# Chapter 7
# Primordial and Primary Levels of Biothreat and Bioterrorism Prevention

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**Abstract** There is still an abundance of preventive and solving measures against biological attacks that makes confusion and dezorientation among experts and health policy-makers. Our pyramidal model of adversaries, and spherical system of prevention help us to solve this problem. They make clearly to us, which measures should be applied at any of four levels of prevention without robust spending.

Primordial level of prevention should be focused to stop entering perpetrator/source of infection/reservoir of pathogen and biological agent/pathogen on defended territory. This is the first line of biodefense, deeply and multiply linked with the strategies of intelligence and deterrence.

The primary prevention of biological attack is focused on monitoring and surveillance of potential internal sources of biological agents and bioterrorists. We elaborate three types of surveillance: clinical (syndromic), laboratory and environmental.

Both levels of prevention were detailed analyzed, according to the next issues: ***Perpetrator/source of infection/reservoir of pathogen*** (Sophistication, Motivation, Intention, Intelligence, Secrecy, Number of perpetrators, Number of sources of infection/reservoirs, Accessibility to sources of agent/pathogen, Accessibility to targets/population at risk), ***Biological agent/pathogen*** (A category, B category, C category, Emerging pathogens, Amount of the available agent/pathogen), ***Means/media of delivery/factors of transmission*** (Air, Water, Food, Fomites, Vectors, Biological ammunition, Delivery systems, Dispersion systems **mechanism of release**), ***Target/susceptible population at risk*** (Intelligence, Secrecy, Personal control, Control of means/media of delivery/factors of transmission, Physical protection, Protection by chemoprophylaxis, Protection by immunoprophilaxis, Number of people in a target/population at risk, Importance of target/population at risk, Location of target/population, Distribution of people in a target/population at risk), and for each issue a whole spectrum of cheap, simple and effective preventive measures were proposed.

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## 7.1 Introduction

To make clear our approaches and proposals within biodefense [1], we start with systematic, logical and concrete explanation of the key terms:

1. doctrine of biodefense,
2. strategy in biodefense and
3. investment in biodefense.

*Doctrine* in biodefense defines enemies, potential enemies and available resources in biodefense. Each country should define a doctrine for itself and then to find out its place in the collective doctrine on international level.

*Strategy* in biodefense defines types of biorisks (types of bioattacks), their structure and feasibility, levels and ways of their prevention [2].

*Investment* in biodefense, should be preferably in scientific community. The priority task of scientific community is to offer solutions – develop methods and models to reduce life losses, costs and risks, than just to demand more money, more vaccines, more drugs and so on.

Following practical reasons (saving human and material resources), we have analyzed different scenarios of unusual epidemiological events (UEEs) and biological attacks (BAs), designed and applied the new methods of outbreak analysis (early and quickly orientation, subtle and detailed differentiation) [3–7].

At first sight it is obvious that there are numerous possibilities for BAs [3, 8, 9], and consequently, it was almost impossible to assess risk of BAs. Because of that, we have divided BAs into four components, and components into 10 qualitative and 22 quantitative parameters [3]. If by analogy propose BA as an equivalent to outbreak, then these 32 parameters may consider as an equivalent to links in Vogralic's chain. So, elimination as many as possible BAs parameters, means reducing or elimination risk from BAs. This was a base for the new approaches:

1. Vulnerability analysis, allows targets classification, identification their *"locus minoris resistentiae"*, and constructive plans for their improvements.
2. Feasibility analysis, identify possible scenarios, possibilities for their prevention, costs and possible losses.
3. Bioterrorism risk assessment (BTRA) is a unique approach of the two former analyses allows biosecurity experts and policy-makers very clear strategy in biodefense – distinct directions with several steps [3].

Depending on necessities, mentioned approach may have dual purpose:

1 Retrograd analysis – to assess which biodefence scenario was possible and at which degree;
2 Anterograd analysis – to estimate outbreak (BA) risk for any target and make measures for its reducing or complete elimination.

From the aspect of biodefense the most important is *Anterograd analysis,*[1] that start from the component *Target/Population at risk*. If we have list of possible *Targets* then should classify them according to common threaten parameters from the method. Next step is reducing or complete elimination threatening parameters as many as possible. By this way we can approximatelly estimate outbreak risk for any target and make measures for its defence. These methods present a step forward in global biosecurity.

