# The Ongoing Challenge of Controlling Chemical Weapons

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# What is chemical warfare?

- **Intentional application for hostile purposes of toxic substances against humans and their environment**

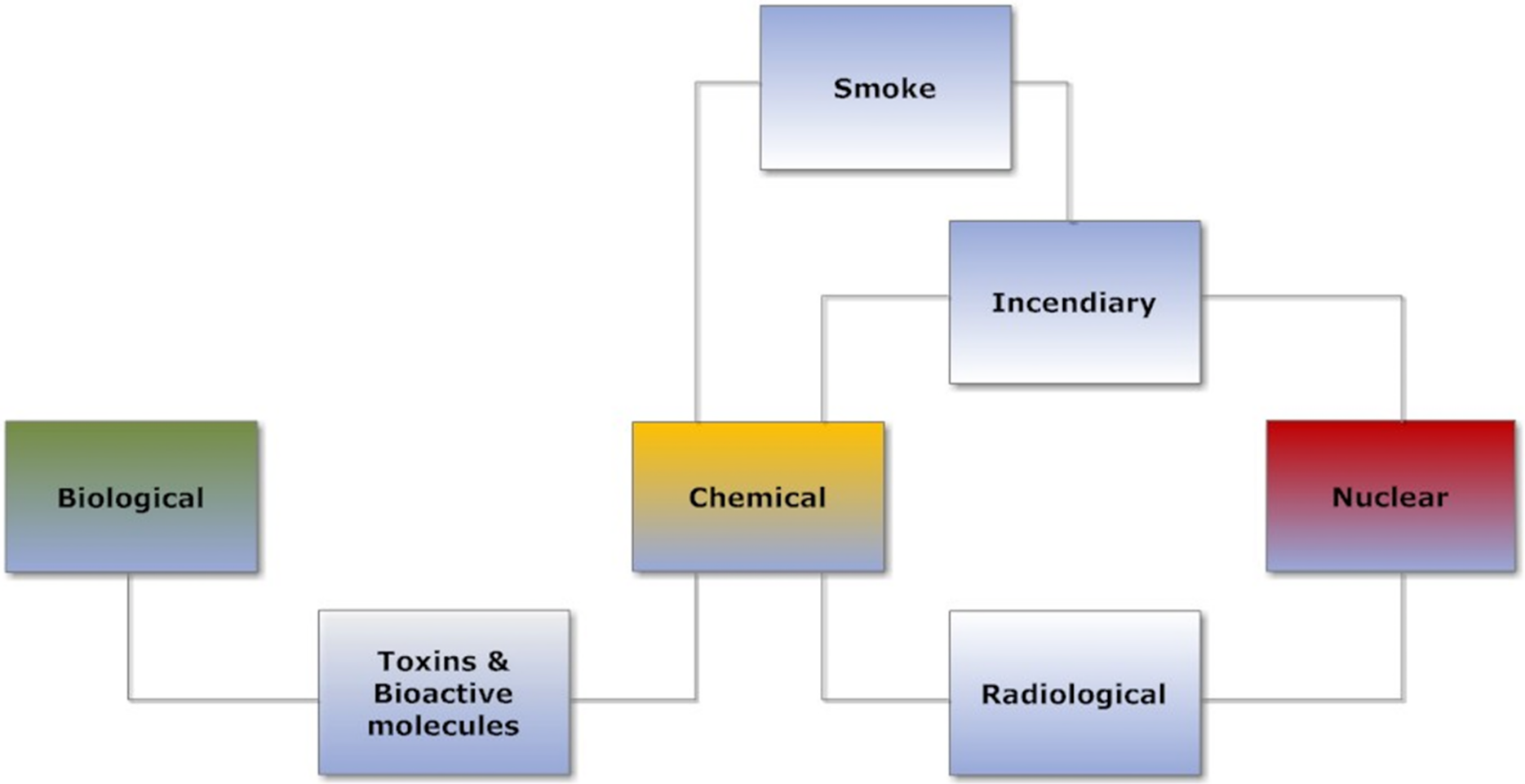
- **Chemical weapons are separately or together**
  - ***Poisonous substances*** in the form of a gas, liquid or solid
  - The ***delivery system*** (Bomb, grenade, shell, missile warhead, landmine, aerosol generator, barrel bomb, …)
  - Any ***specific equipment*** required to make chemical warfare possible (e.g., munition filling equipment)

