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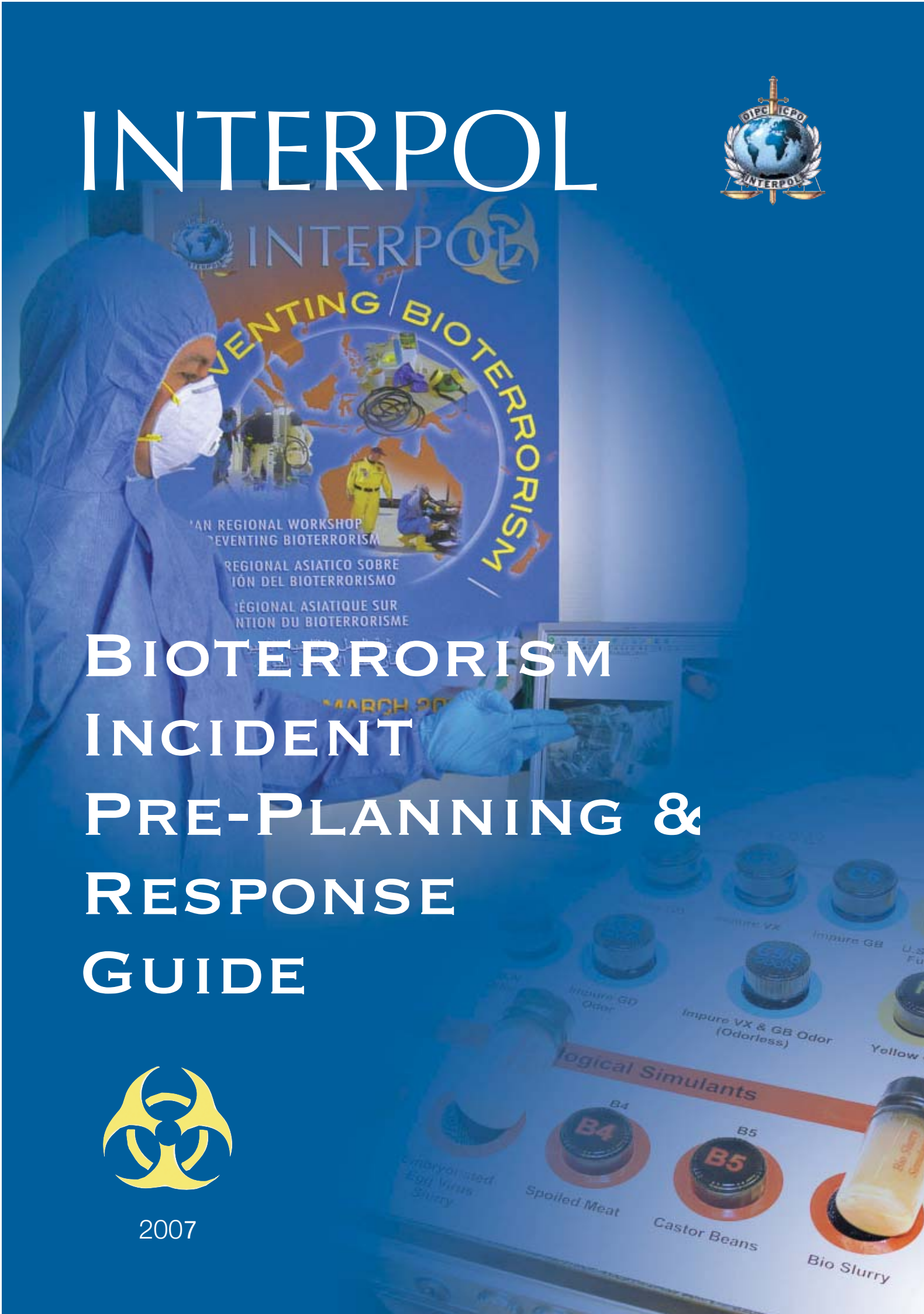

Bioterrorism Incident Pre-Planning & Response Guide

2007

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Copies of the ICPO-Interpol Bioterrorism Incident Pre-Planning and Response Guide can be obtained from the Interpol General Secretariat, Bioterrorism Unit, 200 quai Charles de Gaulle, 69006 Lyon - France
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INTERPOL SECRETARY GENERAL'S FOREWORD

The threat of bioterrorism is real. It is becoming increasingly possible for terrorists to be able to produce and deploy bio-weapons, as the volume and sophistication of the necessary information becomes ever more accessible through publications, the internet, and other sources. Given the magnitude of the harm that could be caused by a bioterrorist attack -- an untold number of deaths is possible -- it is clear to Interpol that we must take this threat seriously.

This Bioterrorism Incident Pre-Planning and Response Guide provides important tools to use in prevention and response efforts. Other tools are also provided by Interpol, including web resources and training opportunities available through the Bioterrorism Unit working in conjunction with National Central Bureaus.

It should be noted, however, that all of these tools must be understood within the framework of a comprehensive approach involving all the relevant constituencies, including police, customs, immigration, health professionals, bio-safety, bio-security, legal, emergency management offices, military/security organizations, intelligence services, environmental management, agriculture, and other relevant private and public organizations (local, regional, national, and international). These diverse professional communities must forge effective partnerships in order to ensure an integrated and coordinated approach, and to maximize the synergies of our complimentary skills, methodologies, perspectives, and resources.

I therefore urge all of you to work with us in putting in place the cross-cutting relationships, information channels, protocols, procedures, and practices that are necessary to most effectively respond in the event of a bioterrorist attack, and, more importantly, to most effectively prevent any such attacks from occurring in the first place.

Ronald K. Noble
Secretary General

Table of Contents

PART 1: GENERAL INFORMATION

PART 2: OPERATIONAL RESPONSE

PART 1: GENERAL INFORMATION

INTRODUCTION

Proposed definition:

"Bioterrorism refers to the intentional release of biologic agents or toxins for the purpose of harming and killing humans, animals or plants with the intent to intimidate or coerce a government or civilian population to further political or social objectives."

Many in law enforcement believe that recent trends in terrorism favouring mass-casualty incidents forbode the use of weapons of mass destruction such as bio-weapons. The relative ease of acquisition of candidate biological materials and their effectiveness as a weapon to instill fear make their use a natural evolution of terrorism. There have been numerous historical events involving the use or threatened use of toxins and pathogens. In recent times a number of individuals and terrorist organizations have expressed interest in, or attempted to acquire, biological pathogens and toxins.

Current analysis indicates that the potential for terrorist use of biological agents represents a real threat. The timing of events is difficult, if not impossible, to predict, and the threat is summarized by the statement: "not if, but when".

Bioterrorism poses many challenges for the law enforcement community. There is potential for terrorists to select agents that can be manipulated and dispersed to affect a single person or hundreds to thousands of individuals. The impact of this form of terror may be multi-jurisdictional or multi-national requiring co-ordinated communication and investigative efforts across national borders. A large portion of the public could feel that they or their families have been exposed and forcefully demand health care and medications, thus requiring police to position themselves at hospitals, medical clinics and drug stores. Quarantine enforcement will likely become a responsibility of the police as well.

Planning for the health care of police officers and their families must be given high priority within the overall law enforcement strategy.

Traditionally police plan and exercise extensively for response to "overt" acts of terrorism such as bombings, hostage-takings and assassinations. While acts of bioterrorism may be overt, enabling police to respond traditionally, unique challenges arise when individuals or groups use biological agents covertly. Because biological agents are not generally detected by the senses and the time from exposure to onset of illness may vary from days to a few weeks, perpetrators may be attracted to this form of crime as they have plenty of time to flee the "scene".

