World Health Organization

EBOLA RESPONSE ROADMAP

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ABBREVIATIONS

ETC	Ebola Treatment Centre
EVD	Ebola Virus Disease
GOARN	Global Outbreak Alert and Response Network
HCW	Health care worker
IHR	International Health Regulations
IPC	Infection Prevention and Control
NGO	Nongovernmental Organization
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PPE	Personal Protective Equipment
R&D	Research and Development
UN	United Nations
UNCT	United Nations Country Team
UNICEF	United Nations Children's Fund
UNSG	United Nations Secretary-General
WASH	Water, sanitation and hygiene
WFP	World Food Programme
WHO	World Health Organization

GOAL

To stop Ebola transmission in affected countries within 6-9 months and prevent international spread.

CONTEXT

The 2014 Ebola Virus Disease (EVD, or "Ebola") outbreak continues to evolve in alarming ways, with the severely affected countries, Guinea, Liberia, and Sierra Leone, struggling to control the escalating outbreak against a backdrop of severely compromised health systems, significant deficits in capacity, and rampant fear.

To accelerate actions on EVD in West Africa, a Ministerial meeting was convened in July in Accra, Ghana, and an operations coordination centre established in Conakry, Guinea. The escalating scale, duration and mortality of the outbreak led the Governments of Guinea, Liberia, and Sierra Leone and WHO to launch an initial Ebola Virus Disease Outbreak Response Plan on 31 July 2014, which outlined the main pillars for action based on the situation at that time and an initial estimate of resource requirements. Since then the outbreak has been further complicated by spread to Lagos, Nigeria.

In August 2014, an Emergency Committee was convened by the Director-General of WHO under the International Health Regulations (2005) [IHR 2005], which informed the Director-General's decision on 8 August 2014 to declare the Ebola outbreak a Public Health Emergency of International Concern and issue several Temporary Recommendations to reduce the risk of international spread.

As of 27 August 2014, the cumulative number of Ebola cases in the affected countries stands at more than 3000, with over 1400 deaths, making this the largest Ebola outbreak ever recorded, despite significant gaps in reporting in some intense transmission areas. An unprecedented number of health care workers have also been infected and died due to this outbreak.

National authorities in the affected countries have been working with WHO and partners to scale-up control measures. However, the EVD outbreak remains grave and transmission is still increasing in a substantial number of localities, aggravating fragile social, political and economic conditions in the sub-region and posing increasingly serious global health security challenges and risks.

The Ebola response activities to date have generated significant knowledge on the effectiveness and limitations of current approaches, highlighting key areas for course corrections. Clearly, a massively scaled and coordinated international response is needed to support affected and at-risk countries in intensifying response activities and strengthening national capacities. Response activities must be adapted in areas of very intense transmission and particular attention must be given to stopping transmission in capital cities and major ports, thereby facilitating the larger response and relief effort.

This updated and more comprehensive roadmap builds on current, country-specific realities to guide response efforts and align implementation activities across different sectors of government and international partners.

PURPOSE OF DOCUMENT

To assist governments and partners in the revision and resourcing of country-specific operational plans for Ebola response, and the coordination of international support for their full implementation.

OBJECTIVES

1. To achieve full geographic coverage with complementary Ebola response activities in countries with widespread and intense transmission

2. To ensure emergency and immediate application of comprehensive Ebola response interventions in countries with an initial case(s) or with localized transmission

3. To strengthen preparedness of all countries to rapidly detect and respond to an Ebola exposure, especially those sharing land borders with an intense transmission area and those with international transportation hubs

MAJOR ASSUMPTIONS

This Roadmap builds on nearly 40 years of experience gained in EVD control, and is rooted in the fundamental strategies that have been proven effective in the context of previous outbreaks. However, it incorporates new experience gained, particularly over the past 3 months, in urban and widespread transmission settings. This experience is unique in the history of EVD and clearly indicates that in such areas with very intense transmission, combined with fragile and very weak health systems, the standard Ebola strategies must be complemented by new approaches. These approaches must allow for the rapid scaling of control activities when the case load outstrips currently available resources, and include a fundamental role for communities and their leaders in strategy implementation.

This Roadmap assumes that in many areas of intense transmission the actual number of cases may be 2-4 fold higher than that currently reported. It acknowledges that the aggregate case load of EVD could exceed 20,000 over the course of this emergency. The Roadmap assumes that a rapid escalation of the complementary strategies in intense transmission, resource-constrained areas will allow the comprehensive application of more standard containment strategies within 3 months. This plan recognizes that a number of currently unaffected countries could be exposed to EVD, but assumes that the emergency application of the standard control strategies will stop any new transmission within 8 weeks of the index case.

Fundamental to the Roadmap is the strengthening of laboratory, human resource, and response capacities, all of which are on the critical pathway for short- and long-term EVD control, as well as strengthening of the public health infrastructure against future threats. Some areas require particularly urgent action, such as infection control training.

