# Issues Associated with Population Protection from Disaster and Infectious Disease and the Role of Public Health

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# Learning Objectives

- Understand need and application of non-medical countermeasures to populations
- Understand the role of medicine and public health in disaster response
- Understand the role of the government in disaster response and population care

# Who Am I?

- Mechanical Engineering Background
  - **Started in Combat and Weapon Systems Testing**
- 20 years in national security and counterterrorism
  - **Focus on**
    - **Systems analysis**
    - **Countering suicide attacks**
    - **WMD**
    - **Operational and technical issues**
    - **Population preparedness**
- Selected current consulting/advisory positions
  - **Special Advisor on WMD and HLS to the US Surgeon General**
  - **Sr. Science Advisor, DATSD/CBD, DOD**
  - **Sr. Technical Advisor, US Army Medical Research and Materiel Command**
- Researcher, Institute for Counter-terrorism, Israel
- Member, Board of Directors, International Counter-Terrorism Academic Community (ICTAC)
- Numerous other positions

# My Approach

- When I used to be an engineer (many years ago) I was trained to look at things "systemically"
  - **What am I really trying to achieve?**
  - **How (as a system) do I get there?**
  - **"Law of unintended consequences"**
- Sometimes an "orthogonal approach" was best
  - **"Blood safety"**

# I am NOT a physician

- And I don’t play one on TV
- I am an engineer and systems analyst who has looked at health and medical response as an engineering problem, rather than a medical problem

# BACKGROUND

# Underlying Thesis

- In any disaster the key issues are:
  - **Preservation of life**
  - **Preservation of property**
  - **Learning to prevent or mitigate the effects of a future incident**
- Medical and health play important and vital roles
  - ***BUT THEY ARE NIETHER THE MOST IMPORTANT, NOR "IN CHARGE"***

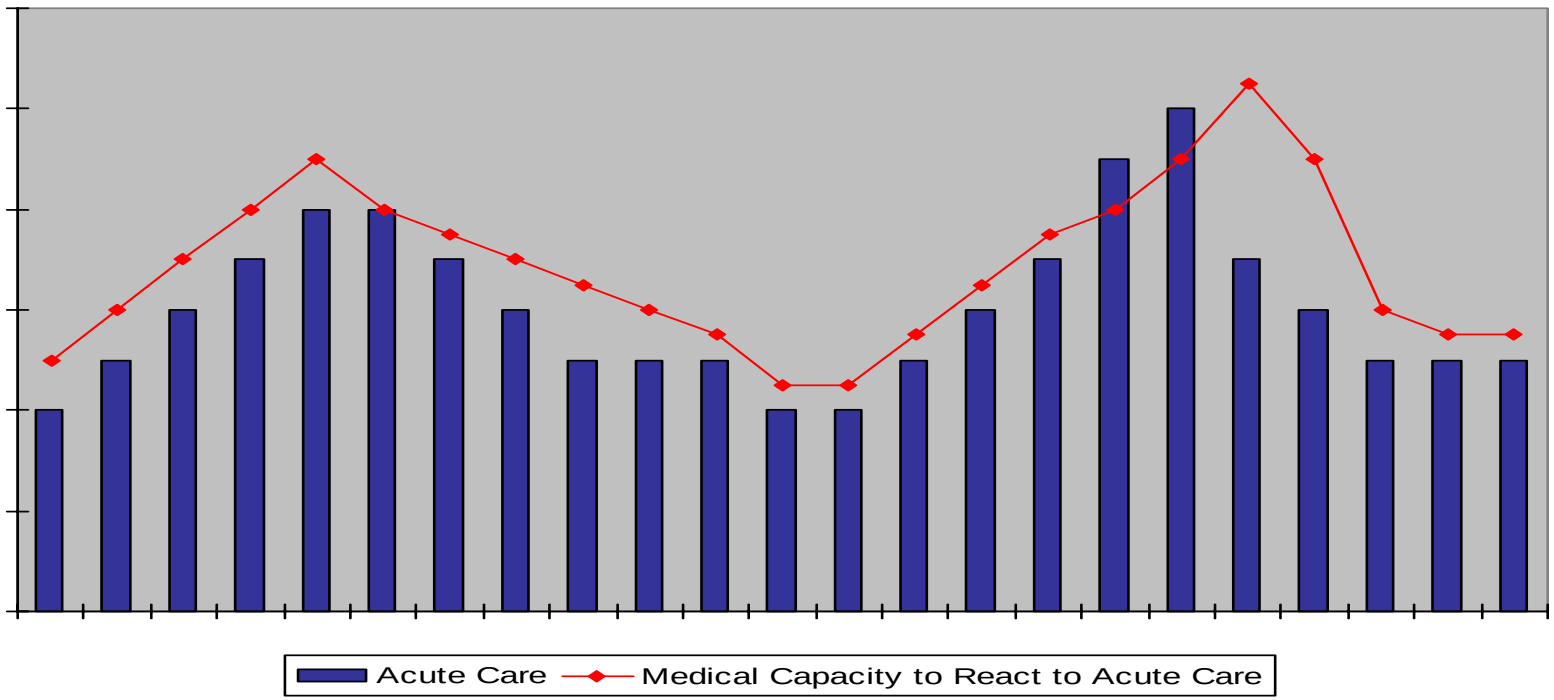
# What is “Success?”