**Target Classification**
We recognize six groups of targets:

1. **Hard targets, strategic level**

The aim of a bioattack is to produce mass effects and incite mistrust in authorities, as well as panic and fear among the population. Even the use of biological weapons at a tactical level can cause losses with strategic dimensions. One case of Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS) or Ebola viral hemorrhagic fever is enough to cause catastrophic economic consequences. Since Western countries have intensive food production and centralized food industries, only one successful bioterrorist action may contaminate a huge amount of food and threaten the lives of thousands or hundreds of thousands of inhabitants.

2. **Soft targets, strategic level**

These targets encompass large territories and large populations [10, 11]. Classic bioattack on big cities simultaneously from the air (aerosols) or dozen(s) of terrorist infected with high contagious and lethal pathogen. Biological attacks cause two types of epidemics: epidemics of infectious disease and epidemics of fear and panic.

3. **Hard targets, operational level**

Consequences of the operational level attack could be of strategic importance. In the case of military⁄intelligence targets, security and stability of the state are endangered.

4. **Soft targets, operational level**

Attacks on "softer" targets (airports, railway stations, food production industries) have both: direct political and economic consequences.

[1] Regarding *Retrograd analysis* the most informative are components *Perpetrator/Source/Reservoir of infection* and *Target/Population at risk*. They have the highest number of parameters and they are of the most importance for security experts. For the scientific community the most attention should be focused on two components: *Agent/Pathogen* (new or re-emerging pathogen, artificial or possible weaponized pathogen), and *Means/media of transmission/ Factors of Transmission* because of medical and academic reasons (possible new modes of transmission, period of communicability and consecutive contrameasures). Component *Agent/Pathogen* and last three parameters (*Importance of target/population at risk, Number of people in a target/population at risk, Distribution of people in a target/population at risk)* from component *Target/Population at risk,* are most important for assessing possibility of deliberate outbreak (DO) on any concrete target.

5. **Hard targets, tactical level**

The most probable targets are highly prominent and protected institutions (government buildings, media centers) and people (politicians, scientists, high officers), but in sense of effects could be of strategic importance.

6. **Soft targets, tactical level**

"Soft targets" are ordinary people at public places (respiratory agents released in crowded and closed spaces like theaters, cinemas, sports events and political meetings).

## 7.2 Primordial Level of Prevention

There is still an abundance of preventive and solving measures against biological attacks that makes confusion and dezorientation among experts and health policymakers. Our pyramidal model of adversaries and spherical system of prevention help us to solve this problem [10]. They make clearly to us, which measures should be applied at any of four levels of prevention without robust spending.

Primordial level of prevention should be focused on Perpetrator/source of infection/reservoir of pathogen and Biological agent/pathogen.

Elimination of *Sophistication* should be focused on top scientists who are at the same time both a source of agents and potential perpetrator. Highly sophisticated perpetrators are more probably to use highly dangerous agents (category A agents or emerging agents), attack without suicidal intent, keep themselves unknown and try to attack "hard" targets. Such perpetrator(s) carried out the U.S.A. anthrax attacks in 2001. Highly motivated but low sophisticated perpetrators (mainly poor terrorists or fanatics with suicidal intent) will probably use the more available category B agents and attack public ("soft") targets.

Scientific community should be monitored and bioresearch regularly assessed. It is highly recommendable better coordination between both scientific and intelligence community. Dual-use bioresearch demands strict control of employed staff and research material. The most secure way is successive chain of production with separate staff for every step. The main components of laboratory biosecurity are physical security (restrict access to unauthorized individuals), personnel security (individual screening), material control and accountability (transparency regarding working material), transport security (reliable information about packaging and carrier), information security (sensitive information protection from public release). In June 2015, India and the U.S.A. signed a new 10-year defense framework agreement, to work together in developing a lightweight protective suit effective in chemical and biological hazard environments [12]. With the advancement in the bioresearch field, regulations should be updated to minimize risks and independent committees of industry leaders, agency officials and academics should be appointed to design and reform regulations based on the risk assessments.