It is expected that solutions to the current limitations on air traffic to and from the worst affected countries will be addressed within 2 weeks, and that by the end of September, a comprehensive, UN-led plan will be launched to complement the Ebola Response Roadmap by providing a common operational platform for enhancing response activities and for addressing the broader consequences of the outbreak. The UN-led plan is expected to underpin support for the increasingly acute problems associated with food security, protection, water, sanitation and hygiene, primary and secondary health care, and education, as well as the longer-term recovery effort that will be needed. That plan will also need to address the complex social consequences of this emergency, such as the increasing number of children who have been orphaned.

Course corrections to this Roadmap will be driven by the availability of human and financial resources for its implementation, the evolving epidemiology, and the broad context in which this outbreak is evolving.

PRIORITY ACTIVITIES

OBJECTIVE 1: To achieve full geographic coverage with complementary Ebola response activities in countries with widespread and intense transmission

Key Milestones: Reverse the trend in new cases and infected areas within 3 months, stop transmission in capital cities and major ports, and stop all residual transmission within 6-9 months.

PRIORITY ACTIVITIES

- **Apply full Ebola intervention package to the extent of available resources**
  - Case management: Ebola treatment centres with full infection prevention and control (IPC) activities; Ebola referral/isolation centres; referral processes for primary health care facilities
  - Case diagnosis: by a WHO-recognized laboratory
  - Surveillance: contact tracing and monitoring
  - Burials: supervised burials with dedicated expert burial teams
  - Social mobilization: full community engagement in contact tracing and risk mitigation

- **Develop and apply complementary approaches for intense transmission areas**
  - Case management: community-based care supported by intensified IPC and appropriate PPE
  - Case diagnosis: by epidemiologic link to case confirmed by WHO-recognized laboratory
  - Surveillance: monitoring for new transmission chains (i.e. in infected areas)
  - Burials: trained and PPE-equipped community burial teams
  - Social mobilization: community engagement to implement complementary approaches

- **Assess short-term extraordinary measures to limit national spread**
  - Implement specific programmes to ensure continuity of essential and supportive services in containment areas (e.g. primary health care, psychosocial support, food)
  - If non-essential movement in and out of a containment area is stopped, ensure that essential movement (e.g. for response providers, essential services) continues unhindered
  - To facilitate EVD response, defer mass gatherings until intensity of transmission is reduced

- **Implement WHO's Temporary Recommendations under IHR to prevent international spread**
  - Prohibit travel of all Ebola cases and contacts (except for medical evacuation)
  - Implement and monitor exit screening at international airports, seaports and major land crossings
  - Align practices of all international airline carriers with national travel policy

- **Ensure essential services and lay the foundation for health sector recovery and strengthening of national core capacities for outbreak response**
  - Establish short-term capacity to address critical gaps in essential services (including health, food, education, protection, WASH [water, sanitation and hygiene]) through national service providers, NGOs, UN agencies, humanitarian organizations and other partners, based on needs assessment and gap analysis
  - Develop a medium-term investment plan to strengthen health services that includes syndromic surveillance and laboratory networks to diagnose relevant pathogens

- Introduce a fast-track training programme for priority health worker gaps (including surveillance)

OBJECTIVE 2: To ensure emergency and immediate application of comprehensive Ebola response interventions in countries with an initial case(s) or with localized transmission

Key Milestone: Stop all transmission within 8 weeks of index case.

PRIORITY ACTIVITIES

- **Initiate emergency health procedures**
  - Immediately communicate the case and relevant information through the IHR contact point in the relevant WHO Regional Office
  - Establish an emergency operations centre and activate relevant national disaster/emergency management mechanisms
  - Coordinate operations and information across all partners, and the information, security, finance and other relevant sectors
  - Initiate public crisis/risk communications plan

- **Immediately activate Ebola response protocols and facilities, in keeping with WHO IPC guidance and universal precautions**
  - Immediately isolate all suspect and confirmed cases in designated Ebola treatment centre with full IPC
  - Secure access to diagnostic capacity in a WHO-recognized laboratory
  - Fully implement contact tracing and monitoring
  - Ensure safe burials
  - Implement public communications strategy to facilitate case identification, contact tracing and risk education

- **Implement IHR Temporary Recommendations to prevent international spread**
  - Prohibit travel of all Ebola cases and contacts (except for medical evacuation)

OBJECTIVE 3: To strengthen preparedness of all countries to rapidly detect and respond to an Ebola exposure, especially those sharing land borders with areas of active transmission and those with international transportation hubs

Key Milestone: Full Ebola surveillance preparedness and response plan established in areas sharing a land border with an Ebola-infected country and at all major international transportation hubs within one month.