# “Success” in Terms of “Medical/Health” Aspects of an Incident

- It’s NOT…
  - **Stopping a pandemic**
  - **Stockpiling “enough” medical supplies**
  - **Having “sufficient surge capacity”**
  - **Creating a new vaccine**

# “Success” is…

- Ensuring that society’s need for health care stays below it’s ability to provide it
  - **And maximizing that delta**



# Two Key Aspects of Population Protection and Care

- Management
  - **Plans**
  - **Doctrine and protocol**
  - **Implementation**
- Countermeasures
  - **Medical**
    - **Those things that directly effect the biology, metabolism, or status of the organism**
  - **Non-medical**
    - **Pretty much everything else**
      - Behavioral
      - Materiel
      - Social

# Management Issues

# Who Is "In Charge?"

- On August 23, 2005, Department of Homeland Security (DHS) Secretary Chertoff announced that **DHS would manage and direct the Federal Response to a pandemic of avian flu**.
- Shortly thereafter, the Department of Health and Human Services (DHHS), and much of the public health community, objected to this declaration. **They asserted that DHS was incapable of understanding the complexity of a medical disaster.** Because pandemic flu is a public health issue, they argued that the public health community should be "in charge."

# Public Health Resources

- The idea of DHHS and the Public Health community being “in charge” is somewhat reminiscent of the idea of the mice voting to bell the cat.
  - **How many resources do Public Health organizations and agencies have for responding to disasters?**
    - **Aircraft, fuel tankers, security personnel, helicopters, trucks, radios, satellites, shelters, relief funds, etc…**

# There is No Such Thing as a Medical Disaster!

- Saying HHS should be “in charge” of a pandemic makes as much sense as saying the Nuclear Regulatory Commission should be in charge if there is a nuclear reactor explosion
- There are disasters with medical components
- But they also have communications, command and control, logistics, etc. components as well.

# So Who Should be "In Charge?"

- Focus should be on:
  - **Identifying the agency and individuals who most clearly possess the highly complex skill sets, training, resources, and backgrounds needed to provide overall management of a crisis**
    - **Original concept of DHS was to have a single organization that was an expert in the location, integration, and management of individuals and organizations with these skill sets and specialized resources**
      - DHS was created to direct and provide resources during a crisis

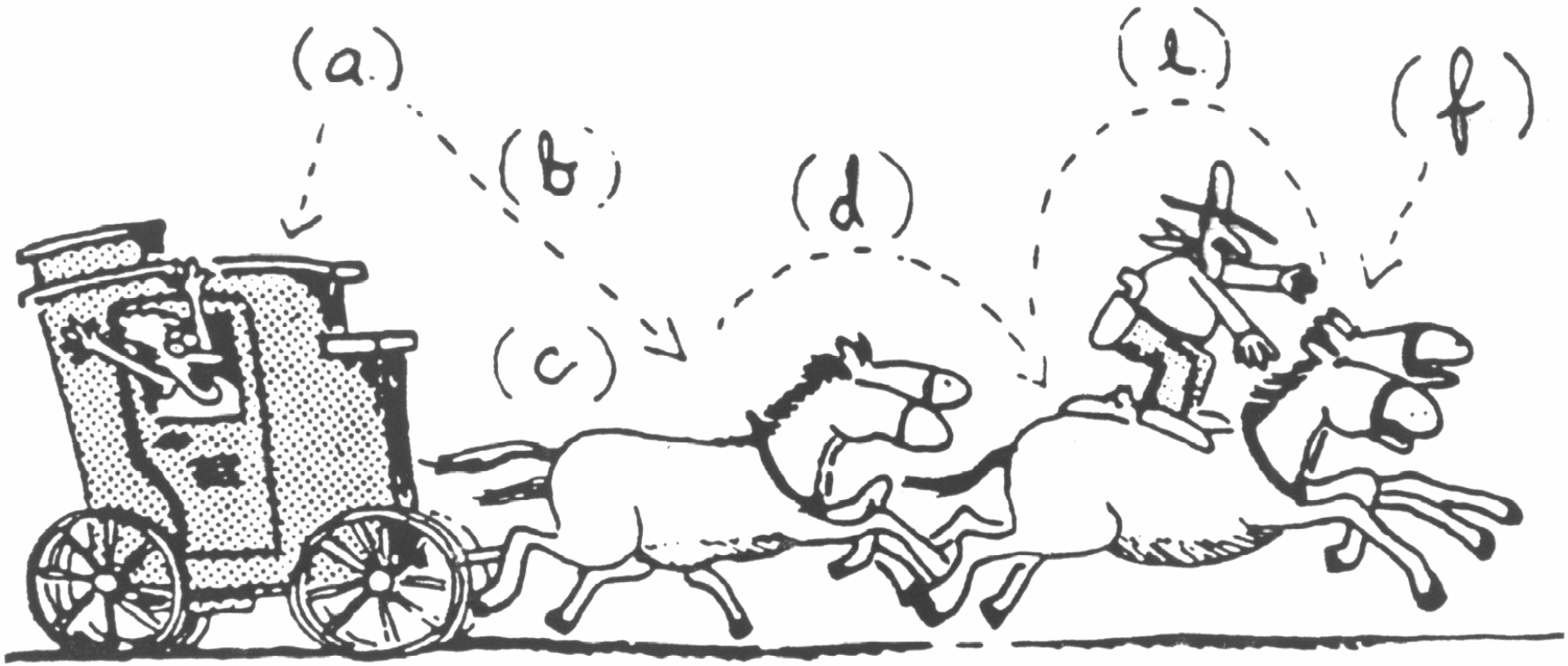
# What Does a Surgeon General Know?

