

## Bugs, Terrorism and Disasters: New Rules for the 21st Century

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## Changing Motivations of Terrorism

Yesterday Today Tomorrow



## Changing Tactics of Terrorism

Yesterday Today Tomorrow



## The Ways of Terror

- Conventional weapon used in a conventional way (**usual war**)
- Conventional weapon used in a non-conventional way (**WTC bombings**)
- Non-conventional weapon used in a conventional way (**anthrax letters**)
- Non-conventional weapon used in a non-conventional way (**the future?**)

## Types of Disaster Events

- Naturally occurring
- Technological
- Human or man-made

## Natural Disasters

- Hurricane
- Tornado
- Severe thunderstorm
- Snowfall
- Blizzard
- Ice Storm
- **Earthquake**
- Tidal wave
- Temperature extremes
- **Drought**
- Flood, external
- **Wild Fire**
- Landslide
- Volcano

## Natural Disasters

- Hurricane
- Tornado
- **Severe thunderstorm**
- **Snowfall**
- **Blizzard**
- **Ice Storm**
- Earthquake
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- Temperature extremes
- Drought
- Flood, external
- Wild Fire
- Landslide
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## 2005 Hurricane Evacuations

- July
  - Monsoon in India - 500,000
  - Hurricane Emily in Mexico – 85,000
- **August**
  - **Hurricane Katrina – 1,200,000**
- September
  - Typhoon Nabi in Japan – 100,000
  - Typhoon Khanun in China - 1,350,000

## Infectious disease consequences of natural disasters

- Contaminated food supply
- Gastrointestinal illness
- Air pollution
- Increased insect populations
- Poverty with subsequent poor sanitation and hygiene

Not a problem in New Orleans



### Technological events

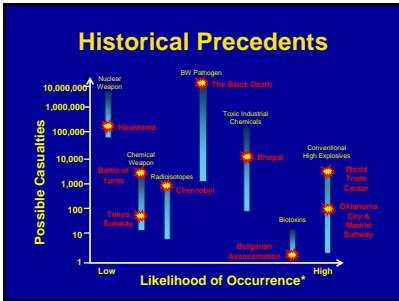
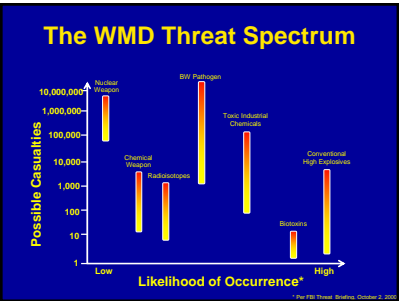
- Electrical failure
- Generator failure
- **Transportation failure**
- Fuel shortage
- Natural gas failure
- Water failure
- Sewer failure
- Steam failure
- Fire alarm failure
- **Communications failure**
- Medical gas failure
- Medical vacuum failure
- HVAC failure
- **Information systems failure**
- Fire, internal
- Flood, internal
- **Hazmat exposure, internal**
- **Unavailability of supplies**

### Human or Man-made Events

- Mass casualty incident
  - Trauma
  - Medical
  - Hazmat
- Hazmat exposure, ext
- Terrorism, chemical
- **Terrorism, biological**
- Terrorism, radiological
- Terrorism, cyber
- VIP situation
- Infant abduction
- Hostage abduction
- Civil disturbance
- Labor action
- Forensic admission
- Bomb threat

### Convergence & Terrorism

- **Threat = capabilities + intentions**
- **Warning = threat + indications**
- **Risk = warning + vulnerability**



### Nightmares for Disaster Planning\*

- Nuclear detonation
- **Aerosolized anthrax**
- **Flu pandemic**
- **Pneumonic plague**
- Blister agent
- Industrial chemicals
- Nerve agent
- Chlorine tank explosion
- Major earthquake
- Major hurricane
- Dirty Bomb
- Improvised bomb
- **Food contamination**
- **Foot & Mouth disease**
- Cyber attack

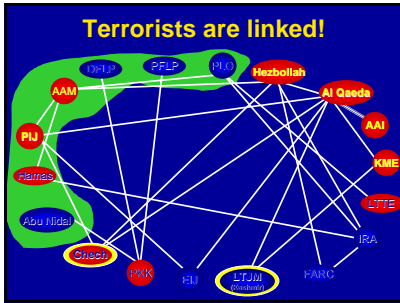
\*DHS hypothetical scenarios

### It's a more appealing time for WMD\*

- More concentration of people in cities
- More extensive global travel
- Global mass food processing, production & shipping
- A much more interconnected, "globalized" and thus vulnerable world
- Over reliance on technology: email, internet, cell phones, biotechnology

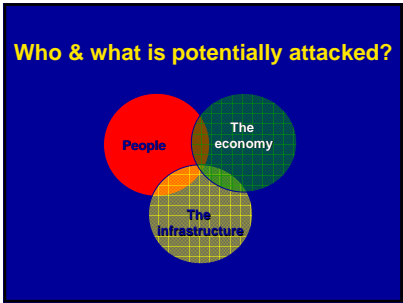
### Post-Modern Terrorism

- Blurring the distinction between crime & war
- Weapons of mass destruction & **disruption**
- New emerging vulnerabilities
- Asymmetric warfare
- Religious and cultural fervor w/o constraints
- Involvement of rogue states
- Link to transnational organized crime
- Suicide bombing
- Global networked organizations



