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Forensic Investigation of Bioterrorism

Submitted by the Netherlands

Introduction

1. This paper is about the way the Netherlands Forensic Institute (NFI) is involved in the fight against terrorism. More specifically, it will be about the Quick Response Team and its role in investigating cases of alleged manufacture or use of biological warfare agents by terrorists.

The Netherlands Forensic Institute

2. The Netherlands Forensic Institute is an independent organisation, residing under the Ministry of Justice. It has three main tasks. The first one is to conduct forensic casework, mostly in the laboratory, and for a relatively small part at the scene of the crime. An integral part of the forensic casework is reporting the results and conclusions of the investigations. In many cases, NFI-experts also present, explain and, if necessary, defend their findings in the courtroom. The second main task is research and development, for instance on new analytical methods. Often, this is done in co-operation with other research institutes and universities. Research is also being carried out to be able to draw better conclusions from laboratory findings. The NFI's third main task is consultancy. The NFI is a national and international centre of expertise on many forensic disciplines, and is able to provide police, judiciary and other parties involved in justice with support and advice. NFI-employees also educate and train police and judiciary on technical aspects of forensic work, while development of national policies and legislation is often supported with expertise from the NFI as well.

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3. Many different forensic disciplines are available at the NFI. Most of them are relevant to investigating possible terrorism cases only in a general way, like fingerprints or micro traces. Some of them are important to terrorism investigating in a more specific sense, like toxicology, biology and environmental forensics. In the future, DNA-analysis could be very important to the investigation of bioterrorism cases, but the methods of analysis and interpretation of human DNA-data will not be directly applicable to bacterial DNA. In this field, a lot of work still remains to be done.

The Quick Response Team

4. Over the years several incidents contributed to the developing idea of establishing a QRT at the NFI. The fireworks disaster in the Dutch city of Enschede showed that it is not easy to coordinate the activities of different governmental agencies, first responders and accident investigators at the site of a large-scale disastrous incident.

One of the main problems, however, was the fact that under these circumstances, forensic evidence seemed to disappear like snow before the sun. During the Enschede investigations, people at the NFI began to realize the importance of being at the scene of an incident as soon as possible, to be able to preserve as much physical evidence as possible.

5. Of course, the 11th of September had an impact on the forensic world. In the Netherlands it was felt that not only first responders, but also forensic investigators should be better prepared for events like this.

6. Like many other countries, after 9/11 the Netherlands was confronted with a large number of "anthrax letters". More than a thousand of them were investigated at the NFI for things like fingerprints, handwriting, DNA and such, after first being declared "safe" by a microbiological laboratory. Logistics were problematic, the strain on the regular forensic work was enormous, and there were serious doubts about exactly how safe the safety declaration was. After all, the letters were only checked for *Bacillus anthracis*, and other micro-organisms or chemical agents might still be present and dangerous. Luckily, none of the letters actually contained anthrax and no-one appears to have been harmed by any other substance from the letters.

7. In October 2001 the Dutch government presented a national action plan for fighting terrorism. One of the actions (number 12) was to establish a Rapid Response Team at the Netherlands Forensic Institute. The NFI started a project for this purpose, and although a lot of work is still underway to further develop things, from January 2003 the QRT is a fact.

Objectives, task and practice of the QRT

8. The first objective of the QRT is to optimally assist forensic investigations in case of incidents of (NBC-) terrorism. Assistance, mostly to the police and the public prosecutor, can be delivered in the form of advice, or by playing an intermediate role between police and other institutes, or by actually carrying out forensic investigations at the scene of the incident. A second

goal is to guarantee quick availability of all necessary experts. The sooner NFI-experts are involved in the activities at the incident scene, the smaller the chance that the importance of forensic investigations will only be recognized when it's already too late. The last objective is optimal use and safekeeping of "volatile" forensic evidence. For this it is necessary to inform all personnel at the incident scene in an early stage of special measures that need to be taken to destroy as little physical evidence as possible.

9. To attain these goals the QRT's main task is to be prepared. An important part of the preparation time is invested in the formation of a co-ordinated network with other dedicated institutes. In the Netherlands, various - mostly governmental - organisations have a role in the response to terrorist incidents. Much effort is put into making sure that, when the time comes, all these organisations will co-operate smoothly.

10. In the case of a terrorist attack it may be necessary to do traditional forensic work under N-, B- or C-conditions. Therefore, safety procedures and equipment need to be put in place and employees need to be trained. Quite a lot of this work has been done already, many of the relevant experts have had some training in safety and the use of personal protective equipment. However, much still remains to be done.

11.. Finally, research is being carried out into possible detection methods and instruments and into analytical procedures to identify terrorist agents and determine their source. For bio weapons, this subject will be treated in a bit more detail later in this paper.

12. In practice, the QRT is more or less a "virtual" organisation: the most important thing is, that arrangements have been made, so that existing "traditional" forensic experts will be available on short notice. In addition to this, several new fields of expertise, like chemical and biological weapons and forensic medicine have been defined and new specialists have been hired to further develop these. The QRT also had assigned a logistic co-ordinator, who has to make sure all necessary equipment will be available on-site, and in time. For this purpose, two small vans have been bought. At least one of these is kept at standby at all times.

The NFI/QRT and bioterrorism

13. Investigating bio-weapons is a new field of interest for the NFI. The aim is not just to identify biological agents, but also, and more important: to determine the source, establishing or ruling out links with suspects. For this, the differences that need to be looked at, are not only at the genus- and species-level, but especially between strains of bacteria. Existing techniques to identify bacterial species, like bacteriological methods and PCR-techniques do not yield results that are detailed enough to establish differences between strains: new techniques and methods are to be developed.

14. For many microbes, including *Bacillus anthracis*, entire genomes have also been sequenced. However, before these data can be used to compare and identify strains of micro-organisms, it has to be determined - for each individual species of interest - which variable regions within the genome are actually characteristic. This is a task, way beyond the possibilities of one forensic institute like

the NFI. This kind of work can only be done in cooperation with other organisations. At the moment the NFI is looking into the possibilities to cooperate with the Dutch research institute TNO. It is expected that several joint research projects will be started soon.

Conclusion

15. In the field of bioforensics, a lot of work important has to be done. This goes beyond the scope of individual organisations like the Netherlands Forensic Institute. It is necessary to cooperate with other institutes, nationally as well as internationally, within the forensic world as well as outside it.
