

Terrorism: Past, Present and Future



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What's Needed for a Disaster?

- Convergence
- A perfect storm
- A tipping point
- A random isolated event
- "Reload" phenomena



Questions about Disaster Planning

- What do we mean by being "prepared"?
- Who and what are we protecting?
- What are we preparing for?
- Where and how do we appropriate protection resources?



What do we mean by "prepared"?

...the "right place" on the continuum between mindless complacency and all consuming paranoia



The Economic "Perfect Storm"

- Health care cost explosion, Medicare Part D
- Baby boomers → Medicare & SS age
- "Institutional Katrinas"
- The "just-in-time" supply chain
- Optimal surge has limits
- The private sector working with government

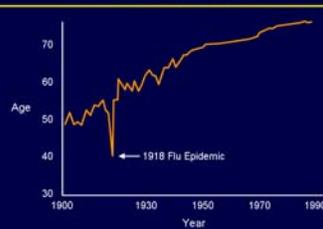
Hong Kong Airport During SARS



Questions about Pandemic Disease

- What's the real risk?
- How scared should we be?
- How will it affect the economy?
- Is dual use feasible and useful?
- What do we do about surge capacity?
- Are we on the right track with immigration, protecting borders, and foreign student visas?
- How prepared or unprepared are we?

US Life Expectancy

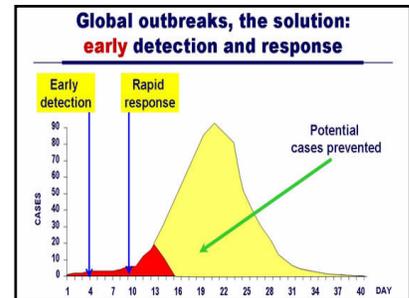
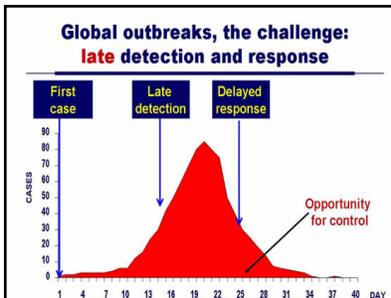
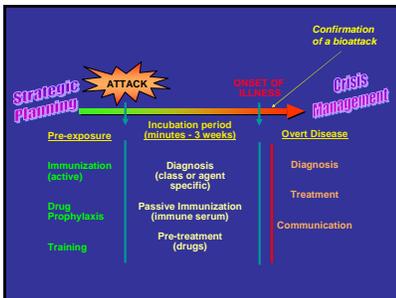
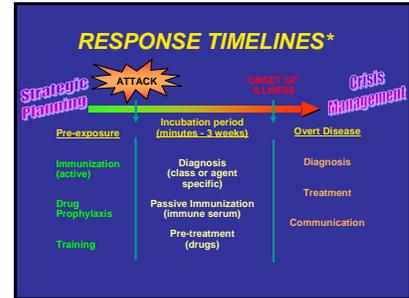


How should we allocate disaster funds?

- Areas of high risk
- Per capita
- By role, agency
- Equally among jurisdictions
- For basic vs. applied science
- Between prevention, response, remediation
- To public health vs. medicine
- Proactive vs. reactive
- OR GIVE IT ALL TO THE FBI AND CALL IT QUILTS

HOW DO YOU DEAL WITH AN ENEMY THAT HAS NO GOVERNMENT, NO MONEY TRAIL AND NO QUALMS ABOUT KILLING WOMEN AND CHILDREN?

The enemy is Mother Nature. And on August 29, 2005, in the form of Hurricane Katrina, she killed 1,836 people, devastated a land area larger than Great Britain and caused over 100 billion dollars worth of destruction. Even when her wrath isn't as grand, she is still accountable every year for almost 500 American deaths and 14 billion dollars worth of damage.



