

Infection Prevention and Emergency Management

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Objectives

- Impact of infectious diseases during disasters
- Interventions for infection prevention during disasters
 - All healthcare settings
- How to assess organization's response plan r/t infection prevention

9/11: Food Safety at the Pentagon



Hurricane Katrina



Biggest Threat r/t Infectious Diseases



Battling Bioterrorism



Bird Flu



**Emerging
infectious disease**

Impact of 2003 SARS Outbreak

SARS Demographics 2003 Outbreak

Total cases: 8,096
Mortality rate: 9.6%

Nosocomial transmission 55 - 72%

72% of cases in Canada were HCWs

Costs: \$18 billion in Asia; \$1.5 - \$2.1 billion in Canada

HCW infection associated with aerosolizing procedures & poor infection prevention practices, including PPE use/removal



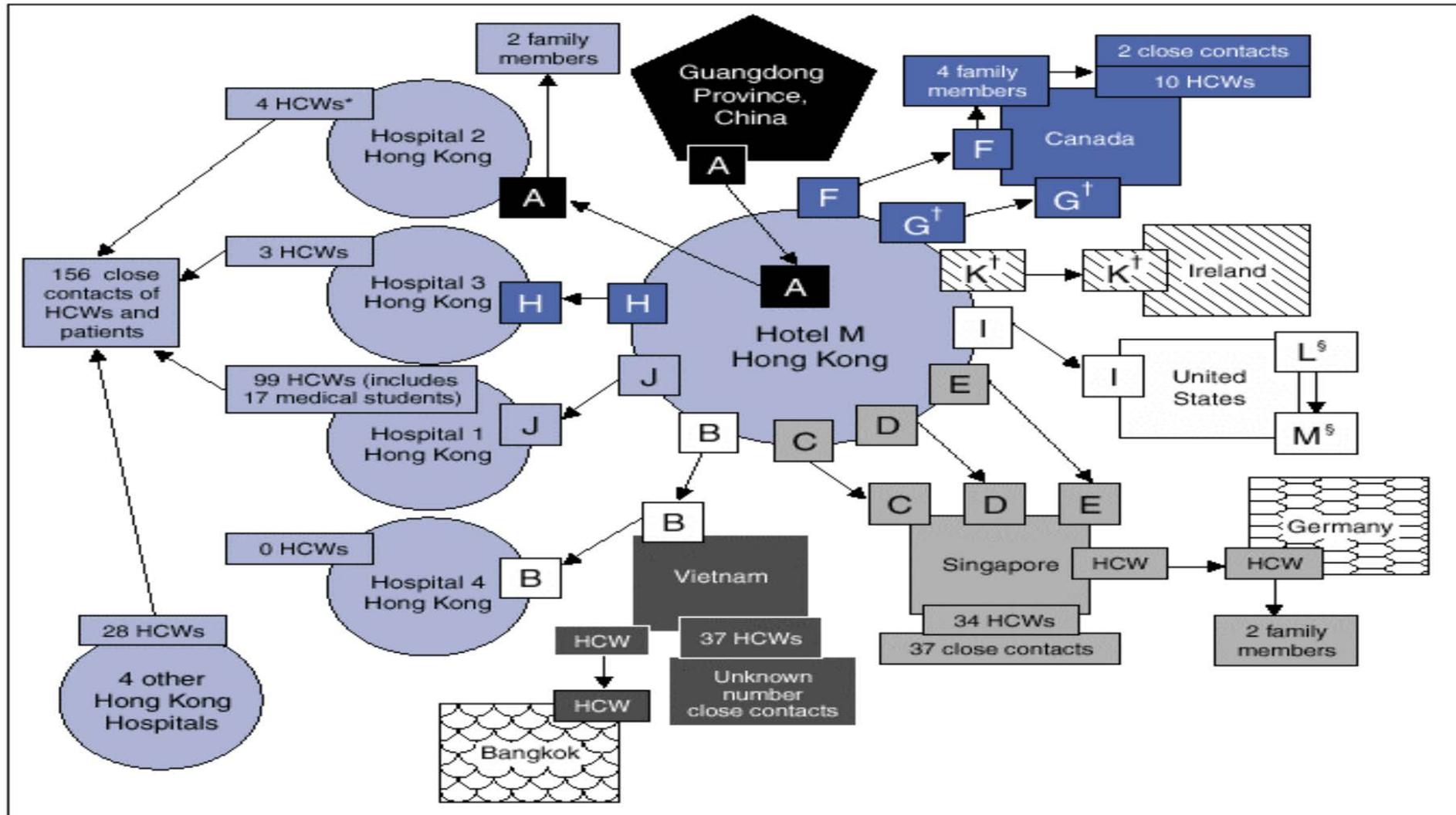


H1N1 pandemic:
Real life test of
preparedness for
infectious disease
disasters



Diseases travel globally

FIGURE 1. Chain of transmission among guests at Hotel M — Hong Kong, 2003

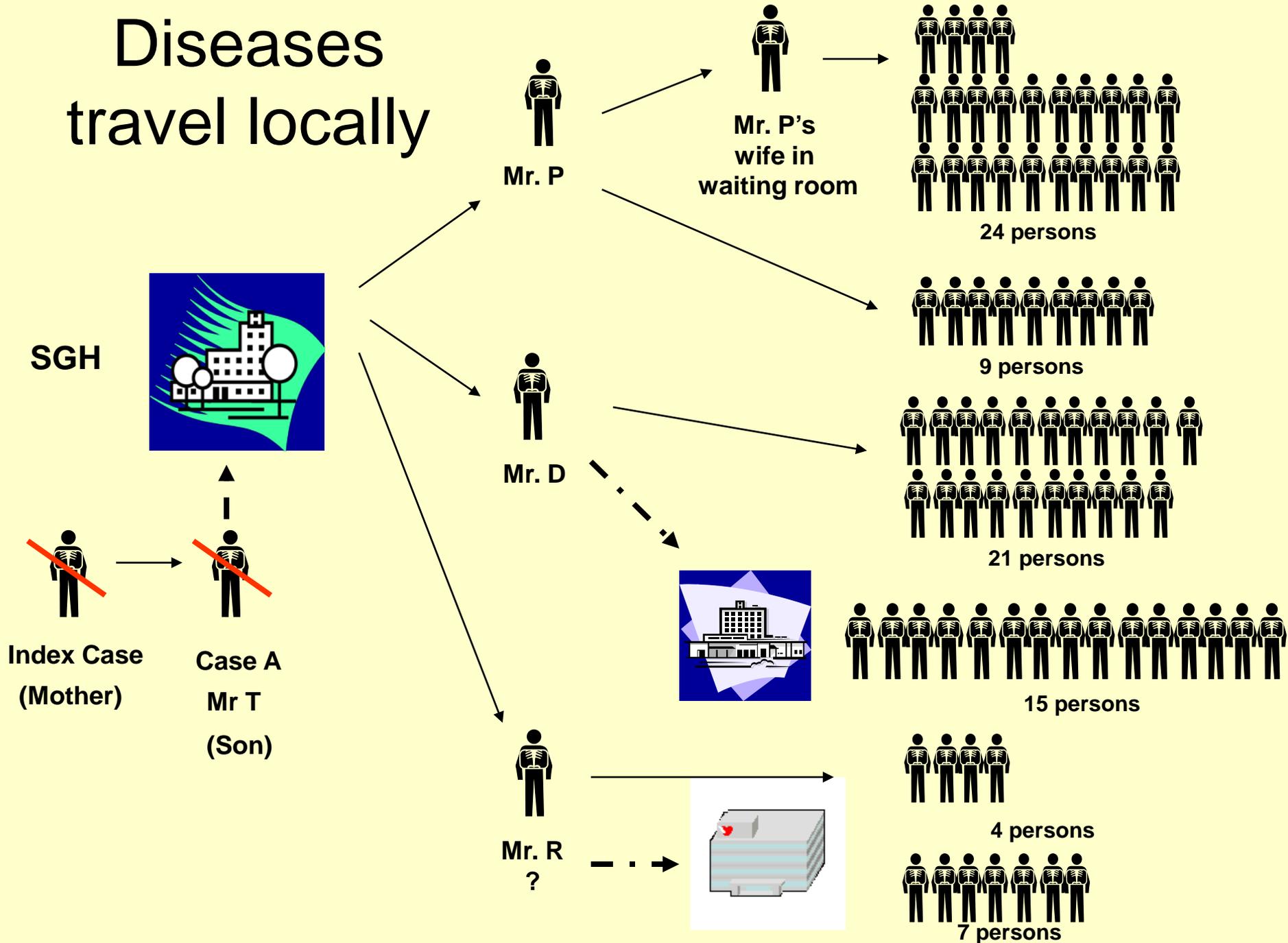


* Health-care workers.

