

Biological Incident Annex to the Sectoral Emergency Response Plan of the Ministry of
Labor, Health and Social Affairs of Georgia

ESPECIALLY DANGEROUS PATHOGENS AND BIOLOGICAL INCIDENTS RESPONSE
PLAN OF THE MINISTRY OF LABOUR, HEALTH AND SOCIAL AFFAIRS OF
GEORGIA

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List of Acronyms

BSL	Biosafety Level
CBRN	Chemical, Biological, Radiological and Nuclear
CDC	U.S. Centers for Disease Control and Prevention
CPHR	Richard Lugar Center for Public Health Research
DTRA	Defense Threat Reduction Agency
EDP	Especially Dangerous Pathogens
EIDSS	Electronic Integrated Disease Surveillance System
EMA	Emergency Management Agency (Ministry of Internal Affairs)
EOC	Emergency Operations Center (Ministry of Internal Affairs)
GoG	Government of Georgia
IDSS	Integrated Disease Surveillance System
IHR	International Health Regulations
JAS	Job Action Sheet
LMA	Laboratory of the Ministry of Agriculture
LSS	Laboratory Surveillance Station
MIA	Ministry of Internal Affairs
MoA	Ministry of Agriculture
MOD	Ministry of Defense
MoLHSA	Ministry of Labour, Health and Social Affairs.
NCDC	National Center for Disease Control and Public Health
NRT	National Response Team
PPE	Personal Protective Equipment
SNS	Strategic National Stockpile
SOP	Standard Operating Procedure
TTX	Tabletop Exercise
WHO	World Health Organization
ZDL	Zonal Diagnostic Laboratory

Introduction

Infectious diseases continue to present challenges to health care professionals who track and contain them. These diseases are a leading cause of morbidity and mortality around the world and remain an enigma to many. The new threat of bioterrorism has become a significant security concern to all nations. The emergence and re-emergence of epidemic-prone diseases caused by many of the Especially Dangerous Pathogens (EDPs) are also a growing threat. Far from having been conquered, they have resurged dramatically in recent years. Their public health significance in terms of human suffering, deaths, and disability is compounded by the considerable toll they take on economic growth and development.

New diseases such as SARS and Ebola are but a few of the new threats over the last 30 years. No doubt more are to come. The microbial agents that cause them are dynamic, resilient, and well adapted to exploit opportunities to change and spread. For many important diseases, whether in the form of new diseases or well-known diseases behaving in new ways, control is problematic either because of the lack of effective vaccines and therapeutic drugs, or because existing drugs are being rendered ineffective as antimicrobial resistance spreads.

As the emergence of worldwide H1N1 (2009) influenza pandemic or the Ebola outbreak so clearly demonstrated, every country is vulnerable, and the public health and economic consequences, exaggerated by public fear of the unknown, can be felt around the world.

Georgia faces challenges from endemic and non-endemic EDPs. The country is also prone to potential biological threats caused by accidental biological agent releases from laboratories, deliberate actions of bioterrorism attacks or biological warfare. In Georgia, potential biological threats, coupled with significant levels of exposure and vulnerability, may have a substantially negative impact on national economy. Once new diseases emerge or biological incidents occur, they often take their heaviest toll on health care workers and can jeopardize the capacity of health care system to cope. This situation is likely to be repeated when the next new disease emerges, when the next inevitable influenza pandemic occurs, or following the deliberate release of a pathogen with deliberate intent to harm.

For all these reasons, increased concerns about the impact of communicable diseases have encouraged the Georgian health care authorities to give much higher priority to biological events of epidemic and pandemic potential. This led to the intention to establish a multi-agency, multi-discipline response plan that, in conjunction with existing national emergency response plans, is designed to deal with large-scale public health

emergencies – whether pandemics or bioterrorism or biological events of another origin – in which health care facilities are required to cope with a surge of casualties and emergency admissions.

I. General Provisions

Article 1: Goal

The “Especially Dangerous Pathogens and Biological Incidents Response Plan” (hereinafter referred to as the Response Plan) offers specific planning guidance to the Ministry of Labour, Health and Social Affairs of Georgia (MoLHSA). Overall goal of the plan is to strengthen national capacities in public health and health care, and related sectors, to prevent the occurrence of biological incidents and diseases caused by EDP, prepare health services to meet the health needs of the population in the event of crises, and organize and coordinate adequate measures to deliver effective preparedness, response, mitigation and recovery activities.

Article 2: Purpose

1. The purpose of this document is to delineate the roles and responsibilities of all levels of the health care system, and establish mechanisms that can be immediately called into action to enhance communication and collaboration among the public health agencies, the health care delivery system (ambulatory services, primary health care and hospital sector), the intelligence community, law enforcement agencies and national defense systems as needed.
2. The Response Plan is designed to improve multi-agency interoperability and to identify the arrangements whereby all public health activities are well integrated, and health care authorities at all levels are able to work together effectively to manage a biological event and reach rapid socio-economic recovery.
3. The Response Plan delivers generic concepts on the procedures, capabilities and equipment required to implement an effective response, and provides guidance on when regional, national or international assistance may be required.
4. This Plan draws on the principles, concepts, terminology and guidance of the “National Especially Dangerous Pathogens and Biological Incidents Response Plan” as a framework and serves as the annex to the “Sectoral Emergency Response Plan of the Ministry of Labor, Health and Social Affairs/Function No. 6 – Medical Provision for the National Response Plan for Emergency Situations Caused by Natural and Manmade Disasters”.

Article 3: Objectives

1. The general objective of the Response Plan is to contribute to the improvement of the overall bio-preparedness and bio-security for public health emergencies of biological origin, enhance national capacities to respond to bioterrorism or naturally occurring EDP outbreaks, and promote a multi-disciplinary approach to ensure the interoperability of existing public health emergency plans and their coherence with national policies and strategies.
2. The specific objectives of MoLHSA's Response Plan to Biological Incidents include the following:
 - 2.1. Provide a unified, biological threat identification and mapping tool for preparedness and response planning, including assigning roles and responsibilities to the relevant state institutions;
 - 2.2. Enhance bio-surveillance, epidemiological surveillance and environmental monitoring to facilitate the prevention and early detection of diseases caused by EDPs, and minimize the risks of catastrophes produced by them;
 - 2.3. Prepare the health system to deliver appropriate public health and medical services for those exposed to EDPs to minimize morbidity and mortality in case of biological crises, through the following actions:
 - a) Identify and maintain a National Strategic Stockpile (pharmaceuticals, vaccines, equipment etc.) to counter diseases caused by EDPs and introduce recommendations for the allocation of resources in those circumstances when local resources are insufficient to meet the increased needs of the population;
 - b) Support the implementation of institutionalized and standardized educational programs for health professionals in the clinical recognition and management of diseases caused by EDPs;
 - c) Facilitate and coordinate the elaboration of Hospital Emergency Response Plans for Biological Incidents to increase their resilience and capability to withstand surge influx, while maintaining the provision of other essential care services to the population in general.
 - 2.4. Identify and establish a clear delineation of roles, responsibilities and competencies of the key public health and health delivery entities in regards to the biological crises management;
 - 2.5. Ensure inter-agency coordination efforts within the health system and in relation to other relevant Ministries to maximize resources and the health response impact in the event of biological incidents;

- 2.6. Collaborate with international actors, civil society and the private sector to establish an operational platform for the timely mobilization of expertise and resources in time of crisis;
- 2.7. Develop plans, procedures, and guidelines for public information and risk communication;
- 2.8. Coordinate processes to restore disrupted services and support disaster-affected communities in the restitution of emotional, physical, social and economic well-being.

Article 4: Scope of the Plan

1. The Response Plan specifically addresses diseases caused by especially dangerous pathogens and other biological agents listed in Order No. 01-18/N of the Minister of Labour, Health and Social Affairs of Georgia, dated 27 May 2013 on “Approval of the List of Especially Dangerous Pathogens” that have the potential to pose an immediate risk to national security.
2. All supportive agencies are expected to cooperate, whether working directly in the organizational structure designated within this plan or acting individually, and they are encouraged to adopt the principle of collaboration in managing crises of biological origin and minimizing its public health and socio-economic impact.
3. This plan aligns with other plans in place to address health issues related to biological disasters, emergencies and bioterrorism at the regional and national level and can be scaled to the types, magnitude and severity of the biological incident and available resources.
4. This is a supporting, agency-specific plan that facilitates the operational integration of national arrangements and mechanisms whilst operating under the authority, direction and guidance of the strategic overarching arrangements of the “National Response Plan to Natural and Manmade Emergency Situations” (hereinafter National Response Plan).

Article 5: Definition of Terms

As used herein, the following terms shall have the following meaning:

Biological Agent of Endemic and Pandemic Potential – Biological agents that pose a special threat to human or animal health if released into the environment. These have the potential to be made into a biological weapon and/or be transmitted relatively easily.

They can cause large-scale morbidity, mortality, or mass disruption of public activities and require national level responses to contain and eliminate or mitigate their consequences.

Biological Incident–Natural outbreak or release of EDPs through intentional or unintentional activities that may cause harm to human or animal health or death.

Biological warfare – Employment of biological agents to produce casualties in man or animals and damage to plants or material.

Bioterrorism Act – Intentional use of pathogenic biological agents or toxins on a person or group of people, animals, or both, with the intent to cause a disease.

Disinfection – Procedure whereby health measures are taken to control or kill infectious agents on a human or animal body surface or in or on baggage, cargo, containers, conveyances, goods and postal parcels by direct exposure to chemical or physical agents.

Disinsection– Procedure whereby health measures are taken to control or kill the insect vectors of human diseases present in baggage, cargo, containers, conveyances, goods and postal parcels.

Dispensing – The process of providing medical prophylaxis to the targeted population in the community.

Especially Dangerous Pathogens – a) pathogens with high individual and low community risks that cause severe human and animal diseases, but under ordinary circumstances do not spread through random contact of the infected individual with other persons; effective prevention measures and treatment are available; b) pathogens with high individual and community risks that under ordinary circumstances cause very severe diseases (very often incurable); they easily transfer from one individual to another or from animal to human through casual contact; effective prevention measures and treatment are not available;

Exercise – A simulated emergency condition carried out for the purpose of testing and evaluating organizational readiness to handle a particular type of emergency.

Facilities of Opportunity – Nonmedical buildings that, because of their size or proximity to a medical center, can be adapted into surge hospitals. These facilities may include sites such as hotels, schools, sports arenas, convention centers, exhibition halls, airport hangars, or empty warehouses.

First Responder – A local police, fire, or emergency medical person who arrives first on the scene of an incident and takes action to save lives, protect property, and meet basic human needs.

Hazard – A source of potential harm from past, current, or future exposures.

Incident Command System – An organizational structure for emergency response based on clear and consistent definitions of roles, responsibilities, and reporting channels of all participating personnel.

Inspection - Examination, by the competent authority or under its supervision, of areas, baggage, containers, conveyances, facilities, goods or postal parcels, including relevant data and documentation, to determine if a public health risk exists;

Isolation – Separation of sick people with a contagious disease from people who are not sick.

Mass Prophylaxis – The process by which an entire community is to receive prophylactic medicine and/or vaccines over a defined period of time in response to possible exposure to a biological agent.

Screening examination– Preliminary assessment of a person by an authorized health worker or by a person under the direct supervision of the competent authority, to determine the person's health status and potential public health risk to others. It may include the scrutiny of health documents, and a physical examination when justified by the circumstances of the individual case.

National IHR Focal Point –Designated national center that shall be accessible at all times for communications with WHO IHR Contact Points.

Neutralization (Decontamination) – The process of reducing and removing contamination in people, animals, plants, food, water, soil, air, surfaces, territories and objects through physical, chemical and/or other methods. Disinfection and sterilization are two different forms of neutralization.

Personal Protection Equipment – Specialized clothing or equipment worn by an individual for protection against infectious materials.

Pre-exposure prophylaxis - Any medical or public health procedure used before exposure to the disease causing agent. Its purpose is to prevent, rather than treat or cure, a disease.

Post-exposure prophylaxis: A treatment administered following exposure to a harmful agent, which attempts to block or reduce injury or infection.

Prophylaxis – Pharmacological measures designed to preserve health and prevent the spread of disease.

Public Health Emergency – Occurrence of imminent threat of exposure to an extremely dangerous condition or the occurrence of a highly infectious disease or toxic agent that poses an imminent threat of substantial harm to the population.

Quarantine – Precautionary physical separation of persons who have or may have been exposed to a threatening or potentially threatening communicable disease from the general population to protect against the transmission of the disease to uninfected persons.

Risk – The likelihood that a substance and/or situation will cause damage in specific circumstances.

Risk Assessment – Collection and analysis of information regarding the potential damage that may be caused by the situation and assessment of the level of risk posed to the human population and the environment by the outbreak.

Risk Communication – An interactive process of information and idea exchange among individuals, groups and agencies concerning the containment and control of a crisis designed to minimize its adverse social, economic and political consequences.

Shelter in place - Generic term meaning stay in a safe place . If you are outside, go into the closest building to avoid possible danger.

Strategic National Stockpile (SNS) –The centralized cache of pharmaceuticals, vaccines, medical supplies, equipment, and other items to augment local supplies of critical medical care targeted at high-priority diseases and conditions.

Surveillance – The process of monitoring community-wide illness syndromes or disease occurrence to detect a possible natural outbreak of unusual diseases or bioterrorist act.

Syndromes Associated with Biological Agents of Epidemic and Pandemic Potential– Syndrome (e.g., a collection of physical signs and associated symptoms) categories to be monitored that may be indicative of the clinical presentations of Biological Agents of National Significance.

II. Regulatory and Policy Framework

Article 6: Legislation

Biological incident response measures are regulated through dedicated legislative acts and a national policy and strategy for disaster management. However, there is a need for a regulatory framework that would delineate the specific mandates, roles and responsibilities of relevant institutions charged with biological incident response activities.

Biological incident issues are regulated by the Constitution of Georgia and by a number of laws and bylaws, such as:

1. Laws of Georgia:

- a) “The Law of Georgia on Civil Security” creates the main legal basis for disaster management in Georgia. The law predominantly addresses civil protection, defining the functions and competencies of various state entities at the stages of preparedness, response, prevention of emergency situations, and early recovery action as a part of unified response platform. It introduces a common system of emergency management and centralized control of command at all levels (central/national, regional, municipal, and Autonomous Republics of Adjara and Abkhazia).
- b) “The Law of Georgia on Health Care”.
- c) “The Law of Georgia on Public Health”.
- d) “The Law of Georgia on the State of Emergency”.
- e) “The Law of Georgia on the State of War”.

2. Subordinate legislation:

The national emergency response arrangements have five main pillars that will form the key functional platform to address biological incidents of national consequence, including national and hazard/agency specific plans that are designed to support the strategic coordination mechanisms of the National Response Plan. Those pillars are as follows:

2.1. Planning Hierarchy:

- a) National Response Plan - Decree No. 415 of the President of Georgia, dated 26 August 2008, on “Approval of the National Response Plan to Natural and Man-made Emergency Situations” formalizes decision-making and coordinated response arrangements for addressing emergency situations of national significance.

b) Supporting Plans:

- b.a) Decree No. 347 of the GoG, dated 13 May 2014, on “Approval of the National Especially Dangerous Pathogens and Biological Incidents Response Plan”.

b.b) “The Sectoral Emergency Response Plan of the Ministry of Labor, Health and Social Affairs of Georgia/Function No. 6 – Medical Provision of the National Response Plan for Emergency Situations Caused by Natural and Manmade Disasters”.

b.c) Resolution No. 1807 of the GoG, dated 1 October 2014, on “Approval of the Operative Response Plan for Diseases Caused by the Ebola Virus”.

b.d) “Influenza Pandemic Preparedness and Response National Plan” - approved by the decision of the Standing Commission on Emergency Situations in November 2009.

2.2. Other subsidiary regulations:

a) Decree No. 38 of the GoG, dated 6 January 2014, on “Establishment of the State Security and Crisis Management Council”;

b) Decree No. 428 of the GoG dated 31 December 2010, on “Approval of the Technological Scheme of Implementing Sanitary-Quarantine Control and of the Rules of Implementing Sanitary-Quarantine Control within the Borderland and Custom Control Zones of Georgia”;

c) Joint Order N41/n – N2-23, dated 16 February 2010, of MoLHSA and Ministry of Agriculture (MoA) on “Approval of Regulations for Coordination of Epidemic Liquidation Measures”;

d) Decree No. 77, of the GoG, dated 15 January 2014, on “Approval of Sanitary Norms for Working with Pathogenic Biological Agents”;

e) Order No. 01-18/N of the Minister of Labour, Health and Social Affairs, dated 27 May 2013 on “Approval of the List of Especially Dangerous Pathogens”;

f) Order No. 01-27/N of the Minister of Labour, Health and Social Affairs, dated 23 May 2012 on “Approval of Rules for Processing and Delivering Medical Statistical Information”;

g) Statute of the Department of Emergency Situations Coordination and Regime of

the Ministry of Labour, Health and Social Affairs of Georgia and Statute of the National Center for Disease Control and Public Health (hereinafter NCDC).

3. Subordinate legislation and international acts that are defined by the “National Especially Dangerous Pathogens and Biological Incidents Response Plan” (Decree No. 347 of the GoG, 13.05.2014).

Article 7: National Policies and strategies

1. General concepts of emergency management issues are integrated across national policies, development strategies and programs of the GoG, such as:
 - a) “National CBRN Threat Reduction Strategy” - aims to establish a unified approach to consolidate state efforts for addressing Chemical, Biological, Radiological and Nuclear (CBRN) threats and challenges. A set of measures are proposed with the intention of strengthening early detection, diagnostic, reporting and response capabilities; and improving communication between state entities and agencies that are responsible for human/animal health care and the protection of plants.
 - b) The Government’s “Basic Data and Directions (BDD)” - outlines the medium term reform program of Georgia and in essence provides the mid-term macro-economic framework, including the fiscal resource allocations, and the individual sectoral strategies for achieving these objectives. The latest revision of BDD (2014-2017) sets the following priority directions addressing the CBRN risk management sphere: establishment of a unified mechanism for addressing the CBRN threats aimed at CBRN incident prevention, detection, preparedness and response; sustained assessment of issues related to CBRN; and the periodical revision and modernization of strategies and action plans based on newly revealed threats, risks and challenges.
 - c) The State Strategy on Regional Development (2010-2017) is a mid-term strategic document that defines the main principles, goals and objectives for sustainable regional development of the country, focusing on effective regional management, development of municipal infrastructure and services. Priority areas identified under this document include: implementation of a monitoring and early warning system within risk zones; development of response plans and introduction of relevant mitigation measures; assessment of the socio-economic impacts of disasters and their integration into sustainable development plans and action plans of the regions.

III. Functional Organization and Assignment of Responsibilities¹

Article 8: Functional Organization

The emergency management system is organized into political (strategic), operational and tactical levels:

a) **Political (strategic) Level:**

The State Security and Crisis Management Council is the consultative body subordinated directly to the Prime Minister of Georgia, and is authorized to adopt the highest level political decisions that address all types of crises of national significance.

b) **Operational Level:**

b.a) The Interagency Emergency Management Operation Center is the body established by the Emergency Management Agency of MIA. The Center is comprised of authorized representatives of the governmental agencies and is authorized to organize and coordinate response activities to potential or actual emergency situations at an operational level.

b.b) The Emergency Headquarters of the governmental agencies are the units established by the respective organizations in the event of emergency situations, and are authorized to manage and organize activities at an operational level in conformity with their sectoral subordination.

c) **Tactical Level:**

c.a) In the event of crises, the Emergency Management Agency of MIA is entitled to establish and coordinate Field Operation Center(s) or Joint Field Operation Center (JEOC) within the crisis scene or in adjacent territory to organize emergency response actions at a tactical level.

c.b) The Emergency Headquarters of governmental agencies are authorized to establish Field Operation Center(s) within the crisis zone or in adjacent territory that under the authority of JEOC or NRT will provide on-scene management of response forces at a tactical level.

¹ Chart of Command Levels for the Management of Biological Incidents is provided in Annex D

Article 9: Assignment of Responsibilities²

1. Ministry of Labour, Health and Social Affairs of Georgia:

2.1. Establishes an emergency headquarters (HQ) during emergency situations caused by extremely hazardous infections and biological incidents.

2.2. Ensures provision of public health and healthcare services during emergency situations, develops core measures of medical provision and coordinates their implementation through its substructures and subordinated agencies, such as: the Department of Emergency Situations Coordination and Regime and the L. Sakvarelidze National Center for Disease Control and Public Health:

a) In times of biological crises the Department of Emergency Situations Coordination and Regime will:

a.a) Provide overall management of public health and healthcare resources during emergency situations.

a.b) Coordinate the implementation of civil defense and health emergency response plans at the national and local levels.

a.c) Mobilize corresponding public health and healthcare forces and the means to ensure the provision of medical services and civil defense measures to the population.

a.d) Coordinate the formation of medical response groups.

a.e) Organize and implement training programs for healthcare personnel during an emergency situation as well as in preparedness and recovery phases.

a.f) Plan, manage and distribute strategic medical stockpiles.

a.g) Organize the coordinated functioning of medical facilities (hospitals, ambulances/disaster medicine centers, primary healthcare facilities) and medical transportation/referral of critical patients during emergency situations as well as on a day-to-day basis.

b) In the event of emergency situations caused by extremely hazardous infections and biological incidents, the National Center for Disease Control and Public Health will:

b.a) Ensure epidemic surveillance and control over the outbreak and spread of particularly hazardous infections and epidemic and pandemic

²Organization Roles is provided in Annex A

biological agents.

- b.b) Make operational visits to the presumed affected areas of biological incidents, or hotbeds of biological incidents to study the current situation, conduct a risk assessment, quantify the resources required to address the situation and determine the public health and medical services provision measures to be taken, including whether there is a need to evacuate the population.
- b.c) Isolate areas to eradicate the potential consequences of a biological hazard or incident, plan preventive and treatment measures, and take necessary lab samples to characterize a biological agent and materials and conduct lab research; coordinate the provision and distribution in the relevant region of the necessary vaccines, medication, medical utensils, personnel protection equipment and other logistical mechanisms and the creation of a utensils-equipment stock.
- b.d) Elaborate modeling scenarios for crisis development, assess their potential consequences and set recommendations for healthcare decision-makers.
- b.e) Elaborate temporary protocols for case management and conduct training courses for public health personnel.

2.3. The MoLHSA is the lead agency to manage public health and healthcare service provision measures at the national, autonomous and local levels through relevant public health and medical institutions, according to Georgian legislation. At the autonomous and local level, emergency situations management are carried out by the MoLHSA's Emergency Headquarters in collaboration with the local municipal administrations and governmental entities of the Autonomous Republics of Ajara and Abkhazia.

2.4. The MoLHSA executes the "Sectoral Emergency Response Plan of the Ministry of Labor, Health and Social Affairs/Function No. 6 – Medical Provision of the National Response Plan for Emergency Situation Caused by Natural and Manmade Disasters".

2. Supporting entities and organizations

- a) **The Ministry of Agriculture and Subordinate Agencies (the NFA and the Laboratory of the MoA (LMA):**
 - a.a) Undertakes overall coordination of the response to extremely hazardous infections and biological incidents in animal populations.
 - a.b) Provides the control and expertize of food, food raw materials and forage, organizes phyto and veterinary quarantines in incident areas, implements the delivery of food and water to the population as well as ensures food safety and protection of plants and animals, in accordance with the terms of Function N10 and Function N16 of emergency assistance.
- b) **The Ministry of Internal Affairs (MIA)** carries out nationwide coordination to manage emergency situations via emergency prevention, mitigation and elimination of its consequences through its substructures and subordinate agencies:
 - b.a) **The Interagency Coordinating Council for Countering CBRN Threats**, which is affiliated with the Ministry of Internal Affairs, oversees implementation of CBRN action plans and coordinates interagency activities. To effectively accomplish its mission, the Council creates chemical, biological and Nuclear-Radiological working groups and is authorized to invite independent experts.
 - b.b) **The Emergency Management Agency of the Ministry of Internal Affairs (EMA)** operates according to the terms of Functions N1, N4 and N14 and carries out overall coordination of response measures and maintaining public order.
 - b.c) **The consultative body Experts' Advisory Panel**, which is established within the EMA, provides scientific recommendations to the decision-makers responsible for disaster management issues.
 - b.d) **The Police Department of the MIA** ensures unimpeded patient transportation and ambulance movement; the isolation of biological incident scene and the establishment of quarantine measures. It will also maintain public order and the security of strategic state facilities, and conduct a criminal investigation where a suspicion exists that a biological incident was deliberately caused.

- b.e) **The Security Police Department** legal entity of public law of the MIA ensures protection of the security of medical facilities.
- c) **The Ministry of Defense** ensures the provision of first aid medical activities for the population of an emergency zone, including large scale public health and medical assistance measures.
- d) **The Ministry of Internally Displaced Persons from the Occupied Territories, Accommodation and Refugees of Georgia** ensures temporary refuge for the evacuated residents of the biological incident zone, and takes necessary preventive and curative measures within such compact settlements of IDPs and migrants.
- e) **The Ministry of Environment Protection and Natural Resources** monitors the pollution of the environment and takes measures within its competency to eliminate epizooty (disease outbreaks affecting many animals at the same time) and/or pollution of the environment arising from a biological incident.
- f) **The Public Service Development Agency Legal Entity of Public Law of the Ministry of Justice** is responsible for the registration of deceased persons according to current legislation.
- g) **The Ministry of Finance** ensures funding for the preparedness measures and responses to such incidents and their consequences, according to the rules established by law, and also funding of necessary public health, phyto-sanitary and veterinary/border quarantine measures.
- h) **The Ministry of Foreign Affairs** in cases of necessity ensures the provision of support outlined in emergency assistance Function N7 concerning providing diplomatic protocols and obtaining international humanitarian support.
- i) **The Georgian Public Broadcaster Legal Entity of Public Law (public TV)** and private broadcasters furnish risk communication and provide timely information to the population about the biological threat and/or incident.
- j) **The Georgian Red Cross Society** is responsible for providing medical assistance (including first aid) in areas where the entrance of official state bodies is restricted.

- k) **Regional Administrations** organize and supervise the fulfillment of prevention, response and outcome mitigation measures for biological incidents and particularly dangerous infections by municipal and local government bodies. During regional scale emergencies, it establishes ad hoc Headquarters from which to do this.
- l) **Municipalities and Local Government Bodies** assume responsibility for the implementation and coordination of prevention, response and outcome mitigation measures of biological incidents and particularly dangerous infections at the municipal and local levels.