PRIORITY ACTIVITIES

- ***In all unaffected countries***
  - Provide advice to travellers to Ebola-affected areas with relevant information on risks, measures to minimize those risks, and steps to take following a potential exposure
  - Identify an isolation unit where any suspect Ebola case could be properly investigated and managed
  - Verify access to diagnostic capacity in a WHO-recognized laboratory
  - Establish a strategy for identifying and monitoring the contacts of any suspect Ebola case
  - Where appropriate, ensure that preparedness activities include contingency planning for health centres, schools and other vital infrastructure and services

- ***In all unaffected countries sharing a land border with an Ebola-infected area***
  - Establish active surveillance for clusters of unexplained deaths or febrile illness in areas bordering Ebola-affected countries and in major cities
  - Provide the general public with accurate and relevant information on the neighbouring Ebola outbreak and measures to reduce the risk of exposure
  - Establish a protocol for managing travellers who arrive at major land crossing points with unexplained febrile illness
  - Identify and prepare an isolation unit where any suspect Ebola case can be properly investigated and managed
  - Arrange a process for rapidly shipping diagnostic specimens to a WHO-recognized laboratory
  - Engage international support team(s) if/as required to accelerate the development, implementation and assessment of preparedness measures

- ***In all unaffected countries with an international transportation hub***
  - Reinforce the capacity to manage travellers who arrive at international airports with unexplained febrile illness and potential exposure to Ebola
  - Ensure a protocol, and identify an isolation unit, for the investigation and management of any suspect Ebola case

MAJOR ISSUES IN OPERATIONALIZING THE EBOLA RESPONSE ROADMAP

- **Human Resources for Strategy Implementation:** mobilizing and sustaining sufficient human resources to implement Ebola response interventions requires a comprehensive approach to their remuneration, training, equipment, physical security, and access to health care. Implementation of Ebola response activities to date have highlighted a number of specific considerations that must be addressed to operationalize fully the Ebola Roadmap:

  - National staff considerations:
    - *Remuneration:* Governments must rapidly establish a comprehensive package that defines the salary, hazard pay and – where appropriate – insurance/death benefit available to each category of worker required to implement the national strategy (e.g. physicians, nurses, physicians assistants, laboratory workers, cleaners, burial teams, surveillance officers). If necessary, UN (e.g. WHO) or partner agencies should assist Governments as needed in implementing this package.
    - *Training & Equipment:* a specific accelerated training programme must be developed for each category of worker that is adaptable to the district/treatment centre level and places particular emphasis on IPC and proper use of PPE. Consideration must be given to particularly vulnerable groups such as cleaners and to the needs of women, who constitute a significant proportion of care providers. All Ebola workers must have access to sufficient quantities of the appropriate PPE.
  - International staff considerations:
    - *Mobilization of International Expertise:* WHO and partners will continue intensive outreach to all international medical NGOs, humanitarian organizations (i.e. the Red Cross Movement), Global Health Cluster partners, foreign medical teams and Global Outbreak & Alert (GOARN) Partners to mobilize sufficient medical expertise to support the staffing of all Ebola Treatment Centres in countries with intense and widespread transmission. For newly infected countries, Rapid Response Teams should be deployed within 72 hours, if requested, to provide expert support to the establishment and staffing of new case management facilities.
    - *Accelerated Training of Supplementary International Expertise:* WHO will establish a specific programme to identify, train and deploy an extended roster of international health care workers to provide clinical care in Ebola treatment centres and Ebola referral/isolation centres. Particular emphasis will be given to implementing protocols for health care worker protection, based on WHO IPC Guidance and the WHO Care Management Handbook.
  - *Medical Care of Health Workers:* WHO will continue its work with the international community on a two-pronged approach to ensuring the best possible care of exposed health care workers through a combination of specialized medical referral centres in affected countries (for national and international health care workers) and medical evacuation where necessary and appropriate.

- *Role of Communities:* given the acute lack of health staff, and often lack of trust in the health system, communities, especially Community Health Workers, will need to play an increasing role in delivering messages, addressing stigma and implementing complementary approaches to EVD control (see Social Mobilization & Community Engagement, below).

- **Security:** where necessary, and particularly in areas of intense transmission and short-term extraordinary containment measures, national/local authorities must plan for and deploy the security services necessary to ensure the physical security of Ebola facilities. National/local authorities must give particular attention to ensuring the security of the staff working in Ebola treatment centres, Ebola referral/isolation centres, laboratories and, if required, for teams working at the community level to conduct surveillance, contact tracing and safe burials.

- **Rapid Access to a WHO-Recognized Ebola Diagnostic Laboratory:** recognizing the limited number of facilities globally to reliably diagnose Ebola infection, WHO will work with its global network of collaborating centres and partners to ensure that:
  - all countries with intense and widespread Ebola transmission have sufficient in-country diagnostic capacity to serve all Ebola treatment centres and Ebola referral/isolation centres
  - all countries that are newly infected with EVD or have localized transmission have either in-country diagnostic capacity or rapid access (within 72 hours) to a WHO-recognized diagnostic facility
  - all countries at particular risk for EVD have a designated WHO-recognized diagnostic facility that is prepared to receive and process as a matter of urgency samples from suspect Ebola cases.