- A History of Bioterrorism**
- 8 Century BC -2 Century AD - Scythian archers (manure)
 - 1346 - Crimean peninsula, Black Sea and Italy (**plague**)
 - 1518 - Latin America (**smallpox**)
 - 1710 - War between Russia and Sweden (**plague**)
 - 1767 - English general, Sir Jeffery Amherst (**smallpox**)
 - 1930s & 1940s - Japan (**plague**...)
 - 1942 - Gruinard Island, Scotland (**anthrax**)
 - 1969 - U.S. (mixed)
 - 1979 - Sverdlovsk (**anthrax**)
 - 1980-88 - Iran-Iraq war (mixed)
 - 1984 - Rajneesh cult, USA (salmonella)
 - 1993 - Aum Shinrikyo cult, Japan (**anthrax**)
 - 2001 - US **anthrax** letters

The Black Death

- 1347-1351 AD
- 40 million killed
- Italian 40-day "quaranta" or Latin "quadragina"
- Started by an act of biological terrorism at Kaffa?

- The consequences**
- An isolated act of bioterrorism starting a pandemic?
 - The nature of economies changed forever
 - Ethnic hatreds surfaced

Contributors to Terrorism

- **Ancient Persians, Greeks and Romans**
- **1-19 C** – Sicarii, Zealots, Thugs & Assassins
- **19-20 C** - Revolutions, colonialism, political motivations
- **1347** - Kaffa and plague
- **1763-7** - French and Indian War
- **1789-99** - French Revolution
- **1866** - dynamite

The French and Indian War: 1763-7

- British officers gave blankets contaminated with smallpox to Native Americans



The French Reign of Terror

- The word 'terrorism' entered into European languages during the French revolution of 1789
- In the early revolutionary years, it was largely by violence that the French government tried to impose their radical new order on a reluctant citizenry
- 18,000 - 40,000 people were executed



The Waves of Modern Terrorism

- **Anarchist Wave (1880s)**
 - Dramatic reforms in the Russian government
 - Rapid democratic reforms in Europe
 - Industrial Workers of the World (IWW)
 - Wobblies in the US
- **Anti-Colonial Wave (after 1919)**
 - Precipitated by the Versailles Treaty which established self-determination and undermined colonial empires
 - IRA, Israeli groups, Kenya, Malaysia, Cyprus, Algeria
- **New Left Wave (after 1968)**
 - Used little technology against the West
 - Viet Cong, Baader-Meinhof, PLO, Black September
 - Weather Underground, Symbionese Liberation Army in the US
- **Religious Wave (after 1980)**
 - Iranian Revolution
 - Low tech suicide bombers – truck → boat → plane
 - US response critical politically and technologically

The 20th Century

- Germans and glanders
- Japanese and plague
- US anthrax letters
- Iraqi and Russian arsenals
- Jihadist beginnings
- Globalization
- Technology
- WMD
- State sponsorship
- Media
- Religion

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 botulism toxin



Iraqi's Delivery Systems for Biological Weapons

SCUDs:

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

Bombs:

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

MIG-21

- Remote controlled
- Equipped with a 500-gallon sprayer



In 1984 the Bhagwan religious cult put *Salmonella* in the salad bars of 10 restaurants in The Dalles, Oregon, to incapacitate voters in the local election. 715 people became sick.



What did we learn from the Bhagwan incident?

- Cults can be very destructive
- Initial investigation was wrong
- Public health didn't have BT on the radar
- Bioterrorism doesn't pay

The Use of Chemical Weapons

- 429 and 424 B.C.- toxic fumes in the Peloponnesian War
- 1456- Belgrade defeats invading Turks by igniting rags dipped in poison to create a toxic cloud
- 1863- The US War Dept proclaims "the use of poison in any manner, be it to poison wells, or foods, or arms, is wholly excluded from modern warfare"
- 1914-1918 – WW1 – million plus casualties, chlorine gas at Ypres
- 1922-1927 – Spanish Morocco
- 1925 – banned under international law
- 1940s - Germany and Zyklon B
- 1963-67 - Egypt uses phosgene, mustard against Yemen
- 1980s – Iraq uses tabun and mustard
- 1995 – sarin in Tokyo subway

Iraq and Chemical Weapons

- Used against Kurds and Iranians in Sardasht and Halabja – mustard & tabun
- The world didn't care
- May have prompted Iran to get "defensive" nuclear and chemical weapons

