



Canadian Conference on
Counter-Terrorism and
Public Health

October 29 - November 1, 2003
Toronto, Ontario

Minister Groom

Conférence canadienne
sur la santé publique
et la lutte contre le terrorisme

Du 29 octobre au 1^{er} novembre 2003
Toronto (Ontario)

Thank you - invitation - opportunity to renew acquaintances with very special colleagues from Com naught Labs (now Aventis Bio Secur) who played vital roles in both smallpox and polio eradication - roles for which they have never been fully and properly acknowledged. And an opportunity to learn more of your experiences with SARS. Members of my staff both from Johns Hopkins and government have visited you and all have come back - deeply impressed by the competence, dedication and capabilities of all concerned. The most straightforward compliment I can pay you is to quote them: "I doubt there are more than 2 or 3 cities in the U.S. that could match the performance of those in Toronto. This pleased me greatly - as one whose roots are totally Canadian. My parents came to the States shortly before I was born - the one renegade branch of the staunchly Canadian clan of Hendersons and McMillans. The down side of this was a still memorable taunting I endured from my Canadian cousins about the fact that



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at Niagara Falls, The Canadian falls are substantially larger than the American falls. But, what is not recorded in the annals is that during my years with WHO in the smallpox program - more than once, faced with some ridiculously contrived administrative barrier and questions of a big-brother bureaucracy, I was able to explain that I really wasn't American - I was Canadian - and I understood the problems of trying to sleep in a bed with a restless elephant. Today asked to speak on: Bioterror and Public Health. ^{Now} ~~It~~ skins are being raised as to why we are concerned to his weapons. Why now? And why now especially, given the fact that no weapons have been found in Iraq. Fair questions. Let us revisit the concerns and the issues.

Bioterror and Public Health

how we got here

Counter-Terrorism and Public Health
Toronto, Canada

D.A. Henderson M.D., M.P.H.
October 31, 2003

Biological Weapons

- A threat, largely ignored until 1995
 - Too difficult to grow organisms
 - A problem to disseminate
 - A moral barrier against use

Biological weapons – 20th C.

- 1940-44 – Japanese Army – Unit 731
 - **Attacks on Chinese cities**
Anthrax, botulism, brucellosis, cholera, dysentery, gas gangrene, plague, paratyphoid, typhoid
- 1942-- ? Soviet use of Tularemia at Stalingrad
- Research and Development Programs in major countries -- incl. US, UK, Canada, France, Australia, USSR

Biological weapons

1972 – A watershed year

- Biological Weapons Convention –1972
 - Countries pledged to destroy weapons and cease research on offensive weapons
 - Signed by US, UK, USSR, Canada, Iraq, et al
- Medicine and Public Health
 - Activity of any sort re:biological or chemical weapons shunned
 - Little research on exotic diseases that are prime candidates for use

1995 Critical Events

Iraq

- Hussein Kamal deserts
 - Research reports reveal a much more extensive and sophisticated program than UNSCOM had uncovered
- Concern: If so much activity could continue undiscovered despite intelligence, how many other countries might be similarly engaged?

1995 Critical Events

Aum Shinrikyo (Japan)

- Religious cult releases Sarin gas in Tokyo subway
 - Cult - previously unknown to intelligence
 - Thousands of members, well-funded
 - Aerosolized anthrax and botulinum toxin throughout Tokyo at least 8 times
 - Organized team to Congo to obtain Ebola virus
- Concern – unknown, non-state sponsored organization, acting without concern for moral deterrents

1995 Watershed Events

USSR

- 1972 - Bioweapons Program intensified
- 1989 - First knowledge of Program in West
- 1992 - Ken Alibek, Deputy Director of USSR Program, deserts to US
- 1992 - President Yeltsin admits that USSR has a program

Criterion Rating of Bioagents

Anatoliy Voroboyov - April 1994

■ Smallpox	26 (31)
■ Plague	23
■ Anthrax	21
■ Botulism	21
■ VEE	20
■ Q fever	20

On U.S. list of Class A agents

"On May 8, 1980, WHO announced that smallpox had been eradicated from the planet... Soon after the WHO announcement, smallpox was included in a list of viral and bacterial weapons targeted for improvement in the 1981-85 Five-Year Plan....Where other governments saw a medical victory, the Kremlin perceived a military opportunity...the military command issued an order to maintain an annual stockpile of 20 tons (of smallpox virus)."