# The CW threat spectrum

- **War scenarios**
- **Terrorism**
- **Criminal acts**

- **Each will consider and have the availability of different chemical agents, with different degrees of toxicity**
  - Depends on ***intent***
  - Depends on ***availability***
  - Depends on ***technical skills*** and ***structure*** of the organisation

# Non-conventional weapons



# Types of chemical warfare agents

- ***Blood agents***: prevention of oxygen transfer to tissues (e.g., phosgene)
- ***Choking agents***: interfere with breathing (e.g., chlorine)
- ***Incapacitating agents*****:** induce temporary physical disability or mental disorientation (e.g., LSD, BZ, carfentanyl)
- ***Irritating agents***: induce temporary irritation (e.g., tear gas, pepper spray)
- ***Nerve agents***: attack the central nervous system (e.g., sarin, VX)
- ***Vesicants***: produce blisters (e.g., mustard agents)

- ***Anti-plant agents***: herbicides, growth inhibitors or accelerators, etc.

# 22 April 1915: Confluence of several trends – 1

- **Emergence of chemistry as a science**
  - End 18th century; rapid development in 19th century
  - Development of new analytical and production methods
  - Toxic chemicals are manufactured; not derived from nature

- **Discovery and synthesis of new chemicals**
  - ***Chlorine***: first preparation in 1774
  - ***Phosgene***: first synthesised in 1811
  - ***Mustard gas***: compound and its effects first described in 1860

# 22 April 1915: Confluence of several trends – 2

- **Industrialisation**
  - Second industrial revolution in the 2nd half of the 19th century
  - Commercial application of chemistry
  - Integration of science and large-scale production based on economic rationale
- **Education**
  - Permeation of science and technology throughout society
  - Impact on problem identification, analysis, and application of technical solutions in all sectors of society
- **1st World War**
  - Industrialisation of warfare (total war)
  - Forced integration of science, industry and military art

# CW control after WW1

- **Different policy preferences compared to today**
  - Proliferation of CW was preferred policy option
    - Sale to countries without production capacity in WW1 (e.g., France & GB to Belgium and USA)
  - Threat perceptions in Europe
    - Disproportionate accumulation of CW capacity by one state rather than number of countries with CW
    - Assistance with 2nd-tier power CW programmes
      - E.g., France to Belgium in 1920s & 1930s
  - Technological innovation driver of fears
    - Development of strategies for aerial warfare, including massive bombardment of cities
    - From early 1920s until WW2: chemical bombs seen as ultimate weapon against cities (cf. NW today)
- **1922 Washington Conference: Chemical warfare almost legitimised**
  - 5 Powers: France, Italy, Japan, UK, USA
  - Objective: controlling weapon technologies that matured in WW1 (e.g., aeroplane, submarine, gas, etc.)
  - Context:
    - Deep disappointment that laws of war (humanitarian law) could not prevent the carnage in Europe → value questioned
    - Fast technological progress challenged goal of restraining use of weaponry in war
  - Chemical warfare
    - Proponents of chemical warfare posited it was a humane method of combat
    - Opponents could not see how humanitarian law could control legitimate uses of toxic chemicals (dual-use problem)
    - Chemistry was developing too fast for regulation
    - Hence, committee proposal to authorise chemical warfare with exception of bombardment of cities (basic principle)
  - Overruled by former US Secretary of State Elihu Root → Treaty banning submarines & gases
    - Never entered into force

# Towards the Geneva Protocol

- **Conference for the Supervision of the International Trade in Arms and Ammunition and in Implements of War (League of Nations, May – June 1925)**
  - US proposal to *'prohibit the export from their territories of any such asphyxiating, poisonous or other gases, and all analogous liquids, intended or designed for use in connection with operations of war'*
  - Practical problem: several '*asphyxiating, poisonous or other gases*' had widespread legitimate industrial & commercial application
- **Dual-use problem could not be resolved → Proposal for protocol banning use in war**
  - Moral imperative as issue of gas had been raised in diplomatic forum
  - Drew on language from 1899 Hague Declaration (IV, 2) & 1922 Washington Treaty
  - 'Protocol' was agreed in anticipation of comprehensive disarmament treaty to be negotiated by League of Nations

