery of safe potent vaccines through equitable free immunization services. The country has over the past many years recorded high immunization coverage rates of over 90% for most antigens. However, a worrisome decline in coverage has been recorded since 2015.

To vaccinate, Botswana uses community structures such as village health committees, whose main role is to mobilize community members to access health services including immunizations. Outreach services are also available to ensure that people do not travel long distances for vaccination. School children are also reached through the school health programme.

There is a strong political commitment by the Government of Botswana to the immunization programme, evidenced by procurement of vaccines and monitoring of the coverage. Monitoring and evaluation of immunization coverage is done at ministerial level through the Ministerial Performance Improvement Committee and Office of the President. The country procures vaccines directly from suppliers and this procurement is fully funded by the government. Immunization is also offered free of charge nationwide in public facilities and some selected private facilities.

A measles rubella catch-up campaign targeting a wide age range (children aged 9 months to 14 years) was conducted in 2016. The campaign targeted over 700 000 children and the cost of campaign is estimated at about 18 million pula (1.8 Million USD) with over 95% of the cost funded by the government. The campaign achieved vaccination coverage of 95.6%.

The last vaccine-preventable disease epidemic was in 2010 and was a regional outbreak of measles that affected other southern African countries as well.

Surveillance of adverse events following immunization (AEFI) has been occurring for several years though it is not well established. Reporting of AEFI is mostly done during immunization campaigns. To improve the surveillance, EPI recently developed the AEFI surveillance guidelines; management within the MoHW is yet to appoint the AEFI committee responsible for reviewing AEFI cases.

Recommendations for priority actions

- Establish a national data management technical committee and develop data quality management plans (including capacity building and improvement of the processes).
- Designate a vehicle at the district health management team (DHMT) level for delivery of vaccines within all districts.
- Conduct refresher EPI trainings which will cover topics such as vaccine management, Reaching Every District strategy, data management, and surveillance.

Indicators and scores

P.7.1 Vaccine coverage (measles) as part of national programme – Score 4

Strengths/best practices

- Vaccination services are accessible to everyone within 5–8 km radius
- EPI data are presented to the Office of the President on a monthly basis for monitoring.
- There are trained and qualified human resources primarily nurses and health education officers.
- Supplementary immunization activities for measles are conducted every three to four years.
- A legal framework exists to support children's rights, including the right to immunization.
- All children aged under 5 years old can access child welfare clinics monthly, where they are screened for vaccine-preventable diseases and provided with other high-impact health interventions.
- Two months each year are designated for acceleration of high-impact interventions among children.

Areas that need strengthening/challenges

- Outreach vaccination services through provision of reliable transport services needs to be strengthened.
- The quality of immunization data needs to be improved, including better estimation of denominators.
- Hard-to-reach communities need to be identified fully and strategies to address their varied contexts developed.
- AEFI surveillance needs to be strengthened.
- Health workers' knowledge of EPI needs to be expanded.
- Lack of standard operating procedures (SOPs) and guidelines on data management is a challenge.

P.7.2 National vaccine access and delivery – Score 4

Strengths/best practices

- Government has consistently funded the procurement of vaccines as well as operational costs associated with their use.
- No stock outs of vaccines have occurred at central level, and they are rare at the district level. Occasional stock outs at facility level are mainly due to transport issues.
- Cold-chain capacity is generally adequate, with most of the equipment having been sourced from WHO pre-qualified suppliers.
- Storage and transport/distribution is subcontracted to a private service provider under a public-private partnership arrangement.
- Immunization services are provided through mobile stops and in some districts to hard-to-reach populations.

- Government provides some private institutions/clinics with vaccines.
- Government provides vaccinations free of charge to both citizens and non-citizens.
- School-based vaccination services are provided to citizen and non-citizen school children.

Areas that need strengthening/challenges

- The availability of vaccines at facility level can be a challenge due to the lack of reliable transport of vaccine to some remote facilities.
- Monitoring of temperatures for freeze-sensitive vaccines during transportation between points needs to be strengthened.
- Development, printing and distribution of SOPs to guide staff on how to carry out all critical functions of the immunization supply chain needs to be done.

DETECT

National laboratory system

Introduction

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

Target

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

Botswana's level of capabilities

Botswana is well served with laboratories, with each district health management team having one laboratory, in addition to reference laboratories, private and mine laboratories. The public laboratories in the country are classified from level I to level IV, with clearly documented services to be provided at each level. Specimens can be referred from one level to another, depending on the suspected causative organism which the sample may contain. For example, while most specimens may be referred from level I to level II laboratories, a suspected viral haemorrhagic fever sample could be referred directly to a level IV laboratory. Algorithms are available for the testing of priority diseases/pathogens. Generic specimen collection guidance is available in all health facilities.

From the site visit it was noted that while specimens are transported in cooler boxes, they are not always shipped in sealable bags, which means that all specimens can be contaminated in the event of a breakage. Since specimens are received in the administration section of the national public health laboratory, this could pose risks to staff and should be remedied as quickly as possible.

Each district health management team is responsible for providing transport for specimens, usually by courier. This system works well, and the specimen transport rarely has interruptions. Protocols are available in health facilities for specimen collection. Health education assistants and drivers are trained on specimen collection and transportation, respectively. A similar system is utilized by the Botswana National Veterinary Laboratory, where Ministry of Agriculture vehicles and Air Botswana are used to transport specimens.

The MoHW laboratories are connected through the Laboratory Information System so results are shared electronically. Laboratories not connected through the Laboratory Information System receive results through other means (eg. Fax, email).

Procurement for consumables for laboratories is centralized through the Central Medical Stores. Laboratories place weekly orders for consumables and they are delivered by courier. Many laboratories, including animal health laboratories, produce their own culture media. Use of the centralized procurement system does occasionally lead to stock outs.

Point-of-care testing is done for tuberculosis (TB), HIV and malaria. A policy is under development which will cover additional point-of-care tests, however, this was not finalized by the time of the joint external evaluation. Toxicology testing is available in the forensic laboratory, but these services are not used for routine testing of live patient specimens.

Recommendations for priority actions

- Investigate mechanisms to strengthen procurement of laboratory supplies, for example through provision of a budget to enable laboratories to buy directly from wholesalers at times when stock outs are imminent and the procurement system cannot provide consumables in time.
- Develop standard operating procedures (SOPs) and training curriculum for specimen handling and shipment.
- Explore mechanisms for the implementation of quality management systems for all laboratories.
- Establish networking and collaborative structures between the different laboratories for information sharing, and sharing and maintenance of equipment.

Indicators and scores

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

Strengths/best practices

- Diagnostic algorithms and SOPs in line with international standards are available in all laboratories. A best practice example is the laboratory SOPs based on national SOPs, but tailored with facility-specific details, developed by the laboratory quality assurance officer at Thamaga Primary Hospital.
- Core tests for HIV, malaria, TB and salmonella are conducted across the tiered laboratory network.
- Some testing, such as for influenza, measles and cholera, is centralized for best use of resources.
- The Laboratory Information System and the Integrated Procurement Management System are in place in most laboratories for sharing results.
- Validation of testing is done through external laboratories.
- Testing in the Botswana laboratories is in alignment with international standards.
- External quality assurance programmes are in place in most laboratories.

Areas that need strengthening/challenges

- Both animal and human health laboratories face issues in terms of equipment maintenance contracts. There are no services in Botswana for the servicing of biosafety cabinets.
- Formal agreements need to be made with reference laboratories outside the country.
- Procurement of commodities is through the Central Medical Stores. This is not always efficient for laboratory supplies.

D.1.2 Specimen referral and transport system – Score 4

Strengths/best practices

- The specimen transport system for both animal and human specimens uses respective ministry vehicles and couriers.
- There is a formal specimen referral system in the country.
- Specimen collection manuals are available in all health facilities.
- Laboratories participate in regional and global networks (measles, poliomyelitis, rotavirus)

Areas that need strengthening/challenges

- The specimen referral network, while effective, could benefit from strengthening, for example through the provision of sealable bags to reduce contamination when specimen containers break.
- Establishment of a formalized laboratory network between the various laboratories, to share information, consumables and expertise is needed.