Covert incidents will primarily be detected by medical and public health authorities. Police services cannot deal with instances of bioterrorism on their own. It is critical that agreements be in place and regularly exercised between law enforcement and partner agencies outlining their respective/ co-operative roles in dealing with a biological attack. Most important are agreements with the medical and public health communities that include:

- **an early warning system** wherein law enforcement is informed of any emerging suspicious health issues;
- a **means for disclosure** of information, accommodating **patient privacy and confidentiality** issues;
- collection and handling of **evidence**;
- selection of compatible **personal protective equipment**; and,
- co-operation with other **national/international health and law enforcement organizations**.

PREVENTION

It is universally agreed that the terrorist acquisition of biological agents must be prevented. In many countries, governments have realized the need to strictly regulate the legitimate use of potential biological agents to prevent those materials from being misused. Laws and regulations have been put in place restricting the export and import of agents and the apparatus used for their preparation/weaponization.

All countries must take a proactive role in battling bioterrorism. Agreements must be negotiated between countries to jointly combat bioterrorism by sharing intelligence and best practice and eliminating the proliferation of biological agents and precursors.

The Biological and Toxin Weapons Convention was signed in 1972 by the United Kingdom, the United States and the former Soviet Union, among others. It not only bans the use of biological weapons but also the production, acquisition and stockpiling of agents. However, the convention does not include verification mechanisms for compliance.

In addition to the development of **response** protocols, law enforcement should take a lead role in promoting a program of **prevention**. Because dangerous biological pathogens are stored in many legitimate laboratory facilities within a nation, a first step in prevention may be to improve security at these facilities. Similar to other critical infrastructure requirements, legislation requiring mandatory reporting of accidents, theft, loss, or release of biological agents should be enacted. In addition, legislation restricting the purchase of dual-use laboratory equipment, and regulations on the transportation of biological agents may serve as a deterrent to the misappropriation of biological agents. The creation of outreach programs that increase the level of bioterrorism awareness and information exchange between law enforcement, industry and scientific communities will facilitate the reporting of suspicious activities and may have deterrent value as well.

[1] Available at http://www.opbw.org/

BIOLOGICAL AGENTS

Biological agents are defined as disease-causing organisms or toxins produced from a biological source and may also be referred to as pathogens. Toxins are poisons produced by or derived from living organisms.

These agents may be selected by terrorists to injure or kill persons or animals and some may be used to destroy crops.

EXAMPLES

Bacterial Agents
- *Bacillus anthracis* (Anthrax)
- *Yersinia pestis* (Plague)

Viral Agents
- *Variola* (Smallpox)
- Marburg (Hemorrhagic Fever)

Toxins
- Botulinum Toxin (from *Clostridium Botulinum*)
- Ricin (from Castor Beans)

BIOLOGICAL AGENT ACQUISITION

While there are legitimate reasons for the acquisition of particular biological agents and associated production equipment, it is also possible for people to acquire these agents for criminal purposes. A significant challenge for the terrorist is the acquisition of the pathogen or a source of toxin for production and dissemination.

Bacteria and viruses are living entities. When placed in the right atmosphere and supplied with proper nutrients, bacteria can grow and multiply in a relatively short time. Viruses cannot grow on their own. Viruses must reproduce within living cells, and are therefore more difficult to grow in a laboratory. Toxins may be derived from bacteria, plants or animals. There is publicly available information that may enable persons with various levels of education to carry out successful production processes.

Depending on the intentions of the terrorists, they will consider a number of characteristics in selecting a biological agent:

EXAMPLES OF AGENT SELECTION CRITERIA

- Ease of acquisition/production
- Ease of weaponization
- Ease of delivery
- Resistance to environmental factors
- Intention to kill or temporarily disable
- Whether the agent is contagious
- Potential risk to the terrorists themselves

Possible means of **acquisition** include obtaining biological agents:

- From a sponsoring government
- By the diversion of transported materials
- From natural sources
- By theft from universities, microbiological laboratories, veterinary laboratories and industry.

EXAMPLES OF MEANS OF PATHOGEN ACQUISITION

National biological weapons programs
Nations that sponsor terrorism
Diversion
- Fraudulent laboratory acquisition
- Natural sources
- Plague outbreaks
- Bovine anthrax outbreaks
- Ebola outbreaks

Theft
- Breach of laboratory security
- Co-opting legitimate researchers

BIOLOGICAL AGENT PRODUCTION

There are a number of methods for the isolation, culturing, purification and weaponization of biological materials. The education required varies since the methods may be very simple or extremely advanced. While executing a plan for the isolation, growth, purification and dissemination of a pathogen may require advanced scientific training or laboratory experience, plans involving toxins could be effectively carried out by individuals or groups with far less formal education or laboratory experience. Information detailing bio-agent preparation is available in libraries and on the Internet. Apparatus/equipment need not be specific, recognizable laboratory equipment; there are a number of household items that can be used in clandestine biological agent preparation.

Biological agents may be prepared in liquid, water-based slurry or powder forms. A well-prepared, fine powder presents the most danger to the public and responders. Other additives may be included to protect the agent or assist with dispersal, e.g., silica, clay particles and cellulose. These additives may have unique features which provide vital evidentiary value within the forensic investigation.

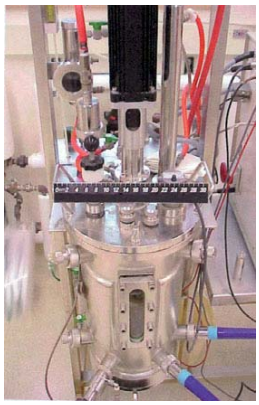
INTELLIGENCE THAT MAY INDICATE BIOTERRORISM

Surveillance of a terrorist group may yield specific indicators of their attempts to acquire, manufacture and weaponize a biological agent.

EXAMPLES OF INTELLIGENCE FINDINGS POTENTIALLY INDICATING INTEREST IN BIOTERRORISM

- Efforts to recruit members with education or experience in microbiology, medicine or engineering
- Buildings with altered ventilation systems
- Possession of protective clothing or respirators or masks
- Test animals, cages and animal care-related materials
- Bacterial or viral cultures
- Purchase of plants, seeds and/or beans known to be sources of toxins
- Vaccines and antibiotics
- Laboratory equipment
- Periodicals, instruction manuals or web resources providing biological agent preparation recipes
- Antiseptics, bleach or other anti-microbial cleaning supplies
- Dissemination equipment such as sprayers, pressure tanks or nebulizers
- See select examples pictured on pages 15-18