# Discovery of 'dual use'

- **French immediate reaction when welcoming US proposal:**
  - *Need "to define, if possible, the characteristics of gases and chemicals which cannot be utilised in war, or of those which can be utilised both for warlike and non-warlike purposes."*
- **Top scientists set to task, but Military Technical Committee reported back:**
  - *'Such substances are not by any means rare; the majority are common materials ordinarily manufactured and employed in large quantities for peace-time requirements, so that there is very little difference between the manufacture of pharmaceutical products and that of injurious substances used in war.'*
- **Fear that trade ban would place non-producing countries at major security disadvantage**
  - Conclusion was consonant with contemporary threat perceptions in Europe
  - Contemporary proliferation policies eliminated ***discrimination*** based on a state's level of technological development

# 4 critical issues to resolve

- **Late 1920s: to prevent chemical warfare, peacetime preparations had to be prohibited**
  - Diplomats had to tackle the 'dual-use' problem head on
  - In May 1932: report by the Special Commission on CBW offered solutions → contained the foundations of what is now known as the

***General Purpose Criterion***

- **Definition of 'chemical weapon'**
  - ***Rejection*** of circumscription based on 'toxicity' or 'lethality'
  - ***Rejection*** of circumscription based on chemical composition
  - Need to ***capture*** all toxic chemicals (including 'tear gas'), present and future
    - Focus on physiological impact on living organisms
    - Emphasis on 'all' toxic chemicals → ***no exceptions to definition***
- **Ban on the application of ('all') toxic chemicals became *default* position**
  - A limited number of ***purposes*** were identified to be legitimate applications, and therefore explicitly 'exempted' from the general prohibition
- **Defence and protection against CW was to be authorised**
  - CW development, production and stockpiling for '***deterrence***' not

# British draft convention (16.03.1933)

- **Article 52**
  - In order to enforce the aforesaid general prohibition it shall in particular be prohibited:
    - (1) To manufacture, import, export or be in possession of appliances or substances *exclusively suited* to chemical or incendiary warfare.

      The quantities of chemical substances necessary for *protective experiments, therapeutic research and laboratory work shall be excepted*. The High Contracting Parties shall inform the Permanent Disarmament Commission of the quantities of the said substances necessary for their protective experiments.

      The manufacture of and trade in these substances may not be undertaken without government authorization.
    - (2) To manufacture, import, export or be in possession of appliances or substances suitable for *both peaceful and military purposes* with intent to use them in violation of the prohibition contained in Article 48.
    - (3) To instruct or train armed forces in the use of chemical, incendiary or bacterial weapons and means of warfare, or to permit any instruction or training *for such purposes* within their jurisdiction.

# Lasting impact of the Geneva Protocol

- **Laid the foundation for *disarmament* (rather than arms control & non-proliferation)**
  - 'No use' pushed CW to the margins of military doctrine
  - Principles apply to all states parties, without discrimination
  - Technology was not forgotten, but how to use it in war gradually was
    - Gas discipline levels of WW1 were never achieved again
    - No commander could afford gas attrition rates of WW1 ever again
- **Nuclear weapon *disarmament*: possible impact of a *General Purpose Criterion***
  - E.g., all enrichment activities would be prohibited, except for non-prohibited purposes → impact on ***nature*** of verification activities
  - No haggling over number of centrifuges, given the default condition of prohibition
  - No need to differentiate between peaceful applications and possible weapon dimensions
  - Same basic solutions would apply to all countries, incl. nuclear-weapon states, nuclear-armed states, and threshold states (non-discrimination principle)
  - ***BUT***: ban on 'use' is the precondition for the GPC to work → delegitimises weapon

# Chemical Weapons Convention

- **A disarmament treaty**
  - Bans development, production, possession and use of CW
  - Global
  - Equal rights and obligations for all states parties
- **Status**
  - 192 states parties
  - Four states must still join:
    - Egypt, Israel, North-Korea, South-Sudan
    - State of Palestine? (Joined the NPT in February 2015)

