

# New Medical – Biological Emergency Emergency Response to Medical–Biological Emergency of Complex Type



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## ABSTRACT

Emergency management and emergency care are an actual issue worldwide, a topic very difficult to treat for lacking historical data a comparability of this type of events. The ongoing Covid-19 pandemic has showed that health, social, political, economic and biological aspect of every single population has overweight. The complexity of the phenomenon and its dependence on social, cultural, political, economic context is contained in the statement “the pandemic is a complex emergency.” The difficulties in applying and failure of emergency protocol and response, and our experience with SARS-CoV-2 in the first “red zone” in Lombardy, Italy, in 2020, have led us to the multidisciplinary analysis of emergency management and emergency response system. The contextualization of the event leads to the comprehension what hazard identification and risk management are, to the revision of the emergency protocols and networks. Emergency response system and emergency management are closely related and embedded to the other areas of health care and human life, especially if a complex emergency is considered. They are directly connected to the dynamics of the population not affected by the emerging pathogen, to prevention and public health, clinical care, they are conditioned by social, cultural, political, economic context. The health care system blends in all these areas that determine the outcome of emergency response on medical–biological emergency of complex type and future population health.

**Keywords:** New Medical–Biological Emergency; Complex Emergency; Biological Threat; Asymptomatic Population

## Introduction

The emergency health care is a service for the community. The emergency management concept is characterized with main features and adjectives as primacy of life, comprehension, collaboration, coordination, flexibility, risk based, shared responsibility,

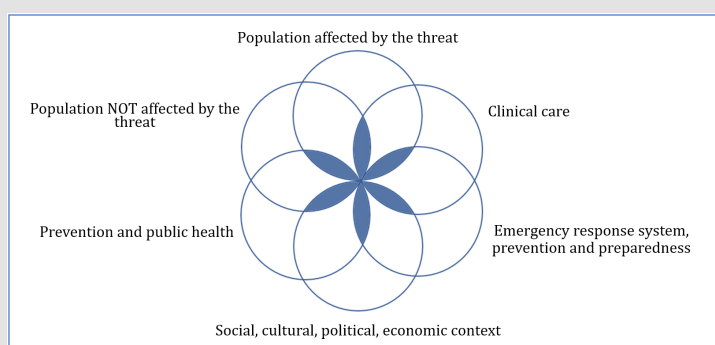
communication, integrated response, resilience, apolitical [1]. They contain main features of any emergency, which landmarks are the primacy of life and equality of survivors or wounded. Therefore, to any level of management the impartiality must be an unavoid-

able requirement once the morality is acknowledged. The WHO Constitution (1946) envisages "...the highest attainable standard of health as a fundamental right of every human being" [2]. As far as the emergency management different jurisdictions distinguish the following categories, that express functional impairment of the society affected by a threat: emergency, disaster and catastrophic disaster. An emergency is defined as an event, actual or imminent, which endangers or threatens to endanger life, property or environment, and which requires a significant and coordinated response. A disaster is conditioned by a serious disruption of the functioning of a community or a society, leading to human, material, economic and environmental impacts. A catastrophic disaster is an event that overwhelms all the system and degrades or disables governance structures, strategic and operational decision-making functions [2]. Specific types of emergencies as chemical, biological, radiological, nuclear and explosive events are precisely described.

Let's the general structure of the emergency framework. The emergency response system is designed as hierarchic, usually local, regional, national level are defined with correlative institutions or agencies, executive organs and the feedback system, being usually activated on the local clinical level. For example, on the European level the health care governance within the European Union is predominantly a competence of the individual member states and this issue is provided through the Treaty on the Functioning of the European Union. Globally, the WHO emits recommendations and guidelines about Public Health Emergency if International Concern to the public health authorities [3], based on traditional epidemiologic and bio-surveillance principles and International Health Regulations of 1969 and other rules. The global management of biological threat became critical during Covid-19 pandemic. The liberty of the States to report and share data about exact epidemiologic situation and awareness has been discussed. The

hazard identification and risk management recognize four known aspects of emergency management: prevention (mitigation), preparedness, response and recovery. They may precede the activation of emergency framework with overall impact on life, environment, social-political system, economy. Hazard and risk analyses provide the information to develop programmes in each of four aspects of emergency management. From mathematical point of view, risk is the product of hazard and vulnerability [4].