D.1.3 Effective modern point-of-care and laboratory-based diagnostics – Score 3

Strengths/best practices

- Point-of-care testing has been implemented across the country for TB, HIV and malaria, ensuring accessibility for all citizens.
- Culture media is made in the laboratories locally.
- Procurement processes are in place at national and facility levels.

Areas that need strengthening/challenges

- Botswana is in the process of developing a point-of-care policy. This policy needs to be finalized and implemented.
- Centralized procurement can be erratic at times and processes need to be put in place to avoid stock outs.
- Laboratories only have emergency money for routine tests but are not included in the public Health Emergency Preparedness budget.

D.1.4 Laboratory quality system – Score 3

Strengths/best practices

- All laboratories are licenced and inspected annually by the Health Inspectorate.
- There are five laboratories accredited to International Organization for Standardization (ISO) standards and one has measles accreditation by the World Health Organization (WHO).
- Most laboratories are following quality management systems programmes.
- Some laboratories are implementing Stepwise Laboratory Quality Improvement Process Towards Accreditation/Stepwise Laboratory Improvement Process Towards Accreditation systems through WHO.
- There are close working relationships with other MoHW programmes in terms of training, monitoring and supervision of other laboratories.

Areas that need strengthening/challenges

- There is a need to ensure that external quality assurance becomes mandatory for all laboratories.
- The scope of external quality assurance testing panels and the number of laboratories enrolled in the system needs to be expanded.

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 indicator- 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 sub-national, national and international levels of authority regarding surveillance of events of public health significance; improved country and intermediate level regional capacity to analyse and link data from and between strengthened, real-time surveillance systems, including interoperable, interconnected electronic reporting systems. This would include 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 the IHR and OIE standards.

Botswana's level of capabilities

Botswana has a well-established indicator-based surveillance system based on the WHO regional Integrated Disease Surveillance and Response (IDSR) strategy. IDSR was adopted in Botswana in 2003, and began with adaptation of the technical guidelines, followed by training of health workers at the various levels. The country has identified priority diseases, public health events and conditions, categorized into: those for immediate notification through case-based reporting, and those for weekly, and monthly reporting, respectively. The Public Health Act, (2013) promotes and enforces surveillance. Data collection tools include the IDSR register, summary sheets and reporting tools (revised in 2014). The Botswana IDSR guidelines were last revised in 2012.

Diseases/conditions under surveillance via IDSR in Botswana include 10 for immediate reporting (e.g. yellow fever, plague, measles, meningococcal meningitis), five for weekly reporting (e.g. diarrhoea, rabies exposure, typhoid, malaria), and 20 for monthly reporting (e.g. tuberculosis, HIV/AIDS, pneumonia). The diseases included in Botswana IDSR include several syndromes (e.g. diarrhoea, acute flaccid paralysis, pneumonia). Laboratory confirmation of some diseases (e.g. measles) may be included in the IDSR but in general there is no laboratory data or laboratory reporting in the Botswana IDSR. Botswana includes several noncommunicable diseases in their monthly IDSR reporting including asthma, hypertension, stroke and motor vehicle injuries. IDSR in Botswana does not include event-based surveillance (the surveillance and reporting of outbreaks and other public events from formal and informal information sources).

IDSR reporting is conducted via the internet, from the district health medical facilities to the national IDSR unit at the Public Health Department of the MoHW. Such reporting is usually conducted through email (BotswanaIDSR@gmail.com) although the use of Facebook has recently been initiated. National surveillance, via IDSR, is one of the four flagship programmes for the proposed Botswana Public Health Institute. IDSR data are maintained in a District Health Information System (DHIS) database by the national IDSR unit, but access to the IDSR database is not available at the district level; instead the IDSR unit provides summaries to, and communicates with, the districts by email (e.g. weekly summaries of IDSR data). The IDSR unit conducts frequent analysis of the IDSR database; alert and outbreak thresholds for

all diseases and conditions are automatically identified. However, there is no validation conducted by the IDSR unit of reported data. Analysis of IDSR data is sporadically conducted at the district-level on district-specific IDSR data and a rapid-response team has been identified in each district; however, most districts do not have a person identified with the sole responsibility of being the IDSR district surveillance officer. Furthermore, there appears to be infrequent field investigations launched at the national level or the district level in response to analysis of the IDSR data.

Surveillance for animal diseases is conducted by the Department of Veterinary Services of the Ministry of Agriculture; this surveillance, which is a paper-based system from district level to national level, includes seven zoonotic diseases. Surveillance data are not routinely shared between the Department of Public Health (MoHW) and the Department of Veterinary Services.

Recommendations for priority actions

- Establish event-based surveillance at national and district levels.
- Routinely share surveillance data between human and animal sectors.
- Appoint IDSR surveillance officers at district level to serve as IDSR focal persons.
- Conduct routine quality checks of IDSR data at national and local levels.

Indicators and scores

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

Strengths/best practices

- There is a well-established IDSR system with identified priority diseases and conditions and identified alert and outbreak thresholds.
- IDSR technical guidelines and manuals are available and training is routinely conducted at district level.
- IDSR is conducted using DHIS for reporting and database, and weekly summaries created.
- Selected noncommunicable diseases are included in the IDSR strategy.

Areas which need strengthening/challenges

- Event-based surveillance needs to be established.
- Districts need an IDSR surveillance officer to serve as the IDSR focal person.
- Additional training on event-based surveillance and the training of the private sector is needed.
- The IDSR training guide needs to be updated (including use of e-learning module), and evaluated along with the Threat and Hazard Identification and Risk Assessment (THIRA) as part of comprehensive preparedness.
- Routine sharing of surveillance data between animal and human sectors is needed.

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

Strengths/best practices

- An electronic data management system (DHIS) is used by the national IDSR unit.
- Routine reporting from districts to the national IDSR unit is conducted via email and, more recently, via Facebook.

Areas which need strengthening/challenges

- Internet connectivity of the health facilities needs to be improved.
- An IDSR surveillance officer in each district should be appointed.
- Sharing of surveillance data between human and animal sectors needs to be increased.
- In the absence of internet connection, there is a need to explore the use of mhealth – using mobile phone applications to share data.

D.2.3 Integration and analysis of surveillance data – Score 3

Strengths/best practices

- IDSR data are thoroughly reported in a timely manner.
- IDSR data are stored in a DHIS database and are frequently analysed.
- IDSR data summaries are created and distributed weekly and monthly.

Areas which need strengthening/challenges

- Analysis of IDSR data at the district level needs to be enhanced.

D.2.4 Syndromic surveillance systems – Score 4

Strengths/best practices

- IDSR includes surveillance of several syndromes.
- Case definitions and case-based reporting tools for immediately notifiable events and pocket guides are available.

Areas which need strengthening/challenges

- Networking with the National Public Health Laboratory for prompt laboratory confirmation of reported syndromes needs strengthening.
- Health workers need additional (in-service) IDSR training

Reporting

Introduction

Health threats at the human–animal–ecosystem interface have increased over the past decades, as pathogens continue to 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 diseases at the interfaces between them.

Target

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

Botswana's level of capabilities

The Deputy Permanent Secretary of the MoHW is designated as the focal point for reporting to the World Health Organization (WHO). The Director of the Department of Veterinary Services of the Ministry of Agricultural Development and Food Security is the focal point for reporting to the World Organisation for Animal Health (OIE). The Radiation Protection Inspectorate is the focal point for radiation emergencies reporting to International Atomic Energy Agency (IAEA). The Division of Nutrition and Food Control, under the Department of Public Health is the reporting focal point of the International Food Safety Authorities Network (INFOSAN) to WHO and the Food and Agricultural Organization of the United Nations (FAO) on food safety issues. The last event reported to WHO was for poliomyelitis in 2004.

While the process for decision-making on reporting will be made using Annex 2 of the IHR, there is no protocol outlining the decision-making process, including thresholds for reporting, who the final decision rests with, nor who should submit the report. However, MoHW collaborates closely with WHO on reporting, and responds quickly to requests for verification of events, which may have been picked up through global monitoring of events.