# CWC: organisation of compliance

- **Functions on the basis of the General Purpose Criterion**
  - Covers all toxic chemicals (past, present ***and*** future)
- **Organisation for the Prohibition of Chemical Weapons (OPCW)**
  - International organisation overseeing implementation of and compliance with ***all*** treaty articles
  - Has ***autonomous responsibility*** for detecting non-compliance and restoring compliance
- **Mechanisms to:**
  - Generate transparency ⇛ declarations
    - States parties must declare all past and present CW-related activities within treaty-specified parameters
    - Any unreported or erroneously reported activity is violation of CWC (but not necessarily deliberate)
  - Address anomalies
    - Consultations
    - Clarification requests
    - Challenge inspections
    - Investigation of alleged use of CW

# Trends in the chemical threat

- **Cold War**
  - USA (1990): 30.000 agent tonnes
  - USSR (1990): 40.000 agent tonnes
- **Iraq (Gulf War)**
  - Multiple thousands of agent tonnes
- **Syria**
  - 1,300 tonnes of precursor chemicals
  - ± 20 tonnes of mustard agent
- **Libya**
  - ± 26 tonnes of mustard agent
  - Precursor chemicals
- **Terrorism**
  - A few kilogrammes
  - Opportunistic use of industrial toxic chemicals

# CW attacks in Syria

- **CW allegations mounting during 1st half of 2013**
  - 21 March: UNSG accepts Assad's request for an investigation of alleged use
  - August: UN team (OPCW + WHO) finally arrives in Damascus after much haggling
  - Team uses OPCW operational procedures for CW investigation and OPCW-certified reference laboratories
- **CW attacks against Ghouta (Damascus), 21 August 2013**
  - Change mandate UN investigative team
  - Preliminary report, 16 September (Ghouta only)
  - Final report, 12 December (also includes originally mandated investigations of allegations and some post-Ghouta allegations)
  - Outcomes:
    - Reports do not apportion blame
    - Ghouta: strong suggestion responsibility Syrian government
    - Earlier attacks: confirmation of sarin use in some of them; other evidence very limited
    - Still some open questions
- **Chlorine attacks (spring – summer 2014; 2015)**
  - Confirmed by OPCW investigations
  - As good as certain that Syrian government forces are responsible
  - Some unconfirmed claims of ISIL use (mostly in Iraq)
    - One as good as confirmed by OPCW investigation

# Opportunistic use of toxic chemicals

- Syrian use of barrel bombs with chlorine
  - OPCW investigated & confirmed allegations
  - February 2015: OPCW EC decision condemning chemical warfare in Syria (1st in a CWC state party)
  - March 2015: unanimous UNSC condemnation
  - UNSC Resolution 2235 (2015): Established OPCW – UN Joint Investigative Mission (JIM)
    - Determine criminal responsibility
    - Role for International Criminal Court?
    - How to proceed?
- ISIL allegations of CW use
  - AQI bombing campaign with chlorine (October 2006 – June 2007)
  - Syria: skin irritant report from Kobane area (August 2014)
  - Several chlorine reports from Iraq (September – October 2014)
  - Today: reports of chlorine and mustard agent (confirmed by OPCW)
  - Trend towards technology development for delivery systems?
- Challenges
  - How to investigate? Who requests investigation?
    - CWC: territory not under government control → UNSG's investigative mechanism
  - Kobane scenario: non-state actor against non-state actor on territory of CWC state party, but not under control of that state party
  - OPCW: strategies for chemical safety/security in conflict zones?
    - Preventive infrastructure protection strategies?