*Motivation*. Terrorists may behave on two ways. Some of them want to avoid attribution for a bioattack, others want to claim credit for it. People accidentally included in natural outbreaks (as a source/reservoir of infection) and look like perpetrators at first sight, are always afraid and cooperative during investigations. Also, natural source/reservoir of infection always completely behaves according to epidemiological characteristics (incubation, period of communicability). We recommend to check the passports of suspicious people on the borders, where they were (endemic areas, outbreak territory, suspicious contacts during travel) and carried out immediately health measures on them, if necessary (surveillance, isolation, chemo- or seroprophilaxis).

*Intention*. Control of incriminated and suspicious people on the borders like their travels in last 2 months (endemic areas, outbreak territory, incriminated (terrorist supporters) countries with biosafety labs levels 3 and 4, suspicious contacts during travel) and if necessary, carried out immediately health measures on them (surveillance, isolation, chemo- or seroprophilaxis).

*Perpetrator/source of infection/reservoir of pathogen*. Check the epidemiological situation in the country of origin or coming, especially for respiratory diseases. Detailed, complete, up-to-date follow-up of imported animals and plants as well as suspicious persons, from the place of origin until the border of importing/entry country.

*Intelligence.* Complete and up-to-date global network for: dangerous pathogens and diseases, labs facilities and experts.

*Secrecy.* Focus on two groups of people and two types of places. First, top scientist employed at the labs bio-safety level (BSL) 3 and 4, and their labs. Second, people from endemic areas and/or outbreak encompassed territories, suspected on infection from Category A agents or emerging pathogens.

*Number of perpetrators.* Border control of people from endemic areas or territories with patients/carriers, suspected on infection by A category agents or emerging pathogens.

*Number of sources of infection/reservoirs.* Eliminate them as soon as possible and as many as possible. People should warn to avoid endemic areas or other territories contaminated with agents from the A category and/or emerging pathogens. Provide health-security and legislative measures for people who plan to travel there. Improve monitoring of incriminated areas through World Health Organization (WHO), Physicians without borders, local authorities, epidemiology intelligence. Control passports on borders (visited countries). If person, according above mentioned is suspicious put him/her under health surveillance until maximum disease incubation plus 2 days.

*Accessibility to sources of agent/pathogen.* Priority should be on the labs BSL 3 and 4 and employed staff, as well as outbreak encompassed territories and endemic areas suspected on infection by Category A agents or emerging pathogens. Documents abound, about the desire by the Islamic terrorist groups, seeking to obtain biological agents in order to cause terror [13].

*Accessibility to targets/population at risk.* Identify *loci minoris resistentiae* in food chains, water supply systems and maximally secure them. Suspicious people

and patients/carriers who enter on defended territory, keep isolated during incubation.

### 7.2.1 Biological Agent/Pathogen

*A category/Emerging pathogens*. Strengthen efforts to eradicate or eliminate diseases caused by *A category/Emerging pathogens*. Further, monitor experts who are able to make agents out of governmental control. Monitor dual-use research facilities.

*B category/C category.* Surveillance through WHO, Physicians without borders, local authorities and epidemiology intelligence for: patients, carriers, suspicious contacts and immediate environment. If necessary introduce: isolation, vaccino-, seroprophilaxis and other appropriate measures.

*Amount of the available agent/pathogen.* Additionally to strictly border control for both: people (written before) and animals for import (possible sources/reservoirs of *tularemia, anthrax, SARS, swine flu, avian flu*). For *haemorrhagic fevers* strictly border control when import rodents.

### 7.2.2 Means/Media of Delivery/Factors of Transmission

*Air.* The aerosol route may be used for strategic (large-scale) attack. Such pathogens are stable in aerosol and capable to be dispersed (5-17 μm particle size) [14]. So, scientific research should be focused on the means which can neutralize aerosols of micrometer size and security efforts on control of air traffic because of dispersion possibility of the agent (aerosol).

(I) Measures addressed to people:

1. Terrorist or suspicious. Surveillance through intelligence and epidemiology intelligence.
2. Tourists, immigrants and refugees. Surveillance through: WHO, Physicians without borders and local authorities. Epidemiology intelligence of: patients, carriers, suspicious contacts and immediate environment.
3. Scientist or other lab staff. Surveillance through intelligence and epidemiology intelligence.

(II) Measures addressed to potential *sources/reservoirs* of respiratory transmissible diseases (anthrax, haemorrhagic fevers, tularemia, plaque): immediate reporting and isolation of any suspicious case, suspicious contacts, carriers and immediate environment. Strictly border control when import rodents.

