Overview of the Lectures in the Education Module Resource

Lecture No. 1

Module Structure

- B. The Threat of Biowar, Bioterror and the International Prohibition Regime
  - Slide 2-10
- C. The Dual-Use Dilemma and the Responsibilities of Scientists
  - Slide 11-18
- D. National Implementation of the BTWC
  - Slide 19-20
- E. Building an Effective Web of Prevention
  - Slide 21

B. The Threat of Biological Warfare (BW) and Biological Terrorism (BT) and the International Prohibition Regime

B2. BW from Antiquity to the First World War

- Pre-scientific biological warfare
  - Slides (1 - 8)
- Initial use of biological warfare
  - Slides (9 - 16)
- The beginnings of scientific biological warfare
  - Slides (17 - 20)

Notes: The aim of this lecture is to begin the process of telling the students about the past misuse of the life sciences for hostile purposes. In short, to reveal the hidden history of their field of study in order that they understand the need for care in the future.

B3. BW from the First World War to the Second World War

- The French Programme
  - Slides 2 - 3
- The British Programme
  - Slides 4 - 11
- The Japanese Programme
  - Slides 12 - 16
- The US Programme
  - Slides 17 - 20

Notes: The aim of this lecture is to review what might be called the second generation of biological warfare programmes. These produced the first effective biological weapons and the first attempts to use modern biological weapons against people.Scientific investigations in this period and lack of accurate intelligence led to effective weaponisation of biological agents by several major powers of the time. Some of these programmes are described.

B4. BW during the Cold War

- At the end of World War II
  - Slides 2 - 3
- The US Programme
  - Slides 4 - 11
- The Anti-Crop Aspect of US Activities
  - Slides 11 - 16
- The Soviet Programme
  - Slides 17 - 20

Notes: The aim of this lecture is to provide a brief overview of important aspects of the offensive BW programmes of the Cold War period. As in previous lectures references are given to current views on key agents. However, the three issues that are picked out are the huge US and Soviet programmes and anti-plant biological warfare. It should be noted that there probably remains much information that is not in the public domain, particularly about the Soviet programme. Also no attention is given here to the early postwar programmes of countries like the UK and France, or to the later programmes of Iraq and South Africa.

In the first half of the Cold War a series of biological agents were weaponised and anti-plant BW was used extensively in Vietnam. In the latter part of the Cold War new viral agents were weaponised and modern methods of manipulation of agents were undertaken.

B5. The Impact of Biological Warfare Agents

- Military Characteristics of BW Agents
  - Slides 2 - 5
- WMD/Strategic BW Attacks
  - Slides 6 - 12
- Production of BW Agents
  - Slides 13 - 16
- Other Types of BW Attack
  - Slides 17 - 20

Notes: The aim of this lecture is to give students a firm basis for understanding the dangers involved if there is a resurgence of offensive biological weapon programmes by discussing some of the numerical data available in the open literature. Openly-available information from credible sources leaves little doubt that in the right circumstances BW and BT could be used across a wide range of scales to devastating effect.

B6. Assimilation of BW through State Offensive Programmes

- The CBW Prohibition
  - Slide 1
- Threats to the Prohibition Regime
  - Slides 2 - 11
- Assimilation in State Programmes
  - Slides 12 - 17
- Bioterrorism
  - Slides 18 -20

Notes: The international community eventually moved in the latter part of the last century to add restrictions such as non-development to the ban on use of CBW embodied in the 1925 Geneva Protocol. We deal in more detail with the BTWC in lecture 7. Here it is important for students to note that despite the addition of other policies such as export controls on dangerous materials in a 'web of prevention' the prohibition is far from secure.

The aim of this lecture is to inform students that previous scientific and technological revolutions have been applied in major ways for both benign and hostile purposes. If modern biotechnology is widely used to produce new forms of weaponry for armed forces in coming decades it could be very dangerous for international security. BT could also become widespread.

B7. International Legal Agreements

- The BW Proliferation Regime
  - Slide 2
- The 1925 Geneva Protocol
  - Slide 3
- The Biological and Toxin Weapons Convention (BTWC)
  - Slides 4-18
- The current situation
  - Slides 19-20

Notes: Life scientists do not need to know all of the fine details about the BTWC and its negotiation history. What this lecture is intended to do is review the main features of the Convention in order that the process of further strengthening of the Convention can be better understood.