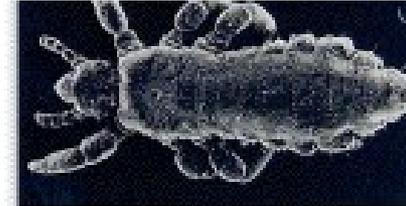
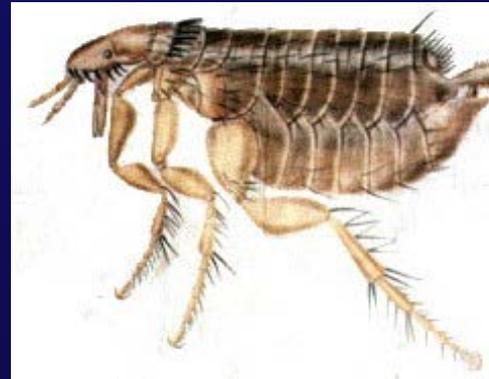
† All guests except G and K stayed on the 9th floor of the hotel. Guest G stayed on the 14th floor, and Guest K stayed on the 11th floor.

§ Guests L and M (spouses) were not at Hotel M during the same time as index Guest A but were at the hotel during the same times as Guests G, H, and I, who were ill during this period.

Diseases travel locally



Diseases Travel with Animals & Insects



Adult Louse (23-30 days)

The Environment Plays Role in Infection Transmission



How are Infection Prevention Interventions Different During a Disaster?

Difference: Scope



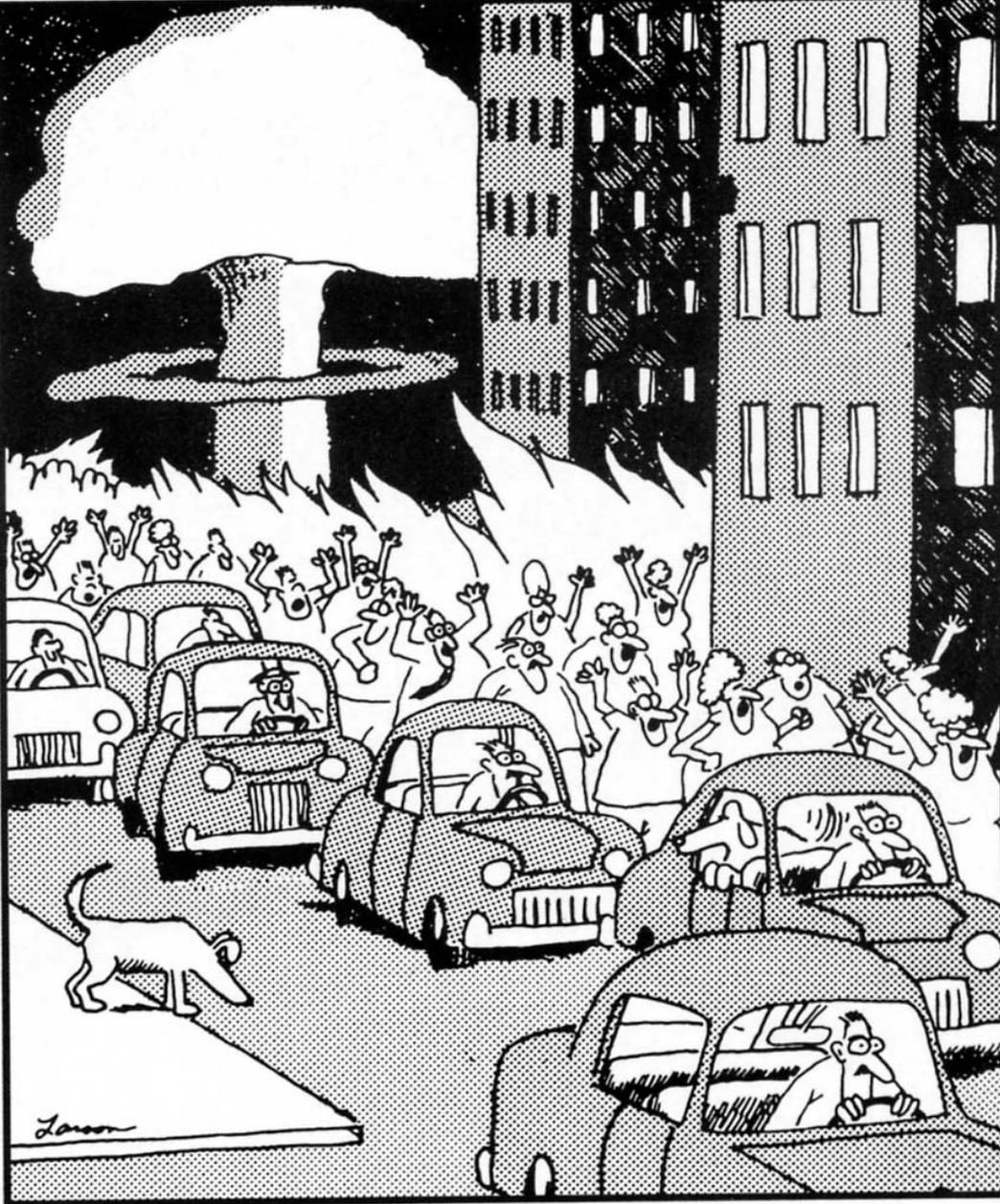
Healthcare



Public

Biosurveillance

We need
rapid
identification
of an incident



And then Jake saw something
that grabbed his attention.

