4

Science of Mass Destruction: How Biosecurity Became an Issue for Academies of Science

Koos van der Bruggen

Introduction

The growing interest in biosecurity outlined in other chapters in this volume has reached the international academic arena. Many national and international scientific organisations are involved in these issues in a way they were not in the past; including national academies of sciences. This chapter concentrates on the role of the InterAcademy Panel (IAP) on International Affairs and on the debates and discussions in the Netherlands where the Royal Netherlands Academy of Arts and Sciences (KNAW) developed a national Code of Conduct for Biosecurity.

The initial background in the first part of the chapter will serve as a springboard for addressing two questions in the second part:

- Is the interest from growing parts of the life science community in biosecurity fuelled by a growing risk of misuse of life sciences or more by a growing political and societal concerns on (bio)security?
- How are relevant political and military developments incorporated in the life sciences discussions on biosecurity?

The chapter concludes with some recommendations for the future involvement of scientists and their organisations in the debate about biosecurity.

The Inter Academy Panel and biosecurity

The Inter Academy Panel on International Affairs was launched in 1993 as a global network of science academies. Its primary goal is 'to help member academies work together to advise citizens and public officials

B. Rappert et al. (eds.), *Biosecurity*

on the scientific aspects of critical global issues'.[1] Since its inception, IAP has issued statements on urgent social and scientific issues such as population growth (1994), sustainability (2000) and human reproductive cloning (2003). By issuing these statements and other activities, IAP has the intention to help academies to develop 'the tools they need to participate in science policy discussions taking place beyond university classrooms and research laboratories'. These tools will help 'to raise both their public profile among citizens and their influence among policymakers'.[2]

Since 2004, IAP has been active on the issue of the relation between security and life science research. In that year a Biosecurity Working Group (BWG) was established with the Academies of China, Cuba, Nigeria, the Netherlands, the United Kingdom and the United States. This BWG was inspired by activities on the field of biosecurity that had already been developed in the United States and that resulted in the now famous 'Fink Report' or *Biotechnology Research in an Age of Terrorism* (NRC 2004).

The BWG has developed a series of activities to stimulate discussion. In 2005 (20–22 March), IAP was one of the organising parties of an 'International Forum on Biosecurity' in Como, Italy. Together with the International Council for Science (ICSU), the InterAcademy Medical Panel (IAMP) and The National Academies of the United States, IAP hosted the Forum. One of its purposes was to serve as a major convening and coordinating mechanism to share information about activities that were underway or planned to address the biosecurity issue. These deliberations contributed to the Meetings of Experts and States Parties to the Biological Weapons Convention (BWC) in the summer and fall of 2005.

In December 2005, IAP issued a *Statement on Biosecurity* (see Appendix 4.1). This statement responded to the call from States Parties to the BWC during their fifth review conference in 2002 to 'promote common understanding and effective action (…) on the content, promulgation, and adoption of codes of conduct for scientists' (see the chapter by Revill and Dando for further background).[3] As an organisation consisting of member organisations, it was initially seen as useful for IAP to develop a code of conduct for its members. Eventually though IAP took the decision to produce a statement that contained five guiding principles that could then be 'translated' in codes of conduct by its member organisations. This *Statement on Biosecurity*, endorsed by 69 IAP member academies in 2005, was presented at the 2005 BWC meetings and has continued to be referred to (Kellman 2007; Guthrie 2007).

Since this declaration, biosecurity has stayed on the agenda of the Panel. The BWG enabled the IAP and its member academies to become internationally recognised voices for the inter-section of security and biological sciences. The member academies of the Working Group, as well as others, have been important sources of advice to their own governments on national policy. Moreover, IAP is increasingly recognised as an important representative on biosecurity issues for the international scientific community. As a sign of this, it was invited to the BWC Meeting of Experts in Geneva during August 2008. In the spring of 2008, IAP again was one of the coorganising parties for the 2nd International Forum on Biosecurity in Budapest referred to in Chapter 1. The working groups at the 2nd Forum produced a number of ideas for future activities, both for the BWG as well as for collaborative activities with other scientific organisations. For example, one working group recommended that IAP establish a task force to develop a clearinghouse for educational materials on biosecurity. Another recommended developing an IAP statement on appropriate models for oversight of dual-use research.[4]