- **Personal Protective Equipment, IPC Materials & Other Essential Supplies:** the escalation of the Ebola outbreak combined with enhanced preparedness efforts globally and the scale-up of response activities in affected countries, particularly through deeper community mobilization and engagement in essential response activities (e.g. community care, surveillance, safe burials), will make substantial additional demand on supplies of PPE, IPC materials and other essential supplies such as disinfectants, tents and body bags. Ensuring that appropriate PPE, IPC and other essential materials are available in sufficient quantities for all infected areas will require further international coordination of supply. WHO will enhance its work in support of the procurement and provision of PPE and IPC materials for governments and partners, particularly those operating in the worst affected areas. Collaboration with the World Food Programme will be strengthened to facilitate the timely transport and delivery of such materials as required.

- **Social Mobilization & Community Engagement:** while community understanding and engagement is a fundamental aspect of standard Ebola control strategies, it assumes even greater importance in the context of the complementary approaches needed in the worst affected countries to effectively address the current outbreak. Achieving real community understanding, ownership and implementation of any complementary approaches, particularly given the deep-rooted fear and stigmatization emerging in the affected areas, requires sustained mobilization, engagement and dialogue with community, religious, traditional and other local

leaders, women's and youth groups, as well as traditional healers, to build collective trust and confidence in the response efforts and community action. Establishing robust, community-led approaches to EVD that build on existing local networks and organizations in each affected and at-risk district will be essential to the full implementation, effectiveness and sustainable results of the Roadmap. UNICEF will lead and coordinate the support to national and local governments in this work through communication for development (C4D) and social mobilization task teams, aligning it with the related programme communications activities, the use of mass media and social media, and other community-based approaches to enhance understanding of the disease, risks and risk mitigation measures, putting people at the centre of the response.

- **Infrastructure & Transport:** enhanced response implementation and coordination requires the designation by national, subnational and local authorities of sufficient, appropriate and well-located facilities to house all elements of the response, from crisis management teams to Ebola treatment centres and Ebola referral/isolation centres. The international community and partners should be prepared to assist with the rapid repurposing and equipping of such facilities where required. Additional transport capacity must be properly assessed and budgeted in national operational plans to address all elements of the Ebola intervention package, from the safe transport of cases and specimens, to the work of burial teams and contact tracers.

- **Information Management & Data Analysis:** tracking the impact of the Ebola Roadmap, optimizing the deployment of resources, and ensuring timely course corrections requires a substantial improvement in the collection, management, analysis and dissemination of relevant data on the epidemiology of the disease and the coverage and quality of the full range of control interventions. Additional investment will be made in data collection and management at all levels of the response, the analysis and twice-weekly publication of standard monitoring information and impact indicators, and institutional collaborations to facilitate more sophisticated data analysis and modelling.

- **Research & Product Development:** the primary objective of this work is to fast-track access to treatment and vaccine options to address EVD, with major activities focused on facilitating the use of experimental medicines and vaccines through:
  - guidance on safety, efficacy, quality, regulatory standards and ethical use of therapies in the R&D pipeline.
  - accelerated development and clinical evaluation of promising experimental interventions.
  - coordination and facilitation of the ethical deployment of existing experimental treatments and vaccines.
  - convening the research community to ensure R&D is oriented towards actual, current needs.

- **Technical & Normative Guidance:** the extraordinary nature and geographic extent of this Ebola outbreak, combined with the need to adapt tactics to the intensity of transmission and availability of resources, requires accelerated development, or adaptation, and dissemination of normative/technical guidance to improve control measures in affected countries (e.g. guidelines on safe burials), guidance for at-risk areas (e.g. active surveillance for suspect EVD) and advice

relevant to all countries (e.g. advice for travellers). Specific expert task teams, networks and inter-agency working groups will be established or convened as needed to accelerate the drafting, vetting, and finalization of such materials. It is particularly important to consolidate, for countries with outbreaks, an in-hand practical guideline that concentrates on hospital infection control and protection of health workers, contact tracing and surveillance, and community mobilization. Similar guidance on preparedness is needed for countries at risk of importation.

- **Financing the Ebola Roadmap:** full financing of the Ebola Roadmap will require a combination of domestic and international government financing, funding from development banks, private sector financing, and in-kind contributions. WHO and the World Bank will establish dedicated capacity to ensure a concerted and accelerated resource mobilization effort for the health response, and to coordinate resource mobilization for the health response with consolidated appeals through the broader UN system to address the full range of support needed for essential and ancillary services, particularly in the worst affected areas. The World Bank will facilitate resource tracking against the Roadmap.

- **Coordination and Crisis Management**

Subnational Level

- Designated coordination and crisis management units should be established, or, if present, strengthened, at the district level in all areas of active Ebola transmission, with highest priority to areas of intense transmission, capital cities and major hubs in other transmission zones. Such units should be hosted by the relevant district authority, housing representatives of WHO, UNICEF, key NGOs and technical agencies, and other major implementing partners to facilitate the implementation and monitoring of the full Ebola package – or complementary approaches if necessary – in all infected localities.