"We should at least think about (WMD) for our own defense"



The 1995 Tokyo Sarin Gas Attack in the Tokyo Subway

Three simultaneous attacks timed to coincide with rush hour when trains were packed with commuters



They were planned directly below the central Tokyo Police Station

But there's more to Aum

- They played with biological weapons (anthrax) unsuccessfully
- Purchased a 48,000 acre farm in Australia to test biological agents on livestock
- Had \$300 million of which about \$80 million was dedicated to bioterror
- They send people to Africa to collect Ebola specimens
- Brought cult terror to the forefront

Nuclear Terror

- IAEA confirmed 16 smuggling attempts of weapons grade nuclear material broken up by authorities since 1993
 - The largest occurred in 1994 when police in the Czech Republic intercepted six pounds of highly-enriched uranium
 - The latest episode occurred in Georgia in 2006
- And then there's Polonium
- Ports screen for this

The Nuclear Piece: Pakistan's AQ Khan



Can we learn from the past?

- | | |
|-----------------------|-----------------------|
| 68 BC | 2001 AD |
| • Rome's port @ Ostia | • NYC, Washington, DC |
| • Fleet destroyed | • Buildings destroyed |
| • Fire, kidnapping | • People killed |
| • Pirates | • Jihadists |

The consequences: Lex Gabinia

- Pompey the Great illegally assumed power and rebuilt the military (500 ships, 120,000 infantry, 5,000 cavalry)
- He was granted absolute authority & uncontrolled power
- Dissenting voices were dismissed as "soft" or "traitorous"
- Received almost the entire Roman Treasury (144 million sesterces) to pay for the "war on terror"
- It took less than 3 months to sweep the pirates from the entire Mediterranean

Where are we today?



Today's Greatest Threats?

- Climate change & environmental degradation*
- Armed conflict
- Organized crime
- Terrorism
- WMD proliferation
- Poverty*
- Corruption
- Energy
- Emerging and re-emerging infectious diseases
- Natural disasters
- Fanaticism & fundamentalism*...



or:

a convergence of bureaucratic inefficiency, improved bio and information technologies, and fanaticism



In the 20th Century
100 million people died
from armed conflict

and 300 million people
died from smallpox

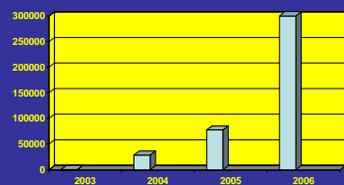
A more appealing time now for terrorists?

- A lack of **constraints**
- Religious and cultural **fervor**
- More **concentration** of people in cities
- More extensive global **travel**
- Mass global **food** production, processing & shipping
- Stirred up **hatreds** used politically

Our Vulnerabilities

- Risk communication
- Communication non-interoperability
- We rely on SIGOPS more than HUMOPS
- MYSPACE is #3
- Integrating energy or transportation into emergency response is new

Potentially Important National Targets for Would-be Terrorists*



*Identified by Congress

Conventional Biotreats

Category A

- Anthrax
- Botulinum toxin
- Plague
- Smallpox
- Tularemia
- Hemorrhagic fevers

Category B

- Q fever
- Brucellosis
- Glanders
- Ricin
- Gas gangrene
- Staph enterotoxin B

Category C

- Nipah virus
- Hantavirus
- The tickborne encephalitis viruses
- Yellow fever
- Tuberculosis (multidrug-resistant TB)

Why these?

- **Category A**
 - can be easily disseminated or transmitted person-to-person;
 - cause high mortality, with potential for major public health impact;
 - might cause public panic and social disruption; and
 - require special action for public health preparedness.
- **Category B**
 - are moderately easy to disseminate;
 - cause moderate morbidity and low mortality; and
 - require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.
- **Category C**
 - availability;
 - ease of production and dissemination; and
 - potential for high morbidity and mortality and major health impact.