They work with terms as vulnerability, susceptibility or resilience. We would like to point out resilience, which is the ability of a system, community or society exposed to hazards to resist, adapt to, transform and recover from the effects of a hazard or threat [68], for example through prevention and preparedness. Susceptibility is for the sensibility of the community to hazards. Principally, the focus is on the population directly affected by the threat or emerging pathogen and on the effort to protect the healthy population. Notably, the impact on critical infrastructures is one of the key points of the emergency. All less than urgent questions and health care remain repressed, leading to the further alteration of the health care system in the acute phase of the response to the threat and to long-term sequelae on the population health (Figure 1). Factors as health care, emergency response system, prevention and preparedness, emergency management, interaction of the population affected by the emerging pathogen and healthy population, and social, cultural, political, economic context determine the medical – biological emergency of complex type. The health care system is represented by the intersection of these six main components, in blue. Areas depicted as non-overlapping or complementary, for example the population not affected by the threat (or emerging pathogen) and the emergency response system, are indirectly related and unavoidably impact on the other components via four areas that share.



**Figure 1:** The New Biological – Medical Emergency.

In December 2019 Severe Acute Respiratory Syndrome Coronavirus 2 was observed for the first time in China and spread worldwide [5,6]. The WHO declared COVID-19 a Public Health Emergency of International Concern on 30 January and a pandemic on 12 March 2020 [7]. We remember the SARS-CoV-2 is a high priority biological agent of class A according to the criteria of United States Centers for Disease Control and Prevention [8]. In December 2022, 6.618.579 deaths and 640.395.651 confirmed cases of Covid-19 were registered [9]. Long-term consequences are to be precisely defined. We may mention the post-acute Covid-19 syndrome, Covid Stress Syndrome or severe thromboembolic, cardiovascular, immunologic and neuro-psychiatric complications of this disease [10-14]. The secondary impact in terms of mortality and life expectancy with chronic or oncologic diseases, diseases requiring surgery, cardio-thoracic surgery etc., has not been precisely quantified. In 2021 DJ Hunter described elegantly relationship between public health and clinical medicine as complementary. Critical infrastructures as supply of water, protection from and response to natural disasters, vaccination, infectious disease control and licensing of medicines and devices belong to the area of public health with for example response to war, occupational safety, education, food safety, tobacco control, and many other determinants of population health. Then, clinical medicine and health care system are implanted in this wide area [15].

The activation of emergency framework corresponds to the treatment of acute clinical disease, which was not sufficient in case of Covid-19, considered the complexity of the phenomenon [16]. The role of healthy, but asymptomatic and non-diagnosed population during Covid-19 pandemic was confirmed, for example, by mathematic – physical modelling of epidemic trend, used for the reliability analysis of pandemic countermeasures adopted in Italy [17]. Recognizing primacy of life, shared responsibility and proper communication the main characteristics of emergency response and management, reassuming that known academic classifications and protocols requiring a complex and functional input, we may define a new medical – biological emergency as complex event, actual or imminent, which endangers or threatens to endanger life, property or environment, characterized by a disproportion of number of victims/patients and the resources, present in that moment in the area of any extension, from delimited to global, requiring the identification of the risk, correct hazard and risk analyses in every single social, political, biological, economic context, integrated by the evaluation of the functional distress of the society affected by

the threat. Factors as health care, emergency response system, prevention and preparedness, emergency management, interaction of the population affected by the emerging pathogen and healthy population, social, cultural, political, economic context determine the medical-biological emergency of complex type. The health care system blends in all these areas that determine the outcome of emergency response and future population health.

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