Bioreactor



Fermenter

Improvised Fermenter

Autoclave

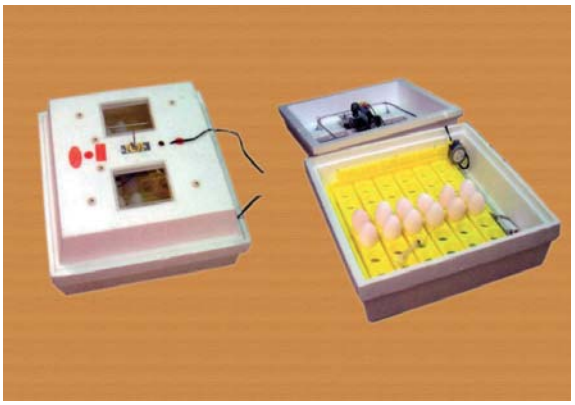
Autoclave

Centrifuge

Bench Top Fermenter

Incubator

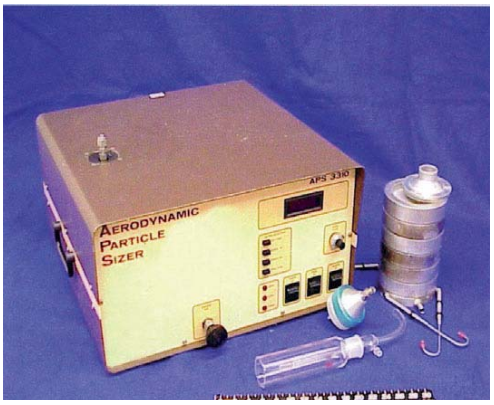
Incubator Shaker



Egg Incubator

Lyophilizer

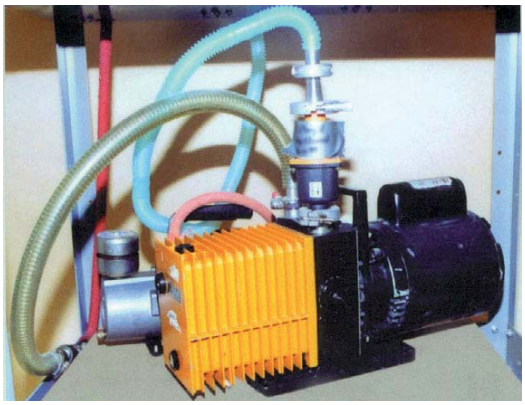
Milling Device



Sampling Equipment

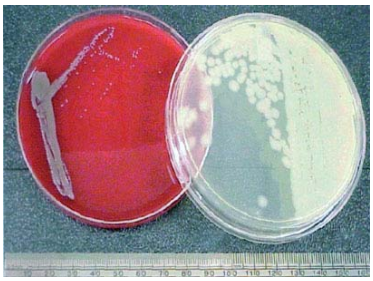
Photos courtesy of FBI and NCTC-USA.

Vacuum Pump



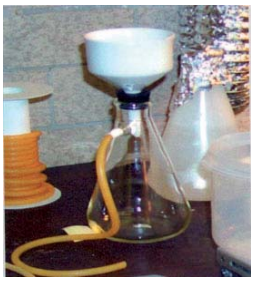
Vacuum Pump

Microscope



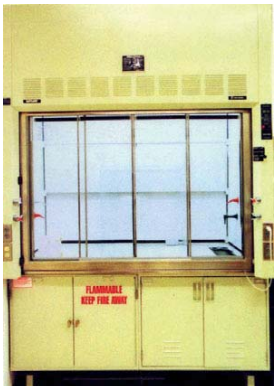
Agar Plate

Glassware

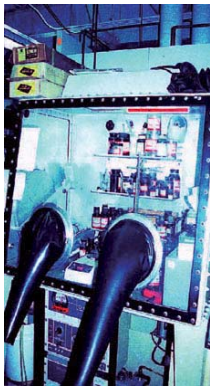


Vacuum Filtration

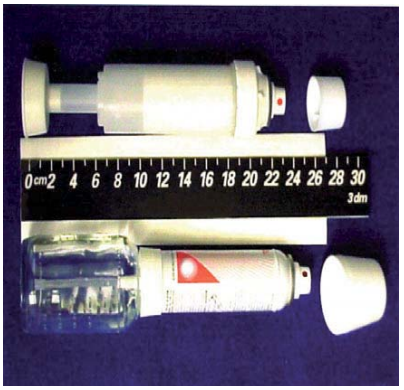
Mortar & Pestle



Lab Bio Cabinet



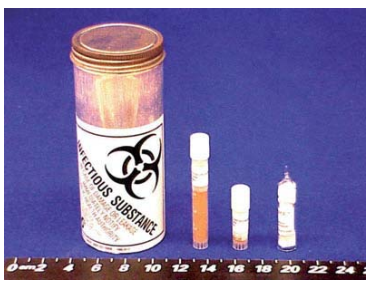
Glove Box



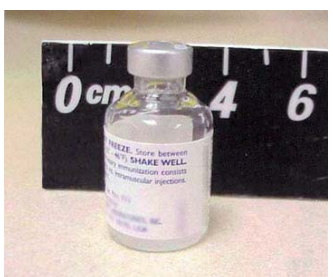
Agent Sprayer

Agent Sprayer

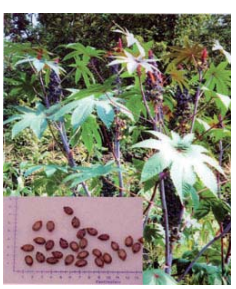
Growth Media



Agent Containers



Vaccine Vial



Castor Beans

Photos courtesy of FBI and NCTC-USA.

Castor Bean Pulp

Ricin Extraction

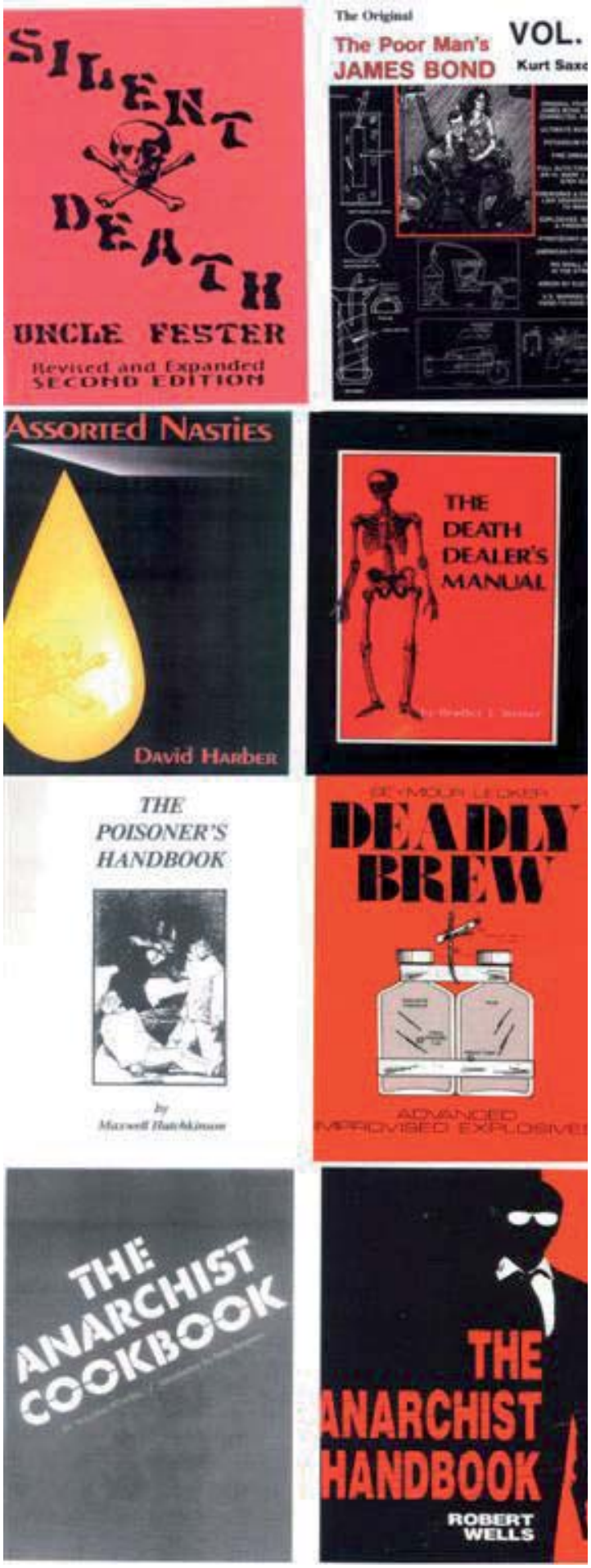
Meat Broth

Bleach

Bio-Hazard Signs

Bio-Hazard Signs

Photos courtesy of FBI and NCTC-USA.



Photos courtesy of FBI and NCTC-USA.

MEANS OF AGENT DISSEMINATION

Biological agents can be disseminated in a number of ways.