Delphi

Unconventional Emerging Threats

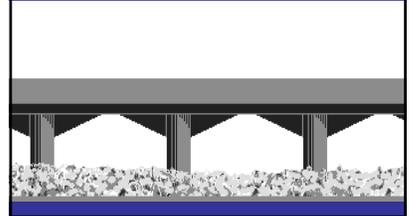
- Non-category A, B, C agents
- Over-reaction
- Exploitation of fear by both sides
- Economic disruption or collapse
- Trading democracy for greater security
- Misdirected policy decisions
- Pampered complacency

Convergence: Cuba and the Marshall Plan: incapacitation

- SEB – 3-12 hrs
- VEE – 1-5 days
- Q fever – 10-20 days



Government Bureaucracy



Homeland Security Challenge*

20 Year	Problems
5 Year	Strategic Plans
2 Year	Elected Officials
1 Year	Budgets
30 sec.	Disasters

*from Ellis Stanley



How are decisions made?

- Allocation of money decides priorities
- Political not practical considerations predominate
- Graft and corruption are factors
- Money is spent along sustainability lines not what is actually needed or sometimes even wanted
- Information flows up and down a sluggish bureaucracy
- New factor: religion dictating science

How are political decisions made?



Florida Congressman
Connie Mack

How are "scientific" decisions made?

Science is a *methodology* to verify or refute assumptions. It is not mathematics.

What do we mean by "truth"?

- Consensus
- Consistency (with prior truth)
- Duration / durability / test of time
- Revelation (can't be questioned, just is)
- Authority or expert opinion
- Science - disconfirms prior truth

Religion, Science and Politics

- Climate change
- Evolution and intelligent design
- Making the morning after pill OTC
- Stem cell research
- AIDS, condoms, abstinence & sex workers

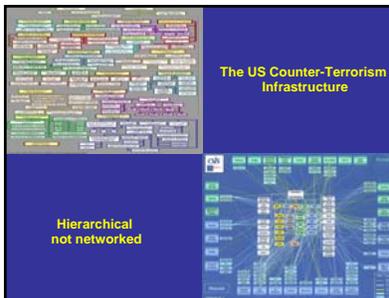


And how do we adapt or make necessary changes?

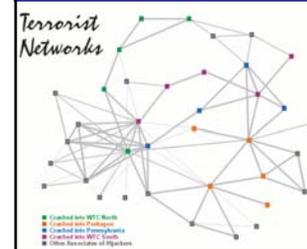
Adaptation Failure*

- Institutional breakdown – structures, cultures, incentives
- No procedures, priorities in place
- So what do we do?
 - We rearrange the boxes on the organizational chart
- And if we want to get really innovative?
 - We design a new organizational chart

*work of Amy Zegart



Case Definition for Terrorism



The colored points represent the 9/11 hijackers.

The gray points represent previously unidentified cases of "infection."

Which would do better?

Organization 1

- Hierarchical
- Centralized leadership
- Tightly coupled (greater interdependence among parts)
- Concentrated workforce
- Specialists
- Policy and procedure driven

Organization 2

- Networked
- Distributed leadership
- Loosely coupled (less interdependence)
- Dispersed workforce
- Cross-trained generalists
- Guided by simple yet flexible rules

Which would do better?

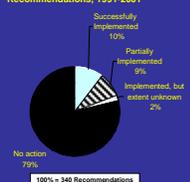
Governments

- Hierarchical
- Centralized leadership
- Tightly coupled (greater interdependence among parts)
- Concentrated workforce
- Specialists
- Policy and procedure driven

Terrorists

- Networked
- Distributed leadership
- Loosely coupled (less interdependence)
- Dispersed workforce
- Cross-trained generalists
- Guided by simple yet flexible rules

Implementation of Intelligence Reform Recommendations, 1991-2001



Get a Grip on Reality. . .

Some intelligence problems are just too hard – technology and money won't solve them

Programs that are silly, stupid or badly managed aren't the answer

It's a dynamic world – be wary of solutions aimed at yesterday and today

The problem is not

- Underpaid airport security
- Bush's failure to properly prioritize terrorism
- Clinton failure to capture bin Laden
- But rather ... the inability of intel to adapt to the rise of a new post-Cold War threat

Historically, we've had no shortage of errors of judgment

A few examples. . .