(III) Measures addressed to endemic areas or other incriminated territories. Surveillance through: WHO, Physicians without borders, local authorities,

epidemiology intelligence of patients, suspicious contacts, carriers and immediate environment.

*Water.* Maximally secure water supply systems from intruders.

*Food.* Maximally secure food chains, especially storage and distribution centers, as well as production facilities for fruits, vegetables and dairy products (food without heating preparation).

*Fomites.* Early detection and immediate reporting for even suspicious case with Category A /Emerging pathogen. Incriminated fomites burned or disinfected.

*Vectors.* Low probably event. Recommendation for air traffic control is aerosol dispersion of repellents in airplanes even during their stay in endemic – incriminated areas.

*Biological ammunition.* It is low probably factor of agents/pathogens transmission.

*Delivery systems.* Those are very probably means of agents/pathogens transmission. Maximally secure water supply systems and food chains, apply automatic handling in postal offices (letters, packages) and enforce border control, especially for food.

*Dispersion systems/mechanism of release.* Airplanes control because of aerosol (agent) dispersion possibility (very probably event).

### *7.2.3 Target/Susceptible Population at Risk*

*Intelligence.* Intelligence may be global and local. On local level are: personal control, electronic surveillance systems, local intelligence and observations possible targets (repeated visits by pedestrians or vehicles to the target). Further are: control of media such as air, food, water and fomites (office equipment, postal letters, packages). On global level the most important is networking of health and security services.

*Secrecy.* The impact of secrecy has been evident in the aftermath of the 2001 anthrax letters. The U.S. Postal Service and the CDC knew that the Brentwood postal facility in Washington, DC, was contaminated, they waited for 4 days before closing the facility and treating workers with antibiotics. During that time, one worker had died of anthrax, another was close to death, and two were gravely ill. Another example is China in 2003, when the government denied the SARS epidemic for 6 weeks, causing international alarm and spread of the disease.

*Personal control.* The highest standards of control must be applied to "hard" targets. Personal control includes physical control of people (their health status) and behavioral control (CV reviewing, control of suspected behavior, control of communications/contacts).

*Control of means/media of delivery/factors of transmission.* Control of water includes use of bottled water and permanent surveillance of central water supply systems. Food control should follow the principle "from the farm to the fork." In

likely targets should incorporate biosensors. In “hard” targets air conditioning systems with gradually increasing air pressure is recommendable.

Parameters of protection are physical, chemical and immunological.

*Physical protection.* The simplest form of physical protection of people is advice them to remain indoors in response to a biological attack alarm. This will simply prevent transmission of biological agents. Much more sophisticated is the use of air conditioning systems or systems of increasing air pressure in different parts of buildings. Furthermore, UV radiation sources may be used as physical protection.

*Protection by chemoprophylaxis.* Mainly, chemical protection refers to use of antibiotics. It is a great logistical challenge, since it provides protection as long as the available stocks last.

*Protection by immunoprophylaxis.* Mass immunization programs require careful assess of potential risks and benefits. A nationwide smallpox vaccination, carried out in November 2002 in the U.S., was based on the idea of smallpox-infected Iraqis invading USA. It was 145 serious adverse cases among vaccinated persons (hospitalization, permanent disability, life-threatening illness and at least 3 deaths) [3].

*Number of people in a target/population at risk.* Since overcrowded targets are at highest risk, people must be advised to avoid them or spaciously safely distribute themselves. Potential targets should be well organized.

*Importance of target/population at risk.* Biological attacks cause epidemics of infectious disease and epidemics of fear and panic. The final and ultimate goal of bioattacks is political/ideological. Epidemic or pandemic of fear and panic spread much faster, could be much larger than epidemic of infectious disease and consequently more appropriate for reaching final goal. Physical disease in the target population is coming to be the second important objective.

*Location of target/population and Distribution of people in a target/population at risk.* Potential targets should be safely organized, well protected, located out of dense urban areas and with easily accessed roads. Targets and consequences could be direct or indirect. Killing people and destroying their health is direct target – consequence. Economic losses and political implications are indirect targets – consequences.