Another strand of activity conducted or prepared by the BWG has been international workshops on biosecurity. A workshop in China, organised by the Chinese Academy of Sciences, took place in December 2008. An African workshop planned for 2008 had to be postponed for organisational reasons. Moreover, IAP has conducted two surveys of its member academies. These surveys asked members to provide details of activities undertaken in the field of biosecurity. While most responding academies had undertaken some initiatives, this was most commonly limited to publishing the *Statement on Biosecurity* to their website. The development of a (national) code of conduct on biosecurity was in fact only taken up by the Netherlands. For a summary of the answers on the second questionnaire see Appendix 4.3.

A workshop was planned for mid-2009 to be organised by IAP in cooperation with other international scientific groups. Its purpose was to develop recommendations for the most effective approaches to educating life scientists internationally on dual-use issues. The intention was for the workshop to:

- survey strategies and resources available internationally for education on dual-use issues and identify gaps;
- consider ideas for filling the gaps, including development of new educational materials and implementation of effective teaching methods; and
- discuss approaches for including education on dual-use issues in the training of life scientists.

Biosecurity policy in the Netherlands: The role of the Royal Netherlands Academy of Arts and Sciences

Biological weapons – and more specifically bioterrorism – attracted considerable attention after the attacks of September 11, 2001. Less well known is that before 2001, the Dutch authorities had already paid attention to the possible threats of the dual-use of biological agents. The Netherlands does not have a history of developing or using biological weapons. Indeed, as far as can be ascertained, there have been no attempts to develop such weapons by any Dutch government. The Netherlands has been a State Party to the Geneva Protocol (1925) as well as in the BWC (1972) since their inceptions.

Pre-2001, most of the attention to biological weapons in the Netherlands was linked to the broader issues of Chemical, Biological, Radiological and Nuclear (CBRN) weapons. In a common letter of 17 October 1997, the Ministers of Defence and of Science already stated:

> In the past twenty years the threat of warfare with biological weapons has grown worldwide. The Biological Weapons Convention of 1972, that prohibits the development, production and possession of biological and toxin weapons, has not been signed by a great number of countries. A growing number of countries have the disposition of biological weapons for offensive use. Moreover, these weapons can be produced more easily because of modern technology, while place and time of production hardly can be discovered.

The ministers concluded that the Netherlands had a lag in the development of means that could provide effective protection against biological weapons. Because of this a research programme was started for developing such means of protection (Tweede Kamer 1997).

With hindsight it is remarkable that all the attention in the late 1990s was devoted to the possible threats of states that were not then party to the BWC. A terrorist threat is not spoken of. A few years later, the concern with a terrorist threat was explicit in the June 2001 report *Verdediging tegen bioterrorisme* (*Defense against bioterrorism*), published by the Dutch Health Council (Health Council 2001). The Health Council issued the work at a request of the Ministry of Health in 1999. The report gave a list of recommendations intended to better coordinate existing preventive and precaution measures as well as to make researchers and medical doctors more aware of the possibility of the intentional spread of pathogenic organisms. The idea was to edit a handbook that would provide tools and rules for acting in the case of bioterrorism.

After the 9-11 attacks and the anthrax letters, a complementary report was produced in 2002 wherein the June 2001 recommendations were elaborated further (Health Council 2002). Given the remit of the Health Council, both reports concentrate on the medical aspects; specifically the prevention, development of vaccines and insight into disease symptoms.

Legal and political aspects of biothreats in the Netherlands are handled by the intelligence services and the office of the National Coordinator on Terrorism. They undertake analyses of a wide spectrum of threats. The overall conclusion from these assessments is that the likelihood of an attack with biological weapons is very limited, either in the Netherlands or more generally.[5] One of the reasons for this is that the production of pathogenic agents requires sophisticated biological and medical knowledge. As such, horror stories that suggest that every high school student could download recipes for biological weapons from the Internet that cause mass casualties are highly exaggerated (KNAW 2007, p. 21).