- **1848 – Morse telegraph**
 - \$50K demo, program dumped by Government
- **1980s – Cell phones worldwide**
 - USG never believed useful for enemies or criminals
- **1990s – Commercial encryption**
 - Unlawful to "export" software already available on the Internet

Samuel Morse & the Telegraph

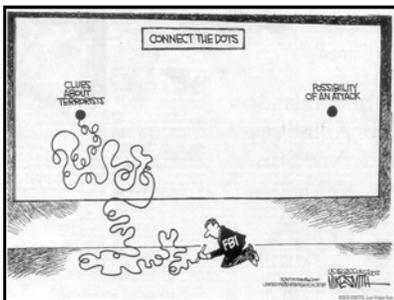
- "What has God Wrought?"
- \$50,000 army grant
- Washington DC – Baltimore
- The US government then decided they had no need for electronic communication



The FBI



- Better at domestic profiling
- Better equipped to search houses than databases
- Have no intel experience but now have made it a high priority
- Real men don't type



Learning from West Nile Virus

- First recognized by an astute physician
- The lab got the bug wrong
- Crows started dying
- Zoos became concerned
- Vets started talking to non-vets
- Labs became overwhelmed
- Too many conference calls



Learning from Tuberculosis

- Infects 2 billion people worldwide
- Kills 1.6 million per year
- 9 million new cases per year
 - 450,000 MDR (2/3 cured)
 - 27,000 XDR in 37 countries (1/3 cured)
 - XXDR slowly rising
- Isolating and treating 1 case XDR = \$250,000
- Need a better test, new drugs, enforced travel bans, HEPA filters on planes

The XDR Tuberculosis Case

- Long delay in confirming diagnosis
- Told not to travel by Fulton County HD
- Told to stay put in Italy
- Allowed to cross the border from Canada
- Put on "No Fly List" 5 hours after completing all his flights

Leading causes of death, US, 1906

1. Pneumonia and influenza
2. Tuberculosis
3. Diarrhea
4. Heart disease
5. Stroke

Paradigm Change

- We might look at national security as a health care system
- Changing infrastructure very rare
 - 1957 President Eisenhower spent \$250 billion on the US highway system
 - Japan and Germany had biggest economic growth in the 1950s
- A Manhattan-type project

Origins of the Hospital



- Collapse of amphitheater at a Gladiatorial contest 27 A.D.
- 20,000 to 50,000 casualties
- System of care overwhelmed

What about the ambulance?

- During the Civil War the Minnie Ball changed fundamental nature of war
- Advantage shifted from Offensive to Defense
- Accuracy allowed defenders to cause large number of casualties in attackers
- Order of magnitude greater number of wounded and severity of wounds
- Provided immense challenge to Military Medicine at the beginning of the War



As physicians, we are caught between Paradigm Change

Expect the unexpected
or
Look for horses not zebras

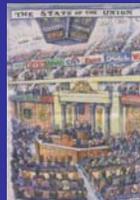
Changing Tactics of Terrorism

Yesterday Today Tomorrow



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

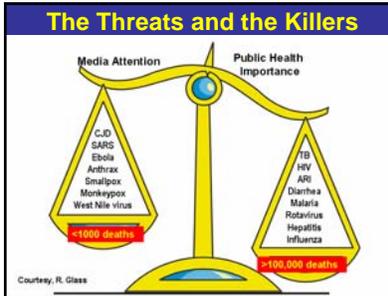


Epidemiology
will solve
all problems



If all
epidemiologists
were laid end-to-end
they would not
reach a conclusion

Do we have misplaced priorities?



“Predictions are a difficult thing, especially when they involve the future.”



Dan Quayle
(although previously attributed to Yogi Berra)

Where are we headed?



Predicting the Future:
Climate Change

- What's known and what's conjectured?
- Political conviction dictating science?
- Thomas Kuhn's work
- Tweaking mathematical modeling
- Promoting self-interest
- Examples
 - Warming or CO2 coming first?
 - Contribution of sunspots?
 - Consistency of measurements

The Real Cause of Global Warming



What could happen tomorrow?

