



# **Integrated Biological Attack Response System in Poland (Model and Realities)**

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# **Military Relevance in Civilian Response**

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- **Military/Civilian Community response cooperation**
- **Strategy to improve epidemiological and laboratory detection & identification capabilities to tailor response adequately to agent transmission (e.g. contact, aerosol, non-transmissible);**
- **Strategy & preparations to deal with casualties exceeding local medical capabilities;**
- **Strategy to assist community response.**

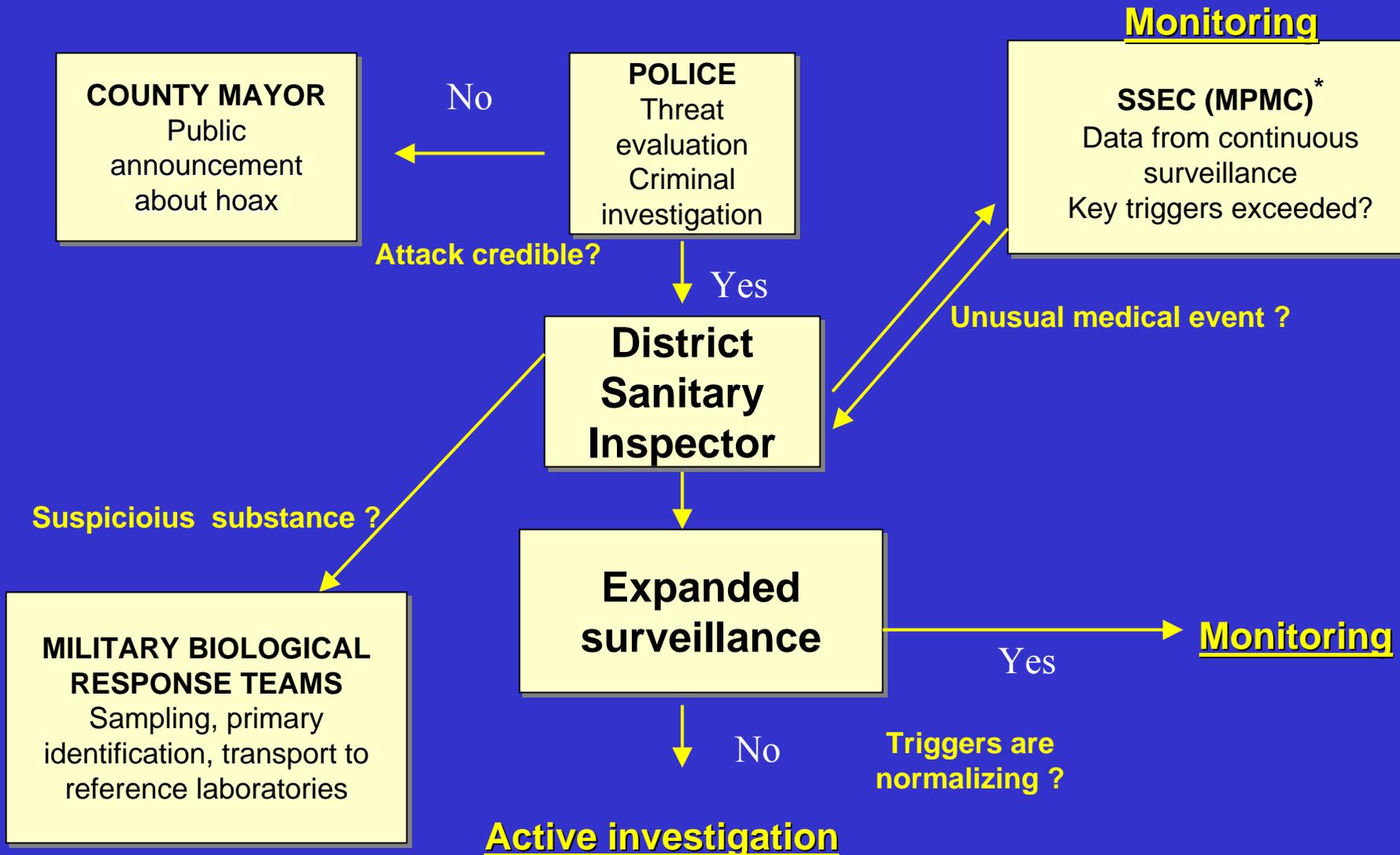


# **BIODEFENSE SYSTEM OF THE POLISH ARMED FORCES**

- **Seven mobile Biological Response Teams;**
- **Biological Threat Identification & Countering Center (BSL-3 laboratory);**
- **Department of Microbiology & Epidemiology (Epidemiological Surveillance System);**
- **5 Military Preventive Medicine Centers;**
- **74 Epidemiological Battalion.**

