Mother Nature is a Bioterrorist

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EMS Editor - Fire Engineering magazine
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Power Point version of these slides available at www.mikemcevoy.com

(Click on “Open Bar” tab)
Mike McEvoy - Books:

Emergency & Critical Care
Pocket Guide™ ACLS Version
©2006, Fifth Edition – Informed

- New ACLS Algorithms
- Acute Coronary Syndromes
- Stroke Management/Neuro
- Pediatric Resuscitation
- Medical Emergencies
- Emergency Medications
- Hemodynamics / Labs
- Prescription Drugs

Critical Care Transport

American College of Emergency Physicians
Series Editor: Andrew N. Pollak, MD, FAOPS
Disclosures

• I am a pandemic advisor to the CDC and several major corporations including critical infrastructure providers.
• I chair the emerging infectious diseases committee for the IAFC.
• I am the EMS editor for Fire Engineering magazine.
• I do not intend to discuss any unlabeled or unapproved uses of drugs or products.
Outline

• Bioterrorism
  – Past experience
  – Why Mother Nature is the greatest bioterrorist of all time

• What to worry about
  – Measles, MERS, Ebola, Bird Flu
  – The hype about influenza

• Public health response
  – Past, present, future…

• Actionable issues
Current Concerns: Today

- Measles
- Bird flu
- MERS-CoV
  - Middle East Respiratory Syndrome (Coronavirus)
- Ebola
- Seasonal influenza
- Resistance
Bioterrorism
Potential Bioterrorism Agents

- **Bacterial Agents**
  - Anthrax
  - Brucellosis
  - Cholera
  - Plague, Pneumonic
  - Tularemia
  - Q Fever

- **Viruses**
  - Smallpox
  - VEE
  - VHF

- **Biological Toxins**
  - Botulinum
  - Staph Entero-B
  - Ricin
  - T-2 Mycotoxins

Source: U.S. A.M.R.I.I.D.
10-9-01

Editor
New York Post
1211 Ave. of the America
New York NY 10036

Senator Leahy
433 Russell Senate Office Building
Washington D.C. 20510-4502
Tom Brokaw
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30 Rockefeller Plaza
New York NY 10112

09-11-01
This is next
Take Penicillin now
Death to America
Death to Israel
Allah is great

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Source: U.S. A.M.R.I.I.D.
Smallpox: Take the Shot or Not?

Planning an Effective EMS Exercise
Managing Chemical Exposures: the Engine Company Perspective
My Aching Back: How to Avoid On-the-Job Back Injuries
Frequent Fliers: The Increasing Burden of Repeat 9-1-1 Callers on EMS
The Fire-EMS Mission: Establishing a Mindset and a Vision
Let’s get real…

- Chemical
- Biological
- Radiological
- Explosive/Incendiary
- Cyberspace
- Unimagined…

70%
Boston Marathon...
The Greatest Bioterrorist

Rap Sheet:
- Smallpox
  \( \frac{1}{2} \text{ billion} \)
- Influenza
  \( \frac{1}{4} \text{ million/year} \)
- Plague
  137 million
- AIDS
  39 million
- SARS... 916
Measles

- Highly contagious virus
- Spread by respiratory secretions
  - Including coughing and sneezing
- Lives for up to 2 hours on surfaces/air
  - Can infect others after carrier leaves
  - 9 of 10 unvaccinated people will be infected
Measles in the U.S.

Measles—United States, 1950-2001

Cases (thousands)

- Vaccine Licensed

Measles prior to 1970...

- 3 to 4 million cases every year
  - Recovery did convey immunity
- 48,000 hospitalizations per year
- 500 deaths per year
- 4,000 measles encephalitis cases per year
Measles lately...