- bin Laden, al Qaeda and the “big one”
- A **splinter group** acquiring a WMD
- Decisions
 - Important political and military ones in the Middle East
 - balancing democracy and security
- A **convergence** of bureaucratic inefficiency, corruption, bankruptcy, technology, fanaticism
- **Substitution**

The Possible Evolution of WMD

- RDD
- IED in the US
- Polonium 210
- Chlorine tanker explosion
- Reciprocal deterrence, suicide bombing
- Stolen/bribed/suitcase nuclear device
- Sociopolitical explosion of Pakistan
- Biotechnology used well
- Use/misuse of history
- Inability to surge enough

Scary CIA "BioReports"

- **Binary agents** that would consist of two separate and harmless agents that would become deadly when combined
- **Agents that could become harmful when combined with a typical treatment**, such as a virus designed to cause flu-like symptoms and then turn deadly when the infected person takes aspirin.
- A **"stealth" virus** that could lie dormant in the infected for long periods of time
- **Engineered biological agents** that could resist antibiotics, evade an immune response, or permanently wreck a person's genetic make-up

The New Smoky Bomb: Litvinenko and Polonium 210

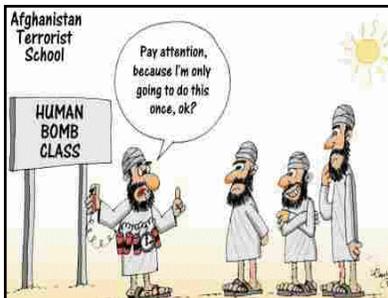
- Needs to be inhaled or ingested to kill
- Not detected by a conventional Geiger counter
- Essentially no shielding required
- Weaponization of dissemination is needed
 - Burn the material
 - Blow it up
 - Dissolve it in a lot of water
 - Pulverize it to a size so small that particles can float in the air and lodge in the lungs
- Trigger for a nuclear weapon

The Mubtakkar

- "Invention" in Arabic, "the initiative" in Farsi
- Delivery system for a combination of chemicals – **sodium cyanide & hydrogen** → hydrogen cyanide which is lethal inhaled
- Delivering this **combination as a gas** has been a holy grail for terrorists
- Ramzi Yousef tried it in WTC I
- Aum Shinrikyo tried it after Tokyo
- Zyklon B

Weaponization: Converting Bugs to Weapons

- **Particle size uniformity** ~ 1-5 microns
- **Coating**
 - No electrostatic charge
 - Non-hydrophobic
 - Non-self-adhering or "flowability"
- **Virulence**
- **Viability of agent within each particle**
- **Antibiotic resistance**
- **Milling to remove clumps, stabilizing**



Evolving Technology

20 Century = Physics

- Quantum physics
- Cosmology
- Digital computer
- Cars & airplanes
- Tele and cell phone
- Wireless
- But no unified field theory

21 Century = Biology

- Biofuels
- Human Genome
- Dx and Rx
- AI, robotics, cyborgs
- Uploading
- Cloning & Ethics
- Living sensors

IT & VR

Space

Or using genetic engineering to make bacteria use carbon dioxide to make methane

Why did the Roman Empire fall?

- Declining moral and ethical values and political comity at home
- Overconfidence & overextension abroad
- Fiscal irresponsibility by the central government
- Not terrorism

The Imperial Predicament

"The problems of a vast multiethnic nation with a messianic view of itself and an often simplistic view of the rest of the world, stretched too thin beyond its borders and facing mounting challenges within them."

From Cullen Murphy

What will it take?

- Good proactive non-partisan planning?
or
- Disaster after disaster to stir up the system reactively

Are Danish cartoons in bad taste; do we just not understand a very different perspective? Or are we exercising our freedoms?



Chemicals, guns, bombs, explosives have been around for a long time and even biological weapons have been used for thousands of years

The fundamentalists, fanatics & extremists were always around.

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

The tribal wisdom of the Dakota Indians, passed on from generation to generation, may be analogous to terrorism, and says ...



"When you discover that you are riding a dead horse, the best strategy is to dismount."