- Discussion of Deputy Secretary of Homeland Security
  - **The former USAF Surgeon General was suggested**
  - **Several people asked "what does a physician know about homeland security?"**
- My Response
  - **A great deal more than a lawyer**
- Consider the skill sets employed today in management positions in many of our organizations

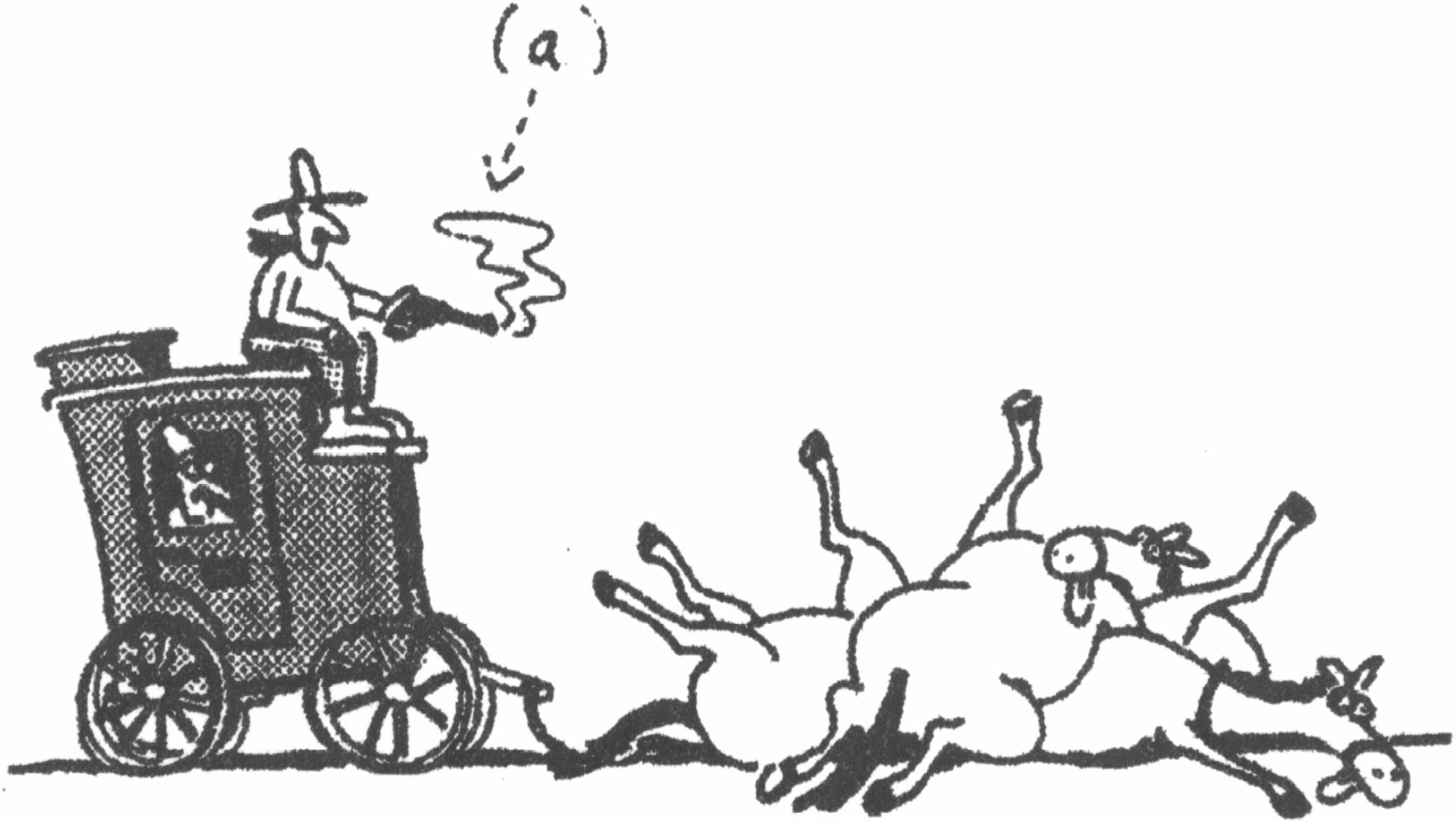
# Hurricane Katrina Response

A Complex Incident

# How to stop a Runaway Stage




# INNOVATIVE IDEA



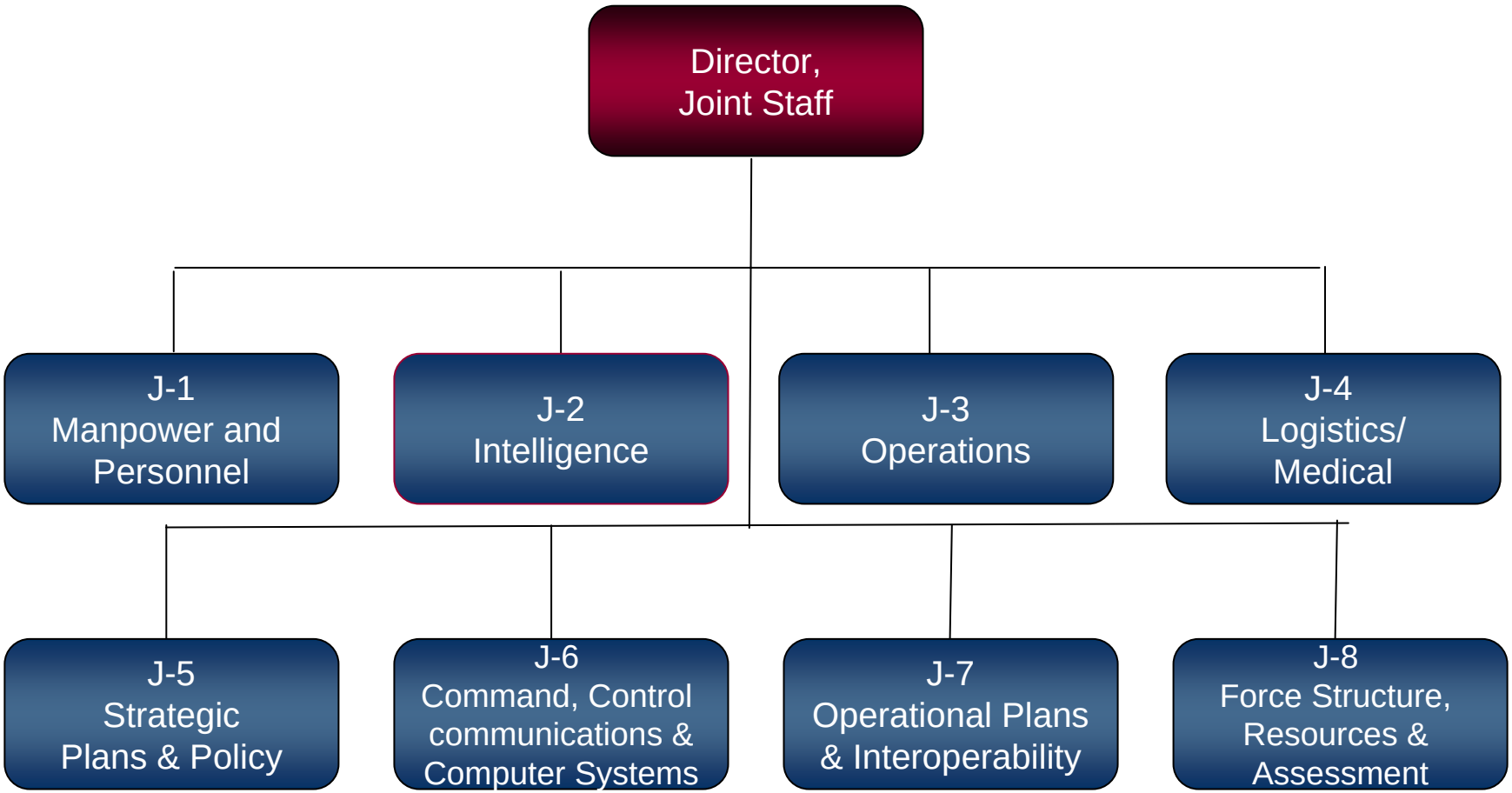

# SYSTEM IMPLEMENTATION

# The Most Complex of Incidents

# The Most Complex Man-made Endeavor That Ever Existed

- **War!**
- Without a doubt and without exception, war is by far the most complex operation and endeavor ever pursued by man
- War, at any level, really is the “oldest profession”
- Ultimately, war is a ***management problem***

# What Does it Take to Fight a War?



# What Does it Take to be "In Command?"

## Military Command Structure

- **Col. (0-6) equivalent to a CEO**
  - Regimental level (Navy 0-6 Commands carriers)
  - Largest operational unit
  - 6000 to 9000 persons
  - Supporting staff
  - 9-18 months additional training
  - Past joint staff assignment
  - 21-28 years of experience
- **LTC. (0-5) equivalent to a COO**
  - Battalion level
  - Typically the smallest unit capable of executing unsupported independent operations (7 to 14 days)
  - 900-1800 persons
  - Supporting staff (S-1 through S-6)
  - 9-18 months additional training
  - 16 to 21 years of experience
- **Capt. (0-3) equivalent to VP**
  - Company level
  - 180-300 persons
  - 9-18 months additional training
  - 7 to 9 years of experience
- **Lt. (0-1 & 0-2) equivalent to Directors**
  - Platoon level command
  - 30 -45 persons
  - College graduate
  - 3-6 months training
  - Entry level experience

# The Military Should ***NOT*** be "In Charge!"

- The are only an example of the complexities of managing an operation
  - **To show level of training, skill, and resource required**
- The military is a source of last resort for disaster response
  - **They should always be in a *supporting* role, and only after all other resources have been expended**

# Another Issue

Standard of Care

Vs.

Sufficient Care

# Standard of Care Vs. Sufficient Care

- Let’s consider another issue related to management

# Standard of Care

- The traditional standard for doctors is that they provide the
  - **"average degree of skill, care, and diligence exercised by members of the same profession practicing in the same or similar locality in light of the present state of medical and surgical science."**

*Gillette v. Tucker, 67 Ohio St. 106, 65 N.E. 865*

- "Standard of care" is defined as
  - **An established clinical benchmark of acceptable medical care *independent of the extant situation***

