

**Meeting of the States Parties to the Convention
on the Prohibition of the Development,
Production and Stockpiling of Bacteriological
(Biological) and Toxin Weapons and on Their
Destruction**

2 December 2019

English only

2019 Meeting

Geneva, 3-6 December 2019

Item 6 of the provisional agenda

**Consideration of the factual reports of the Meetings of Experts
reflecting their deliberations, including possible outcomes**

**Investigating alleged use of biological agents
against agriculture, livestock and the natural
environment: A practical approach**

Submitted by Portugal

I. Introduction

1. The 2019 Meeting of Experts on Assistance, Response and Preparedness considered several topics for discussion, including *inter alia*, the following items:

(a) Procedures, including the establishment and use of the assistance database, to improve the prompt and efficient response without preconditions to a request of assistance by a State Party under Article VII, and coordination and cooperation among States Parties and with relevant international and regional organisations such as World Health Organization (WHO), World Organisation for Animal Health (OIE), Food and Agriculture Organization (FAO), as appropriate (agenda item 6);

(b) Exploration of approaches by which States Parties, individually or collectively, might contribute to the strengthening of international response capabilities for infectious disease outbreaks, whether natural or deliberate in origin (agenda item 8);

(c) Exploration of means to prepare for, respond to and render assistance in case of the possible hostile use of biological agents and toxins against agriculture, livestock as well as the natural environment (agenda item 9).

2. Work under the abovementioned agenda items included statements, working papers, technical presentations and side event discussions, in which consideration of strengthening international response capabilities for infectious disease outbreaks (natural or deliberate in origin), coordination with relevant International Organisations and the topic of deliberate release of biological agents against animals, plants and the environment were brought into the discussion.

3. With a view to develop concrete actions on these topics, Portugal recently organised a biopreparedness field training exercise to support the development of sound international assistance capabilities to respond, investigate and mitigate disease outbreaks, including those due to alleged use of biological and toxin weapons.

4. Portugal has previously reported on national biopreparedness field training exercises to share experiences with other States Parties, highlight concrete actions to strengthen the



United Nations Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons (UNSGM), and encourage the further development of multinational expert networks in investigating the alleged use of biological weapons ([BWC/MSP/2017/WP.11](#)).

5. This Working Paper continues to share training exercise experiences and to evolve collective learning on investigations into the alleged use of biological weapons. The Paper's key findings and lessons focus on electronic chain-of-custody and interviewing.

II. Exercise description

A. Introductory notes

6. In Portugal, biopreparedness field training exercises form part of an annual series of CBRN exercises. These 'CELULEX' exercises are civil support exercises organised and conducted on an annual basis by the Portuguese Army. They integrate several institutions in a multisectoral context, and adopt an all hazards approach and a one health perspective as main pillars for the construction of scenarios.

7. The CELULEX19 exercise took place at multiple sites around Lisbon, Portugal on 14-18 October 2019. The biological component of the exercise was based on a realistic scenario involving an investigation of alleged deliberate release of biological agents directed at livestock with a zoonotic agent that led to human cases.

8. CELULEX19 involved several national institutions, including the Portuguese Army¹, Portuguese Air Force², National Authority for Emergency and Civil Protection³, National Republican Guard⁴, Public Security Police⁵, Lisbon Fire Fighters Regiment⁶, Instituto Superior Técnico, University of Lisbon⁷, Portuguese Environmental Agency⁸, Directorate General for Health⁹, Directorate General for Food and Veterinary¹⁰, National Institute of Health¹¹, National Institute for Agrarian and Veterinary Research¹², National Institute of Medical Emergency¹³, National Institute of Legal Medicine and Forensic Sciences¹⁴, Portuguese Criminal Police¹⁵, Public Prosecution Service¹⁶ and Dona Estefania Paediatric Hospital¹⁷.