B8.Strengthening the BTWC: 1980-2008

- How the BTWC deals with scientific and technological developments
  - Slides 2-6
- The First Review Conference
  - Slides 7-8
- The Second and Third Review Conferences
  - Slides 9-12
- The Fourth and Fifth Review Conferences
  - Slides 13-18
- The Sixth Review Conference
  - Slides 19-20

Notes: The aim of this lecture is to give a thorough introduction to how the State Parties to the BTWC have considered and dealt with the scientific and technological changes that have taken place as the revolution in the life sciences has developed since 1980. In order to do that the main mechanism of consideration and deliberation at the Review Conferences is introduced and then each of the conferences in 1980, 1986, 1991, 1996, 2001-02 and 2006 are considered. There is a wealth of official documentation for this lecture that is easily available on the internet for the students. Efforts to strengthen the Convention through its five yearly Review Conferences and measures agreed at these conferences have proceeded with little involvement or interest from life scientists, but scientists must now understand these processes as they set the context for scientists undertaking their responsibilities.

B9. The First Intersessional Process of the BTWC 2003 – 2005

- Introduction
  -Slides 2-3
- The Collapse of the Protocol Negotiations
  -Slides 4-6
- The Intersessional Process
  -Slides 7-9
- 2003 Meetings
  -Slides 10-11
- 2004 Meetings
  -Slides 12-13
- 2005 Meetings
  -Slides 14-20

Notes: The aim of this lecture is to provide an overview of what has variously been termed (first) “Inter-sessional Process” specifically looking at the new approach taken by the BTWC post 2001 and the role of scientists within this new approach. For interested parties that wish to know more, there is a wealth of official documentation for this lecture that is easily accessible on the internet.

B10. The New Inter-Sessional Process of the BTWC 2007 – 2010

- The First Intersessional Process
  -Slides 2-3
- The Sixth Review Conference
  -Slides 4-8
- The BTWC 2007 Meetings
  -Slides 9-10
- The BTWC 2008 Meetings
  -Slides 11-16
- Expectations for the BTWC 2009 & 2010 Meetings
  -Slides 17-18
- The Future of the Biological and Toxin Weapons Convention.
  -Slide 19
- The Role of Scientists in the BTWC
  -Slide 20

Notes: The aim of this lecture is to provide an overview of what has variously been termed second Intersessional process or the second inter-Review Conference Process of the Biological and Toxin Weapons Convention (BTWC), specifically looking at the role of scientists in the discussions over the course of the meetings up to 2009.

C. The Dual-Use Dilemma and the Responsibilities of Scientists

C11. Ethics - theory to practice

- Outline:
  - **Normative and descriptive ethics**
  - Slides 2-6
  - **Applied ethics**
  - Slides 7 – 12
  - **New bioethics and cultural impacts**
  - Slides 13 – 14
  - **Reviewing and changing our practice**
  - Slides 15 - 21

Notes: This slide serves to introduce the idea of normative ethics – what we "ought" to think is right and wrong.
Explanation about different types of ethics – applied ethics, descriptive ethics, meta-ethics and so on will simply introduce the scope of the various types of ethics that are discussed in philosophy. There is no need to go into detail about all the different types of ethics – the aim here is to situate the role of normative ethics as a philosophical approach to understanding how people come to decisions about what is "right" and wrong".

C12. The Obligations Built into the Biological and Toxin Weapons Convention (BTWC)

- BTWC Regime
  - Slides 2-3
- Role of the Preamble and the BTWC
  - Slides 4-6
- Ethical Responsibilities under the BTWC
  - Slides 7-8
- Practicing BTWC Norms
  - Slides 9-14
- Ethical Norms in Specific BTWC Articles
  - Slides 15-18
- Scientific Background Papers
  - Slides 19-20

Notes: The objective of this lecture is to consider how the internationally envisaged norms against the biological and toxin weapons can be directed towards practical implementation. Ethical responsibilities of scientists and non-scientists can be discharged by: 1, strengthening the BTWC to enhance the global framework against the misuse of science at the international level; 2, implementing national measures under the BTWC and other relevant international regulations at the national level; and 3, promoting ethical awareness of scientists at the individual level in creating and maturing a culture of responsibility.

C13. The Growth of Dual-Use Bioethics

- Dual-use as an ethical issue
  - Slides 2 – 3
- Duties associated with dual-use science
  - Slides 4 – 9
- Tensions in benefit and risk analysis
  - Slides 10 – 12
- Precautionary principle
  - Slides 13 – 16
- Statement on Scientific Publication and Security
  - Slides 17 - 18
- Decision making for dual-use dilemmas
  - Slides 19 - 20

Notes: The aim of this lecture is to introduce students to the ways in which bioethical reasoning may be used to help resolve ethical problems raised by the dual-use dilemma.

