Chapter 11
Case Study – Greece

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Abstract Biological terrorism and the need for biological defence is a relatively new concept for Greece. Although defence against weaponized pathogens was part of CBRN training in the military, it was the 9/11 massacre followed by the anthrax letters horror that triggered a more active involvement of the Greek public health sector. In that historical moment a third bullet was added to the already existing disease outbreak classification – naturally, accidental and now deliberate. These incidents and the subsequent 2004 Olympic Games in Athens drove the Greek government to focus on biodefence and revise existing civil emergency planning by inclusion of new emerging threats.

11.1 Introduction

Naturally occurring or accidental outbreaks of a disease usually take place in both urban and country environments. Big cities are usually the targets of bioterrorism due to the high density of population resulting in both physical and psychological casualties.

If the disease does not start from one's own country then early warning might be possible, leading to preventive measures all the way from the borders into the community. The H1N1 virus pandemic is an example of this globalization of medical information that is useful to both countries and citizens.

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I. Hunger et al. (eds.), *Biopreparedness and Public Health: Exploring Synergies*,
NATO Science for Peace and Security Series A: Chemistry and Biology,
DOI 10.1007/978-94-007-5273-3_11,

Table 11.1 Distribution of specific diseases in Greek citizens and immigrants (2010)

Disease	Declared cases among			
	Immigrants (number)	Immigrants (percentage)	Greeks (number)	Greeks (percentage)
Malaria	38	84.44	7	15.56
Tuberculosis	229	46.93	259	53.07
Shigellosis	1	3.03	32	96.97
Hepatitis A	5	8.47	54	91.53
Hepatitis B	12	35.29	22	64.71
Typhoid fever	6	60.0	4	40.00
Brucellosis	11	11.34	86	88.66

Source: Epidemiological Surveillance System, CDCP

11.2 Main Public Health Threats

One important parameter of the epidemiology of infectious diseases is the movement of the populace either for professional, recreational or immigration reasons. In the past, moving from one location to another, even within the same country borders, took considerable time. In modern times, usually less than 24 h is needed to cross the world. We witnessed the contribution of faster travel to the spread of disease recently during the 2010 flu pandemic. Apart from the legal movement of a population, mass illegal immigration also poses a significant problem in certain parts of the world – e.g. in Greece – in relation to the spread of a disease or re-emergence of old diseases like malaria or tuberculosis. The geographical location of Greece and its porous borders due to the significant coastline make it an attractive destination for those seeking a better living environment or as a way to enter other EU countries as a final destination.

Greece receives a considerable number of tourists annually that exceeds its own population. Greeks also travel globally for the reasons mentioned above. This constant movement of a populace makes epidemiologic surveillance and disease prevention extremely difficult.

The reality of disease transmission as a result of immigration and travel is reflected below in the results from the Hellenic Centre for Disease Control and Prevention (CDCP) [2] and various relevant NGOs addressing the health status of immigrants and transmission of old and new infectious diseases. The percentage of declared cases of specific diseases attributed to Greek citizens and immigrants is shown in Table 11.1.

11.3 Bioterrorism as a Potential Threat

Timely information is crucial when it comes to a natural or accidental outbreak of a disease. This information might be beneficial to laboratory or institution workers or the population that needs to be protected. Of course, in most cases, basic hygiene

measures (personal or collective, at home or in a wider infrastructure such as schools) can prevent these diseases.

Defence against a deliberate outbreak of a disease requires intelligence. This type of medical intelligence is attributed to national intelligence service both civilian and military. Usually international collaboration is mandatory when weaponized pathogens are the problem.

Risk identification and assessment contribute to national defence as well. It is a continuous process dealing with both the deliberate and non-deliberate forms of disease outbreaks. Internal (sanitary institutions, police reports, etc.) and external (neighboring countries, World Health Organization, EU public health surveillance systems, etc.) hints can assist experts to perform a risk assessment leading to an alert of the public health system.

Current geopolitical instability and turmoil in our own region combined with the existing direct and indirect, overt and covert threats against Western societies make bioterrorism attacks a potential risk.

Production of biological weapons is both easy and cost effective. Of course we must discriminate between the production and weaponization of pathogens that is not as easy and needs specialized equipment. Pathogen production does not require large factories and existing facilities in commercial infrastructure (food industry, drug industry) can be used for this purpose. On a smaller scale, pathogens can be cultivated in small laboratories or mobile caravans similar to those used to produce illegal drugs. Identification of such illegal laboratories is very difficult. Viral pathogens are more difficult to produce as compared to bacteria and also need some extra precautions and equipment.