Bioattacks on the operational and tactical level may have consequences of strategic importance. In the case of government/military/intelligence targets, security and stability of the state are endangered. That is why political consequences could be prompt and enormous. “Soft targets” are ordinary people at public places (respiratory agents released in crowded and closed spaces like theaters, cinemas, sports events and political meetings). The importance of “bioshield” activities in food production facilities can not be overestimated. Since Western countries have intensive food production and centralized food industries, only one successful bioterrorist action may contaminate a huge amount of food and threaten the lives of hundreds of thousands of inhabitants. Such bioterrorist acts make people change their behavior for years, decades or even permanently. For example, when food is incriminated for a relatively short period, people may change their diet permanently. Because of fear from a bioattack, people can change or leave their jobs or residences, or avoid traveling to certain regions.

## 7.3 The Primary Level of Prevention

The primary prevention against biological attack should comprises monitoring and surveillance of potential internal sources of both: biological agents and bioterrorists. There are three types of surveillance: laboratory, clinical (syndromic) and environmental.

Routinely laboratory surveillance could be hold at biosafety level two (BSL2) labs. In cases of suspicion Europe, USA, Canada, Russia and some other countries are able to carry out diagnostic at BSL4 within 1 day.

The most important for clinical (syndromic) surveillance during detection bioterrorism event is to maintain a high level of suspicion among physicians (continual medical education and up-to-date information).

The most important for environmental surveillance is „*in focus detection* "(sampling from environmental source to detect and identify agent).

In the case of outbreak suspicion we propose our „*Remote detection"*(by questionaire).[2]

*Perpetrator/source of infection/reservoir of pathogen.* Several agents from Category A are present in many countries, mainly sparsely present or currently absent as indigenous diseases (tularemia, viral hemorrhagic fevers, botulism, anthrax, plague). Also, the outbreak could occur due to accidental infection during the biological weapons research. Special monitoring and preventive measures should be addressed to the next groups:

(1) Terrorist, disaffected groups and individuals; (2) Tourists, immigrants and refugees; (3) Laboratory staff from the BSL 3 and 4 labs.

*Sophistication.* Control measures should be focused on labs staff (BSL 3 and 4) and endemic areas with haemorrhagic fevers. Unsophisticated terrorist could infect himself deliberately in endemic areas with Ebola virus or viruses of other hemorrhagic fevers and goes to big cities during period of communicability to infect as

[2] **REQUEST FOR THE RESPONSIBLE AUTHORITIES (Remote outbreak detection by questionaire)**

1. Was there unusual/atypical manifestation (fulminant course) of a known disease? 2. Were there several unusual/unexplained syndromes coexisting in the same case without any other explanation? 3. Was there sudden unexplainable increase in the number of cases or deaths in human populations? 4. Was there higher than expected morbidity and/or mortality rates? 5. Was there clustering of patients with fever only or with fever and other symptoms? 6. Was disease identified in the region for the first time, again after a long period of time or after its eradication? 7. Was it new strain of pathogen identified in the region for the first time, after a long period or after its eradication? 8. Was disease with an unusual/atypical seasonal distribution? 9. Was there one or more explosive epidemics/outbreaks with indicators of a point-source origin?

10. Was disease with an unusual geographic distribution? 11. Was there existence of a biological risk? 12. Was there existence of a biological threat? 13. Was there high concentration of the biological agent in the environment? 14. What were peculiarities of the transmission mode of the biological agent? 15. Was there limitation of the epidemic to a specific population? 16. Was there lower attack rates in protected individuals? 17. Were there dead animals? 18. Was there reverse spread? 19. Is there direct evidence of deliberate outbreak?

many as possible people. They are with suicidal tendencies and it is one of the most horrible bioterrorism scenario.

*Motivation/Intention*. The most probably are Islamic terrorist, neonazists, disaffected sects or individuals. They have strong political or ideological motives and intentions for such acts.

*Intelligence.* Epidemiological intelligence presents ability to get true and timely information on global and local levels related to a biological attack (preferably about terrorist/suspicious persons and their activities/movements, type of pathogen, unusual disease occurrence and endemic/incriminated areas).