A platform for formal information exchange in the country is yet to be developed. As a result, there is limited exchange of information prior to formal reports being put forth by the animal health sector to OIE, or radiation sector to IAEA. There are no formal information exchange protocols for sharing official reports with the IHR NFP. It was noted during plenary that the MoHW does not access the event information site that serves as a formal information exchange established to share information between national focal points across the globe. While the WHO Country Office has access, the IHR NFP should also regularly access the site to be informed of events occurring in neighbouring countries.

Recommendations for priority actions

- Develop protocols and/or SOPs for reporting and conduct a simulation exercise to ensure the SOPs are fit for purpose.
- Ensure the passwords for the IHR learning platform and event Information site are available, so that those who need training, and/or information can access these sites.
- Appoint reporting focal points and mechanisms for all sectors involved in IHR reporting, including for food safety and chemical events.
- Create a formal platform for information exchange between the relevant sectors.

Indicators and scores

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

Strengths/best practices

- There is strong collaboration between WHO and the MoHW for assistance with reporting.
- WHO provides relevant information from the event information site to the MoHW.

Areas that need strengthening/challenges

- The staff of the IHR NFP have not been trained on IHR processes, due to lack of access to the learning platform.
- There is a need for protocols or procedures for reporting.

D.3.2 Reporting network and protocols in country – Score 2

Strengths/best practices

- In terms of radiation events, well-established reporting protocols have been established between police and security authorities. This reporting mechanism has been tested during actual events.

Areas that need strengthening/challenges

- There have been no simulation exercises of an infectious disease event requiring reporting.
- There is no historical knowledge on reporting of infectious disease potential of public health emergencies of international concern.

Workforce development

Introduction

Workforce development is important in order to develop a sustainable public health system over time by developing and maintaining a highly qualified public health workforce with appropriate technical training, scientific skills and subject-matter expertise.

Target

States Parties with 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).

Botswana's level of capabilities

Human resources (HR) are a support service under the Department of Corporate Services within the MoHW. Its responsibilities include: recruitment, selection, placement, providing orientation induction, professional development of staff, benefits and compensation and ensuring legal compliance. It is primarily concerned with management of people focusing on policies, procedures, laws, acts and directives. The public health workforce is financed by the Government of Botswana. Budget estimates are prepared annually by MoHW and submitted to the Ministry of Finance and Economic Development. The Directorate of Public Service Management (DPSM) under the Ministry of Presidential Affairs, Governance and Public Administration is the main appointing authority in the Botswana Public Service. It is the main employer and is mandated to provide the overall policy framework for HR and productivity development for the Government of Botswana. It assists the ministry with HR policy and approves quotas to the various ministries. The DPSM delegates HR functions to ministries (budgeting for and monitoring of HR).

There is no specific post of epidemiologist or biostatistician within the public health sector of Botswana. Public health specialists (usually a medical doctor with a postgraduate Master of Public Health degree) act as epidemiologists. At national level these health workers are usually the technical persons for disease control programmes. At district level they usually coordinate all preventive services. There is, however, a shortage of public health specialists with only half of the health districts having these experts. Community health nurses (nurses specializing in community health) contribute to filling gaps although they are not distributed equitably throughout the country. Other cadres involved in public health include environmental health officers, health educators, monitoring and evaluation officers, dieticians, pharmacists and so on.

Most of the training for the various cadres involved in public health are produced locally by both government and private institutions. The University of Botswana has both undergraduate and post graduate/specialty training courses including public health and clinical specialties. There are several, mostly government owned, nursing schools (Institute of Health Sciences) in the country from which nurses, health educators, environmental health officers etc graduate annually. The University of Botswana is also training nurses both at undergraduate and at postgraduate levels.

Previously there was a Field Epidemiology Training Program (FETP), which the MoHW conducted in collaboration with the CDC. The programme was a certificate level course that covered two weeks of didactic sessions, two weeks of field-work as well as a project assignment. The programme, however, last trained in 2014 after running for only two cycles, and primarily targeted members of the rapid response teams in all the 28 health districts. It could not continue mainly due to lack of funding.

The country has a health workforce strategy, which was suspended in 2016. A new organizational structure has been prepared and approved for both MoHW and district health management teams (DHMTs), but not yet implemented.

Recommendations for priority actions

- Review and update the health workforce strategy to include a One-Health approach.
- Re-launch and revitalize the Field Epidemiology Training Program (FETP), and perhaps the FETP frontline course.
- Implement the revised and approved structure for the MoHW and district health management teams (DHMTs) and implement human resource plans and processes.
- Identify gaps in human resources requirements and develop a mechanism for addressing shortages of specific cadres.

Indicators and scores

D.4.1 Human resources available to implement IHR core capacity requirements – Score 2

Strengths/best practices

- In-service training for most health cadres is provided in the country.

Areas that need strengthening/challenges

- There is a shortage of human resources in DHMTs.
- There is a high attrition rate caused by ageing staff, low salaries, death and other reasons.

D.4.2 FETP or other applied epidemiology training programme in place – Score 1

Strengths/best practices

- There was an FETP in existence.
- The FETP trained in two cycles (five cohorts) in all 28 health districts, mostly targeting members of the RRT.

Areas that need strengthening/challenges

- The FETP was only a short course (4 weeks long) and was interrupted in 2014.

D.4.3 Workforce strategy – Score 2

Strengths/best practices

- The Government of Botswana has mechanisms in place for retention of staff, including incentives for remote work, and clearance for staff to work in private business.
- There are trained staff for emergency response.
- There is provision of ongoing in-service training.
- There is a health workforce strategy (though it expired in 2016).

Areas that need strengthening/challenges

- There is a need to update the health workforce strategy or implement a new strategy.
- The FETP needs to be reintroduced and reinvigorated.
- Having staff conducting private business is not always effective in terms of absenteeism, or conflicting priorities on time while at work.
- There are challenges in filling posts, which occasionally remain vacant due to a lack of suitably qualified applicants.

RESPOND

Preparedness

Introduction

Preparedness includes the development and maintenance of national, intermediate and community/primary response level public health emergency response plans for relevant biological, chemical, radiological and nuclear hazards. Other components of preparedness include mapping of potential hazards, the identification and maintenances of available resources, including national stockpiles and the capacity to support operations at the intermediate and community/primary response levels during a public health emergency.

Target

Development and maintenance of national, intermediate (district) and local/primary level public health emergency response plans for relevant biological, chemical, radiological and nuclear hazards. This covers mapping of potential hazards, identification and maintenance of available resources, including national stockpiles and the capacity to support operations at the intermediate and local/primary levels during a public health emergency.

Botswana's level of capabilities

Botswana's Public Health Act (2013) guides and enforces the establishment of a public health emergency preparedness and response plan. Within the Integrated Disease Surveillance and Response (IDSR) technical guidelines are the terms of reference for public health emergency team members.

A risk assessment in the form of a Threat and Hazard Identification and Risk Assessment (THIRA) was conducted in 2017, but analysis of the data is continuing and the report, at the time of the joint external evaluation of IHR core capacities, had not been finalized. Therefore mapping of resources to manage the risks identified have not yet been done.

Botswana is currently planning for the establishment of the Botswana Public Health Institute, which includes a dedicated facility (a site has already been chosen). Public health emergency management will be one of the pillars within the structure of the Institute.

All districts have an epidemic preparedness plan and multisectoral rapid response teams. The districts have been encouraged to upgrade their epidemic plans to public health emergency response plans, to include other public health emergencies. To support planning and response, each district has an epidemic preparedness task force.

Recommendations for priority actions

- Establish a national public health emergency management committee.
- Fast track finalization of the Threat and Hazard Identification and Risk Assessment (THIRA) report, and conduct resource mapping to manage the risks identified.
- Develop a public health emergency preparedness and response plan.
- Fast track the establishment of the Botswana Public Health Institute.

Indicators and scores

R.1.1 National multi-hazard public health emergency preparedness and response plan developed and implemented – Score 1

Strengths/best practices

- There is a functional health system to support the management of emergencies.
- The Public Health Act (2013) is in force and IDSR is well established.
- The Botswana Public Health Institute structure will bring together surveillance, laboratory, preparedness and emergency response.