9. Several international experts participated as training audience and observers, from the following institutions: Food and Agriculture Organization of the United Nations (FAO); Instituto de Defesa Química, Biológica, Radiológica e Nuclear (Brazil); Institut für Mikrobiologie der Bundeswehr (Germany); Instituto Gulbenkian de Ciência (Portugal); King's College London (United Kingdom); Ministério da Agricultura, Pecuária e Abastecimento (Brazil); Regimiento de Defensa NBQ (Spain); Robert Koch Institut (Germany); Scuola Interforze per la Difesa NBC (Italy); United Nations Office for

¹ Exército Português

² Força Aérea Portuguesa

³ Autoridade Nacional de Proteção Civil

⁴ Guarda Nacional Republicana

⁵ Polícia de Segurança Pública

⁶ Regimento de Sapadores Bombeiros - Câmara Municipal de Lisboa

⁷ Instituto Superior Técnico - Universidade de Lisboa

⁸ Agência Portuguesa do Ambiente

⁹ Direção-Geral de Saúde

¹⁰ Direção-Geral de Alimentação e Veterinária

¹¹ Instituto Nacional de Saúde Doutor Ricardo Jorge

¹² Instituto Nacional de Investigação Agrária e Veterinária

¹³ Instituto Nacional de Emergência Médica

¹⁴ Instituto Nacional de Medicina Legal e Ciências Forenses

¹⁵ Polícia Judiciária

¹⁶ Ministério Público

¹⁷ Hospital Dona Estefânia

Disarmament Affairs (UNODA); World Health Organization (WHO); World Organization for Animal Health (OIE).

10. The programme of the exercise included several phases comprising initial briefings, scenario presentation and planning; field-based activities at different investigation sites; topic discussions; on-site visits to the BSL3 laboratories of the National Institute for Agrarian and Veterinary Research (bacteriology, virology and prionic diseases laboratories) and the biological and chemical defence laboratories of the Portuguese Army; and a Distinguished Visitors Day with static displays and demonstrations.

B. Scenario

11. The exercise scenario was based on the alleged deliberate release of a zoonotic agent on the environment, that led to an epizootic outbreak and a small number of secondary human cases.

12. At the start of the scenario, 12 fatal cases at a cattle farm had been reported to the National Authority for Animal Health. The cattle had suffered high fever, muscle tremors and difficulty breathing. The National Authority took samples, confirmed the diagnosis through testing at the National Veterinary Laboratory, managed the outbreak as a naturally occurring outbreak, and took several control measures including restricting movement inside the country, vaccination, targeted surveillance, quarantine, official disposal of carcasses and waste, disinfection and decontamination. A 63-year-old male worker from the farm was hospitalised and later died. For the purpose of the scenario, the notification of the animal outbreak was submitted to the World Animal Health Information System (WAHIS), and the human case was reported to the National System for Epidemiological Surveillance and the official notification to the WHO.

13. Within a few weeks, additional cases with similar symptoms were reported from four more farms, all within a few kilometers from the first farm. In total 53 animals had died. Diagnostic tests confirmed the common source of the outbreaks, all of which were reported to the World Animal Health Information System (WAHIS). A 42-year-old female worker and a retired, male resident near one of the farms presented with the same diagnosis, and were hospitalised and treated with appropriate antimicrobials.

14. The epidemiological investigation of the five outbreaks linked them to a possible anthropogenic origin of agent dispersion into the environment as part of a fictional development project to introduce a new technology for pest control. Ensuing allegations of deliberate release of a biological agent led to an international fact-finding investigation.

C. Field-based activities

15. CELULEX19 was focused particularly on evidence gathering, sample transportation and chain-of-custody in an alleged use investigation. The field-based activities of the mock international fact-finding investigation comprised five different sites. The first four sites trained different types of samples and approaches.

- Site 1 was a farm, where 40 cows were in quarantine. In the scenario, there was information that the animals had been exposed to a contaminated pasture and the host nation was currently waiting for national lab results. The international evidence-gathering team comprised two individuals to collect biomedical samples (handling contaminated material), one individual to prepare sampling equipment and package samples (handling clean material) and one compiler to register samples and carry out chain-of-custody procedures. The samples consisted of blood, nasal swabs and hair samples from selected animals.
- Site 2 was the same farm, but the focus was on the field allegedly sprayed with the contaminated material. The evidence-gathering team comprised one individual to collect environmental samples (handling contaminated material), one individual to prepare sampling equipment and package samples (handling clean material) and one compiler to register samples and carry out chain-of-

custody procedures. Soil samples were collected from spots identified in the sampling plan.