EXAMPLES OF BIOLOGICAL AGENT DISSEMINATION TECHNIQUES

Dispersal systems for inhalation exposure

- Mail/packages
- Commercially available spray devices
- Crop dusters
- Fire extinguishers
- Air conditioning systems
- Smoke generators
- Street air freshners

Food and water contamination

- Individual consumption items
- Food chain contamination

Injection

- Contaminated needles
- Projectiles
- Contaminated shrapnel

Direct contact by infected persons/animals

Military munitions

Law enforcement may detect biological agent dissemination through reports of unusual behavior or the discovery of unexpected devices or odors.

EXAMPLES OF BIOLOGICAL AGENT DISSEMINATION INDICATORS

- Presence of suspicious liquids or powders
- Unscheduled/unusual spraying activity
- Unusual odors
    - Purified biological agents are odorless, but unpurified products may have distinct odors characteristic of rotting meat or fermentation.
    - The smells of growth media may be interpreted as musty, yeasty or like rotten meat
- Presence of dissemination devices
- Reports of tampering with food or water supply or distribution systems
- Receipt of a written, electronic or verbal threat or claim of responsibility

Weather conditions and building ventilation systems can affect dispersal efficiency. Outdoors, a light wind may help disseminate an agent; however, high winds may spread an agent over such a large area that the dose inhaled by individuals may be too small to cause disease. Indoors, there are many variables which impact the effectiveness of aerosol dissemination. Ventilation systems which move air within buildings may spread an agent throughout a building rapidly. On the other hand, many modern heating and air conditioning systems utilize very efficient filtration to remove indoor and outdoor air pollutants. These filters may also remove a biological agent from the air, significantly reducing the impact of an indoor release.

CONDITIONS THAT PROMOTE AIRBORNE DISSEMINATION

- Cloudy weather or night time
- Light winds (5-10 kph)
- Uniform terrain
- Vehicular or pedestrian movement
- Active heating ventilation equipment (buildings)
- Crowded places

CONDITIONS THAT ARE ADVERSE TO AIRBORNE DISSEMINATION

- Direct sunlight
- Precipitation
- High winds or no wind at all
- Lack of active ventilation system (building)

BIOLOGICAL, CHEMICAL, OR RADIOLOGICAL EVENT?

This guide is intended to provide valuable information pertaining to bioterrorism prevention and response. Before utilizing this document to guide response actions, **it is essential to rule out the presence of chemical and radiological hazards**.

Biological agents have characteristics which are dissimilar to chemical agents. Biological agents are generally more difficult to detect by physical observation and cause symptoms some time after exposure. These characteristics make recognition of a biological event more difficult.

EXAMPLES OF BIOLOGICAL AGENT CHARACTERISTICS

- Do not have a unique color, taste or smell
- Preparation method may impart some odor
- May have small infective doses
- Can cause delayed symptom onset from 2-7 days but may extend to 30-40 days
- Can be transmitted by ingestion, injection or inhalation of aerosolized particles
- Some may be transmitted person-to-person
- Rarely cause disease on exposure to unbroken skin
- May have a high morbidity and mortality rate
- Could potentially be produced with either laboratory or improvised household equipment
- Variable survival in the environment when exposed to sunlight, air pollution, humidity or other meteorological conditions

Chemical materials that may be used by terrorists include the classical warfare agents or toxic industrial chemicals (TICs). They may be in the form of a powder, liquid or gas.

EXAMPLES OF CHEMICAL AGENTS

- Sarin nerve Gas
- Mustard
- Cyanide
- Chlorine
- Toxic industrial chemicals

GENERAL CHARACTERISTICS OF CHEMICAL AGENT EVENTS

- Exposure by skin contact, ingestion or inhalation
- Onset of symptoms within seconds to minutes or hours such as
    - Coughing
    - Burning skin
    - Convulsions
    - Death
- Presence of a visible cloud or plume
- Unusual smells
- Presence of dead insects, birds or fish
- Brown withered vegetation

Radiological materials come in a variety of physical forms. The presence of radiation is not detectable by the senses, and may cause symptoms that may be delayed hours, weeks or even years depending on the dose rate and the duration of exposure.

EXAMPLES OF RADIOLOGICAL AGENTS

- Uranium 235
- Cobalt 60
- Iodine 131

CHARACTERISTICS OF RADIOLOGICAL AGENTS

- Odorless and tasteless
- Can have the form of powders, metallic pellets, liquids or gases
- Emit radiation
    - Alpha, Beta, X-ray, Gamma, Neutrons
- Are detectable with instruments
    - Geiger-Mueller counter
    - Ionization chambers
    - Radiation badges
    - Radiation monitors

Photos courtesy of the Romanian National Police

Chemical and radiological agents can be detected by commonly available instruments. In addition, chemical agents can be generally detected by the senses and by the symptoms they produce.

While the potential presence of chemical or radiological agents must be ruled out as part of routine WMD threat investigations. THIS GUIDE DOES NOT CONTAIN SPECIFIC INFORMATION REGARDING CHEMICAL OR RADIOLOGICAL INCIDENTS.

COVERT VERSUS OVERT ATTACKS

It is extremely important for law enforcement to understand the differing aspects of covert and overt attacks in the development of all bioterrorism response protocols.

Overt Attack

An **overt** attack is an event clearly recognizable by the police or other responders. Awareness of the attack will be evidenced by:

- reception of a specific threat, warning or intelligence,
- discovery of a means of dispersal or other signature activities/ apparatus, or
- discovery of questionable/suspect materials.

To mitigate the health consequences of the attack, public health and medical authorities must be informed by law enforcement of the event. The means for this contact should be pre-established and exercised in order to avoid delay and inefficient information exchange.

The consequence of failing to have an established information exchange protocol between law enforcement and public health for overt attacks is the potential for delays in public health and medical responses. There is also the potential that attacks have occurred prior to the detection of the overt event, and these prior attacks would be only found on review of medical and public health information.

COVERT ATTACKS

Terrorists are likely to use biological agents in a covert attack. A covert attack will have no annunciated threat or warning, a carefully disguised dispersal device or method, and no physical indication of the agent being spread.

In these situations, victims are unaware that they have been exposed, and police are not aware that a crime has taken place. There will not be a defined crime scene until after medical diagnosis or environmental detection has occurred. The terrorist is likely to desire this scenario as victims will not seek the necessary medical treatment until they experience symptoms, thus creating a delayed recognition by law enforcement. For some agents this delay will increase mortality as treatment become less effective the longer the disease is unrecognized.

A police investigation will not be initiated until notification by public health subsequent to their detection of an unusual disease pattern by a surveillance system or the health-care community has diagnosed an unusual disease.

EXAMPLES OF DISEASE PATTERNS THAT MAY INDICATE BIOTERRORISM

- A sudden increase in patients with similar symptoms
- A high mortality rate among victims having common home/work locations and activities
- Disease concurrent with illness in the susceptible animal population
- A disease that is not normally seen in that geographical location or at that time of year
- The diagnosis of a known bioterrorism disease such as inhalational anthrax or smallpox

LAW ENFORCEMENT INTERACTION WITH PUBLIC HEALTH

It is essential to establish communication mechanisms between law enforcement and public health. These mechanisms and the criteria used to prompt information exchange should be developed with consideration of pertinent laws and regulations protecting both the sensitive data of law enforcement and confidential medical information. Effective information exchange requires that law enforcement and public health personnel be familiar with one another and know which people in each agency should receive the information.

A strong working relationship between law enforcement and public health is essential to responding effectively to both covert and overt acts of bioterrorism. Public health and medical assets should be incorporated into training. Exercises should be planned to build these relationships and identify and correct potential problems before an actual event occurs.

COMMON GOALS OF LAW ENFORCEMENT AND PUBLIC HEALTH

- Protect the public
- Prevention of disease
- Prevention of bioterrorism
- Identify those responsible and prevent a secondary attack
- Protect responders/investigators and members of the public from harm

Why should law enforcement agencies focus their efforts on establishing partnerships with public health?