But even if the risks are very small, it should still be acknowledged that the possible consequences of a bioterrorist attack could be immense. Small pox or anthrax epidemics could take tens of thousands of victims. In addition, the affect of deliberate disease on agriculture or animal husbandry could be huge; has been illustrated by recent outbreaks of animal diseases. Even if the effects are limited in terms of the number of victims, political and economic damage cannot be discounted. The panic after the anthrax letters affair was enormous, and not only in the United States.[6]

The Netherlands may have a clean record as far as biological weapons development and use is concerned, but the story is different regarding nuclear weapons. The notorious Pakistani nuclear scientist, Dr. AQ Khan worked for Dutch universities and Dutch companies early in his career during the 1970s. He was involved in a project to enrich uranium. In 1975 Khan returned home to Pakistan. A few years later it became clear that with technology taken from the Dutch company URENCO, Pakistan was developing its own nuclear weapon. Because of this painful history, the Dutch government and Dutch scientific world has become alert to the possible destructive application of scientific knowledge. A recent example is the prohibition on students and researchers from Iran entering some laboratories for nuclear research or following certain 'high risk' courses. This decision was based on Resolution 1737 of the Security Council of the United Nations (2006). In practice, it should be noted that the effect of the measure is negligible. Until the end of 2008 no Iranian student was affected. Nevertheless the scientific community expressed unhappiness about the measure. In a letter dated January 2009, president of the KNAW, Robbert Dijkgraaf, asked the government to withdraw the restriction.[7]

In the field of biosecurity, comparable measures were not taken until the last few years. Two kinds of policies were developed: In cooperation with the office of the National Coordinator for Counterterrorism, new physical security measures were introduced. The potential weak spots in Dutch laboratories and research institutes were assessed and, where necessary, supplementary security measures were implemented to minimise the risk that the laboratories could unwittingly provide materials that could be used in a bioterrorist attack. These measures varied from improved physical security, to control over the import and export of biological agents, to screening activities. The second policy measure was directed at raising awareness in the scientific community of biosecurity issues. As a follow-up of the IAP Declaration on Biosecurity and the discussions during the 2005 meetings of the BWC, the Dutch government asked KNAW to develop a 'Code of Conduct on Biosecurity'. The KNAW established a working group to perform this task. The presumption underlying the initiation of this activity was that if a Code of Conduct was to have its intended effect, the content had to link-up with relevant scientific, social and political developments and with the daily practice of scientists and their organisations. For that reason relevant actors from science, industry and government were involved in the development of the code from the outset. A focus group of advisors was established to make practical comments and suggestions based on their experience as researchers and policymakers.

For most members of the focus group the issue of intentional misuse of life sciences was new, although they were familiar with questions of biosafety. The reactions and responses of the members of the focus group were comparable with reactions elsewhere in the world:[8] they were not familiar with the risks related to the intentional misuse of biological agents; they were worried that new measures would hamper the progress of research; and were concerned that new measures could affect the freedom to publish results of scientific research. There was also concern about the further bureaucratisation of science and the possibility that the import or export of biological agents from or to colleagues in other countries would be hampered.

The KNAW working group aimed to convince the members of its focus group that a code of conduct was not intended to prescribe new rules, let alone to hamper scientific progress. The main purpose of a code was to raise awareness. The debates that led to the Code of Conduct did begin to foster awareness, albeit still in a rather small circle of scientists. Some of the focus group members organised meetings in their institutes or discussed the issue with colleagues. With the help of the insights that were developed by the stakeholders' suggestions, ideas were identified and then translated into issues for inclusion in the Code of Conduct.

In line with the design of other codes of conduct in the area of biosecurity, it was decided that the KNAW code should be a concise document, which should concentrate on the main issues related to the possible dual use of life sciences research. Thus the Code begins with the statement that:

> The aim of this code of conduct is to prevent life sciences research or its application from directly or indirectly contributing to the development, production or stockpiling of biological weapons, as described in the Biological and Toxin Weapons Convention (BWC), or to any other misuse of biological agents and toxins.

