



*The conventional and non conventional emergencies is a macro definition including all the events that can affect, directly or indirectly, the safety and the security at local, regional, national or international levels. The Covid-19 pandemic situation such as the Spanish flu, the Chernobyl accident such as the Fukushima's one, the chemical attack in Ypres such as the subway release of Sarin in Tokyo are just few example representing some of the historical recurrences that can be classified as natural, accidental, intentional or war related events or as biological, radiological/nuclear, chemical events. There are many aspects to consider in order to face those events and the related consequences: experts and technologies availabilities, national and international intervention and cooperation plans, prevention plans, education and training programs, research projects, emergency management plans, communication systems, recovery of normality, logistic, economical and legal aspects, business continuity and so on. It is indubitable that an emergency involve, directly or indirectly, the entire society. This is way this scientific & editorial project want to collect all the aspects related to the emergency, «CBRNe & Beyond» has the purpose to be a point of convergence of expertise, experiences and lessons learned to improve safety and security worldwide in order to reach the recovery of normality after an event.*

# CBRNe & Beyond

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**B in CBRN  
and Something More**

UNIVERSITÀ

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## Chapter 1

# Generalia

What was initially NBC (Nuclear, Biological, Chemical) then became CBRN, adding “Radiological” to the sequence. Later on, in the Anglo-Saxon context, the Atlantic Alliance started using it on a normal basis, turning the acronym to CBRNe. The “e” of the acronym which stands for explosive, also includes attacks with the widespread use of explosive substances, as in Madrid (March 11, 2004). Not all the experts agree, indeed I would say few, because the development of an event “CBRN”, in comparison to an “e” event has connotations of much more importance, with long-term consequences in the affected area and with specific interventions in the medium and long term, even if only for the restoration of the environment. In this matter, as an example, consider that the half-life of Caesium 137 is about 30 years and that the pandemic from SARS-CoV-2, which began in December 2019, is still ongoing in July 2022.

The presence of a nuclear, biological, or chemical element is not enough to define an event as CBRN: we need a device, a mechanism, a weapon in a word, able to let the aggressive element develop its destructive capabilities. In the past, there have been such serious incidents, and potentially

similar ones could occur in the future, that the distinction between a CBRN event and an accident, in fact, with the presence of substances related to the CBRN matter may seem a really subtle question. To distinguish the events of Chernobyl, Bhopal, and Seveso, within the effects on their territory, from a real use of a CBRN weapon, is difficult. The origin of the contamination, however, was well known; with the event partly covered by security procedures, partially somehow, and the existence of contingency plans, which prove, not sufficient. All of this does not exist when the event originates from a deliberate attack with the use of a weapon.

In what way is an accident and an attack precisely differentiated?

- The predictability or unpredictability of the event (of an industry we know everything, of a terrorist attack nothing).
- The prevention to avoid the event.
- The planning logic for the first response to the event to mitigate the consequences.
- Planning logic and arrangements before an event occurs.
- The preparation of the Rescue Forces and the decision-making chain.

## Chapter 2

# Talking about Different Possibilities

A nuclear attack is obvious: the five classical effects of a nuclear explosion (impact, heat, light, neutron induction, electromagnetic pulse) are always a consequence. A “non attack”, an accident, are they possible? An accidental explosion of a warhead has a chance on several tens of millions to occur. Possibly, an aircraft carrying the warheads, or the warhead, could crash, resulting in the leakage of radiation due to the rupture of the outer casing of the weapon (and this is also highly unlikely). In both the situations, the origin of the contamination is known as far as the quantity and quality of radiological elements that can be released.

To carry out an attack that causes a fall-out and the radiological contamination of the territory it is necessary to use a weapon: you can not simply chop up cobalt 60, or what else, and leave it here and there. The so-called dirty bomb is a weapon. Whether artisanal or not, it is still a weapon, designed, moreover, very different from the simplistic use of explosives and one or more radioactive substances together. Only explosives are of little use. Much better to create a fire with temperatures above 800 centigrade degrees and to use a gamma emitter melting at low temperature (Caesium

137 for example) to ensure extensive contamination of the downwind territory.