Public health practitioners are responsible for disease control measures within the community, while physicians focus on curing the sick and promoting health in individuals. Public health agencies are responsible for protecting the health of the public. They do this by investigating the causes of disease outbreaks or epidemics, and then making recommendations to prevent the spread of disease, as well as prevent future outbreaks. Therefore, public health practitioners have specialized expertise in investigating disease outbreaks, which can prove highly valuable to law enforcement during a bioterrorism investigation.

Joint Investigations or Operations

Once information regarding a potential threat, outbreak or incident has been shared, law enforcement and public health agencies may be responsible for independent roles and responsibilities in the resulting investigation. Coordination of law enforcement and public health activities is essential. It is recommended that joint operations and investigations be pre-planned and exercised.

JOINT INTERVIEWS

In a bioterrorism investigation, it may be beneficial to conduct joint interviews utilizing both public health and law enforcement investigators. A joint interview draws on the strengths of having a multidisciplinary interview team. In a joint interview, a law enforcement officer and a public health official both take part in a single interview of a victim. This allows both parties to obtain the same information and minimizes potential duplication of efforts and possible collection of contradictory information.

ADVANTAGES OF JOINT INTERVIEWS

- Minimize the collection and documentation of conflicting information
- Simultaneous information access
- Opportunity to address misunderstandings
- Multi-disciplinary interview perspective

DISADVANTAGES OF JOINT INTERVIEWS

- Logistical challenge of coordinating two or more interviewers
- Law enforcement presence may inhibit forthright answers
    - Confidential health information concerns
    - Immigration status
- Law enforcement participation may draw attention from both the media and the public

Regardless of the decision to utilize a joint interview approach, it is highly recommended that law enforcement coordinate with the appropriate public health agencies to establish a positive working relationship before an event occurs. These partnerships should be included in bioterrorism-specific training and exercises to ensure that the partnerships will be beneficial during an actual response.

RESPONSE PRIORITIES

Police officers who respond to a potential bioterrorism event must do so **within the limitations of their training, support network and equipment. Personal safety is a primary concern.**

Police agencies should also consider providing officers with alternative housing during this period. Officers on duty face a higher risk of being exposed to the bio-agent and consequent higher probability of being infected. As such, officers may wish to stay away from their families during this period and alternative housing should be provided to this purpose.

HUMAN RESOURCES

The police framework for response to bioterrorism should consist of a layered, integrated model.

Frontline Police Personnel: The first officers to respond will be general duty personnel, who should be able to adopt self-protection measures, report the situation to multi-agency responders, observe symptoms if present, cordon and preserve the scene, and finally provide other services as directed.

Specialized Teams: These teams include those police personnel who will provide critical incident response. They should possess advanced response equipment, training, and operational support. These teams should be able to conduct improvised-dispersal-device render-safe procedures, incident mitigation and forensic scene examination, including sampling and recovery of traditional forensic evidence within contaminated environments.

Biological Advisor: This person or persons should be able to give real-time advice on agent characteristics and production, site safety, medical intervention and decontamination.

Investigative Teams: These should consist of police officers working with public health and other designated agencies within a pre-established means of cooperative investigation, information sharing and operational support.

Media Relations Team: Media relations team would include police and public health press information officers and those of related responding agencies.

SAFETY

To ensure personal safety for police and support agencies within a contaminated crime scene, training, equipment and support must be provided to the officer.

Training: Training in the recognition of potential incidents and hazards, use of personal protective equipment, incident mitigation apparatus and methods, inter-agency concepts of operations and support means is critical for the success of the response.

Personal Protective Equipment (PPE): There are a number of different forms of suitable PPE, with selection being determined by the form of the threat, work environment and type of personal decontamination facilities in operation. Respiratory protection is critical since the primary route of exposure for biological agents is by inhalation.

Operational Support: Police operations within a contaminated crime scene must be supported by a competent decontamination facility to transition responders, equipment and evidence in and out of the scene.

Medical Counter-Measures: Medical staff must be on the scene to care for responders. Medical monitoring must be provided for all personnel entering and exiting the scene. Of particular importance is the medical capacity to address heat stress injuries as well as prophylactic treatment for responders against accidental exposure to the agent. Depending on the agent, it may be necessary for medical personnel to administer antibiotics or vaccines to responders and to continue medical monitoring for a prescribed time period after the event.

LEVELS OF PPE

Level A – Offers a high level of protection for both respiratory and skin exposure to toxic liquid and gaseous products as well as biological agents, and includes a self-contained breathing apparatus (SCBA) worn within a gas-tight suit and chemical-resistant gloves and boots. An example of level A PPE is shown below.

Level B - Offers a high level of respiratory protection and includes a splash protective suit (non gas-tight), SCBA and chemical-resistant gloves and boots. An example of level B PPE is shown below.

Photos courtesy of the Romanian National Police

Level C – Offers respiratory protection and some splash protection and includes hooded coveralls, gloves and foot coverings, and a full-face respirator or powered air-purifying respirator (PAPR) with high efficiency particulate air (HEPA) filters. An example of the suit and PAPR are shown below.

Photos courtesy of the Romanian National Police

PART 2: OPERATIONAL RESPONSE

Command Incident Response Checklist

Implement Contamination Control Measures and Select Personal Protective Equipment

Advise Public Health

Media Strategy

Hazard Assessment

Containment

Evidence Recovery

COMMAND INCIDENT RESPONSE CHECKLIST

- Adopt self protection measures.
- Establish an incident command centre.
- Establish safe holding area - uphill and upwind.
- Establish a cordon.
- Gather information regarding the incident/threat/suspect substance.
- **Select appropriate PPE and implement contamination control.**
- Ensure no responders enter the contaminated area without the proper PPE.
- Evacuate victims to safe area – collect identifying and contact information.
- **Advise public health.**
- Identify and interview witnesses.
- **Implement media strategy.**
- Designate a health liaison.
- Determine the level of response required.
- Request specialized teams to deploy to the scene and reassess location of the holding area.
- Brief personnel about on-site safety.
- Establish decontamination.
- **Conduct a hazard assessment** - Eliminate explosive, radiological and chemical hazards.
- **Hazard containment.**
- Determine if additional resources and actions are required.
- **Conduct evidence recovery.**
- Conduct full handover briefing to the agency responsible for remediation/site cleanup.
- Notify domestic and international partner agencies.

IMPLEMENT CONTAMINATION CONTROL MEASURES AND SELECT PERSONAL PROTECTIVE EQUIPMENT

Ensuring the safety of responders within any potentially contaminated environment includes the appropriate selection and use of **Personal Protective Equipment (PPE)**, adherence to strict **contamination control and presence of on-site medical personnel.**

Once it has been determined that there are no explosive, chemical or radiological hazards, PPE should be selected after considering the following criteria:

- **The type of hazard**
- **The entry/exit routes of responders**
- **Environmental conditions**

If the hazard involves airborne particles, it is essential that responders rely on either a self-contained breathing apparatus (SCBA) or a full-face respirator to ensure protection of the lungs. Respiratory protection may be adjusted, after a comprehensive hazard assessment.

The intent of **contamination control** is to avoid unnecessary exposure. It includes proper entry, in-scene and decontamination procedures for personnel, equipment and evidence. **Decontamination is a critical component of these procedures and must be in place before any responder enters the contaminated area.**

Decontamination procedures, as a minimum, should proceed as follows:

1. Rinse outer garments through the application of a light spray of soap and water.
2. Disrobe the responder following Standard Operating Procedures (SOP).
3. Shower the responder thoroughly with soap and water.
4. Thoroughly decontaminate equipment and the first container/ bag that contains the evidence (double bag procedure) removed from the scene.
5. Dispose of contaminated waste as hazardous waste.
6. Rule out potential remnant contamination

Factors to consider in selecting PPE

The wearing of any level of PPE imposes a number of limitations on responders. Police officers should train often to understand the impact of wearing PPE on operational duties.

