## Scenario 22-B: Silent attack at the underground train station platform

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| **Scenario 22-B: Silent attack at the underground train station platform** | |
| **Complexity of the scenario: complex** | |
| **Possible application of the scenario: Topics 4.1, 5.1, 5.2, 5.6, 6.1 and 6.3** | |
| **Scenario description:** | |
| It is 8.30 AM on a Monday morning in a crowded Capital city. It is rush hour and thousands of people are at the central train station taking public transport mainly to go to work, school, and to reach the main airports of the city for national and international travels.  As a result of the unstable geopolitical scenario, various terroristic attacks have been perpetrated in many big cities in the last 8 months and the threat for the use of unconventional weapons appears to be realistic to the authorities.  A molecular biologist, researcher of the biggest University in the city, is the Principal Investigator of a project on the use of plant toxines as therapeutics agensts. A few days ago, the main funder of his research activity officially confirmed that the contract for this research funding will not be renewed, because of the unsatisfactory results of the researcher’s work.  A high-speed train is slowly approaching the underground station platform to board the passengers for a journey to the second biggest city of the country that will take 5:00 hours with a stop at an intermediate station after 2:50 hours.    Just 15 minutes before the the arrival to the final train station (at 13:30), some people, especially those sitting in the carriages at the rear of the train start to experience moderate to severe breathing difficulties. While the train is approaching to the station, some passengers request support to the on-board staff, who reassure them and direct them to the station's first aid point.  After the passengers have disembarked from the train, while some make their way to the first aid point, 5 people are forced to stop in the station hall because their breathing difficulties have increased considerably.  The law enforcement agents patroling the station, realising what is happening, rush to the aid of the passengers in the hall and in the meantime initiate a call for medical assistance.  The situation rapidly deteriorates as more people from the same train start experiencing difficulties breathing.  Also, some of the passengers who got off at the intermediate stop, started to report the same symptoms to the local health authorities.  At the same time, cleaning staff members who were waiting the train on the plaform, to get on board from the rear of the train, to carry out the cleaning procedures at 8.30 in the morning, reported breathing difficulties to their occupational physician in charge. Apparently, nothing has been reported so far from the cleaning staff members who were waiting for the train on the same platform, but at the head of the train.  Eventually, after 12 hours from the onset of symptoms, clinical investigations on the patients demonstrated an intoxication with Abrin toxin most likely due to inhalation.  During the following days, investigations were able to correlate the research activities of the molecular biologist whith his presence on the platform of the departing train before 8:30 AM. Through CCTV cameras of the station, it will be also found out that the researcher deliberately released Abrin toxin that he was able to purify in his laboratory with the aim of indirectly rekindling investor interest in its research. CCTV captured the researcher abandoning a plastic bag and tying it to a pole near the start of the platform. CCTV also shows the bag bulging and flapping in the direction of travel of the train as it arrives and stops at the platform.  The plastic bag will be found later, during the investigations, it had several small holes on its surface.  In total:  - 127 people needed medical assistance and were hospitalized either in the three different cities where the train stopped.  - 35 people died within 24 hours  **Things to consider:**  **About the diffusion of biological agents in underground and train platforms:**  In the aftermath of the Second World War, several research programs have been conducted by many countries worldwide to assess the impact of the use of CBRN agents for war and terrorism. In the US, several experiments have been conducted to study the potential way of disseminating biological agents in big cities and critical infrastructures [1] like the subway [2]. In the latter case, a number of research studies have evaluated the dinamics and impact of the dispersion of chemical and biological agents in this specific infrastructure.  Urban underground systems are among the most susceptible to a terrorist attack by biological or chemical agents because they are heavily trafficked and have limited points of egress. The combination between efficient creation of casualties and anonymity afforded to terrorists make subways attractive targets [3]. Also, fluid dynamics simulation of biological agents’ diffusion in subway stations showed the potential lethal impact of this kind of attack [4].  **About biological toxins:** Biological toxins are a heterogeneous group produced by living organisms. Toxins are very attractive to terrorists for use in acts of bioterrorism. The first reason is that many biological toxins can be obtained very easily. Simple bacterial culturing systems and extraction equipment dedicated to plant toxins are cheap and easily available, and can even be constructed at home. These molecules induce detrimental effects in other organisms by inhalation, injection, ingestion or absorption Many toxins affect the nervous systems of mammals by interfering with the transmission of nerve impulses, which gives them their high potential in bioterrorist attacks. Others are responsible for blockage of main cellular metabolism, causing cellular death. Moreover, most toxins act very quickly and are lethal in low doses (LD50 < 25 mg/kg), which are very often lower than chemical warfare agents [5]  **About Abrin**: Abrin is a protein toxin isolated from the plant *Abrus precatorius,* commonly known as the ‘rosary pea’ or ‘jequirity bean’. This plant is indigenous to South Africa, China, West Indies, India, Brazil, but is also now widespread and can be found in other parts of the world, such as Florida, Alabama, Georgia and Hawaii in the United States, and Puerto Rico. Abrin can be use by aerosolization as a dry powder or liquid droplets, or by addition to food and water as a contaminant [5].  