Areas that need strengthening/challenges

- There is a need to establish a public health emergency preparedness and response committee; foremost among its tasks should be to develop and implement an emergency management plan.
- There is a lack of a formal platform for collaboration under the IHR.
- Technical assistance and IHR implementation guidance is currently a challenge.
- Additional resources for assessments, both financial and human, are needed.

R.1.2 Priority public health risks and resources mapped and utilized – Score 1

Note: Public health risks have been mapped, but resources have not.

Strengths/best practices

- A THIRA has been conducted to identify risks.
- There is a well-functioning health system in place.
- A multi-hazard disaster plan is available through the National Disaster Management Office.

Areas that need strengthening/challenges

- Resource mapping for managing the risks identified through THIRA needs to be conducted.
- Human and financial resources are required to map public health risks, specifically an assessment of priority public health risks.

Emergency response operations

Introduction

A public health emergency operations centre 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 a response to an emergency or emergency exercise. They also provide other essential functions to support decision-making and implementation, coordination and collaboration.

Target

Country with public health emergency operations centre (EOC) functioning according to minimum common standards; maintaining trained, functioning, multisectoral rapid response teams and "real-time" biosurveillance laboratory networks and information systems; as well as trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency.

Botswana's level of capabilities

The Public Health Act (2013) provides the authority to the Department of Public Health within the MoHW to develop public health emergency preparedness and response planning and to coordinate public health emergency responses. The Department of Public Health operates a robust IDSR programme that conducts national surveillance for priority public health diseases and conditions. Within IDSR, alert and outbreak thresholds have been identified. When a threshold is exceeded, an outbreak investigation and control effort may be launched. Such public health emergency response activities at the national level are coordinated by the Disease Surveillance and Response unit of the Department of Public Health through the utilization of a rapid response team under the direction of ad hoc epidemic committees. Rapid response teams are also identified at the district level and are responsible for responding to public health emergencies. Diverse stakeholders are engaged in response operations for public health emergencies in Botswana. Response plans are currently guided by disease-specific case management guidelines and procedures. However, no simulation exercises have been conducted.

Botswana has developed a plan to establish the Botswana Public Health Institute. One of the pillars of the Institute is public health emergency management, including a public health emergency operations centre (EOC). Although a significant amount of planning has gone into the establishment of the Botswana Public Health Institute structure, the final approval of the BPHI is still pending. A facility has been identified to house the BPHI that will include a public health EOC.

In addition, Botswana has a National Disaster Management Office (NDMO). NDMO is responsible for planning and coordinating government responses to all disasters. NDMO is developing a multi-hazard EOC. Authority for activation of the EOC is being finalized. District-level multisectoral rapid response teams are well established, although staffing of these teams is a challenge in some districts.

Recommendations for priority actions

- Expedite the establishment of the Botswana Public Health Institute plan including creating a public health emergency management programme with an emergency operations centre.
- Develop standard operating procedures (SOPs) for public health emergency management.
- Conduct public health emergency response simulation exercises, involving the relevant sectors.

Indicators and scores

R.2.1 Capacity to activate emergency operations – Score 1

Strengths/best practices

- A plan has been developed for the Botswana Public Health Institute, which includes a public health EOC.
- There is a robust surveillance system and established national and local rapid response teams, as well as experience in responding to infectious diseases outbreaks.
- NDMO is responsible for all-hazards emergency disaster management.

Areas which need strengthening/challenges

- There are no formal procedures in place for management of public health emergencies.
- There is currently no public health EOC.

R.2.2 EOC operating procedures and plans – Score 1

Strengths/best practices

- EOC planning – including an incident management structure – is actively under way, which will be coordinated under the structure of Botswana Public Health Institute.

Areas which need strengthening/challenges

- There is currently a lack of plans, procedures and an incident management structure to facilitate emergency response.
- There is a lack of dedicated staff for management of public health emergencies.

R.2.3 Emergency operations programme – Score 1

Strengths/best practices

- Drills have been conducted by different stakeholders.
- Strong informal relationships among stakeholders have led to adequate ad hoc responses to emergencies in the past.

Areas which need strengthening/challenges

- There is no formal emergency operations programme.
- Conducting regular simulations exercises to test the systems.

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

Strengths/best practices

- Guidelines/case management SOPs are available for some priority diseases.

Areas which need strengthening/challenges

- No case management procedures have been developed for non-infectious hazards.
- Responders are not always aware of available case management guidelines.

Linking public health and security authorities

Introduction

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

Target

Country conducts a rapid, multisectoral response in case of a biological event of suspected or confirmed deliberate origin, including the capacity to link public health and law enforcement, and to provide and/or request effective and timely international assistance, such as to investigate alleged use events.

Botswana's level of capabilities

Botswana has a long-established cooperative relationship between the public health sector and security authorities. Enshrining this and other relationships in a formal Memorandum of Understanding is not a standard practice among agencies and departments within the Government of Botswana. The police and security forces are a standard element of the multisectoral district RRTs and support public health programmes and response. They assist in providing security and order during campaigns, render logistics support in hard-to-reach areas and assist with the checks and movement control of animals for zoonotic diseases along the designated disease control borders. The district RRT representatives facilitate logistic planning, transport and resource mobilization from the security sector, as demonstrated in the 2009 pandemic influenza response. Health personnel from the security forces participate in some training exercises with public health authorities, including related to IDSR.

Security authorities also support animal health and food safety. Police officers and food inspectors routinely staff animal disease control gates and points of entry (PoE) during zoonotic outbreaks and crop disease outbreaks to ensure compliance with movement restrictions of animal products and crops. For example the Botswana Defence Force (BDF) recently provided personnel for monitoring the animal disease cordon fence within a few days of the outbreak of foot-and-mouth disease in Kuke.

There is a conducive legal environment in Botswana that fosters this collaborative relationship. The governmental security authorities are subordinate to the civil authority in general; and the BDF Act (1977) in particular, provides for assistance to civil authorities as a primary mandate. Security sector organs provide health care services to their own personnel and their health facilities are subordinate to the district health management teams (DHMTs). This organizational structure ensures commonality of programmes, guidelines, protocols, SOPs, etc.

Recommendations for priority actions

- Establish a permanent multisectoral public health response team with the mandate to develop response plans and validate efficacy through periodic table-top exercises and simulations.
- Establish a joint training programme for public health and security authorities to further institutionalize the collaborative relationship of the sectors.
- Develop a communication strategy among the multisectoral stakeholders to ensure regular and consistent information sharing.

Indicators and scores

R.3.1 Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspect or confirmed biological event – Score 3

Strengths/best practices

- The established custom of identifying critical stakeholders at the outset of any emergency and involving them in the planning and response implementation has worked effectively without the mechanism of MoUs among governmental entities. This process cascades down from the cabinet meeting deliberating on the emergency scenario to all the government departmental heads, for a “one government” approach.
- Security sector organs being subservient to civil authority has greatly facilitated the collaborative approach to addressing public health concerns and leveraging governmental resources.
- There is an appreciation of the contemporary meaning of “security” within Botswana in addressing the expanded concept of modern security threats beyond the military sphere.

Areas which need strengthening/challenges

- Information sharing is currently on a need-to-know basis, as opposed to a systematic communication process among stakeholders and response partners.
- There is a lack of regular simulations or table-top exercises to challenge the response system.

Medical Countermeasures and Personnel Deployment

Introduction

Medical countermeasures (MCM) are vital to national security and protect nations from potentially catastrophic infectious disease threats. Investments in MCM create opportunities to improve overall public health. In addition, it is important to have trained personnel who can deploy to respond to a public health emergency.

Target

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

Botswana's level of capabilities

Botswana's medical countermeasures capacities are considered limited, due primarily to the fact that no formal plans exist from which personnel could work to respond. For example, there is no plan in place that identifies procedures and decision-making related to sending and receiving medical countermeasures during a public health emergency; no plan has been drafted to address logistic concerns or regulatory concerns of receiving drugs or devices from an international source during emergencies; and there is also no plan to address security concerns that may emerge related to sending/receiving/distributing medical countermeasures during emergencies.