IV. Biological Threat Overview

Article 10: Characteristics of biological agents

The most important characteristic of biological agents is that they are living micro-organisms, or have been produced by micro-organisms. Their other essential characteristics are as follows:

- a) Infectivity - The infectivity of an agent reflects the relative ease with which micro-organisms establish themselves in a host species. A greater infectivity means that fewer micro-organisms are required. It does not mean that the symptoms and signs of disease appear more quickly or are more severe.
- b) Virulence - The virulence of an agent reflects the relative severity of disease produced by that agent. Different micro-organisms or different strains of the same micro-organism may produce diseases of different severity. The most virulent strain produces the most acute or severe effects.
- c) Toxicity - The toxicity of an agent reflects the relative severity of illness or incapacitation produced by a toxin.
- d) Pathogenicity – The pathogenicity reflects the capability of an infectious agent to cause disease in a susceptible host.
- e) Incubation – The incubation period is the time between the infective penetration of micro-organisms into the body and the appearance of the symptoms of the disease. It is not normally less than 24 hours and depends on many variables, including: the initial dose, virulence, route of entry, rate of replication, and host immunological factors.
- f) Transmissibility – Also referred to as communicability. Some micro-organisms produce infection which may be transmitted from person to person (e.g. plague)

directly, and thus may cause an epidemic. Indirect transmission (for example, via arthropod vectors) may cause a significant spread as well.

- g) **Lethality** – Lethality reflects the relative ease with which an agent causes death in a susceptible population. Some micro-organisms will produce diseases that are usually lethal if the target population is not immune. Others will give rise to illnesses that are incapacitating rather than lethal (e.g. influenza), except for the infirm or very young.
- h) **Stability** – The stability of an agent is affected by various environmental factors, including temperature, relative humidity, atmospheric pollution, and sunlight.

Article 11: Types of EDPs

Biological crises may occur due to natural outbreak of diseases caused by EDPs, releases of EDPs resulting from intentional or unintentional activities or terroristic use of biological weapons.

1. Biological agents that cause disease outbreaks or that may be used in terrorist attacks are generally classified as:
 - a) **Viruses** – organisms that require living cells in which to grow and replicate, and therefore are dependent on a living host to cause their effects. The diseases that viruses produce generally do not respond to antibiotic therapy but may be treatable by antiviral compounds or by immune serum globulins.
 - b) **Bacteria** - single cell, free-living organisms that can vary in size and shape. Some of them have the ability to form spores. Spores are much hardier since they are more capable of surviving in environments that would destroy other bacteria (e.g. ultraviolet light, heat, etc.). The diseases that bacteria produce can often be treated with specific antibiotic therapy.
 - c) **Toxins** – poisonous substances produced and derived from living plants, animals, or micro-organisms. Some toxins may also be synthetically manufactured. Toxins are not living organisms.
 - d) **Fungi** - any of a diverse group of eukaryotic single-celled or multinucleate organisms that live by decomposing and absorbing the organic material in which they grow. Fungi do not use photosynthesis and do not require oxygen for growth. Most fungi exist in a yeast-like state or as resistant spores.

2. A list of Especially Dangerous Pathogens has been defined and enacted by order No. 01-18/N of the Minister of Labour, Health and Social Affairs of Georgia, dated 27 May 2013, on “Approval of the List of Especially Dangerous Pathogens”(list and summary of EDPs is provided in Annex I).

Article 12: Dissemination and Delivery

Most biological agents are communicable and can be spread in natural ways. However, biological agents that are not contagious require a dissemination mechanism to invoke disease transmission. Dissemination is the process by which infectious agents or toxins are dispersed to cause disease or intoxication. Biological agents can be delivered in several different ways, including:

- a) Aerosol delivery systems – aim to generate invisible clouds of particles or droplets that can remain suspended in the air for long periods and can be transported by the wind over long distances. Each droplet consists of many micro-organisms grouped together. The size of each droplet can be determined by the characteristics of the dispenser.
- b) Contamination of Food and Water – direct contamination of consumables, such as drinking water, foodstuffs, or medications, could be used as a means to disseminate infectious agents or toxins. It is also possible that food or other ingested products can become indirectly contaminated as a result of an aerosol attack.
- c) Vector Transmission – attempts might be made to spread typical vector borne diseases by releasing infected natural (or unnatural) arthropod hosts such as mosquitoes, ticks or fleas. These live vectors can be produced in large numbers and be infected by allowing them to feed on infected animals, infected blood reservoirs, or artificially produced sources of a biological agent.

Once a biological agent is spread through natural means or is disseminated, it can be introduced into the human body through inhalation, ingestion or percutaneous inoculation. Different agents of biological origin may lead to different scales of disease outbreak, which will require implementation of emergency preparedness, response and mitigation measures.

V. Preparedness

Article 13: Sectoral Response Plan

“The Sectoral Emergency Response Plan of the Ministry of Labor, Health and Social

Affairs of Georgia/Function No. 6 – Medical Provision of the National Response Plan for Emergency Situation Caused by Natural and Manmade Disasters” provides multi-hazard response guidance to the MoLHSA and its subordinated agencies, which encompasses the roles and responsibilities of primary and supporting organizations and provides a set of specific measures for different types of emergency situations and alert levels. The Plan has to be updated biannually.

Article 14: Hospital Emergency Response Plans

1. The Hospital Emergency Response Plan to Biological Incidents (hereinafter ERP) is the hospital’s strategy to deal with emergency situations induced by biological events that threaten to overwhelm or disrupt health service capabilities.
2. The aim of the ERP is to ensure that hospitals will not only remain standing in case of a disaster, but also that they will function effectively and without interruption of essential services, will be able to enhance their surge capacity, are ready for optimal use of existing resources and ensure that trained personnel are available to provide high quality, compassionate, and equitable treatment for disaster-affected persons.
3. Not all hospitals will be expected to provide all services during biological crises. A list of hospitals that are designated to provide infectious disease management services in case of biological emergencies are provided in Annex G. However, all hospitals are required to develop and adopt local plans for biological incidents to provide first aid or limited care to patients who may present themselves in times of biological events, and to ensure the protection of the facilities’ personnel, patients, resources and infrastructure.
4. This plan sets the main principles and recommendations for minimum standards and key components for hospital Emergency Response Plan for Biological Incidents.
 - a) The Main Principles include:
 - a.a) Maintaining the continuity of essential activities and services (according to the hospital’s role and function in the community);
 - a.b) Managing the extra-load of patients needing to be admitted;
 - a.c) Organizing the response;
 - a.d) Protection of the facility and its services (staff & patients) from harm;
 - a.e) Ensuring the continuity of delivery of essential care if evacuation is decided.

- b) Minimum Standards include:
- b.a) Rapid and accurate assessment of the problem;
 - b.b) Rapid and appropriate activation of the ERP;
 - b.c) Clearly described command and control structures (overall management and for the various departments) – a simple organogram may do for small size hospitals with a simple description of roles and responsibilities;
 - b.d) Security of the facility to limit contamination spread (e.g. limit all entry/exit to one controlled door; activate systems to protect against contamination through or to: environmental systems; medical gases including suction; water supplies and drainage systems);
 - b.e) Triage guidelines;
 - b.f) Resources mobilization (e.g. “call back” procedures; surge capacity; opening of the disaster triage area);
 - b.g) Identification of main roles for all staff;
 - b.h) Notification chart;
 - b.i) A limited set of JAS (Job Action Sheets) for key managerial positions (including for the management of information and logistics);
 - b.j) A limited set of SOPs (Standard Operations Procedures) specifically applicable during crisis mode (with special concern to security and continuity of delivery of essential services as well as surge capacity);
 - b.k) Decontamination Procedures;
 - b.l) Coordination system within the hospitals;
 - b.m) Coordination system/memoranda of understanding between the hospital and outside parties (e.g. referral hospitals, ambulance/disaster medicine services etc.)
 - b.n) A section describing the main elements of logistics management;
 - b.o) Simple description of communication means;
 - b.p) Evacuation Plan;
 - b.q) Waste management system such as water run-off and disposal of other contaminated waste;
 - b.r) Tracing system for patients, clothing, personal belongings;
 - b.s) Minimum set of pharmacological and PPE supplies;
 - b.t) Back-up arrangements for power, fuel, oxygen and communication.

- c) List of key components of ERP include:

Situation analysis	1. The role and place of the hospital in the community
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	2. Hospital information (services, departments, staffing)
	3. The hazards and risk that can be reasonably expected
Roles and responsibilities	4. The overall command structure: functions, roles, responsibilities, composition, place
	5. Standard Operation Procedures (SOPs)
	6. Job descriptions for key personnel (Job Action Sheets)
Triggering the plan	7. The alarm and its processing
	8. Activation of the plan and its tiers
	9. Mobilizing personnel (e.g. "call back" procedures for staff who are not at work when the incident occurs)
Operational areas	10. Receiving/Triage area for affected patients
	11. The main treatment areas
	12. Family and media centers
	13. Management of fatalities
Support for operational areas	14. Security
	15. Essential supplies (including pharmacy)
	16. Maintenance of critical equipment
	17. Ancillary services
	18. Continuity of Operations (including evacuation and relocation)
	19. Psychosocial support (for patients, families, staff)
Coordinating with other health facilities	20. Coordination mechanisms with other health care facilities (e.g. Memoranda of Understanding)
	21. Medical chart and special forms used in emergency situations when the plan is activated (this includes patient tracking)
	22. Communication systems and sharing of information procedures
Community relations	23. Relationship with the community (including key services such as the fire service)
Preparedness	24. Training of staff
	25. Exercises
	26. Validation of the plan
	27. Revision and updating of the plan
	28. Infection control and treatment guidelines for diseases caused by EDP

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Article 15: Training and Education

- a) The MoLHSA has introduced regular (annual) training programs in management of emergency situations and clinical conditions to build capacity in the national health system by preparing hospital managers, healthcare providers, first responders and government officials to face the challenges of emergency preparedness, mitigation, response and recovery.
- b) The MoLHSA will facilitate the establishment of a national public health distance-learning system that provides training on the management of diseases caused by EDP and biological incidents to healthcare and public health workers.
- c) The MoLHSA will promote the development of infection control and clinical (treatment) guidelines/protocols for the management of diseases caused by EDPs and will facilitate their inclusion into regular training concepts.
- d) Full-scale exercises, drills and tabletop exercises based on biological hazard scenarios will be conducted within the frames of annual training programs for the purpose of developing response abilities and testing the inter-sectoral dimensions.

Article 16: National Pharmaceutical Stockpiles

- a) The MoLHSA maintains at all times sufficient stockpiles of pharmaceuticals (including antibiotics, IV administration, and life-support medications), medical items and consumables, medical equipment, PPE and other first-order medical supplies for medical provision of injured population in case of disasters and emergency situations.
- b) The Department of Emergency Situations Coordination and Regime of MoLHSA is responsible for the planning, securing, updating and distribution of medical supplies.
- c) The National Center for Disease Control and Public Health stocks and manages supplies of vaccines and vaccination materials (syringes, safe boxes) to conduct routine immunization and non-routine immune-prophylactics.

- d) The MoLHSA has developed a stockpile-related SOP for biological incidents including a list of pharmaceuticals and medical items/equipment within the sectoral response framework (stockpile-related SOP is provided in Annex B).
- e) In the event of crises, the MoLHSA will supplement/supply and re-supply reference hospitals designated by this Plan (see Annex G) as well as other hospitals and public health agencies involved in the management of biological incidents.
- f) If the incident requires additional pharmaceuticals or medical supplies, pre-existing contractual agreements/memoranda are in place between the MoLHSA and pharmaceutical companies under which, upon occurrence of a crisis situation, the companies undertake to provide pharmaceuticals and/or medical items/equipment according to the MoLHSA's request.

VI. Concept of Operations

Article 17: General Provisions

1. Depending on the emergency situation and risk analysis, there may be two modes of emergency response:
 - a) **Elevated Preparedness Mode** – response phase when there is a threat of occurrence and development of an emergency situation.
 - b) **Emergency Response Mode** – response phase when an emergency situation occurs.
 - c) Based on the risk assessment and analysis, the specifically authorized body will decide the mode of emergency response phase in which the respective responding agencies should function.

Article 18: Detection

A disease outbreak or introduction of a biological agent into the environment through accidental or intentional release can occur anywhere, at any time and in multiple ways.

1. Mechanisms of biological agent introduction:

The occurrence/outbreak of an infectious disease caused by an EDP may take place through a number of mechanisms:

- a) An agent endemic to Georgia may mutate and/or develop anti-microbial resistance and migrate to an area of the country not typically exposed to the agent.
- b) An agent not endemic to Georgia may be introduced to the country through host migration (including human travel, animal/bird migration and/or commercial trade items).
- c) A laboratory mishap or the mishandling of a controlled agent may result in an accidental release of the agent (the pathogenic nature of which may have been altered during research) into the environment.
- d) An agent may be intentionally released as part of a criminal or terrorist act.

2. Biological event indicators:

Factors that may indicate, singly or taken together, that an outbreak is out of the ordinary include:

- a) Unusually large numbers of cases at the time of assessment.
- b) Unusually severe cases with many hospitalizations and deaths.
- c) Wide atypical geographic spread.
- d) Unexplained mode of spread.
- e) Widely distributed mode of spread (e.g. food item in wide commercial distribution).
- f) Atypical temporal or unseasonal clusters of a disease (e.g. illness resembling mosquito-borne encephalitis in winter).
- g) Short incubation period and/or high secondary attack rates, indicating potential for a rapid increase in the number of cases.

3. Information sources:

Recognizing that an unusual disease outbreak or a biological event has occurred or may occur is critical. Increased or altered behavior or healthcare service utilization and unsolicited outbreak reports may be detected and disseminated via number of sources, including:

- a) **112 Call Center** can provide information on any unusual increase of EMS services utilization. Any increase in the volume of calls above seasonally expected levels with no obvious explanation could signify the occurrence of a

public health event. Mapping the geographic distribution of 112 calls may point to the possible source of agent release or natural outbreak.

- b) **Primary health care providers** are in the best positions to observe and report unusual illnesses or symptoms. Primary health care personnel and other front-line medical providers may observe an increased number and unusual pattern of illnesses or suspicious deaths in previously healthy individuals. Any rapid rise above seasonally expected levels with no obvious explanation might be an indication of an unnatural public health event.
- c) **Hospitals/Emergency Departments** are effective sites for incident information because emergency departments are frequently the primary sites of health care delivery for a large part of the population. Hospital administrators or infection control staff can provide information on changes in hospital admissions and emergency department visits that suggest suspicious circumstances.
- d) **Clinical Laboratories** assist medical service providers in the diagnosis and treatment of patients. They are more likely to identify unusually high occurrences of a particular syndrome, because they receive specimens from multiple medical providers.
- e) **The National Disease Surveillance System**, which is a nationwide network of public health laboratories comprised of Regional Laboratories, Sentinel Station Laboratories, and the Richard Lugar Center for Public Health Research) and is incorporated into the Electronic Integrated Disease Surveillance System, may detect at the national level an outbreak that may evolve “unnoticed” by individual administrative-territorial units and mobilize in a timely manner the expertise required for the epidemiological investigation.
- f) **Intelligence Agencies/law enforcement agencies** are also likely to detect and recognize the warning signs associated with bioterrorist acts.
- g) **Hotlines** – the public may report an unexplained outbreak of respiratory or flu-like illness, or unusual numbers of sick or dying animals or suspicious events, such as abandoned equipment/bags or an unusual swarm of biting insects etc.

1. General

a) Based on laboratory and epidemiological data, all notification/reporting obtained from medical service providers is classified into three categories:

a.a) Suspect Case – A disease or syndrome detected in a person or animal that meets the clinical and epidemiological criteria of a disease or syndrome caused by an EDP. Each suspect case is subject to an epidemiological investigation.

a.b) Probable Case – A suspect case that has been investigated clinically and epidemiologically and meets additional criteria (for example, has been subjected to express diagnostic investigations - saliva, urine and blood). Each probable case is subject to laboratory confirmation by respective methods.

a.c) Confirmed Case – A disease or syndrome detected in a person or animal that meets all the clinical, epidemiological and laboratory criteria of a disease or syndrome caused by EDP, including diagnostic criteria that distinguish a probable case from a confirmed case.

b) From the surveillance and response perspective, there are two main groups of all diseases and conditions that are subject to the mandatory reporting requirements:

b.a) Statutory notifiable diseases and conditions that require immediate notification if a single case emerges.

b.b) Statutory notifiable diseases and conditions that require immediate notification if an outbreak occurs.

c) Single cases of diseases caused by EDPs, whether confirmed, probable or suspect, must be reported immediately (on the same working day, and in any case not later than 24 hours, after the disease is clinically or laboratory manifested) to the higher level public health services. They must also be incorporated into monthly reporting forms in accordance with the established rules (Order No. 01-27/N of the Minister of Labour, Health and Social Affairs, 23.05.2012).

2. Medical Service Providers shall:

- a) Record all cases of communicable diseases (including those caused by EDPs) in accordance with the established requirements, irrespective of the referral point (e.g. independent practitioner, medical facility, or disease is detected within the facility's coverage area).
- b) Refer any suspect or probable case of diseases caused by an EDP to a suitable laboratory for disease confirmation, according to the methodical instructions or order additional diagnostic tests.
- c) Report immediately to public health authorities (public health services of local government or regional public health centers depending to incident location) on the diseases/conditions that are subjected to immediate notification (including those caused by EDPs) by the fastest means at their disposition (e.g. reporting card, phone, fax, email).
- d) Directors/managers of medical facilities, irrespective of ownership and legal form (including managers of private medical facilities and diagnostic laboratories involved in management of infectious diseases), are responsible for communicating case notification and reporting requirements to their subordinated staff.

3. Clinic and Public Health Laboratories:

- a) All laboratory staff members are responsible for the timely reporting of identified pathogens of concern (including especially dangerous pathogens).
- b) Laboratory personnel will immediately report suspected or identified pathogen cases to the director of laboratory services and the appropriate medical service provider (if a laboratory analysis has been ordered by the provider). The director of laboratory services, or his designated representative, will in turn report this information to the public health service of the appropriate local government or the regional public health center.

4. Public Health Services/Centers:

- a) All diseases and conditions that are subjected to the immediate notification must be aggregated into the Electronic Integrated Disease Surveillance System (with

mandatory indication of credible location of exposition) by the respective public health personnel, and submitted to the NCDC according to the established rules.

- b) Once immediate notification on the case of concern is received by the public health services of local government, the immediate notification (not later than 24 hours) shall be made to the corresponding regional public health centers by the fastest means possible (phone, fax, email, card, EIDSS), which in turn will notify the NCDC following the rules above.
- c) Any potentially significant biological agent, unusual diseases case/disease outbreak or biological incident suspected or identified by healthcare and public health service providers as having public health implications should involve immediate notifications by the NCDC/Regional Public Health Centers to the decision-maker authorities of the Ministry of Labour, Health and Social Affairs of Georgia, which, based on threat and risk analyses will decide the scope, level and extent of the immediate response and consequent activities (information flow chart is provided in Annex C).

Article 20: Confirmation and Agent characterization

1. **The Integrated Laboratory System** provides laboratory testing and analysis of diseases caused by EDPs to make a diagnosis for individual patients, confirms suspect cases for epidemiological analysis, and characterizes agent specifics to determine its origin. It is comprised of a network of the different level laboratories that include³:
 - a) NCDC/Lugar Center
 - b) Zonal Diagnostic Laboratories (ZDL) of the NCDC
 - c) NCDC Regional Diagnostic Laboratories
2. Confirmatory testing should be conducted at the lowest level possible and duplicate samples should be transported to Lugar Center. All laboratories are required to report positive diagnostic tests to the respective ZDL or NCDC.

Article 21: Response Actions

1. In case the magnitude or character of a biological event, whether naturally occurring or resulting from accidental or intentional actions, has the potential to

³ See Annex H - List and Coverage of ZDL and LSS

overwhelm the capabilities of the national response system, the MoLHSA will address the State Security and Crises Management Council to notify and trigger the national response system;

2. The State Security and Crises Management Council will convene an expert body to assess event-specific information and the epidemic potential of a biological agent and determine the thresholds for:
 - a) Declaration of the mode of emergency response (Elevated Response Mode or Emergency Mode);
 - b) Activation of the National Response Plan and its biological section - Especially Dangerous Pathogens and Biological Incidents Response Plan;
 - c) Triggering the National Response Team.
3. If the Elevated Preparedness Mode is declared by the authorized agency, the MoLHSA will (in many cases through the Department of Emergency Situations and NCDC) complete the following activities prior to an incident:
 - a) Conduct hazard vulnerability and risk assessment for defined area;
 - b) Identify the population at risk;
 - c) Enhance surveillance and investigation for early detection of diseases caused by EDP;
 - d) Conduct public health and health delivery capacity assessment for the area at risk;
 - e) Develop forecast modeling for incident development scenarios;
 - f) Ensure preparedness of Referral Hospitals;
 - g) Acquire the resources and surge capacity necessary to address public health and medical needs;
 - h) Develop operational objectives for an emergency response;
 - i) Develop/revise plans, procedures, protocols and guidelines specific to the biological incident;
 - j) Develop a risk communication strategy;
 - k) Ensure that designated public health and medical personnel (ambulance, hospital and PHC personnel) are trained in bio-safety practices and protocols (including the use of Personal Protective Equipment);
 - l) Conduct trainings for public health and healthcare personnel on emergency operations plans, incident management systems and case management/treatment guidelines;

- m) Conduct exercises to evaluate health personnel preparedness and interagency coordination.

4. In case the Emergency Response Mode is declared by the authorized agency:

4.1. The State Security and Crises Management Council will activate the National Response Plan and its biological section - Especially Dangerous Pathogens and Biological Incidents Response Plan;

4.2. The Emergency Management Agency of MIA will activate the Interagency Emergency Management Operation Center.

4.3. The MoLHSA will launch implementation of response activities at the operational and tactical levels, according to the Sectoral Response Plan (Biological Incident Annex).

4.4. At the operational level, the MoLHSA will:

- a) Send authorized representatives to the Interagency Emergency Management Operation Center of the Ministry of Internal Affairs to provide liaison support;
- b) Establish an Emergency Headquarters to carry out incident command functions. The Emergency Headquarters is to be chaired by the Minister of Labour, Health and Social Affairs of Georgia or the Minister's designated person (composition is provided in Annex E);
- c) Create an experts body on public health and medical subject-matter issues;
- d) Form First Responder Teams;
- e) Maintain primary responsibility for the risk analysis, situation assessment and medical, public health and behavioral needs identification;
- f) Assume operational control on Function N6 response actions and maintain constant communications with the Emergency Management Agency of the MIA;
- g) Address supporting agencies/functions to request deployment of additional resources and international support, if needed.

4.4.1. The Emergency Headquarters of the MoLHSA will:

- a) Immediate actions (within 1-6 hours):

- a.a) Based on the decision of the Interagency Emergency Management Operation Center of MIA, activate Function №6 (Medical Provision) and declare an alert level in accordance with the Sectoral Response Plan;
- a.b) Within one hour convene all headquarters members to discuss the situation and determine the appropriate initial response;
- a.c) Communicate with all supporting agencies and subject-matter experts and request their liaison/cooperation support;
- a.d) Hold conference calls with the Ministry's regional representatives, public health authorities and medical facilities of the affected areas to obtain an initial assessment of the medical, public health, behavioral health and community needs, and assign specific tasks;
- a.e) Assign Reference Hospitals (See Annex G) and identify quarantine stations, as the need arises;
- a.f) Contact the medical facilities of the affected area and request activation of the corresponding section(s) of their Emergency Response Plans;
- a.g) Send authorized experts to the emergency headquarters/operation center of the local government, medical facilities or/and field operation center.
- a.h) Deploy regional staff and First Responder Teams to provide initial support to the affected location.

b) Continuing Actions:

- b.a) Monitor the surge capacities of hospitals and ambulance services, and deploy the human and material resources to address increased medical and behavioral health needs;
- b.b) Coordinate (through the Department of Emergency Situations Coordination) patient movement and transportation from initial reception point to the designated referral hospitals, if the need arises;
- b.c) Deploy, refill and redeploy the Strategic National Stockpile and mobilize the other pharmaceutical and medical resources that are reserved under the memoranda with pharmaceutical companies (including PPE, vaccines, vaccination materials, antivirals,

- antibiotics, IV administration, life-support medications and other medical items and equipment);
- b.d) Establish a public information and risk communication center and release general medical and public health messages that communicate consistent, accurate, actionable and transparent information in a timely and culturally and linguistically accessible manner. The Minister designates a recognized spokesperson(s) from public health officials and medical community;
 - b.e) Evaluate the development of the incident and make recommendations to the Interagency Emergency Management Operation Center (including the need for isolation, shelter-in-place, quarantine, mass isolation or social distancing to prevent the spread of diseases);
 - b.f) Deploy isolation wards, field hospitals or Facilities of Opportunity as the need arises;
 - b.g) Take decisions on when and where to initiate appropriate protective measures, such as mass vaccination or pre and post-exposure prophylaxis for populations at risk, including first responders and health workers engaged in incident-related activities;
 - b.h) Report and coordinate (through NCDC) with WHO on potential international threats, whether naturally occurring or thought to have been deliberately released, as required by International Health Regulations (2005);
 - b.i) In the event or suspicion of the deliberate use of a biological agent to harm the human population, work in a coordinated effort with law enforcement agencies and the intelligence community to identify and manage contaminated or exposed persons, and support cooperative efforts to control rumors/hoaxes and minimize public unrest and panic;
 - b.j) Continue situation evaluation in collaboration with subordinated agencies and departments, partner organizations and local governments to assess morbidity, mortality, health and community needs and provide recommendations to the Interagency Emergency Management Operation Center;
 - b.k) Provide after-action reports.