The code of conduct offers rules of conduct and responsibilities of scientists, and gives suggestions for regulation and sanctions on the following issues: awareness raising, research and publication policy, accountability and oversight, internal and external communication, accessibility, shipment and transport. It was considered important that these issues should be elaborated on and applied in laboratories, universities and other relevant institutions. (See Appendix 4.2 for further details).

The KNAW stressed that the code of conduct is not a goal in itself and should not be text that disappears into desk drawers or filing cabinets. After publication of the Code of Conduct, a series of awareness raising activities were organised by the KNAW in collaboration with the Ministry of Science. A number of debates and workshops brought together scientists and other involved parties, such as funding organisations and industry, who were involved in such discussions for the first time. Presentations and publications were delivered to participants on request and audiovisual materials were prepared. These activities were intended to ensure that biosecurity issues became a part of the individual and collective awareness of life scientists, in the same way as biosafety is in the Netherlands. It was also hoped that the cooperation that was sought with the national coordination group of biosafety officials would help to translate and apply the code of conduct in the daily practice of laboratories, research institutes and so on.

Biosecurity and dealing with security risks

It would be naïve to believe that a code of conduct would make abuse of the life sciences impossible. As was said during a 2007 conference of the National Science Advisory Board on Biosecurity (NSABB): 'A code of conduct can make good people better, but probably has negligible impact on intentionally malicious behaviour.'[9] The attention to mitigating the risks of a terrorist attack with biological weapons is understandable in the light of the terrorist assaults in the United States, Spain, Great Britain, and – more recently – India. However, it is important to see the problems in perspective. The chance of an attack with biological weapons is very limited. Recent research in the Netherlands led to the qualification of biological weapons use as a '*low likelihood, high impact risk*' (Bakker 2008, pp. 143–4). In that context a code of conduct may be more effective than more rigorous measures that may hamper the continuation and freedom of scientific research.

In general, the more imminent or probable a threat is perceived to be, the more willing the public will be to accept far reaching security measures to counter it. Any consideration of whether such measures are necessary should start by asking the questions: What are the threats? What is the chance that the threats will be realised? Are the same measures necessary for all kinds of threats? What are possible side-effects of security measures? Since these questions do not always get the attention they deserve, I consider below possible pitfalls in dealing with the issues of biosecurity. These are intended as a more or less provocative mix of empirical and normative considerations with the intention to stimulate further debate.

Tunnel vision

Over the past few years the Netherlands have experienced examples of criminal cases in which prosecutors and police made serious mistakes as a result of what can be termed 'tunnel vision'. In these cases the information gathered by police was interpreted in such a way that it strengthened the belief in the guilt of the suspected offender. Information that contradicted this conviction was neglected. The result was that in several cases innocent people were imprisoned for years (Wagenaar 2002).

What is the risk that such tunnel vision occurs in security policy?

It is conceivable that a focus on security issues can lead to policy issues being subordinated to security issues, or judged only in their relation to them.[10] To give a fictitious, but not unrealistic example from the life sciences, it may be questioned why a student from a Middle Eastern country may wish to come to a European laboratory for his PhD research. The idea that this person may just wish to become a good scientist in order to help his/her country to fighting serious diseases may be set aside by the tunnel vision driven view that he or she could be a potential terrorist or wishes to steal materials. It is possible that the measures taken by Dutch government with regard to preventing Iranian students from studying freely in the Netherlands may be an example of such a tunnel vision.

While awareness of the potential for the misuse of the materials or results of life science research is important, this awareness should not lead to distrust being the default attitude in a laboratory.

Anticipated decision regret

'Anticipated decision regret' is an attitude which leads individuals to take actions that are directed at preventing possible future incidents. It is expressed as 'if I take this preventive measure now, it will mean that I do not have to blame myself (or get blamed by others) for not having done everything to prevent that incident from happening'. This attitude can be seen in healthcare. Increasing numbers of preventive screening tests are offered that provide information about the chance of developing some kind of disease, even though the chance of contracting the disease may in reality be very small. It is also possible that the measures taken to prevent the disease negatively influence the lifestyle of the individual involved. Dutch medical sociologist Tjeerd Tijmstra (2001) provides some – often hilarious – examples of anticipated decision regret: if a pregnant women is offered a screening test for a disease for which the risk is 1 at 90,000, she is likely to agree to the test – even if her doctor explained to her that her chance of having a car accident while driving to the clinic was equivalent to the child having the disease. Her motivation would be that she could not forgive herself if the child did have the disease and she had not done everything in her power to address it.