Although formal plans are absent, Botswana has a well-established and efficient procurement and distribution system through the MoHW Central Medical Stores (CMS). Furthermore, the CMS has an efficient procedure to rapidly purchase and distribute medicines and medical supplies in an emergency. For example, during a national increase in diarrhoeal diseases in 2016, CMS urgently purchased and distributed rotavirus vaccine. Similarly, during the recent increase in malaria cases, CMS rapidly purchased and distributed additional anti-malarial medicines. The CMS logistical capacity to store and distribute medical countermeasures is outstanding. CMS distributes to 96 delivery points. Medicines in the CMS warehouse and during shipping to delivery points are closely monitored including for temperature fluctuations. Medical facilities are responsible for transport from the delivery points to the medical facility.

There is no formal plan in place to identify procedures and decision-making, training criteria and standards or address regulatory and licensure concerns related to sending and receiving health personnel during a public health emergency. There have been instances, however, when public health staff have been deployed within the country rapidly for example during the 2006 diarrhoea outbreak.

Recommendations for priority actions

- Develop and ensure endorsement of a national countermeasure plan (including plan for budgeting), which includes sending and receiving medical countermeasures as well as a plan for sending and receiving medical personnel.
- Develop written procedures for rapid procurement, licencing and delivery mechanisms for medical countermeasures needed during a public health emergency.
- Develop and exercise guidelines and relevant agreements for sending and receiving health personnel 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

- There is a well-operated CMS for procurement, warehousing and distribution of medicines.
- There are existing structures for distribution of logistics, i.e. a supply chain.

Areas which need strengthening/challenges

- There is a need to develop plans and procedures for sending and receiving medical countermeasures.
- There is a need to get the written plans and procedures endorsed by the relevant stakeholders.

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

Strengths/Best Practices

- Botswana has proven capable of internally deploying medical personnel during emergency situations.

Areas which need strengthening/Challenges

- There is no formal plan in place for sending and receiving health personnel during public health emergencies.
- A plan for training and maintaining the medical personnel who would respond (e.g. via a formal readiness roster) is also lacking.

Risk communication

Introduction

Risk communications should be a multilevel and multifaceted process which aims at helping 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 the dissemination of information to the public about health risks and events, such as disease outbreaks. For any communication about risk caused by a specific event to be effective, the social, religious, cultural, political and economic aspects associated with the event should be taken into account, including the voice of the affected population.

Communications of this kind promote the establishment of appropriate prevention and control action through community-based interventions at individual, family and community levels. Disseminating the information through appropriate channels is essential. Communication partners and stakeholders in the country 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

State Parties use multilevel and multifaceted risk communication capacity. Real-time exchange of information, advice and opinions between experts and officials or people who face a threat or hazard (health or economic or social wellbeing) to their survival, so that informed decisions can be made to mitigate the effects of the threat or hazard and protective and preventive action can be taken. This includes a mix of communication and engagement strategies, such as media and social media communications, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement and community engagement.

Botswana's level of capabilities

Risk communication in the MoHW is conducted through the Health Promotion and Education Division (HPED) and the Public Relations Office (PRO). The mandate of the HPED is to provide health promotion and education services to individuals, groups, organizations and communities in general whereas PRO is responsible for customer care and communication with all stakeholders. There are about 150 health education officers in Botswana (public health sector) both at headquarters and at district health management teams (DHMTs). There are currently 21 public relations officers covering the headquarters, referral hospitals and the DHMTs. At the district level there are health education officers and public relations officers who provide public information. At the community level, there is a health education assistant for every health facility.

During an emergency, there is collaboration with different stakeholders to develop new or reprint existing health education and promotion messages and materials. The MoHW has a media production unit with graphic designers working closely with PRO and HPED to develop health materials. Messages are presented through different media: public notice, TV, radio, pamphlets, press releases, newspaper adverts, posters and social media.

In case of an emergency there is a cross-sectoral collaboration through an ad hoc national committee structure, which includes all stakeholders. During the 2014 Ebola virus disease epidemic an advocacy and social mobilization committee was established to address risk communication. The committee was multi-sectoral and it included amongst others: security authorities, Botswana government communications

office, different government ministries, the National Disaster Management Office (NDMO), Botswana Red Cross Society, WHO, United Nations Children's Fund, CDC and media.

There are no SOPs and no dedicated budget for risk communication during emergencies but funds are made available to conduct different mitigating activities in case of emergencies.

Recommendations for priority actions

- Develop a national multi-hazard risk communications plan.
- Develop SOPs for risk communication at every level and each phase (before, during and after an event).
- Formalize and strengthen the system to address rumours and misinformation.
- Develop a media response plan on risk communication during emergencies.
- Conduct training courses on risk communications for key audiences, including:
 - media
 - national, district and local level staff.

Indicators and scores

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

Strengths/best practices

- Dedicated health communication and health promotion personnel exist at the national, district and local levels.
- There is an established national-level health communication approval process for health messages during emergencies and standardized messaging across the country.
- There is a cascading information-sharing system/process from national to community level.
- In each emergency response plan the first group established is the communication team, followed by an epidemiological/surveillance team.

Areas which need strengthening/challenges

- There is a need for a national response plan, SOPs, a specific budget for risk communication before, during and after emergencies or in case of an outbreak.

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

Strengths/best practices

- The PRO coordinates communication among stakeholders during an emergency.
- Government of Botswana Communication and Information System Office coordinates communication with internal (within country) and international stakeholders.
- An ad hoc technical working group is initiated in emergencies to handle communications at both the national and district level.

Areas which need strengthening/challenges

- Information sharing between partners regarding lessons learned and new strategies should be increased.
- There is need for a formal mechanism of communication to mobilize internal and external stakeholders.
- No dedicated budget exists for coordination with external partners.

- The testing of the communications system with partner organizations is not routinely tested.
- The One-Health approach is not implemented, though all relevant sectors are called during an emergency.

R.5.3 Public communication – Score 3

Strengths/best practices

- During emergencies MoHW provides regular media briefings and updates through press conferences, press releases and social media platforms.
- At national level, health communication is conducted in both English and Setswana. Materials can be translated into local languages as per the need.

Areas which need strengthening/challenges

- Production of new health learning materials often takes a long time and gets delayed during emergencies when facing an unexpected/new threat.
- Health education and promotion materials are not field-tested on a regular basis.
- Limited materials exist for disabled people, though there are some Information, Education and Communication materials in braille.

R.5.4 Communication engagement with affected communities – Score 3

Strengths/best practices

- A risk communication representative is part of the multi-sectorial rapid response team during all outbreaks; this person facilitates outreach to the affected populations.
- At local level health education assistants work with the village health committees to educate and mobilize community members.

Areas which need strengthening/challenges

- Field testing of health education materials is not done on a regular basis and needs to be strengthened through regular evaluation of the risk communication response and efficacy with the target audience.
- People with disabilities are not adequately addressed during emergencies.

R.5.5 Dynamic listening and rumour management – Score 2

Strengths/best practices

- There are weekly radio and television programmes that educate the community on current health issues, and the community can telephone a call centre located within the MoHW, which addresses the frequently asked questions and rumours regarding public health issues.
- There are regular updates on social media platforms, whose users may also follow up with the call centre with questions or concerns.
- Health education assistants conduct health talks and daily home visits where they share information with the community and are able to correct and clarify any misinformation.

Areas which need strengthening/challenges

- There is no systematic mechanism for active listening and rumour management.
- There is a need to conduct regular evaluations regarding community engagement and response.

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 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 designate ground crossings), which will implement specific public health measures required 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, a State Party may designate ground crossings) that implement specific public health measures required to manage a variety of public health risks.

Botswana's level of capabilities

Botswana has designated 12 points of entry (PoE) although the formal communication to notify the World Health Organization (WHO) is pending. Trained Port Health staff are employed at each entry point, in addition to a central office of three staff. Routine services provided by Port Health at the points of entry include: waste management at the entry point; conveyance of repatriated bodies; water quality monitoring at entry points; inspections of chemicals entering the country; drugs inspections to ensure compliance with national policy; inspections of foods entering the country; vector control at entry points; examination of yellow fever certificates; and ill passenger referrals. PoE are periodically inspected to ensure they provide a safe environment for travellers.