# Sufficient Care

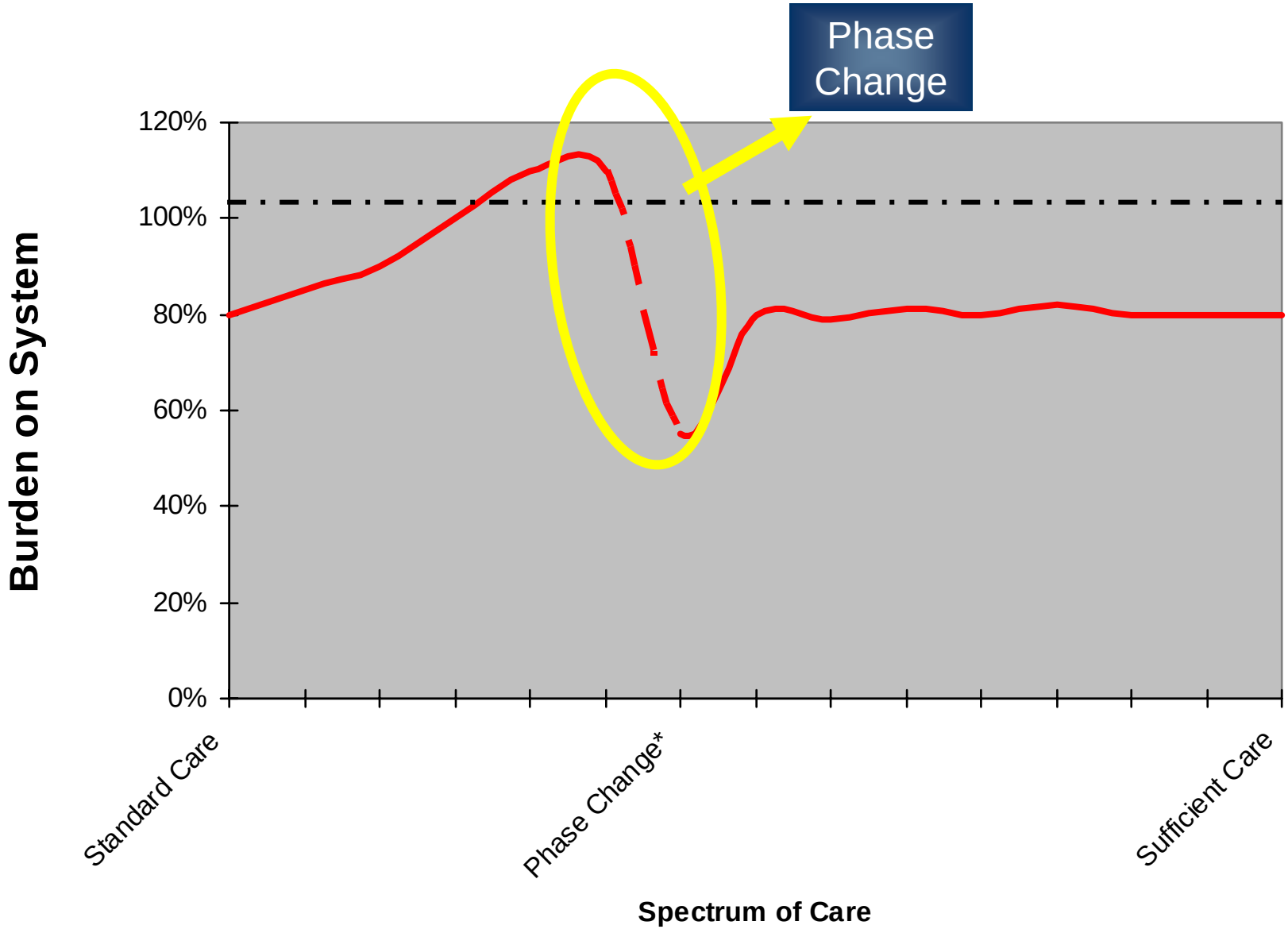
- Medical care that provides the most good for the greatest number of people under adverse conditions and/or limited resources
  - **People**
  - **Technology**
  - **Drugs/pharmaceuticals**
- Applied during mass casualty or other unconventional incidents
- Population or “herd” care

# Sufficient Care

- One case of cholera in Washington, D.C.
  - **Admission to ICU**
  - **Round-the-clock care by physicians and staff**
  - **Careful monitoring by CDC, with a nationwide health alert**
- 1,000 cases of cholera in Washington, D.C.
  - **Stay home**
  - **Drink lots of fluids**
  - **Be miserable for a week then you'll feel better**