- Unvaccinated people are greatest threat to measles spread in US
- 20 million cases/yr in Europe, Asia, Pacific and Africa (146,000 deaths)
- International travel fuels outbreaks
- 2004 = 37 cases, 2014 = 644 (highest) all centered in areas w/ low vaccination compliance
189 cases total (113 CA)

2015 Measles Cases in the U.S.
January 1 to September 18, 2015

*Provisional data reported to CDC’s National Center for Immunization and Respiratory Diseases
Vaccines

Protect people:
- Those vaccinated (somewhat)
- Family members/contacts (more)

• 22 diseases (US)

• >60,000 die annually from preventable diseases
Conclusion: Immunizing children and adolescents with inactivated influenza vaccine significantly protected unimmunized residents of rural communities against influenza.
Meningococcal Infection 7 mos
AVIAN INFLUENZA
A pandemic of human influenza could kill up to 100 million people around the world in a worst case, a World Health Organization official said Monday, significantly raising the agency's earlier estimates of the potential number of deaths in such a catastrophe.
Epidemiology Imprecise:

Fall 2006 – Alaska, West Coast

Spring 2007 – East Coast

[Map showing migration routes of bird flyways]
December 2014 - HPAI

- 21 states report bird flu infections
- 48.1 million chickens, turkeys, other birds killed
- $191 million lost (poultry farms)
- Egg prices ↑ 80%
Should U Fear the Chicken?
Pope contracts Bird Flu...
From one of his Cardinals
Coronaviruses

- SARS, MERS
Coronaviruses

- Named for crown-like spikes
- Believed responsible for common colds
- Typically URI in humans
- Also GI s/s in animals
- Discovered in 1960’s
- SARS 11/02 – 4/04
MERS-CoV

- Middle East Respiratory Syndrome
  - First reported 2012 in Saudi Arabia
  - Fever, cough, SOB, high case fatality rate
  - Middle East and Korea largest outbreaks

- 1595 cases worldwide, 571 died
  - 2 US cases in May 2014 (IN, FL)
  - HCW from Saudi Arabia

- Believed virus came from camels
- Requires vigilance…
Saudi Arabia - Hajj

- Largest mass gathering in world
- Every able-bodied adult Muslim is required to make Hajj at least once
- Sept. 21-26, 2015 (2 million people)
The Pilgrimage...

THE SACRED JOURNEY
What it takes to complete the holy pilgrimage of Islam

The 5 stages of Hajj
1. Start of the main pilgrimage
2. Prayers at the Plain of Arafat
3. Pilgrims sleep at Muzdalifah
4. Jamaraat - stoning the pillars
5. Return to Mecca

The required pilgrimage dress:
Men wear two white cloths, one of which covers the body from the waist down, and one that is gathered around the shoulder, this is known as an "Ihram".

Women usually wear a simple white dress and headscarf, or their own native dress. Any garment which covers her so she is dressed modestly.

The required pilgrimage dress is a symbol of purity and equality.

Source: Ministry of Hajj KSA
Ebola Virus

- Prototype Viral Hemorrhagic Fever Pathogen
  - Filovirus: enveloped, non-segmented, negative-stranded RNA virus
  - Severe disease with high case fatality
  - Absence of specific treatment or vaccine

- >20 previous Ebola and Marburg virus outbreaks
- 2014 West Africa Ebola outbreak caused by Zaire ebolavirus species (five known Ebola virus species)
Ebola Virus

- Zoonotic virus – bats the most likely reservoir, although species unknown
- Spillover event from infected wild animals (e.g., fruit bats, monkey, duiker) to humans, followed by human-human transmission
This graph shows the cumulative reported cases in Guinea, Liberia, and Sierra Leone provided in WHO situation reports beginning on March 25, 2014 through the most recent situation report on January 14, 2015.
Ebola Virus Transmission

- Virus present in high quantity in blood, body fluids, and excreta of symptomatic EVD-infected patients

- Opportunities for human-to-human transmission
  - Direct contact (through broken skin or unprotected mucous membranes) with an EVD-infected patient’s blood or body fluids
  - Sharps injury (with EVD-contaminated needle or other sharp)
  - Direct contact with the corpse of a person who died of EVD
  - Indirect contact with an EVD-infected patient’s blood or body fluids via a contaminated object (soiled linens or used utensils)

- Ebola can also be transmitted via contact with blood, fluids, or meat of an infected animal
  - Limited evidence that dogs become infected with Ebola virus
  - No reports of dogs or cats becoming sick with or transmitting Ebola
Human-to-Human Transmission