Alibek, 1998

Deaths in the 20th Century

Due directly or indirectly to armed conflict:

100,000,000

Due to smallpox

300,000,000+

"That disease was the most terrible of all the ministers of death. The horror of the Plague...visited our shores only once or twice within living memory but the smallpox was always present, filling the churchyards with corpses...and making the eyes and cheeks of the betrothed maiden objects of horror to the lover."

Macauley

Sitala Mata



Sapona



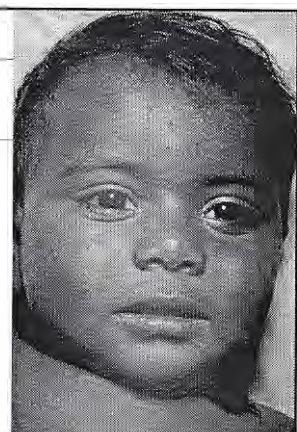
Smallpox -- characteristics

- Incubation period is 10-12 days
- Severe flu-like symptoms then rash
- Case fatality rate -30 % in unvaccinated
- No therapy available

Day 1



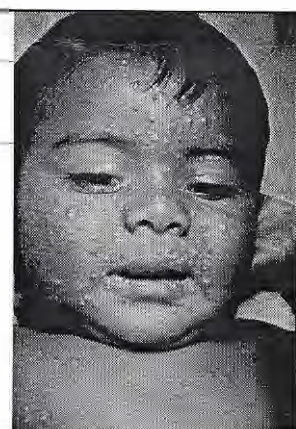
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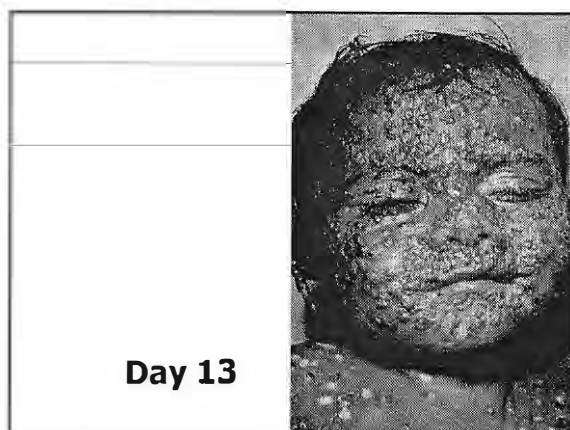
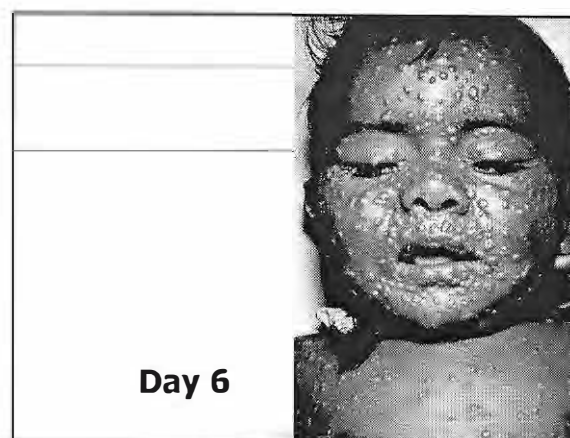
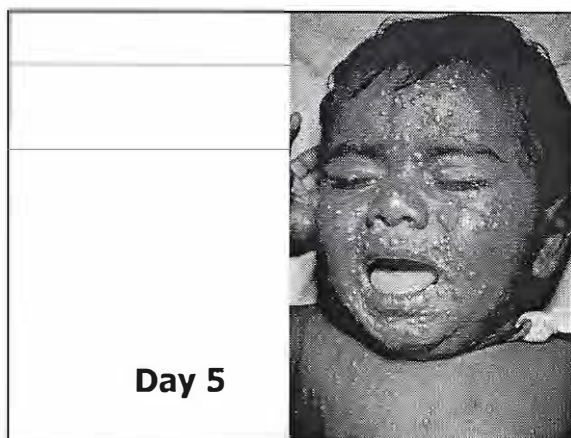