*Secrecy.* Secrecy comprises the capacity to keep activities clandestine before an attack and to keep perpetrators unknown after an attack. Period between deployment of a bioweapon and its effects could be long enough to give terrorist chance to escape. Strategic attack using viral respiratory bioagents (influenza virus, SARS virus, MERS virus) is highly possible and in such cases it would be difficult to distinguish between a natural disaster and a bioterrorist act. A clandestine biological attack with highly dangerous agents (anthrax, smallpox, viral hemorrhagic fevers) is possible, but will be detected easily and quickly because it is large-scale and with very unusual dangerous agents. As potential perpetrators military/intelligence forces prefer clandestine attack but terrorist groups/individuals prefer publicly confirmed attacks.

*Number of perpetrators* could be numerous particularly from disaffected groups. International network of security intelligence and epi-intelligence should identify and follow incriminated groups/persons.

*Number of sources of infection/reservoirs* could be numerous, especially for agents from categories B, C and sometimes emerging agents. Local health authorities are mandatory for identification, surveillance, reporting and elimination *sources/reservoirs of infection.*

*Accessibility to sources of agent/pathogen* exists, probably on many ways, especially for agents from categories B, C and emerging agents during outbreaks. Health authorities are mandatory for identification, surveillance and reporting of: patient(s), suspicious case(s) or carrier(s) with some agent(s) from any of the categories A, B, C or emerging agents.

*Accessibility to targets/population at risk* probably is easy and quickly because of presence of both on the territory: agent/pathogen and possible perpetrator. Health service is obligatory for diagnostics and reporting about patient, suspicious case or carrier infected by agent(s) from any of the categories A, B, C or emerging agents/pathogens.

### *7.3.1 Biological Agent/Pathogen*

Measures should be addressed to endemic areas or other incriminated territories to eradicate pathogen from the territory. In case that is not possible, surveillance depending on type of disease, reservoirs/sources of infection and means/media of

transmission. Special attention should be addressed to respiratory diseases (hemorrhagic fevers).

*A category/Emerging pathogens.* There are two sources of infection/reservoirs of pathogen. The first one, are top scientists and other staff from the labs with BSL 3 and 4 from the own territory, and another one are endemic areas particularly with respiratory hemorrhagic fevers (own territory). Focus should be on control staff from the labs with BSL 3 and 4 and on travelers from endemic areas preferably with respiratory hemorrhagic fevers. Surveillance by WHO and other international health organizations, governmental health authorities is an asset.

*B category and C category.* State's health authorities are mandatory for surveillance, identification and reporting even suspicious case of disease from these categories of agents. Early detection could save many lives by triggering an effective containment strategy (isolation, chemo- and immunoprophilaxis). A developed network of data collecting, rapid data transmission to the relevant public health institutions and their careful analyses are priorities. Ultimate aim is to notice subtle differences between usual and unusual occurrence of diseases.

*Amount of the available agent/pathogen.* From small to mediate amounts of pathogen is possible to get disaffected persons, criminals or terrorists. But consequences could be of strategic importance.

### *7.3.2 Means/Media of Delivery/Factors of Transmission*

Any kind of medium could be used. Means of delivery depend on the characteristics of the agent.

*Air*. The only mean of delivery for respiratory agents for strategic and clandestine use is airplane. The Congressional Office of Technology Assessment estimated that the aerosolized release by airplane of 100 kg of anthrax spores upwind of Washington, DC, could result in approximately 130,000 to 3 million deaths [15]. Dissemination of an agent through a ventilation/air conditioning system is another powerful way of attack by air. So, air traffic control is of the highest priority.

*Food/Water.* Centralized food production and water supply systems in developed countries increase vulnerability to foodborne [16, 17] and waterborne pathogens (most dangerous diseases are botulism and anthrax) [18, 19]. The most likely, terrorist groups and disaffected individuals could use drinking water and food for contamination with bioagents/pathogens. Multiple means of delivery are also possible; for example, anthrax can be an airborne or foodborne agent. Permanent monitoring and frequent control of centralized food production and water supply systems are mandatory.

*Fomites.* Could be used on tactical level but with strategic consequences (Ameritrax attack in 2001). May be carried out by states' institutions, such as military forces, intelligence services, well-funded organizations or individuals. Handling with fomties of mass using should be automatic.

*Vectors.* Means of delivery might be suicidal biobombers infiltrated in the targets, animals (birds infected with avian influenza, pigs infected with swine influenza and insects). Veterinary control of animal import has to be carried out completely.