# Announced attack

# Not announced attack



\*

**SSEC – State Sanitary Epidemiological Center**  
**MPMC – Military Preventive Medicine Center**



# EPIDEMIOLOGICAL SURVEILLANCE SYSTEM

# Continuous Real-Time Surveillance

**MODEL:**

**REALITY:**

## Monitoring of Key Indicators

- |                                      |   |
|--------------------------------------|---|
| - Hospital admissions                | ongoing   |
|                                      | but data not available on-line to crisis management |
| - Unexplained deaths                 | ibid  |
| - Reportable diseases                | ibid  |
| - Emergency call volume              | ibid  |
| - Increased medication sales         | not monitored                                       |
| - Unusual animal diseases and deaths | veterinary services, data not exchanged             |
| - EMS activities                     | data not exchanged                                  |
| - Employment absentee above baseline | lack of real-time data access                       |

# Expanded Surveillance Activities

## MODEL:

### Active Data Collection

- Poll hospital departments and ER's
- Poll EMS activities
- Poll family physicians and clinics
- Poll medical examiners
- Poll veterinary clinics and zoos
- Poll poison control centers
- Poll employment absentee levels

**public health aware that  
respective regulations should  
be adopted**

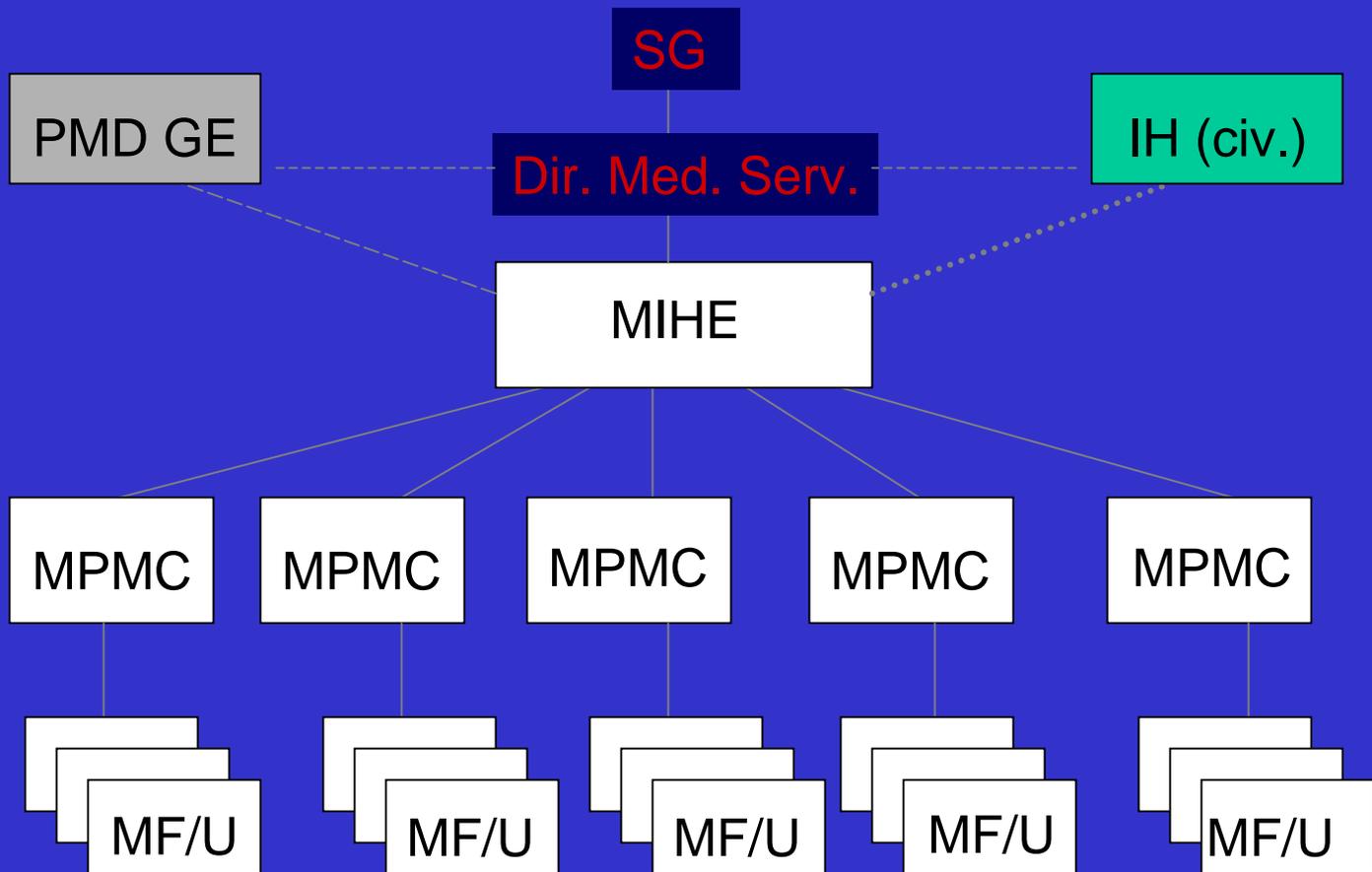
# EXPANDED SURVEILLANCE - EPIDEMIOLOGICAL DATA COLLECTION SYSTEM

## *Environmental Health Teams :*

- located in five Military Preventive Medicine Centers
- collection of data from facilities located in the monitored territory
- sending data to the Epidemiological Team for Monitoring of Infectious Diseases in the Polish Armed Forces (at MIHE-Warsaw).

# CONTINUOUS SURVEILLANCE IN ARMED FORCES

## EPIDEMIOLOGICAL DATA COLLECTION SYSTEM



# CONTINUOUS SURVEILLANCE EPIDEMIOLOGICAL DATA COLLECTION SYSTEM

*Epidemiological Team for Monitoring of  
Infectious Diseases in the Polish Armed Forces  
(MIHE-Warsaw)*

(according to WG MPM-4 guidelines)

Reports:

- routine (monthly);
- immediate (emergency).



## **EPIDEMIOLOGICAL SURVEILLANCE TEAM** **(Dept. Microbiology & Epidemiology, MIHE, Warsaw)**

- **monitoring of infectious diseases in the military units (baseline level);**
- **preparation of *routine* and *immediate* reports;**
- **reporting to the Surgeon General Office, Polish Armed Forces;**
- **reporting to the NATO Epidemiological Reporting Center (NERC) at Prev. Med. Dept., GE Armed Forces Medical Office, Bonn, FRG.**