National level

- National governments have responsibility for coordinating the national response effort within their borders, guided by a comprehensive National Ebola Emergency Operational Response Plan and operating through an Emergency Operations Centre that houses representatives of all major partners operating in the response.
- WHO – through its Country Office – will coordinate international support to the national operational plan, including crisis and risk communications. This role will be facilitated by ongoing needs assessment and gap analyses conducted with partner agencies, and comprehensive monitoring of the coverage, quality and impact of response activities. Where a health sector coordination mechanism either does not exist or does not meet the needs of the response, activation of a health cluster may be discussed with government, the UN Resident Coordinator and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).
- The UN Country Team (UNCT) – through the UN Resident Coordinator – has responsibility for coordinating the inter-agency support to States with intense, widespread transmission. This may include requesting the activation, where he/she deems appropriate, of the necessary clusters to coordinate support to specific sectors.

International level

- WHO (working through its Headquarters, Regional Office for Africa, and Conakry Ebola Operations Hub) will coordinate the overall health response, including crisis/risk communications, through the development and updating of international strategy, the provision of technical guidance on Ebola, monitoring of strategy implementation, and collation, consolidation and dissemination of information on the outbreak and impact of response activities.
- The UN – through the UNSG's Special Representative – has responsibility for coordinating the overall, multi-sectoral support to States with intense, widespread transmission (currently Guinea, Liberia, and Sierra Leone).

MAJOR ROLES & RESPONSIBILITIES

- ***National governments (affected and unaffected countries)***
  - Implement fully the relevant Temporary Recommendations issued under the International Health Regulations (2005) regarding the 2014 Ebola Outbreak in West Africa
  - Lead, ideally using an incident management system designed for this purpose, the organization, coordination, and implementation of national preparedness and response activities, including, where and when relevant, in collaboration with international development and humanitarian partners
  - Mobilize and provide technical expertise and additional medical capacity (especially foreign medical teams) to countries undertaking large-scale Ebola response efforts
  - In countries with intense and widespread Ebola transmission, enable national agencies to act as rapidly as required, while providing the necessary civil protection and ensuring continuity of essential goods and services
  - When necessary, establish legal/regulatory frameworks and operating environment for international relief efforts
  - Engage in international development cooperation to exchange expertise, lessons learned and best practices in the re-establishment of health and other essential services subsequent to national emergencies

- ***Local Political, Community, Traditional, and Religious Leaders (in affected countries)***
  - Leverage deep roots in local communities and congregations to widely communicate accurate information about the risks of Ebola and measures to mitigate exposure
  - Ensure the full engagement of communities in appropriate Ebola control measures, particularly contact tracing and monitoring
  - In areas of intense transmission, lead the collaboration with Ebola response teams to facilitate the full implementation of community-based approaches
  - Take part in public engagement activities, such as community dialogues, to alleviate fear and establish trust in national and international efforts to halt the spread of Ebola
  - Coordinate community projects to ensure the provision of essential services

- ***WHO***
  - Provide technical leadership and operational support to governments and partners for Ebola control efforts
  - Monitor Ebola transmission and the impact of interventions in order to guide allocation of resources in line with operational plans
  - Assist in delineating existing response needs and encourage partners to provide the needed resources to meet such needs
  - Facilitate availability of essential health data/information and use of therapies

- ***UN Agencies***
  - Assist national governments in development of national preparedness plans and, in infected countries, operational plans to guide partner actions and contributions
  - Support the government in garnering international support as needed

- Provide support for essential services (e.g. health, food, WASH, protection, education) in worst affected areas, as well as the maintenance and continued functionality of critical services more broadly
- Engage partners who contribute to the overall effort, under government leadership, at national and local level

➢ ***NGOs***

- Heighten coordination with national authorities, UN agencies and other response partners
- Health
    - Address emergency case management needs and deficits
    - Repurpose existing primary health care and other programmes to support response efforts
    - Mobilize human resources and establish treatment centres
    - Assist in procurement and distribution of essential commodities
    - Support the government in garnering international support as needed
    - Social mobilization and engagement at community level
    - Maintain stocks of emergency supplies and commodities
- Other sectors (WASH, food security, protection, livelihoods, logistics, governance, legal)
    - Repurpose existing programmes to support control efforts

➢ ***National and International Technical Agencies and Academic Institutions***

- Provide strategic advice and guidance on the international Ebola response
- Assist expert task teams and/or working groups to address priority gaps in normative and technical guidance and R&D
- Provide technical expertise, training and capacity building for essential targeted functions, including surveillance systems, data generation, information management, and implementation of Ebola response interventions
- Assist with additional and specialized data analytical capacity
- Provide expert staff to augment international prevention and control efforts

➢ ***Humanitarian Organizations***

- Deliver lifesaving aid to worst affected communities
- Provide essential services, including food, education, and water and sanitation systems, and facilitate the rehabilitation of such services
- Build the capacity of local organizations and support civil society initiatives