There are signals that 'anticipated decision regret' has become a prevalent attitude in security issues. After 9/11 security measures to counter potential terrorist attacks were given high priority. It appeared as though some governments were willing to invest a lot of energy in minimising the risk of terrorist attacks because they did not want to take the risk that they had not done everything they could to prevent an assault. This attitude could be the result of past experience. For example, officials of the Dutch government were reproached for not doing enough to prevent the murder of film director Theo van Gogh in 2004. These reproaches led to decisions directed at minimising the chance of new attacks. The creation of a National Coordination Center for anti-terrorism is an example. A good deal of money and a lot of energy are devoted to this issue. Most Dutch citizens found this acceptable, if not desirable. It is not farfetched to suppose that this is one of the effects of 'anticipated decision regret'. Yet it is easy to forget that the chance of becoming a victim of a terrorist attack is still many times smaller than the chance of being killed in a car accident. The chance that a terrorist would use biological agents in the attack is even less likely.

Stigmatisation

The concept of stigmatisation refers to the psychological phenomenon in which the (potential) enemy is often depicted in a way that does not, or only partially, coincides with reality: stronger, more evil, unreliable, more numerous. Often characteristics are attributed to a greater group or to a total country: *the* Russians, *the* Muslims, *the* communists. The evil attributions serve as legitimation for (counter)measures against the enemy. If your adversary indeed is so bad, perverted and wicked, the use of violence against an individual or group presenting the threat is both easily understandable and justifiable. If the enemy is made up of ordinary citizens who wish for a decent and secure life, this only becomes visible after the conflict has ended. In Europe, and elsewhere, this was a lesson learned after the Cold War when it was discovered that Russians were not very different from us.

After 9/11 this stigma appeared to have been transferred to the Muslim community. In such a context crimes and acts of terror by a small group become examples of a generalising stereotype. The decision of the Dutch government to ban all Iranians from nuclear research can be seen as an example of this way of thinking.

Life sciences, politics and security

What relation do these concepts from the world of security and politics have with the life sciences community? Until a few years ago these were two almost completely separated worlds. Historically, in general biologists and other life scientists have not been involved in security politics. The exception has been a relatively limited group of biologists and other life scientists who work in biodefence or who took part in biological weapons programmes. Most of these life scientists did not take part in public debates on biological weapons or weapons of mass destruction more generally. This is unlike physicists who played a part in the debate about nuclear weapons from the beginning.

Although life scientists have a long history of involvement in state biological weapons programmes – both running and starting them

– there has been relatively little debate within the life sciences community about the role of scientists in preventing biological weapons development. It is clear that in relation to the international discussions about biosecurity, it was the political and security communities who took the initiative to involve life scientists, as was the case with the initiative of the Dutch government to ask for a code of conduct on biosecurity.

This absence from the field of biological weapons prevention and related security politics does not mean that life scientists do not have any regard for the social and political aspects of their activities. On the contrary, since the beginning of the era of genetic modification, life scientists have been central to social and ethical discussions about the implications of their work. Well known in this regard is the Asilomar Conference of 1975, where the life scientists decided to maintain a moratorium of some aspects of recombinant DNA research because they could not yet guarantee that this research would not be dangerous.

In spite of the temporary limitations on research, biology and biotechnology developed rapidly after the 1970s. This brought life sciences to the centre of societal and political debates, although not always willingly. Initially biologists were inclined to concentrate their contributions to the public debate on what they saw as the advantages of the new developments: new medicines, more effective ways of producing food and so on. In doing so they neglected the fears of many people about the results of genetic engineering. The consequence was that they were very often surprised by the negative reactions of the public to genetically modified foods.