# COMMUNICATION, COMMAND AND CONTROL

# BW Response Template and Key Decisions

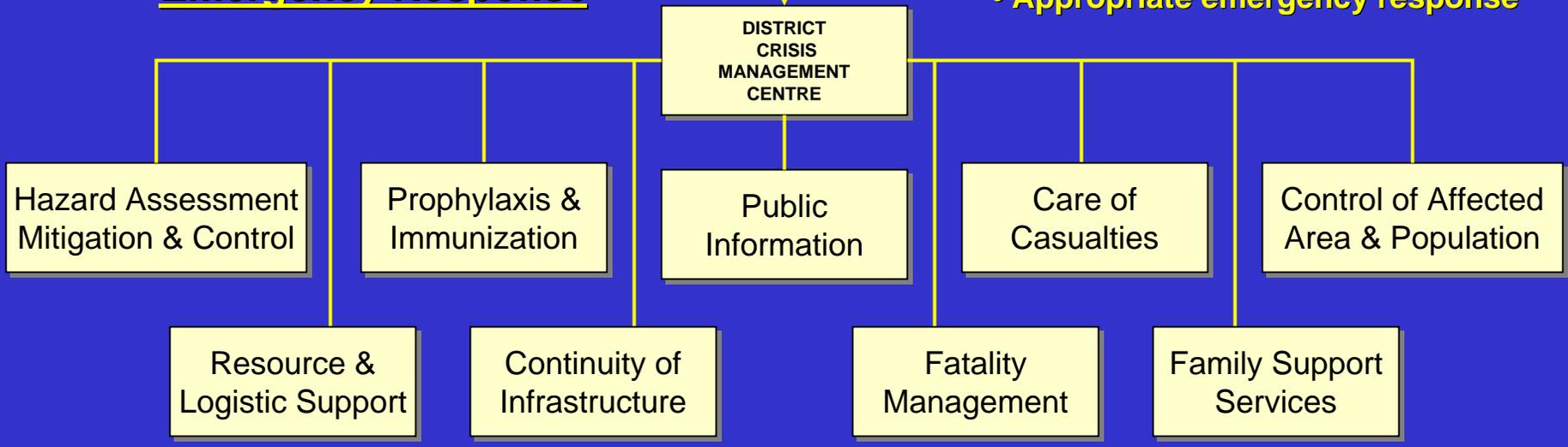
## Active Investigation



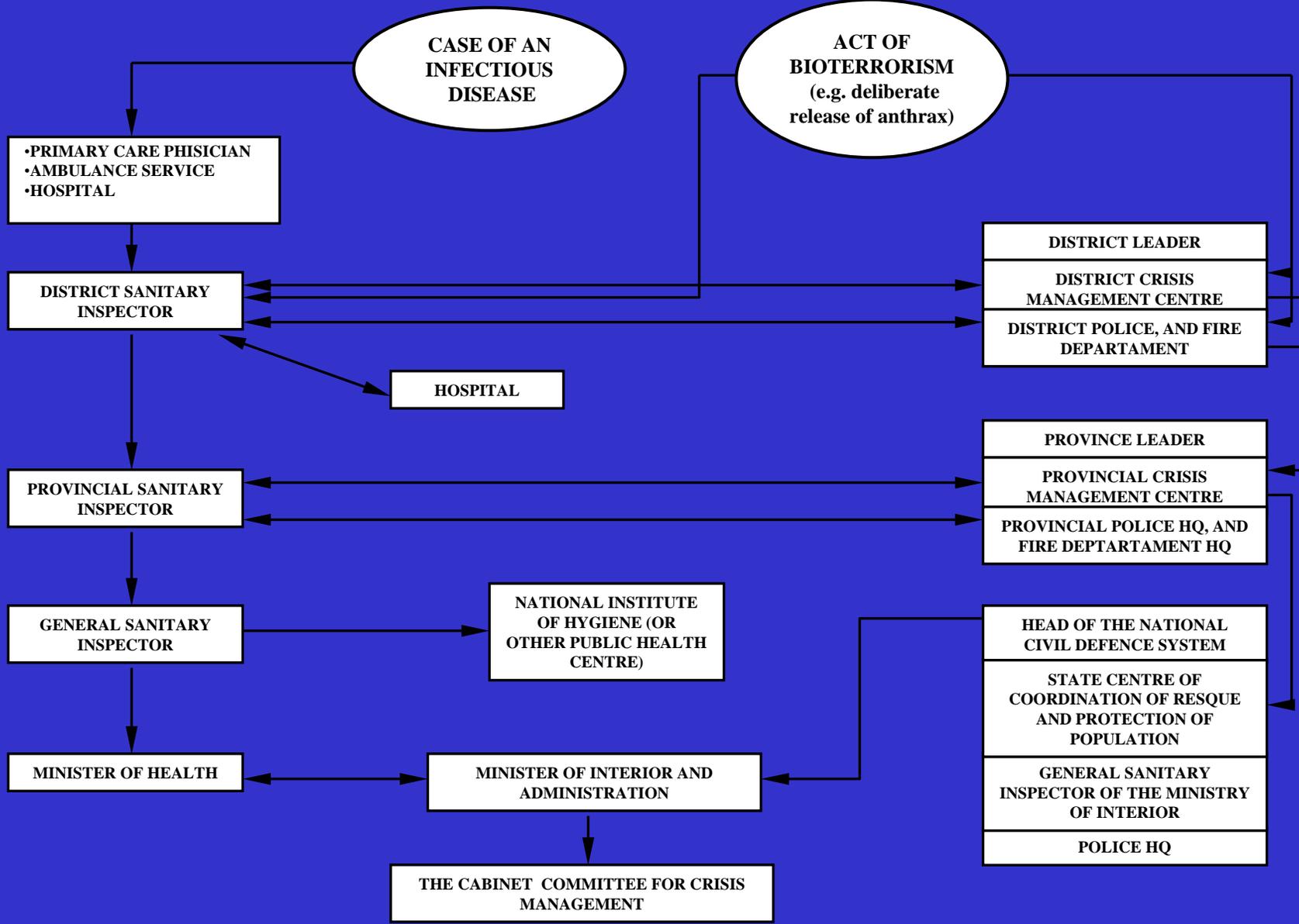
## Key Decisions

- Major public health event (Y/N)
- Cause & population at risk
- Prophylaxis, treatment, isolation
- Appropriate emergency response

## Emergency Response



# Schematic view of a system of notification and cooperation in case of a threat of a dangerous infectious disease or an act of bioterrorism





# Hazard Assessment, Mitigation & Control Activities

# Hazard Assessment, Mitigation & Control Activities

## **MODEL:**

- **Conduct clinical and environmental sampling (human, air, water, soil, surfaces, animals, insects, plants as applicable)**
- **Conduct control and decontamination measures**
- **Perform vector and animal control**
- **Control food sources**
- **Support sampling and decontamination teams**



**DEPLOYABLE  
BIOLOGICAL RESPONSE (SURVEY)  
TEAM (BRT)**



## BRT PERSONNEL:

- **Commander (epidemiologist)**
- **Deputy Commander  
(molecular biology specialist)**
- **Three members (microbiologist, molecular biologist,  
medical doctor)**
- **Technician/driver**



Biological Response Team vehicle for outside country mission



## BRT CAPABILITIES:

### 1. Collection of suspected infectious material:

- air samples
- soil samples
- water samples
- tissue samples
- food samples



BRT vehicle for local missions



BRT vehicle for international missions



## BRT CAPABILITIES (contd):

### *2. In situ provisional (primary)*

**identification of biological agents:**

- *Bacillus anthracis* (anthrax)