- Infected persons are not contagious until onset of symptoms
- Infectiousness of body fluids (e.g., viral load) increases as patient becomes more ill
  - Remains from deceased infected persons are highly infectious
- Human-to-human transmission of Ebola virus via inhalation (aerosols) has not been demonstrated
Ebola Symptoms

Signs include fever (> 38.0°C or 100.4°F) (87%) and:

- Fatigue (76%)
- Vomiting (68%)
- Diarrhea (66%)
- Loss of appetite (65%)
- Severe headache
- Muscle pain
- Abdominal pain
- Unexplained hemorrhage

- Incubation period: 2 – 21 days (average 8-10 days)
- Not contagious until symptomatic
Ebola Response

- BERT (Biological Emergency Response Team)
Influenza Virus

- Orthomyxoviridae single strand RNA respiratory viruses

- **Type A** (most severe, 2 subtypes)
  - Humans, birds (avian)*, pigs (swine), horses (equine), other animals. *wild birds are natural hosts*
  - Affects all ages
  - Epidemics and pandemics

- **Type B** (less severe, no subtypes)
  - Humans only
  - Primarily affects children (can be severe in elderly)
  - Milder epidemics, cannot cause pandemics

- **Type C** (mild to no symptoms)
  - Humans and pigs (swine)
  - Rare (?) - by age 15, most have antibodies
Influenza Vaccine

- 2015-2016:
  - (A) H1N1
  - (A) H3N2
  - (B) Phuket (2013)
  - (B) Brisbane*

*Quadrivalent only
Flu Vaccine Effectiveness

- SWAG method
- 2011-2012 was 71% effective
- 2014-2015 was only 18% effective
  - Antigenic drift responsible
  - Two different strains combine
Influenza A - subtypes

HA (hemagglutinin)
- 15 types (H5, H7, H9)

NA (neuraminidase)
- 9 types (N1, N2)
Influenza Epidemiology

• Viruses normally species specific
• “Spill over” extremely rare
Natural hosts of influenza viruses

<table>
<thead>
<tr>
<th>Haemagglutinin subtype</th>
<th>Neuraminidase subtype</th>
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<tr>
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From animals to people:
Timeline of Emergence of Influenza A Viruses in Humans

1918: Spanish Influenza
1957: Asian Influenza
1968: Russian Influenza
1977: Hong Kong Influenza
1997: Avian Influenza
1998/9: H5
2003: H7

H1: 1918
H2: 1957
H3: 1968
H5: 1977
H9: 1998/9
Influenza is a serious illness

- Annual deaths (US): 36,000*
- Hospitalizations: >200,000*

* 1990’s estimates from average 500 million annual cases (Worldwide death rate > 250,000 annually)

- Who is at greatest risk for serious complications?
  - persons 65 and older (comprise 85% of deaths)
  - persons with chronic diseases
  - infants
  - pregnant women
  - nursing home residents (attack rates of 60% vs. general population attack rates of 5-20%)
Influenza

- **Respiratory infection**
- **Transmission**: Contact with respiratory secretions from an infected person who is coughing and sneezing
- **Incubation period**: 1 to 5 days from exposure to onset of symptoms (typical 2 days)
- **Communicability**: Maximum 1-2 days before and 4-5 days after onset of symptoms (kids > 10 days and possibly up to 6 months)
- **Timing**: Peak usually December - March (NA)
Flu or common cold?

What distinguishes flu from a butt kickin’ common cold?
Influenza Symptoms

- Rapid onset of:
  - Fever (>100°F in 99.3%)
  - Chills
  - Body aches
  - Sore throat
  - Non-productive cough
  - Runny nose
  - Headache

- Hallmark = sudden onset
How you get the flu:

- Germs are transmitted
- Greatest period of infectivity correlates with fever
How close is too close?