- Site 3 was a warehouse storing a mini-UAV with spraying devices and containers. The evidence-gathering team comprised two individuals to collect environmental samples (handling contaminated material), one individual for on-site detection, one individual to prepare sampling equipment and package samples (handling clean material) and one compiler to register samples and carry out chain-of-custody procedures. Swabs, liquid and solid samples were collected from the equipment and containers.
- Site 4 was the National Veterinary Laboratory, where an animal was presented for necropsy. Post-mortem samples were collected by the veterinarian personnel of the host nation under observation by members of the evidence-gathering team. The investigation team was comprised of two individuals to collect post-mortem samples (handling contaminated material), one individual to prepare sampling equipment and package samples (handling clean material) and one compiler to register samples and carry out chain-of-custody procedures. The samples consisted of blood, skin and hair samples from the animal.

16. Experts with the requisite sample collection skills used internationally recognised protocols to collect the various biomedical, environmental and post-mortem samples. During the planning phase of the exercise, the international evidence-gathering teams had consultations with the laboratories likely to analyse the samples to establish the appropriate amounts to be collected. Upon arrival at the investigation site, the international evidence-gathering teams identified samples collected earlier by the host authorities and organisations, and considered whether to include those samples and the host nation sample analysis in the records of the investigation. As samples were taken, the investigative team initiated chain-of-custody procedures.

17. During the exercise, the investigative team tested an electronic chain-of-custody information system comprised of specialised software and tablets in ruggedised, waterproof sleeves that can operate both in online and offline modes.

18. CELULEX19 dedicated a significant part of the exercise to train interviewing of witnesses and victims in an investigation. Some interview training took place at the farm (site 1 and 2), but the main training was focused on the fifth field site.

- Site 5 was an infectious diseases hospital, where in the scenario two patients were recovering in negative pressure rooms. The investigative team comprised three individuals: two interviewers and one note-taker.

III. Key findings and observations

A. Electronic chain-of-custody

19. Traditional, paper-based chain-of-custody systems can sometimes be problematic. They are prone to human error, there are often legibility issues, and the paper can potentially be contaminated. CELULEX19 trialled a newly developed electronic chain-of-custody system to complement, or potentially replace, the paper-based system.

20. There are clear benefits to an electronic chain-of-custody system. It simplifies the chain-of-custody process, and it enables electronic tracking of samples from the field to the laboratory. It speeds up the registering of samples for compilers in the field, and time is often a critical factor in alleged use investigations. When the tablet is used in its online modus, it can connect to the command centre, where copies of all the electronic documentation can be printed in real time and stored in physical form as a back-up. The command centre is also able to monitor the entries as they are recorded, and provides an additional means of managing the fact-finding team in the field. Each entry on the electronic system is marked with a precise time and date, enabling reconstruction of the chain-of-custody. In addition to

a record-keeping and field monitoring system, the electronic system can in this way also function as an auditing tool.

21. A small number of teething-problems were experienced by the CELULEX19 evidence-gathering teams when operating the electronic systems. These included some unstable network connections, instances where inputted data could not be saved, and occasions where scanning failed and barcodes had to be manually entered. There were also some issues raised that need further consideration, including vulnerabilities opened up by an electronic system and personal data protection. In general, however, the CELULEX19 evidence-gathering teams had a positive experience of the electronic chain-of-custody system.

22. The electronic chain-of-custody system is still at the proof-of-concept stage, and Portugal used CELULEX19 as an opportunity to field-test it. Based on the exercise, Portugal considers that an electronic chain-of-custody is feasible in principle at the national level for select stakeholders, and that the system developed so far can usefully be built on. The system can be further trialled for international investigations.

B. Interviewing witnesses and victims

23. Interviews may be an important element of an investigation. There is substantial methodology to interviewing, but some aspects remain more of an art than a science. Polite, considerate and culturally-sensitive behaviour, as well as establishing rapport in the shortest possible time, are critical aspects. Interview practice in a variety of potentially relevant settings is essential. In the CELULEX19 exercise, a doctor and two patients in separate rooms at an infectious diseases hospital were interviewed by a team of three international investigators.