- *Vibrio cholerae* (cholera)
- *Coxiella burnetii* (Q fever)
- *Francisella tularensis* (tularemia)



BRT vehicle (inside view)



## BRT CAPABILITIES (contd):

### 2. Primary identification of biological agents (contd):

- *Brucella spp.* (brucellosis)
- *Salmonella spp.* (salmonellosis)
- *E.coli* O:157 H:7 (enterohemorrhagic strains).



BRT vehicle (inside view)



## BRT EQUIPMENT:

- **Individual Protective Gear:**
  - **Sealed impermeable level A suit**
  - **Self-contained breathing apparatus with communication system;**
  - **60-minute air bottle;**



Level A suit with SCBA and air bottle



Level A suit with SCBA and air bottle



## **BRT EQUIPMENT (contd):**

- **Detection and identification equipment:**

- **Sample collection equipment and kits;**

- **Clinical microbiology equipment**

**(portable incubator, portable centrifuge, microluminometer etc.);**

- **PCR equipment;**

- **Biochemical tests equipment and kits;**



Tent for changing equipment



## BRT EQUIPMENT (contd):

- **Decontamination equipment:**

- **Portable decontamination tent with a shower;**

- **High pressure portable decontamination device;**

- **Portable autoclave;**

- **Disinfectants (against vegetative and spore forms of bacteria);**



Portable decontamination tent



## BRT EQUIPMENT (contd):

- Equipment for refilling the air bottles;
- Masks with the HEPA filter;
- Level A training suit;
- Freezers;
- GPS.



Decontamination shower inside the decontamination tent



## BRT OPERATIONAL CAPABILITY:

- operational over the area 250 kilometers in diameter;
- military assistance necessary (sapper squad, chemical team).