Botswana has a formalized referral system in place and health facilities to respond to health issues of ill travellers. PoE, through the referral system, have access to appropriate medical services including diagnostic facilities for the prompt assessment and care of ill travellers and with adequate staff, equipment and premises. However, based on recommendations in Annex 1b of the International Health Regulations (IHR), the available capacity needs to be strengthened.

Inspection of permits for animals at PoE is done and samples are taken to ensure compliance. There is a common agreement of movement of animals within the Southern African Development Community (SADC) countries in case of emergency; this is in place with canines used for emergency purposes. Import permits are required for all animals, to demonstrate they have been screened in the country of origin. Information has been provided to veterinary services in neighbouring countries to ensure they are aware of any animal diseases which would preclude an animal entering Botswana.

There is no national public health emergency contingency plan for responding to public health emergencies occurring at PoE. District health management teams (DHMTs) have rapid response teams which provide services to PoE should they be called on.

There is close collaboration between the agencies with responsibilities at points of entry (for example, immigration services, the Botswana Unified Revenue Service and the Port Health staff). All staff are aware of the responsibilities of the other agencies, and work closely on a day-to-day basis.

A large part of the border is fenced, reducing the informal entry and exit of goods and persons.

Recommendations for priority actions

- Formalize the designation of points of entry by officially notifying WHO according to its guidelines.
- Refine the Port Health strategic plan of 2009, incorporating changes in MoHW structures and development in public health.
- Develop and conduct exercises on a national public health contingency plan to respond to public health emergencies at points of entry and ensure alignment with the national and district emergency plans.
- Strengthen the safe environment programme by developing and testing standard operating procedures (SOPs) and PoE operation plans for assessing and referring potential contaminated goods and/or infected travellers and animals including facilities for quarantining and management of suspected cases.

Indicators and scores

PoE.1 Routine capacities established at points of entry – Score 4

Strengths/best practices

- Screening for yellow fever vaccine among travellers is routine.
- A referral system is established for emergency response to points of entry.
- Adequate trained personnel for the inspection of conveyances are available at points of entry.
- Twelve PoE have been designated (eight ground crossing and four international airports).
- There is collaboration with the airlines and Department of Immigration and Citizenship to ensure travellers have valid vaccination certificates.

Areas that need strengthening/challenges

- Mechanisms for the provision of medical services at PoE need to be strengthened.
- Provision of isolation facilities (holding areas) at PoE pending referral and conveyance to treatment site is lacking.
- There is a shortage of financial resources and equipment at some PoE.
- Customized training does not exist for Port Health staff.

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

It was determined during plenary that the four international airports have contingency plans in place for a mass casualty event. Not all of these plans however incorporate the public health emergency plan for communicable diseases. Of all ports (land and air), only the Sir Seretse Khama International airport and the Maun Airport have a public health emergency plan for communicable diseases.

Strengths/best practices

- DHMTs send medical staff to points of entry during emergencies.
- Immigration officials work closely with Port Health staff in terms of identifying ill travellers and reviewing yellow fever certificates.

Areas that need strengthening/challenges

- National public health emergency contingency plans for PoE, which include all agencies, is lacking.
- There are competing priorities between stakeholders.

Chemical events

Introduction

Timely detection and effective response to potential chemical risks and/or events require collaboration with other sectors responsible for chemical safety. This necessitate that State Parties to IHR 2005 to have surveillance, response capacity and effective communication to manage chemical risks or events.

Target

States Parties with 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.

Botswana's level of capabilities

Botswana has a substantial use of chemicals, particularly in the agro-pastoral, health, mining, industrial and domestic sectors, but a comprehensive management system remains to be established. Botswana has got fragmented pieces of legislation with some complimentary regulations, and existing legal measures do not address the whole life cycle of chemicals. A comprehensive legislation for management of chemical events is in draft form. Some of the applicable laws in Botswana include: the Agrochemicals Act (1999) in the Ministry of Agricultural Development and Food Security, and the Waste Management Act (1998) in the Ministry of Environment, Natural Resources Conservation and Tourism.

A national chemicals profile giving the administrative infrastructure for management of chemicals was prepared in 2013 but has not yet been updated. A chemicals safety policy and a national strategy and action plan for implementing the Strategic Approach to International Chemicals Management (SAICM) have not been prepared. Botswana has, however, ratified the Basel, Minamata, Rotterdam and Stockholm Conventions and the Waste Management Act (1998) has domesticated the Basel Convention⁴. The implementation of the Globally Harmonized System of Classification and Labelling of Chemicals is being undertaken in cooperation with SADC. Capacity building is needed to ensure the implementation of the multilateral environmental agreements. Botswana is not a party to the Paris Convention on chemical weapons and it does not participate in the International Conference on Chemical Materials. The International Labour Organization (ILO) conventions 170 and 174 are not in force.

Some guides and procedures for sound chemicals management have been elaborated, but are only partially implemented. There is access to international databases relating to chemicals such as WHO IPCS/INCHEM and FAO pesticides registration toolkit.

There are laboratories of varying capacities; at the University of Botswana, the Botswana Bureau of Standards, the Geology Laboratory and the Botswana Vaccine Institute; but little coordination among these facilities exists. Good laboratory capacity for identifying chemical risks with SOPs does not exist at the national level. Environmental monitoring of air and water and surveillance for chemicals in other media is provided by the Environment Laboratory but does not cover the whole of the country. For exposed patients laboratory diagnosis and treatment remains weak at most hospitals. The existing laboratory capacity for identifying viral and bacteriological diseases could be expanded for some toxicological testing.

An inter-ministerial coordinating mechanism for consultation among stakeholders and for management of chemical events exists; this includes the national agrochemicals committee and a multilateral environmental

⁴ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

agreements committee. Coordination with other IHR sectors is partial and communication of chemical risks needs strengthening.

Public awareness and education concerning chemical risks is inadequate. Programmes for chemical risk identification, minimization and actions to respond to emergencies are required. Training of human resources in chemicals risk assessment and communication is desirable; as well as the strengthening of existing training for response to chemical events both by first responders and the medical professionals.

A well-developed national centre for toxico-vigilance and pharmacovigilance, providing an important component for continuous identification and surveillance of chemical risks, particularly acute exposures, with systematic collection of case data does not exist. Chemical risks from chronic exposure, with the potential of becoming chemical events, needs to be developed. Some capacity exists for identifying chemical risks associated with contamination of food, although there is a need to strengthen capacity for analysis of clinical toxicological samples, as well as chemical samples in environmental media.

There are no specific health sector plans for chemical emergencies. While the health sector cooperates with the emergency medical services for preparedness and response to chemical events and their notification, there remains a lack of systematic harmonized data collection and exchange of information on chemical events occurring throughout the country. Specific financial resources are not available for mobilization for a chemical events response other than what is available for all emergencies. Few, if any, industrial installations have their chemical emergency preparedness and response plans for the periphery as well as the interior of the installation (though most industries have general emergency evacuation plans).

An inventory of potential industrial chemical risk sites throughout the country was prepared in relation to national implementation of the Stockholm Convention, but this needs to be regularly updated, evaluating the risks involved in chemical sites, and communicating these risks to relevant decision-makers throughout the country for specific action. Hazardous chemicals transiting Botswana are sealed and information is communicated with the boarder where the consignment is scheduled to pass. There is no system for tracking chemical consignments entering the country destined for domestic use. Comprehensive chemical emergency plans are lacking and need developing with SOPs; such plans should be regularly tested and improved through simulation exercises, e.g. the management of chemical warehouse fire in 2016 involving obsolete agro-chemicals was not satisfactory.

Recommendations for Priority Actions

- Develop and/or enact comprehensive legislation on chemicals (i.e. fast track the passage of the bill addressing this issue).
- Develop a public health plan for chemical incidents/emergencies.
- Develop a surveillance guideline for chemical events.
- Review the need to establish a national poison information centre and related medical and analytical facilities that would operate continuously.