USE OF PPE LIMITS OPERATIONAL CAPABILITIES

- Impaired dexterity
- Restricted mobility
- Difficulty in hearing instructions
- Difficulty in being understood/radio use
- Reduced vision
- Heat stress
- Increased weight
    - Level A can weigh as much as 20-25kg
- Psychological stress
    - Claustrophobia for wearers
    - Threatening appearance to victims
- SCBA tank provides limited supply of air

Given all of the above, regular exercises should be carried out for pre-planned signal usage.

ADVISE PUBLIC HEALTH

Definitive criteria for public health notification to law enforcement are difficult because almost all biological agents mimic other diseases in their early presentation. However, there are a number of specific situations in which information should be shared between public health, medical and law enforcement authorities to detect and manage a bioterrorism event.

TRIGGERS FOR LAW ENFORCEMENT TO SHARE INFORMATION

- Any intelligence or indication that any group or individual is unlawfully in possession of biological agents.
- Seizure of processing equipment, dissemination devices, literature or related items that could be used in the production or use of biological agents.
- Any assessment that indicates a credible biological threat may exist in that area.
    - Credible threats to events and venues in the area.
    - Credible threats to segments of the population.

TRIGGERS FOR MEDICAL AND PUBLIC HEALTH TO SHARE INFORMATION

- Any indication that a disease outbreak could be caused by an intentional act
- Lab results that indicate the identification of a potential biological terrorism agent
    - Respiratory anthrax
    - Pneumonic plague
    - Ricin
    - Smallpox
- Large number of individuals reporting common symptoms
- Unexplained deaths
- Unusual disease presentation such as
    - Anthrax (inhalation)
    - Plague (pneumonic)
- Any disease with an unusual geographic or seasonal distribution such as
    - Ebola in non-endemic areas
    - Flu-like illness in the summer

MEDIA STRATEGY

The terrorist use or threatened use of biological agents is likely to have an extreme psychological impact on the civilian population, potentially resulting in challenges for law enforcement. Response planning must include a media strategy. **Early coordinated statements in the media by law enforcement, public health, medical and political authorities are vital to provide accurate information and to defuse the public's confusion and fear.** The joint media team must be included in training and exercises.

EXAMPLE MEDIA STRATEGY

- Conduct joint media conferences, including radio and television broadcasts.
- Provide frequent regular updates.
- Be clear about what is known and what is unknown.
- Provide a plan of action that reassures the public that an active investigation is underway.
- Ensure that any requests for public actions are clear and concise.
- Encourage the media to ensure that all releases are coordinated with the joint media team.
- Recognize the media is the primary information source for the public.
- High media profile can engage the public to provide law enforcement useful information on suspicious activity.

HAZARD ASSESSMENT

A prompt and thorough hazard assessment is vital to ensure the safety of responders and the public. Hazard assessment involves determining what the agent is, the form of the agent (e.g., powder, liquid), efficiency of dispersal and predicted dispersal patterns. Hazard assessments distinguish between actual events and hoaxes. In the case of an actual event, hazard assessment allows informed development of the medical response strategy, selection of appropriate PPE, defines evacuation zones/routes and suggests best practice for decontamination/containment. Biological agents in their most dangerous form as powders may move with air movement, which can be modeled to determine the hazard zone. Hazard assessment in a potential bioterrorism incident is complicated by the lack of consistently reliable field detection equipment capable of rapidly identifying biological agents.

COMPONENTS OF A BIOLOGICAL HAZARD ASSESSMENT

- Adopt self protection measures
    - Uphill and upwind safe area
- Gather all relevant information
    - Explosions
    - Victims' symptoms
    - Time from exposure to onset of symptoms
    - Smells
    - Observable agents/materials, devices, containers or debris
- Model potential downwind risk and hazard area
- Determine potential victims at risk
    - Consider evacuation
    - Consider medical interventions
    - Consider shelter in place
- Select the appropriate level of PPE
- Identify/utilize available detection and monitoring equipment
    - Assess explosive hazards
    - Assess chemical hazards
    - Assess radiological hazards
- Determine evidence recovery equipment and teams
- Ensure that the scene is photographed/videoed prior to being disturbed
- Conduct on-site presumptive tests of the hazard, and collect samples for lab analysis
    - Coordinate sample preparation with receiving laboratory

CONTAINMENT

The purpose of containment is to reduce the risk to the public and responders as well as to preserve evidence. Because a terrorist may attack an open-air event or within a structure, containment strategies must be developed for both. Evacuation of potential victims should take place first before containment. As soon as possible after victims are removed, a containment strategy should be employed.

INDOOR ATTACKS MAY BE CONTAINED BY:

- Turning off ventilation systems
- Closing doors and windows
- Turning off elevators
- Restricting air flow by sealing ducts, windows, doors
    - Utilize tape, expanding foams and sheet plastic

OUTDOOR ATTACKS MAY BE CONTAINED BY:

- Physically covering the device or dispersed substance
- Lightly spraying the dispersed materials with water and bleach mixtures and employing other available commercial systems for agent containment

EVIDENCE RECOVERY

Specially trained and equipped crime scene personnel will recover/ interpret evidence within the crime scene and from victims. Evidence removed from the site must be handled and packaged by a means that eliminates any cross-contamination or accidental transfer of the agent from the area.

This phase is undertaken only if the environment is safe to work in; **personal safety should not be compromised for evidence recovery.**

COMPONENTS OF EVIDENCE RECOVERY

- Recording of the scene using digital photography/video
- Collecting suspect substances for confirmatory testing
- Collecting/packaging of contaminated items for forensic examination
- Must be consistent with the level of risk posed by the agent
- Procedures should be in place between law enforcement and forensic/epidemiological labs for analysis and retention of contaminated exhibits

SAMPLING FOR SUSPECT BIOTERRORISM INCIDENTS

It is imperative that any unknown substances be cleared for the presence of chemical or radiological materials. If ionizing radiation or chemical hazards are detected, separate procedures must be applied. Procedures for sampling chemical and radiological materials are not covered in this guide.

Introduction

The sample collection procedures that follow are to be employed during an investigation in which there is suspicion that the substance is of a biological nature.

Collection of biological evidence should be performed by a specially trained team following specific procedures that are established and coordinated with the receiving analytical laboratory.

Composition of the Sampling Team

Sampling team configuration may vary and will be based on country-specific legislation and incident-specific requirements. As a general rule the sampling team must consist of at least three operators: two individuals for sample collection and a scribe/photographer.

Under some jurisdiction, Sampling Teams might be requested to be composed of authorized/qualified personnel with proper training and equipment. The proper clearance can be given by the entitled national authorities. If contrary, the samples collected may not be accepted as evidence in the court of law or questioned by the defense attorney.

PRE-ENTRY PREPARATION

- Coordinate all sample collection and packaging with the analytical laboratory that will receive the samples.
- Generate a sample collection plan after determining the areas and number of specimens to be taken.
- Identify necessary equipment.
- Separate equipment for each sampling task into itemized packages:
    - liquid
    - powder
- Label the inner containers for each of the collection items.
- Check the prepared sampling kits against the sampling plan.
- Organize spare equipment.
- Prepare control samples (refer to the "Controls" section below).
- Prepare other necessary equipment before entry:
    - carry basket, bucket or plastic bag for sampling gear,
    - sample equipment/kits,
    - plastic sheets for the floor,
    - cameras/video equipment (waterproof),
    - radio (waterproof or wrapped in plastic),
    - waterproof note pad and pens.
- Identify potential safety hazards and conduct a safety briefing.