4.5. Tactical Level:

4.5.1. **The National Center for Disease Control and Public Health Legal Entity of Public Law of MoLHSA** mobilizes and deploys public health personnel (within 24 to 48 hours after the occurrence of a biological event) and organizes the implementation of following activities: (a) epidemiology surveillance; (b) laboratory surveillance and diagnostics; (c) rapid response and containment; (d) community-based control and mitigation interventions; and (e) implementation of infection control strategies, including:

- a) Collection, transportation and analysis of samples to identify agent characteristics and determine the level, location and zones of the contamination area;
- b) Early detection, immediate notification and prompt isolation of new cases to interrupt secondary transmission of diseases in the community;
- c) Case finding and contact tracing;
- d) Active surveillance and observation of persons at risk, such as persons in contact and highly vulnerable risk-groups (e.g. first responders and health workers involved in response activities);
- e) Enhanced syndrome surveillance (e.g., ILI cases, or patients with hectic fever or hemorrhagic syndrome);
- f) Disinfection, disinsection and disinfestation by the territorial public health services;
- g) Border control (e.g. screening and inspection) and cross-border collaboration;
- h) Cooperation with supporting agencies to ensure that standard sanitary requirements relative to cargo, postal services, or conveyances are followed by the respective agencies;
- i) Public education (mass information, public seminars, thematic leaflet/booklet/calendar preparation and distribution) and community engagement, especially in areas of intense transmission;
- j) Continued information gathering, analysis and dissemination;
- k) Continued surveillance and situation evaluation to identify needs regarding the introduction of isolation, quarantine, mass isolation, shelter-in-place or social-distancing measures, while: a) decisions on the introduction of quarantine/isolation measures (type of measure, location, targeted population) will be taken by the State Security and

- Crises Management Council; b) measures to execute decisions on patient(s) isolation or quarantine will be carried out by the Emergency Management Agency of MIA; c) decision of duration of quarantine measures should be taken in conformity with WHO recommendations.
- l) Maintenance of routine immunization processes within and outside of the outbreak hotbed area as long as it is possible, using human and material resources (vaccines, syringes, vaccination materials) supported by the State Immunization Program.
 - m) Development, together with MoLHSA, of a vaccination and prophylaxis strategy and supplementary immunization measures based on epidemiologic indications and risk factors, such as: (a) the possibility of mass gathering within the crises zone, which increases the risk of human-to-human transmission of vaccine-preventable diseases; (b) the inaccessibility of documentary confirmed immunization status; (c) the activation of unusual ways of disease transmission and other biological event indicators; and (d) the spread of those diseases for which prophylaxis WHO-prequalified and approved vaccines are in place.
 - n) Deployment and distribution of vaccines (vaccination materials), antivirals and PPE supplies to public health and medical facilities, and ensure that designated medical and public health personnel have been trained in standard precaution procedures (e.g. contact, droplet, airborne precautions) and PPE handling. The MoLHSA is responsible to refill immunization and PPE supplies during an emergency period.
 - o) Provision of recommendations to the authorized bodies (Interagency Emergency Management Operation Center, Emergency Headquarter of MoLHSA).
 - p) As National IHR Focal Point, reporting to WHO on diseases that are subject to the International Health Regulations (2005).

4.5.2. The Department of Emergency Situations Coordination and Regime of MoLHSA:

- a) Supports Emergency Headquarters in mobilization of appropriate public health and medical forces to form First Responder Teams and organizes their dispatch to the affected area(s);
- b) Ensures uninterrupted communication with responding hospitals and assesses their needs concerning medical personnel, pharmaceuticals, medical equipment and other medical items;

- c) Continuously monitors the availability of hospital beds and other critical settings through direct communication and/or via online health information portal of MoLHSA (www.moh.gov.ge);
- d) Coordinates formation of Specialized Medical Response Teams and their allocation to the hospitals of the affected area as well as to the designated referral hospitals if needed;
- e) Coordinates the deployment of additional bed capacities to meet any patient surge and increased demand of medical services;
- f) Provides the tooling, kitting, packaging and distribution of assets mobilized from the Strategic National Stockpile (SNS) (antivirals, antibiotics, IV administration, life-support medications, PPE, isolation stretchers and other medical items and equipment) and pharmaceutical companies (in accordance with the terms of prior agreements or memoranda) to support immediate medical response operations and supply or restock hospital facilities and Emergency Medicine Services;
- g) If the emergency exceeds healthcare sector response capabilities (and so corresponds to the general alert level of entire healthcare sector), coordinates mobilization of surge capacities, such as:
 - g.a) Gradual mobilization of hospitals in the capital city, discharge of non-critical patients, cancelation of selective operations, re-specialization of hospital wards;
 - g.b) Opening alternative care sites such as field hospitals or Facilities of Opportunity;
 - g.c) Recruiting from retired or currently unemployed but qualified volunteer specialists;
 - g.d) Making use of other medical resources such as health professional students, pharmacists and health auxiliary providers;
 - g.e) Reallocating providers from nonemergency care and nonemergency sites to emergency response assignments and from unaffected regions to affected regions;
 - g.f) Creating and training a pool of nonmedical responders to support health and medical care operations;
 - g.g) Coordinates with MoD and Department of Veterans Affairs to mobilize military medical resources in support of hospitals or field response forces;
- h) Provides around-the-clock dispatching of disaster medicine and regional ambulance services to coordinate patient movement between hospitals and synchronize the referral system.

Article 22: Patient Evacuation

1. In the event of biological emergencies, the Emergency Medical Services (EMS) of various jurisdictions may work together throughout the incident to create and maintain an integrated response platform⁴:
 - a) **“112” Legal Entity of Public Law of the Ministry of Internal Affairs of Georgia** – receives and processes calls to the respective EMSs (Tbilisi Emergency Medical Center and Regional Emergency Medical Center), and works in coordination with the MoLHSA (Department of Emergency Situations and Coordination) and other authorized entities.
 - b) **The Tbilisi Emergency Medical Center Legal Entity of Public Law of Tbilisi Municipality**
 - b.a) Mobilizes and manages all emergency medical services operating in Tbilisi regardless of their ownership and legal form (apart from Disaster Medicine Centers);
 - b.b) Depending on the situation, provides emergency services in Tbilisi as well as supports regional EMSs in on-site emergency care (triage, prioritizing, life-saving and first stabilization procedures) and patient evacuation and transportation to medical facilities for definitive care;
 - c) **The Regional Emergency Medical Center Legal Entity of Public Law of the Ministry of Labour, Health and Social Affairs of Georgia**
 - c.a) Provides emergency medical services in coordination with MoLHSA (Department of Emergency Situations Coordination) and the 112 Call Center;
 - c.b) Coordinates the functioning of regional EMSs (regional units of the center), which provide emergency care, patient evacuation and transportation from impacted area to the receiving hospitals within their respective regions.
 - d) **The Disaster Medicine Services Legal Entities of Private Law, which are** highly equipped and specialized ambulance services, deliver on-scene pre-hospital emergency care and patient evacuation from the crises zone, and provide patient transportation from reception hospitals to the definitive care referral hospitals.
2. The MoD participates in patient evacuation measures upon the MoLHSA’s request in accordance with the established legislation.

⁴ Prehospital/Ambulance Management Chart is provided in Annex F

Article 23: Hospital response

Any major biological disaster, whether caused by a natural outbreak or releases of EDPs, can lead to a rapidly increasing service demand that can overwhelm the functional capacity and safety of hospitals. Therefore, hospitals must formulate a policy and the systems to ensure: (1) the continuity of essential services; (2) the well-coordinated implementation of hospital operations at every level; (3) swift adaptation to increased demands and expansion of surge capacities; (4) the effective use of scarce resources; (5) clear and accurate internal and external communication; and (6) a safe environment for health-care workers. To efficiently contribute to the biological crisis response, hospitals shall:

1. Activate the Hospital Emergency Preparedness and Response Plan triggered by the request of the Emergency Headquarters of the MoLHSA.
2. Immediately (within one hour) create an ad hoc Headquarters/Incident Command Group (ICG) in order to have a command structure in place to formulate an action plan and manage emergency response operations. The ad hoc ICG should:
 - a) Establish and maintain continual communication with the MoLHSA's Emergency Headquarters;
 - b) Conduct an inventory of the core existing documents such as clinical practice and infection control guidelines and decontamination protocols that are significant for hospital management during an outbreak caused by EDPs or biological incidents, in order to effectively respond to a biological incident;
 - c) Ensure timely and accurate data entry in the MoLHSA's online health information portal in accordance with Order No 01-33N of the Minister of Labour, Health and Social Affairs of Georgia (4 August, 2013), which requires entry and updating of the information on the availability of critical/intensive care and infectious bed capacities, blood supply, ventilators and other critical settings in accordance with the established rules;
 - d) Coordinate with alternative treatment sites when such settings are opened and ensure that alternative sites have been identified in the surrounding community. Identify the role and functions of the hospital and coordination with these sites;
 - e) Ensure continual communication with the emergency medical services and dispatch center to maintain patient movement and transportation in a coordinated manner;

- f) Formulate a clear policy, practical guidelines and procedures for screening examination, early detection, hospital triaging, admitting, treating, reporting and isolation of contagious patients;
- g) Ensure quality standards of medical services;
- h) Ensure that the infection control procedures cover the following issues: standard precautions (e.g. hand hygiene), contact precautions and droplet precautions as well as environmental and engineering control;
- i) Ensure the arrangement of isolation boxes and wards in coordination with MoLHSA/NCDC;
- j) Implement or develop job action sheets that briefly list the essential qualifications, duties and resources required of ICG members, hospital managers and staff;
- k) Designate waiting areas for patient family/relatives and volunteers;
- l) Establish a decontamination zone;
- m) Ensure the availability of appropriate back-up arrangements for essential life lines, including power, fuel and oxygen;
- n) Take action to ensure the availability of adequate supplies of food and water;
- o) Ensure procedures for waste management and laboratory cleaning and disinfection;
- p) Maintain patient triage operations:
 - p.a) Designate an experienced triage officer to oversee all triage operations;
 - p.b) Ensure that areas for receiving patients, as well as waiting areas are effectively secured from potential environmental hazards and provided with adequate work space, lighting and access to auxiliary power;
 - p.c) Ensure that staff working in triage area is well-prepared and equipment is easily available as well as procedures for infection control and prevention;
 - p.d) Ensure that the triage area is in close proximity to essential personnel, medical supplies and key care services (e.g. the emergency department, the intensive care unit);
 - p.e) Ensure that entrance and exit routes to/from the triage area are clearly identified;
 - p.f) Ensure unhindered movement of emergency medicine and ambulance services;
 - p.g) Establish a clear method of patient triage identification, and ensure an adequate supply of triage tags.
- q) Manage hospital surge capacity:
 - q.a) Identify methods of expanding hospital inpatient capacity;

- q.b) Estimate the increase in demand for hospital services and formulate an action plan for deployment of additional hospital beds;
- q.c) Identify essential medical services and maintain their continuity;
- q.d) Increase hospital capacity by outsourcing the care of non-critical patients to appropriate alternative treatment sites (e.g. outpatient departments, home care for low-severity illness);
- q.e) Prioritize/cancel non-essential services;
- q.f) Designate care areas for patient overflow;
- q.g) Identify potential gaps in the provision of medical care, and address these gaps in coordination with the authorities and neighboring hospitals;
- q.h) Revise the existing laboratory capacities (lab technicians, critical laboratory supplies and reagents) and assess their relevance and adequacy for managing an emergency situation;
- q.i) Coordinate with the public health services of local government and NCDC to acquire additional support;
- q.j) Designate an area for use as a temporary morgue;
- q.k) Formulate a contingency plan for post mortem care with the appropriate partners (e.g. medical examiners, pathologists, morticians);
- r) Effectively manage human resources to meet increased demand for medical personnel:
 - r.a) Update the hospital staff list;
 - r.b) Mobilize all medical and non-medical hospital staff;
 - r.c) Identify the list of the most qualified and demanded specialists, and ensure their preparedness;
 - r.d) Set up urgent training activities for the staff, especially focusing on infection prevention and control procedures;
 - r.e) Prioritize staffing requirements and distribute personnel accordingly;
 - r.f) Establish a contingency plan for the provision of food, water and living space for hospital personnel;
 - r.g) Establish a clear staff sick-leave policy, including contingencies for ill family members of dependents of staff;
 - r.h) Recruit and train additional staff (e.g. retired staff, university affiliates/students and volunteers) according to the anticipated need;
 - r.i) Cross-train health-care providers in high-demand services (e.g. emergency, intensive care units).
- s) Ensure clear, accurate and timely communication to ensure informed decision-making, effective collaboration and cooperation, and public awareness and trust:

- s.a) Appoint a public information spokesperson to coordinate hospital communication with the public, the media and health authorities;
- s.b) Designate a space for press conferences (outside the immediate proximity of the emergency department, triage/waiting areas and the command center);
- s.c) Draft brief key messages for target audiences (e.g. public, media, and health authorities);
- s.d) Brief hospital staff members on their roles and responsibilities within the incident action plan;
- s.e) Establish mechanisms for the appropriate and timely collection, processing and reporting of information to supervisory stakeholders (e.g. the government, health authorities);
- s.f) Ensure the availability of reliable and sustainable primary and back-up communication systems (e.g. mobile devices, landlines, internet connection, and portable radio transmitters when available);
- t) Ensure the continuity of essential hospital supplies (including vaccines, antibiotics, antitoxins, life-support medications, PPE, ventilators and other supplies and equipment):
 - t.a) Develop and maintain an updated inventory of all equipment, supplies and pharmaceuticals;
 - t.b) Identify what resources such as special equipment, protective clothes, medicines, vaccines and laboratory maintenance/reagents are needed, and formulate an action plan in order to urgently acquire or upgrade those which are indispensable for infection control and prevention, and for the management of patients;
 - t.c) Secure and stockpile pharmaceuticals, PPE and other critical supplies to ensure an initial response to a biological incident;
 - t.d) Establish contingency agreements with local vendors to ensure the procurement and prompt delivery of equipment, supplies and other resources;
 - t.e) Coordinate with the MoLHSA to ensure the continuous provision of essential medications and commodities (e.g. those available from central stockpiles) in times of shortage;
- u) Ensure essential safety and security procedures for the maintenance of hospital functions:
 - u.a) Prioritize security needs and identify areas of increased vulnerability (e.g. entry/exits, food/water access points, pharmaceutical stockpiles, decontamination and isolation areas);

- u.b) Appoint a hospital security team (private security services, volunteers) for hospital safety and security activities;
- u.c) Coordinate with the MoD and MIA to ensure crowd control and protection of hospital personnel, triage sites, hospital access points and hospital premises from violence;
- u.d) Ensure that the security measures required for safe and efficient hospital evacuation are clearly defined;
- u.e) Implement procedures to ensure the secure collection, storage and reporting of confidential information.

Article 24: Site Operations

1. Field Emergency Operations Center

Biological events may evolve as rapidly or gradually progressive outbreaks or occur as sudden, defined scene events (e.g. intentional or accidental release of a biological agent). In both cases, depending on the situation, the deployment of a field Emergency Operations Center may be required to provide direct, on-scene control of tactical operations and support to Interagency Emergency Management Operation Center to oversee the incident. A Field EOC may consist of first responders of different responding agencies (e.g. law enforcement, emergency medical services, public health services, CBRN National Response Team). The core functions of a Field EOC include: (a) multiagency coordination and communication; (b) information collection, analysis and dissemination; (c) damage assessment, needs identification and resource allocation; and (d) coordination of onsite response activities.

2. CBRN National Response Team

- a) The CBRN National Response Team (NRT) is the operational structure of the MIA staffed with highly trained professionals and equipped with state-of-the art field portable analytical and diagnostic capabilities that are intended to perform onsite hazard identification and assessment of health risks posed by a CBRN event, and provide recommendations to the operational commander and respective authorities. For response to a biological incident, the CBRN NRT will likely be augmented by additional personnel and resources from the MOHLSA and the MOA.

- b) The CBRN NRT is expected to be activated and deployed to the scene of a biological event when the event is of a magnitude or character its consequences have overwhelmed, or are expected to overwhelm, the capabilities of national response system. The trigger/threshold for NRT activation will be determined by the State Security and Crisis Management Council in consultation with the expert body, based on the event specific assessment and risk evaluation.
- c) The CBRN NRT is directed by the Interagency Emergency Management Operation Center. At the scene, and depending on the situation, the CBRN NRT will assume Incident Command from local officials and Field EOC and will retain this authority until relieved by the Interagency Operation Center. Responding agencies and Field EOC(s) will mobilize their resources in support of the team and will help to form a common operating picture of the incident. Depending on the circumstances, the team will:
 - c.a) Assume command and control over the operations of response organizations;
 - c.b) Conduct an initial damage/needs assessment;
 - c.c) Provide first aid assistance, triage and evacuation of casualties/patients from the incident hot zone;
 - c.d) Provide hazard detection and initial identification;
 - c.e) Provide sample packaging and transport;
 - c.f) Provide meteorological information and modeling;
 - c.g) Direct/conduct victims and environmental decontamination;
 - c.h) Direct pharmaceutical and non-pharmaceutical public health interventions (including post-exposure antidote or prophylaxis administration strategies, shelter-in-place, quarantine and restriction of movement);
 - c.i) Communicate with central government offices and responding ministries through the Interagency Emergency Management Operation Center.

VII. Risk communication

1. The Public Information and Risk Communication Center (hereinafter Information Center) will be established by the MoLHSA's Emergency Headquarters to provide accurate information, raise awareness, promote priority prevention behaviors and engage in collaborative dialogue among major institutions responsible for the management of emergency situations.

2. The goal of the Information Center is to maintain public trust and confidence during a crisis. It should adhere to the WHO Outbreak Communication Guidelines to build trust, announce early, be transparent, respect public concerns, and plan in advance.
3. The Minister of Labour, Health and Social Affairs of Georgia designates a recognized spokesperson(s) who can serve as a consistent and credible face for delivering messages to the media.
4. The Department of Media and Public Relations of MoLHSA supports all activities of the Information Center to implement an effective communication strategy, including:
 - a) Training of spokespersons in public information and risk communication, stressing the importance of openness, empathy and trust. It is essential to speak with one voice, even if there are several people acting as spokespersons;
 - b) Training of MoLHSA's hot line personnel so that they are able to deliver basic information such as: when to seek care, where to seek care, how to seek care;
 - c) Conducting research on what the public perceives and believes about outbreak or incident. An awareness of public knowledge, attitudes and perceptions will enable the communication team to tailor messages and information;
 - d) Identifying the target audience, such as general public, media, special and vulnerable groups, healthcare providers etc.;
 - e) Maintaining formal and informal dialogue with the community to monitor what they need and want, and informing on what the government can provide. It is important to find out who the community trusts to deliver credible information;
 - f) Maintaining communication with the PR units of line ministries to have a concerted communication platform;
 - g) Inviting partners for cooperation such as celebrities, representatives from youth groups, schools, sport clubs, churches and associations in order to get their support in public education;
 - h) Mobilizing the support of primary health care doctors, nurses and other health providers, as they are most likely be the first contact points in providing medical services and transmitting information about the outbreak of diseases caused by EDPs;
 - i) Creating communication messages that are concise, transparent, candid, jargon-free, easily understood, medically accurate and scientifically proven, but humanized and moderate;

- j) Producing informational releases for the MoLHSA's website, print, broadcast, radio media aimed at prevention and containment;
- k) Updating media lists and contact information to seek the best and most reliable channels to educate the public, maintain trust and prevent public anxiety;
- l) Conducting media training sessions to build their professional capacity and scientific understanding, and make them partners;
- m) Generating materials to reach vulnerable and isolated populations, using appropriate language, channels and technology;
- n) Addressing rumors, misperceptions, and stigmatization. It is important to proactively address reports that may create misplaced fear or unrealistic expectations;
- o) Timely updating the information and maintaining regular communication with the media to keep the public informed.

VIII. Recovery

1. Once immediate lifesaving activities are complete, the focus shifts to supporting disaster-affected communities in reconstructing the physical infrastructure and restoring of emotional, social, economic and physical wellbeing. In the short term, recovery is an extension of the response phase in which basic services and functions are restored. In the long term, recovery is a restoration of both the personal lives of individuals and the livelihood of the community.
2. Additionally, if a biological incident leads to the contamination of victims, responders, equipment and environment, the recovery phase will include decontamination and cleanup efforts involving significant contributions from all responding agencies and society. In such cases, decontamination and related activities will be performed in accordance with the rules and procedures detailed in the National Especially Dangerous Pathogens and Biological Incidents Response Plan.

IX. Funding

According to the "Law of Georgia on Health Care" (article 93), all expenses of medical assistance to those who suffer injuries or become ill as a result of an emergency situation or an epidemic outbreak will be borne by the State. The financing of medical services can be carried out in the following ways:

1. Through the State budget allocated to the corresponding State Health Care Programs, including:

- 1.1. “State Program on Management of Infectious Diseases” – provides hospital care coverage for infectious diseases identified by the program.
 - 1.2. “State Immunization Program” – encompasses a) procurement of vaccines and vaccination materials (syringes and safe boxes); b) procurement, storage and dispensing of strategic stockpiles of specific serums and vaccines; c) provision of antirabic treatment means; d) storage and delivery-distribution of vaccines, serums and vaccination materials (syringes and safe boxes) from central level through administrative units in compliance with “Cold Chain” principles.
 - 1.3. “State Program on Emergency Medical Care and Medical Transportation” – covers ambulance and disaster medicine services including patient transportation and referral to higher-level hospitals for definitive care.
 - 1.4. “State Program on Referral Services” – ensures coverage of medical services for the population injured during emergency situations and natural disasters, in accordance with the decision of the authorized commission created by resolution No 331 of the GoG.
2. Dedicated funds will be mobilized from the government’s reserve funds based on the decision of the GoG and/or Ad Hoc governmental commission, if the need arises.

Annex A
Organization Roles

Responsibilities of Primary Response Agencies

Medical Provision Function N6 – Ministry of Labour, Health and Social Affairs of Georgia	
Ensures provision of public health and healthcare services during preparedness, response and recovery phases of emergency situations, develops core measures of medical provision and coordinates their implementation through its substructures and subordinated agencies:	
Department of Emergency Situations Coordination and Regime	• Coordinates implementation of civil defense and health emergency response plans at national and local levels. • Mobilizes corresponding healthcare forces and means to ensure provision of medical services and civil defense measures to the population. • Coordinates formation of medical response groups. • Organizes and implements training programs for healthcare personnel. • Plans, manages and distributes strategic medical stockpiles. • Organizes coordinated functioning of medical facilities (hospitals, ambulances/disaster medicine centers, primary healthcare facilities) and medical transportation/referral of critical patients during emergency situations as well as day to day bases.
LEPL L. Sakvarelidze National Center for Disease Control and Public Health	• Ensures epidemic surveillance and control over the outbreak and spread of particularly hazardous infections and epidemic and pandemic biological agents. • Makes operational visits to the presumed affected areas of biological incidents, conducts risk assessment, quantifies the resources required to address the situation and determines the public health and medical services provision measures to be taken and whether there is a need to evacuate the population. • Isolates areas to eradicate the potential consequences of a biological hazard or incident, plans preventive and treatment measures, takes necessary lab samples to characterize a biological agent and materials and conducts lab research; coordinates the provision and distribution in the relevant region of the necessary

	vaccines, medication, medical utensils, personnel protection equipment and other logistical mechanisms and the creation of a utensils-equipment stock. • Elaborates modeling scenarios for crises development, assesses their potential consequences and sets recommendations for healthcare decision-makers. • Elaborates temporary protocols for case management and conducts training courses for public health personnel.
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Responsibilities of Support Functions and Agencies

Support Function N10 and N16		
Ministry of Agriculture of Georgia and its Subordinate Agencies (the NFA and the Laboratory of the MoA (LMA))		• Provides the control and expertise of food, food raw materials and forage, organizes phyto and veterinary quarantines in incident areas, implements the delivery of food and water to the population. • Ensures food safety and protection of plants and animals, in accordance with the terms of Function N10 and Function N16 of emergency assistance.
Support Function N1, N4 and N14		
Ministry of Internal Affairs of Georgia	Interagency Coordinating Council for Countering CBRN Threats	Oversees implementation of CBRN action plans and coordinates interagency activities; to effectively accomplish its mission the Council creates chemical, biological and Nuclear-Radiological working groups and is authorized to invite independent experts.
	Emergency Management Agency	Operates according to the terms of Functions N1, N4 and N14 and carries out overall coordination of all barring and response measures.
	Police Department	• Ensures unimpeded patient transportation and ambulance movement. • Provides isolation of biological incident scene and the establishment of quarantine measures. • Maintains public order and the security of strategic state facilities. • Conducts a criminal investigation where a suspicion exists that a biological incident was deliberately caused.
	Security Police Department	Ensures protection and security of public health and medical facilities.
	Experts' Advisory Body	Provides scientific recommendations to decision-makers responsible for disaster management

	issues.
Support Agency-Ministry of Defense of Georgia	
Ministry of Defense of Georgia	Ensures provision of first aid medical activities for the population of an emergency zone, including large scale measures of public health and medical assistance.
Support Function N3	
Ministry of Internally Displaced Persons from the Occupied Territories, Accommodation and Refugees of Georgia	Ensures temporary refuge for the evacuated residents of the biological incident zone and takes necessary preventive and curative measures within such compact settlements of IDPs and migrants.
Support Function N11	
Ministry of Environment Protection and Natural Resources of Georgia	Monitors pollution of the environment and within its competency takes measures to eliminate epizooty and/or pollution of the environment arising from a biological incident.
Support Agency-Ministry of Justice of Georgia	
LEPL Public Service Development Agency	Ensures registration of deceased persons and the legalization of cases according to acting legislation.
Support Agency-Ministry of Finance of Georgia	
Ministry of Finance of Georgia	• Provides funding for the responses to biological incidents and their consequences according to the rules established by law. • Ensures necessary public health, phyto-sanitary and veterinary/border quarantine measures.
Support Function N7	
Ministry of Foreign Affairs of Georgia	In cases of necessity ensures the provision of the support outlined in emergency assistance Function N7 concerning to providing diplomatic protocols and obtaining international humanitarian support.
Regional and Local Support Agencies	
Regional Administrations	During regional scale emergencies establish ad hoc HQs in order to organize and supervise the

	fulfillment of measures of prevention, response and outcome mitigation for biological incidents by municipal and local government bodies.
Municipalities and Local Government Bodies	Assume responsibility for the implementation and coordination of measures for prevention, response and outcome mitigation of biological incidents at municipal and local levels.
Donor/NGO Support	
The Georgian Red Cross Society	Undertakes the responsibility for providing medical assistance (including first aid) in areas to which the entrance of official state bodies is restricted.
Communication Support	
The Georgian Public Broadcaster Legal Entity of Public Law (public TV) and private broadcasters	Assume to furnish risk communication and provide timely awareness to the population about the biological threat and/or incident.

Annex B
National Pharmaceutical Stockpiles
Standard Operating Procedures (SOP)

1. Mission

The mission of the Strategic National Stockpile (SNS) program of the Ministry of Labour, Health and Social Affairs of Georgia is to maintain a national repository of life-saving pharmaceuticals and medical materiel that can be delivered to the site of emergency area in order to supplement and re-supply public health and medical facilities in the event of a bioterrorism or a disease outbreak.

2. Strategy for Supply Management in Emergencies

- a) Assessment of damage and capacities of critical infrastructure to maintain the continuity of the supply of goods and services.
- b) Assessment of the needs of the population, gaps in meeting needs and sources/availability of supplies.
- c) Establishment of a logistics system for selecting, procuring, maintaining, storing, distributing and transporting supplies, facilities and personnel.
- d) Maintaining a directory of suppliers and manufacturers (including contact details, manufacturing capacity, time required for production and delivery)
- e) Establishment of emergency procedures for ordering, procuring, distributing, reordering and accounting for supplies.
- f) Establish a policy on donations of medical supplies and equipment.