### Do we really understand our enemy?

- Who are they?
- What is their organizational structure?
- Is their intent to kill people or disrupt the economy?
- Or do they want
  - a lot of people dead
  - a disrupted economy
  - *and a lot of people watching*



### What is al Qaeda?\*

- Like a virus
- Hierarchy with command and control
- A loose association of groups
- Global network
- A network of networks

### The Conventional Definitions of al Qaeda

1. **Strategic core** for planning and motivation
2. An affiliate or **franchise** layer at the local level targeting Western targets
3. A layer of **inspired followers** of global ideological Jihad

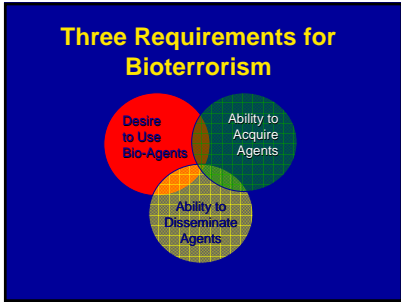
### The World of Microorganisms

- Bugs are always around us
- Bugs can help us
- Bugs can cause disease & disasters
- Bugs can be a consequence of disasters
- The response to bugs can be a disaster

Biological warfare and terror are not new.

**The fundamentalists, fanatics & extremists were always around.**

What is new is the potential to use it on an **UNPRECEDENTED SCALE** with today's technology.



### To pull off a terrorist act lots of things have to go right

- An *effective terrorist group* or other type of perpetrator
- A *target* population or effective host
- *Availability* of a selected biologic agent
- An effective method of *dissemination*
- Proper *environmental conditions*

### We are living in a very dangerous new era!

- There is a sharp decline in anti-infective development
- The resistance of many microorganisms is rising
- We are creating more readily available technologies to cause havoc

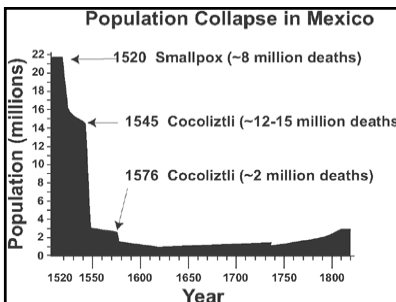
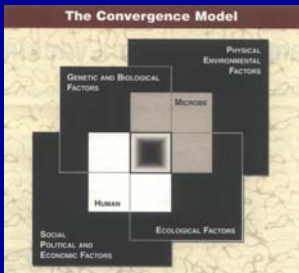
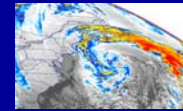


### Why do new diseases come along?

- Changes in human demographics and behavior
- Human susceptibility to infection
- Economic development and land use
- Changing ecosystems
- International travel and commerce
- Microbial adaptation and change
- Breakdown of public health measures
- Changes in industry practices and technology

### Convergence (the Perfect Storm)

- Environmental
- Political
- Sociological
- Disease



### Convergence and Innovation

- Suicide bombing - airplane hijacking
- Fanaticism - Technology
- PC - Internet - software
- Poor decisions on our part

TO UNDERSTAND THE FUTURE  
WE MUST UNDERSTAND THE  
PAST

### The Biggest Infectious Disease Events of the 20th Century

- Eradication of smallpox
- Discovery of penicillin
- Emergence of HIV/AIDS
- Pandemic flu of 1918
- Childhood immunization
- Emergence of bioterrorism

### Converting Bugs to Bioweapons

- Relatively cheap and easy to make or procure
- Detection is difficult
- Air dissemination possible at great distance
- Enclosed spaces are ideal
- Delayed onset
- May be insidious & undetectable until there are numerous casualties\*

The art of medicine consists of amusing the patient while nature cures the disease.



Voltaire

## Plague

## Plague: The unholy trinity

- The bacteria - *Yersinia pestis*



- The rat - *Rattus rattus*



- The flea - *Xenopsylla cheopis*



## Plague and Society\*

- Justinian's Plague
  - 540 AD
  - Killed 100 million people (50% of Europe's population)
- The Black Death
  - 1347-1351 AD
  - Killed 25 million & militarized plague
- Chinese epidemic
  - 19<sup>th</sup> and 20<sup>th</sup> Century
  - Came to California (1924-1925)



## Justinian's Plague (540 AD)\*



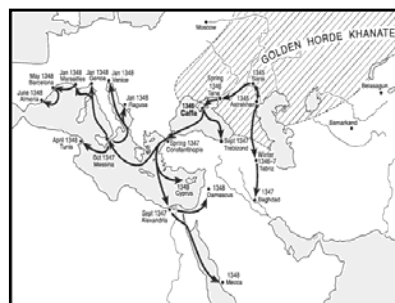
## The Black Death or Great Pestilence

- The 2<sup>nd</sup> plague pandemic erupted in 1346
- Within 5 years it ravaged the Middle East
- Killed >13 million people in China
- Killed 20-30 million in Europe (>1/3 population)
- Sent Jews eastward in Europe