Danger area around sick people is 3 feet.
How germs are transmitted:
Nose ➔ Hand ➔ Object

- Doorknob
- Telephone
- Radio mic
- Pens, keyboards
- SCBA, EMS bags
- Steering wheel
- Etc…
Influenza Viruses

- Hard non-porous surfaces 24-48°C
  - Plastic, stainless steel, etc.
- Cloth, paper & tissue 8-12°C
  - Transferable to hands for 15 minutes
- Hands ➔ viable for < 5 min
- ↓ temp, ↓ humidity = ↑ survival
Prevention: Vaccination

Did you get a flu vaccine?

Vaccination is our single most powerful weapon.
Take Home Points: Flu Shot

1. Employers must offer flu shots
2. Just because you never get sick:
   - Does not mean you won’t infect family
   - Does not mean you won’t infect patients
3. Unvaccinated HCW are negligent
Revised Flu Guidelines 2011

- Surgical mask on the patient
- Vaccinate all FF, EMS, and HCW
- Handwashing
- Gloves
- Consider mask for EMS
- N-95 only for AGP (Aerosol Generating Procedures)
Flu Vaccination – NYS 2013

- Mandatory for HCW
  - Employer must provide at no cost
  - Sign a declination form if refused
- Unvaccinated HCW must wear a mask for all patient contacts
- Does not (currently) cover EMS
  - Commissioner’s regs do not reach EMS
  - Hospitals will require unvaccinated EMS workers to wear mask when entering ED
Flu Pandemics 20th Century

1918: “Spanish Flu” A(H1N1)
20-40 m deaths
>675,000 US deaths

1957: “Asian Flu” A(H2N2)
1-4 m deaths
70,000 US deaths

1968: “Hong Kong Flu” A(H3N2)*
1-4 m deaths
34,000 US deaths
FIGURE 1. Crude death rate* for infectious diseases — United States, 1900–1996†

*Per 100,000 population per year.
Pandemic oops:

1976: “Swine Flu” A(H1N1)
   1 death (13 infected)
   >25 GBS deaths from 40 m vaccines

2003: “SARS” unknown
   774 deaths
   No US deaths

2003: “Bird Flu” A(H5N1)
   262 deaths to date
   No US deaths
But were there lessons learned?
Severe Acute Respiratory Syndrome (SARS)
Except:
Toronto EMS – Spring 2003

- 41 Stations
- 95 units/shift (180,000 transports/year)
- 850 medics
- Over 400 medics quarantined for unprotected SARS exposures
- 4 actually infected
- Crippled 911 system

Newsweek

SARS
What You Need to Know
The New Age of Epidemics
Is this JUST an EMS Problem?

• Most certainly NOT!

• Total deaths worldwide from SARS: 916 (of total 8,422 cases reported from Nov 2002 through Aug 2003).

• 25 % of deaths were HCWs (Health Care Workers). Fully one quarter of SARS infections were HCWs.
Health Care Worker Deaths

- Startling numbers of HCWs infected
- Total deaths worldwide from SARS: 916 (of total 8,422 cases reported from Nov 2002 through Aug 2003)
- 25% of deaths were HCWs (Health Care Workers). Fully one-quarter of SARS infections were HCWs.
- Reason? Breaks in infection control procedures!
Name change to protect pigs

H1N1

SWINE FLU
Tasmania, Australia EMS

- 10 ambulance officers isolated (15% of force) H1N1
- 4 June 2009

“If people don’t take it seriously, this sort of thing will happen…”
U.S. Response

- CDC: notified clinicians, issued guidance
- Public Health Emergency declared
  - Allowed release of funds
  - ¼ SNS pushed to states (Rx, N-95s)
- Laboratory testing
  - Test kits developed for State labs
  - Sensitivity to Oseltamivir (Tamiflu®) & Zanamivir (Relenza®)
- States charged to direct local actions…
- Vaccine development begun
Did the plan work?

What plan?
US caught with pants down

- Pandemic plans were predicated on outbreaks starting in Europe
- Believed U.S. would have weeks or months to prepare
- Instead, outbreak started in U.S. !
- AND: plans all predicated on large numbers of deaths...
Novel H1N1 Spread...