Life scientists learned fast from this experience. Some became well known in the media, and eloquently presented the case of the life sciences in sometimes complicated and difficult debates about genetics, cloning and stem cell research.

Few in the life science community were familiar with the risks of bioterrorism prior to the anthrax attacks of 2001. Most shocking was that the danger could come from within. This was highlighted by the alleged involvement of Bruce Ivins – a well respected scientist of the United States Army Medical Research Institute of Infectious Diseases (USAMRID) who was suspected by the FBI of being behind the anthrax letters of October 2001. In the United States the Ivins case led to (renewed) attention on what has been referred to as 'biosurety': awareness of the threats that can come from within.[11]

In closing it is worth reflecting on why life scientists and their organisations have become involved in security issues in recent years. Why has biosecurity gained such significance?

Quite clearly the events of 11 September 2001 and the anthrax letters in the same period had a great deal to do with the elevation of the perception of threat. These events raised the possibility that those in the life sciences could be a perpetuator of terrorist attacks.

A second reason, (already referred to above) is the initiative of the BWC State Parties in 2005 to stimulate the development of codes of conduct. The choice of this as a topic for the interim process arose from the efforts of BWC State Parties to propose a range of activities in order to prevent a total crisis for BWC after the failure to negotiate verification measures in 2001. (See Revill and Dando in this volume).

Another important factor is the occurrence of new infectious diseases that threaten humans and animals: HIV/AIDS, SARS and Avian influenza are some of the most well known examples. As noted in the Introduction, some authors – such as Fidler and Gostin (2008: 2) – have referred to naturally occurring infectious diseases as a biosecurity issue. They see this broadening of the concept of security as a way to release it from the 'traditional state centred military-biased perspective' (Fidler and Gostin 2008: 6). They draw on the recently developed concept of 'human security' to defend this view (Human Security Centre 2005).

Increasing awareness among scientists that their work is influenced by globalisation, is an additional factor. Growing international personal and commercial contacts are one of the reasons that viruses can spread rapidly across the world. Globalisation has another consequence: that terrorist activities are no longer limited to regional and local conflicts.

Notes

1 http://www.interacademies.net/CMS/About.aspx
2 http://www.interacademies.net/Object.File/Master/7/952/IAP%20Panel2008.pdf
3 As in the Final document of the Fifth Review Conference of the State Parties to the Convention on BWC (UN 2002).
4 This recommendation is taken seriously by the IAP Biosecurity Working Group, but given its limited possibilities it was not (yet) possible to take action.
5 http://english.nctb.nl/Diverse_vragen_en_antwoorden/CBRN_terrorisme/FAQ_3.aspx
6 To give an example of an irrational reaction: in The Netherlands the story goes that fences were put before the entrance of the Dutch Foreign Ministry. Because as is well known, viruses are stopped by fences!
7 http://www.knaw.nl/pdf/KNAW_letter_Iranian_students.pdf (January 2009)
8 As in the seminars held by Malcolm Dando and Brian Rappert in several countries. See Rappert (2007).
9 International Roundtable conference NSABB (25–27 February 2007). See http://oba.od.nih.gov/biosecurity/biosecurity.html
10 To give an example from Great Britain, where Gordon Brown qualified good education "the best weapon against terrorism" *The Guardian*, 1 January 2007.

Of course this is not necessarily the proof of a tunnel vision, but it can lead to it, if no longer education, but fighting terrorism is the central issue.

11 The concept of biosurety was introduced in debates during an international NSABB Roundtable on biosecurity issues: November 2008 (Bethesda. ML).

References

Bakker E 2008. CBRN terrorisme. In ER Muller, U Rosenthal and R. de Wijk (eds) *Terrorisme*. Deventer: Kluwer, pp. 125–48.

Fidler DP and Gostin LD 2008. *Biosecurity in the Global Age. Biological Weapons, Public Health and the Rule of Law*. Stanford: Stanford University Press.

Guthrie R 2007. Rising out of the Doldrums. Report of the BWC Review Conference Disarmament *Today*, nr. 84 (http://www.acronym.org.uk/dd/dd84/ index.htm).