*Biological ammunition.* May be produced and used by government or its institutions. Intelligence activities on suspicious persons are mandatory, as well as surveillance from public health institutions on reservoirs/sources of incriminated pathogens.

*Delivery systems.* Priority should be given security of water and food supply systems/chains. Postal delivery should be under monitoring and automatic as much as possible.

*Dispersion systems/mechanism of release.* Emphasize surveillance of air traffic control and public health surveillance especially above urban areas. Intelligence controls of suspicious persons are mandatory, as well as surveillance from public health institutions of reservoirs/sources of incriminated pathogens.

### *7.3.3 Target/Susceptible Population at Risk*

*Intelligence.* Depending on both: existing sources/reservoirs of infection and possible perpetrators, should be organized and applied eradication programs, elimination programs and surveillance services for them. The intentional spread of anthrax in the USA has led to a surge in the development system able to integrate data from multiple sources into a single surveillance system oriented towards detection of unusual diseases, spread in unusual ways (continual systematic collection, analysis, interpretation and dissemination of data) [20]. Syndromic surveillance is monitoring clinical manifestations of certain illnesses. Laboratory surveillance comprises looking for certain laboratory data or biological markers. Environmental surveillance is the process by which the environmental samples are systematically analyze for the presence of biological agents [21].

Bioterrorism surveillance systems require three key features: timeliness, high sensitivity and specificity, and routine data analysis. Traditional biosurveillance system is based on the recognition and alert of a clear increase in diagnosed/suspected cases (to notice subtle differences between usual and unusual occurrence of diseases). For early detection of deliberate outbreaks the sensitivity of the systems need to be as high as possible [22]. Such system is inexpensive, simply to implement, free of technologic barriers and important component of global biosurveillance. Should be used together with methods which quickly identify the treat and institute public health protection measures (immunization, chemoprophylaxis and isolation).

*Secrecy.* Secrecy is an imperative to the authorities during bioattack and must be very well balanced (not to endanger public health but to mitigate fear and panic).

Simultaneously both, outbreak of infectious disease and epidemic of fear and panic could be caused by biological attack [10]. The main aims of bioterrorists are propagation of: fear, anxiety, uncertainty, depression of the population, mistrust in government and economic damage. An epidemic (or pandemic) of fear and panic multiplies the economic damage (losses in tourism, traffic, investment and export). Causation of physical disease is the second important objective. The final and ultimate goals of bioterrorists are political concessions. Reforming state public health legislation should be addressed to support such potential states' secrecy.

*Personal control.* For "hard" targets the recommend the same procedure as in Primordial prevention. For "soft" targets should apply "mass gathering medicine" preventive measures (improve security aspect of: selection of location, season (time) of event and control participants as many as possible especially from abroad, suspected groups and individuals).

*Control of means/media of delivery/factors of transmission.* Experts in bioterrorism should be involved in both, developing and maintaining surveillance systems. Innovative analytical methods should be able to provide interpretations of the data for: the spread of the outbreak, the identification of the source and early detection of outbreak [7].

*Physical protection.* Physical isolation of existing sources/reservoirs of infection, infected/diseased persons, carriers, suspected on infection individuals, and epidemiological/security surveillance of possible perpetrators.

*Protection by chemoprophylaxis and by immunoprophylaxis.* Should be reconsidered strategy that must have enough amounts of drugs and vaccines to every inhabitant. If the public health system is well developed, it is enough to have chemoprophylaxis for several dozens thousands inhabitants and immunoprophylaxis for several thousand inhabitants, for the first respond.

*Importance of target/population at risk.* Focus should be on finding out and monitoring both: existing internal sources/reservoirs of infection and possible internal perpetrators. If we are well introduced and control those issues then, there are both, enough time and enough information to be prepared for primary level of prevention, especially for "hard" targets.

*Location of target/population at risk.* Potential "soft" and "hard" targets, should be located to easy accessible highways and hospitals.

*Number of people in a target/population at risk.* Risky times request avoiding risky behaviors. Should avoid mass gathering. Strict control of food and water supply and delivery systems. In case of diseased people forbid mass gathering and isolate suspicious cases/contacts.

*Distribution of people in a target/population at risk.* The risk is very high in camps or every kind of temporary/overcrowded accommodation. In case of suspicious or confirmed patient/contact immediately carry out isolation. Recommendation is, as less as possible people in every room.

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