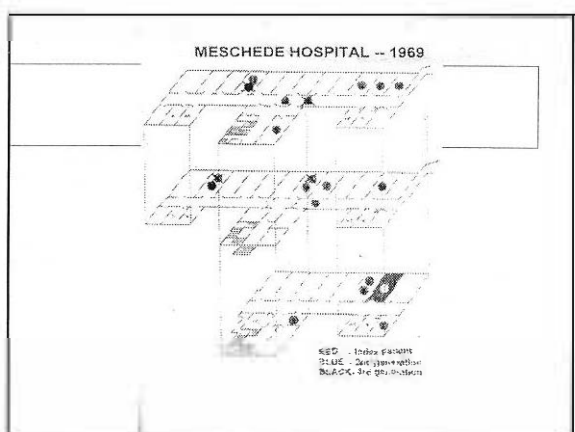
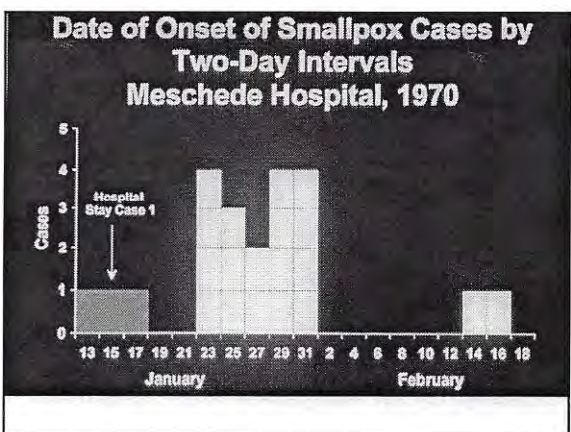
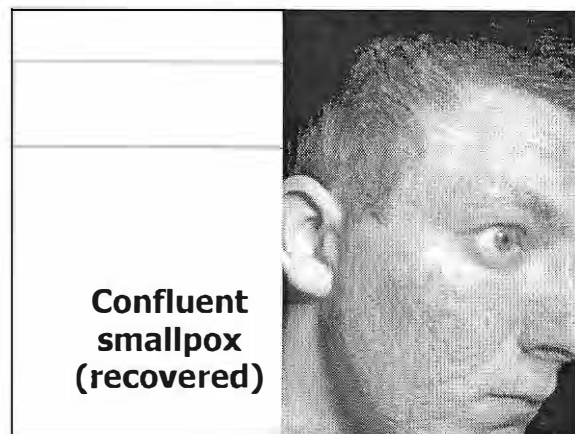
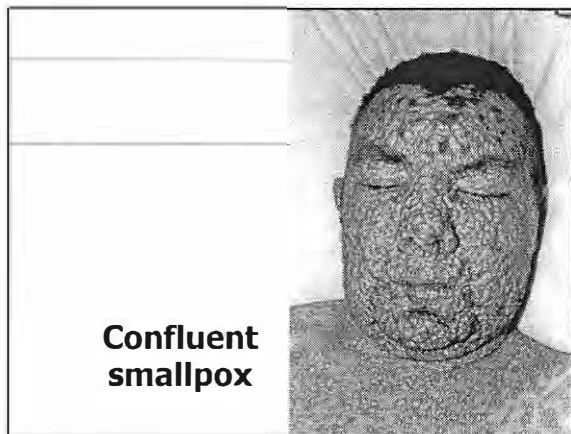
Day 3



Day 4







Susceptibility of US Population to Smallpox -- 2003

- Vaccination stopped in 1972
- Few under 32 years of age have been vaccinated -- 45% of population
- Americans successfully vaccinated only once before 1972 have little immunity-- about 35% of population