However, in government, education, and in corporate America, more advanced strategies are often employed, such as:

- Buying a stronger whip.
- Changing riders.
- Appointing a committee to study the horse.
- Arranging to visit other countries to see how other cultures ride horses.
- Lowering the standards so that dead horses can be included.
- Reclassifying the dead horse as living-impaired.
- Hiring outside contractors to ride the dead horse.
- Harnessing several dead horses together to increase speed.
- Providing additional funding and/or training to increase dead horse's performance.
- Doing a productivity study to see if lighter riders would improve the dead horse's performance.
- Declaring that as the dead horse does not have to be fed, it is less costly, carries lower overhead and therefore contributes substantially more to the bottom line of the economy than do some other horses.
- Rewriting the expected performance requirements for all horses.
- Promoting the dead horse to a supervisory position.

In conclusion

- How is terrorism changing?
- How quickly is it changing?
- What are the underlying issues?
- What can we do to alter that in a way that is beneficial to us?
- Can current institutions adapt and make the necessary changes?

Institutional Katrina's

- LA County Board of Supervisors
- Walter Reed fiasco
- XDR tuberculosis case
- Iraq
- The FDA
- Virginia Tech shooting
- Immigration & borders
- Our education system

Education:

It's what's left over after all you've forgotten after your training has been completed

We are currently preparing students for jobs that don't yet exist using technologies that haven't yet been invented in order to solve problems we don't even know are problems yet.

Has the Media Changed over Time?

- Bias (intentional or unintended)
- Abuse (by all sides)
- Partisanship (blatant or subtle)
- Manipulation (overt or covert)
- Globalization
- Trust

Misconceptions: the Media & the Iraq war, October 2003*

- 60% of Americans believed in at least one of the following untruths:
 1. Clear evidence linking Iraq and al Qaeda
 2. WMD found in Iraq
 3. World public opinion favoring the US going to war with Iraq

*Program on Int'l Policy Attitudes reported in NY Times, 6/29/07

But this depended on where the information come from

- 23% who got their information from PBS/NPR believed any of these things
- 80% who relied primarily on Fox News believed them

Lobbying and the Media

- London-based energy company wanting to burnish the image of Turkmenistan
- Met with Cassidy & Associates and APCO
- For up to \$1.5 million per year
 - Send Congressional delegations
 - Write and plant opinion pieces in newspapers under the names of academics and think tank experts
 - Set up "independent" media events in DC

FEAR INC. — A TIMES INVESTIGATION Selling the threat of bioterrorism

A scientist deflected, warned of epidemics, helped shape policy and sought to profit.



BEN ALSTER
By Ben Alster

In the fall of 2001, Ben Alster, a scientist who had worked for the military during the Vietnam War, was in the middle of a long and profitable consulting career. He was a sought-after expert on bioterrorism, a field that had just become a major focus of the federal government's attention. Alster, who had a Ph.D. in microbiology from the University of California, Berkeley, and a postdoctoral fellowship at the University of Washington, had been hired by the federal government to help it understand the threat of bioterrorism. He had been working on this for several years, and his expertise was in high demand. He had been hired by the federal government to help it understand the threat of bioterrorism. He had been working on this for several years, and his expertise was in high demand. He had been hired by the federal government to help it understand the threat of bioterrorism. He had been working on this for several years, and his expertise was in high demand.

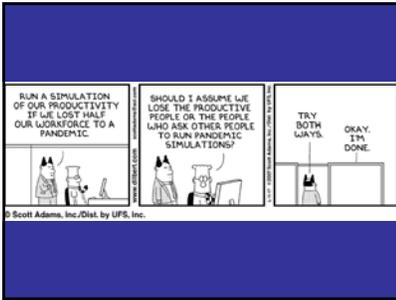


It takes two things to be a consultant -
Gray Hair and Hemorrhoids.

The *Gray Hair* makes you look distinguished -
The *Hemorrhoids* make you look concerned.

There have been 10 pandemics in the past 300 years, and like acts of terror

- They will come
- We don't know how they will play out
- The next one will be different in our "just in time" economies
- We will get through it



**Are we exterminators or
are we gardeners?**

Remember how we "eradicated" the Taliban?
Reminiscent of disease eradication efforts in the 1970s.
Like weeds, the problem always returns...