The nuclear power plant is not a weapon. The chemical industry is not a weapon. The logics of a release by accident, even a major one, or by failure, are handled differently from those of an attack. A nuclear power plant, for example, could produce contamination over a very large area, with a large number of radiological substances of relatively low intensity, not taking in consideration the immediately adjacent area to the plant, of course, as the Chernobyl and Fukushima events demonstrated. The hazard comes mainly from breathing and ingestion, less from direct irradiation. But, if the chemical industry or the nuclear plant were to be target of an attack, would the “Industrial Emergency Planning”, organized by law, still apply, or would it have to be structured differently? This aspect is part of the need to change planning logic when we turn our attention to events that are not probable but possible, characteristic of what will become known as “Crisis Management”.

Changing the planning logic in the sense that, to prepare the installation and commissioning of an industry that is potentially dangerous to the territory and its population, the intended release of substances due to external intervention should also be included as the maximum possible event. Regulations for proper operation and maintenance, therefore, should be combined with more stringent controls on plant workers and with technologically advanced perimeter controls, or even lead to the conclusion that that kind of industry on that territory cannot be built.

For the biological, the difficulty of an attack is related to the ability to produce the weapon, store the necessary virus-

es or bacteria or toxins, and disseminate in such a way that the aforementioned agents do not deteriorate or die upon the release. It is difficult to think of “self-made” terrorist groups engaging in the production and use of a biological weapon.

The purpose of the release of a biological agent by a supposed enemy, or as one prefers to say, by a non-friendly country, is not tactical: to kill as many people as possible; its main purpose is strategic, it is to bring to its knees the continuity of government, the productive and logistical capacities of a nation, and its social cohesion in the medium/long term. Prolonged restrictions over time, which are necessary in the case of pandemics or widespread contamination, connected with misinformation phenomena, sooner or later provoke discontent and reticence. The enormous problems that a pandemic causes in the logistics organization and in the health systems have been experienced abundantly in recent years (SARS-CoV-2).

The way Covid-19 spread, in differentiating first and second wave, is explanatory of how an effective biological attack could be carried out. Not to mention the sophisticated misinformation that was circulated during the pandemic; so sophisticated, at times, as to suggest a kind of training gymnasium of unfriendly, or even friendly, why not, State organisations. Let's be clear, there is no claim that SARS-CoV-2 was introduced on purpose into the environment, there is yet no evidence or consequential logic to support this, apart from easy conspiracy; Covid-19 is simply a perfect biological attack disease.

How did Covid develop itself at the beginning of the pandemic? Most likely (we do not know for sure) its introduction was facilitated by the intense trade between Lombardy (Italian Region) and China – among the most intense

and geographically concentrated in all of Europe – and, from there, its subsequent expansion into parts of Lombardy and neighboring regions and, to a lesser extent, into other areas of the Italian peninsula.

Table 1 shows, in a very concise way, the main events related to Covid and the absence of automatic intervention in the early phase and the consequent delay in effective decisions making to reduce the transmission rate. It is clear that if it were an intended release, a true biological attack, the response methodology would not have changed.

As from information gathered in the media and in activated fora, atypical pneumonias, such as those produced by SARS-CoV-2, beyond the usual, were already present in northern Italy in December 2019. It is abundantly clear, however, that if the nation's preparedness had also had an effective respiratory disease observation centre, with centralisation of information from all Italian hospitals, the alert would probably have started earlier. Such a centralised organisation is not a utopia: it exists, but for intoxications and poisonings.

The second wave represents how any biological attack would spread. The “all free”, from late May 2020 throughout the summer, brought the contagions all over Italy resulting in the virus developing simultaneously everywhere.

A biological attack can start as Covid and spread later, but it can also manifest itself immediately with a widespread presence throughout the country. It is abundantly clear, however, that an attack in a single area, if not discovered in time, more or less quickly becomes a widespread presence over the territory.

