Full Scale Terrorism Response Exercises
Lessons Learned from T2

• Plume Modeling
  T2: Feds use scenario weather; state & local responders use real weather
  T3: LLNL Modeling Center

• Private Sector
  T2: Excluded
  T3: 156 participants, including representatives at both venues & MCC
How to Build a Bioterrorism Scenario?

1. Choose agent …
   If infectious scenario, then smallpox or plague

2. Choose casualties and fatalities ‘desired’
   \( T3 – \text{final casualty count set at 40,000} \)

3. Construct a reasonable terrorist – the Universal Adversary – model

4. Construct other parts of model (& hope they don’t conflict with 1, 2, &/or 3)
Contagious-ness

Basic reproductive rate or secondary transmission rate ($R_0$)

- If $R_0 < 1$ is considered indicative of an outbreak that is under control
- If $R_0 = 1$ then one infected person will infect one person
- If $R_0 > 1$ is regarded as signifying a spreading outbreak

$R_0$ too low = a model in which disease spread is unrealistically slow and may give a false sense of ease of response and infection control

$R_0$ too high = unrealistic scenario will result, which overly weighs the threat of one agent

Real world transmissions are often much more complicated than $R_0$ values convey
Cartoon Representing Disease Transmission

$R_0 < 1$

$R_0 = 1$

$R_0 = 2$

Exponential(!!)
Exercises & Smallpox Transmission

$R_0$

10  Dark Winter exercise (June 2001)

3  Atlantic Storm exercise (January 2005)

10 - 12  18th century inner-city London

10  1972 Kosovo, Yugoslavia outbreak
    (hospital-acquired)

3.5 - 6  Historical

1.8 - 3.2  Contemporary U.S. population
Pneumonic Plague

• **Symptoms**
  “fever, weakness, and rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery sputum”
  ... aka the usual flu-like symptoms

• **Incubation period**
  CDC considers the incubation period (time between exposure and onset of symptoms) to be 1-6 d
  8 well-documented pneumonic plague outbreaks:
  average incubation period = 4.3 d (variance = 1.8)
  average infectious period = 2.5 d (variance = 1.2)
T3 Incubation, Diagnosis & Confirmation

- Release 0200 Day -1 (Saturday)
  3 SUVs w/improvised sprayers along NJ turnpike
- First symptomatic case appears 0930 Day 0 (Sunday)
  31 h after release
- Diagnosis by 1700 on Day 1 (Monday)
  63 hours after notional release (~2.5 d)
- Day 3 (Wed) CDC reports confirmation of *Y. pestis* as agent
  *Barely plausible with notional diagnosis*
  *How realistic?*

What does it take to confirm *Y. pestis*?
- *Y. pestis* is a slow-growing bacterium
- Colonies are pinpoint after 24h on SBA
- Smaller than other Enterobacteriaceae growing for 24 hours on SBA
- May not be visible on MacConkey or eosin methylene blue agar at 24h
- Typically, *Y. pestis* cultures are viewed 48-72 hours of incubation
- Need secondary CDC-approved confirmation method
Assessments & Implications

T3 Hotwash:

- DHS S&T Directorate
  “Medical response capability to plague overly optimistic.”
- HHS & CDC  *No comment*

Artificiality of exercise play can lead to a false sense of

(1) the ease & accuracy of diagnosis,
(2) the time to symptom onset & spread of infectious agents.
Emergency Laws & Biological Emergencies

• T2 – the Top Officials recognized that plague does not trigger Stafford Act
  HHS Sec declared emergency under Public Health Service Act
  Problem noted in AAR

• T3 - nothing changed w/r/t Stafford Act
  Use DHS HSAS code “red” to federalize response
Long-term Recovery & Remediation (aka Decon)

• T2 Only 3 days
  AARs recognized decon as lacking in exercise
• T3 CT Venue exercise halted 1600 Day 4
  Decon just coming into play
  During Hotwash, EPA noted:
  “Termination inject caused confusion among players who were dealing with the decon of facilities and homes.”
  Unaddressed issue: dealing with people who “tracked stuff back into their homes.”
  No consideration of potential long-term health effects (or perceived among “worried well”) of HD exposure (e.g., cancer)
First Responder Observations

• Bob Walsh
  Deputy Fire Chief, Hartford CT:
  Most useful aspect of T3 was “observing toys” Hazmat & decon trucks – “Who has what?”

• Mike Weinlein
  Assistant Chief of Operations, FDNY:
  “Useless”
  Lack of transparency, particularly in after-action reports, limits utility
Conclusions

• Balancing need to exercise some response capabilities has pushed construct of models beyond reasonable artificiality.

  Making everything FOUO is NOT a meaningful solution!

• Unreasonable artificiality may lead to misconceptions and miscommunications affecting perception of threat and ease of response by policy makers and first responders.

• Decon is an after-thought in exercises.

  Whether it’s an RDD, anthrax spores or chemical agent, the financial, human and equipment resources required for decon are underestimated and under-emphasized.