CI4. Dual-Use: The Fink Report

- The concept of dual-use
  - Slides 2 - 6
- The Fink Committee Report
  - – Objective and structure of the report
    - Slides 7 - 10
  - – Recommendations of the report
    - Slides 11 - 14
  - – Experiments of concern
    - Slides 15 - 20

Notes: This lecture introduces the concept of ‘dual-use’ in a systematic manner making particular use of the influential Fink Committee report of the US National Academies.

C15. Dual-Use Examples

- Contentious Research
  - Slides 2 - 8
- Mousepox
  - Slides 9 - 14
- Synthesis of Polio Virus
  - Slides 15 - 18
- Virulence in Smallpox
  - Slides 19 - 20

Notes: The aim of this lecture is to look in more detail at the Fink committee's treatment of dual-use in the life sciences and, in particular to review the three examples they give of 'contentious research' in the life sciences. Links are provided to the original papers and to some other papers of interest in considering this issue.

C16. The Lemon-Relman Report

- The Lemon-Relman Report
  - Slides 2 - 7
- The Recommendations
  - Slides 8 - 11
- Assessing Relevant Scientific Developments
  - Slides 12 -20

Notes: The lecture starts with a detailed discussion of the concerns raised by the 2006 Lemon-Relman Committee: that biotechnology of concern is global and that the potential threat is much wider than just from pathogens and toxins. Examples of concern in regard to traditional agent modifications and new types of agent are introduced to illustrate the dangers.

C17. Weapons Targeted at Nervous System

- A Loophole the CWC?
  - Slides 2 - 5
- Some History of Concern
  - Slides 6 - 8
- Hostile Use of Bioregulators
  - Slides 9 - 12
- Attacking the Nervous System
  - Slides 13 -20

Notes: The intention of this lecture is to illustrate the wide range of the life sciences that could be of dual-use concern. Specifically the lecture concentrates on attacks on the nervous system. However, it begins by widening the student's understanding of the nature of the international prohibition by introducing some aspects of the recently agreed Chemical Weapons Convention (CWC).

C18. Regulation of the Life Sciences

- Literature Reviews
  - Slides 2 - 10
- Regulating Synthetic Genomics
  - Slides 11 - 15
- NSABB Proposals
  - Slides 16 - 18
- Controlling Dangerous Pathogens
  - Slides 19 - 20

Notes: The aim of this lecture is to introduce students to the discussions going on about what the life science community might do to reduce the risks of the hostile misuse of their work. The focus is on the control of the research and publication process.

D. National Implementation of the BTWC

D19. The International Regulation on Biotechnology

- Introduction to the international regulation of biotechnology
  - Slides 2-4
- Arms Control
  - Slides 5-8
- Health and Disease Control
  - Slides 9-13
- Environmental Protection
  - Slides 14-15
- Trade
  - Slides 16-17
- Drugs Control
  - Slide 18
- Social and Ethical Impacts
  - Slide 19
- Summary
  - Slide 20

Notes: The international regulation of biotechnology extends across several issue areas, with significant interactions and overlaps between the areas. Information, including the original texts of these regulations can be found online, but in a dispersed and fragmented manner. For this reason the Genomics Gateway Website was constructed. It provides information on the 37 international regulations of relevance to the control of biotechnology as well as associated international organisations, and analysis of regulatory issues.

Notes: To be effective international agreements need to be implemented properly in national legislation. If they are not so implemented the "Web of Prevention" will necessarily be weakened. So the lecture begins by outlining what a lawyer would expect to see in national implementation of the BTWC and what was found a VERTIC 2003 survey of national implementation in different countries (see slide 6). Following on from that basis a set of State Party working papers for the Sixth Review Conference of the BTWC in 2006 are used to assess the state of development then, and to conclude developments at the 2007 intersessional meeting on national implementation are reviewed.

Slide 24

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E. Building an Effective Web of Prevention to Ensure Benign Development

21. Building a “Web of Prevention”

- The Concept of a Web of Prevention.
  - Slides 2-5
- Component Parts of a Web of Prevention.
  - Slides 6-13
- The Future of the Web of Prevention
  - Slides 14-20

Notes: the objective of this lecture is to inform students that there are many ways in which individuals and groups can take effective action at different levels of web of applied policies against the misuse of life sciences.

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