➢ ***Donors***

- Provide strategy perspectives and advice on the international Ebola response
- Assist with essential resources, including financial and material, to address key deficits in response activities
- Examine the impact on development programmes and whether the reallocation of resources to the response could help ensure that other programmes recover faster

- ***Private Sector***
  - Provide in-kind supplies and assistance
  - Assist international efforts to ensure continuity of airline services to worst affected countries
  - Cooperate with international efforts to expedite R&D on experimental therapies
  - Coordinate with international efforts to ensure that sufficient supplies of appropriate PPE and IPC materials are available for affected countries and areas
  - Maintain business continuity and economic activity in affected countries
  - Assist with essential resources, financial and/or material, to address key deficits in response activities

MONITORING & EVALUATION FRAMEWORK

The impact and implementation of the Ebola Roadmap will be monitored and evaluated on a twice-weekly basis through a combination of impact/outcome metrics and operational response performance indicators corresponding to each of the three major objectives as outlined below.

OBJECTIVE 1: To achieve full geographic coverage with complementary Ebola response activities in countries with widespread and intense transmission

MAJOR IMPACT METRICS	Reverse the trend in new Ebola cases and infected areas within 3 months, stop transmission in capital cities and major ports, and stop all residual transmission within 6-9 months
MAJOR OUTCOME METRICS	Trends in cases (probable and confirmed) and deaths, by district • New, weekly and cumulative cases and deaths • Case fatality rates by month Trends in affected districts, by country • Active cases (within last 21 days) • No longer active (no new cases reported in the last 21 days) • Newly infected areas (new cases in the last 7 days) Trends in health care worker cases (national and international), by country • Number of cases per week • Case fatality rates by month

Performance of the Operational Response (measured at district level)	
MAJOR INDICATORS	Presence and quality of Ebola interventions by district: • Ebola treatment and referral centres • Laboratory access • Surveillance and contact tracing • Safe burial • Social mobilization Proportion of District interventions verified to meet IPC standard, monthly Active exit screening at all major international airports, seaports and major land crossings

Intervention-specific Indicators (measured at district level)	
Ebola treatment centre	• Number of treatment beds • Staff-to-bed ratios • Health care workers infected
Ebola Referral centres	• Proper triage/investigation spaces designated (with IPC, staff, PPE, etc.) • Presence of safe transport systems to Ebola treatment centre
Diagnostic capacity	• Access to a WHO-recognized laboratory

	• Number of tests performed per week
Social mobilization	• Presence of social mobilization programme/capacity • Number of events reflecting community resistance
Surveillance and contact tracing	• Completeness of weekly active surveillance reports • Number of contacts being traced • % of contacts followed for 21 days
Safe burials	• Number of trained and equipped safe burial teams • Number of safe burials per week

OBJECTIVE 2: To ensure emergency and immediate application of comprehensive Ebola response interventions in countries with an initial case(s) or with localized transmission

MAJOR IMPACT METRICS	Stop all Ebola transmission within 8 weeks of an index case
MAJOR OUTCOME METRICS	Trend in cases (probable and confirmed) and deaths, by infected area Number of infected areas Persistence of transmission over time

Performance of the Operational Response (measured by infected area)	
Case management	% of suspect and/or new cases isolated with proper PPE and barrier measures within 12 hours of identification
Diagnostics	% of samples under shipment to a WHO-recognized laboratory within 24 hours
Surveillance and contact tracing	% of cases with contact tracing implemented within 24 hours; % of contacts followed-up for 21 days
Social mobilization	public information and risk communications campaign initiated within 48 hours of case confirmation
Safe burials	% of burials conducted by trained and properly equipped burial teams

OBJECTIVE 3: To strengthen preparedness of all countries to rapidly detect and respond to an Ebola exposure, especially those sharing land borders with areas of active transmission and those with international transportation hubs

Performance of the Operational Response (measured by country)	
In all unaffected countries sharing a land border with an Ebola-infected area	% of weekly active surveillance reports for clusters of unexplained deaths or febrile illness in areas bordering Ebola-affected countries and in the capital city Presence of a protocol for managing travellers who arrive at major land crossing points with unexplained febrile illness Presence of an isolation unit for Ebola case investigation and management Verified access to diagnostic capacity in a WHO-recognized laboratory Verified strategy for identifying and monitoring the contacts of any suspect Ebola case

ESTIMATED COSTS

Estimation of Costs: The US$490m indicative budget for the Roadmap presents a consolidated view of the estimated global resources required over the next 6 months – by national governments, WHO, some UN agencies and other partners (e.g. non-governmental agencies, humanitarian organizations) – for the health response to stop Ebola transmission. This indicative budget does not include the costs of broader support for essential services in the countries worst affected, nor the costs of health systems recovery and strengthening in these areas.

Cost estimates have been developed for each objective of the roadmap as well as the costs associated with operationalizing the plan – a breakdown of cost estimates can be found in Table 1.