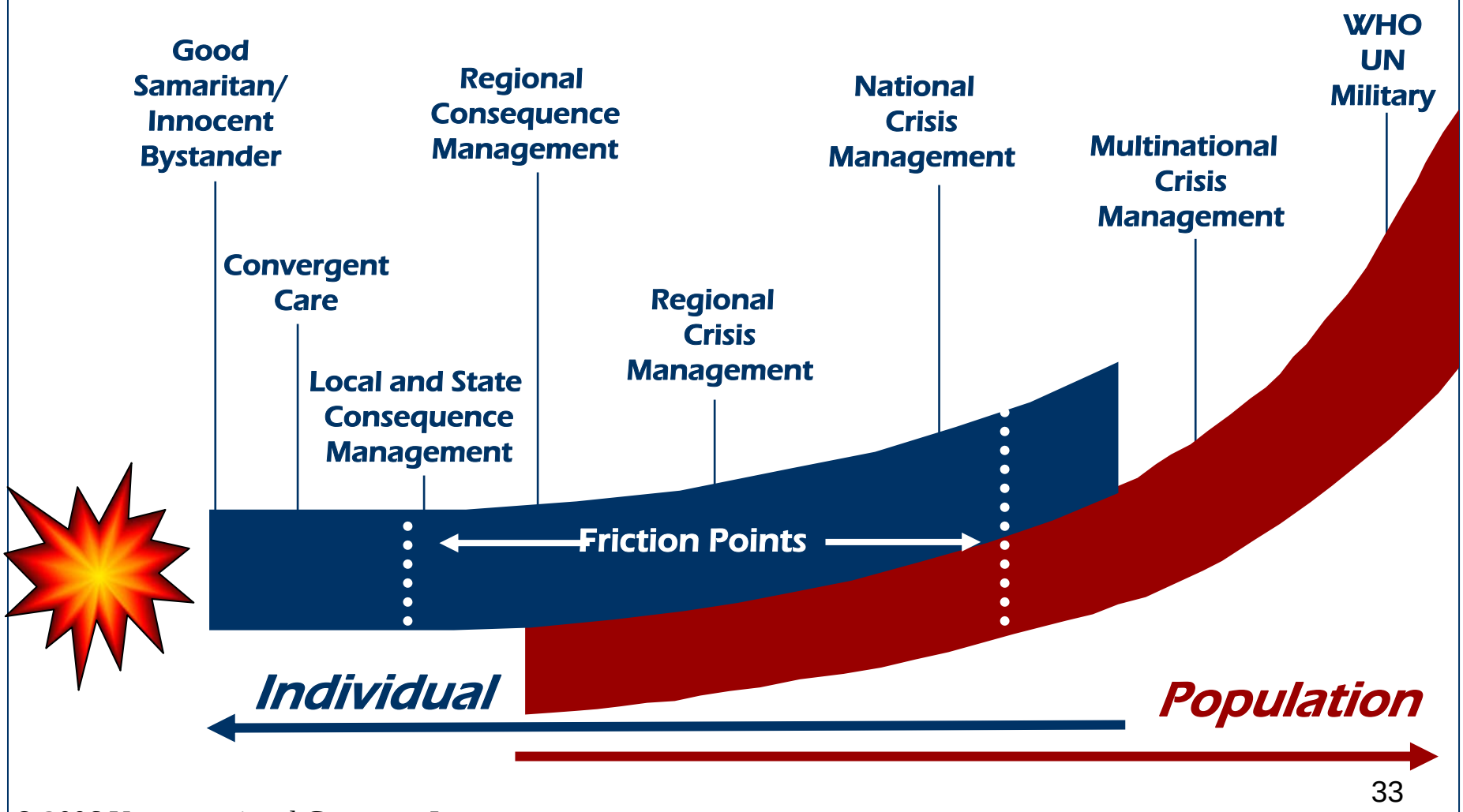
# Sufficient Care

- New concept in the U.S.
- Requires a wholly new paradigm
- Societal acceptance that “standard of care” will not be available
- Must be planned for
  - **Doctrine**
  - **Training**
  - **Practice**
- Must develop a common understanding and lexicon
- Must consider legislative and regulatory factors




* Phase Change is a fundamental paradigm shift in provision of care.
E.g., recovery at home rather than admission.

# Mass Casualty Care: Transition from Individual to Population

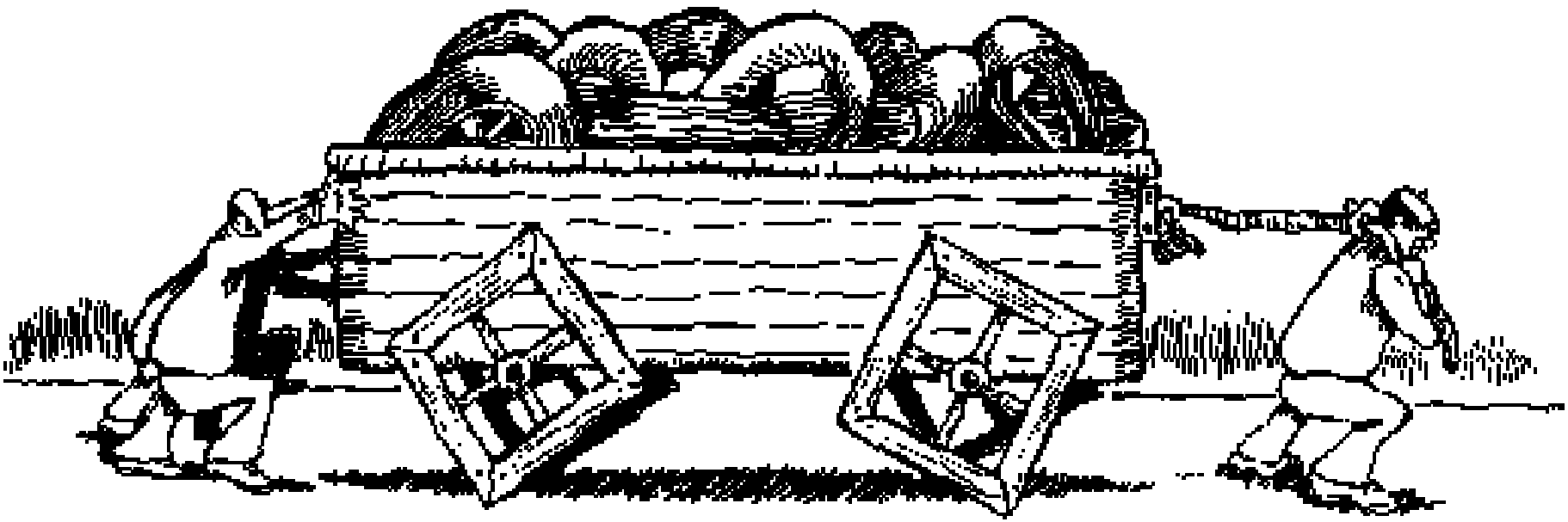


# Non-medical Countermeasures

# Countermeasures

- Medical is being debated ad nauseum
- Pragmatically, they're nice if you've got them, but don't count on them
- Fundamentally, we'll have to focus on ***non-medical*** countermeasures