Health Council (Gezondheidsraad) 2001. *Verdediging tegen bioterrorisme*. Den Haag: Gezondheidsraad

Health Council (Gezondheidsraad) 2002-*Bioterrorisme: vervolgadvies*. Gezondheidsraad: Den Haag,

Human Security Centre 2005. *The Human Security Report 2005. War and Peace in the 21st Century*. New York – Oxford: Oxford University Press.

Kamerstuk 1997–1998, 25600 X, nr. 9, Tweede Kamer.

Kellman B 2007. *Bioviolence, Preventing Biological Terror and Crime*. Cambridge: Cambridge University Press.

KNAW 2007. *A Code of Conduct on Biosecurity*. Amsterdam: KNAW.

NRC (National Research Council) – Committee on Research, Standards and Practices to prevent the Destructive Application of Biotechnology, *Biotechnology Research in an Age of Terrorism*. Washington DC: National Research Council.

Rappert B 2007. *Biotechnology, Security, and the Search for Limits*. London: Palgrave.

Tijmstra T 2001. Het imperatieve karakter van medische technologie en de betekenis van 'geanticipeerde beslissingsspijt' (The imperative character of medical technology and the meaning of anticipated decision regret). Berg M and A Mol (ed.) (2001), Ingebouwde Normen. Medische Technieken Doorgelicht, Utrecht: Van der Wees, pp. 40–5.

UN (United Nations) 2002. *Final Document of the Fifth Review Conference of the State Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* (Geneva, 19 November–7 December 2001 and 11–22 November 2002). Geneva.

Wagenaar W 2002. False confessions after repeated interrogation: The Putten Murder Case. *European Review*, 10: 519–37.

Appendix 4.1

IAP Statement on Biosecurity (December 2005)

Knowledge without conscience is simply the ruin of the soul.

F. Rabelais, 153219

In recent decades scientific research has created new and unexpected knowledge and technologies that give unprecedented opportunities to improve human and animal health and the conditions of the environment. But some science and technology research can be used for destructive purposes as well as for constructive purposes. Scientists have a special responsibility when it comes to problems of 'dual-use' and the misuse of science and technology.

The 1972 Biological and Toxin Weapons Convention reinforced the international norm prohibiting biological weapons, stating in its provisions that '*each state party to this Convention undertakes never in any circumstances to develop produce, stockpile or otherwise acquire or retain: microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic or other peaceful purposes.*'

Nevertheless, the threat from biological weapons is again a live issue. This document presents principles to guide individual scientists and local scientific communities who may wish to define a code of conduct for their own use. These principles represent fundamental issues that should be taken into account when formulating codes of conduct. They are not intended to be a comprehensive list of considerations. These principles have been endorsed by the national Academies of science, working through the InterAcademy Panel, whose names appear below.

1. Awareness. Scientists have the obligation *to do no harm*. They should always take into consideration the reasonably foreseeable consequences of their own activities. They should therefore:

– always bear in mind the potential consequences – possibly harmful – of their research and recognize that individual good conscience does not justify ignoring the possible misuse of their scientific endeavor;

– refuse to undertake research that has only harmful consequences for humankind.

2. Safety and Security. Scientists working with agents such as pathogenic organisms or dangerous toxins have a responsibility to use good, safe and secure laboratory procedures, whether codified by law or by common practice.

3. Education and Information. Scientists should be aware of, disseminate and teach the national and international law and regulations, as well as policies and principles aimed at preventing the misuse of biological research.

4. Accountability. Scientists who become aware of activities that violate the Biological and Toxin Weapons Convention or international customary law should raise their concerns with appropriate people, authorities and agencies.

5. Oversight. Scientists with responsibility for oversight of research or for evaluation of projects or publications should promote adherence to these principles by those under their control, supervision or evaluation.

Appendix 4.2

Code of conduct on biosecurity in The Netherlands

BASIC PRINCIPLES

The aim of this code of conduct is to prevent life sciences research or its application from directly or indirectly contributing to the development, production or stockpiling of biological weapons, as described in the Biological and Toxin Weapons Convention (BWC), or to any other misuse of biological agents and toxins.