Table 1 – Estimated cost by objective

Cost item	Cost (USD '000)
Objective 1. Countries with widespread and intense transmission	389,005
Objective 2. Emergency response in countries with initial case(s) or localized transmission	13,275
Objective 3. Strengthen preparedness, especially in bordering countries	20,000
Operationalizing the Ebola response roadmap	67,570
Total	**489,850**

The majority of costs are for Objective 1, countries with widespread and intense transmission, and particularly for the implementation of the full Ebola intervention package. The breakdown of the estimated costs for Objective 1 can be found in Table 2.

Table 2 – Breakdown of costs for Objective 1

Cost item*	Cost (USD '000)
Full Ebola intervention package	
Ebola treatment centres	126,486
Referring /isolation centres and primary health care facilities	30,360
Laboratory diagnosis	19,570
Surveillance and contact tracing	34,223
Safe burials	6,133
Social mobilization and community engagement	12,114
Sub-national technical / logistical coordination	27,934
Complementary approaches for intense transmission areas	54,516
Short-term extraordinary measures to limit national spread	75,000
Support IHR measures to prevent international spread	2,670
Total	**389,005**

*Note: the costs of essential services, including non-Ebola response services and health sector recovery, are not included in the Roadmap cost estimates, but will be generated as part of the comprehensive UN-led plan to address the broader requirements for essential services (i.e. food security, water and sanitation)

The breakdown of the estimated costs for the implementation of the full Ebola intervention package, by intense transmission country, can be found in Table 3.

Table 3 - Breakdown of cost by country for full Ebola intervention package

Cost item	Estimated costs (USD '000)			
	Guinea	Liberia	Sierra Leone	Total
Ebola treatment centres	17,016	72,602	36,868	**126,486**
Referring /isolation centres and primary health care facilities	5,040	17,520	7,800	**30,360**
Laboratory diagnosis	2,633	11,233	5,704	**19,570**
Surveillance and contact tracing	5,681	19,749	8,793	**34,223**
Safe burials	1,018	3,539	1,576	**6,133**
Social mobilization and community engagement	2,011	6,990	3,112	**12,114**
Sub-national technical / logistical coordination	4,150	13,566	10,217	**27,934**
Total	**37,549**	**145,200**	**74,070**	**256,820**

The estimated country- and intervention-specific costs are based on the following scenarios for the number of cases in each of the intense and widespread transmission countries. The estimated number of cases for the application of the full Ebola intervention packages and complementary approaches is as follows:

Table 4 – Cases scenarios (for a 6-month period)

Country	Cases managed through standard Ebola control	Total cases managed, including with complementary approaches
Guinea	2,250	2,550
Liberia	9,600	11,950
Sierra Leone	4,890	5,500
Total estimate	**16,740**	**20,000**

The estimated costs for an Ebola treatment centre are based on average costs for a 50-bed treatment facility, scalable up or down according to needs in a given area. The costs for a 50-bed facility include an initial setup cost of $386,000 and monthly running costs of $881,000, resulting in a total cost for six months of $5,672,000. It is estimated that at least 1,115 ETC beds will need to be established to accommodate the case scenarios outlined in Table 4. The current breakdown of the estimated bed capacity required under this scenario is given in Table 5.

Table 5 – Breakdown of Ebola treatment centre bed capacity required*

Areas affected	Ebola treatment centre	ETC beds
Guinea		
Conakry	Conakry (Donka Hospital)	50
N'zerekore	Gueckedou	100
Total Guinea		**150**
Liberia		
Bong	Bong county	50
Lofa	Foya, Lofa county	100
Montserrado	Monrovia, ELWA 3	240
	Monrovia, JFK Hospital	100
	Monrovia, (5x100 bed complementary treatment centres)	500
Nimba	Nimba county	50
Total Liberia		**1040**
Sierra Leone		
Eastern	Kailahun	100
	Kenema Hospital	50
	Kenema Field Hospital ETC	50
Northern	Bombali / Makeni	50
Southern	Bo	25
Western	Freetown / Laka	50
Total Sierra Leone		**325**
Total		**1,515**

*Note: the Ebola treatment centre locations and bed capacity are currently being assessed and will be updated as the situation evolves

For each Ebola treatment centre there is anticipated to be one or more referring /isolation centres where suspect case are tested and placed in isolation wards and transported to an Ebola treatment centre if positive. Referring/isolation centres may be purpose built or re-purposed primary health facilities. It is estimated that for every positive Ebola case there will be potentially 10 people seen by a referring/isolation centre. The estimated costs for referring/isolation centre are based on an average centre that can manage 80 people per month, which includes an initial setup cost of $112,500 and monthly running costs of $181,250, resulting in a total cost for six months of $1,200,000. In total it is estimated that the equivalent of approximately 158 such referring/isolation centres will need to be established.