Large quantities of biological weapons can still be produced in a short period of time (days or weeks) in small laboratories. According to Kathleen C. Bailey, former Assistant Director, Office for Disarmament and Armaments Control, who visited many biotechnology and pharmacology companies, a complete biolab requires no more than a room of 4.5 m × 4.5 m and a budget of USD 15,000 for supplies [1]. In such a room, trillions of bacteria can be quickly produced with low risk and with minimum personal protection equipment such as a gas mask and a plastic suit over clothing.

Difficulties relevant to the production of biological weapons include:

- Difficulties in the protection of workers at all levels of production, transportation, and final dispersal of biological weapons;
- Low level of training and expertise can lead to accidents and exposure to pathogens;
- Vaccination of those involved is not always protective/effective;
- Controlling the quality and quantity of produced material is difficult;
- Dispersion is not without problems since dispersal device explosives, UV exposure, or weather conditions such as rain or drying may have negative effects on pathogens or spores;
- Storage of pathogens poses additional problems; specific conditions are required to maintain the efficacy, and it is difficult to maintain them in a form ready for dispersion over long periods of time.

11.4 Preparedness and Response to Health Emergencies in Greece

Key stakeholders in public health preparedness and response systems are:

- General Secretariat of Civil Protection (GSCP) [3] – Organization under the Ministry of Citizen Protection [5] having the overall responsibility for the protection of the population against all disasters [4], either natural (earthquakes, wildfires, floods, landslides, severe weather phenomena etc.), technological, or deliberate (large scale terrorist attacks – CBRN agents release included).
- Centre for Disease Control and Prevention (CDCP) – Organization aiming to protect and promote public health by employing a national strategy for the prevention of disease spread. CDCP is responsible for the surveillance of epidemics, running infectious disease cells at hospitals throughout the country, management of public health hazards, and provision of public guidelines in case a public hazard emerges. It is under the control and funding of the Ministry of Health and Social Solidarity [6] operating on a 24/7 basis.
- First Aid National Centre (EKAB) – Organization supporting medical transportation of casualties to state medical facilities.
- Hellenic Police, Hellenic Fire Service, and National Defence General Staff – Entities supporting GSCP's general emergency plan under the name "Xenocrates".

11.4.1 Epidemiologic Monitoring in Greece

Epidemiologic monitoring is the systematic and continuous collection, analysis and interpretation of sanitary/medical information relevant to public health.

The objectives of epidemiologic monitoring are:

- Follow-up of tendencies (estimate the impact of a disease or health problem through time; estimate dispersion of a disease, problem or incident; determination of risk factors);
- Localization of epidemics or cases (detection of epidemics/cases; prognosis of epidemics);
- Evaluation of public health management (evaluation of interventions; evaluation of public health strategies; follow-up of progress of objectives);
- Comprehension of health problems and their natural course.

These are types of epidemiologic monitoring subsystems:

- System of mandatory disease reporting (Fig. 11.1);
- System of illness observers in primary care (sentinel physicians);
- System of laboratory reporting;
- Syndromic surveillance;
- Networks (laboratories, early warning, monitoring of hospital infections).

Fig. 11.1 Data flow during epidemiologic monitoring

11.4.2 Analysis of the Different Types of Epidemiologic Monitoring Systems

The system of mandatory reporting of diseases represents the basis of epidemiologic monitoring in most countries; usually it is supplemented by more specialized systems, networks or studies with specific objectives.

The objectives of this system are:

- Specific (for the system of mandatory reporting of diseases) – detection of sporadic cases; Detection of epidemic cases
- Generic (for every system of epidemiologic monitoring) – estimation of repercussions of illness through time; estimation of dissemination of illness; determination of risk factors; evaluation of interventions, evaluation of public health strategies, follow-up of progress of objectives.
- Diseases included in mandatory reporting:
  - Diseases belonging to a control or elimination programme;
  - Diseases for which direct preventive measures are required;
  - Diseases which can be identified in the event of an epidemic elevation at the local level;
  - Diseases for which the epidemiologic information is essential for the mapping of a long-term control policy.