# Future challenges for CWC

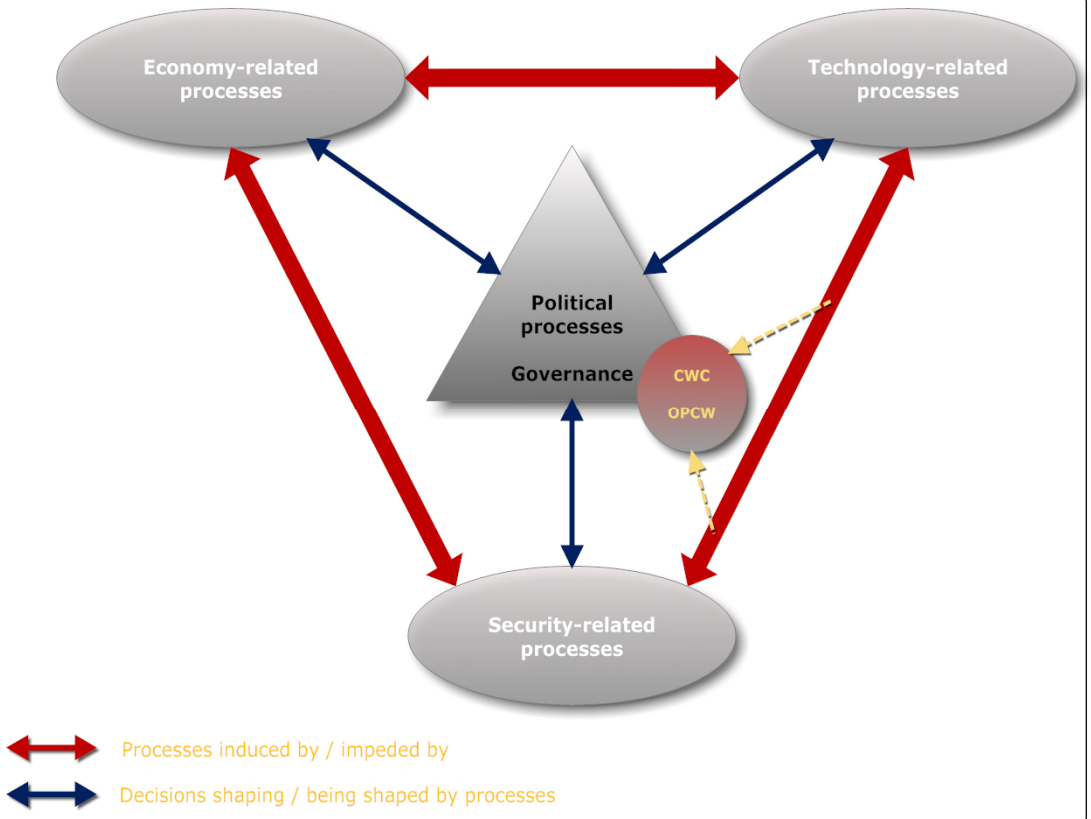
- **CWC of unlimited duration ≠ perpetual**
  - ***Challenge***: How can the CWC retain its relevancy for States Parties after destruction of declared CW?
- **Disarmament**
  - Backward-looking dimension
    - Destruction of existing stockpiles and weapon-related equipment
    - Destruction or conversion of production installations and other infrastructure
  - Forward-looking dimension
    - Prevention of future armament
    - Governance of relevant dual-use technologies
- **Transition phase between the two dimensions**
  - CW destruction deadlines: 2007 / 2012 missed
  - Destruction operations in USA & Russia likely until ± 2022
  - 10-year transition phase for OPCW to adapt to future challenges

# New confluences in science and technology

- **Convergence of several scientific and technological domains:**
  - Biology and chemistry
    - Development of new generation of incapacitating agents
    - Manipulation of biochemical processes on sub-cellular levels
  - Nanotechnology
    - Construction of artefacts on the level of individual molecules or atoms
    - May also be useful for new CBW defence technologies, protection or detection
  - Informatics
    - Computer-assisted creation of new compounds and study of their properties
    - Increasingly fast design of new molecules / gene sequences: 250,000 new genes sequenced/day; 15,000 new chemicals registered (CAS)/day
    - Simulation of processes
  - Engineering and process designs
- **Evolution of production processes:**
  - Modular production processes → may pose challenges for verification thresholds
  - Computer-steered production processes: consistent quality, reduced need for cleaning or interruptions for feeding (e.g., incubation or fermentation processes)

# The post-proliferation governance challenge

- No unified model for governance of weapon control anymore
- States do not drive the processes anymore; they can steer in a limited way
- New stakeholders and security actors
- Increased role of non-state national & transnational actors
- Declining role of states in shaping developments
- Shifting relative balances of powers (economy, politics, military) and multiple power centres
- Geographical decentralisation of business and industry activities
- South-south trade patterns and impact on technology diffusion
- Etc.



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