## Plague As a Bioweapon\*

- **1346**
  - Tartar army hurled the corpses of plague victims over the walls of Kaffa, a seaport on the Crimean coast
- **1422**
  - Battle of Carolstein
- **1710 and 1718**
  - Russia's wars with Sweden



## What's different between then and now?

- Medical care & sanitation were virtually non-existent
- We didn't understand how diseases spread
- We didn't have any good diagnostics or therapeutics available

## Smallpox

## The History of Smallpox?

- Tcheou Dynasty (1122 BC)
- Mummy of Ramses V (c.1000 BC)
- Sung Dynasty (590 BC) used inoculation to prevent the disease
- Rhazes (930 AD) first described the disease
- No mention in Europe till the 6<sup>th</sup> Century



## Smallpox in the Middle Ages\*



A mosaic from the early 14th century inside Kariye Mosque (Church of Christ the Savior), Chora, Istanbul, Turkey

## The Spaniards Brought Smallpox to America

- 1507 – first recorded case
- 1520 - Hernando Cortez, killed 3,500,000 Aztecs in two years
- 1532 – Pizarro improved his chances of victory by presenting smallpox laden clothes to the natives as gifts
- 1617-1619 – 1<sup>st</sup> epidemic in North America
- 17<sup>th</sup> Century - Spaniards also brought smallpox to the Caribbean Islands and Florida



## What about the French?



## Bioterrorism: Smallpox & the French & Indian War (1754-1767)\*

1763

During the Pontiac Rebellion, the British army provided the Delaware Indians with blankets and handkerchiefs from the "Smallpox Hospital"



1767

Sir Jeffrey Amherst gave his consent to give blankets laced with smallpox to Indians loyal to the French.

Even the 20<sup>th</sup> Century was not spared from smallpox, when 100 million people died from armed conflict & 300 million died from smallpox.

## How did we conquer smallpox?

- Infection control
- Variolization & vaccination
- A unified global effort



## SARS

**SARS:  
7,956 cases with 666 deaths**



**SARS ushered in a new & confusing int'l era**

- The most popular rapper is white
- The best golfer has been black
- The tallest basketball player is Chinese
- The French call us arrogant
- The Germans don't want to go to war
- New infectious diseases are never far away

**SARS: Why the fuss?**

- It's new & it's contagious
- There's no cure or vaccine
- It afflicts the healthy & the compromised
- It spread easily through households, hospitals, and the community
- **It devastated trade, travel, sports, religion and politics**
- Provoked an ethnic panic backlash
- Questions remain

**SARS moved very fast**

- Moved across the globe from China from a single person on a single day from a single floor of a Hong Kong hotel
- Within 24 hours it spread to 5 countries
- Within 6 months it spread to more than 30 countries on 6 continents

**Superspreaders**

**China's Hospitals**

- The Guangdong Infectious Disease Hospital had 150 of its 400 beds occupied by SARS patients in February 2003
- A 1,000 bed SARS hospital was constructed in 1 week in May 2003



**Like flu, SARS started in China**

- Crowding of people
- Proximity to animals like chickens & pigs
- Poor sanitary conditions
- Minimal public health infrastructure
- Poor medical care

AND

**China's organizational obstacles**

- Poor flow of information through the government bureaucracy
- Lack of coordination among fragmented government departments
- A political system in which the handling of medical problems internally overrides any recognized value of external assistance

**Is this the US or China?**

**Toronto's Poor Baseball Players**

Professional baseball players were told to avoid crowds, frequently wash their hands, and use their own pens when signing autographs.



**Religion – Catholic Church**

In Ontario, worshippers were asked to refrain from kissing icons, dipping their hands in holy water, or sharing Communion wine.



## Influenza

## We Can't Forget Flu



## The History of Influenza

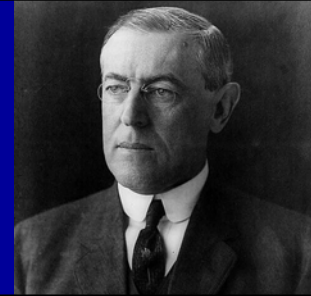
- 2500 BC - domestication of ducks, bringing influenza close to human beings
- 412 BC - Hippocrates described a disease that is probably influenza
- 1580 - 1<sup>st</sup> recorded pandemic: an outbreak in Europe, Africa & Asia
- 1889 - Unknown influenza subtype (probably Russian flu) began in Central Asia & spread to Russia and other parts of the world.
- 1918 - Spanish flu H1N1 (swine flu) killed 50 - 100 million people worldwide, more than on the battlefields of WWI
- 1957 - Asian flu H2N2 pandemic killed 70,000 in the US
- 1968 - Hong Kong H3N2 pandemic killed 34,000 in the US
- 1976 - Swine flu scare

## The Spanish Flu

- Duration: summer 1918 - spring 1919 (10 months) in 3 waves
- >500,000 deaths in the US (equivalent to 1.7 million today)
- 50 - 100 million killed worldwide (equivalent to 175-350 million today)

## Spanish Flu Caused

- Quarantines
- School closures
- Factory shutdowns
- Cancellation of Liberty Bond marches
- Disruption of the war effort
- US response = Chinese SARS response



## Would things be different now?

- We have antibiotics for secondary infections
- A distribution system exists
- There are worldwide warning stations
- Effective vaccines and anti-viral medications exist

Maybe

Normally flu kills the very young and the very old.