Geographic spread of influenza activity
(Geographic spread reflects the number and distribution of regions within a country reporting influenza activity)

Status as of Week 31
27 Jul - 02 Aug 2009
H1N1 projections

• US Population = 307 million
• Projected 20 – 60 % infected
  – CDC estimated 40% if no vaccine ready
  – Usually 5 – 20% infected with seasonal flu
  – Seasonal flu death rate is 1 per 1000 (0.1%) 
  – H1N1 death rate turned out to be 1 per 48,000 (0.048%)
H1N1 actual

- US Population = 307 m
- 57 million became ill (19%)
  - 257,000 hospitalized
  - 11,690 deaths (rate = 0.0002%)
  - Over 8 month period, peaked in October
  - Was not widespread in any single state for greater than 1 month

Source: CDC 15 Feb 2010
And in hindsight...

Parliamentary Assembly Council of Europe (PACE) denounces WHO’s “waste of large sums of public money…unjustified scares…undue influenced by pharmaceutical industry”

British Medical Journal (BMJ) investigation of WHO uncovered “lack of transparency…conflicts of interest…key pandemic scientists funded by Roche and GSK (antiviral drug companies) that profited tremendously from WHO recommendations”
Why all the hysteria?
It appears we were duped

1. Big pharma clearly influenced key decision makers
2. Decision makers pushed hard for vaccinations
3. Big pharma profited immensely
4. The pandemic was not serious
We need to be smarter
Fire Police Captain John Brenckle
1947 - 2004

Berkeley Hills Fire Company Station 247
Pittsburgh, PA
LODD September 23, 2004
Necrotizing Fasciitis
Success is within reach
Why do HCW get infected and die?
Show me the money...

**HCW non-adherence w/ PPE recommendations:**

1. Believe not necessary, inconvenient, disruptive
2. Lack of PPE availability
3. Inadequate infection control training
4. Lack of systematic HCW safety approach
5. Failure to recognize need (situational)

Visentin et al. CJEM 2009;11:44-56
First Rule of Infection Control

Wash your hands!

- Alcohol based hand rubs
  - Superior (CDC, October 25, 2002)
- Soap & water when dirty
Wash Your Hands...

RNs: 71 – 95%

EMS: 1 – 34%

DOCs: 60 – 80%
EMS Handwashing

• Urban EMS System – Minneapolis, MN: 6 month study

http://dx.doi.org/10.1016/j.jemermed.2013.08.070

Selected Topics: Prehospital Care

HAND SANITIZATION RATES IN AN URBAN EMERGENCY MEDICAL SERVICES SYSTEM

Jeffrey D. Ho, MD,† Rebecca K. Ansari, MD,‡ and David Page, EMT-P§

‡Departments of Emergency Medicine and Emergency Medical Services, Hennepin County Medical Center, Minneapolis, Minnesota, †Department of Emergency Medicine, North Memorial Medical Center, Robbinsdale, Minnesota, and §EMS Education Department, Inver Hills Community College, Inver Grove Heights, Minnesota

Reprint Address: Jeffrey D. Ho, MD, Departments of Emergency Medicine and Emergency Medical Services Hennepin County Medical Center, 701 Park Avenue South, Minneapolis, MN 55415
EMS Handwashing

• Urban EMS System – Minneapolis, MN: 6 month study

• Medics:
  – 1.1% prior to patient contact
  – 62.8% after patient contact
  – 19% before meals
  – 59.5% after meals
Resistance

- Bacteria become tolerant, they also become less sensitive to certain antibiotics
- Triclosan has induced resistance to INH
Exposure Control Plan

Gloves, worn once, thrown away

ULTRAFLEX
POWDER-FREE LATEX EXAMINATION GLOVES

- Protein rated
- Textured
- Extended cuff
- Single-use only

CAUTION

Do not reuse the gloves for any other purpose after use. Do not use the gloves if the package is damaged or leaking. Do not allow the gloves to come into contact with sharp objects or hot surfaces. Do not use the gloves if they are damaged or have any defects.