For each suspect and positive case, sample testing and diagnosis by a WHO-recognized laboratory is required. It is estimated for every case, 5 samples will need to be tested. The estimated costs for laboratories are based on an average mobile laboratory that can process 600 samples per month, with an initial setup cost of $100,000 and monthly running costs of $129,600, resulting in a total cost for six months of $877,600. In total it is estimated that approximately 80,000 samples will need to be tested at a cost of $244 per sample.

For each case it is estimated that there are 10 contacts that must be traced and monitored for 21 days. It is estimated that each contact tracer can follow 10 contacts per month. These numbers will vary for rural and urban settings. The estimated costs for contact tracing are based on a team of 100

contact tracers following 1,000 contacts per month, which costs approximately $225,450 per month, resulting in a total cost for six months of $1,352,700. In total it is estimated that approximately 160,000 contacts will need to be followed at a cost of $225 per contact.

For each fatality, safe burial and household disinfection procedures must be followed. Estimated costs for safe burials and household disinfection are based on burial teams that can manage 100 burials per month, which costs approximately $225,450 per month, resulting in a total cost for six months of $1,352,700. In total it is estimated that up to 13,500 burials will need to be performed at an average cost of $404 per burial.

Estimated costs for social mobilization are based on widespread community engagement. For each affected area it is estimated a team of community volunteers will cover a population of 500,000 coordinated at sub-national level, which costs approximately $79,800 per month, resulting in a total cost of $478,800. It is estimated that the equivalent of 55 such teams will need to be established.

At the sub-national level technical and logistical coordination will be essential. These costs have been estimated based on WHO-led teams at the sub-national level where there is an Ebola treatment centre. The sub-national coordination teams will cover sub-national partnerships, technical expertise, infection control, information management and logistics support. The costs for running such a team is on average $450,000 per month, resulting in a total cost for six months of $2,700,000. It is estimated that 10 such sub-national offices will need to be established.

Such an increase in capacity will require a large deployment of both international and national personnel, with a variety of skill sets. The indicative number of people required at any point in time for the field level implementation of the Ebola intervention package is given in Table 6. Note that this does not include personnel required for global, regional, sub-regional and country level for crisis management and coordination. Also, the actual number of individuals required will be higher than the estimates given below as personnel need to be rotated in and out of active duty over the period of operations.

Table 6 – Indicative estimates of international and national personnel required at any point in time for field-level implementation of Ebola intervention package

Cost Item	Guinea		Liberia		Sierra Leone	
	Inter-national	National	Inter-national	National	Inter-national	National
Ebola treatment centre, referral/isolation centres and laboratories	60	770	230	3,170	120	1,590
Complementary approaches and safe burial	20	230	70	900	40	450
Contact tracing and social mobilization	20	900	50	3,100	20	1,380
Sub-national technical / logistical coordination	20	60	60	190	50	160
Total	**120**	**1,960**	**410**	**7,360**	**230**	**3,580**

Mobilizing and sustaining sufficient human resources to implement Ebola response interventions, and providing the necessary technical backstopping and crisis management will require a comprehensive approach to operationalize the Ebola response roadmap. Table 7 below outlines these costs.

Table 7 – Estimated cost of addressing major issues in operationalizing the roadmap

Cost item	Estimated cost (USD '000)
Human Resources for Strategy Implementation	
Accelerated Training of Supplementary International Expertise	1,000
Medical Care of Health Workers	10,000
Rapid Access to a WHO-Recognized Ebola Diagnostic Laboratory	1,500
Information Management and Data Analysis	2,200
Research and Product Development	3,000
Technical and Normative Guidance	2,000
Crisis management and coordination	
National crisis management and coordination	3,870
World Health Organization	18,500
UNICEF (estimate)	5,000
World Food Programme*	20,500
Total	**62,570**

* the WFP logistics costs will increase if there is a delay in establishing and financing the UN-led common operational platform, plan and budget

While most of the response effort will be implemented directly by countries and partner Organizations, WHO will play a key role in leadership and coordination, information management and technical expertise at all levels of the operation – global, regional, country and sub-national. Table 8 outlines the key resource requirements for WHO to fulfill this role.

Table 8 – Estimated resource requirements for WHO coordination/crisis management*

Cost item	Estimated cost (USD '000)
Crisis management and coordination (WCO/Conakry Hub/AFRO/HQ)	18,500
Sub-national technical / logistical coordination	27,000
Human resources for strategy implementation	
Accelerated training of supplementary international expertise	1,000
Medical evacuation	5,000
Rapid access to a WHO-recognized Ebola diagnostic laboratory	1,500
Information management and data analysis	2,000
Research and product development, technical and normative guidance	5,000
Total	**60,000**

** Note: at sub-national level, some of these functions may ultimately be fulfilled by partner agencies*

The estimated resource requirements for WHO outlined above do not include the direct procurement of supplies and equipment, deployment of staff and consultants or funds managed by WHO on behalf of donors to be distributed to partners and Member States for the delivery of the Ebola intervention packages and complementary approaches costed above.