**Spanish flu** killed people in their 20s and 30s - in the prime of life!

We still don't know exactly why!

What does influenza have in common with professional hockey?



### Influenza Epidemics vs. Pandemics

- **"epidemic" years**
  - 10% - 20% of world's population gets influenza
  - 500,000 to 1,000,000 deaths worldwide
  - Caused by genetic "drifts"
  - Happens when a virus spreads rapidly through a population, which happens nearly every year
- **"pandemic" years**
  - over 25% of world's population gets influenza
  - A disproportionate number of deaths worldwide
  - Caused by genetic "shifts"
  - Occurs when the virus spreads across the world

### Morbidity & Mortality in the United States

- 50-60 million **infections** and illnesses
- 25 million **physician visits**
  - most by school-aged children and young adults
- 114,000 - 142,000 **hospitalizations**
  - rates highest in very young and elderly
- 20,000 - 40,000 **deaths**
  - up to 51,000 when flu-related complications, like heart attacks and strokes, are included
- Mimics other infections
- Role in complications often overlooked

There is a flu **pandemic** about once every generation; the last being 1968. So we are overdue!



**H5N1 (avian flu) virus** constitutes the single greatest threat to the world at present.

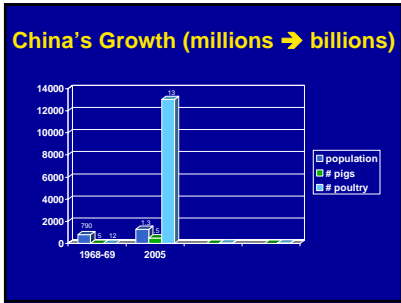
Julie Gerberding  
CDC Director



**Newsweek**  
**The Bird Flu**  
The Race To Prevent A Global Epidemic  
How to Protect Yourself

Is this the next terrorist threat?





## The Irony of Priorities

In 2004 the US government spent **\$283 million** on flu research and **\$5.6 billion** on anthrax vaccine research.

## Anthrax

### The 2001 Anthrax Outbreak

- ~10 (4 confirmed) letters in a few Eastern states
- 23 cases (11 inhalational, 12 skin)
- 5 deaths
- 5,100 exposed (only 152 chose to be vaccinated)



### The 2001 anthrax outbreak: The consequences

- Public health chaos
- No data to base expert's advice on
- Labs quickly became overwhelmed
- Decontamination headaches
- Lots of money spent
- Great panic and anxiety
- Businesses changed

### There was confusion about which antibiotics to use!

- CDC said to use cipro
- NIH said to use doxycycline
- The FDA said neither were licensed
- Few took them for 60 days anyway

### There was abundant testing!

- DOD tested 30,200 specimens
- CDC tested 7,500 specimens
- Public Health Labs tested 84,010 specimens

AND WE STILL DON'T HAVE HIGH THROUGHPUT CAPABILITIES!

And this was for only ~10 letters & 23 cases!

while >20,000 die every year in the US from influenza, 750,000 die from heart disease and 500,000 die from cancer

### The Sverdlovsk Incident: A biological experiment



- April-May 1979
  - 66 Anthrax fatalities
- 1988
  - Soviets present data:
    - 96 cases
    - 79 gastrointestinal
- May 1992
  - Yeltsin admits "military developments"

### Sverdlovsk: A case study of an anthrax accident




### Iraq's Biological Weapons (1990s)

- Found to have 19,000 liters of botulinum toxin, 2,200 liters of aflatoxin and 8,500 liters of anthrax
- Acknowledged filling 25 missiles and 157 bombs with anthrax and botulinum toxin



### Iraqi's Delivery Systems for Biological Weapons

**SCUDS:**

- 13 with Botulinum Toxin
- 10 with Anthrax Spores
- 2 with Aflatoxin

**Bombs:**



- 100 with Botulinum Toxin
- 50 with Anthrax Spores
- 16 with Aflatoxin

**MIG-21**

- Remote controlled
- Equipped with a 500-gallon sprayer




Saddam was pursuing a course of "constructive ambiguity" (bluffing) about WMD after the mid-1990s in an effort to frighten his rivals at home and in Iran, boost his prestige in the Arab world, and deter a Western attack.


### NEW RULES FOR THE 21<sup>st</sup> Century

1. Think outside the box
2. Shorten the decision cycle (don't sit on the fence)
3. Enhance communication and coordination
4. Reduce bureaucracy and increase leadership
5. Reprioritize medicine & public health
6. Use new technology wisely
7. Think through the costs of our actions
8. Reconfigure educational priorities
9. Re-evaluate int'l relations & military options



## Having Perspective



Dustin Hoffman was paid more to star in "Outbreak" than the CDC received that year to combat bioterrorism.