Possible sources of smallpox virus

- WHO-authorized laboratories
 - CDC, Atlanta, Georgia
 - VECTOR, Novosibirsk, Russia
- Bodies in the tundra – doubtful
- Viruses isolated before 1977
 - Note 1972 epidemics in Iran, Iraq, Syria
- Virus production laboratory
 - Sergiev Posad, Russia

Expertise to weaponize smallpox

- Specialists in smallpox weaponization
 - Russian laboratory scientists
- The all-purpose Internet
- Trial and error

Vaccine availability

September 12, 2001

- Vaccine manufacturers
 - U.S. None
 - World None
- Vaccine in storage
 - U.S. 15 million doses
 - World ? 80 million doses
- Ready for emergency shipment in U.S.
 - 90,000 doses of vaccine
 - Limited quantities -- needles, VIG

Smallpox Vaccine Reserve--2003

	<u>No. of doses</u>
■ Wyeth DryVax	15 million
■ Calf-lymph - 1978	
■ Aventis Pasteur	85 million
■ Calf-lymph - 1958	
■ Acambis/Baxter	209 million
■ Tissue culture - 2002	

In emergency -- dilution of vaccine 1:5 is possible

Options for Vaccination Before an Event

- Vaccinate no one
- Vaccinate those at highest risk, candidates:
 - Health care workers
 - First responders
 - Essential personnel
- Vaccinate anyone desiring to be vaccinated
 - Recommend vaccination
 - Recommend against vaccination
- Make vaccination compulsory

Use of vaccine: A Balance of Risks

- Probability that smallpox will be used as a weapon
- Frequency of adverse reactions and public response in 2003
- Likely effectiveness of outbreak control?

Smallpox Vaccine Expected Adverse Events

- **Life-threatening complications (per million)**
 - Post-vaccinal encephalitis (3)
 - Progressive vaccinia (1)
 - Eczema vaccinatum (12)
- **Less serious**
 - Generalized vaccinia
 - Accidental inoculation
 - Rash and fever
- If 100 million vaccinated, 100+ deaths might occur (1960's data)

Aspects of a smallpox bioweapons attack

- Aerosol dispersion
 - powder or wet slurry
 - only small quantities needed
- Probable perpetrators
 - Independent terrorist group (e.g. Aum Shinrikyo)
 - Terrorist group sponsored by nation-state
- Recognition that attack has taken place
 - After first cases have occurred

Outbreak control

- Smallpox doesn't spread readily
- Patient transmits only after symptoms
- Vaccine protects even when given 3-4 days after infection

Surveillance and Containment

Steps in Containment -- I

- **Isolate patient**
- **Vaccinate all who had been in a room with the patient since he became febrile**
- **Place primary contacts under surveillance with daily temperatures**
 - If contact develops fever, isolate until diagnosed
- **Vaccinate all household members of primary contacts (secondary contacts)**
- **Make vaccine available to those who want it**

Models of likely scenarios

- **Epidemic Modeling – a new cottage industry**
 - Military contractors
 - Academic centers
 - ? Recreational games
- **Working Group –U.S. National Advisory Council**
 - CDC – Glasser, Lane, et al.
 - Emory U. –Longini, Halloran
 - Hopkins/Brookings – Burke, Epstein

Principal options considered

- No intervention at all
- Isolation of patients; vaccination of close contacts and health personnel
- Pre-outbreak vaccination of health care personnel
- Large-scale vaccination of 40% to 80% of population

Preliminary conclusions of models based on epidemiological fact

- Isolation of patients and vaccination of contacts is highly effective
- Vaccination of health personnel either before or after release – minimal effect
- Vaccination of <70% of population has a only a limited effect

The Future

- Prospects for destruction of known stocks of smallpox virus -- nil
- Certainty of security against a possible release of the virus at some time in the future – not possible

Eternal vigilance and a readiness to act promptly and decisively will be necessary for the indefinite future.

The return of history's most deadly and feared pestilence to a world more susceptible than at any time in history could be a major catastrophe.