3. Assumptions

- a) A list of components of the SNS for biological incidents is identified within the scope of the Sectoral Emergency Response Plan. The SNS will be activated once Sectoral Response Plan has been triggered and the decision on the deployment of the SNS has been made by the Emergency Headquarter of MoLHSA.
- b) The SNS is not considered to be a first response tool, but rather a backup means of support in the event that local capacities are overwhelmed or are near to be overwhelmed due to the emergency situation (including, bioterrorist act or diseases caused by EDP).
- c) The delivery of the SNS assets from central and/or vendor warehouses to the hospitals/dispensing sites will occur within 8 hours of the MoLHSA' decision to deploy the assets.

- d) Healthcare institutions are encouraged to create under individual preparedness and response plans minimum recommended stockpiles of life-saving medications, intravenous transfusion solutions, antibacterial medications and medical supplies to provide initial response to the increased healthcare demand and patient surge.

4. Structure and Composition of the Stockpiles

- a) The SNS structure is organized in three tiers: MoLHSA's central repository, vaccines and vendor managed inventory:
 - a.a) MoLHSA's central repository contains antibiotics, antiviral medication, life support pharmaceuticals and equipment, intravenous administration supplies, airway maintenance supplies, medical/surgical items, pandemic countermeasures, PPE and other medical materiel. The Department of Emergency Situations Coordination and Regime of MoLHSA maintains primary responsibility for planning, storing, securing, updating and distributing of medical supplies (except of vaccines and vaccination materiel).
 - a.b) Management of vaccines and vaccination materials (syringes, safe boxes) is supported by the State Immunization Program. The National Center for Disease Control and Public Health is responsible for storage, stocking, transportation and distribution of vaccine supplies and PPE according to the quality and safety guidelines.
 - a.c) MoLHSA can access additional medical supplies through the Vendor Managed Inventory based on the pre-established purchasing mechanisms (memoranda). Under these agreements pharmaceutical companies undertake the responsibility to provide pharmaceuticals and medical materiel in accordance with the preexisting contractual agreements.
 - a.d) The list of stockpiles for biological incidents will be defined and attached to this plan. However, due to the sensitive nature of some of the information in that document, exact content of BI stockpiles will be withheld from public disclosure.

5. Storing and replacement

- a) The MoLHSA maintains ownership of secured, environmentally controlled warehouses; some of the SNS assets are stored at private vendor locations as well as at privately owned warehouses.
- b) MoLHSA conducts regular monitoring of expiration and quality of supplies and ensures that the medical materiel stock is rotated, kept and replaced within potency shelf-life limits.

- c) Vaccines, pharmaceuticals and other medical materiel should be stored in accordance with manufacturer recommendations.
- d) The Removal and destruction of expired or deteriorated pharmaceuticals, vaccines and medical items should be performed in accordance with the established rules.
- e) Procurement and replacement of SNS assets should be based on corresponding decree/order of the Minister of Labour, Health and Social Affairs of Georgia.

6. Deployment of the Stockpiles

- a) The SNS will be activated and deployed by the decision of Emergency Headquarter of MoLHSA. The decision to deploy will be based on the considerations and recognition of epidemiological data, number of current and proposed victims, local marketplace shortage, and capacities of healthcare institutions at the time of the event including vaccines, antivirals, PPE and ventilator needs.
- b) During an emergency, healthcare providers are responsible to ensure the procurement and prompt delivery of pharmaceuticals and medical materiel from local vendors. In the event of shortage, healthcare providers will submit the request to the Ministry of Labour, Health and Social Affairs of Georgia to receive initial push-package and continued support from the Ministry's central stockpiles.
- c) Once the request for deployment has been received, the Emergency Headquarter of MoLHSA will consult with local officials to evaluate the threat and the local ability to respond to the event. If the local supplies will not be sufficient, the Emergency Headquarter can order the SNS to deploy.
- d) MoLHSA will coordinate with local officials and healthcare institutions to ensure that the SNS assets can be efficiently received and distributed on arrival at the site.
- e) MoLHSA in collaboration with public health and subject-matter experts will identify prophylaxis strategy (including targeted groups for vaccination and antiviral distribution, priority high risk groups in case of shortage of prophylaxis means, public communication), which will be tailored to the specific situation assessment and biological agent characteristics.

7. Dispatching Procedures

When sending goods, following basic rules must be followed:

- a) Packing and identification of parcels: every parcel must be clearly identified with the sender's and consignee's name, address and telephone, the consecutive

numbering of parcels, as well as any other specific characteristics (fragile, refrigeration required, etc.). Package must contain the packing list and should be marked as "Packing List". This list must be protected into a water-resistant envelope.

- b) Size and weight: as a principle the parcel's weight, size and form should be good enough to be handle for one person (between 25 kg to 50 kg maximum).
- c) Contents: supplies must be packed separately accordingly with their nature and must be accompanied with a packing list.
- d) Dispatching notice: the reception points must be informed about the dispatch of every single good, including information such as transport mean (type, company, characteristics, person in charge, etc.), exact destination, arrival point and estimated time of arrival.

8. Transportation

- a) A previous inventory of available transport must be done and kept updated.
- b) Type and quantity of transport will be decided depending on nature and quantity of the SNS assets to be transported, destination and urgency of the cargo.
- c) MoLHSA/NCDC through their own capabilities or based on contractual agreements (e.g. Post of Georgia) will ensure timely and safe transportation of the goods.
- d) Some drugs and medical products especially vaccines need specific stable and controlled temperature conditions. To transfer this kind of goods it would be necessary to have the appropriate refrigeration equipment and a reliable source of energy to keep it running during transportation. The ideal temperature of these products must be kept during their transportation using cold boxes. An authorized person must be designated to oversee transportation process of medical products requiring cold chain preservation.

9. Reception and Distribution

- a) Receiving/storage sites (e.g. hospitals) and points of dispensing should be identified prior to the arrival.

- b) The space use for the allocation of the diverse goods in the warehouse should be planned before the arrival of the consignments.
- c) Every cargo arriving at the field/receiving hospitals must be counted and inspected in terms of quantity and quality. Contents should match with the documents provided by the sender. Once the verification of the incoming supplies is done, these should be registered immediately to the stock inventory.
- d) MoLHSA will transfer technical advisor(s) to the local authorities/designated hospitals once medical materiel arrives at the designated receiving and/or storage sites in order to assist and advise local officials in putting inventory to prompt and effective use.
- e) Technical advisors and local authorities will conduct SNS asset distribution according to the distribution strategy identified by the MoLHSA.

10. Security

On-site security, traffic control and security during transportation will be provided by the supporting functions/agencies as specified above in this plan.

11. Controlling and monitoring stock

A clear system to register and control the incoming, outgoing and stock supplies must be established. Recommended actions to help the control and monitoring are:

- a) Every single cargo must be registered since its arrival to the warehouse. A written record of entries must be always available for control.
- b) Each type of goods is controlled by a "store card" kept by the storekeeper that should match with the "stack record card", which is stuck to the respective pile or stack. Both of them reflect the movements of every particular good, and should match with the official issuing authorizations.
- c) Date of entry of goods to the warehouse and expiring dates needs a very careful control. This may appear both in the stack record card and in the store card.
- d) Stock keeper must perform physical inventories regularly to keep updated stock cards and printed inventory.
- e) Storekeepers must prepare a weekly report of activities, including the latest inventory.
- f) Clear and updated register and control of losses and destruction or disposal certificates (expired and deteriorated products) should be provided. The disposal

or destruction of damaged goods should be performed in accordance with the established rules.

- g) Forms specifically designed must be used to record all movements of supplies in the warehouse (request, incoming and deliveries). Every form must have consecutive numbers, date, name of the persons involved (senders, transport, recipients...) and other information intended to track the supplies.

12. Continuation of supplies

- a) Hospitals will request any needed SNS medical material other than initial support from the central SNS stockpile through the hospital directors or liaison mechanisms identified by the Emergency Headquarter of MoLHSA.
- b) Emergency Headquarter of MoLHSA in conjunction with regional representatives, local officials and experts will continually assess the need for additional supplies of specific items, forecast further needs and provide replenishment and restocking of local resources.
- c) There is no agency capable to solve by itself the whole problematic confronted when a disaster occurs. An interagency coordination must be searched in order to complement MoLHSA's actions and/or to cover a more extended spectrum of needs.

13. Retrieval

Any durable assets and any unused medical materiel including pharmaceutical items sent to the distribution sites/hospitals will be returned to the MoLHSA/NCDC at the conclusion of a public health emergency response. MoLHSA will assess the return of unused medical materiel to determine if sealed, non-pharmaceutical items stored in accordance with manufacturer recommendations can be returned to central custody. MoLHSA will not otherwise accept return of any unused medical materiel. The MoLHSA will arrange for the pick-up of the medical materiel with any durable assets from the sites and returning it to the central stockpile repository for final disposition.

14. Procurement sources

A local or external purchase is a decision based in technical and political criteria:

- a) Local purchase depends on various criteria, such as the local availability of the product needed, the urgency for this product versus the time to get it from abroad and quality considerations.

- b) International purchase: buying locally could be a good way to help the economic recovery of the affected country or area, but very often the specific items cannot be found locally or the quality/quantity is not good enough to fulfil in an efficient way the needs. In this case, international orders would be the choice.

15. Financing Sources

- a) The responsibility on creating strategic stockpiles can be shared among federal authorities (MoLHSA and its subordinated agencies), local governance and self-governance bodies, and health care and laboratory network institutions.
- b) On central level, creation, maintenance and updating the SNS assets can be funded from several sources:
 - b.a) State budgetary funds assigned to the Ministry of Labour, Health and Social Affairs of Georgia;
 - b.b) State budgetary funds assigned to the corresponding State Healthcare Programs.
- c) In case of a large scale biological event that severely affects Georgia's population and a supplementary infusion of medical supplies is required, additional funds can be sourced from:
 - c.a) President's or government's reserve funds based on the MoLHSA's request;
 - c.b) International financial institutions' and donor organizations' funds in the forms of grants and/or credits.

16. Management of International Relief

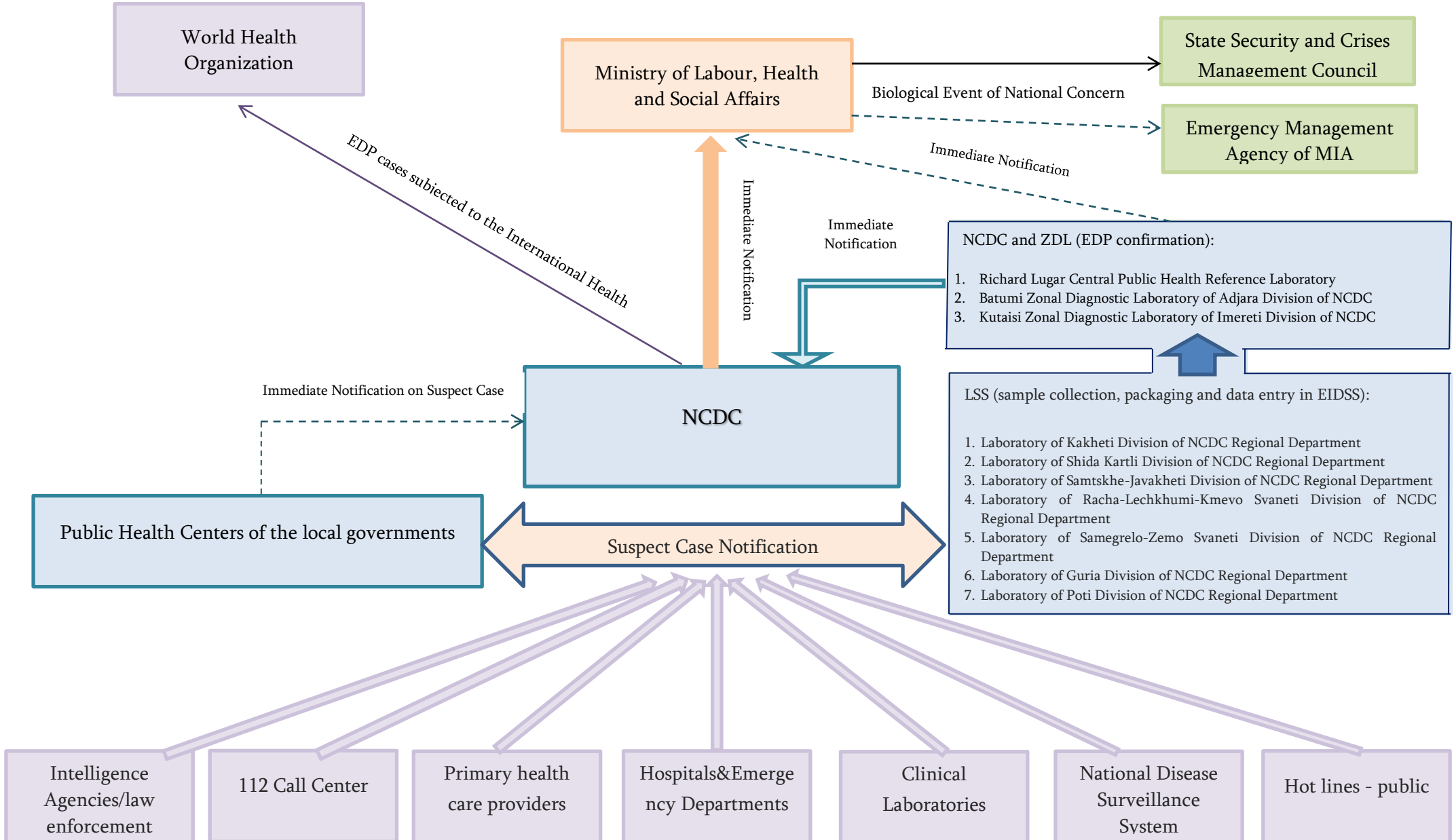
The flow of international aid has to be coordinated and managed at a central level:

- a) Ministry of Internal Affairs is responsible for identifying needs of international support and formalizing the request;
- b) The Ministry of Foreign Affairs is the lead governmental agency for obtaining international humanitarian support through providing diplomatic protocols and support outlined in emergency assistance Function N7;
- c) Ministry of Finance is responsible for providing fast track processes to confer the

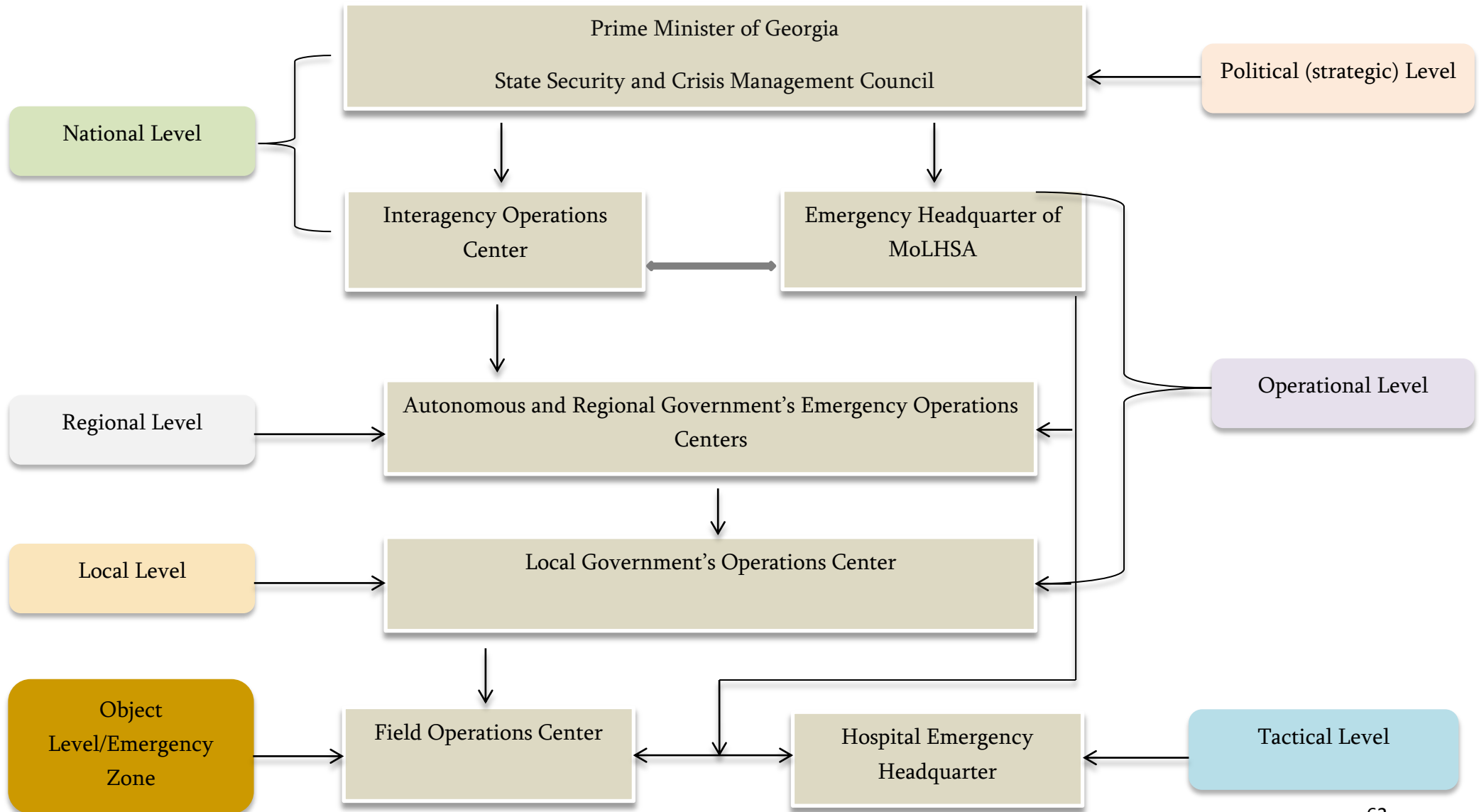
Humanitarian Status to the international consignment and ensure expedited custom clearance;

- d) Ministry of Labour, Health and Social Affairs is responsible for establishing mechanisms that are needed to welcome, register and deploy foreign assistance and ensure that national and international assistance are coordinated as efficiently as possible.

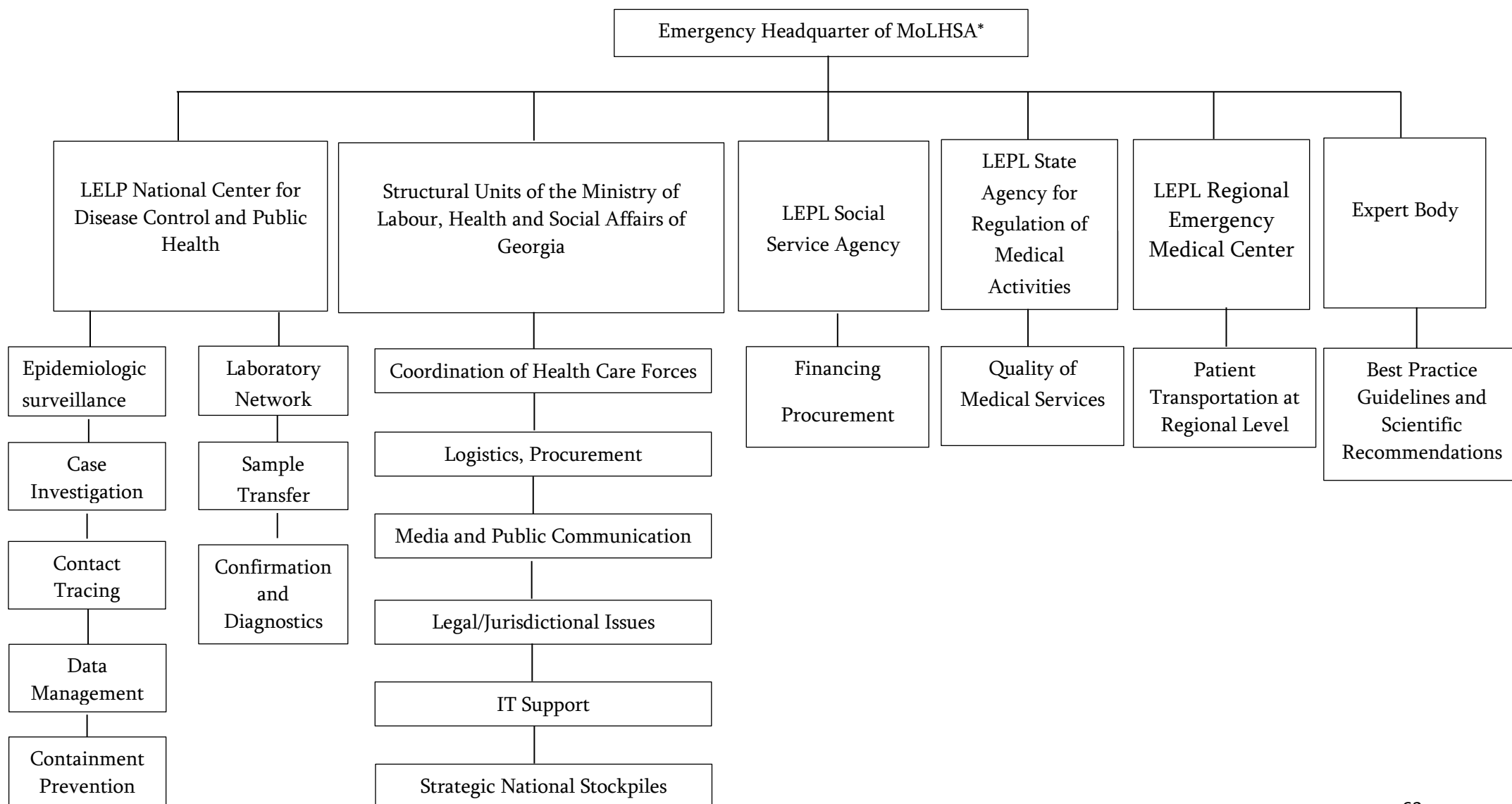
Annex C Information Flow Chart



Annex D
Command Levels for the Management of Biological Incidents

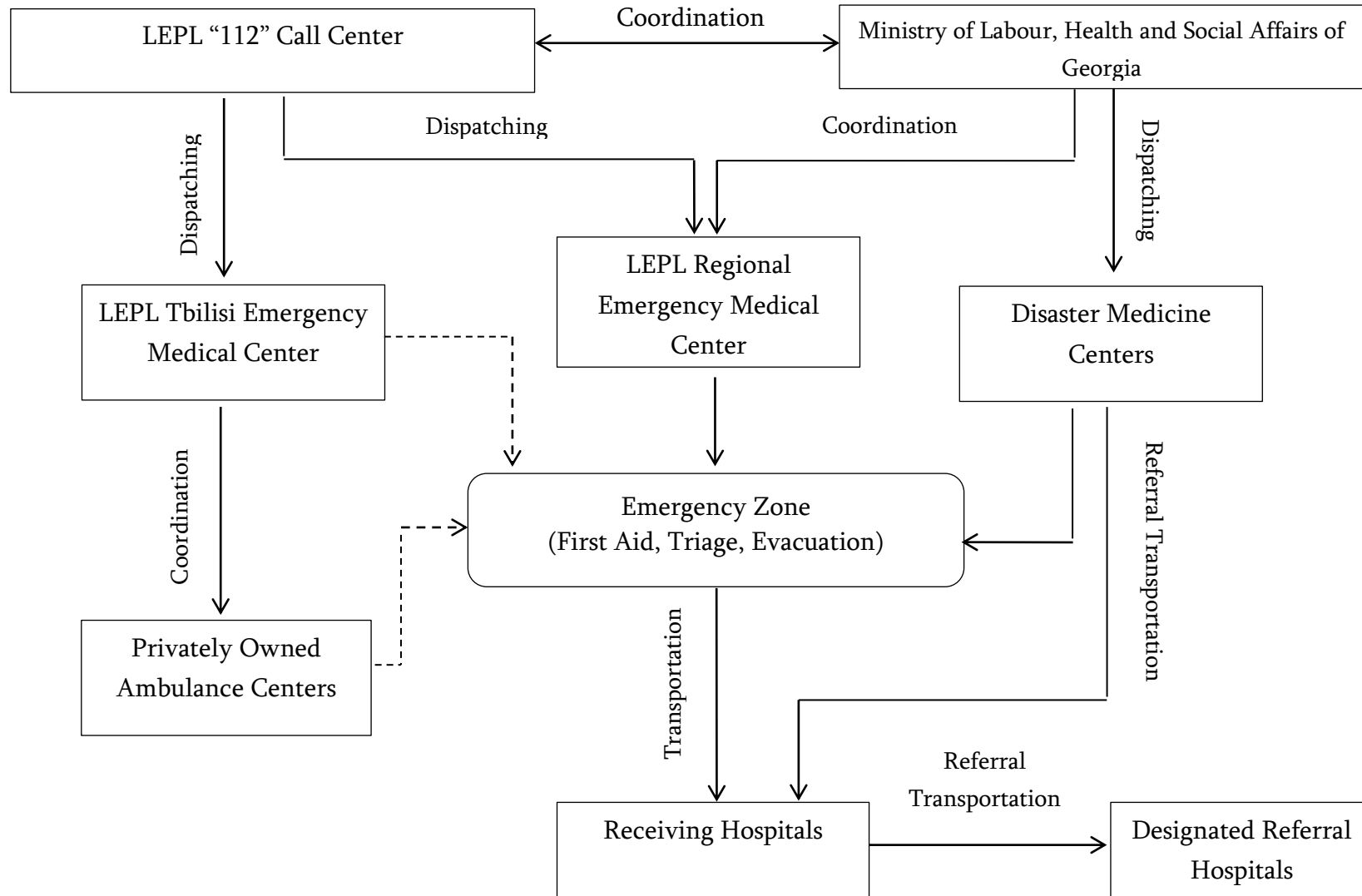


Annex E
Emergency Headquarter of MoLHSA – Composition and Functions



Annex F

Prehospital/Ambulance Management Chart



Annex G

Designated Referral Hospitals

East Georgia
JSC “Infectious Diseases, AIDS and Clinical Immunology Scientific Practical Center” (Tbilisi)
LTD “Tbilisi Children Infectious Clinical Hospital”
West Georgia
LTD “Batumi Infectious Diseases, Aids and Tuberculosis Regional Center”
LTD “Zugdidi Infectious Diseases Hospital”

Annex H

Laboratory Network and Coverage



I. BSL-2 and BSL-3:

Richard Lugar Central Public Health Reference Laboratory

II. ZDL

1. Batumi Zonal Diagnostic Laboratory of Adjara Division of NCDC Regional Department
2. Kutaisi Zonal Diagnostic Laboratory of Imereti Division of NCDC Regional Department

III. LSS

1. Laboratory of Kakheti Division of NCDC Regional Department
2. Laboratory of Shida Kartli Division of NCDC Regional Department
3. Laboratory of Samtskhe-Javakheti Division of NCDC Regional Department
4. Laboratory of Racha-Lechkhumi-Kvemo Svaneti Division of NCDC Regional Department
5. Laboratory of Samegrelo-Zemo Svaneti Division of NCDC Regional Department
6. Laboratory of Guria Division of NCDC Regional Department
7. Laboratory of Poti Division of NCDC Regional Department

Annex I
List of Especially Dangerous Pathogens

List of EDPs as defined by the Ministerial Order No. 01-18/N:

I. Pathogens:

1. African horse sickness virus
2. African swine fever virus
3. Avian influenza virus
4. Bacillus anthracis
5. Bacillus anthracis Pateur strain
6. Botulinum neurotoxin producing species of Clostridium
7. Brucella Species (causes Brucellosis):
 - a) Brucella abortus
 - b) Brucella suis
 - c) Brucella melitensis
8. Burkholderia mallei (former Pseudomonas mallei)
9. Burkholderia pseudomallei (former Pseudomonas pseudomallei)
10. Classical swine fever virus
11. Coxiella burnetii (causes Q Fever Disease)
12. Crimean-Congo haemorrhagic fever virus (CCHF)
13. Eastern Equine Encephalitis virus
14. Ebola virus
15. Foot and mouth disease virus
16. Francisella tularensis
17. Goat pox virus
18. Hendra virus
19. Kyasanuri forest disease
20. Lassa Fever Virus
21. Lujo virus
22. Lumpy skin disease virus
23. Marburg virus
24. Monkeypox virus
25. Mycoplasma capricolum
26. Mycoplasma mycoides
27. Newcastle disease virus
28. Nipah virus
29. Omsk hemorrhagic fever

30. Reconstructed 1918 influenza virus
31. Rickettsia prowazekii
32. Rift Valley fever virus
33. Rinderpest virus
34. Variola major virus (Smallpox virus)
35. Variola minor virus (Alastrim)
36. Tick-borne encephalitis complex (flavi) viruses:
 - a) Far Eastern subtype;
 - b) Siberian subtype.
37. Peste des petits ruminants virus
38. SARS-CoV
39. Sheep pox virus
40. South American haemorrhagic fever viruses:
 - a) Guanarito
 - b) Machupo
 - c) Sabia
 - d) Chapare
 - e) Junin
41. Swine vesicular disease virus
42. Venezuelan Equine Encephalitis virus
43. Yersinia pestis (Causes Plague)

II. Toxins:

1. Abrin
2. Botulinum neurotoxins
3. Conotoxins (Short, paralytic alpha conotoxins containing the following amino acid sequence X1CCX2PACGX3X4X5X6CX7)
4. Diacetoxyscirpenol
5. Ricin
6. Saxitoxin
7. Staphylococcal enterotoxins A,B,C,D,E subtypes
8. T-2 toxin
9. Tetrodotoxin

Annex J
Biological Agents of Epidemic and Pandemic Potential and Associated Syndromes
Methodical Guidelines

Bacillus Anthracis (causes Anthrax)

Agent Characteristics

Agent Classification: Biological

Type: Bacteria (*Bacillus anthracis*), many strains

Description: *B. anthracis* is a naturally-occurring, rod-shaped Gram-positive, sporulating bacterium causing the disease anthrax, and is capable of being weaponized for all exposure routes. Powders of *B. anthracis* are considered “weapons-grade” with such characteristics as high spore concentration, uniform particle size, low electrostatic charge, etc. *B. anthracis* re-aerosolization is a consideration, particularly if weaponized. Even if *B. anthracis* is not weaponized, it is a concern for all exposure routes. There are three forms of anthrax disease, **pneumonic, gastrointestinal, and cutaneous**. These presentations can occur in humans through intentional (bioterrorism) release scenarios or natural sources of exposure (infected animals/tissues).