## Causes of death (1998)\*

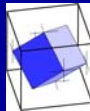
Heart Disease	724,859
Cancer	541,532
Stroke	158,448
Chronic Pulmonary Disease	112,584
Accidents	97,835
Pneumonia/Influenza	91,871
Diabetes	64,751
Suicide	30,575
Kidney disease	26,182
Liver Disease	25,192
Anthrax and smallpox	0

\*National Vital Statistics Reports, Vol. 48, No. 11

## Do we spend too much time dealing with Iraq, al Qaeda and 9-11?

- England and the IRA
- Israel and the Palestinians
- Sri Lanka and the Tamil Tigers
- Iraq and the insurgents
- And what about Iran?

## 1. Thinking Outside the Box



The eye does not see what the mind doesn't know.

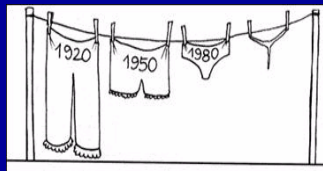
## Thinking Inside the Box

- Thinking short term (getting reelected & quarterly corporate profits)
- Misunderstanding patterns of disease spread & thinking that disease & nat'l security are unrelated
- Underestimating the enemy's resourcefulness
- Underestimating the power of convergence
- Over reliance on intelligence technology
- Preparing for the last war, not the next one

## Thinking Outside the Box

- Red teaming
- Separating science from religion & politics
- Having a global perspective
- Abandoning prior misconceptions
- Networking multiple disciplines

## The Proof for Global Warming



## Anthrax Letters 2001

# Bio Kaczynski or Bio bin Laden?

## Who sent the anthrax letters?

- The Ames strain with a slight negative charge was consistent with Russian (not US) production capabilities
- The weaponized agent had to have been made in a very sophisticated, pharmaceutical or national lab
- By handwriting analysis anthrax hoax letters were sent by the same perpetrator(s) in August 2001 from Indianapolis where there are known al Qaeda sympathizers
- 2 hijackers went to the ER in Florida with a lesion c/w cutaneous anthrax
- The hijackers had contact with Eastern Europeans that were involved with bioweapons production

The FBI's profiling and Don Foster's Vanity Fair article felt that it was a domestic terrorist.



## 2. Shortening the Decision Cycle

## 2. Shortening the Decision Cycle

- In real estate there are three things that are important: LOCATION, LOCATION & LOCATION

## Shortening the Decision Cycle

- In counter-terrorism there are also three things that are important: INTELLIGENCE, INTELLIGENCE AND INTELLIGENCE

"I've laid down the law, though, to everyone from now on about anything that happens: no matter what time it is, wake me, even if it's in the middle of a Cabinet meeting."

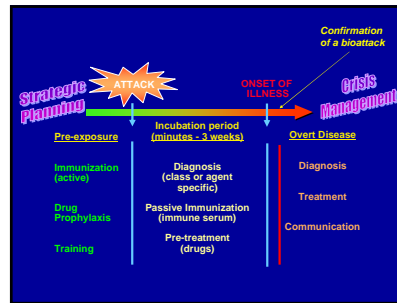
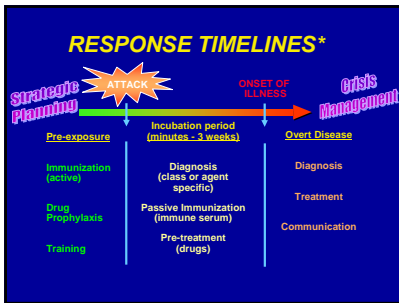


## Decisive Laws for a Wired Age: Messages from Afghanistan

- September 10, 2001
  - NSA intercepts of random monitoring of pay phones in areas where al Qaeda is active
  - "The match begins tomorrow."
  - "Tomorrow is zero hour."
- September 12, 2001
  - Translated and disseminated

## Don't sit on the fence too long

1. Be decisive
2. Tell the truth
3. Psychology and the media
4. Borders, walls and fences



### Potential Detection Data Sources

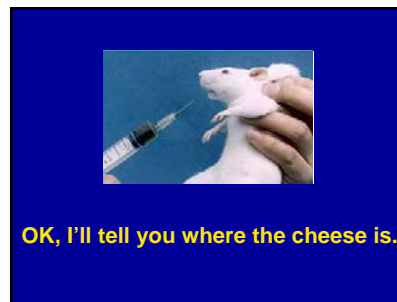
Day 0 - exposure occurs  
 Day 1 - feels fine  
 Day 2 - headaches, fever - buys OTC meds  
 Day 3 - develops cough - calls provider  
 Day 4 - Sees private doctor for flu  
 Day 5 - Worsens - calls ambulance & seen in ED  
 Day 6 - Admitted for "pneumonia"  
 Day 7 - Critically ill - ICU, lab tests +  
 Day 8 - Expires from "respiratory failure"

Traditional Surveillance

### Syndromic Surveillance

Day 0 - exposure occurs  
 Day 1 - feels fine  
 Day 2 - headaches, fever- buys OTC meds **Pharmaceutical Sales**  
 Day 3 - develops cough- calls provider **Nurse's Hotline**  
 Day 4 - Sees private doctor **Managed Care Org** **Absenteeism**  
 Day 5 - Worsens- calls ambulance **Ambulance Dispatch (EMS)** seen in ED **ED Logs**  
 Day 6 - Admitted - "pneumonia"  
 Day 7 - Critically ill- ICU, lab tests +  
 Day 8 - Expires- "respiratory failure"

Traditional Surveillance



### Dealing with psychology & the media

- We need to convey a positive message of what the United States stands for
- We need to expose the terrorist's lawlessness, hypocrisy and inconsistencies.
- al Jazerra vs. Fox News and CNN
- Is perception more important than reality?