24. During the planning phase of the exercise, when it was still uncertain who and how many people the international investigative team could interview, the team developed a set of priority interviewees. These included any affected patients, treating doctors, attending nurses, the diagnostics lab, ambulance staff and first responders, relatives, and patients in neighbouring beds. The team also developed a set of priority questions and secondary questions tailored to the circumstances at hand. A lead (female) and supporting (male) interviewer were assigned, along with a note taker. Due considerations were given to the involvement and consent of the host state, language and particular cultural issues of relevance.

25. At the hospital, the team spoke first with the attending doctor about the two case histories. Questions asked included: What is your impression of the patient, and the condition in which s/he arrived? What in your opinion is the contributing cause or diagnosis of the illness? What are you treating the patient for, and how? What is your experience of handling cases of this sort? The team established whether medical files and laboratory test data could be made available, asked who else had come to speak with the patients, ascertained the language(s) spoken by the patients, and queried the time available for the patient interviews.

26. The investigative team was given very limited time (5 minutes) with the patients to be interviewed. The team asked the doctor to introduce them to the interviewees. The doctor remained in the room throughout both interviews, and for one of the two interviews acted as a translator. At the start of the interviews, the lead interviewer introduced the investigative team members and confirmed with the interviewee that s/he would be willing to speak with them. The team ascertained whether the interviewee was happy to speak to the team, or whether s/he would prefer to have someone else in the room. Recording was deemed inappropriate in the particular setting, and the team relied on the extensive notes taken during the interview as documentation of the interaction.

27. The questions asked were concrete and unambiguous, while at the same time broad and open, in order to minimise leading the interviewee. Questions asked included: Tell me about the days before you got sick and how you started noticing your symptoms. Did you notice anything unusual before, during or after you began feeling unwell? Tell me about the

work you do. Do your routine activities involve handling food, water or waste of livestock? Did you handle the sprayer, or were you in close proximity to the sprayed fields? Do you know whether anyone else got sick? Do you know anyone at the other farms affected? Where the interviewee revealed unexpected information, the interviewer asked follow-up questions to develop possible leads.

28. The role of the supporting interviewer was to aid the lead interviewer if necessary, but it was also to act as an observer. The secondary interviewer paid particular attention to the patient and any symptoms s/he displayed, such as breathing difficulties, fever, malaise, weakness, as well as to any obvious medication or prophylactic administered. The general state and atmosphere of the room was also observed.

29. In closing the interview, the investigative team thanked the interviewee and provided their contact details should the interviewee think of any further relevant information, or should there be any information the interviewee would like to supply without the doctor present. The team asked the interviewee if they may contact her/him again should the team have any follow up questions, and also asked if they were permitted to speak with the attending doctor about their cases and to review their diagnostic results.

IV. Conclusions

30. The potential deliberate release of biological agents against agriculture, livestock and the environment is recognised in the context of the Biological Weapons Convention. The topic acquired particular importance during the 2019 Meeting of Experts on Assistance, Response and Preparedness, as noted by several statements, working papers, technical presentations and dedicated side events.

31. BWC States Parties recognise that health and security issues are interrelated at both national and international levels, and that several International Organisations play central roles in responding to, and investigating, deliberate disease outbreaks. It is therefore crucial to foster effective cooperation and sustainable partnerships with WHO, OIE, FAO, INTERPOL, and UNODA.

32. CELULEX19 focused on investigating the suspected deliberate use of a zoonotic agent on livestock with the intent to cause harm. The exercise considered potential consequences to animal and human health, as well as larger societal, economic and ecological impacts. The wide scope of the exercise scenario enabled CELULEX19 to test different concepts and several types of evidence and samples, including biomedical (human and animal), environmental and post-mortem. The exercise adopted a comprehensive and integrated approach to investigating the alleged use of biological weapons.

33. In CELULEX19, several International Organisations participated with experts and teams as training audiences and observers. Cooperation between States Parties and the International Organisations in charge of responding to outbreaks of human, animal or plant disease enables the global health security community to learn from previous experiences, and it further strengthens and enhances the BWC.

V. Acknowledgements

34. Portugal thanks all international experts and institutions participating in CELULEX19. Portugal also thanks Dr. Filippa Lentzos of King's College London for her support in writing this Working Paper.
