BIOLOGICAL WEAPONS AND GENETIC TECHNOLOGIES

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Biological Weapons and the New Genetics: The Need for Verification

Whilst most people consider biological weapons to be immoral, the temptation to develop and use them will remain unless procedures are in place to prevent this. The advent of the new genetic technologies makes the need for controls even more urgent. Genetic engineering could make biological weapons more attractive to aggressors by making them more rapid and effective at causing death or disease or by enabling weapons to be targeted at certain groups (see Briefing 1 in this series). Finding ways to ensure that such weapons are not being developed and that the international agreement outlawing them is not being broken (known as 'verification and compliance') is one of the primary challenges for arms control.

The Need for Verification

Establishing verification and compliance mechanisms to confirm that nations are not developing biological weapons is important for three key reasons:

1. It allows major violations to be detected and thus builds confidence in the effectiveness of legal mechanisms to outlaw biological weapon development and thereby discourages proliferation – if nations are confident others are not developing biological weapons, they will be less inclined to do so themselves.
2. It acts as a deterrent - people seeking to develop such weapons know they may well be caught.
3. It establishes a political framework for addressing any alleged or actual violations.

The need for verification has led to negotiations on a 'Compliance Protocol' to the Biological and Toxin Weapons Convention (BTWC) which aims to create a legally binding instrument for agreement at the Fifth Review Conference of the BTWC in November 2001. It is envisaged that this would include the establishment of an Organisation for the Prohibition of Biological Weapons (OPBW) to carry out the functions demanded by the Protocol. However, difficulties in gaining political agreement mean that this may not be achieved or that only a very weak Protocol will result, leaving the OPBW constrained in how effectively it could operate.

The Difficulties of Verification

Overall, verification procedures are more about deterrence than detection. No verification regime can give 100% assurance even where conventional weapons are concerned and verifying a ban on biological weapons is particularly difficult. The same techniques and knowledge that could be used in developing biological weapons are used everyday for peaceful purposes. This 'dual use' characteristic of biotechnology means that it is possible to hide hostile activities under the cover of peaceful applications. Whilst this may make it more difficult to distinguish between such applications, it means that transparency about legitimate activities is all the more important.

Verification, therefore, must discriminate between peaceful and hostile uses of biotechnology. However, biotech companies are concerned that if they are scrutinised too closely, the information gained may be used by their competitors in other countries. Similarly, governments are concerned that national security could be compromised if sensitive information, such as their defences against biological weapons, is examined. There are differences of opinion between countries about how serious a problem this is and whether the risks (however minor) of commercial or security information being misappropriated are worth the increased security benefits of a strong verification protocol.

Verification Methods

There are a variety of methods that could be adopted to detect and deter violations, and build confidence including:

- declarations
- visits
- investigations
- information gathering
- on-site sampling
- aerial surveillance

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Verification is always a trade-off between technical capabilities and the political acceptability of certain monitoring measures. The most effective verification approach would include all, or a combination of, these approaches but will run into political difficulties. These are explored in turn below.

Declarations

Declarations involve countries supplying an annually updated list of the facilities in their country which are capable, in theory, of being part of a biological weapons programme. Including the facilities potentially most relevant to offensive weapons production is a key goal. Such declarations include what kind of work is taking place at the site and the kinds of facilities which are available (e.g. what micro-organisms they are capable of handling). The quality of this information obviously depends on the country supplying it and on their honesty in declaring all potential facilities. Declarations should also be made about disease outbreaks in humans, plants or animals that are associated with certain organisms so that any suspicious outbreaks can be investigated if required (see *Investigations* below).

Visits

Inspections to check whether countries' declarations are correct and complete are a cornerstone of any verification system as they help deter people from cheating and identify any violations. They are also an important part of transparency and confidence building. The Protocol envisages two types of verification visits – randomly selected and clarification.

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Randomly selected visits are intended to allow inspectors to choose a declared facility at random and visit it to check the accuracy of the information declared. Such visits are important to maintain general scrutiny, keep inspectors trained and the quality of declarations high. To a certain degree, these activities make the development of biological weapons less likely because people know they might be caught.

Clarification visits would be carried out when declarations have been made but it is considered that more information is needed to confirm the peaceful purpose of the site in a non-confrontational manner. These are an important plank in the detection of violations and building confidence.

Investigations

The capacity for investigation is needed in cases where there is evidence of non-compliance or when suspicious disease outbreaks occur:

Suspected non-compliance: If a state is suspected of developing, producing or even using biological weapons, there needs to be an investigation. This could include facility investigations to check whether a clandestine weapons programme exists and field investigations to clarify cases of alleged use of biological weapons or leaks of biological weapons agents from a research or production facility. Having a procedure and independent body able to deal with such politically sensitive questions is vital.