**"In a time of deceit telling the truth is a revolutionary act."**

George Orwell

### Borders, Walls and Fences

- Bugs and other WMDs don't respect any borders
- Not all walls are the same
- The US has 95,000 miles of sea-accessible coastline
  - 361 major ports
  - 81,000 foreign vessels
  - 9 million containers arrive annually.
  - 90 percent of all world cargo moves by container
  - almost half of incoming trade (by value) arrives in the United States by sea containers
- ~7,000 miles of land borders, mostly unguarded

### Protecting Borders

- Protectable?
- Affect on commerce?
- The nature of "borders" is changing
- Flexible vs. rigid
- Pushing out
- New immigration laws – good or bad?





## Intelligence and law enforcement are worlds apart but moving together

### Intelligence

- Purpose is policy
- Timing is before
- Standard is "good enough..."
- Stay out of evidence chain to protect sources

### Law enforcement

- Purpose is cases
- Timing is after
- Standard is court of law
- To convict you have to make some evidence public

## Where do we go between Mindless Complacency to All Consuming Paranoia?



## 4. Reducing Bureaucracy and Increasing Leadership

## Pyramids

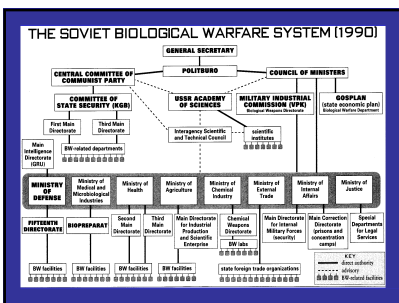


## Pancakes



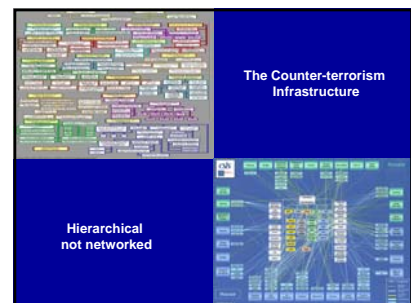
## Compartmentalized Bureaucracy

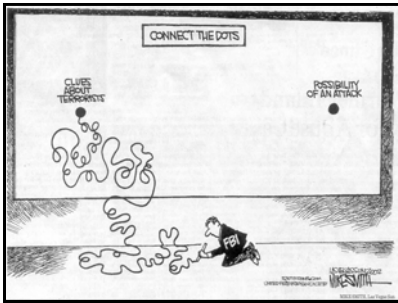
- Cheese pizza → FDA
- If pepperoni topping → USDA
- Whole eggs → USDA
- Egg products → FDA



## The new Department of Homeland Security

Combining 22 agencies & 190,000 employees  
Is it like shuffling the deck chairs on the Titanic?





**What good are treaties if they aren't verified and enforced?**

Take the Russians for example

**The Soviet Bio-weapons Program**

- *Biopreparat* continued *even after* signing 1972 BWC
  - Agency under Ministry of Defense
  - 32,000 - 60,000 scientists and technicians
  - 6 research labs, 5 production facilities
- Program inherited by Russia
  - In 1992 President Yeltsin promised to terminate the program *but*:
  - Still employs ~25,000 people
  - Defections to rogue states is a problem
  - Is there still an existing program?

**Soviet BW Priorities**  
"Agents Likely to be Used"



Smallpox	26
Plague	23
Anthrax	21
Botulism	21
VEE	20
Tularemia	20
Q Fever	20
Marburg	18
Influenza	17
Melioidosis	17
Typhus	15


Vorobjev, A., et al., "Criterion Rating" as a Measure of Probable Use of Bioagents as Biological Weapons, International Symposium, Severe Infection Diseases, Kiev, June 1997

**Bioweapons Production (metric tons/year)**

Organism	US	USSR
SEB	1.9	
Tularemia	1.6	1,500
Q fever	1.1	
Anthrax	0.9	4,500
VEE	0.8	150
Botulinum	0.2	
Plague	0	1,500
Smallpox	0	100
Glanders	0	2,000
Marburg	0	250

**In a disaster who's in charge?**

- CDC is constantly reorganizing
- Incident and Unified Command aren't in place
- Very difficult to cover & manage more than one bureaucracy
- 2004 had the largest turnover of corporate CEOs in US history



'You're doing a heck of a job, Brownie'

**"Neither the DHS Secretary or any of his designees filled this leadership role, which serves to underscore the immaturity of and weakness relating to the current framework."**

GAO Report

**Questions**

- Is one man's terrorist another man's freedom fighter?
- Is one man's terrorist everyman's terrorist?
- Is the law relative or absolute?
- Does God take sides?