Indicators and Scores

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

Strengths/Best practices

- The main multilateral environment agreements for chemicals and waste have been ratified and a coordinating committee for their implementation is in place.
- There is good collaboration among stakeholders and competent personnel.

- Agrochemicals have been listed and an inventory of industrial and domestic chemicals is being developed through the National Implementation Plan for the Stockholm Convention.
- There is efficient inspection by Port Health officers at points of entry and Environmental Health officers in local authorities.

Areas which need strengthening/Challenges

- Comprehensive legislation needs to be developed.
- Capacity for surveillance and detection of chemical events needs to be established (this could be promoted through the establishment of a poisons information centre and related medical and analytical facilities operating continuously with systematic data collection).
- Analytical toxicology laboratory facilities need strengthening, building on existing laboratory services for other IHR areas, with the creation of a regional network of accredited laboratories.
- Capacity should also be strengthened to test for chemicals in food and environmental media.
- A programme directed towards evaluation of health risks of chemical origin throughout the country needs to be established. An inventory of potential chemical risk sites throughout the country and mapping of potential hazards needs to be prepared and regularly updated, evaluating the risks involved in chemical events, communicating these risks to relevant decision-makers throughout the country for specific action.
- A system for tracking hazardous chemical consignments entering the country needs to be established, and a registration and tracking capacity needs to be developed with the Port Health authority.
- Laboratory capacity, qualified human and financial resources remain insufficient.
- Centralization of chemical clearances would enhance administrative efficiency.

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

Strengths/best practices

- Legislation is being developed to establish a comprehensive national plan for the management of chemical events.
- Guidance for pesticide residue limits for food are available.

Areas that need strengthening/challenges

- A comprehensive public health plan for preparedness and response to chemical incidents/emergencies is lacking.
- A surveillance guideline for chemical events is lacking.
- Public awareness on chemical safety needs to be improved.
- Training of medical personal in diagnosis and management of chemicals events is insufficient and should be strengthened (i.e. training of first responders, including provision of guidelines on management of exposed persons).
- No regular simulation exercises are carried out.

Radiation emergencies

Introduction

State parties should have surveillance, assessment, notification, reporting and response capacities for radiological public health hazards, events or emergencies of international concern. This requires effective collaboration and communication among the state organizations with responsibilities in radiation emergency management.

Target

States Parties should have surveillance and response capacity for radio-nuclear hazards/events/emergencies. This requires effective communication and collaboration among the sectors responsible for radio-nuclear management.

Botswana's level of capabilities

Botswana has a complete legislative infrastructure for control of radiological hazards - Radiation Protection Act (2006), and Radiation Protection Regulations (2008) and a competent administrative regulatory authority for managing radiological hazards and for emergency preparedness and response concerning nuclear and radiological emergencies – the Radiation Protection Inspectorate (RPI). A comprehensive inventory has been made of potential sources of radiation and the magnitude of these hazards. The highest level of hazard in Botswana is category II sealed sources used in hospitals and industrial applications that could require on-site protective actions. These are monitored on a regular basis.

The main sources of radiological hazards in Botswana are associated with medical equipment and small-scale use of radioactive materials. With correct use of such equipment the hazard of exposure is low; but there remains the risk associated with misuse and criminal diversion as well as uncontrolled disposal of obsolete equipment and radioactive materials that might be dumped illegally. There is no nuclear power generation, nor nuclear reactors in the country. However, some food stocks (such as milk) are imported from a region which is close to a nuclear power station in South Africa; during the site visit of the RPI it was explained that testing of milk from that region would begin towards the end of 2018. The major concern is transit of radioactive material through Botswana between South Africa and the Democratic Republic of the Congo (two incidents have occurred during transit in 2017). In the future, uranium mineral extraction might be a potential source of radiological exposure.

There is strategic radiation safety plan, which forms a critical part of Ministry of Tertiary Education, Research Science and Technology strategic plan. It is up to date, its performance and effectiveness is evaluated quarterly and revised annually. There is a national response plan to nuclear and radiological emergencies prepared and led by RPI. An inventory has been done of radiological sources and a hazard assessment made according to the International Nuclear Emergency Scale (INES) and identified as a low score of 4. That national plan is however not a formal policy. There has been one emergency exercise including all stakeholders, but further plans and procedures on emergency response need to be developed for the involved organizations. The implementation of any plans and regulations and putting them into practice are based on existing guidelines.

Botswana is a party to the Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident as well as a number of other important conventions and treaties concerning the safe and peaceful use of nuclear energy. There is no focal point for the WHO Radiological Emergency Medical Preparedness and Assistance Network (RANET).

Since 1968, Botswana has been a party to the Treaty on the Non-Proliferation of Nuclear Weapons, and acceded in September 2016 to the International Atomic Energy Agency (IAEA) Convention on the Physical Protection of Nuclear Material (CPPNM) plus its amendment protocol.

The RPI is the technical competent authority that forms part of National Disaster Management Office response mechanism in the event of radiation event. It issues a permit system of licensing for installations containing radiation sources and the transit of radioactive materials. However, an online ICT standard government payment scheme for permits is lacking, which means getting the permit requires a trip to Gaborone in person; compliance would be increased were there to be an efficient payment system available online. The national nuclear security coordinating committee has been constituted and is in place to address events that have national security implications. Members of the committee receive training from IAEA.

Laboratory facilities for identifying and measuring samples for detecting radioactivity, used for environmental safety and consumer product control, are available, as well on monitoring of the radiation-exposed workforce. Qualified technical experts are trained by IAEA and representatives from IAEA have conducted reviews of RPI, most recently in 2017⁵. Further, arrangements are in place for national and international transport of radioactive materials, samples and waste. Obsolete materials and equipment are required to be returned to the manufacture for disposal. In addition, there is a storage facility for confiscated materials and equipment. A simulation exercise of a radiation accident was conducted in 2015, which involved emergency and health services responding to injured persons also exposed to radiation. The simulation included activities to decontaminate those exposed.

Recommendations for Priority Actions

- Formalize the coordination and cooperation mechanisms between national authorities responsible for radiological and nuclear events with the MoHW and the IHR NFP.
- Review the medical facilities which could be developed to manage patients contaminated with radioactive substances and patients with overexposure.
- Establish guidelines for undertaking live drills and simulation exercises with all stakeholders to test emergency response effectiveness.
- Introduce a system for preparing a real-time inventory of transits of radioactive materials, which would allow the following of consignments to their destination.

Indicators and scores

RE. 1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies – Score 3

Strengths/Best practices

- Radiation regulatory oversight, control and emergency response are linked to the national development plan.
- Surveillance and oversight covers the whole country.
- There is a government budget allocation to implement the mandate.
- There is an SOP to respond to radiation emergencies.
- There is a provision for technical feedback through networks and partnerships.

5 <https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-botswana-has-strengthened-nuclear-and-radiation-safety-sees-areas-for-improvement>

- Each nuclear plant licensee has a plan to respond to emergencies at their own facility as part of the licensing agreement.
- There is an intersectoral approach and coordination for response to radiation emergencies.
- Radiation safety and emergency response protocols follow international norms.
- RPI delivers its mandate through an integrated management system (IMS) approach, which inter alia calls for continuous improvement.

Areas that need strengthening/Challenges

- Network partnerships with countries in the region need to be established.
- Government budget allocation for oversight control and prevention needs strengthening.
- Development of SOPs for interoperable efficiency is required.
- Biological-radiological health care expertise needs to be developed.
- Maintenance of nuclear instruments done overseas at high cost is a challenge.
- There are no satellite offices to respond immediately should an emergency occur at the peripheries of the country.

RE.2 Enabling environment is in place for management of Radiation Emergencies – Score 1

While Botswana has a fairly robust environment to manage radiation emergencies, due to the lack of a formal coordination and cooperation mechanism with the IHR NFP in the MoHW, the score of 1 rather than 3 is appropriate. Once such a cooperation mechanism is in place, the score in this area would quickly increase.

Strengths/Best practices

- Strategic and annual plans are in place to guide delivery of the mandate of the RPI.
- An emergency plan is in place to guide response, including a national coordinating mechanism to guide emergency response efforts.
- RPI is part of global radiation safety and security regimes and employs international emergency response norms.
- Planning is integrated and follows government's performance planning protocols.
- Regulation for radiation safety and security and emergency response are based on international standards and principles espoused by the IAEA.