Biosafety Level: 3

CDC Class: A

Incubation Period: 1-7 days, pneumonic cases have occurred 60 days postexposure.

Person-to-Person Transmission: No

Other Forms of Transmission: Contact with animal fur, wool, blood, or bodily fluids, ingestion, or inhalation of small pieces of tissue of infected animals.

Treatment: Supportive accompanied with antibiotics (Ciprofloxacin and/or Doxycycline).

Infectivity/Lethality: Moderate/High for inhalation exposure route if not quickly diagnosed

Persistence/Stability: Spores highly persistent/stable in soil and water

Release Scenarios

CAUTION: RE-AEROSOLIZATION IS A CONCERN FOR ALL RELEASE SCENARIOS.

Air: In a bioterrorism event, B. anthracis can be released in an easily aerosolized form. Re-aerosolization will depend upon the size, purity, and physical properties of the manufactured spores. Release of B. anthracis can occur indoors and/or outdoors. Easily aerosolizable B. anthracis spores can lead to contamination quickly spreading throughout a building and outdoors to surrounding areas. An outdoor release of B. anthracis spores has the potential to travel from the immediate area.

Soil: Spores are resistant to adverse environmental conditions and may remain viable for decades.

Surfaces: Spores are resistant to adverse environmental conditions and may remain viable on surfaces for months to years.

Water: B. anthracis is a possible water threat and is resistant to chlorine levels in drinking water. Reaerosolization can occur when water is used for fire fighting.

Other: B. anthracis is naturally occurring and endemic throughout the territory of Georgia. It can cause all forms of anthrax disease in humans. Naturally occurring exposure includes contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

Health Effects

Onset: Symptoms may occur within 1-7 days or up to 60 days after an inhalation exposure.

Signs/Symptoms per Exposure Route

Pneumonic anthrax: Fever, malaise, fatigue, cough, chest discomfort, stridor (noisy breathing), respiratory distress, dyspnea (shortness of breath), and cyanosis (bluish discoloration of the skin).

Incubation Period	Usually <1 week; may be prolonged for weeks (up to 2 months)	
Typical Signs/Symptoms (often biphasic, but symptoms may progress rapidly)	Initial phase Non-specific symptoms such as low-grade fever, nonproductive cough, malaise, fatigue, myalgias, profound sweats, chest discomfort (upper respiratory tract symptoms)	Subsequent phase 1–5 days after onset of initial symptoms - May be preceded by 1–3 days of improvement - Abrupt onset of high

	are rare) • Maybe rhonchi on exam, otherwise normal • Chest X-ray: ○ mediastinal widening ○ pleural effusion (often) ○ infiltrates (rare)	fever and severe respiratory distress (dyspnea, stridor, cyanosis) • Shock, death within 24–36 hours
Laboratory	• Obtain specimens appropriate to system affected: ○ blood (essential) ○ pleural fluid ○ cerebral spinal fluid (CSF) ○ skin lesion	Clues to diagnosis • Gram-positive bacilli on unspun peripheral blood smear or CSF • Aerobic blood culture growth of large, gram-positive bacilli provides preliminary identification of <i>Bacillus</i> species
Treatment	• Obtain specimens for culture BEFORE initiating antimicrobial therapy. • Initiate antimicrobial therapy immediately upon suspicion. • Do NOT use extended-spectrum cephalosporins or trimethoprim/sulfamethoxazole because anthrax may be resistant to these drugs. • Supportive care including controlling pleural effusions	
Precautions	• Standard contact precautions	

Gastrointestinal anthrax: Flu-like symptoms, nausea, loss of appetite, vomiting, fever, abdominal pain, and severe diarrhea.

Incubation Period	• Usually 1–7 days	
Typical Signs/Symptoms	Initial phase • Nausea, anorexia, vomiting, and fever progressing to severe abdominal pain, hematemesis, and diarrhea that is almost always bloody • Acute abdomen picture with rebound tenderness may develop	Subsequent phase • 2–4 days after onset of symptoms, ascites develops as abdominal pain decreases • Shock, death within 2–5 days of onset

	• Mesenteric adenopathy on computed tomography (CT) scan likely. Mediastinal widening on chest X-ray has been reported.	
Laboratory	• Obtain specimens appropriate to system affected: ◦ blood (essential) ◦ ascitic fluid	Clues to diagnosis • Gram-positive bacilli on unspun peripheral blood smear or ascitic fluid • Pharyngeal swab for pharyngeal form • Aerobic blood culture growth of large, gram-positive bacilli provides preliminary identification of <i>Bacillus</i> species
Treatment	• Obtain specimens for culture BEFORE initiating antimicrobial therapy. • Early (during initial phase) antimicrobial therapy is critical. • Do NOT use extended-spectrum cephalosporins or trimethoprim/sulfamethoxazole because anthrax may be resistant to these drugs.	
Precautions	• Standard precautions	

Cutaneous anthrax: Raised itchy bump to vesicle that progresses to painless ulcer (0.5 to >1 inch; 1 to 3 cm) with black area in the center, swollen lymph nodes, and flu-like symptoms.

Incubation Period	Usually an immediate response up to 1 day
Typical Signs/Symptoms	• Local skin involvement after direct contact with spores or bacilli • Localized itching followed by 1) papular lesion that turns vesicular and 2) subsequent development of black eschar within 7–10 days of initial lesion
Treatment	• Obtain specimens for culture BEFORE initiating antimicrobial therapy. • Do NOT use extended-spectrum cephalosporins or trimethoprim/sulfamethoxazole because anthrax may be

	resistant to these drugs.
Precautions	Standard contact precautions. Avoid direct contact with wound or wound drainage.

Effect Levels

Infectivity: Highly infectious if aerosolized

Infective Dose: Although the infective dose is unknown for the different routes of exposure, for manufactured spores the infective dose is thought to be very low.

Lethality: For pneumonic anthrax, death is universal in untreated cases and may occur in as many as 95% of treated cases if therapy is begun more than 48 hours after the onset of symptoms.

Personnel Safety

Concerns: Level of PPE may vary depending upon the incident and site-specific circumstances. The PPE levels listed are general suggestions only and are appropriate only for B. anthracis; they may not provide protection for chemicals to which workers may be exposed during response/recovery operations.

Medical

Baseline: A VACCINE AGAINST ANTHRAX IS AVAILABLE.

Treatments Available: Treatment is supportive and is accompanied with Ciprofloxacin and/or Doxycycline antibiotics. Effectiveness of antibiotics may be limited if taken after 48 hours of initial pneumonic symptoms.

First Aid

During Incident: Conduct medical monitoring; use PPE; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms and, if necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand self-contained breathing apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) other conditions may present a splash hazard.

3) Full-facepiece respirator with P100 filter or PAPR with HEPA filters, when an aerosol generating device was not used to create high airborne concentration.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

B. anthracis may be present in blood, skin lesion exudates, cerebrospinal fluid, pleural fluid, sputum, and rarely, in urine and feces. The primary hazards to laboratory personnel are: direct and indirect contact of broken skin with cultures and contaminated laboratory surfaces, accidental parenteral inoculation and, rarely, exposure to infectious aerosols. Efforts should be made to avoid production of aerosols by working with infectious organisms in a Biological Safety Cabinet (BSC). In addition, all centrifugation should be done using aerosol-tight rotors that are opened within the BSC after each run.

BSL-2 practices, containment equipment, and facilities are recommended for activities using clinical materials and diagnostic quantities of infectious cultures. ABSL-2 practices, containment equipment and facilities are recommended for studies utilizing experimentally infected laboratory rodents. BSL-3 practices, containment equipment, and facilities are recommended for work involving production quantities or high concentrations of cultures, screening environmental samples (especially powders) from anthrax-contaminated locations, and for activities with a high potential for aerosol

production. Workers who frequently centrifuge *B. anthracis* suspensions should use autoclavable aerosol-tight rotors. In addition, regular routine swabbing specimens for culture should be routinely obtained inside the rotor and rotor lid and, if contaminated, rotors should be autoclaved before re-use.

Brucella Species (causes Brucellosis)

Agent Characteristics

Agent Classification: Biological

Type: Bacteria (Four species: *B. melitensis*, *B. abortus*, *B. suis*, *B. canis*)

Description: Brucellosis is a systemic, zoonotic (transferable between animals and humans) disease, and transferable between different animal species and is caused by one of the four species of bacteria listed above. Virulence in humans decreases in the species order provided. They are small aerobic, non-motile bacteria. They reside in tissue and bone marrow, and are extremely difficult to eradicate, even with antibiotic therapy. Brucellosis is an endemic infection in Georgia. According to the data of the National Center of Disease Control and Public Health of Georgia, 168 and 175 cases of brucellosis were reported in 2008 and 2009, respectively. However, the real numbers can be higher because not all the patients seek medical treatment and even if they do, not all the cases are reported by the physicians to the public health system.

Brucellosis is endemic in wildlife populations of sheep, goats, cattle, bison, elk and several other animals. Most brucellosis patients registered in eastern Georgia, with the most common regions for brucellosis cases being the Kvemo Kartli and Kakheti regions. Traditionally, animal exposures, especially sheep husbandry, are more prevalent in humans exposed during the birthing and slaughtering of an animal, when handling animal viscera, and eating/drinking unpasteurized milk, cheese, ice cream, etc. Humans can also be exposed via inhalation of infectious aerosols or if mucous membranes are exposed to the agent. When responding to human cases, it should be determined if it is from a natural outbreak or a bioterrorism event. If a natural event, infected herds may be culled.

Biosafety Level: 3

CDC Class: B

Incubation Period: 5-60 days

Duration of Illness: Weeks to years

Person-to-Person Transmission: Rare; from sexual contact or via breastfeeding.

Treatments: Treatment is difficult but some antibiotics have been shown to be effective.

Infectivity/Lethality: High/Low (i.e., 0.5-6%) but depends on species of bacteria and whether endocarditis, osteomyelitis or meningoencephalitis develops.

Persistence: Persistent in water and soil.

Release Scenarios

CAUTION: REAEROSOLIZATION IS A CONCERN FOR ALL RELEASE SCENARIOS.

Air: If weaponized, Brucella is an inhalation threat to humans and wild and domestic animals. The area of initial release might be difficult to identify because symptoms may take days to appear.

Soil: Brucella is persistent in soil for up to 125 days.

Water: Brucella is a probable water threat because the bacteria are stable for 20-72 days.

Other: Natural occurring exposure includes contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

Health Effects

Onset: Symptoms may occur 5-60 days after exposure.

Signs/Symptoms

General: Brucellosis is a systemic bacterial disease with acute or gradual onset in the form of flu-like symptoms, with intermittent fevers, making it difficult to conclusively diagnose.

Exposure Route

Inhalation: Unless it is weaponized, transmission of Brucella via inhalation is not a common route but it can be for laboratory, slaughterhouse, and large animal veterinarian occupations.

Skin: Infection is possible through contact of abraded skin with infected animals or contaminated animal products. Persons who work in slaughterhouses, meat-packing plants, hunters, veterinarians, etc. are at higher risk of exposure.

Ingestion: Infection is possible by eating/drinking contaminated, often unpasteurized, milk or dairy products.

Effect Levels

Infectivity: Brucella has high infectivity.

Infective Dose: Currently, there is no infective dose listed for Brucella spp. but it is estimated that inhaling only 10-100 weaponized bacteria is sufficient to cause human disease.

Lethality: Brucella has low lethality (0.5 - 6%).

Personnel Safety

Concerns: Level of PPE may vary depending upon the incident and site specific circumstances. The PPE levels listed are general suggestions only and are appropriate only for Brucella.

Medical

Baseline: Annual physical and respiratory function exams. While vaccine therapy was used in the past (during the Soviet times), presently, vaccine therapy is not utilized because of its ineffectiveness, discomfort, and adverse events to the patient, as well as antibiotics being a more effective treatment option. Vaccine with established efficacy and approved internationally does not exist.

Treatments Available: Treatment post exposure is supportive and is accompanied with Ciprofloxacin and/or Doxycycline antibiotics. Prophylactic use of antibiotics may be recommended.

First Aid

During Incident: Conduct medical monitoring; use PPE, record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms and, if necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) other conditions may present a splash hazard.

3) Full-face piece respirator with P100 filter or PAPR with HEPA filters, when an aerosol-generating device was not used to create high airborne concentrations.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for routine clinical specimens of human or animal origin. Products of conception containing or believed to contain pathogenic *Brucella* should be handled with BSL-3 practices due to the high concentration of organisms per gram of tissue. BSL-3 and ABSL-3 practices, containment equipment, and facilities are recommended, for all manipulations of cultures of pathogenic *Brucella* spp. and for experimental animal studies.

Bunyaviridae—Crimean-Congo Hemorrhagic Fever (CCHF)

Agent Characteristics

Agent Classification: Biological

Type: Virus

Family: Bunyaviridae

Description: Crimean-Congo Hemorrhagic Fever (CCHF) virus is a member of the Bunyaviridae family (similar to Hantavirus). It has been isolated from goats, sheep, cattle, hares, hedgehogs, rodents, and a number of species of ticks associated with these mammals. Humans typically become infected by a tick bite, usually from tick regurgitation during removal from the skin, or from human contact with blood, tissue, or body fluids of infected humans and animals. One confirmed case of CCHF was reported in Tbilisi, Georgia in 2009.

Biosafety Level: 4

CDC Class: C

Incubation: 3-12 days

Person-to-Person Transmission: Yes, via contact with body tissue or body fluids of infected humans.

Treatments: There is no human vaccine. Ribavirin has been used for treatment with some success.

Infectivity/Lethality: Infectivity in humans is low. Mortality rates are 30% for treated individuals, and can range from 9% to 50% for hospitalized patients.

Persistence/Stability: Stable in vectors.

Release Scenarios

Air/Aerosolization: Airborne transmission appears to be a rare event but cannot be conclusively excluded.

Soil /Surfaces: Under moist conditions, CCHF has been found to survive up to 15 days at 4 degrees of Celsius. Elevated temperatures and lower humidity may reduce CCHF survival time; however, extreme caution should be exercised.

Water: CCHF could be a water threat.

Other: Because CCHF would spread through person-to-person contact and tick bites, it is important to de-tick farms in the event of a release of CCHF. CCHF would only be detected after symptoms present in patients.

Health Effects

Onset: Symptoms may occur 3-12 days after exposure.

Signs/Symptoms

General: Initial signs and symptoms include fever, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. Severe cases show signs of bleeding under the skin, internal organs, or from body orifices such as the mouth, eyes, or ears. Severely ill patients exhibit shock, nervous system malfunction, coma, delirium, and seizures. Some types of CCHF infection are associated with renal (kidney) failure.

Exposure Routes:

Inhalation: Airborne transmission appears to be a rare event but cannot be conclusively excluded.

Skin: Direct contact with the blood, tissue, and/or secretions of infected persons and objects or equipment that have been contaminated with infected secretions may pose a threat. Contact with the vector (e.g., tick bites) also may pose a threat.

Ingestion: Exposure through eating contaminated food is highly unlikely.

Eyes: Exposure through contact with body fluids of infected patients is possible.

Infective Dose: Unconfirmed

Lethality: The mortality rate from CCHF is approximately 30%, with death occurring in the second week of illness. In those patients who recover, improvement generally begins on the ninth or tenth day after the onset of illness.

Clinical Features

- The length of the incubation period for the illness appears to depend on the exposure route. Following infection via tick bite, the incubation period is usually 1 to 3 days, with a maximum of 9 days. The incubation period following contact with infected blood or tissues is usually 5 to 6 days, with a documented maximum of 13 days.

- Onset of symptoms is sudden, with fever, myalgia (aching muscles), dizziness, neck pain and stiffness, backache, headache, sore eyes and photophobia (sensitivity to light). There may be nausea, vomiting and sore throat early on, which may be accompanied by diarrhea and generalized abdominal pain. Over the next few days, the patient may experience sharp mood swings and may become confused and aggressive. After 2 to 4 days, the agitation may be replaced by sleepiness, depression and lassitude, and the abdominal pain may localize to the right upper quadrant, with detectable hepatomegaly (liver enlargement).
- Other clinical signs that emerge include tachycardia (fast heart rate), lymphadenopathy (enlarged lymph nodes), and a petechial rash (a rash caused by bleeding into the skin), both on internal mucosal surfaces, such as in the mouth and throat, and on the skin. The petechiae may give way to ecchymoses (like a petechial rash, but covering larger areas) and other haemorrhagic phenomena such as melena (bleeding from the upper bowel, passed as altered blood in the faeces), haematuria (blood in the urine), epistaxis (nosebleeds) and bleeding from the gums. There is usually evidence of hepatitis. The severely ill may develop hepatorenal (i.e. liver and kidney) and pulmonary failure after the fifth day of illness.
- The mortality rate from CCHF is approximately 30%, with death occurring in the second week of illness. In those patients who recover, improvement generally begins on the ninth or tenth day after the onset of illness

Personnel Safety

First Aid: Using tweezers, remove the tick directly without wiggling it. If possible, save the tick in a bottle of rubbing alcohol. Clean the bite area with soap and water, and then swab the bite area with rubbing alcohol. Seek medical attention immediately. Decontaminate contaminated clothing, equipment, and items with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite.

During Incident: Conduct medical monitoring; use PPE; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided as soon as possible.

PPE

PPE	Circumstances
Pressure-demand SCBA with Level A protective suit	• Event is uncontrolled. • The type(s) of airborne agent(s) is(are) unknown. • The dissemination method is unknown. • Dissemination via an aerosol-generating device is still occurring. • Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.
Pressure-demand SCBA with Level B protective suit	• The suspected biological aerosol is no longer being generated. • Other conditions may present a splash hazard.
Full-face piece respirator with P100 filter or PAPR with HEPA filters	• An aerosol-generating device was not used to create high airborne concentration.
Disposable hooded coveralls, gloves, and foot coverings	• Dissemination was by a letter, package, or other material that can be bagged, contained.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for laboratory handling of sera from persons potentially infected with Hantaviruses. The use of a certified Biological Safety Cabinet (BSC) is recommended for all handling of human body fluids when potential exists for splatter or aerosol.

Potentially infected tissue samples should be handled in BSL-2 facilities following BSL-3 practices and procedures. Cell-culture virus propagation and purification should be carried out in a BSL-3 facility using BSL-3 practices, containment equipment and procedures.

Experimentally infected rodent species known not to excrete the virus can be housed in ABSL-2 facilities using ABSL-2 practices and procedures. Primary physical containment

devices including BSCs should be used whenever procedures with potential for generating aerosols are conducted. Serum or tissue samples from potentially infected rodents should be handled at BSL-2 using BSL-3 practices, containment equipment and procedures. All work involving inoculation of virus-containing samples into rodent species permissive for chronic infection should be conducted at ABSL-4.

Ebola and Marburg Hemorrhagic Fevers

Agent Characteristics

Agent Classification: Biological

Type: Virus (Flaviviridae)

Biosafety Level: 4

Description: These are RNA, -enveloped viruses whose origin, locations, and natural habitat are unknown. There are two members of the filovirus family: Ebola and Marburg. Ebola has four subtypes: Ivory Coast, Sudan, Zaire, and Reston. Reston infects only nonhuman primates. Airborne transmission among humans has not been clearly demonstrated. Bats could be a virus carrier. No cases have been registered in Georgia.

Incubation Period: 2-21days (Ebola); 5-10 days (Marburg).

Person-to-Person Transmission: Yes, via direct contact with bodily fluids and objects contaminated with bodily fluids.

Treatments: Supportive treatment only.

Infectivity/Lethality: High/High 60-90%.

Infective Dose: Unknown.

Persistence/Stability: Unstable; difficult to remain viable outside of host.

Air/Aerosolization: Ebola and Marburg could be an inhalation threat. Aerosolization might be a consideration. Although airborne transmission is not well known, airborne releases of Ebola and Marburg are likely to be identified only after exposed persons become ill.

Soil/Surfaces: Persistence and stability of Ebola and Marburg on surfaces is not well known.

Water: Ebola and Marburg could be a water threat in underdeveloped areas.

Other: Ebola and Marburg can be transmitted through direct contact with bodily fluids and objects contaminated with bodily fluids.

NOTE: Keep in mind that Ebola and Marburg could be engineered to become more viable in the environment. As such, decisions regarding PPE, sampling, and decontamination

should not be made without verifying whether the virus was naturally-occurring or weapons-grade.

Onset: Symptoms may occur 2-21 days (Ebola) or 5-10 days (Marburg) after exposure.

Signs/Symptoms: Initial signs and symptoms appear abruptly. They include significant fever, fatigue, dizziness, muscle aches, sore throat, loss of strength, and exhaustion, and can mimic malarial symptoms.

Exposure Routes:

Inhalation: The threat of airborne exposure has not been clearly demonstrated; however, caution should be exercised when the type of agent has not been clearly identified.

Skin: Direct exposure by contact with blood and/or secretions of infected persons and objects or equipment that have been contaminated with infected blood and/or secretions may pose a threat.

Ingestion: Exposure is possible through inadvertent ingestion of bodily fluids of infected patients.

Eyes: Exposure is possible through contact with bodily fluids of infected patients.

Personnel Safety

First Aid: For skin decontamination, wash with warm soapy water, taking care not to abrade the skin. Contaminated PPE, clothing, equipment, or surfaces can be decontaminated with a dilute household bleach solution. Household bleach is 5% sodium hypochlorite.

During Incident: Conduct medical monitoring; observe for fever and other signs and symptoms as listed under the Health Effects section above, and ensure medical attention is provided as soon as possible, if necessary.

Post Incident: Monitor for signs/symptoms and ensure medical attention is provided as soon as possible, if necessary.

PPE	Circumstances
Pressure-demand SCBA with Level A protective suit	• Event is uncontrolled. • The type(s) of airborne agent(s) is(are) unknown. • The dissemination method is unknown. • Dissemination via an aerosol-generating device is still occurring. • Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.
Pressure-demand SCBA with Level B protective suit	• The suspected biological aerosol is no longer being generated. • Other conditions may present a splash hazard.
Full-facepiece respirator with P100 filter or PAPR with HEPA filters	• An aerosol-generating device was not used to create high airborne concentration.
Disposable hooded coveralls, gloves, and foot coverings	• Dissemination was by a letter, package, or other material that can be bagged, contained.

Laboratory Safety and Containment Recommendations

BSL-4 practices, containment equipment, and facilities are recommended for all activities utilizing known or potentially infectious materials of human, animal, or arthropod origin. Clinical specimens from persons suspected of being infected with agent should be submitted to a laboratory with a BSL-4 maximum containment facility.