# Our Current Approach

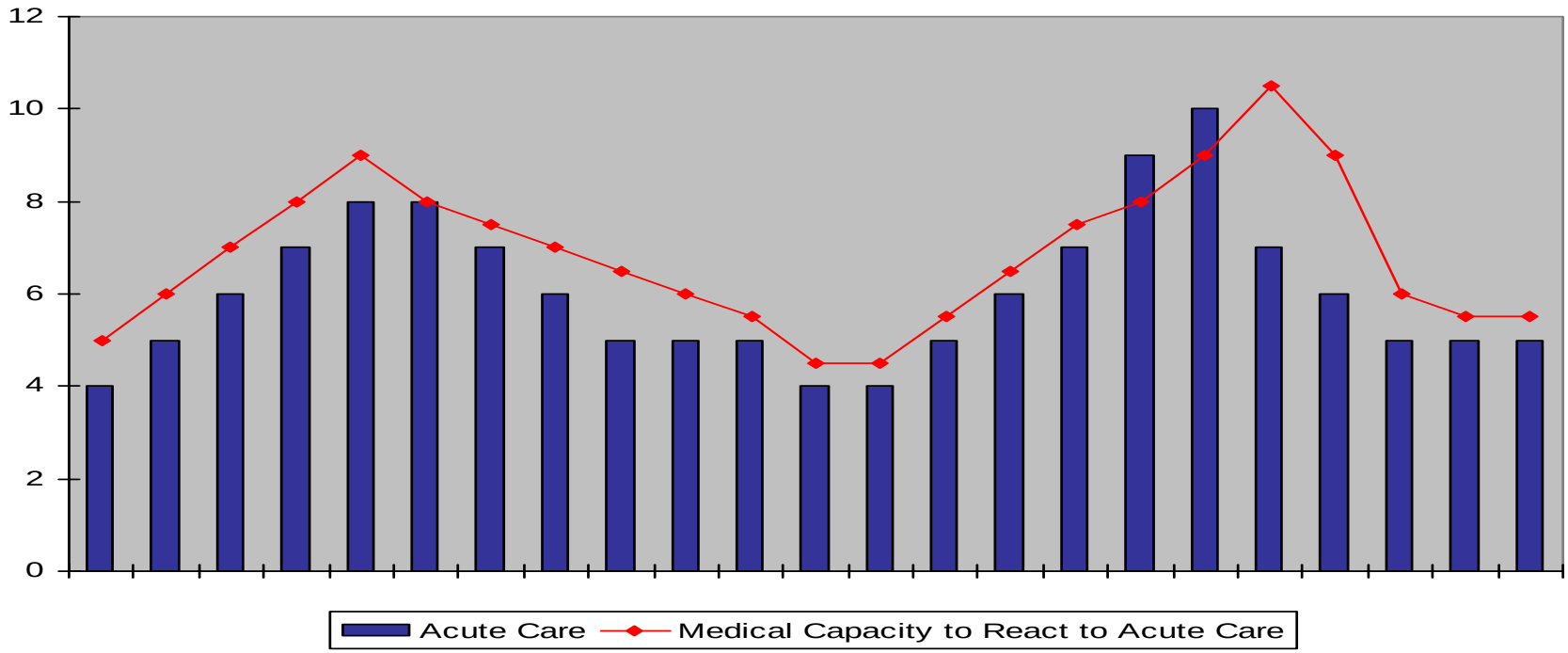


# Basic Assumptions for Countermeasures

- There will not be enough medical countermeasures for a major pandemic of any sort
  - **Insufficient drugs, vaccines, pharmaceuticals**
    - **Quantity or logistics**
  - **Not enough hospital space, medical personnel, etc…**
- It is not an issue of what we need but instead of what we have
  - **How do we make do with current resources, not future ones?**
  - **How do we effect a population?**
    - **Not just a group of individuals**
- Everyone is focused on the six log kill to protect an individual. We must focus on sufficient effectiveness to simply control the pandemic
  - **How do we slow the spread in a population just enough to ensure that there is sufficient medical care?**
  - **How much is "good enough?"**

# “Success” is…

- Ensuring that society’s need for health care stays below it’s ability to provide it
  - **And maximizing that delta**



# Who is the Target?

- *NOT* medical and health professionals
- Instead two other classes:
  - Community leaders
    - Governors
    - Mayors
    - County commissioners
    - Etc.
  - General population
    - The people themselves

# Non-Medical Countermeasures

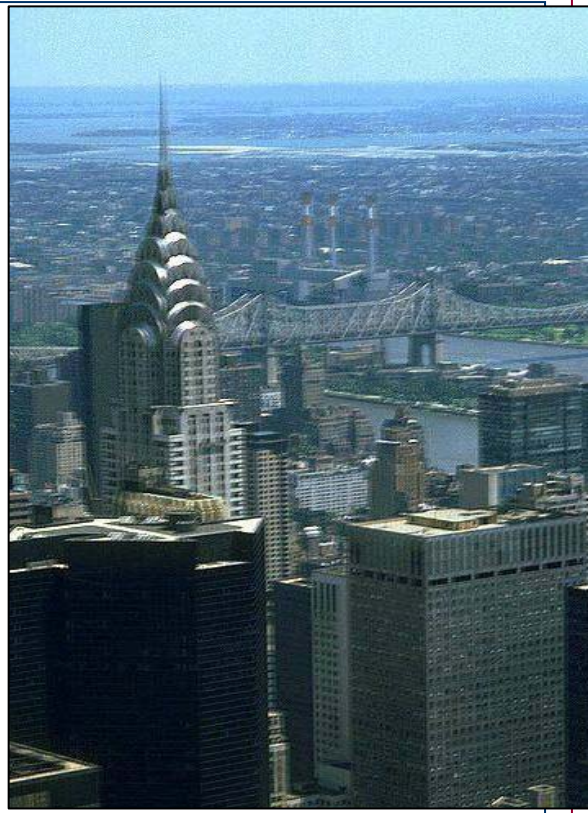
- Those actions or materiel, non-medical in nature, that can be taken to control the spread of a pandemic below the level at which society can effectively deal with it
- "Sufficient"
  - **The best is the enemy of the good!**
  - **Actions and technologies that, when used by enough people enough of the time, can keep health care needs below ability to provide them**

# Goal

- *Population, NOT individual health*
  - **Caring for and treating individuals is nice but it is secondary**
  - **The population MUST be the focus**
- Interrupt the process *prior* to becoming infectious
  - **This is what controls disease spread**
  - **Very difficult**
    - **Contagious a day or more before symptomatic**

- Increasing Global Travel
- Rapid access to large populations
- Poor global security & awareness

...create the potential for simultaneous creation of large numbers of casualties



# Perception

# The Truth Hurts

# Efforts to Calm The Nation's Fears Spin Out of Control

By JOHN SCHWARTZ

IF there's one lesson to be learned from the Bush administration's response to the anthrax threat, it's this: People in the grip of fear want information that holds up, not spin control.

Again and again in recent weeks, administration officials tried to reassure the public; again and again, the situation proved more serious than the officials had suggested. As a result, public trust has evaporated.

While the number of people known to be affected by the disease is still relatively small, and the number of deaths smaller still, the admission that the type of anthrax used was so deadly and so highly refined initially not told all that they knew in order to prevent a panic.

A similar back and forth ensued over the proper treatment for postal workers: first, they were told it was not necessary to take antibiotics. Then two postal workers died and officials belatedly realized that ultrafine powders could easily seep out of the unglued gaps in an envelope's seal, or even through pores in the paper.

The confusion only deepened, for many, the feelings of dread. It began to feel as if the United States was under the kind of relentless attack, against which defense could be futile, that London experienced from Hitler's V-2 rockets.