EXTENDED-CUFF
POWDER-FREE
ORDER # UL-315
The Glove Problem

http://www.aricjournal.com/content/2/S1/03

O003: The misuse of clinical gloves: risk of cross-infection and factors influencing the decision of healthcare workers to wear gloves

J Wilson, S Lynam, J Singleton, H Loveday

From 2nd International Conference on Prevention and Infection Control (ICPIC 2013)
Geneva, Switzerland. 25-28 June 2013

The Glove Problem

- Gloves used inappropriately 42% of time
  - Inappropriate = no risk of BBP exposure
- 39% uses involved cross-contamination
  - More likely with inappropriate use (58% vs. 28%)
- 24% involved > 5 objects touched by gloved hand prior to performing procedure

Gloves

For people, not equipment
Second Rule of Infection Control

Stay Away!

- If you are sick, stay home! (until 24 hr w/o fever)
- If you must be around others, don’t touch them and wear a mask.
How do you detect flu?

- Signs and symptoms
  - Fever most consistent s/s any infection
  - Not just fever, but high fever (> 100° F)
SARS Symptoms Reported at Hospital Admission (% with symptom, n=144)

- Reported fever: 99.3%
- Non-prod cough: 69.4%
- Myalgia: 49.3%
- Dyspnea: 41.7%
- Headache: 35.4%
- Malaise: 31.2%
- Chills: 27.8%
- Diarrhea: 23.6%
- Nausea or Vomiting: 19.4%
- Sore Throat: 12.5%
- Arthalgia: 10.4%
- Chest Pain: 10.4%
- Productive Cough: 4.9%
- Dizziness: 4.2%
- Abdominal Pain: 3.5%
- Rhinorrhea: 2.1%

JAMA, June 4, 2003 – Vol 289, No. 21 (SARS in the Greater Toronto Area)
Who’s infected?
Measuring Temperature

Hospital
1. PA (Pulmonary Artery)
2. Esophageal
3. UBT (Urinary Bladder)
4. Rectal
5. Oral
6. Tympanic

Prehospital
1. Patient opinion
2. Provider impression
3. Tympanic screening
Measuring Temperature

The BEST method:
1. Patient opinion
Public Safety Oversight

Does your 911 center question callers about severe respiratory illness?
Measuring Temperature

At EMD

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<table>
<thead>
<tr>
<th>KEY QUESTIONS</th>
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</thead>
<tbody>
<tr>
<td>1. Is s/he completely alert (responder appropriate)?</td>
</tr>
<tr>
<td>2. (Difficulty communicating) Describe to me what this is about.</td>
</tr>
<tr>
<td>3. Is s/he changing color?</td>
</tr>
<tr>
<td>a. (Yes) Describe the color change.</td>
</tr>
<tr>
<td>4. Does s/he have a fever (not to touch in room temperature)?</td>
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<tr>
<td>5. Is s/he coughing?</td>
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<tr>
<td>6. Does s/he have a sore throat?</td>
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<td>7. Does s/he have body aches?</td>
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<td>8. Does s/he have a runny or stuffy nose?</td>
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<tr>
<td>9. Does s/he have diarrhea or vomiting?</td>
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<tr>
<td>10. Is s/he having chills or sweats?</td>
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<tr>
<td>11. Does s/he have a headache?</td>
</tr>
<tr>
<td>a. (Yes &amp; no other flu symptoms) Was there a sudden onset of severe pain?</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>LEVELS</th>
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<tr>
<td>D</td>
<td>1</td>
<td>INEFFECTIVE BREATHING with flu symptoms</td>
<td>36-D-1</td>
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<td>2</td>
<td>Not alert with flu symptoms</td>
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<td>DIFFICULTY SPEAKING BETWEEN BREATHS with flu symptoms</td>
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<td>CHANGING COLOR with flu symptoms</td>
<td>36-D-4</td>
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<td>Chest pain ≥ 35 with single flu symptom</td>
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<td>Abnormal breathing with single flu symptom</td>
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<td>A</td>
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<td>Chest pain ≥ 35 with multiple flu symptoms</td>
<td>36-A-1</td>
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<tr>
<td></td>
<td>2</td>
<td>Chest pain &lt; 35 with single flu symptom</td>
<td>36-A-2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Abnormal breathing with multiple flu symptoms</td>
<td>36-A-3</td>
</tr>
<tr>
<td>Ω</td>
<td>1</td>
<td>Flu symptoms only (cough, fever, chills or sweats, sore throat, diarrhea, body aches, headache, etc.)</td>
<td>36-Ω-1</td>
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<tr>
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<td>2</td>
<td>Chest pain &lt; 35 with multiple flu symptoms</td>
<td>36-Ω-2</td>
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Infection Keys:

• Rash
Infection Keys:

- High Fever \textbf{or} Rash
- Look sick

AND
Public Health Initiatives

• Drive through flu-screening clinics
  – Not desirable to have infected patients in doctors offices or hospital EDs
  – Quick, easy, large numbers seen

• Confounders
  – Comorbidities
  – CO
<table>
<thead>
<tr>
<th>SpCO%</th>
<th>Clinical Manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5%</td>
<td>None</td>
</tr>
<tr>
<td>5-10%</td>
<td>Mild headache, tire easily</td>
</tr>
<tr>
<td>11-20%</td>
<td>Moderate headache, exertional SOB</td>
</tr>
<tr>
<td>21-30%</td>
<td>Throbbing headache, mild nausea, dizziness, fatigue, slightly impaired judgment</td>
</tr>
<tr>
<td>31-40%</td>
<td>Severe headache, vomiting, vertigo, altered judgment</td>
</tr>
<tr>
<td>41-50%</td>
<td>Confusion, syncope, tachycardia</td>
</tr>
<tr>
<td>51-60%</td>
<td>Seizures, unconsciousness</td>
</tr>
</tbody>
</table>

Carbon Monoxide Poisoning Presents Like the Flu!
CO: The Leading Cause of Poisoning Deaths Worldwide

30-50% of CO-exposed patients presenting to Emergency Departments are misdiagnosed.

Pulse CO-oximetry
Hgb Signatures: SpCO Physics

![Graph showing Hgb Signatures: SpCO Physics](image)
Pandemic Panic?
What about Supplies?

- Extreme shortages
  - Masks
  - Hand gel
  - Gloves

- Many had no stockpiles
  - Private sector better prepared
### US Hospitals: Reported shortages and backorders

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>N-95 masks</td>
<td>58%</td>
<td>21%</td>
<td>26%</td>
</tr>
<tr>
<td>Surgical masks</td>
<td>38%</td>
<td>11%</td>
<td>17%</td>
</tr>
<tr>
<td>Eye Protection</td>
<td>11%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Needles</td>
<td>22%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Hand gels</td>
<td>28%</td>
<td>6%</td>
<td>11%</td>
</tr>
</tbody>
</table>

*Materials Management in Healthcare, AHRMM and APIC: July 2010*
A SEVERE SHORTAGE OF SURGICAL MASKS PROMPTS SOME PEOPLE TO THINK OF ALTERNATIVE PROTECTIVE MEASURES AGAINST THE SARS EPIDEMIC (SEVERE ACUTE RESPIRATORY SYNDROME)
More About Masks

- Benefit of wearing masks by well persons in public settings has not been established
  - Persons may *choose* to wear a mask:
    - Keep hands away from your face!
    - Clean hands if you touch your mask!
Conclusion:

“...use of a surgical mask compared with an N95 respirator resulted in noninferior rates of laboratory confirmed influenza.”
To prevent H1N1 Transmission:

- Dentists wear n-95 masks
- Patients wear surgical masks
Do you have an alert system?
What to advise the public:

• Wash your hands
• Cover your cough
• If you’re sick, stay home
• Be prepared:
  – Get a flu shot every year
  – Stay rested and eat a healthy diet
  – Keep supplies on hand for self & family
What’s coming?

1. Transdermal flu vaccine
   - Just beginning 5 year clinical trials
   - Appears more effective than injectable

2. Mandatory HCW vaccination
   - Already required
   - States and CDC
Glo Germ Powder™
www.glogerm.com

• Synthetic Organic Colorant
• Colorless, odorless, same size as typical bacteria (5 microns)
• Appears under ultraviolet (black) light
Questions?

www.mikemcevoy.com