Francisella Tularensis (causes Tularemia)

Agent Characteristics

Agent Classification: Biological

Type: Bacteria (*Francisella tularensis*)

Description: *F. tularensis* is a pathogenic Gram-negative bacteria that causes tularemia (a.k.a. Pahvant Valley plague and rabbit fever). This zoonotic disease (transmissible from animals to humans) is found in humans, rodents, rabbits, squirrels, hares, ticks, biting flies, free-living amoebae, and carcasses. It is capable of surviving for weeks at low temperatures in water, moist soil, hay, straw or decaying carcasses. There are seven clinical presentations for tularemia: 1) pneumonic (most likely in a bio-terrorism event); 2) typhoidal (likely in a bioterrorism event); 3) ulceroglandular (most common natural form); 4) glandular; 5) oculoglandular; 6) oropharyngeal and 7) gastrointestinal. *Francisella tularensis*, the causative agent of tularemia, displays subspecies-specific differences in virulence, geographic distribution, and genetic diversity. *F. tularensis* subsp. *holarctica* is widely distributed throughout the Northern Hemisphere. In Europe, *F. tularensis* subsp. *holarctica* isolates have largely been assigned to two phylogenetic groups that have specific geographic distributions. Most isolates from Western Europe are assigned to the B.Br.FTNF002-00 group, whereas most isolates from Eastern Europe, including Georgia are assigned to numerous lineages within the B.Br.013 group. In November 2006, an outbreak of waterborne tularemia occurred in an eastern region in the Republic of Georgia. Outbreak investigation revealed 26 cases: 21 oropharyngeal and 5 glandular tularemia cases.

Biosafety Level: 3

CDC Class: A

Incubation Period: 1-10 days, up to 21 days, but typically 3-5 days.

Duration of Illness: 2 or more weeks, depending on how quickly treatment is provided.

Person-to-Person Transmission: No

Diagnosis and Treatment: Tularemia can be difficult to diagnose. It is a rare disease, and the symptoms can be mistaken for other more common illnesses. For this reason, it is

important to share with your health care provider any likely exposures, such as tick and deer fly bites, or contact with sick or dead animals. Blood tests and cultures can help confirm the diagnosis. Antibiotics used to treat tularemia include streptomycin, gentamicin, doxycycline, and ciprofloxacin. Treatment usually lasts 10 to 21 days depending on the stage of illness and the medication used. Although symptoms may last for several weeks, most patients completely recover.

Infectivity/Lethality: High (1-50 organisms) via inhalation route. If untreated, 30- 60% will die, decreases to 2% if treated.

Persistence/Stability: Can live for weeks in cold, moist soils. Minimally stable since believed inactivated 2 days after an outdoor release. *F. tularensis* can persist for 2 weeks in an indoor release.

Release/Exposure Scenarios

Air: *F. tularensis* can be made for dry or wet aerosol dispersion. Re-aerosolization is a consideration with weaponized *F. tularensis*, though it is thought to be unlikely. *F. tularensis* has been weaponized for dry and wet aerosol dispersion. The area of initial release might be difficult to identify because symptoms may take days to appear.

Soil: *F. tularensis* exists naturally (endemic in North America and Eurasia), can contaminate hay and soil and can live for weeks in cold, moist conditions.

Water: Water is a possible pathway for weaponized strain, and natural strain outbreaks have also occurred.

Health Effects

Onset: 3-5 days after aerosolized release, may present within 1-10 days and up to 21 days post exposure.

Signs/Symptoms per Exposure Route

General: The primary clinical forms of tularemia will vary in severity and presentation depending on virulence of the infecting organism, dose, and site of infection. Tularemia can be fatal without treatment and is an incapacitating disease in non-fatal cases.

Inhalation: Inhalation of *F. tularensis* can produce flu-like symptoms progressing to pneumonia, ulcers of the mouth, chest pain, breathing difficulty, bloody sputum, and respiratory failure.

Skin: Cutaneous infection through abraded or cracked skin can produce ulcers at the infection site and swollen lymph nodes. Cutaneous infections also result from bites from ticks and biting insects that have fed on infected animals or carcasses.

Ingestion: Eating/Drinking contaminated food/water can cause oropharyngeal tularemia. Typhoidal and gastrointestinal presentations may also occur; however, ingestion of a large number of organisms is required (10^6 to 10^8).

Other

The primary forms of tularemia are listed below:

- **Ulceroglandular:** This is the most common form of tularemia and usually occurs following a tick or deer-fly bite or after handling an infected animal. A skin ulcer appears at the site where the organism entered the body. The ulcer is accompanied by swelling of regional lymph glands, usually in the armpit or groin.
- **Glandular:** Similar to ulceroglandular tularemia but without an ulcer. Also generally acquired through the bite of an infected tick or deer fly or from handling sick or dead animals.
- **Oculoglandular:** This form occurs when the bacteria enter through the eye. This can occur when a person is butchering an infected animal and touches his or her eyes. Symptoms include irritation and inflammation of eye and swelling of lymph glands in front of the ear.
- **Oropharyngeal:** This form results from eating or drinking contaminated food or water. Patients with oropharyngeal tularemia may have sore throat, mouth ulcers, tonsillitis, and swelling of lymph glands in the neck.
- **Pneumonic:** This is the most serious form of tularemia. Symptoms include cough, chest pain, and difficulty breathing. This form results from breathing dusts or aerosols containing the organism. It can occur also when other forms of tularemia

(e.g. ulceroglandular) are left untreated and the bacteria spread through the bloodstream to the lungs.

Case Classification

Probable: a clinically compatible case with laboratory results indicative of presumptive infection

Confirmed: a clinically compatible case with confirmatory laboratory results

Effect Levels

Infectivity: The organism is highly infectious by the inhalation route. Long-term immunity usually follows recovery from tularemia. However, re-infection has been reported.

Infective Dose: Fifty percent of people that inhale 1 to 50 organisms may contract tularemia. The ingestion pathway requires orders of magnitude more organisms.

Lethality: Less than 7% for pneumonic and typhoidal forms, if appropriate antibiotic therapy is provided early. The other forms are usually not fatal.

Personnel Safety

Concerns: Level of PPE may vary depending upon the incident and site specific circumstances. The PPE levels listed are general suggestions only and are appropriate only for *F. tularensis*; they may not provide protection for chemicals that workers may be exposed to during response/recovery operations.

Medical

Baseline: No internationally approved vaccine exists.

Treatments Available: Supportive accompanied with antibiotics, such as streptomycin.

First Aid

During Incident: Conduct medical monitoring; use PPE as designated by the HASP; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) other conditions may present a splash hazard.

3) Full-facepiece respirator with P100 filter or PAPR with HEPA filters, when an aerosol-generating device was not used to create high airborne concentrations.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for activities involving clinical materials of human or animal origin suspected or known to contain *F. tularensis*. Laboratory personnel should be informed of the possibility of tularemia as a differential diagnosis when samples are submitted for diagnostic tests. BSL-3 and ABSL-3 practices, containment equipment, and facilities are recommended for all manipulations of suspect cultures, animal necropsies and for experimental animal studies. Preparatory work on cultures or contaminated materials for automated identification systems should be performed at BSL-3. Characterized strains of reduced virulence such as *F. tularensis* Type B (strain LVS) and *F. tularensis* subsp *novicida* (strain U112) can be manipulated in BSL-2. Manipulation of reduced virulence strains at high concentrations should be conducted using BSL-3 practices.

Hantavirus

Agent Characteristics

Agent Classification: Biological

Type: Virus

Family: Bunyaviridae

Genus: Hantavirus, Hantaan virus, Seoul virus, Puumala virus, Sin Nombre

Description:

There are two primary diseases caused by the various viruses. Hantavirus Pulmonary Syndrome (HPS) (sometimes called Hantavirus Cardiopulmonary Syndrome [HCPS] when deaths are caused by cardiogenic shock) is primarily found in North and South America (Andes virus) and primarily affects the pulmonary system. Hemorrhagic Fever with Renal Syndrome (HFRS) affects the kidneys and is primarily found in Asia (Hantaan virus), Scandinavia (Puumala virus), Balkans (Dobrava-Belgrade virus) and Worldwide (Seoul virus). Transmission of the naturally occurring diseases is either by the bite of infected rodents or via aerosolization of the virus from rodent urine, feces, saliva, and nesting materials. In a bioterrorism event, humans may contract the disease by breathing in aerosolized virus.

Biosafety Level: 4

CDC Class: C

Incubation: 1-5 weeks, with 8 weeks for some cases of viruses causing HFRS.

Person-to-Person Transmission: Yes, contact with infected bodily fluids or excreta of live or dead victims (e.g. Andes virus, etc.)

Other Forms of Transmission: Yes, contact with infected fluids or excreta of live or dead non-human hosts

Treatments: NO VACCINE AVAILABLE; treatment is supportive

Infectivity/Lethality: HPS: High/1-50%; HFRS: Moderate/1-15%

Primary non-human host: Rodent

Persistence/Stability: Known to persist in bodily fluids or excreta of live or dead host for extended periods. Hantavirus persistence is affected by types of environmental matrices and intentional stabilization (i.e. weapons-grade).

Release Scenarios

Air/Aerosolization: Hantavirus, in nature, is spread via aerosolization. In a bioterrorism event, Hantavirus may be engineered to be even more aerosolizable. Its reaerosolization ability will depend upon the size and physical properties of the contaminated matrix in which it resides and may quickly lead to the virus spreading throughout a building and surrounding areas. Hantavirus can be released indoors and outdoors. An outdoor release of Hantavirus has the potential to travel from the immediate area, increasing the scope of the response.

Soil /Surfaces: Hantaviruses can survive on surfaces and in soil.

Water: Hantaviruses may survive in water.

Other: Hantaviruses are naturally occurring and endemic throughout the world.

Health Effects

Onset CAUTION: HANTAVIRUSES ARE INFECTIVE VIA ALL EXPOSURE ROUTES

Symptoms of HPS typically occur 1- 5 weeks after exposure. Symptoms of HFRS typically occur up to 8 weeks after exposure.

Signs/Symptoms per Exposure Route

General: Two clinical syndromes are associated with exposure to Hantavirus: hemorrhagic fever with renal syndrome (HFRS) and cardio-pulmonary syndrome (HCPS). Initial symptoms for both syndromes are similar and include flu-like symptoms such as fever, headache, muscle aches, abdominal pain, nausea, rapid heartbeat and decrease in blood pressure and heart efficiency. HFRS causes an excessive production of urine and kidney failure. With HFRS, individuals develop difficulty in breathing, coughing, and shortness of breath that can progress to an acute cardiopulmonary phase leading to cardiovascular shock.

Infectivity: The various genera of Hantavirus are presumed to be highly infective if aerosolized.

Infective Dose: Unknown

Lethality: Hantavirus has a 1-50% mortality rate associated with HPS and a 1-15% rate for HFRS.

Clinical Description

Hantavirus pulmonary syndrome (HPS), commonly referred to as Hantavirus disease, is a febrile illness characterized by bilateral interstitial pulmonary infiltrates and respiratory compromise usually requiring supplemental oxygen and clinically resembling acute respiratory disease syndrome (ARDS). The typical prodrome consists of fever, chills, myalgia, headache, and gastrointestinal symptoms. Typical clinical laboratory findings include hemoconcentration, left shift in the white blood cell count, neutrophilic leukocytosis, thrombocytopenia, and circulating immunoblasts.

Clinical Criteria

An illness characterized by one or more of the following clinical features:

- A febrile illness (i.e. temperature greater than 101.0°F or 38.3°C) corroborated by bilateral diffuse interstitial edema or a clinical diagnosis of ARDS or radiographic evidence of noncardiogenic pulmonary edema, or unexplained respiratory illness resulting in death, and occurring in a previously healthy person.
- An unexplained respiratory illness resulting in death, with an autopsy examination demonstrating noncardiogenic pulmonary edema without an identifiable cause.

Laboratory Criteria for Diagnosis

- Detection of hantavirus-specific immunoglobulin M or rising titers of hantavirus-specific immunoglobulin G, OR
- Detection of hantavirus-specific ribonucleic acid sequence by polymerase chain reaction in clinical specimens, OR
- Detection of Hantavirus antigen by immunohisto chemistry.

Case Classification

Confirmed: A clinically compatible case that is laboratory confirmed

Personnel Safety

First Aid

During Incident: Conduct medical monitoring; use PPE; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided AS SOON AS POSSIBLE.

PPE

CAUTION: UNTIL SAMPLING CONFIRMS THE VIRAL AGENT WON'T OR CAN'T BREAKTHROUGH EITHER A P100 or HEPA FILTER, RESPONDERS SHOULD USE A SELF CONTAINED BREATHING APPARATUS (SCBA) FOR RESPIRATORY PROTECTION.

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) viral agent is airborne or aerosolizable, c) the dissemination method is unknown, d) performing decontamination rinsing and washing of workers in Level A protective suits because of an airborne or aerosolizable viral agent.

2) Pressure-demand SCBA with Level B protective suit, when: a) the viral agent is no longer a reaerosolization threat but the viral agent's breakthrough ability for P100 or HEPA filters is not known, b) response operations may cause a splash hazard.

3) Full-face piece respirator with P100 filter or PAPR with HEPA filters, when sampling confirms the viral agent won't or can't breakthrough the P100 or HEPA filter.

4) Disposable hooded coveralls, gloves, and foot coverings, when there is NO threat of airborne release or re-aerosolization of the viral agent.

Workers: PPE recommendations will vary by job type (e.g., cleanup, decon, etc.), type of exposure (e.g. airborne or surface/liquid/soil hazard), and any other site hazards (e.g. chemical, physical, etc.).

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for laboratory handling of sera from persons potentially infected with hantaviruses. The use of a certified Biological Safety Cabinet (BSC) is recommended for all handling of human body fluids when potential exists for splatter or aerosol.

Potentially infected tissue samples should be handled in BSL-2 facilities following BSL-3 practices and procedures. Cell-culture virus propagation and purification should be carried out in a BSL-3 facility using BSL-3 practices, containment equipment and procedures.

Experimentally infected rodent species known not to excrete the virus can be housed in ABSL-2 facilities using ABSL-2 practices and procedures. Primary physical containment devices including BSCs should be used whenever procedures with potential for generating aerosols are conducted. Serum or tissue samples from potentially infected rodents should be handled at BSL-2 using BSL-3 practices, containment equipment and procedures. All work involving inoculation of virus-containing samples into rodent species permissive for chronic infection should be conducted at ABSL-4.

Coxiella burnetii (causes Q Fever Disease)

Agent Characteristics

Agent Classification: Biological

Type: Bacteria (*Coxiella burnetii*)

Description: *C. burnetii* is an obligate intracellular Gram negative microorganism found in humans, cattle, sheep, goats, cats, and rabbits. *C. burnetii* is resistant to heat, drying, and many common disinfectants. *C. burnetii* does not usually cause illness in livestock; however, the microorganisms are found in body fluids, milk, urine, and feces of infected animals. Q fever is a zoonotic disease (transferable between animals and humans) caused by *C. burnetii*. Infection of humans occurs through inhalation of the organisms from the air, and very few organisms are needed to cause disease. Approximately 50% of infected people show signs of illness. No cases have been reported in Georgia.

Biosafety Level: 3

CDC Class: B

Incubation Period: 9-28 days

Person-to-Person Transmission: Yes, via contact with body fluids or thru unprotected sexual contact.

Other Forms of Transmission: Tick bite

Treatment: Supportive with antibiotics like doxycycline.

Infectivity/Lethality: High/Low

Persistence/Stability: Persistent in soil for months. Stable because resistant to heat, drying, and many common disinfectants, which enables the bacteria to survive for long periods of time in the environment.

Release Scenarios

CAUTION: RE-AEROSOLIZATION IS A CONCERN FOR ALL RELEASE SCENARIOS.

Air: *C. burnetii* poses an aerosol threat in its natural and specially engineered forms. Transmitted commonly by airborne dissemination of small cell variants (spore-like particles) in dust from contaminated surfaces; microorganisms may be carried >0.5 mile downwind.

Soil: Persists in soil for months due to its resistance to heat and desiccation.

Surfaces: Persists on surfaces for months due to its resistance to desiccation and common disinfectants.

Water: *C. burnetii* can pose a water threat.

Food: Unpasteurized milk and dairy products.

Other: To avoid animal to man transmission, milk should be pasteurized; dust control in agricultural related industries is essential and animal placentas, feces, and urine should be incinerated.

Health Effects

Onset: Symptoms may occur 9-28 days and the illness may last for weeks.

Signs/Symptoms per Exposure Route

General: Acute Q fever is characterized by sudden onset of fever, headache, malaise and interstitial pneumonitis. Pneumonia occurs frequently. Approximately 50% of infected people show signs of illness. Only 1-2% of people with acute Q fever die and most patients will recover without any treatment. A few people may develop chronic Q fever, an uncommon but serious disease, 1-20 years after the initial infection. Therefore, early treatment and diagnosis is important. Uncommon complication include chronic hepatitis, endocarditis (inner heart layer inflammation), aseptic meningitis (inflammation of brain membranes), encephalitis (inflammation of the brain), and osteomyelitis (infection of the bone).

Inhalation: Primary route of exposure via dust from contaminated surfaces/premises.

Skin: Direct contact with infected animals and after-birth tissue, wool, straw, manure fertilizer and clothing of exposed personnel.

Ingestion: Ingestion of unpasteurized milk and dairy products has been responsible for some cases.

Effect Levels

Infectivity: *C. burnetii* is considered to be highly infectious.

Infective dose: As little as one organism can cause Q fever in a susceptible individual.

Lethality: Lethality <2% for treated individuals.

Personnel Safety

Concerns: Decisions regarding PPE level, sampling, and decontamination should not be made without verifying whether the Q fever outbreak was naturally occurring or from an engineered source. Level of PPE may vary depending upon the incident and site specific circumstances. The PPE levels listed are general suggestions only and may not provide protection for some decon and other chemicals that workers may be exposed to during response/recovery operations. For decontamination of workers, use warm soapy water, taking care to avoid abrading the skin.

First Aid

During Incident: Conduct medical monitoring; use PPE; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) Other conditions may present a splash hazard.

3) Full-facepiece respirator with P100 filter or PAPR with HEPA filters, when an aerosol-generating device was not used to create high airborne concentrations.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

BSL-2 practices and facilities are recommended for nonpropagative laboratory procedures, including serological examinations and staining of impression smears. BSL-3 practices and facilities are recommended for activities involving the inoculation, incubation, and harvesting of embryonated eggs or cell cultures, the necropsy of infected animals and the manipulation of infected tissues. Experimentally infected animals should be maintained under ABSL-3 because infected rodents may shed the organisms in urine or feces. A specific plaque-purified clonal isolate of an avirulent (Phase II) strain (Nine Mile) may be safely handled under BSL-2 conditions.

Severe Acute Respiratory Syndrome (SARS)

General Information

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus, called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. Over the next few months, the illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained.

The SARS Outbreak of 2003

According to the World Health Organization (WHO), a total of 8,098 people worldwide became sick with SARS during the 2003 outbreak. Of these, 774 died.

Symptoms of SARS

In general, SARS begins with a high fever (temperature greater than 100.4°F [$>38.0^{\circ}\text{C}$]). Other symptoms may include headache, an overall feeling of discomfort, and body aches. Some people also have mild respiratory symptoms at the outset. About 10 percent to 20 percent of patients have diarrhea. After 2 to 7 days, SARS patients may develop a dry cough. Most patients develop pneumonia.

Transmission

The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes. Droplet spread can happen when droplets from the cough or sneeze of an infected person are propelled a short distance (generally up to 3 feet) through the air and deposited on the mucous membranes of the mouth, nose, or eyes of persons who are nearby. The virus also can spread when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose, or eye(s). In addition, it is possible that the SARS virus might spread more broadly through the air (airborne spread) or by other ways that are not now known.

What does “close contact” mean?

In the context of SARS, close contact means having cared for or lived with someone with SARS or having direct contact with respiratory secretions or body fluids of a patient with SARS. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking to someone within 3 feet, and touching someone directly.

Laboratory Safety and Containment Recommendations

The following procedures may be conducted in the BSL-2 setting: pathologic examination and processing of formalin-fixed or otherwise inactivated tissues, molecular analysis of extracted nucleic acid preparations, electron microscopic studies with glutaraldehyde-fixed grids, routine examination of bacterial and fungal cultures, routine staining and microscopic analysis of fixed smears, and final packaging of specimens for transport to diagnostic laboratories for additional testing (specimens should already be in a sealed, decontaminated primary container).

Activities involving manipulation of untreated specimens should be performed in BSL-2 facilities following BSL-3 practices. In the rare event that a procedure or process involving untreated specimens cannot be conducted in a BSC, gloves, gown, eye protection, and respiratory protection, filter respirator [N-95 or higher level] or a PAPR equipped with HEPA filters) should be used.

Work surfaces should be decontaminated upon completion of work with appropriate disinfectants. All waste must be decontaminated prior to disposal.

SARS-CoV propagation in cell culture and the initial characterization of viral agents recovered in cultures of SARS specimens must be performed in a BSL-3 facility using BSL-3 practices and procedures. Inoculation of animals for potential recovery of SARS-CoV from SARS samples, research studies, and protocols involving animal inoculation for characterization of putative SARS agents must be performed in ABSL-3 facilities using ABSL-3 work practices. Respiratory protection should be used as warranted by risk assessment.

In the event of any break in laboratory procedure or accidents (e.g., accidental spillage of material suspected of containing SARS-CoV), procedures for emergency exposure management and/or environmental decontamination should be immediately implemented and the supervisor should be notified.

Smallpox (Variola major, Variola minor)

Agent Characteristics

Agent Classification: Biological

Type: Virus

Description: Orthopoxviruses are double-stranded DNA-enveloped viruses. There are two clinical forms of orthopoxvirus that causes smallpox: Variola major and Variola minor. Smallpox caused by Variola major is more common and more severe, producing an extensive rash and high fever. Variola major smallpox occurs in three forms in the unvaccinated: 1) “ordinary-type” smallpox producing pronounced pustules and accounts for more than 90% of cases; 2) “flat-type” smallpox characterized by severe toxemia and flat, velvety, confluent lesions that do not progress to the pustular stage, and 3) “hemorrhagic-type” smallpox characterized by blood poisoning and a hemorrhagic rash. Smallpox caused by Variola major in the vaccinated is the “modified-type” smallpox characterized by fewer lesions and is rarely fatal. Smallpox caused by Variola minor is less common and much less severe. This virus is not zoonotic as humans are the only natural host.

Biosafety Level: 4

CDC Class: A

Incubation Period: 7-19 days

Duration of Illness: 2 or more weeks, depending on how quickly treatment is provided.

Person-to-Person Transmission: Yes, via inhalation or physical contact with infected bodily fluids (e.g. blood, saliva) smallpox pustules, fluid within the pustules, and crusted scabs are also infective. Smallpox is most contagious within 7-10 days following the onset of rash.

Other Forms of Transmission: Yes, inhalation or physical contact with infected bodily fluids present on contaminated objects (e.g. bedding, clothing).

Infectivity/Lethality: High (only 10-100 virus particles are needed). Variola major: lethality approximately 30%, Variola minor lethality approximately 1% in unvaccinated and untreated individuals.

Diagnosis and Treatment: There are no proven treatments for smallpox; medical care is generally supportive. Vaccination can prevent or lessen the severity of disease if given within 2-3 days of the initial exposure and decreases symptoms if given within the first week of exposure. Medical care is general supportive accompanied with possible home quarantine.

Persistence/Stability: Orthopoxviruses show a high resistance to drying and are stabilized when associated with dermal crust, serum, blood, and other bodily excretions. Contaminated dust and textiles remain infectious for several years. Purified virus particles from culture are not thought to be as persistent as those from infected individuals. Heat and humidity make the virus less stable.

Release Scenarios

Air/Aerosolization: Smallpox can be aerosolized for a bio-terrorism event and can be released either in an indoor or outdoor environment. While devices designed to detect aerosolized versions of the orthopoxvirus are available, airborne releases are likely to be identified only after exposed persons become ill. Environmental sampling will be needed to test for evidence of aerosolization of orthopoxvirus and effectiveness of decontamination.

Surfaces: Stability of the orthopoxvirus is weakened with heating/humidity. In an outdoor release, the orthopoxvirus should be inactive within 24 hours. In an indoor release, the virus can persist for up to 17 weeks on clothing and certain surfaces.

Food/Water: When stored at 4⁰C, orthopoxviruses have been isolated from contaminated food for up to 14 days and from contaminated storm water for up to 166 days.

Health Effects

Onset: Symptoms occur within 7-19 days after exposure.

Signs/Symptoms

General: Symptoms include high fever, malaise, aching pains, headaches, and a rash that develops first in the mouth and throat. The rash then covers the body and produces raised bumps. These bumps then become pustules that are raised, round, and firm. The pustules form a crust and then a scab. Scabs fall off leaving scars. Victims are most infectious

during the week after appearance of mouth and throat rash and are not contagious when all scabs have fallen off. Smallpox may debilitate the victim to such an extent that they are susceptible to opportunistic concurrent bacterial infections that have been known to cause residual disabilities (e.g. blindness) even after recovery.

First Aid

During Incident: Conduct medical monitoring; use PPE as designated by the HASP; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects, and, if necessary, ensure medical attention is provided as soon as possible

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) viral agent is airborne or aerosolizable, c) dissemination method is unknown, d) Performing decon rinsing and washing of workers in Level A protective suits because of an airborne or aerosolizable viral agent.

2) Pressure-demand SCBA with Level B protective suit, when: a) the viral agent is no longer a reaerosolization threat but the viral agent's breakthrough ability for P100 or HEPA filters is not known, b) response operations may cause a splash hazard.

3) Full-face piece respirator with P100 filter or PAPR with HEPA filters, when sampling confirms the viral agent won't or can't breakthrough the P100 or HEPA filter.

4) Disposable hooded coveralls, gloves, and foot coverings, when there is NO threat of airborne release or re-aerosolization of the viral agent.

Laboratory Safety and Containment Recommendations

Worldwide, all live variola virus work is to be done only within WHO approved BSL-4/ABSL-4 facilities. In general, all persons working in or entering laboratory or animal care areas where activities with vaccinia, monkey pox, or cowpox viruses are being conducted should have evidence of satisfactory vaccination. Vaccination is advised every

three years for work with monkeypox virus and every 10 years for cowpox and vaccinia viruses (neither vaccination nor vaccinia immunoglobulin protect against poxviruses of other genera).

ABSL-3 practices, containment equipment, and facilities are recommended for monkeypox work in experimentally or naturally infected animals. BSL-2 facilities with BSL-3 practices are advised if vaccinated personnel perform other work with monkeypox virus. These practices include the use of Class I or II BSCs and barriers, such as safety cups or sealed rotors, for all centrifugations. The NIH Guidelines have assessed the risk of manipulating attenuated vaccinia strains (modified virus Ankara [MVA], NYVAC, TROVAC, and ALVAC) in areas where no other human orthopoxviruses are being used and have recommended BSL-1. However, higher levels of containment are recommended if these strains are used in work areas where other orthopoxviruses are manipulated. Vaccination is not required for individuals working only in laboratories where no other orthopoxviruses or recombinants are handled. BSL-2 and ABSL-2 plus vaccination are recommended for work with most other poxviruses.