SHEESH! THIS OUTBREAK IS TOUGHER TO CONTAIN THAN THE ANTHRAX!
Rumors
BIOTERROR RUMORS
Rumors
Rumors
STAR TRIBUNE

# Crisis Mode and Panic

- It has become “in vogue” to speak of being in a crisis for months
  - March 13, 2006, ABC News — - In a remarkable speech over the weekend, *Secretary of Health and Human Services Michael Leavitt* recommended that Americans **start storing canned tuna and powdered milk under their beds** as the prospect of a deadly bird flu outbreak approaches the United States.
  - “If an influenza pandemic struck today, borders would close, the global economy would shut down, international vaccine supplies and health-care systems would be overwhelmed, **and panic would reign.”**

*Michael Osterholm, Foreign Affairs, July/August 2005*

- **Cats sleeping with dogs**
- **Republicans working with Democrats**
- **The end of society as we know it**

# Results

- Effects will be based on our ability to educate the public
  - **Not just *public health***
- Policy makers and talking heads are not just planning for disaster
  - **They are actually causing it**
- Assumptions are mostly unrealistic
  - **Day care centers are not shutting down for six months**
  - **People will not stockpile food for the length of a pandemic**

***AND THEY WON'T NEED TO!***

# Reality

- A pandemic, if it occurs, will last for months
  - **The total numbers of those affected are irrelevant; it is the *rate* that matters**
  - **Chicago**
    - **July 1995, 525 deaths due to heat wave over a 5-day period (1 out of every 13,000)**
    - **1918 death rate was 3.5 per 1000 people during an 8 week period of the flu pandemic.**
  - **France**
    - **August 2003, 14,802 deaths during a 30 day period due to heat wave (1 out of every 4,000)**
      - More than 19 times the death toll from the SARS epidemic worldwide
    - **1918 400,000 died due to influenza (over an entire year)**

# Reality

- We need to start studying and understanding *now* what the reality, not merely the perception, is
- Most guesses and estimates today are based on wildly unrealistic assumptions concerning population behavior
- *NO DATA* on methods of intervention, or their effectiveness

# So what are some options?

- What can be implemented *TODAY?*
  - **With available resources**
  - **Under current laws and regulations**
  - **At the state and local level**
    - **NOT at the federal level**
      - We don’t have time to wait

# Considerations

- Very little work has been done to explore how to effect the environment in such a way that it becomes inimical to the pathogen, thereby reducing or eliminating the spread of the disease
- The same question applies to society as well

# Some Non-medical Countermeasures

- Quarantine and Isolation
- Masks
- Hand washing and other personal hygiene practices
- Behavior changes
  - **Reducing population density in public places**
- Increasing ventilation in buildings
- Increase UV output in lights
- Reduce relative humidity
- Decrease person to person interaction times

# Careers More Vulnerable to Influenza

- Healthcare workers
- Bankers
- School teachers/workers/students
- Public transit workers
- Custodial staff
- Food service staff
- Jobs that require person to person interaction

# Other Approaches

- Local isolation of every person in a medical waiting room
  - **Gloves and masks/hoods**
    - **If they're sick, they won't transmit it**
    - **If they're well, they won't catch it**
  - **Protect the mucous membranes**
- Involve industry
  - **Enforce hand cleaning just like no-smoking**
  - **Telecommuting**
  - **Increase janitorial efforts and focus on steps to reduce disease spread**
    - **More frequent cleaning of door handles and telephones**
    - **Improved cleaning of public areas**
  - **More disposable items**
    - **Coffee cups**

# Other Approaches

- Use of fewer door handles
  - **Automatic doors**
    - **A possible new ordinance**
- Reduce population densities
  - **Extend hours in super markets**
    - **Certain zip codes on certain days**
    - **Sales/specials at off hours**
  - **Mass Transit**
    - **More frequent cleaning**
    - **Higher air flows**

# Fundamental Considerations

- No method will be perfect
  - **Though they must be effective at realistic implementation levels**
- No single method will be effective
  - **Must be considered systemically**
  - **Part of an overall, integrated system**
- A different mix of methods will be appropriate for each community
  - **But must achieve some minimum capability**

# Bottom Line
# "We Just Don't Know"

- Mass quarantine has never been used in modern times
- We are "guessing" at how to reduce spread of particles
  - **Is it better to cover you mouth when you sneeze?**
  - **Do masks really help?**
- **We need real data, not just best guesses!**

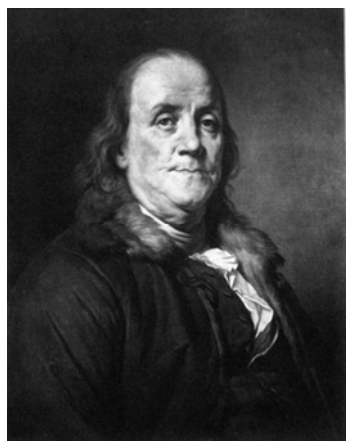
# Summary

- Response to disaster (pandemic, mass casualty, natural, etc.) can *NOT* be a physician or medical/health centric process
  - **Highly complex**
  - **Multi-disciplinary**
- Management of a disaster or pandemic must be handled as a management problem
  - **People skilled in management must be in charge.**
- We must take a broader, systemic view of population preparedness and response
- Medical countermeasures will never be sufficient
  - **We must consider alternatives**
- The federal government will have little value in response
  - **It will be local citizens, state and local governments that will prevail**

# Final Thought

We must all hang together, or we will surely all hang separately.

*Benjamin Franklin (1706-1790)*



***NOTHING*** REPLACES WELL TRAINED, COMPETENT AND MOTIVATED PEOPLE!

**NOTHING!**

***PEOPLE*** ARE **THE** MOST IMPORTANT ASSET

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