## **BRT COOPERATION WITH:**

- microbiological laboratories (field or stationary);**
- chemical team (area, methods, and efficiency of disinfection);**
- civilian biological threat response system;**
- preventive medicine and veterinary medicine specialists.**



**BIOLOGICAL THREAT  
IDENTIFICATION  
& COUNTERING CENTER  
(BSL-3 LABORATORY)**



## **BSL-3 LABORATORY ASSIGNMENTS:**

- **Leader in bio-defense research;**
- **Final (confirmed) identification of extremely dangerous bacterial agents;**
- **Estimation of the sensitivity of bacteria to anti-bacterial agents;**
- **Elaboration and testing of new bio-detection and identification methods;**



- **BSL-3 LABORATORY ASSIGNMENTS**  
**(contd):**
- **Elaboration and testing of new antibacterial agents;**
- **Elaboration and testing of new disinfectants;**
- **Elaboration and testing of protective measures against biological agents;**
- **Testing of new equipment for detection of and protection against biological agents;**



- **BSL-3 LABORATORY ASSIGNMENTS**  
**(contd):**
- **Participation in NATO exercises involving identification of biological warfare agents;**
- **Training medical army and civilian officers responsible for and involved in organization, supervision and execution of bio-defense system (including biological weapons and bio-terrorism) in Poland.**



- **BSL-3 LABORATORY IDENTIFICATION CAPABILITIES:**

- **Three-step tests (microbiological, biochemical, molecular) for final (confirmed) identification of:**

- *Bacillus anthracis* (anthrax)
- *Vibrio cholerae* (cholera)
- *Coxiella burnetii* (Q fever)
- *Francisella tularensis*  
(tularemia)
- *Brucella spp.* (brucellosis)



Bio-safety class 3 cabinet



- **BSL-3 LABORATORY IDENTIFICATION CAPABILITIES (contd):**

- *Yersinia pestis* (plague)
- Yellow fever virus (yellow fever)
- VEE virus (Venezuelan equine encephalitis)
- Orthopox genus virus
- *Burkholderia mallei* (glanders)



Bio-safety class 2 cabinet

- *Salmonella spp.* (salmonellosis)
- *E.coli* O:157 H:7 (hemorrhagic colitis).



- **BSL-3 LABORATORY TECHNIQUES:**
- **Classical microbiology;**
- **Biochemical: API, PhPlate;**
- **Molecular: PCR (Multiplex, Nested, LR-PCR, PCR-ELISA);**
- **Pulsed field gel electrophoresis;**
- **Other: ELISA, flow cytometry, clonogenic assays, biological tests.**





## BIO-SAFETY CLASS 3 LABORATORY EQUIPMENT:

- **Biological safety cabinets class 1, 2, 3;**
- **Self-sterilizing incubators;**
- **Biologically safe centrifuges;**
- **Portable and computer controlled autoclaves;**
- **Equipment for biochemical tests;**
- **Microplate readers (ELISA);**
- **Thermocyclers, spectrophotometers, deep freezers;**
- **Flow cytometer, gel registration systems.**



(glove box cabinet)



Bio-safety class 1 cabinet



**DEPARTMENT  
OF MICROBIOLOGY & EPIDEMIOLOGY  
(RESEARCH CENTER)**



**DEPARTMENT OF MICROBIOLOGY**  
**& EPIDEMIOLOGY (RESEARCH CENTER)**  
**(contd)**

- **Epidemiological investigation of bacterial contamination of food and water supplies;**
- **Development of molecular epidemiology methods;**
- **Participation in the NATO epidemiologic surveillance network;**
- **Training of microbiologists and epidemiologists in surveillance of communicable diseases.**



# LABORATORY RESPONSE NETWORK



## **LABORATORY RESPONSE NETWORK**

*(prepared and ready to receive and analyse samples of bio-contaminated material):*

- **BSL-2 and BSL-2+ laboratories at the Military Preventive Medicine Centers and in MIHE;**
- **BSL-2 and BSL-2+ laboratories at the civilian sanitary-epidemiological stations;**
- **BSL-3 laboratory at the MIHE Biological Threat Identification & Countering Center (in Pulawy)**



**BIODEFENSE TRAINING  
CENTER  
(pending)**

# Medical Diagnosis Activities

## **MODEL:**

- **Undertake clinical lab tests**
- **Obtain presumptive diagnosis and preliminary ID in hospital lab (Level A) – rule-out or refer;**
- **State Sanitary Epidemiological Centres – confirmative identification (Level B) – identify or refer;**
- **In case of suspected biological attack: refer to National Institute of Public Health or MIHE to obtain final confirmation and archive (Level C Laboratories) – refer to partner regional BSL4 laboratories in EU.**