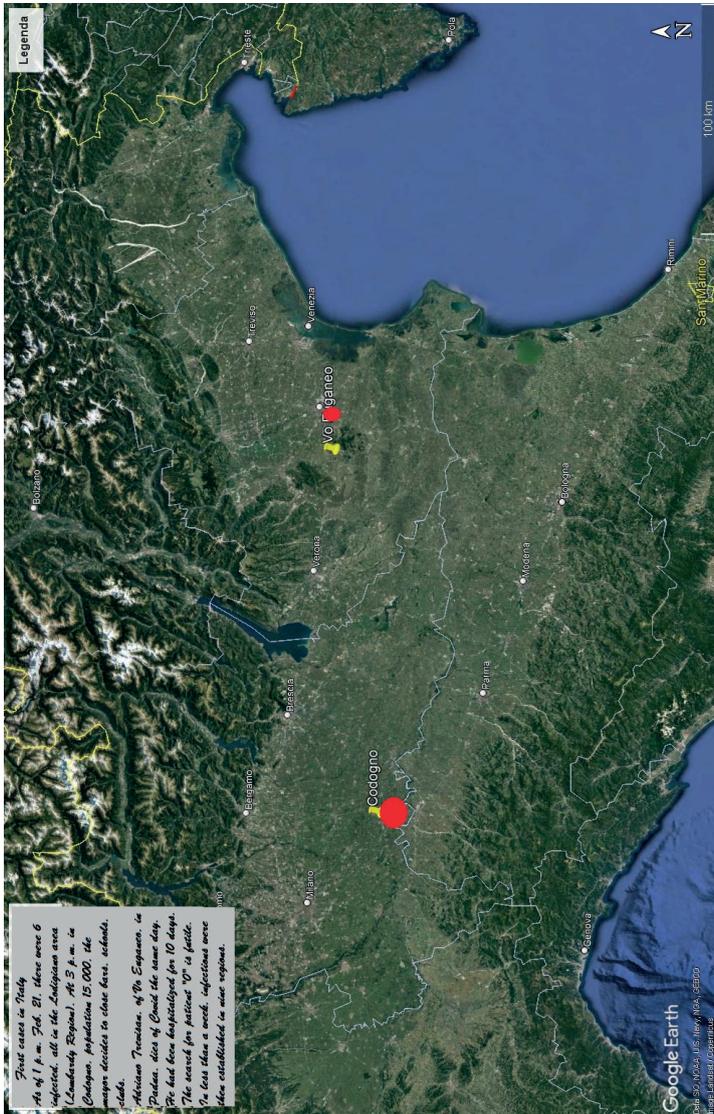


Figure 1. First cases in Italy and their immediate consequences.

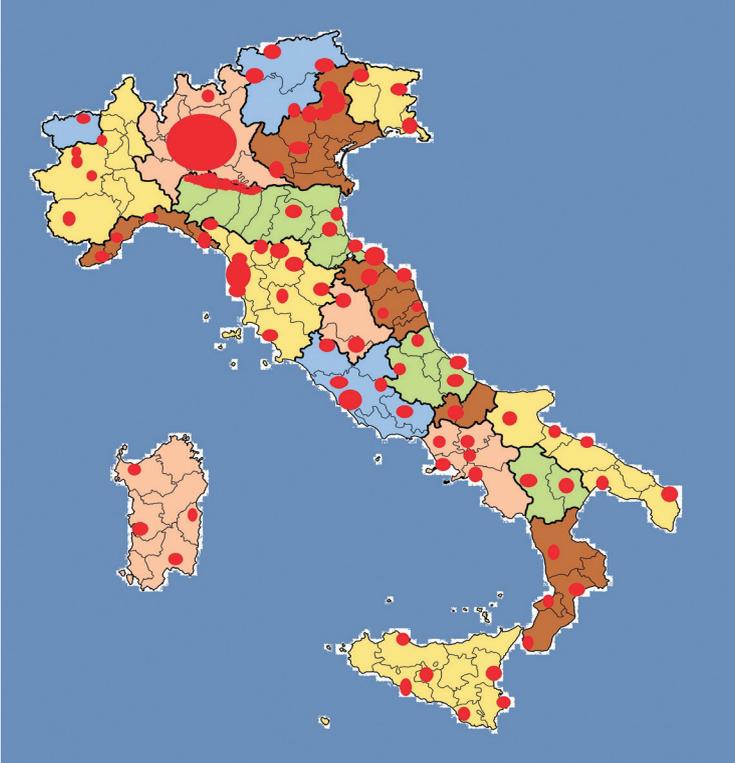


Figure 2. *The consequences of the “free all”. Probably the virus would still have spread to all of Italy but not so fast and not in so many places at the same time.*

## CBRNe & Beyond

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