

Chem & Bio non-proliferation

Workshop on the Export Control of Dual-use Materials
and Technologies in GUAM Countries

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Chem & Bio are different

BWC & CWC prohibitions are defined by purpose

Article II. Definitions and Criteria

1. "Chemical Weapons"

- (a) Toxic chemicals and their precursors ... except purposes
- (b) Munitions and devices , specifically designed to cause death or other harm through the toxic properties...
- (c) Any equipment specifically designed for use directly in connection ...

2. "Toxic Chemical" means:

Any chemical which through its **chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals**. This includes all such chemicals, **regardless of their origin or of their method of production**, and regardless of whether they are produced in facilities, in munitions or elsewhere.



Circe poisoning the sea by John William Waterhouse (1892)

Chem & Bio are different

BWC & CWC prohibitions are defined by purpose

Article I - BWC

(1) 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, protective or other peaceful purposes;**

(2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.

Article II of the CWC & Article I of the BWC contain what is called the **General Purpose Criterion** – not 'things' but 'uses' are prohibited

Sufficiently broad to accommodate evolving technology



Chem & Bio are different

CWC provides in its annexes lists of chemicals to aid implementation

(however, scope defined by purpose)

BWC lacks such explicit, internationally shared and agreed lists

Both have supplemental mechanisms, agreements, instruments

– as covered by **Angelo Minotti**

Web of Prevention: “multiple overlapping measures to ensure that all potential stages or aspects of research, development and production are protected from misuse”

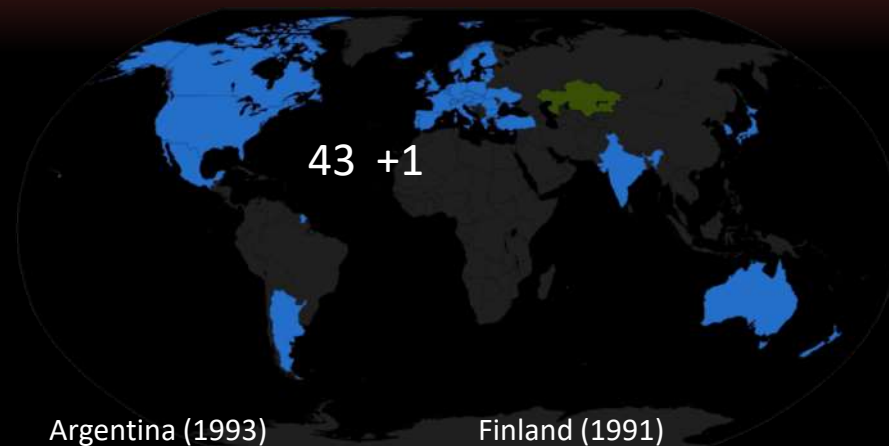
– as covered by **Richard Guthrie**



Australia Group

Shared commitment to CBW non-proliferation
and national measures

– not legally binding



Chemical Weapons Precursors

Dual-use chemical manufacturing
facilities and equipment and related
technology and software

Dual-use biological equipment and
related technology and software

Human and Animal Pathogens and
Toxins

Plant pathogens

Argentina (1993)	Finland (1991)
Lithuania (2004)	Republic of Turkey (2000)
Australia (1985)	France (1985)
Luxembourg (1985)	Romania (1995)
Austria (1989)	Germany (1985)
Malta (2004)	Slovak Republic (1994)
Belgium (1985)	Greece (1985)
Mexico (2013)	Slovenia (2004)
Bulgaria (2001)	Hungary (1993)
Netherlands (1985)	Spain (1985)
Canada (1985)	Iceland (1993)
New Zealand (1985)	Sweden (1991)
Croatia (2007)	India (2018)
Norway (1986)	Switzerland (1987)
Czech Republic (1994)	Ireland (1985)
Poland (1994)	Ukraine (2005)
Denmark (1985)	Italy (1985)
Portugal (1985)	United Kingdom (1985)
Estonia (2004)	Japan (1985)
Republic of Cyprus (2000)	United States (1985)
European Union (1985)	Latvia (2004)
Republic of Korea (1996)	Kazakhstan (2015)

Chem & Bio are different

Multiple ways of making chemical & biological agents

Biological agents make and unmake themselves and evolve

Harvard, E.coli, acquisition anti-biotic resistance

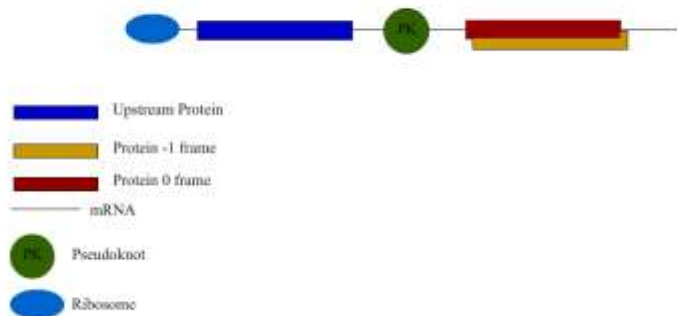


Chem & Bio are different

There are ways of hiding signatures

e.g. ribosomal frameshifts

Pseudoknot no induced programmed ribosomal frameshift



Pseudoknot inducing a programmed ribosomal frameshift