Areas that need strengthening/challenges

- SOPs for interoperable effectiveness in the management of radiation emergencies need to be developed.
- Procedures and guidelines for scheduled emergency plan review, live drills and simulation exercises need to be developed.
- It is often a challenge that stakeholders are too busy with their own mandates to sit together to prepare SOPs and protocols critical for effective and seamless operations.

Appendix 1: JEE background

Mission place and dates

Gaborone, Botswana, 3-8 December 2017

Mission team members:

- Ambrose Talisuna, Regional Office for Africa, WHO (Team Lead)
- Fred Angulo, United States of America, CDC (Team co-lead)
- Sofonias Asrat, Ethiopia Country Office, WHO
- Elizabeth Bell, United States of America, CDC
- Israel Gebresillassie, Mozambique Country Office, WHO
- John Haines, Geneva, UNITAR
- Kai Lashley, writer
- Liliane Luwaga, South Sudan Country Office, WHO
- Jose Nyamusore, Rwanda, Observer
- Adrienne Rashford, Headquarters, WHO
- Herbert Schneider, consultant, OIE
- Roland K. Wango, Regional Office for Africa, WHO

Objective

To assess Botswana's capacities and capabilities relevant to the 19 technical areas of the JEE tool for providing baseline data to support (host country'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.

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 <host country> 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.

Key host country participants and institutions

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Lenah Bogwasi	Botswana television
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Teto Dinake	Ministry of Health and Wellness / Department of Public Health
Mr Gokatweng Disho	Radiation Protection Inspectorate
S. Gasennelwe	Ministry of Health and Wellness / Primary health Care
Dr Nesredin Jami	Ministry of Health and Wellness / Department of Public Health / Integrated Disease Surveillance
Angela Kashani	Ministry of Health and Wellness / National Food Lab
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Ms Ditso Kebonyemodisa	Ministry of Health and Wellness / Department of Public Health / Chemicals Programme
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Mr T Modiakgotla	Office of the President / National Disaster Management Office
Mr B Moeng	Ministry of Health and Wellness / Health Policy and Planning
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Ms Margaret Mokomane	Ministry of Health and Wellness / Department of Clinical Services / National Health Lab
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Dr Tshepo Y. Sereetsi	Ministry of Agricultural Development and Food Security / Department of Veterinary Services
T.J. Tlhakanelo	University of Botswana / Faculty of Medicine

Supporting documentation provided by host country

National legislation, policy and financing

- Public Health Act, 2013
- National health policy: towards a healthier Botswana, December 2011. Gaborone: Ministry of Health Botswana; 2012 (http://www.moh.gov.bw/Publications/policies/revised_national_health_policy.pdf, accessed 16 January 2018)
- Diseases of Animals Act, 1977
- BDF Act, 1977
- Food Control Act, 1993
- Agrochemicals Act, 1999

IHR coordination, communication and advocacy

- Ebola response plan to demonstrate the use of an ad hoc arrangement to address threats
- Public Health Act, 2013
- Botswana IHR monitoring Report 2017

Antimicrobial resistance

- Botswana treatment guidelines, 2007
- Botswana antimicrobial guidelines, 2012
- Draft National Action Plan on Antimicrobial Resistance (November 2017)

Zoonotic diseases

- Handbook for the assessment of capacities at the human animal interface. World Health Organization/ World Organisation for Animal Health; 2015 (www.who.int/ihr/publications/handbook_OMS_OIE/en/, accessed 16 January 2018)
- Publications related to food safety: <http://www.who.int/foodsafety/publications/all/en/>
- Diseases of Animals Act, 1977
- Livestock and Meat Industries Act, 2007
- OIE Country PVS report and OIE Country PVS gap analysis report
- Contingency plan for Rift Valley fever
- Avian influenza response plan (2006)
- Avian influenza standard operating procedures

Food safety

- Publications related to food safety: <http://www.who.int/foodsafety/publications/all/en/>
- Food Control Act, 1993
- Regulations:
 - » Maximum levels of melamine in Food,
 - » Maximum levels of aflatoxins in foods,
 - » Marketing of foods for infants and young children,

- » Food grade salt regulations,
- » Labelling of pre-packaged foods regulations,
- » Labelling of food additives regulations.

Biosafety and biosecurity

- Laboratory safety manuals
- Quality management system documents
- Draft laboratory policy
- Botswana Biosafety Bill

Immunization

- Annual report on immunization performance 2016 (WHO/UNICEF Joint Reporting Form)
- Botswana Comprehensive multi year plan for immunizations 2017–2022
- Comprehensive EPI/VPD surveillance review report 2017
- Effective vaccine management assessment report 2017
- WHO Country Cooperation Strategy 2014–2020 Botswana [e-book]. Brazzaville: World Health Organization Regional Office for Africa (http://apps.who.int/iris/bitstream/10665/246289/1/ccs_bwa_en.pdf, accessed 15 January 2018)

National laboratory system

- Quality Management Systems manuals
- Botswana medical laboratory practice standards
- Public Health Act, 2013

Real-time surveillance

- Public Health Act, 2013
- IDSR reports, 2006 to 2017
- IDSR training manuals, October 2017
- International Health Regulations (2005)
- OIE Terrestrial Animal Health Code – Section 1
- Manual of diagnostic tests and vaccines for terrestrial animals. Paris: World Organisation for Animal Health; 2017 (<http://www.oie.int/en/international-standard-setting/terrestrial-manual/access-online/>, accessed 15 January 2018)

Reporting

- Annual IHR Monitoring Reports

Workforce development

- Botswana Public Service Act, 2008
- Employment Act, 1982
- General orders

- Health workforce strategy
- Health workers manual
- Policies and procedure manual
- Training Plan
- Memorandum of Understanding (with the Governments of Cuba and China)
- Various directives issued by the Directorate of Public Service Management

Preparedness

- Botswana THIRA draft report
- Botswana Public Health Institute Draft Strategic Plan

Emergency response operations

- WHO Public Health Emergency Operations Centre Network (EOC-NET) [webpage]: http://www.who.int/ihr/eoc_net/en/

Linking public health and security authorities

- BDF Act, 1977
- Public Health Act, 2013

Medical Countermeasures and Personnel Deployment

- Central Medical Stores Standard Operating Procedures

Risk communication

- Health promotion strategy
- Health promotion policy
- Public Health Act, 2013
- Minutes from previous emergency meetings
- Ebola advocacy and social mobilization plan with budget
- Historical press releases about health topics

Points of entry

- Public Health Act, 2013
- International Health Regulations (2005)
- Draft Port Health strategy 2009

Chemical events

- Public Health Act, 2013
- Agrochemicals Act, 1999
- BOS 66: (GHS - Classification, Packaging and Labelling of Chemicals- SDS included here)
- Waste Management Act, 1998

- Stockholm Convention on Persistent Organic Pollutants
- Rotterdam Convention on the prior Informed Consent procedure for Certain Hazardous chemicals and Pesticides in International Trade
- Minamata Convention on Mercury
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

Radiation emergencies

- Radiation Protection Act, 2006
- Radiation Protection Regulations, 2008
- Radiation Protection Board Quarterly Report, Q2, November 2017, Radiation Protection Inspectorate
- Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards. Vienna: International Atomic Energy Agency; 2014
- Ministry of Tertiary Education Research Science and Technology (MOTE) Strategy, April 2017–March 2022
- RPI Annual Performance Plan, 2017
- National Development Plan 11, April 2017–March 2023. Gaborone: Ministry of Finance and Development Planning Botswana; 2016: pp. 169–170 (<http://www.ncongo.info/wp-content/uploads/2017/02/NDP-11.pdf>, accessed 16 January 2018)
- Emergency response for dispersion of source or contamination, guideline. Radiation Protection Inspectorate; 2016
- Response to a transport accident/incident involving radioactive materials, guideline. Radiation Protection Inspectorate; 2016
- Response to a lost or stolen radioactive source, guideline. Radiation Protection Inspectorate 2016