Mandatory disease reporting systems intensified during the 2003–2004 period. During that time a complete revision of the 45 supervised diseases took place along

with complete reformation of CDCP's databases aiming to reinforce a reliable system of mandatory reporting during the Olympic Games in Athens (2004). The Epidemiologic Monitoring and Intervention Division of CDCP was fully reformed to comply with the European Network of Epidemiologic Surveillance.

11.4.3 Categorization of Diseases of Mandatory Reporting

- Diseases of direct reporting (reporting immediately when explicit clinical suspicion exists) include: plague, anthrax, botulism, viral hemorrhagic fevers, smallpox, tularemia, Lassa virus, diphtheria, encephalitis from arthropod-borne viruses, rabies, cholera, and SARS.
- Diseases that are transmitted through the respiratory system or with droplets (reporting within 24 h following diagnosis) include: tuberculosis, legionellosis, meningitis of different types, and influenza (laboratory confirmed).
- Diseases that are prevented with vaccination (reporting within 24 h following diagnosis) include: tetanus/tetanus neonatal, whooping cough, measles, mumps, rubella, varicella (chickenpox) with complications, toxoplasmosis, and syphilis.
- Diseases that are transmitted through food, water or environmental sources, animal diseases, and viral hepatitis (reporting within 24 h following diagnosis) include: a large number of food-borne or water-borne diseases, typhoid fever, salmonellosis, shigellosis, infection with entero-haemorrhagic E. coli (EHEC), trichinellosis, brucellosis, listeria, Q fever, Echinococcus, leishmaniasis, leptospirosis, hepatitis A, hepatitis B (HBsAG (+) in infant of <12 months), and hepatitis C (confirmed Anti-HCV (+) first diagnosis).
- Diseases of special reporting and imported diseases (reporting within one week following diagnosis) include: AIDS, contagious spongiform encephalopathy (variant of CJD), poliomyelitis, and malaria.

11.4.4 Flow of Information

The reporting process can start from the clinical or laboratory doctor or the hospital's infectious diseases nurse but has to be sent immediately (by fax) to the Regional Health Directorates and CDCP.

The reporting form includes the following data:

- Full name;
- Date of birth or age;
- Residence/actual address;
- Connection with a similar case;
- Education;
- Nationality;
- Date of beginning of symptoms;
- Risk factors/precautions;

- Clinical characteristics;
- Laboratory results;
- Case classification.

After reporting, evaluation of the validity/completeness of the reported elements will follow along with a thorough investigation of the case that will lead to a systematic/rapid analysis and interpretation/export of the conclusions. Briefing of public health/sanitary/medical/nursing services will follow a complete evaluation of the system.

11.4.5 Legal Framework on Mandatory Reporting in Greece

1836: elementary mandatory reporting of diseases (Newspaper of Government, No. 83, 31/12/1836).

1911–1915: legislation on systematic mandatory reporting of diseases (cholera 1911, smallpox 1911, plague 1915).

1950: "Measures taken against infectious diseases justifying their reporting as mandatory", Art. 1: mandatory reporting of diseases (RD 7/9-11-1950).

1998: Essential improvement of mandatory reporting system (National Centre of Epidemiologic Surveillance and Intervention).

2003: "Organization and modernization of public health services and other provisions", Art. 8, Law 3172/6-8-2003: epidemiologic monitoring of pestiferous diseases is practiced and coordinated by CDCP.

2003: "Regulations applied for regional systems of health and providence", Art. 44, Law 3204/23-12-2003: CDCP – each private or public medical institution or individual doctor, operating legally, is obliged to inform CDCP of each case of pestiferous disease that comes to his/her attention.

Hellenic Personal Data Protection Authority:

- 1997: "Protection of individuals from the manipulation/exposure of data of personal character", Art. 7, Law 2472/1997: Exceptionally, it is allowed:
  - If it concerns subjects of health;
  - If it is executed by a health professional in duty of secrecy;
  - If it is essential for medical prevention.
- 2004: Authorization from "Hellenic Personal Data Protection Authority".

11.4.6 System of Illness Observers in the Primary Care Setting (Sentinel Physicians)

This system was set in operation in 1999 and revised in September 2004. It deals with common diseases with minor indications (usually). Its scope is to support the health system through data gathering and processing, to make a clear estimate of diachronic trends and detect a possible epidemic elevation in an area or region.

A large number of selected primary care doctors participate in this system/programme. These doctors are distributed all over the country in the following networks:

- Private doctors network (86 physicians);
- Regional health care centres/clinics (98 physicians);
- Social security institute health units network (44 physicians).