Control Samples

Control samples may be required as evidence during court proceedings to indicate that collection vessels are sterile and that the samples are free from environmental contamination.

Whenever possible, prepare control samples for each type of environmental sample taken at a sampling site. For example, if collecting a soil or water sample from a contaminated site, also collect a sample of soil from an area not involved in the investigation but similar to the site being investigated and label it as a "control sample".

Blank samples are used to prove the sterility of the collection equipment. Blank samples of collection media and utensils are prepared and packaged in the same manner as the actual samples, although they are not subjected to a contaminated surface or substance. Preferably the blank and control items should be from the same batch number as those items used during actual sampling. Control samples and blank samples are prepared away from the contaminated site and stored for future cross-referencing during sample analysis.

General Operations

Sample collection and safety plans must be prepared prior to commencing operations. Ensuring personal safety, collecting useful samples, avoiding sample contamination and maintaining accurate documentation are the main objectives during sample collection.

GUIDE FOR EVIDENCE COLLECTION

- Enter the area and designate a “clean” area.
- Photograph the scene.
- Place plastic sheeting onto a clean area and place all of the tools on the plastic sheet.
- Mark sample areas or items with an indicator tag; photograph and record them.
- Individuals who are collecting samples should wear multiple pairs of gloves.
- The outer gloves should be changed between samples to avoid potential cross-contamination.
- At no time should the innermost gloves be removed in the contaminated area.
- Additional gloves may be added to ensure a clean pair is worn for the collection of each sample.
- Sampling gloves and tools, such as pipettes, must be used only once for each sample or sampling area and then placed into the hazardous waste bag or container.
- If an outer glove becomes grossly contaminated or damaged, remove the outer pair first, inspect the inner pair and put on a new pair of outer gloves.
- Should the inner pair be also damaged, it is recommended that the individual leave the contaminated area and be decontaminated, informing the decontamination team that the inner gloves have been damaged.
- Using a minimum of two operators, designate one as a “clean” operator and the other as a “dirty” operator. The “clean” operator will select the clean tools and pass them to the “dirty” operator.

Cont’d…..

GUIDE FOR EVIDENCE COLLECTION, cont'd

- The designated "dirty" operator then collects the sample and transfers it to the appropriate collection tube/jar. This inner tube is then placed into another outer tube (the secondary container).
- Label all primary and secondary sample containers with their identifying information.
    - the sample identifier (i.e., number),
    - type of material (e.g., powder, liquid, fabric),
    - date obtained,
    - investigator's initials, and
    - location where it was collected.
- Record in the sample collection notebook the date, sample identifier and a description of the sample, and document all photographs taken.
- Ensure that the hazardous materials are transported within physical protection systems and comply with national and/or international requirements.

Sample Collection Example Protocols

Biological Liquids

Biological liquids such as liquid media or culture broth can be packaged safely in sterile, plastic tubes. The goal of packaging the samples is to preserve the evidence and to create a safe transportation vessel.

BIOLOGICAL LIQUID SAMPLING PROTOCOL

- Label the centrifuge tube with identifying numbers.
- Use a disposable pipette to transfer 1-3 ml of the liquid to the centrifuge tube and cap it.
- Transfer the centrifuge tube to a sterile plastic container.
- Seal this container with Parafilm (wax paper).
- Over-pack this container inside a 50 ml plastic container.
- Seal the outer plastic container with evidence tape.
- Place the containers in a zip-lock bag or plastic container.

A sterile plastic tube placed inside a larger plastic secondary tube

Powders – Visible

Biological powders can be packaged safely in sterile, plastic tubes. The goal of packaging the samples is to preserve the evidence and to create a safe transportation vessel.

BIOLOGICAL POWDER SAMPLING PROTOCOL

- Use sterile disposable scoop or spatula.
- Sweep powder away from the sampler.
- Transfer a small quantity to a sterile centrifuge/plastic tube.
- Seal the tube with Parafilm.
- Over-pack this inner tube inside a 50 ml centrifuge/plastic tube, and seal it with evidence tape.
- Place the outer tube in a zip-lock bag or plastic container.

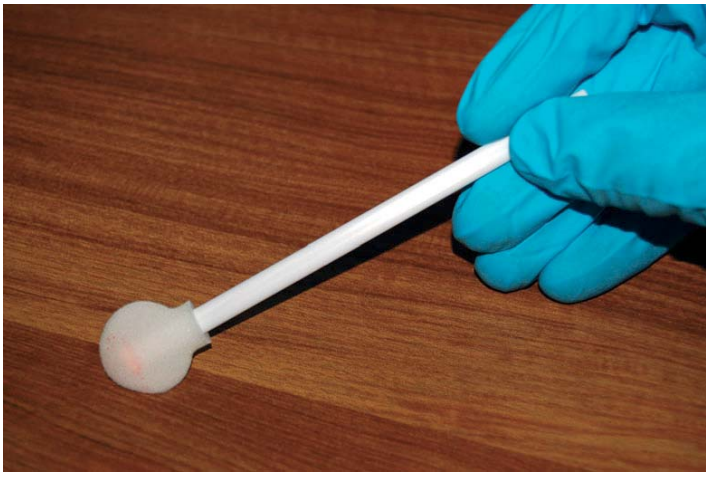
Sterile scoop with inner tube. Sample over-packed in a 50 ml centrifuge tube.

Powders – Trace

Biological trace powders can be packaged safely in sterile, plastic tubes. The goal of packaging the samples is to preserve the evidence and to create a safe transportation vessel.

TRACE POWDER SAMPLING PROTOCOL - APPLICATORS

- Remove applicator from the packaging.
- Moisten the tip with sterile water to increase its collection capability.
- Use it dry if protecting other critical evidence such as fingerprints.
- Wipe the tip over a surface using the entire padded area.
- Roll the applicator over approximately a 10 cm by 10 cm area.
- Place the applicator into a labeled 50 ml sterile plastic tube.
- Cut the applicator handle with shears and seal the tube with Parafilm and evidence tape.
- Over-pack the tube inside a plastic container or plastic bag.



Foam-tip applicator for trace collection.

Swab placed into centrifuge tube and sealed with Parafilm.

It is preferable to use swabs which are attached to the inside of the lid of the container as illustrated above.

To increase the likelihood of recovering trace evidence, consider sampling from horizontal surfaces and protected areas such as drawers, heating or air conditioning vents, or cracks and seams in tables or work surfaces.

CULTURE PLATE

- Seal the culture plate with Parafilm.
- Cover its edge with evidence tape; sign and date it.
- Place the plate into a zip-lock bag or small plastic drum.
- Store at refrigerated temperature.

Culture plate sealed with Parafilm and evidence tape.

USE OF MICROSCOPE SLIDE

- Place the microscope slide into a sterile 50 ml centrifuge tube.
- Place Parafilm over the lid.
- Over-pack the tube in a zip-lock bag or small plastic drum.

Evidence Preservation

Biological samples are sensitive to heat and sunlight. Transport to the receiving analytical laboratory as soon as possible. If necessary, make an effort to keep the samples in a cool or shaded area. Regarding storage temperature, consider this rule:

- If it's cold, keep it cold (do not freeze!).
- If it's warm, make it cold.
- If it's frozen, keep it frozen.

Evidence Integrity

In order to keep a chain of custody for evidence, collection data must be included with the sample submission. This protocol should be developed in advance.

CHAIN OF CUSTODY

- Date and time of the incident,
- Name of the officer in charge of the incident,
- Brief description of the incident,
- Description of the sample (e.g., powder, granules),
- Details of all individuals having responsibility for the collection, packaging and transport of the specimen,
- Name of the receiving laboratory employee,
- Time of receipt of the sample (as there may be a delay in transit), and
- Contact numbers for future communication.