**The assault on the seams of society**

- Moral equivalence
  - Killing innocents vs. targeted killings
  - Political correctness - one side is never fully at fault
- The War in Iraq
- Deciding between privacy and security
- What to do with the borders
- Immigration laws

### 5. Reprioritizing Medicine & Public Health

- Public health is under funded
- Clinical medicine is inappropriately funded
- Poor relationship between doctors, public health and law enforcement

**Disasters & epidemics need the help of medicine and public health but....**

### Where are we today?



### How would our health care system handle an outbreak of avian flu?

- We don't have enough hospital beds or respirators
- Infection control guidelines are often not followed
- There isn't any ability to do high throughput testing

### Emergency Rooms

- Patient visits have increased while the number of ERs has decreased
- In LA, 6 ER's have closed down this past year
- In California, more than 65 ERs have closed in the past decade

### Hospitals: The first receivers & potential secondary targets



### Surge capacity

- Medical personnel
- Hospital beds
- Equipment
- Testing
  
- But we will have a surge of hysteria

**80 percent of the world's measles vaccines come from one company in India!**



### What did the current shortage of vaccine teach us?





Experience is a wonderful thing.  
It enables you to recognize a  
mistake when you make it again.

### Neglected Public Health

- Life expectancy in the US since 1900 has gone from 47 years to 77 years!
- 25 of these 30 additional years come from public health
  - immunization
  - clean water
  - sewage treatment
  - clean food

### We spend <1% of health care dollars on public health!



“There is no other area of human endeavor in which the application of thought and resources can make so profound a difference in as many peoples' lives as in the work of public health.”

Lawrence Summers

### Other countries do things differently



- A central Asian country of 5 million ruled by a dictator, Saparmurad A. Niyazov, a man who controls one of the world's largest supplies of natural gas
- He dismissed 15,000 licensed health care workers and replaced them with conscripts
- He fired all HCWs (including doctors) who had foreign degrees
- He declared all infectious diseases illegal
- He sat on a plague outbreak spread by gerbils

### Uzbekistan & Russia's response

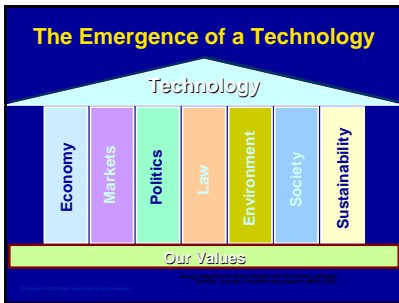
- Ran tests on fleas and rodents near border
- Mass vaccination
  - Cattle breeders, oil workers, geologists
  - Thousands of camels
- Tightened border controls
- Banned the import of monkeys, cats, camels

### but the Turkman response was to

- Declare the word "plague" illegal (Health care workers had to sign a pledge)
- Initiate border controls to prevent disease from entering the country from neighboring states
- Not acknowledge that the disease is a problem

### 6. Using New Technology Wisely

- The proliferation of bioweapons may be uncertain but the proliferation of biotechnology is not
- Use new technology not because it's commercially viable but because it is useful
- Relying on technology over human intelligence got us into trouble



### The mythology of technology warned of danger

- The Greek gods guarded their "technologies" jealously.
- Prometheus taught humans to use fire and other tools.
- His sentence was an eternity of torture.

### Icarus and Daedalus didn't like the island of Crete much

- Daedalus made wings of wax and feathers for himself and his young son, Icarus
- He advised his son to "fly the middle course" between the sea and sun
- Icarus didn't make it



### Forecasting technology won't incur anyone's wrath (we hope)

Some technologies are supposed to change the world... and don't (or haven't yet):	While some refuse to die:	What will happen to new technologies?
<ul style="list-style-type: none"> <li>• Directed energy weapons</li> <li>• Ballistic missile defense</li> <li>• Optical computing</li> <li>• Nuclear fusion</li> <li>• Modern nuclear power</li> <li>• Artificial intelligence</li> <li>• Electric cars</li> <li>• Voice recognition</li> </ul>	<ul style="list-style-type: none"> <li>• Analog Watches</li> <li>• Dot Matrix Printers</li> <li>• Typewriters</li> <li>• Broadcast Radio</li> <li>• Pagers</li> <li>• Reel to Reel Tapes</li> <li>• Vacuum Tubes</li> <li>• Fax Machines</li> <li>• Mainframe Computers</li> <li>• FORTRAN</li> </ul>	<ul style="list-style-type: none"> <li>• IT?</li> <li>• Artificial Intelligence?</li> <li>• Nanotechnology?</li> <li>• Information Security?</li> <li>• Biotechnology?</li> <li>• Military Technology?</li> <li>• Communications?</li> </ul>

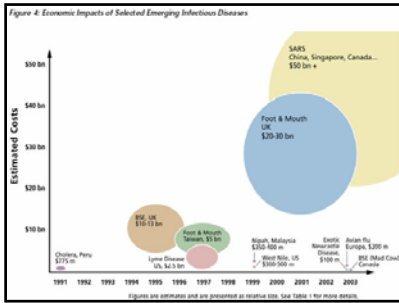
### More Exotic Potential Threats

- Combinations or mixes of spores, bacteria, toxins and/or viruses
- Genetically engineered agents
- Antibiotic resistant organisms
- "Fusion" or chimera agents (Ebola/smallpox)
- Attacking > 1 location simultaneously or repeatedly (Richard Danzig's "reload" phenomenon)
- Combining a civilian attack with a military one