# Epidemiological Investigation Activities

- **Integrate epidemiological and criminal data gathering and sharing – regulations not issued**
- **Conduct information and contact tracing efforts**
- **Establish case definition and update with new findings**
- **Analyze distribution of cases, places and time**
- **Define population at risk**
- **Recommend measures for containment, prevention, treatment, and protection**

**Standard steps of epidemiological investigation known to experts community but rarely trained due to scarcity of major outbreaks of communicable disease**

# Criminal Investigation Activities

## **MODEL:**

- **Activate investigation task force**
- **Conduct interviews with hospital staff, patients and others**
- **Collect evidence such as unexplained powder residue**
- **Interface with epi investigation and share information**

## **REALITY:**

**Police report lack of specific preparedness to such events**

# Local Command & Control Activities

## **MODEL:**

- **Activate local Crisis Management Centre**
- **Activate a unified medical command**
- **Request local, state and central agency representatives at CMC**
- **Implement local emergency operations plans**
- **Declare a local state of emergency**
- **Request State disaster declaration and assistance**

**REALITY:** Crisis Management Exercise 2003 revealed various levels of regional preparedness despite awareness of the problem, lack of specific modifications in emergency plans, awaiting guidelines from central level

# Prophylaxis & Immunization Activities

## **MODEL:**

- **Activate medical prophylaxis plan**
- **Distribute prepackaged medication via**
  - **Distribution sites**
  - **Door to door canvas**
  - **Other means**
- **Immunize at community centers, homes and other places**
- **Arrange for security as needed**
- **Implement centralized control of critical medications**

# Prophylaxis & Immunization Activities

## **REALITY:**

**views expressed that pre-event smallpox vaccination is not required but other views are that it should be restricted to lab workers in reference laboratories;**

- smallpox vaccine stockpile for post-event vaccination of key personnel available;**
- further enlargement of stockpile considered to secure mass vaccination (if needed) is warrant ;**
- stockpile of wide-spectrum antibiotics prepared;**
- stockpile of infusion fluids and equipment prepared;**
- distribution system and vaccination procedures under elaboration.**

# Care of Casualties

## **REALITY:**

- **high containment isolation rooms construction and renovation program started in major cities (so far facilities in the capital city operating);**
- **isolation beds available throughout the country but frequently conversed for other purposes;**
- **additional „war time” bed base available – procedures for its usage in case of bioattack pending;**
- **in the military organization of BW Disease Treatment Sectors as the sectors of infectious diseases wards of the military hospitals (by the end of 2006).**

# Other

- Public Information
  - Control of Affected Area & Affected Population Activities
  - Resource & Logistic Support Activities
  - Continuity of Infrastructure Activities
- 
- Issues to be further discussed during the future field exercises and intragovernmental seminars.

# BW PROTECTION SYSTEM IMPROVEMENT

## *Planned activities :*

- establishment of BSL class 3 laboratory for final diagnostics of viral factors – at BTICC, Puławy (by the end of 2005);
- establishment of BSL class 4 laboratory for final diagnostics of the whole spectrum of BW agents – at MIHE Warsaw (by the end of 2005);
- organization of BW Disease Treatment Sectors at infectious diseases wards of the military hospitals (by the end of 2006).

# CONTRIBUTION TO NATO AND OTHER INTERNATIONAL MISSIONS

## *Contribution to NATO Deployable NBC Analytical Laboratory:*

### *Deployable Biological Laboratory:*

- Six personnel including medical and veterinary doctors specialized in microbiology, molecular biology, epidemiology and/or infectious diseases, epizootology, a microbiologist (or molecular biologist) and a technician/driver;
- Capabilities: in situ collection of samples and preliminary identification of pathogens, transportation of the samples to laboratory for further identification of: *Bacillus anthracis* (anthrax), *Vibrio cholerae* (cholera), *Coxiella burnetii* (Q fever), *Francisella tularensis* (tularemia), *Brucella spp.* (brucellosis), *Yersinia pestis* (pestis), *Salmonella spp.* (salmonellosis), *E. coli* O157: H7 (enterohemorrhagic *E. coli* strains); participation in demarcation and bio-safeguarding of the contaminated area.