Forensic Microbiology and the Investigation

Forensic science is, in brief, the application of science in the investigation of legal matters. The scientific knowledge and technology varies among disciplines yet ultimately this science has the potential to provide the information necessary to correctly determine who committed a given crime. As with all major crime investigation, the collection and analysis of traditional forensic evidence such as fingerprints, hairs, fibers and DNA can be valuable in the process of first identifying and later prosecuting the offender.

An act of bioterrorism or crime brings with it a new classification of forensic science – forensic microbiology – which seeks to identify signature traits and markers related to the biological agent used.

Forensic microbiology is defined as a scientific discipline dedicated to analyzing evidence from a bioterrorism act, crime or the inadvertent release of micro-organisms/toxins for attribution purposes.

Attribution does not refer to the identification of the pathogenic organism alone but more importantly to the persons who committed the crime. In addition to the collection of traditional forensic evidence, investigators may need to consider seeking to analyze the specific make-up of the agent in question (e.g., the strain or species type), because that knowledge might reveal manufacturing traits (e.g., remnants of culture media) and weaponization traits (e.g., flow agents and additives) which might in turn help to narrow the field of suspects. ***Investigators should seek out those laboratories capable of conducting such testing.***

It is also important to note that the collection of traditional forensic evidence may be difficult as items of interest may be contaminated and successful decontamination may not be possible without destroying critical evidence. Forensic police may be required to adapt to the challenges presented by a contaminated crime scene. For example:

It is advised that where possible the collection of traditional forensic evidence, such as latent fingerprints and their development, be conducted on the scene and recorded using digital imaging with water-proof housing.

AREA CLEAN-UP AND RETURN TO PUBLIC ACCESS

This phase is not normally carried out by the police. Typically, national environmental departments or contractors will conduct the final cleaning of affected areas.

In situations involving agents that are very resilient and/or grossly contaminated environments, the affected building may have to be destroyed or areas excavated to remove the entire hazard.

GLOSSARY OF BIOLOGICAL TERMS

Aerosol	A fine suspension of particles or fine liquid droplets suspended in the air.
Agar	Polysaccharide extract of red algae used as a solidifying agent in various microbiological media. May be a dry powder or a gel at room temperature.
Anthrax	Anthrax is a serious disease caused by Bacillus anthracis, a bacterium that forms spores. There are three types of anthrax: skin, lungs and digestive. The bacteria are found in the soil and infect grazing animals.
Antibiotic	A substance that inhibits the growth of, or kills, microorganisms.
Antiserum	The liquid part of blood containing antibodies, which react against disease-causing agents such as those used in bio-weapons (BW).
Aseptic techniques	Precautionary measures taken in the field and the lab to prevent the contamination of equipment, people, animals or plants by extraneous materials or other microorganisms.
Bacteria	Single-celled organisms that multiply by cell division and that can cause disease in humans, plants or animals.
Botulinum toxin	Toxin made by the bacteria Clostridia botulinum. This toxin causes botulism, a muscle-paralyzing disease. Exposure can be by inhalation, ingestion or injection by the toxin. It is not transmitted person-to-person.
Causative agent	The organism or toxin that is responsible for causing a specific disease or harmful effect.

Contagious	Capable of being transmitted from one person to another, one animal to another and between people and animals.
Culture	A population of micro-organisms grown in a medium. Medium may be liquid or solid.
Culturing	The process of growing bacteria in a prepared medium (e.g., a liquid or solid).
Decontam-ination	The process of making people, objects or areas safe by absorbing, destroying, neutralizing, making harmless or removing the hazardous material.
Dual-use technology	Technology that can be used for both peaceful and military aims.
Fungi	Any of a group of plants mainly characterized by the absence of chlorophyll, the green compound found in other plants. Fungi range from microscopic single-celled plants (such as molds and mildews) to large plants (such as mushrooms).
genetic engineering	The techniques involved in altering the characteristics of an organism by inserting genes into its genetic material.
host	An organism, animal or plant that acts as the habitat for the growth of another organism.

Infectious agents	Biological agents capable of causing disease in a susceptible host.
Infectivity	(1) The ability of an organism to spread. (2) The number of organisms required to cause an infection in secondary hosts. (3) The capability of an organism to spread out from the site of infection and cause disease in the host organism.
Line-source delivery system	A delivery system in which the biological agent is dispersed from a moving ground or air vehicle in a line perpendicular to the direction of the prevailing wind. (See also "point-source delivery system".)
Medical monitoring	Assessment of individuals' health and well-being by competent medical personnel.
Micro-organism	Any organism, such as bacteria, viruses and some fungi that can be seen only with a microscope.
Mycotoxin	A toxin produced by fungi.
Organism	Any individual living thing, whether animal or plant.
Parasite	Any organism that lives in or on another organism without providing benefit in return.
Pathogen	Any organism capable of causing disease in animals, plants and microorganisms.
Pathogenic agents	Biological agents capable of causing serious disease.

Plague	Plague is a disease caused by Yersinia pestis, a bacterium found in rodents and their fleas in many areas of the world. There are two forms of the disease: pneumonic (lung infection) and bubonic (infection of the lymph glands). The pneumonic plague variety can be spread person-to-person.
Point-source delivery system	A delivery system in which the biological agent is dispersed from a stationary position. This delivery method results in coverage over a smaller area than with the line-source system. (See also "line-source delivery system".)
Ricin	Ricin is a poison that can be made from castor beans. Intoxication may be via inhalation, ingestion or injection of the toxin. Castor bean plants are grown all over the world and are used to make castor oil. Ricin intoxication cannot be transmitted person-to-person.
Route of exposure (entry)	The path by which a person comes into contact with an agent or organism; for example, through breathing, ingestion or skin contact.
Smallpox	Smallpox is a disease caused by the virus Variola major. It is a serious contagious disease to humans. To date, smallpox has been eradicated in the world population.
Spore	A reproductive form some microorganisms can take to become resistant to environmental conditions, such as extreme heat or cold, while in a "resting stage".
Toxicity	A measure of the harmful effect produced by a given amount of a toxin on a living organism. The relative toxicity of an agent can be expressed in milligrams of toxin needed per kilogram of body weight to kill animals.

Toxins	Poisonous substances produced by living organisms.
Tularemia	Tularemia is a disease caused by the bacterium Francisella_tularensis. It is highly infectious, with a small number of bacteria causing disease; it is not transmitted person-to-person. Tularemia is typically found in animals and is most prevalent in rodents.
Vaccine	A preparation of killed or weakened microorganism products used to artificially induce immunity against a disease.
Vector	An agent, such as an insect or rat, capable of transferring a pathogen from one organism to another.
Venom	A poison produced in the glands of some animals, for example, snakes, scorpions or bees.
Virus	An infectious microorganism that exists as a particle rather than as a complete cell. Particle sizes range from 20 to 400 nanometers. Viruses are not capable of reproducing outside a host cell.

IPSG OPERATIONAL PRIORITY

TO PROVIDE A PROACTIVE AND RAPID RESPONSE TO THE REQUIREMENTS OF THE MEMBER COUNTRIES AND PROVIDE INFORMATION IN REAL TIME FOR THE POLICE OFFICERS IN THE FIELD

At the request of the member states, the CCC is mobilized and acts as a Crisis Co-ordination Center to facilitate the co-ordination of any large-scale disaster management.

The following services will be provided:

- Absolute priority given to the event concerned;
- Service 24 hours a day, 7 days a week in the Organization's four official languages;
- Efficient circulation of the information to all concerned, anywhere in the world;
- Direct access to all the identification tools available at the General Secretariat (DNA, Fingerprints, ICIS etc.);
- Expertise and analysis;
- Release of specific resources for the event concerned, such as staff, equipment and premises.

CONTACT DETAILS

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Visit also: http://www.interpol.int/Public/BioTerrorism/default.asp