Tick-Borne Encephalitis (TBE)

Agent Characteristics

Agent Classification: Biological

Type: Virus

Family: Flaviviridae

Genus: Flavivirus

Description: Flaviviruses are small lipid-enveloped RNA viruses responsible for disease of the central nervous system. Three virus sub-types are: European or Western TBE virus; Siberian TBE virus, and Far eastern TBE virus (formerly known as Russian Spring/Summer encephalitis virus). Ticks act as both vector and reservoir, small mammals could also act as reservoir for TBE. Humans are infected with TBE through tick bites and possibly through consumption of raw milk from goats, sheep, or cows. Goats, sheep, and cows can be infected without showing signs of illness. TBE virus transmission has infrequently been reported through laboratory exposure and slaughtering viremic animals. Direct person-to-person spread of TBE occurs only rarely, through blood transfusion or breastfeeding.

Biosafety Level: 4

CDC Category: C

Incubation: 7-14 days

Person-to-Person Transmission: No, except from infected mother to fetus.

Treatment: Once diagnosed, treatment is supportive.

Infectivity/Lethality: Unknown/Variable (up to 40% dependent upon viral species). If death occurs, it is usually 5 to 7 days after onset of neurologic signs.

Persistence/Stability: Persistent and stable in the tick and its offspring.

Release Scenarios

Air/Aerosolization: No; however, aerosolization may be possible if weaponized. Laboratory-acquired infections have occurred; known to be a laboratory aerosol hazard, when not using proper biosafety precautions.

Soil/Surfaces: Unknown.

Food: Possibly from consumption of raw milk from infected goats, sheep, or cows.

Water: Unknown.

Other: Diseased ticks released into their natural environment.

Health Effects

Onset: Symptoms may occur within 7-14 days after exposure.

Signs/Symptoms per Exposure Route

General: The disease usually has two phases. In the initial phase, signs and symptoms include fever, fatigue, dizziness, muscle aches, loss of strength, and exhaustion. The second phase occurs in about 20-30% of those infected and involves the central nervous system with symptoms of meningitis (i.e. fever, headache, and a stiff neck) or encephalitis (i.e. drowsiness, confusion, sensory disturbances, and motor abnormalities such as paralysis) or meningo-encephalitis. TBE disease is usually more severe in adults than in children.

Effect Levels

Specific Effect Levels: Unknown.

Infective Dose: Unknown.

Infectivity: Unknown.

Lethality: Fatality rates up to 40% have been reported for the far-eastern subtype of TBE virus.

Personnel Safety

Concerns NOTE: No internationally approved vaccine exists. Level of PPE may vary depending upon the incident and site-specific circumstances.

How to Properly Remove a Tick

If you find a tick attached to your skin, there's no need to panic. There are several tick removal devices on the market, but a plain set of fine-tipped tweezers will remove a tick quite effectively.

1. Use fine-tipped tweezers to grasp the tick as close to the skin's surface as possible.
2. Pull upward with steady, even pressure. Don't twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the

mouth-parts with tweezers. If you are unable to remove the mouth easily with clean tweezers, leave it alone and let the skin heal.

3. After removing the tick, thoroughly clean the bite area and your hands with rubbing alcohol, an iodine scrub, or soap and water.

Avoid folklore remedies such as "painting" the tick with nail polish or petroleum jelly, or using heat to make the tick detach from the skin. Your goal is to remove the tick as quickly as possible--not waiting for it to detach.

If you develop a rash or fever within several weeks of removing a tick, see your doctor. Be sure to tell the doctor about your recent tick bite, when the bite occurred, and where you most likely acquired the tick.

Medical

Treatments Available: If exposed, seek medical attention. There is no specific antiviral treatment for TBE; therapy consists of supportive care and management of complications.

First Aid

During Incident: Conduct medical monitoring; use PPE, record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects, and, if necessary, ensure medical attention is provided as soon as possible. Thoroughly examine body for ticks; if found remove as cited above.

Post Incident: Monitor for signs/symptoms and, if necessary, ensure medical attention is provided as soon as possible.

PPE (aerosolized release)

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

- 1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) dissemination via an aerosol-generating device has

stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) other conditions may present a splash hazard.

3) Full-facepiece respirator with P100 filter or PAPR with HEPA filters, when an aerosol-generating device was not used to create high airborne concentration.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

BSL-3 practices, containment equipment, and facilities are recommended for activities using potentially infectious clinical materials and infected tissue cultures, animals, or arthropods.

Yersinia pestis (Causes Plague)

Agent Characteristics

Agent Classification: Biological

Type: Bacteria (*Y. pestis*)

Description: *Y. pestis* is a pathogenic Gram-negative bacteria found in humans, rodents (e.g., rats, prairie dogs, various squirrels, and marmots) and black footed ferrets. Fleas act as the vector between infected animals and humans. Pets may also bring plague-infected fleas into the home. This zoonotic vector borne disease can present in three forms: 1) **Pneumonic** plague affects the respiratory system and is transmissible person-to-person and via a bio-terror aerosol. Pneumonic plague may occur secondarily to bubonic or septicemic plague. Pneumonic plague is naturally occurring but very rare. 2) **Bubonic** plague is an infection of the lymphatic system and is the most common form. 3) **Septicemic** plague is an infection of the bloodstream. There are endemic foci of plague in Georgia.

Biosafety Level: 3

CDC Class: A

Incubation: 1-8 days (bubonic); 1-3 days (pneumonic via person to person or bio-terror)

Duration of Illness: Dependent on form of illness and treatment.

Person-to-Person Transmission: pneumonic: yes; bubonic: no.

Symptoms and Treatment

With pneumonic plague, the first signs of illness are fever, headache, weakness, and rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery sputum. The pneumonia progresses for 2 to 4 days and may cause respiratory failure and shock. Without early treatment, patients may die.

Early treatment of pneumonic plague is essential. To reduce the chance of death, antibiotics must be given within 24 hours of first symptoms. Streptomycin, gentamicin, the tetracyclines, and chloramphenicol are all effective against pneumonic plague. Antibiotic treatment for 7 days will protect people who have had direct, close contact

with infected patients. Wearing a close-fitting surgical mask also protects against infection.

Infectivity/Lethality: High for pneumonic if untreated, more than 90% will die within 24 hours of symptoms appearing. If prompt treatment is received the rate drops to less than 5%. Lethality is approximately 14% for other forms.

Persistence/Stability: The way in which *Y. pestis* persists in certain animal hosts and vector insects is not well understood. *Y. pestis* can be engineered to be stable in the environment. *Y. pestis* is rapidly inactivated by sunlight, desiccation, and heating and does not survive long without a host. In a World Health Organization (WHO) analysis of a worst-case scenario, aerosolized *Y. pestis* was estimated to be viable and infectious for as long as 1 hour without a host.

Release Scenarios

Air: Aerosolized *Y. pestis* is considered to be a bio-threat as it is the primary cause of pneumonic plague. Persons with pneumonic plague can infect others, within 6 feet of themselves, via droplets from coughing, sneezing, and breathing. If not “caught” by the BioWatch program, aerosolized releases of *Y. pestis* are likely to be confirmed only after patients present with pneumonic plague. During the incubation period, there would be minimal risk of further transmission of disease from the original aerosol release because *Y. pestis* is unstable in the environment.

Soil: Under controlled (temperature and humidity) soil conditions, *Y. pestis* can remain viable and infectious for up to 40 weeks.

Surfaces: Under controlled conditions, *Y. pestis* can remain viable for approximately 5 days after being suspended in solution, spread over a surface, and left to dry.

Water: May pose a water threat, *Y. pestis* has persisted 160 days in spring water under lab conditions.

Food: Infection can occur via contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

Other: Vector and reservoir control will be required to mitigate the potential of secondary plague outbreaks.

Health Effects

Onset: 1-8 days (bubonic) or 1-3 days (pneumonic).

Signs/Symptoms and Exposure Routes

General: It is critical for treatment to begin within 24 hours of first appearance of pneumonic symptoms.

Inhalation: Primary route of exposure for pneumonic plague, which occurs when *Y. pestis* infects the lungs. This type of plague can spread from person to person through the air. Transmission can take place if someone breathes in aerosolized bacteria via a dispersal device, which could happen in a bioterrorist attack, or if suspended in respiratory droplets from the cough, sneezing or breathing of an infected person or animal. Symptoms include high fever, chills, headache, hemoptysis (coughing blood), toxemia (blood poisoning), dyspnea (shortness of breath), stridor (noisy breathing), and cyanosis (bluish discoloration of the skin). Death results from respiratory failure, circulatory collapse, and bleeding. Becoming infected in this way usually requires direct and close contact with the ill person or animal. Pneumonic plague may also occur if a person with bubonic or septicemic plague is untreated and the bacteria spread to the lungs.

Skin: Primary route of exposure for bubonic plague via infected flea bites, or via contact with materials contaminated with *Y. pestis* entering through a break or crack in skin. Swollen, tender lymph nodes (buboes) will result, in addition to fever, headache, chills, and weakness.

Ingestion: Very rare, large number of organisms needed to cause bubonic plague. Buboes appear in the neck lymph nodes.

Eyes: Infection can occur from exposure to aerosolized *Y. pestis* or contaminated body fluids.

Blood: Septicemic plague occurs when plague bacteria multiply in the blood. It can be a complication of pneumonic or bubonic plague or it can occur by itself. When it occurs alone, it is caused in the same ways as bubonic plague; however, buboes do not develop. Patients have fever, chills, prostration, abdominal pain, shock, and bleeding into skin and other organs. Septicemic plague does not spread from person to person.

Case Classification

Suspected: A clinically compatible case without presumptive or confirmatory laboratory results.

Probable: A clinically compatible case with presumptive laboratory results.

Confirmed: A clinically compatible case with confirmatory laboratory results.

Effect Levels

Infectivity: The organism is highly infectious if aerosolized.

Infective Dose: 50% of people exposed to 10E2 to 10E4 microorganisms may become ill.

Lethality: Untreated pneumonic plague, >90%; with prompt treatment, <5%.

Personnel Safety

Concerns: Decisions regarding PPE and sampling should not be made without verifying whether the plague outbreak occurred naturally or from an engineered source. Level of PPE may vary depending upon the incident and site-specific circumstances. The PPE levels listed are general suggestions only and may not provide protection for chemicals that workers may be exposed to during response/recovery operations.

Medical

Baseline: There is no internationally approved human plague vaccine.

Treatments Available: Supportive accompanied with antibiotics, such as streptomycin and doxycycline.

First Aid

During Incident: Conduct medical monitoring; use PPE; record the PPE levels used; monitor for fever and other signs/symptoms as listed under Health Effects and, if necessary, ensure medical attention is obtained as soon as possible.

Post Incident: Monitor for signs/symptoms. If necessary, ensure medical attention is provided as soon as possible.

PPE

Emergency Response to a Suspected Biological Incident: Possible PPE levels for emergency responders are based on the following scenario risks from highest level of protection to least:

1) Pressure-demand Self Contained Breathing Apparatus (SCBA) with Level A protective suit, when: a) event is uncontrolled, b) the type(s) of airborne agent(s) is(are) unknown, c) the dissemination method is unknown, d) dissemination via an aerosol-generating device is still occurring, e) Dissemination via an aerosol-generating device has stopped, but there is no information on the duration of dissemination, or what the exposure concentration may be.

2) Pressure-demand SCBA with Level B protective suit, when: a) the suspected biological aerosol is no longer being released, b) other conditions may present a splash hazard.

3) Full-facepiece respirator with P100 filter or PAPR with HEPA filters, when an aerosol generating device was not used to create high airborne concentrations.

4) Disposable hooded coveralls, gloves, and foot coverings, when dissemination was by a letter, package, or other material that can be bagged, contained, etc.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for all activities involving the handling of potentially infectious clinical materials and cultures. In addition, because the infectious dose is so small, all work, including necropsies of potentially infected animals should be performed in a BSC. Special care should be taken to avoid generating aerosols or airborne droplets while handling infectious materials or when performing necropsies on naturally or experimentally infected animals. Gloves should be worn when handling potentially infectious materials including field or laboratory infected animals. BSL-3 is recommended for activities with high potential for droplet or aerosol production, and for activities involving large-scale production or high concentrations of infectious materials. Resistance of *Y. pestis* strains to antibiotics used in the treatment of plague should be considered in a thorough risk assessment and may require additional containment for personal protective equipment. For animal studies, a risk assessment that takes into account the animal species, infective strain, and proposed procedures should be performed in order to determine if ABSL-2 or ABSL-3 practices, containment equipment, and facilities should be employed. BSL-3 facilities and arthropod containment level 3 practices are recommended for all laboratory work involving infected arthropods.

Shiga Toxin-Producing *E. coli*

General Information

Escherichia coli (*E. coli*) bacteria normally live in the intestines of humans and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract. However, some *E. coli* are pathogenic, meaning they can cause illness, either diarrhea or illness, outside of the intestinal tract. The types of *E. coli* that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals or persons.

Enterohemorrhagic *Escherichia coli* (EHEC) produces toxins, known as verotoxins or Shiga-like toxins because of their similarity to the toxins produced by *Shigella dysenteriae*. EHEC can grow in temperatures ranging from 7°C to 50°C, with an optimum temperature of 37°C. Some EHEC can grow in acidic foods, down to a pH of 4.4, and in foods with a minimum water activity (*A_w*) of 0.95. It is destroyed by thorough cooking of foods until all parts reach a temperature of 70°C or higher. *E. coli* O157:H7 is the most important EHEC serotype in relation to public health; however, other serotypes have frequently been involved in sporadic cases and outbreaks.

E. coli consists of a diverse group of bacteria. Pathogenic *E. coli* strains are categorized into pathotypes. Six pathotypes are associated with diarrhea and collectively are referred to as diarrheagenic *E. coli*.

- Shiga toxin-producing *E. coli* (STEC)—STEC may also be referred to as Verocytotoxin-producing *E. coli* (VTEC) or EHEC. This pathotype is the one most commonly heard about in the news in association with foodborne outbreaks.
- Enterotoxigenic *E. coli* (ETEC)
- Enteropathogenic *E. coli* (EPEC)
- Enteroaggregative *E. coli* (EAEC)
- Enteroinvasive *E. coli* (EIEC)
- Diffusely adherent *E. coli* (DAEC)

Where do STEC come from?

STEC live in the guts of ruminant animals, including cattle, goats, sheep, deer, and elk. The major source for human illnesses is cattle. STEC that cause human illness generally do not make animals sick. Other kinds of animals, including pigs and birds, sometimes are infected with STEC from the environment and may spread it.

Transmission

An increasing number of outbreaks are associated with the consumption of fruits and vegetables (sprouts, spinach, lettuce, coleslaw, salad) whereby contamination may be due to contact with faeces from domestic or wild animals at some stage during cultivation or handling. EHEC has also been isolated from bodies of water (ponds, streams), wells and water troughs, and has been found to survive for months in manure and water-trough sediments. Waterborne transmission has been reported, both from contaminated drinking-water and from recreational waters.

Person-to-person contact is an important mode of transmission through the oral-faecal route. An asymptomatic carrier state has been reported, where individuals show no clinical signs of disease but are capable of infecting others. The duration of excretion of EHEC is about one week or less in adults, but can be longer in children. Visiting farms and other venues where the general public might come into direct contact with farm animals has also been identified as an important risk factor for EHEC infection.

Risk Groups

People of any age can become infected. Very young children and the elderly are more likely to develop severe illness and hemolytic uremic syndrome (HUS) than others, but even healthy older children and young adults can become seriously ill.

Symptoms

Symptoms of the diseases caused by EHEC include abdominal cramps and diarrhea that may in some cases progress to bloody diarrhea (haemorrhagic colitis). Fever and vomiting may also occur. If there is fever, it usually is not very high (less than 38.5°C).

The incubation period can range from 3 to 8 days, with a median of 3 to 4 days. Most patients recover within 10 days, but in a small proportion of patients (particularly young

children and the elderly), the infection may lead to a life-threatening disease, such as HUS. HUS is characterized by acute renal failure, haemolytic anaemia and thrombocytopenia. It is estimated that up to 10% of patients with EHEC infection may develop HUS, with a case-fatality rate ranging from 3 to 5%. Overall, HUS is the most common cause of acute renal failure in young children. It can cause neurological complications (such as seizure, stroke and coma) in 25% of HUS patients and chronic renal sequelae, usually mild, in around 50% of survivors.

Persons who experience bloody diarrhea or severe abdominal cramps should seek medical care. Antibiotics are not part of the treatment of patients with EHEC disease and may possibly increase the risk of subsequent HUS.

Incubation period

The incubation period is usually 3-4 days after the exposure, but may be as short as 1 day or as long as 10 days. The symptoms often begin slowly with mild belly pain or non-bloody diarrhea that worsens over several days. HUS, if it occurs, develops an average 7 days after the first symptoms, when the diarrhea is improving.

Diagnosis

STEC infections are usually diagnosed through laboratory testing of stool specimens (feces). Identifying the specific strain of STEC is essential for public health purposes, such as finding outbreaks.

Treatment

Non-specific supportive therapy, including hydration, is important. Antibiotics should not be used to treat this infection. There is no evidence that treatment with antibiotics is helpful, and taking antibiotics may increase the risk of HUS. Antidiarrheal agents like Imodium® may also increase that risk.

Prevention

The prevention of infection requires control measures at all stages of the food chain, from agricultural production on the farm, to processing, manufacturing and preparation of foods in both commercial establishments and household kitchens.

Laboratory Safety and Containment Recommendations

Strict compliance with BSL-2 practices, containment equipment, and facilities are recommended for all activities utilizing known or potentially infectious clinical materials or cultures. Procedures with aerosol or high splash potential should be conducted with primary containment equipment or in devices such as a BSC or safety centrifuge cups. Personal protective equipment, such as splash shields, face protection, gowns, and gloves should be used in accordance with a risk assessment. The importance of proper gloving techniques and frequent and thorough hand washing is emphasized. Care in manipulating faucet handles to prevent contamination of cleaned hands or the use of sinks equipped with remote water control devices, such as foot pedals, is highly recommended. Special attention to the timely and appropriate decontamination of work surfaces, including potentially contaminated equipment and laboratory fixtures, is strongly advised. ABSL-2 practices and facilities are recommended for activities with experimentally or naturally infected animals.

Clostridium botulinum

Agent Characteristics:

A potent neurotoxin produced from *Clostridium botulinum* and rare strains of *C. butyricum* and *C. baratii*, which are anaerobic, spore-forming bacteria.

Type: Bacteria; *Clostridium botulinum* is the name of a group of bacteria.

Description: *C. botulinum* can be found in soil and grow best in low oxygen conditions. The bacteria form spores, which allow them to survive in a dormant state until exposed to conditions that can support their growth. There are seven types of botulism toxin designated by the letters A through G; only types A, B, E and F cause illness in humans.

Transmission

Foodborne botulism follows ingestion of toxin produced in food by *C. botulinum*. The most frequent source is home-canned foods, prepared in an unsafe manner. Wound botulism occurs when *C. botulinum* spores germinate within wounds. Infant botulism occurs when *C. botulinum* spores germinate and produce toxin in the gastrointestinal tract of infants.

Risk Groups

All persons; injection drug users are at increased risk for wound botulism.

Incubation Period

In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days

Symptoms

The classic symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness. Infants with botulism appear lethargic, feed poorly, are constipated, and have a weak cry and poor muscle tone. These are all symptoms of the muscle paralysis caused by the bacterial toxin. If untreated, these symptoms may progress to cause paralysis of the respiratory muscles, arms, legs, and trunk.

Treatment

The respiratory failure and paralysis that occur with severe botulism may require a patient to be on a breathing machine (ventilator) for weeks or months, plus intensive medical and nursing care. The paralysis slowly improves. Botulism can be treated with an antitoxin, which blocks the action of toxin circulating in the blood. If given before paralysis is complete, antitoxin can prevent worsening and shorten recovery time. Botulism can result in death due to respiratory failure. Patients who survive an episode of botulism poisoning may have fatigue and shortness of breath for years and long-term therapy may be needed to aid recovery.

Prevention

Many cases of botulism are preventable. Foodborne botulism has often been from home-canned foods with low acid content. Persons who do home canning should follow strict hygienic procedures to reduce contamination of foods. Because the botulinum toxin is destroyed by high temperatures, persons who eat home-canned foods should consider boiling the food for 10 minutes before eating it to ensure safety. Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs. Most infant botulism cases cannot be prevented because the bacteria that causes this disease is in soil and dust. The bacteria can be found inside homes on floors, carpet, and countertops even after cleaning. Honey can contain the bacteria that cause infant botulism; therefore, children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for activities that involve the organism or the toxin including the handling of potentially contaminated food. Solutions of sodium hypochlorite (0.1%) or sodium hydroxide (0.1N) readily inactivate the toxin and are recommended for decontamination of work surfaces and for spills. Autoclaving of contaminated materials also is appropriate.

Additional primary containment and personnel precautions, such as those recommended for BSL-3, should be implemented for activities with a high potential for aerosol or droplet production, or for those requiring routine handling of larger quantities of the

organism or of the toxin. ABSL-2 practices, containment equipment, and facilities are recommended for diagnostic studies and titration of toxin.

Hemorrhagic Fever Renal Syndrome (HFRS)

General Information

Hemorrhagic fever with renal syndrome (HFRS) is a group of clinically similar illnesses caused by Hantaviruses from the family Bunyaviridae. HFRS includes diseases such as Korean hemorrhagic fever, epidemic hemorrhagic fever, and nephropathis epidemica. The viruses that cause HFRS include Hantaan, Dobrava, Saaremaa, Seoul, and Puumala.

Description:

HFRS is found throughout the world. Hantaan virus is widely distributed in eastern Asia, particularly in China, Russia, and Korea. Puumala virus is found in Scandinavia, Western Europe, and western Russia. Dobrava virus is found primarily in the Balkans, and Seoul virus is found worldwide. Saaremaa is found in central Europe and Scandinavia. In the Americas, Hantaviruses cause a different disease known as Hantavirus pulmonary syndrome (HPS).

Transmission:

Rodents are the natural reservoir for hantaviruses. Known carriers include the striped field mouse (*Apodemus agrarius*), the reservoir for both the Saaremaa and Hantaan virus; the brown or Norway rat (*Rattus norvegicus*), the reservoir for Seoul virus; the bank vole (*Clethrionomys glareolus*), the reservoir for Puumala virus; and the yellow-necked field mouse (*Apodemus flavicollis*), which carries Dobrava virus.

People can become infected with these viruses and develop HFRS after exposure to aerosolized urine, droppings, or saliva of infected rodents or after exposure to dust from their nests. Transmission may also occur when infected urine or these other materials are directly introduced into broken skin or onto the mucous membranes of the eyes, nose, or mouth. In addition, individuals who work with live rodents can be exposed to hantaviruses through rodent bites from infected animals. Transmission from one human to another may occur, but is extremely rare.

Symptoms:

Symptoms of HFRS usually develop within 1 to 2 weeks after exposure to infectious material, but in rare cases, they may take up to 8 weeks to develop. Initial symptoms

begin suddenly and include intense headaches, back and abdominal pain, fever, chills, nausea, and blurred vision. Individuals may have flushing of the face, inflammation or redness of the eyes, or a rash. Later symptoms can include low blood pressure, acute shock, vascular leakage, and acute kidney failure, which can cause severe fluid overload. The severity of the disease varies depending upon the virus causing the infection. Hantaan and Dobrava virus infections usually cause severe symptoms, while Seoul, Saaremaa, and Puumala virus infections are usually more moderate. Complete recovery can take weeks or months.

Diagnosis:

Several laboratory tests are used to confirm a diagnosis of HFRS in patients with a clinical history compatible with the disease. Such patients are determined to have HFRS if they have serologic test results positive for Hantavirus infection, evidence of hantavirus antigen in tissue by immunohistochemical staining and microscope examination, or evidence of hantavirus RNA sequences in blood or tissue.

Treatment:

Supportive therapy is the mainstay of care for patients with hantavirus infections. Care includes careful management of the patient's fluid (hydration) and electrolyte (e.g., sodium, potassium, chloride) levels, maintenance of correct oxygen and blood pressure levels, and appropriate treatment of any secondary infections. Dialysis may be required to correct severe fluid overload. Intravenous ribavirin, an antiviral drug, has been shown to decrease illness and death associated with HFRS if used very early in the disease.

Depending upon which virus is causing the HFRS, death occurs in less than 1% to as many as 15% of patients. Fatality ranges from 5-15% for HFRS caused by Hantaan virus, and it is less than 1% for disease caused by Puumala virus.

Prevention:

Rodent control is the primary strategy for preventing Hantavirus infections. Rodent populations near human communities should be controlled, and rodents should be excluded from homes. Individuals should avoid contact with rodent urine, droppings,

saliva, and nesting materials, and the safety measures described below should be followed when cleaning rodent-infested areas.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for laboratory handling of sera from persons potentially infected with hantaviruses. The use of a certified BSC is recommended for all handling of human body fluids when potential exists for splatter or aerosol.

Potentially infected tissue samples should be handled in BSL-2 facilities following BSL-3 practices and procedures. Cell-culture virus propagation and purification should be carried out in a BSL-3 facility using BSL-3 practices, containment equipment and procedures.

Experimentally infected rodent species known not to excrete the virus can be housed in ABSL-2 facilities using ABSL-2 practices and procedures. Primary physical containment devices including BSCs should be used whenever procedures with potential for generating aerosols are conducted. Serum or tissue samples from potentially infected rodents should be handled at BSL-2 using BSL-3 practices, containment equipment and procedures. All work involving inoculation of virus-containing samples into rodent species permissive for chronic infection should be conducted at ABSL-4.

Highly Pathogenic Avian Influenza

Key Facts:

- Avian influenza (AI), commonly called bird flu, is an infectious viral disease of birds.
- Most avian influenza viruses do not infect humans; however some, such as H5N1, have caused serious infections in people.
- Outbreaks of AI in poultry may raise global public health concerns due to their effect on poultry populations, their potential to cause serious disease in people, and their pandemic potential.
- The majority of human cases of H5N1 infection have been associated with direct or indirect contact with infected live or dead poultry. There is no evidence that the disease can be spread to people through properly cooked food.
- Controlling the disease in animals is the first step in decreasing risks to humans.

Avian influenza H5N1 background:

The H5N1 virus subtype, a highly pathogenic AI virus, first infected humans in 1997 during a poultry outbreak in Hong Kong. Since its widespread re-emergence in 2003 and 2004, this avian virus has spread from Asia to Europe and Africa and has become entrenched in poultry in some countries, resulting in millions of poultry infections, several hundred human cases, and many human deaths. Outbreaks in poultry have seriously impacted livelihoods, the economy and international trade in affected countries. Ongoing circulation of H5N1 viruses in poultry, especially when endemic, continues to pose threats to public health, as these viruses have both the potential to cause serious disease in people and may have the potential to change into a form that is more transmissible among humans. Other influenza virus subtypes also circulate in poultry and other animals, and may also pose potential threats to public health. There were cases of poultry infection in Georgia in 2006. No human cases of avian influenza H5N1 were registered in Georgia.

