United Nations Office for Disarmament Affairs

Biological Weapons Convention

Relevant science and technology review

Jean Pascal Zanders
Political Affairs Officer
United Nations Office for Disarmament Affairs (UNODA), Geneva

Regional Workshop for Eastern Europe and Central Asia
Implications of developments in science and technology
for the Biological Weapons Convention
Kyiv, Ukraine, 21–22 September 2017

Factors influencing the science and technology (S&T) debates

- Threat perceptions arising from terrorism
- Perceptions of how S&T could lead to new weapons
- Impact of emerging and re-emerging diseases on perceptions of the BW threat
- Perceptions of the BWC as an incomplete disarmament treaty

Threat perceptions arising from terrorism

- Since 1975, > 100 persons have been killed through deliberate disease
  - Most cases involved toxins
  - Most cases were criminal in nature
- Major terrorist BW programmes have been total failures (Rajneesh Cult; Aum Shinrikyo)
  - Rajneeshees provoked highest number of casualties ever
    - 751 infected persons
    - Agent of choice: Salmonella bacteria disseminated in salad bars
    - Goal: Influence local elections; Salmonella attack supported other strategies
  - However, anthrax letters (USA, 2001) demonstrate the potential for low-casualty — high-impact events by an individual (but was an outflow of an official biodefence programme)
  - Most bioterror events do not involve actual agents (hoaxes)
- Key question: Are we framing the issue in the right way?
  - *Bioterrorism*: Use of BW is viewed an end in its own right
    - Focus tends to be on the most destructive agents and growing ease of acquiring them
    - Capacity to inflict harm is attributed not just to groups, but also individuals
    - Most recent S&T developments become focus of concern
  - *Terrorism with BW*: BW are a tool in the pursuit of terrorist ends
    - In other words, BW are one technology among several available to terrorists
    - Question becomes: what marginal benefit over other technologies do BW offer terrorists?
    - This question may explain why we have seen so few incidents and high incidence of hoaxes

Impact of emerging and re-emerging diseases on perceptions of the BW threat

- Infectious diseases are responsible for
  - > 13 million deaths annually (≈ number of fatalities in the Twin Towers attacks on 9/11 every two hours)
  - ¼ of all deaths worldwide
  - ½ of all deaths in developing countries
- 1918: Spanish Flu caused more fatalities worldwide than World War 1
- Emerging diseases: SARS; West Nile Virus; Avian flu (H5N1 and H7N9), Zika
- AIDS in Africa: threat to social fabric of societies
- Ebola in West Africa
  - Fast spread
  - Demonstrated multinational dimensions of a major health crisis
  - Highlighted many issues with domestic preparedness & international response capacity
- Economic impact of non-human disease outbreaks:
  - Swine Fever outbreaks in Taiwan (1994 – 2001)
  - Foot and Mouth Disease outbreak in the UK (2001)

Perceptions of how S&T could lead to new weapons

- Rapid pace of progress
  - New technologies and techniques in genetic engineering (e.g. CRISPR)
  - Each new technology seems to generate its own set ethical and dual-use concerns
    - Loss of sense of capacity to fully assess implications of new technologies and processes
    - Loss of sense of capacity for regulatory controls
  - Concerns about convergence of scientific and technological disciplines enabling new developments
    - Even though this has been a fact in scientific enterprise since 18th century
- Focus on high-risk pathogens
  - Their genetic manipulation raises ethical concerns because of dual-use potential or societal risk
  - Design, approval and implementation of research projects are raising questions at different stages of completion
- Problem of 'deskilling' in genetic engineering
  - Processes in genetic engineering become simpler and cheaper
  - Key question is whether 'deskilling' is *absolute* or relative to overall societal development?
  - If *relative*, 'upskilling' will also be part of the process to manage overall complexity of projects and programmes: Many other skills required to run or manage the so-called simplified tasks
- Increased access to relevant technologies, knowledge and skills
  - Increasing numbers of persons are taking degrees in the various domains of the life sciences
    - Statistically, the possibility of rogue elements increases too
    - Concerns about so-called 'bio-hackers'
  - Formal and informal means of disseminating knowledge (e.g., peer-reviewed journals vs internet)
  - Commercialisation of gene sequences

Perceptions of BWC as an incomplete treaty

- No verification; limited transparency mechanisms
  - Gaps in reporting certain types of treaty-relevant activities
  - Uncertainties about intent of certain programmes involving highly-contagious pathogens
    - Particularly in cases involving accidental releases or unusual outbreaks
  - Proliferation of high-containment laboratories: useful or national prestige?
- No international organisation supporting treaty implementation
  - No central forum for assessing and discussing relevant S&T developments
  - No central platform for organising training and capacity building (e.g. in biorisk management)
  - No centralised assistance to improve national legislative and regulatory mechanisms
- Perceptions became worse after end negotiations (1992) and entry into force (1997) of the Chemical Weapons Convention
  - BWC immediately seen as weak
  - Failure of negotiations towards a legally-binding protocol to upgrade the BWC (1996 – 2001)
  - Intersessional meetings between review conferences have useful information exchanges and discussions but they do not lead to treaty reinforcement or regime development
  - Failure of the 2016 Review Conference: No current work programme agreed (Hopefully in December)

Science & Technology assessment: What does it entail?

- Research & technology development in the life sciences can bring benefits to humanity but also carry the potential for serious harm (= dual-use potential)
  - Save lives (e.g. new medicines; new insights into life processes; agriculture; societal development)
  - Cause harm (e.g. certain genetic modifications of pathogens; environmental impacts of genetically modified organisms in agriculture)
  - Deliberate disease (design as weapons against humans, animals and plants)
- How does one assess and address the dual-use potential in the life sciences?
  - Assessment of immediate issues in current science & technology undertakings
  - Identification and assessment of issues for their medium and long-term implications
  - How to prevent (inadvertent?) harm in a general societal context?
    - Who should be targeted?
    - What policies & actions should be adopted (e.g. education, licensing, restrictions on research design or result publication)?
  - How to prevent the securitisation of health, and therefore of the life sciences?
- How do these elements relate to the BWC?
  - The questions concerning the governance of science & technology and ethics in research cover many activity areas and different research projects
  - How do we view the relationship to the BWC of individual issues, i.e. the prevention of misuse for hostile purposes (armament, war, terrorism, ...)?
    - Direct concerns?
    - Indirect concerns?

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Contact

Jean Pascal Zanders
Political Affairs Officer
UN Office for Disarmament Affairs (Geneva Branch)
Room C.1-1, Palais des Nations, CH-1211 Geneva 10

Tel: +41 (0)22 917 4460
Mob: +41 (0)76 691 0585
Fax: +41 (0) 22 917 04 83
jzanders@unog.ch