TARGET GROUP

The Biosecurity Code of Conduct is intended for:

1. professionals engaged in the performance of biological, biomedical, biotechnological and other life sciences research;
2. organisations, institutions and companies that conduct life sciences research;
3. organisations, institutions and companies that provide education and training in life sciences;
4. organisations and institutions that issue permits for life sciences research or which subsidize facilitate and monitor or evaluate that research;
5. scientific organisations, professional associations and organisations of employers and employees in the field of life sciences;
6. organisations, institutions and companies where relevant biological materials or toxins are managed, stored, stockpiled or shipped;
7. authors, editors and publishers of life sciences publications and administrators of websites dedicated to life sciences.

Rules of conduct

RAISING AWARENESS

- Devote specific attention in the education and further training of professionals in the life sciences to the risks of misuse of biological, biomedical, biotechnological and other life sciences research and the constraints imposed by the BWC and other regulations in that context.
- Devote regular attention to the theme of biosecurity in professional journals and on websites.

RESEARCH AND PUBLICATION POLICY

- Screen for possible dual-use aspects during the application and assessment procedure and during the execution of research projects.

- Weigh the anticipated results against the risks of the research if possible dual-use aspects are identified.
- Reduce the risk that the publication of the results of potential dual-use life sciences research in scientific publications will unintentionally contribute to misuse of that knowledge.

ACCOUNTABILITY AND OVERSIGHT

- Report any finding or suspicion of misuse of dual-use technology directly to the competent persons or commissions.
- Take whistleblowers seriously and ensure that they do not suffer any adverse effects from their actions.

INTERNAL AND EXTERNAL COMMUNICATION

Provide (additional) security for internal and external e-mails, post, telephone calls and data storage concerning information about potential dual-use research or potential dual-use materials.

ACCESSIBILITY

Carry out (additional) screening with attention to biosecurity aspects of staff and visitors to institutions and companies where potential dual-use life sciences research is performed or potential dual-use biological materials are stored.

SHIPMENT AND TRANSPORT

Carry out (additional) screening with attention to biosecurity aspects of transporters and recipients of potential dual-use biological materials, in consultation with the competent authorities and other parties.

Appendix 4.3

Summary of Replies to the Follow-Up Biosecurity Questionnaire

30 January 2008

In order to gain insight about further activities done by academies on the issue of Biosecurity, the 2006 Biosecurity Initiative Questionnaire has been repeated after a year. Again, the list of questions was sent to all member academies of IAP, this time divided into two groups: those who responded to the first questionnaire and those who did not. Of the 94 members of IAP we received 21 replies to the questionnaire, 11 of which were new respondents.

There were 69 signatories to the Biosecurity Statement. Part of the reason for repeating the questionnaire was to urge academies that had not yet signed the Statement, to reconsider doing so. As a result of this reminder, 2 member academies have decided to sign the statement.

Following is a list of some activities academies have undertaken in the field of Biosecurity this past year or are planning for the coming months:

Academy of Sciences of Albania:
– National Scientific Conference of GMO's

Academy of Sciences of Cuba:
– Cuban standard on Biosecurity in development

Israel Academy of Sciences and Humanities
– in preparation: legislation concerning control of dangerous biological agents
– in preparation: report on the issue of Biotechnological Research in the Age of Terrorism

Polish Academy of Sciences
– organized conference on dual use

Académie Nationale des Sciences et Techniques du Sénégal
– national code in preparation
– seminar Biosecurity and National Capacity Building in the Ummah, Dakkar March 2008

Zimbabwe Academy of Sciences
– code of conduct developed

The following are some observations made by respondents that might be interesting to discuss further:

– most African countries do not give high ranking to a possible threat, as they are not involved in making biological and toxin weapons
– international coordination of activities in this area will be extremely valuable
– collaboration and technology transfer between scientists in developing and developed countries might help developing countries to get more involved and raise the awareness
– more seminars, both national and international, should be encouraged and initiated
– restrictions on sharing information can potentially affect some positive developments for alleviating biosecurity issues