Abrin has a similar structure, properties and mechanism of toxic action as ricin, but it is 75 times more toxic than ricin. Abrin poisoning as a result of ingestion of seeds or contaminated food causes severe abdominal pain, vomiting and diarrhea. These symptoms result in kidney failure. In most cases, bleeding from the gastrointestinal tract is also observed. If abrin enters the organism as a result of inhalation, symptoms such as pulmonary edema, hypertension in the pulmonary arteries and hemolysis of red blood cells will appear. Death usually occurs 36-72 h after exposure, depending on the route of entry and dose. Because there are no drugs or vaccines available against abrin poisoning, the treatment is supportive and based on minimizing the effects of the poisoning. The type of medical care depends on several factors, the most important being based on the route of infection. Measures include respiratory support, intravenous fluid administration and blood pressure stabilization. Possible neurological symptoms after exposure include hallucinations, reduced consciousness and blood pressure stabilization. Possible neurological symptoms after exposure include hallucinations, reduced consciousness and convulsions. Recognition of the poisoning as well as its medical treatment are identical to the response to ricine poisoning [5].  [1] Navy Fogged Bay Area With Bacteria – The Washington Post , September 17, 1979 [www.washingtonpost.com/archive/politics/1979/09/17/navy-fogged-bay-area-with-bacteria/cee3e0eb-7504-44d4-b89e-0c801152a324/](http://www.washingtonpost.com/archive/politics/1979/09/17/navy-fogged-bay-area-with-bacteria/cee3e0eb-7504-44d4-b89e-0c801152a324/)  [2] Senators Are Told of Test of a Gas Attack in Subway – The New York Times, September 19, 1975 <https://www.nytimes.com/1975/09/19/archives/senators-are-told-of-test-of-a-gas-attack-in-subway-engineer-says.html>  [3] B. Witting, Design of a Scale Model to Evaluate the Dispersion of Biological and Chemical Agents in a NYC Subway Station, Final Report, January 12, 2011, City College of New York, University Transportation Research Center  <http://www.utrc2.org/sites/default/files/pubs/Design-Scale-Model-to-Evaluate-Dispersion-of-Biological-%26-Chemical-Agents.pdf>  [4] J.F. Ciparisse et al. (2016), A Computational Fluid Dynamics Simulation of Anthrax Diffusion in a Subway Station. International Journal of Mathematical Models and Methods in Applied Sciences. Vol 10. ISSN 1998-0140.  <https://www.naun.org/main/NAUN/ijmmas/2016/a722001-aaj.pdf>  [5] Janik E, Ceremuga M, Saluk-Bijak J, Bijak M. Biological Toxins as the Potential Tools for Bioterrorism. Int J Mol Sci. 2019 Mar 8;20(5):1181. doi: 10.3390/ijms20051181. PMID: 30857127; PMCID: PMC6429496. | |
| **Application: First alarm (Topic 4.1)**  **Target audience: DO, FB, (M)P, AS** | **Learning objective:** To recognize signs of a potential CBRN release and (initiate first) respond(ers).  **Aim:** The dispatch officer interacts with the caller to identify the likelihood of a possible CBRN release and to know which information should be shared with the chain of command. Use of METHANE and Four W’s protocols. |
| Example: |  |
| **Application: Arrival on scene (Topic 5.1)**  **Target audience: FB, (M)P, AS** | **Learning objective:** To recognize how to carry out an on-site risk assessment, zoning of the area, and isolation and registration of victims.  **Aim:** The first responders arrive on scene, perform a risk assessment, talk with the caller, perform a reconnaissance of the incident scene and discuss actions. They apply METHANE, establish zoning, isolate people and pet animals, initiate evacuation, register persons. |
| **Example:** |  |
| **Application: Forensic awareness (topic 5.2)**  **Target audience: FB, (M)P, AS, EMS, GP** | **Learning objective:** To recognize how to carry out your work without forensic disruption of the scene.  **Aim**: The responders discuss the possible forensic value of the materials found on the scene and preserve the evidence. |
| **Example:** |  |
| **Application: medical treatment and triage (topic 5.6)**  **Target audience: FB, (M)P, AS, EMS, GP** | **Learning objective:** To recognize how to apply appropriate medical care towards patients involved in a CBRN incident.  **Aim:** The responders assess the medical conditions of the victims, perform triage on the victims and recommend possible treatment. |
| **Example:** |  |
| **Application: Alarm Protocol (topic 6.1)**  **Target audience: DO** | **Learning objective:** To differentiate a possible CBRN incident (from normal incident) and to carry out appropriate procedures & protocols.  **Aim:** The dispatch officer interacts with the caller and relays necessary information to the responders moving towards the scene. |
| **Example:** |  |
| **Application: Task Specific – Triage of victims (topic 6.3)**  **Target audience: AS, EMS, GP** | **Learning objective:** To familiarize with and carry out triage and provide medical care in relation to CBRN scenarios**.**  **Aim:** The responders assess the medical conditions of the victims and perform medical triage on the victims based on provided symptoms. |
| **Example:** |  |