## CONTRIBUTION TO NATO AND OTHER INTERNATIONAL MISSIONS (contd)

### *Contribution to NBC Event Response Team:*

- **Personnel support:** medical doctor(s) trained in NBC agent prophylaxis and management.

# FURTHER DEVELOPMENTS IN CIVILIAN PREPAREDNESS PROGRAM

- National preparedness and response system – decision making and executive competency;
- Routine syndrome based surveillance system for alert and warning;
- Food threat early warning system (i.a. mycotoxines, GMO feed and food surveillance);
- Qualitative and quantitative improvement of high containment medical facilities;
- Further improvement of diagnostic capabilities (2 BSL3 and 1 BSL4);
- Biological response team in every state;
- Regional cooperation – facilitation of epidemiological data exchange and standardization of lab protocols, training.

# INTERNATIONAL COOPERATION EXPERIENCE

1. **Organization of NATO-Russia Council Seminar on NBC defence and training co-operation, December 2003**
- 2. **Organization of 3 NATO Advanced Research Workshops :**
  - **May 1997: Rapid Methods for Monitoring the Environment in Biological Hazard**
  - **November 2000: Scientific and Technical Implication of the BTWC Protocol for Civil Industry**
  - **January 2003: Preparedness against bioterrorism and re-emerging infectious diseases – regional capabilities, needs and expectations in Central and Eastern Europe countries**
- 3. **Organization of the meeting of COMEDS Working Group for Food Hygiene, Technology & Veterinary in May 2001**
- 4. **Technical support to national delegation at Ad Hoc Group of States Parties of Biological Weapons Convention 1997-2001**
- 5. **Every year SIBCA drill in microbiological diagnostics**

# INTERNATIONAL COOPERATION EXPERIENCE

9. Bilateral co-operation with several research institutes in Germany, Netherlands, UK, USA, as well as membership and participation in Applied Science Association, Pugwash, CB MTS

•10. Representation of Polish Army Medical Service in NATO expert working groups: NBC-MED, COMEDS, BIOMEDAC, United Nations Monitoring and Verification Commission (UNMOVIC) and NATO R&T Organization.

•11. Certificate of the “Medical Management of Biological Casualties” course organized by US Army Medical Research Institute of Infectious Diseases.

•12. Certificate of the “Medical Management of Chemical Casualties” course organized by US Army Medical Research Institute of Chemical Defense.

# PLANNED INTERNATIONAL COOPERATION ACTIVITIES

1. Regional scenario-based biological threat preparedness exercise for senior public health officials;
2. WHO Preparedness Guidelines field exercise?
3. NATO CEPD Sagbata project on decision making support tools?

# BIOSECURITY ACTIVITES

Government of Poland is going to establish an **oversight committee** involving all the different implementing and enforcement agencies together with those who are affected by the legislation in **government, industry and academia** in order to review the consistency and continuing adequacy of the current legislation and regulations as well as creating new pieces of legislation if required.

The agenda of work for this committee encompasses:

1. **Review of national legislation** implementing the obligations of the Convention to be **complemented by developments in other national legislation addressing topics such as anti-terrorism, public, animal and plant health, and hazardous materials.** The language used in the national legislation should be identical to or closely similar to that in the Convention so as to avoid any loopholes;
2. Institution of **further regulations concerning transfer** of essential technologies and goods in concordance with Article III of the Convention, including administrative regulations pertaining to internal transportation of micro-organisms and toxins between facilities and to standard rules of packing of biological material for transportation and marking;

3. Adoption of further regulations concerning the **containment and equipment of facilities handling micro-organisms and toxins, good laboratory practice (GLP), good manufacturing practice (GMP), and good research standards including the security and oversight of pathogenic microorganisms and toxins;**
4. Mounting of an **effective and continuing campaign** to ensure that **all those working with biological agents and toxins both now and in the future are aware of the prohibitions of the Convention** and of the national legislative, administrative and other measures to implement these prohibitions;
5. Adoption of rules for the **accreditation of facilities** as well as **licensing of staff** handling essential pathogens and toxins.