The diseases included in the system of illness observers at the first degree health care centres are: whooping cough, measles, mumps, rubella, varicella, influenza of infective etiology, respiratory infection with fever (>37.5 °C).

A weekly report is done of the number of cases and patients. The report is done according to the clinical findings and definitions.

11.4.7 Laboratory Reporting System

Laboratory reporting is an additional source of information. The objectives of this system are to provide health directorates a clear estimate of general tendencies over the years and provide them with the capability of detecting an epidemic elevation in the region.

Chosen laboratories with a suitable geographic distribution participate in the system/programme.

Prerequisites for the optimal function of the system include:

- Systematic weekly reporting;
- Sharing small amounts of information with constant flow from the laboratories;
- Sending cultures to specialized centres.

11.4.8 Syndromic Surveillance (Special Systems)

This system is activated in special conditions or when there is a specific objective. It applies to the reporting of predetermined clinical conditions (“syndromes”) and not diagnosed diseases (e.g. “respiratory infection with fever” instead of “pneumonia from pneumococci”).

Syndromic surveillance applies to the system of illness observers, early detection of epidemic elevations or individual incidents with public health importance (e.g. Olympic Games 2004) and in the case of a known epidemic (e.g. SARS).

Syndromes that are supervised with syndromic surveillance include:

- Respiratory infection;
- Hemorrhagic diarrhea;
- Gastroenteritis;
- Fever with rash;

- Meningitis (syndrome compatible with meningitis, encephalitis or unexplained acute encephalopathy/delirium);
- Hepatitis A (syndrome compatible with acute hepatitis);
- Syndrome compatible with botulism;
- Septic/unexplained shock;
- Unexplained death.

Other networks (laboratories, early warning, monitoring of hospital infections) and studies with specific objectives also exist. These are clinical-laboratory networks for special pathogens, such as hospital bio-pathology laboratories, reference laboratories, specialized laboratories, and special clinical units.

These networks focus on:

- Diseases of food origin (centres for Salmonella reporting);
- Contagious spongiform encephalopathy (centres for spongiform encephalopathy reporting);
- Poliomyelitis (centres for poliovirus reporting);
- Meningitis (centres for meningitis reporting);
- Legionellosis (centres for legionellosis reporting).

11.5 Military and Civilian agencies' Contribution in Preparedness and Response Against Natural or Deliberate Health Emergencies in Greece

All public sector services, in the case of a suspected or confirmed biological incident – deliberate or not – that needs to be treated, alert the Civil Protection Operations' Centre of GSCP.

GSCP then activates the Crisis Management Team (CMT) which consists of representatives from Police, Fire Service, First Aid National Center (FANC) [7], National Defence General Staff, Centre for Disease Control and Prevention (CDCP) and the GSCP itself.

GSCP's representative coordinates the functions of the CMT through telephone or video conference. After the thorough evaluation of the severity of the incident and the classification with different color codes if necessary, CMT will conduct a meeting at the GSCP building for better coordination of the operation.

When an initial estimation has been made, medical directorates in various/all regions of the country are informed and guidelines are issued. Medical directorates are obliged to report immediately to the GSCP about any laboratory result following citizens' examinations and inform the public according to the guidelines of GSCP.

Different missions are given to Police and Fire Service depending on the incident's nature.

If needed, National Defence General Staff contributes resources through its military hospitals, laboratories, mobile laboratories, medical personnel, services (mass vaccination) and equipment (direct supply of masks with filters against

biological agents, personal protective suits, decontaminants, antidotes, drugs, mobile toilets, and decontamination facilities) or other supportive units (e.g. to clear or secure an area, for quick transportation or relocation of people, etc.).

In case of a CBRN agent release, Hellenic National Defence General Staff activates its Special Joint CBRN Company which has the capability to be airborne and deploy anywhere in Greece within 4 h (maximum), to conduct a CBRN search, survey, identification, sampling, decontamination, and provide specialized first aid. For bioterrorism agents, this company has the capability to operate portable biological detectors that can identify pathogens of special interest, such as those causing anthrax or plague, within 30 min (up to 28 biological samples can be processed simultaneously).

The Platoon was established after the 2004 Olympic Games by merging the two specialized units (one field unit operating in both hot and warm zones and one hospital-based unit deployed at the Army General Hospital of Athens) that were created and deployed during the Games in support of first responders.

References and Further Reading

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