Most Cases of H5N1 in People Have Been Linked to Contact with Infected Poultry

In the majority of cases, the person got HPAI H5N1 virus infection after direct or close contact with sick or dead infected poultry.

Other HPAI H5N1 risk factors include visiting a live poultry market and prolonged, unprotected close contact with a sick HPAI H5N1 patient. For some HPAI H5N1 cases, the source of exposure to HPAI H5N1 virus is unknown.

Seasonality of human cases of HPAI H5N1 has been observed with increases during months at the end and beginning of the year. This seasonality corresponds to the seasonality of HPAI H5N1 virus outbreaks among poultry, which increase during the relatively cooler periods. However, human cases can occur at any time, especially in countries where HPAI H5N1 is endemic in poultry.

Avian influenza H5N1 infections and clinical features in humans

The case fatality rate for H5N1 virus infections in people is much higher compared to that of seasonal influenza infections.

Incubation Period:

The incubation period for H5N1 avian influenza may be longer than that for normal seasonal influenza, which is around 2 to 3 days. Current data for H5N1 infection indicate an incubation period ranging from 2 to 8 days and possibly as long as 17 days. WHO currently recommends that an incubation period of 7 days be used for field investigations and the monitoring of patient contacts.

Clinical features:

In many patients, the disease caused by the H5N1 virus follows an unusually aggressive clinical course, with rapid deterioration and high fatality.

Initial symptoms include a high fever, usually with a temperature higher than 38°C, and other influenza-like symptoms. Diarrhea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums have also been reported as early symptoms in some patients.

On present evidence, difficulty in breathing develops around 5 days following the first symptoms. Respiratory distress, a hoarse voice, and a crackling sound when inhaling are commonly seen. Sputum production is variable and sometimes bloody

Antiviral treatment:

Evidence suggests that some antiviral drugs, notably oseltamivir, can reduce the duration of viral replication and improve prospects of survival.

In suspected cases, oseltamivir should be prescribed as soon as possible (ideally, within 48 hours following symptom onset) to maximize its therapeutic benefits.

Risk factors for human infection:

There is no evidence to suggest that the H5N1 virus can be transmitted to humans through properly prepared poultry or eggs. A few human cases have been linked to consumption of dishes made of raw, contaminated poultry blood. However, slaughter, defeathering, handling carcasses of infected poultry, and preparing poultry for consumption, especially in household settings, are likely to be risk factors.

Human pandemic potential:

The H5N1 AI virus remains one of the influenza viruses with pandemic potential, because it continues to circulate widely in some poultry populations, most humans likely have no immunity to it, and it can cause severe disease and death in humans. In addition to H5N1, other animal influenza virus subtypes reported to have infected people include avian H7 and H9, and swine H1 and H3 viruses. H2 viruses may also pose a pandemic threat. Therefore, pandemic planning should consider risks of emergence of a variety of influenza subtypes from a variety of sources.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are suitable for activities utilizing known or potentially infectious body fluids, and for cell culture passage of laboratory-adapted strains. BSL-3 is required for activities with high potential for aerosol production, work with production quantities or high concentrations of infectious materials, and for manipulation of infected transplantable tumors, field isolates and clinical materials from human cases. Strains of LCMV that are shown to be lethal in non-human primates should be handled at BSL-3. ABSL-2 practices, containment equipment, and facilities are suitable for studies in adult mice with mouse brain-passaged strains requiring BSL-2 containment. Work with infected hamsters also should be done at ABSL-3.

Multidrug-Resistant Tuberculosis (MDR-TB)

General Information

Tuberculosis (TB) is a disease caused by bacteria that are spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. In most cases, TB is treatable and curable; however, persons with TB can die if they do not get proper treatment.

The bacteria that cause TB can develop resistance to the antimicrobial drugs used to cure the disease. Multidrug-resistant tuberculosis (MDR-TB) is TB that does not respond to at least isoniazid and rifampicin, the two most powerful antituberculosis drugs. Every year, more MDR-TB cases are being reported. Up to 10% of the newly diagnosed and 31% of retreatment TB cases are caused by MDR strains in Georgia.

The primary cause of multidrug resistance is mismanagement of TB treatment. Most people with TB are cured by a strictly followed, 6-month drug regimen that is provided to patients with support and supervision. Inappropriate or incorrect use of antimicrobial drugs, or use of ineffective formulations of drugs, can cause drug resistance. Strong and enforced regulations to ensure acceptable, effective TB treatment can help control MDR-TB.

In some countries, it is becoming increasingly difficult to treat MDR-TB. Treatment options are limited and recommended medicines are not always available. In some cases even more drug-resistant TB is developing. Extensively drug-resistant TB, XDR-TB, is a form of MDR-TB that responds to even fewer available medicines.

There were about 650,000 cases of MDR-TB present in the world in 2010. It is estimated that about 9% of these cases were XDR-TB.

(XDR-TB is a rare type of MDR-TB that is resistant to isoniazid and rifampin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin).

Because XDR-TB is resistant to the most potent TB drugs, patients are left with treatment options that are much less effective.

XDR-TB is of special concern for persons with HIV infection or other conditions that can weaken the immune system. These persons are more likely to develop TB disease once they are infected, and also have a higher risk of death once they develop TB.

Transmission of TB:

Drug-susceptible TB and drug-resistant TB are spread the same way. TB bacteria are put into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks, or sings. These bacteria can float in the air for several hours, depending on the environment. Persons who breathe in the air containing these TB bacteria can become infected.

TB is not spread by

- Shaking someone's hand
- Sharing food or drink
- Touching bed linens or toilet seats
- Sharing toothbrushes
- Kissing

How does drug resistance happen?

Resistance to anti-TB drugs can occur when these drugs are misused or mismanaged. Examples include when patients do not complete their full course of treatment; when health-care providers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs; when the supply of drugs is not always available; or when the drugs are of poor quality.

Risk for getting MDR-TB:

Drug resistance is more common in people who:

- Do not take their TB medicine regularly
- Do not take all of their TB medicine as told by their doctor or nurse
- Develop TB disease again, after having taken TB medicine in the past
- Come from areas of the world where drug-resistant TB is common
- Have spent time with someone known to have drug-resistant TB disease

Prevention:

The most important thing a person can do to prevent the spread of MDR-TB is to take all of their medications exactly as prescribed by their health care provider. No doses should be missed and treatment should not be stopped early. Patients should tell their health care provider if they are having trouble taking the medications. If patients plan to travel, they should talk to their health care providers and make sure they have enough medicine to last while away.

Health care providers can help prevent MDR-TB by quickly diagnosing cases, following recommended treatment guidelines, monitoring patients' response to treatment, and making sure therapy is completed.

Another way to prevent getting MDR-TB is to avoid exposure to known MDR-TB patients in closed or crowded places such as hospitals, prisons, or homeless shelters. If you work in hospitals or health-care settings where TB patients are likely to be seen, you should consult infection control or occupational health experts.

Vaccination:

There is a vaccine for TB disease called Bacille Calmette-Guérin (BCG). It is used in some countries to prevent severe forms of TB in children. However, BCG is not generally recommended in the United States because it has limited effectiveness for preventing TB overall.

Symptoms:

The general symptoms of TB disease include feelings of sickness or weakness, weight loss, fever, and night sweats. The symptoms of TB disease of the lungs may also include coughing, chest pain, and coughing up blood.

Treatment:

TB is a treatable and curable disease. Active, drug-sensitive TB disease is treated with a standard 6-month course of four antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer. Without such supervision and support, treatment adherence can be difficult and the disease can

spread. The vast majority of TB cases can be cured when medicines are provided and taken properly.

Additional Information:

US CDC - Multidrug-Resistant TB (MDR TB) MMWRs

US CDC - Questions and Answers about TB

US CDC - Tuberculosis: General Information

US CDC - Tuberculin Skin Testing

US CDC Tuberculosis Information for International Travelers

Rabies

General Information

More than 55,000 people die of rabies every year, primarily in Asia and Africa.

For the period 1986-1995, a total of 40 rabies cases in humans were reported in Georgia.

In 2004, 2005 and 2006 there were 12, 10 and 7 reported cases, respectively, representing a significant increase in overall incidence for this period. Ninety-three percent (93%) of cases were caused by dog bites.

Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. The disease infects domestic and wild animals, and is spread to people through close contact with infected saliva via bites or scratches.

Transmission

People are infected following a deep bite or scratch by an infected animal. Dogs are the main host and transmitter of rabies. They are the source of infection in all of the estimated 50,000 human rabies deaths annually in Asia and Africa.

Bats are the source of most human rabies deaths in the United States of America and Canada. Bat rabies has also recently emerged as a public health threat in Australia, Latin America and Western Europe. However, in these regions, the number of human deaths due to bat rabies remains small compared to those due to dog bites. Human deaths following exposure to foxes, raccoons, skunks, jackals, mongooses and other wild carnivore host species are very rare.

Transmission can also occur when infectious material – usually saliva – comes into direct contact with human mucosa or fresh skin wounds. Human-to-human transmission by bite is theoretically possible but has never been confirmed.

Rarely, rabies may be contracted by inhalation of virus-containing aerosol or via transplantation of an infected organ. Ingestion of raw meat or other tissues from animals infected with rabies is not a source of human infection.

Incubation Period

The incubation period for rabies is typically 1–3 months, but may vary from <1 week to >1 year

Symptoms

The initial symptoms of rabies are fever and often pain or an unusual or unexplained tingling, pricking or burning sensation (paraesthesia) at the wound site.

As the virus spreads through the central nervous system, progressive, fatal inflammation of the brain and spinal cord develops. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

Diagnosis

No tests are available to diagnose rabies infection in humans before the onset of clinical disease, and, unless the rabies-specific signs of hydrophobia or aerophobia are present, the clinical diagnosis may be difficult. Human rabies can be confirmed intra-vitam and post mortem by various diagnostic techniques aimed at detecting whole virus, viral antigens or nucleic acids in infected tissues (brain, skin, urine or saliva).

Post-Exposure Prophylaxis (PEP)

Post-exposure prophylaxis (PEP) consists of:

- local treatment of the wound, initiated as soon as possible after exposure;
- a course of potent and effective rabies vaccine that meets WHO recommendations;
- and
- administration of rabies immunoglobulin, if indicated

Effective treatment soon after exposure to rabies can prevent the onset of symptoms and death.

Local Treatment of the Wound

Removing the rabies virus at the site of the infection by chemical or physical means is an effective means of protection. Therefore, prompt local treatment of all bite wounds and scratches that may be contaminated with rabies virus is important. Recommended first-aid procedures include immediate and thorough flushing and washing of the wound for a

minimum of 15 minutes with soap and water, detergent, povidone iodine or other substances that kill the rabies virus.

Recommended PEP

PEP depends on the type of contact with the suspected rabid animal (see table).

Categories of Contact with Suspect Rabid Animal	Post-exposure Prophylaxis Measures
Category I – touching or feeding animals, licks on intact skin	None
Category II – nibbling of uncovered skin, minor scratches or abrasions without bleeding	Immediate vaccination and local treatment of the wound
Category III – single or multiple transdermal bites or scratches, licks on broken skin; contamination of mucous membrane with saliva from licks, contacts with bats.	Immediate vaccination and administration of rabies immunoglobulin; local treatment of the wound

All Category II and III exposures assessed as carrying a risk of developing rabies require PEP. This risk is increased if:

- the biting mammal is a known rabies reservoir or vector species;
- the animal looks sick or has an abnormal behavior;
- a wound or mucous membrane was contaminated by the animal's saliva;
- the bite was unprovoked; and
- the animal has not been vaccinated

In developing countries, the vaccination status of the suspected animal alone should not be considered when deciding whether to initiate prophylaxis or not.

Risk Groups

Dog rabies potentially threatens over 3 billion people in Asia and Africa and is also frequent in Georgia.

Although all age groups are susceptible, rabies is most common in children under age 15. On average 40% of PEP regimens are given to children aged 5–14 years, and the majority are male.

Anyone in continual, frequent or increased danger of exposure to rabies virus – either by nature of their residence or occupation – is also at risk. Travelers with extensive outdoor exposure in rural, high-risk areas where immediate access to appropriate medical care may be limited should be considered at risk regardless of the duration of their stay. Children living in or visiting rabies-affected areas are at particular risk.

Prevention

Eliminating Rabies in Dogs

Rabies is a vaccine-preventable disease. The most cost-effective strategy for preventing rabies in people is by eliminating rabies in dogs through vaccination. Vaccination of animals (mostly dogs) has reduced the number of human (and animal) rabies cases in several countries, particularly in Latin America. However, recent increases in human rabies deaths in parts of Africa, Asia and Latin America suggest that rabies is re-emerging as a serious public health issue.

Preventive Immunization in People

Safe, effective vaccines can be used for pre-exposure immunization. This is recommended for travelers spending a lot of time outdoors, especially in rural areas, involved in activities such as bicycling, camping, or hiking as well as for long-term travelers and expatriates living in areas with a significant risk of exposure. Pre-exposure immunization is also recommended for people in certain high-risk occupations such as laboratory workers dealing with live rabies virus and other lyssaviruses, and people involved in any activities that might bring them professionally or otherwise into direct contact with bats, carnivores, and other mammals in rabies-affected areas.

Laboratory Safety and Containment Recommendations

BSL-2 and/or ABSL-2 practices, containment equipment, and facilities are recommended for all activities utilizing known or potentially infectious materials or animals. Pre-exposure rabies vaccination is recommended for all individuals prior to working with lyssaviruses or infected animals, or engaging in diagnostic, production, or research activities with these viruses. Rabies vaccination also is recommended for all individuals entering or working in the same room where lyssaviruses or infected animals are used. Prompt administration of postexposure booster vaccinations is recommended following

recognized exposures in previously vaccinated individuals per current guidelines. For routine diagnostic activities, it is not always feasible to open the skull or remove the brain of an infected animal within a BSC, but it is pertinent to use appropriate methods and personal protection equipment, including dedicated laboratory clothing, heavy protective gloves to avoid cuts or sticks from cutting instruments or bone fragments, and a face shield or PAPR to protect the skin and mucous membranes of the eyes, nose, and mouth from exposure to tissue fragments or infectious droplets.

If a Stryker saw is used to open the skull, avoid contacting brain tissue with the blade of the saw. Additional primary containment and personnel precautions, such as those described for BSL-3, are indicated for activities with a high potential for droplet or aerosol production, and for activities involving large production quantities or high concentrations of infectious materials.

Salmonella

Etiologic Agent

Enterobacteriaceae of the genus *Salmonella*, a gram-negative rod-shaped bacillus

Key Facts

A total of 2,501 different *Salmonella* serotypes have been identified up to 2004. While all serotypes can cause disease in humans, they are often classified according to their adaptation to animal hosts. A few serotypes have a limited host-spectrum (affect only one or a few animal species), for example *Salmonella* Typhi in primates; *Salmonella* Dublin in cattle; and *Salmonella* Choleraesuis in pigs. *Salmonella* Enteritidis and *Salmonella* Typhimurium are the two most important serotypes for salmonellosis transmitted from animals to humans.

Transmission

Salmonella live in the intestinal tracts of humans and other animals, including birds. *Salmonella* are usually transmitted to humans by eating foods contaminated with animal feces. Contaminated foods usually look and smell normal. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but any food, including vegetables, may become contaminated. Thorough cooking kills *Salmonella*. Food may also become contaminated by the hands of an infected food handler who did not wash hands with soap after using the bathroom.

Salmonella may also be found in the feces of some pets, especially those with diarrhea, and people can become infected if they do not wash their hands after contact with pets or pet feces. Reptiles, such as turtles, lizards, and snakes, are particularly likely to harbor *Salmonella*. Many chicks and young birds carry *Salmonella* in their feces.

Epidemiology

In addition to acquiring infection from contaminated food, human cases have also occurred where individuals have had contact with infected animals, including domestic animals such as cats and dogs. Domestic animals probably acquire the infection in the same way as humans; i.e. through consumption of contaminated raw meat, poultry or poultry-derived products.

Risk Groups

Salmonella affects all age groups. Groups at greatest risk for severe or complicated disease include infants, the elderly, and persons with compromised immune systems.

Diagnosis

Many different kinds of illnesses can cause diarrhea, fever, or abdominal cramps. Determining that Salmonella is the cause of the illness depends on laboratory tests that identify Salmonella in the stool of an infected person. Once Salmonella has been identified, further testing can determine its specific type.

Symptoms

Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons, the diarrhea may be so severe that the patient needs to be hospitalized.

Treatment

Salmonella infections usually resolve in 5-7 days and often do not require treatment other than oral fluids. Persons with severe diarrhea may require rehydration with intravenous fluids. Antibiotics, such as ampicillin, trimethoprim-sulfamethoxazole, or ciprofloxacin, are not usually necessary unless the infection spreads from the intestines. Third-generation cephalosporins (which need to be given by injection) are widely used in children with serious infections.

Quick Tips for Preventing Salmonella

- Cook poultry, ground beef, and eggs thoroughly. Do not eat or drink foods containing raw eggs, or raw (unpasteurized) milk.
- If you are served undercooked meat, poultry or eggs in a restaurant, don't hesitate to send it back to the kitchen for further cooking.
- Wash hands, kitchen work surfaces, and utensils with soap and water immediately after they have been in contact with raw meat or poultry.
- Be particularly careful with foods prepared for infants, the elderly, and the immunocompromised.

- Wash hands with soap after handling reptiles, birds, or baby chicks, and after contact with pet feces.
- Avoid direct or even indirect contact between reptiles (turtles, iguanas, other lizards, snakes) and infants or immunocompromised persons.
- Don't work with raw poultry or meat, and an infant (e.g., feed, change diaper) at the same time.
- Mother's milk is the safest food for young infants. Breastfeeding prevents salmonellosis and many other health problems.

Drug-resistant salmonella

Since the beginning of the 1990s, strains of *Salmonella* that are resistant to a range of antimicrobials, including first-choice agents for the treatment of humans, have emerged and are threatening to become a serious public health problem. This resistance results from the use of antimicrobials both in humans and animal husbandry. Multi-drug resistance to “critically important antimicrobials” is compounding the problems.

Laboratory Safety and Containment Recommendations

Strict compliance with BSL-2 practices, containment equipment, and facilities are recommended for all activities utilizing known or potentially infectious clinical materials or cultures. This includes conducting procedures with aerosol or high splash potential in primary containment devices such as a BSCs or safety centrifuge cups. Personal protective equipment should be used in accordance with a risk assessment, including splash shields, face protection, gowns, and gloves. The importance of proper gloving techniques and frequent and thorough hand washing is emphasized. Care in manipulating faucet handles to prevent contamination of cleaned hands or the use of sinks equipped with remote water control devices, such as foot pedals, is highly recommended. Special attention to the timely and appropriate decontamination of work surfaces, including potentially contaminated equipment and laboratory fixtures, is strongly advised. ABSL-2 facilities and practices are recommended for activities with experimentally infected animals.

Viruses causing Encephalitis

Etiologic Agent

Several alpha-, flavi- and bunya- viruses; chiefly, St. Louis encephalitis (SLE), western equine encephalitis (WEE), Venezuelan equine encephalitis (VEE), eastern equine encephalitis (EEE), La Crosse virus and other California serogroup viruses.

Key Facts

- Nipah virus causes severe illness characterized by inflammation of the brain (encephalitis) or respiratory diseases.
- Nipah virus can be transmitted to humans from animals, and can also be transmitted directly from human-to-human; in Bangladesh, half of reported cases between 2001 and 2008 were due to human-to-human transmission.
- Nipah virus can cause severe disease in domestic animals such as pigs.
- There is no treatment or vaccine available for either people or animals.

Nipah virus (NiV) is an emerging zoonotic virus (a virus transmitted to humans from animals). In infected people, Nipah virus causes severe illness characterized by inflammation of the brain (encephalitis) or respiratory diseases. It can also cause severe disease in animals such as pigs, resulting in significant economic losses for farmers.

Nipah virus is closely related to Hendra virus. Both are members of the genus Henipavirus, a new class of virus in the Paramyxoviridae family.

Although Nipah virus has caused only a few outbreaks, it infects a wide range of animals and causes severe disease and death in people, making it a public health concern.

Nipah Virus in Domestic Animals

Nipah outbreaks in pigs and other domestic animals (horses, goats, sheep, cats and dogs) were first reported during the initial Malaysian outbreak in 1999. Many pigs had no symptoms, but others developed acute feverish illness, laboured breathing, and neurological symptoms such as trembling, twitching and muscle spasms. Generally, mortality was low except in young piglets.

These symptoms are not dramatically different from other respiratory and neurological illnesses of pigs. Nipah should be suspected if pigs also have an unusual barking cough or if human cases of encephalitis are present.

Nipah virus is highly contagious in pigs. Pigs are infectious during the incubation period, which lasts from 4 to 14 days.

Transmission

Mostly mosquito-borne

Signs and Symptoms

Human infections range from asymptomatic infection to fatal encephalitis. Infected people initially develop influenza-like symptoms of fever, headaches, myalgia (muscle pain), vomiting and sore throat. This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis. Some people can also experience atypical pneumonia and severe respiratory problems, including acute respiratory distress. Encephalitis and seizures occur in severe cases, progressing to coma within 24 to 48 hours.

The incubation period (interval from infection to onset of symptoms) varies from 4 to 45 days.

Most people who survive acute encephalitis make a full recovery, but around 20% are left with residual neurological consequences such as persistent convulsions and personality changes. A small number of people who recover subsequently relapse or develop delayed onset encephalitis. In the long term, persistent neurological dysfunctions are observed in more than 15% of people.

The case fatality rate is estimated at 40% to 75%; however, this rate can vary by outbreak depending on local capabilities for surveillance investigations.

Diagnosis

Nipah virus infection can be diagnosed by a number of different tests:

- serum neutralization
- enzyme-linked immunosorbent assay (ELISA)
- polymerase chain reaction (PCR) assay

- immunofluorescence assay
- virus isolation by cell culture

Treatment

There are currently no drugs or vaccines available to treat Nipah virus infection. Intensive supportive care with treatment of symptoms is the main approach to managing the infection in people.

Prevention

There is no vaccine against Nipah virus. Routine cleaning and disinfection of pig farms (with sodium hypochlorite or other detergents) is expected to be effective in preventing infection.

If an outbreak is suspected, the animal premises should be quarantined immediately. Culling of infected animals – with close supervision of burial or incineration of carcasses – may be necessary to reduce the risk of transmission to people. Restricting or banning the movement of animals from infected farms to other areas can reduce the spread of the disease.

As Nipah virus outbreaks in domestic animals have preceded human cases, establishing an animal health surveillance system to detect new cases is essential in providing early warning for veterinary and human public health authorities.

Reducing the risk of infection in people

In the absence of a vaccine, the only way to reduce infection in people is by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to the virus.

Public health educational messages should focus on the following:

- Reducing the risk of bat-to-human transmission. Efforts to prevent transmission should first focus on decreasing bat access to date palm sap.
- Reducing the risk of human-to-human transmission. Close physical contact with Nipah virus-infected people should be avoided. Gloves and protective equipment should be worn when taking care of ill people. Regular hand washing should be carried out after caring for or visiting sick people.

- Reducing the risk of animal-to-human transmission. Gloves and other protective clothing should be worn while handling sick animals or their tissues, and during slaughtering and culling procedures.

Controlling Infection in Health-Care Settings

Health-care workers caring for patients with suspected or confirmed Nipah virus infection, or handling specimens from them, should implement standard infection control precautions.

Samples taken from people and animals with suspected Nipah virus infection should be handled by trained staff working in suitably equipped laboratories.

Laboratory Safety and Containment Recommendations

Because of the unknown risks to laboratory workers and the potential impact on indigenous livestock should the virus escape a diagnostic or research laboratory, health officials and laboratory managers should evaluate the need to work with the virus and the containment capability of the facility before undertaking any work with Hendra, Nipah or suspected related viruses. BSL-4 is required for all work with these viruses. Once a diagnosis of Nipah or Hendra virus is suspected, all diagnostic specimens also must be handled at BSL-4. ABSL-4 is required for any work with infected animals.

West-Nile Virus

General Information

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall.

Prevention

Prevention measures consist of community-based mosquito control programs that are able to reduce vector populations, personal protection measures to reduce the likelihood of being bitten by infected mosquitoes, and the underlying surveillance programs that characterize spatial/temporal patterns in risk that allow health and vector control agencies to target their interventions and resources.

The easiest and best way to avoid WNV is to prevent mosquito bites.

- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
- Make sure you have good screens on your windows and doors to keep mosquitoes out.
- Get rid of mosquito breeding sites by emptying standing water from flower pots, buckets and barrels. Change the water in pet dishes and replace the water in bird baths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and on their sides when they aren't being used.

Symptoms

- **Serious Symptoms in a Few People.** About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.
- **Milder Symptoms in Some People.** Up to 20% of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and

sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

- **No Symptoms in Most People.** Approximately 80% of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all.

Transmission

- **Infected Mosquitoes.** Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.
- **Transfusions, Transplants, and Mother-to-Child.** In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.
- **Not through touching.** WNV is not spread through casual contact such as touching or kissing a person with the virus.

People typically develop symptoms between 3 and 14 days after they are bitten by the infected mosquito.

Treatment

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Risk of Getting Sick from WNV

People over 50 at higher risk to get severe illness. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

Being outside means you're at risk. The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

Risk through medical procedures is very low. All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

Pregnancy and nursing do not increase risk of becoming infected with WNV. The risk that WNV may present to a fetus or an infant infected through breast milk is still being evaluated. Talk with your care provider if you have concerns.

Other Information

If you find a dead bird: Don't handle the body with your bare hands. Contact your local health department for instructions on reporting and disposing of the body. They may tell you to dispose of the bird after they log your report.

Laboratory Safety and Containment Recommendations

BSL-2 practices, containment equipment, and facilities are recommended for activities with human diagnostic specimens, although it is unusual to recover virus from specimens obtained from clinically ill patients. BSL-2 is recommended for processing field collected mosquito pools whereas BSL-3 and ABSL-3 practices, containment equipment, and facilities are recommended for all manipulations of WNV cultures and for experimental animal and vector studies, respectively.

Dissection of field collected dead birds for histopathology and culture is recommended at BSL-3 containment due to the potentially high levels of virus found in such samples. Non-invasive procedures performed on dead birds (such as oropharyngeal or cloacal swabs) can be conducted at BSL-2.