A short history of bioterrorism

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Are we ready for the next bio-threat, - natural, accidental or deliberate?

Symposium & Workshop
Friday 19 – Saturday 20 August 2011
Westmead Education & Conference Centre
“Those who cannot remember the past are condemned to repeat it”

George Santayana (1905)
Bioterrorism

- “.......acts or threats of violence of national concern, calculated to evoke extreme fear for the purpose of achieving a political objective in Australia or in a foreign country”

(National Antiterrorism Plan 1995)
Early bioterrorism

- Contamination of water supplies (cadavers)
  - 700 BC to 1800s (American Civil War)
- Projectile weapons - Middle Ages until 20th C
  - Arrows poisoned with blood/faeces
  - Catapult/trebuchet
    - cadavers, animals,
    - human waste

Image from an illuminated manuscript depicting an 11th century Byzantine siege of a citadel
“...In 1346, ...... the heathen Tartar races, ...... invested the city of Caffa and besieged the trapped Christians there for almost three years. ...... But behold, the whole army was affected by a disease which overran the Tartars and killed thousands upon thousands every day. .... swellings in the armpit or groin caused by coagulating humours, followed by a putrid fever......

Narrative of Gabriele de’ Mussi
In Wheelis, 2002 [http://www.cdc.gov/ncidod/EID/vol8no9/01-0536.htm]
Siege of Caffa - plague

“The dying Tartars ...... ordered corpses to be placed in catapults (trebuchets) and lobbed into the city in the hope that the intolerable stench would kill everyone inside. ..........The scale of the mortality and the form which it took persuaded those who lived, weeping and lamenting, ......that the last judgement had come.

Wheelis, 2002 http://www.cdc.gov/ncidod/EID/vol8no9/01-0536.htm
“...among those who escaped from Caffa by boat were a few sailors who had been infected with the poisonous disease......... When they reached ... Genoa, Venice and other Christian places and mixed with the people there........ death entered through the windows, and as cities and towns were depopulated their inhabitants mourned their dead neighbours.”.

Wheelis, 2002 http://www.cdc.gov/ncidod/EID/vol8no9/01-0536.htm
17th & 18th centuries

North & South America
Spanish and British colonists distributed smallpox-contaminated blankets to Aztecs and native Americans as a “goodwill” gesture.

Eitzen & Takafuji 1997
http://www.vnh.org/MedAspChemBioWar/chapters/chapter_2.htm
20th century

World War 1
German army attempted to infect Allies’ horses and mules, with glanders & anthrax bacteria in sugar cubes

Redmond et al 1998
1925 Geneva Protocol

- Prohibited **use** of biological weapons
  - **But did not prohibit:** possession, research, stockpiling
  - “No-first-use” agreement
Japan 1930-45

• Unit 731 & others (Manchuria, China)
  – human, animal, plant pathogens & toxins
• 10,000s prisoners & Chinese civilians infected
  – plague, typhoid, cholera
  – contaminated water; infected fleas; aerial attack
  – anthrax-contaminated chocolates
• Exposed during war crimes trials (1949)

Other countries

• USA 1940s Camp/Fort Detrick
• Germany, France, Britain, Canada, Russia
Post World War II

- USA – retaliatory capability, research
  - Expanded 1950s-60s; numerous agents
  - Human experiments (volunteers)
    - tularaemia; Q fever
  - Simulated “attacks”
    - *Serratia marcescens, B. globogii* spores
      - San Francisco Bay; Washington airport; NY subway
    - Mosquitoes - Florida, Georgia
- Public and international distrust
  - Disbanded 1969
1972

“Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biologic) and Toxin Weapons and on their Destruction (Biological Weapons Convention or BWC) Treaty”

• 100 signatories (now 140) including:
  – USA, Soviet Union, Iraq etc.
• References to inspection, verification & control – deleted (unacceptable to Soviet Union)
• Allowed research on “prophylactic, preventive or other peaceful purposes”
Sverdlovsk, USSR, 1979

April 4 - May 1979 (6 wks)

- Inhalational anthrax epidemic/epizootic
- Claimed due to contaminated meat ......
- USA suspected violation of BWC
  - ?Massive explosion; ?,1000s of deaths
- ~100 cases; >64 deaths
**Sverdlovsk incident**

- 1992 President Boris Yeltsin –
  - (Communist Party Chief in Sverdlovsk in 1979)
  - admitted incident due to an accident at bioweapons facility

- Investigation by Matthew Meselson:

- “Most people who contracted anthrax worked, lived, or attended daytime military reserve classes during the first week of April 1979 in a narrow zone, with its northern end in a military microbiology facility in the city” *(Military Compound 19)* “and its other end near the city limit 4 km to the south; livestock died of anthrax in villages located along the extended axis of this same zone, out to a distance of **50 km**”.

Matthew Meselson, *et al*; *Science* 266, 18 Nov., 1994; 1202-8
Sverdlovsk incident

• Due to accidental release of ?? ~100 gm spores (disputed)
  – failure to replace clogged filter
• Highly refined – traveled 50 Km

• Information provided by defecting scientists – 1990s
  – e.g. Dr Kanatjan Alibekov (Ken Alibek)
  – Former Chief Scientist & Deputy Director of Biopreparat

One of 10 4-storey fermenters in Military Compound 19
Soviet Union – biological weapons research

• Biopreparat established 1973-4
  – Employed >60,000 scientists; 38 facilities
  – Genetically-modified antibiotic resistant bacteria
    • stabilised; weaponised
    • large scale production/distribution capability
  – Scaled back in 1990s
    • ? Current status; scientists? seed stocks?
USA 2001

- Anthrax
  - 11 pulmonary/5 deaths; 11 cutaneous
- Letters containing anthrax spores
- Hundreds of mail handlers exposed
  - Given prophylactic antibiotics
- Suspected source:
  - biodefence researcher, Fort Detrick
    - US Army Medical Research Inst. Infect Dis.
- Triggered another “disaster”
  - “white powders”
Bioterrorism 2001 - fallout

• 100,000s of “white powder” events
• Deficiencies in “disaster” response exposed
• Positive outcomes
  – improved procedures
  – greater laboratory/microbiological security
  – resources (opportunities)
• Proposed/actual emergency powers
  – potential threats to civil liberties
What have we learnt?

• Biological agents are “attractive” weapons
• Have been used for centuries
  – But with limited “success”
• Easy to obtain (or used to be)
  – Can be mass-produced, genetically modified & weaponised (e.g. as by Soviet Union & USA)
    • but hard to hide; expensive national program needed
    • small scale attacks (if any) most likely
• Vigilance, preparedness planning & rapid response will minimise damage
• CIDM, Emerging Infectious & Biosecurity Unit (EIBRU)
• Sydney Emerging Infectious & Biosecurity Institute (SEIB)