### 7. Thinking Through the Costs of our Actions\*

- 6 million lbs of air cargo was carried in 2004
  - all uninspected
  - cost would be \$4 billion/yr to inspect
- Sustainability of yearly renewals - Is federal funding a crutch for core operational needs
- Paying
  - Hospitals for losses during a disaster?
  - Drugs makers to produce vaccines?
  - Penalties for non-compliance?
- We spend more on protecting ourselves from law suits than on R&D



### Medical Care in the US: Spending more and getting less

- \$2 trillion in 2004
- Has grown 2.5% faster than income
- 16% of GDP compared to 5% in 1950
- Will require 1/3 of the national output by 2030
- Paper predominates

### Cost of Influenza

- The annual direct medical costs of influenza are estimated at \$3-5 billion
- Avian flu has already cost SE Asia \$8-12 billion
- The World Bank estimates that a bird flu pandemic would cost the global economy \$800 billion per year.
- CDC estimates it will cost \$170 billion

Since it's so hard to protect assets...

### Deny Terrorists Resources

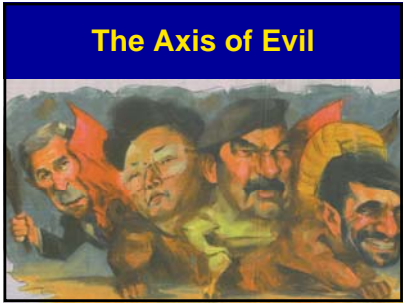
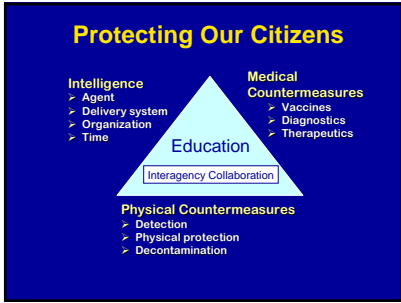
- Funding
- Recruits
- Weapons
- Support groups
- Propaganda

### 8. Reconfiguring educational priorities\*

- What we're doing wrong at home
  - Educating first responders poorly
  - We're not educating our children about them & us
  - Our enemies know us better than we know them
- What 's happening abroad
  - China is producing 325,000 engineers per year (5-10 times what we are)
  - Out of every \$1.50 in foreign aid, 3 cents goes to education
  - Our enemies are teaching their children to hate

### Teaching Standards

- JCAHO and emergency plans
- AP Tests



### 9. Re-evaluating diplomatic & military options

- The DoD budget is more than 100 times the DoS budget
- We like democracy but get better results from dictatorships
- Are we paying a price for supporting repressive Muslim regimes?
- We often spend foreign aid money poorly
- We need more coalitions of the willing
- Our foreign policy objectives are often unclear

### Consistency of the Bush Doctrine: Even our allies need to understand us

- Regime change?
- Pre-emption?
- State-building?
- Democratization?



© World U.S. Signals Helped TB Hunt Toward China

### You can't have it both ways\*



"What people want most from the state is protection, not freedom."



*Leviathan* (1651)  
Thomas Hobbes



### Final Thoughts

- Do we need another event and then another event to maximize preparedness?
- Can you have a war on a tactic?
- Instead of a GWOT should we have a war on inefficiency and cronyism?
- Learn from history

### Why no CONUS attack since 9-11?

- They are busy in Iraq
- Their operational capabilities have been greatly diminished
- They don't have a mature infrastructure in the US and can't get their operatives into the country
- They want to topple local corrupt governments in the Middle East first, then our allies in Europe then us
- They are planning big and are very patient

### Why does a society collapse?

- Environmental damage inflicted by people
- Climate change
- *Enemies*
- Changes in friendly trading partners
- Society's political, economic and social responses to these shifts

Jared Diamond

### The mid to long term presents many problems

- They are networked, disjointed & adaptable
- Their disjointed nature may provide a fringe group with WMD technology
- Unlike nuclear bombs (which are least likely but most destructive), biological agents are naturally available
- Soon they will have genetic engineering, Chimera agents, and weaponization technology much more easily available

### Where does this leave us?

- Organisms have been coping with disease for hundreds of millions of years, sometimes successfully, sometimes not
- Society has been coping with effective methods of public health for only ~150 years
- Society has a lot to learn about effectively coping with disasters & disease, but we are early on in the process, and we will learn

"We cannot with any confidence forecast the future trajectory of terrorism. It will almost certainly persist. It clearly has escalated. With or without weapons of mass destruction, terrorists will surprise us with attacks that could profoundly affect our society. We remain vulnerable. We are sliding into complacency. Whatever we do must be consistent with our values. This is no matter of mere morality. It is a strategic imperative. To ignore this is to risk alienation and isolation."

Brian Jenkins  
Senior adviser to the president of RAND Corporation and one of the world's most respected terrorism analysts

The Chinese had a curse:  
"May you live in interesting times."

### Are we in a crisis?



Los Angeles Times May 21, 2002

### The Chinese depict the word "crisis" with two characters\*



Chinese symbol for danger.

Chinese symbol for opportunity.

You have to be lucky all the time.  
We only have to be lucky once.

The IRA

### What do you think of Western Civilization?



Mahatma Gandhi

"I think it would be a very good idea."

The End