Disease outbreaks: An outbreak of a suspicious disease in humans, plants or animals could indicate that a biological weapon had been used or that there had been an accidental release from a biological weapons facility. It would not be possible to investigate all disease outbreaks but a combination of evidence - such as the nature of the organism, location of the outbreak and pattern of the disease - would have to be used to determine whether it was 'suspicious'. Even then, most disease outbreaks would probably prove to be naturally occurring but the process of investigation would build confidence in the effectiveness of the Convention.

Information Gathering

For the most effective scrutiny and verification, the inspectorate should be able to draw on the widest possible sources of information available. This could include information in the open scientific literature, the Internet and publicly available national registers. Most of this information will help reassure inspectors about the peaceful purposes of declared facilities but it could also indicate when facilities have not been declared or when potential biological weapons agents are being used. Whilst this seems a logical use of available information, this is currently not included in the draft Protocol to the BTWC.

Governments are concerned that on-site investigations might undermine their national security

On-Site Sampling

Whilst sampling at facilities might be a useful mechanism for checking the veracity of declarations and identifying possible infringements of the BTWC, it is one of the most contentious verification proposals. Industry are insistent that it would compromise their commercial confidentiality and it is only likely to be used as part of an investigation into alleged violations. It is possible, however, for a system of 'blind' sampling to be developed. Here, sampling would only be used to determine if potential biological weapons agents (such as the anthrax organism) were being used or certain genetic changes had been made (to produce a toxin for example). This would be a very powerful deterrent against developing biological weapons as the chances of being caught would be greatly increased. Even if a facility conducting illegitimate activities is 'cleaned up' before an inspection, traces of organisms (especially undegraded DNA) may remain.

Aerial Surveillance

Aerial surveillance systems for verification are already important in other areas of arms control but some consider them of little use in biological weapons control. However, whilst images gathered from aeroplanes or satellites will not be completely reliable in identifying possible biological weapons facilities, they could identify certain features and be used to supplement other information to ensure compliance with the BTWC. Such surveillance would be most useful if the OPBW itself could gather the data rather than relying on images being supplied by member states.

International efforts to develop an effective verification Protocol are being jeopardised by the USA and its concerns for the commercial confidentiality of its biotechnology industry

Security Versus Commercial Confidentiality

All on-site activities generate concern amongst the biotechnology industry and some governments and there is particular concern that commercial confidentiality may be breached. Although the biotechnology industry is highly regulated and inspected by its own national regulators, it is the use of foreign inspectors that seems to cause most anxiety. Governments are not only concerned on behalf of their own industry, they are also worried about national security and fear that challenge inspections could be used mischievously to cause political controversy.

How and whether visits should be allowed to take place and the definition of

inspectors' rights during such visits are key sticking points in the current negotiations for a Protocol to the BTWC. The US is particularly resistant to anything other than minimal visits. It also insists that the facility being investigated has complete control over the visit. The US has the biggest biotechnology industry in the world and therefore feels it has most to lose from a strict Protocol.

Conclusions

Without effective verification procedures in place, it is difficult to generate confidence that biological weapons will not be produced and the new genetic technologies abused. Whilst international efforts are being made to develop an international verification Protocol to the BTWC, this is being jeopardised by the United States and its concerns for the commercial confidentiality of its biotechnology industry. The US (and its industry) is now considered to be the single most important barrier to implementing the Protocol. The US intransigence is even more difficult to understand since the way in which the inspections will be carried out will be discussed with the facility involved and will be undertaken by an independent, trained inspection team. There would be negotiated access to levels of information and member states can use a range of techniques as long as compliance with the Convention is demonstrated. Neither commercial confidentiality nor national security need be compromised.

Whilst the US and its industry are a key stumbling block, there are other obstacles. The biotech industry elsewhere has also contributed to the problem and the developing countries are also concerned about export controls included in the Protocol and how these will be determined. These issues will be explored further in the next briefing in this series.

Persuading the US and its industry that they, like all citizens, have much to gain from confidence that microbiology and the new genetics are being used only for peaceful purposes is vital. In Europe, it is important that governments do not allow their determination to develop a strong and effective Protocol to be undermined by the interests of the US. Continued scrutiny of the negotiations will be crucial in the run-up to the Fifth Review Conference. Scientists - especially in the private sector - should ensure that their representative organisations argue for a strong Protocol to build confidence that they will not allow their science to be abused again as it has been in the past.

Bibliography and Resources

Department of Peace Studies, University of Bradford - comprehensive collection of detailed materials on the BTWC and the Protocol: http://www.brad.ac.uk/acad/sbtwc

Federation of American Scientists – extensive collection of information on verification and other biological weapons issues: www.fas.org/bwc

VERTIC – The Verification Research, Training and Information Centre: www.vertic.org

Wheelis, M. (2000) Investigating Disease Outbreaks under a Protocol to the Biological and Toxin Weapons Convention. *Emerging Infectious Diseases* 6 (6): http://www.cdc.gov/ncidod/eid/vol6no6/wheelis.htm

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