Screening & Triage Best Practices

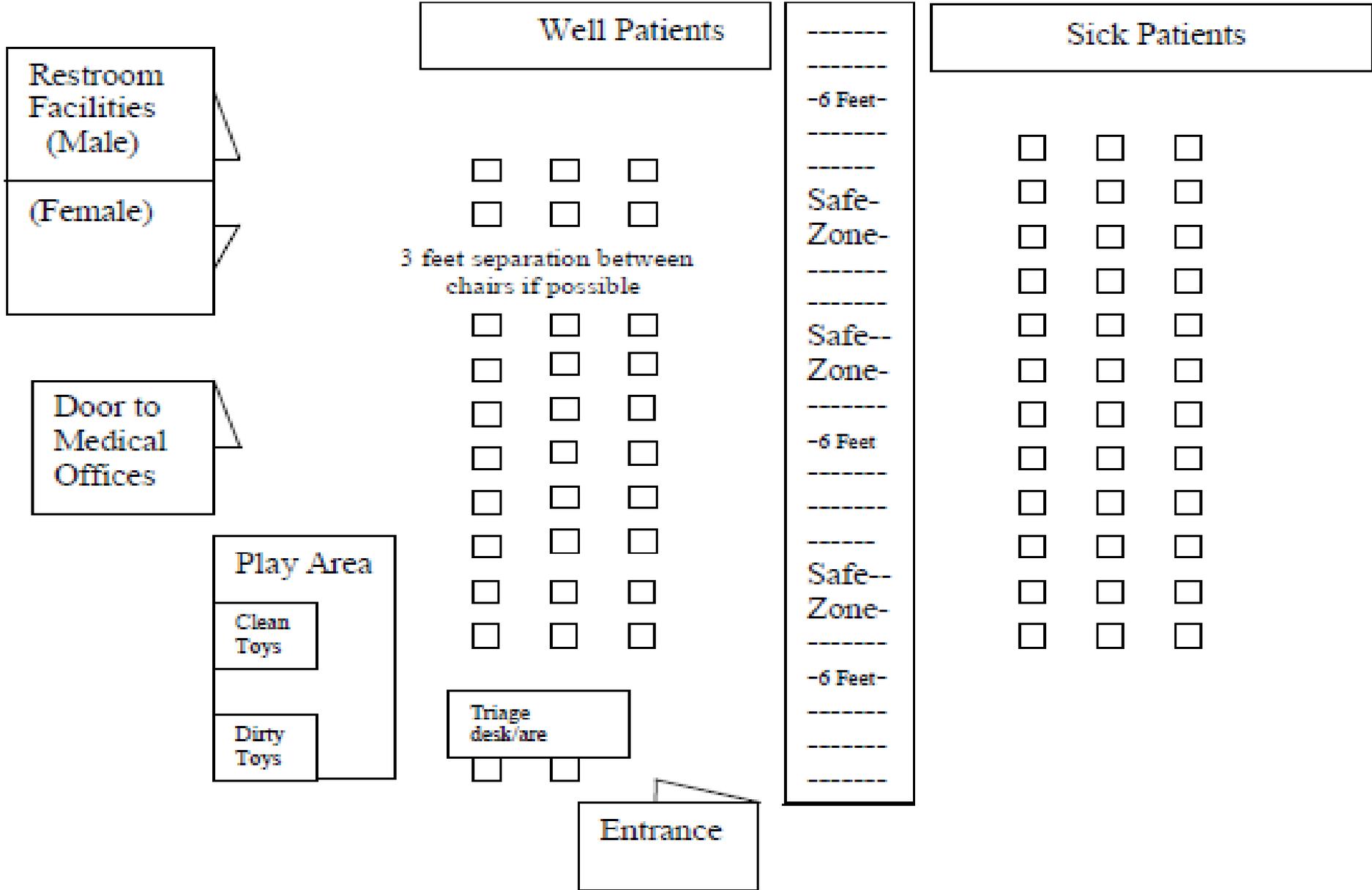
- Screen all visitors & staff
 - Consider limiting visitors
- Limit number of entrances
- Separate staff entrance



Train screeners well



Example of Hospital Entrance Physical Layout



Isolation

- Follow HICPAC guidelines when possible
- Undiagnosed: transmission based precautions

Symptoms Isolation Precautions Needed

Cough, runny nose, watery eyes = Standard

Fever & cough (adults) = Droplet

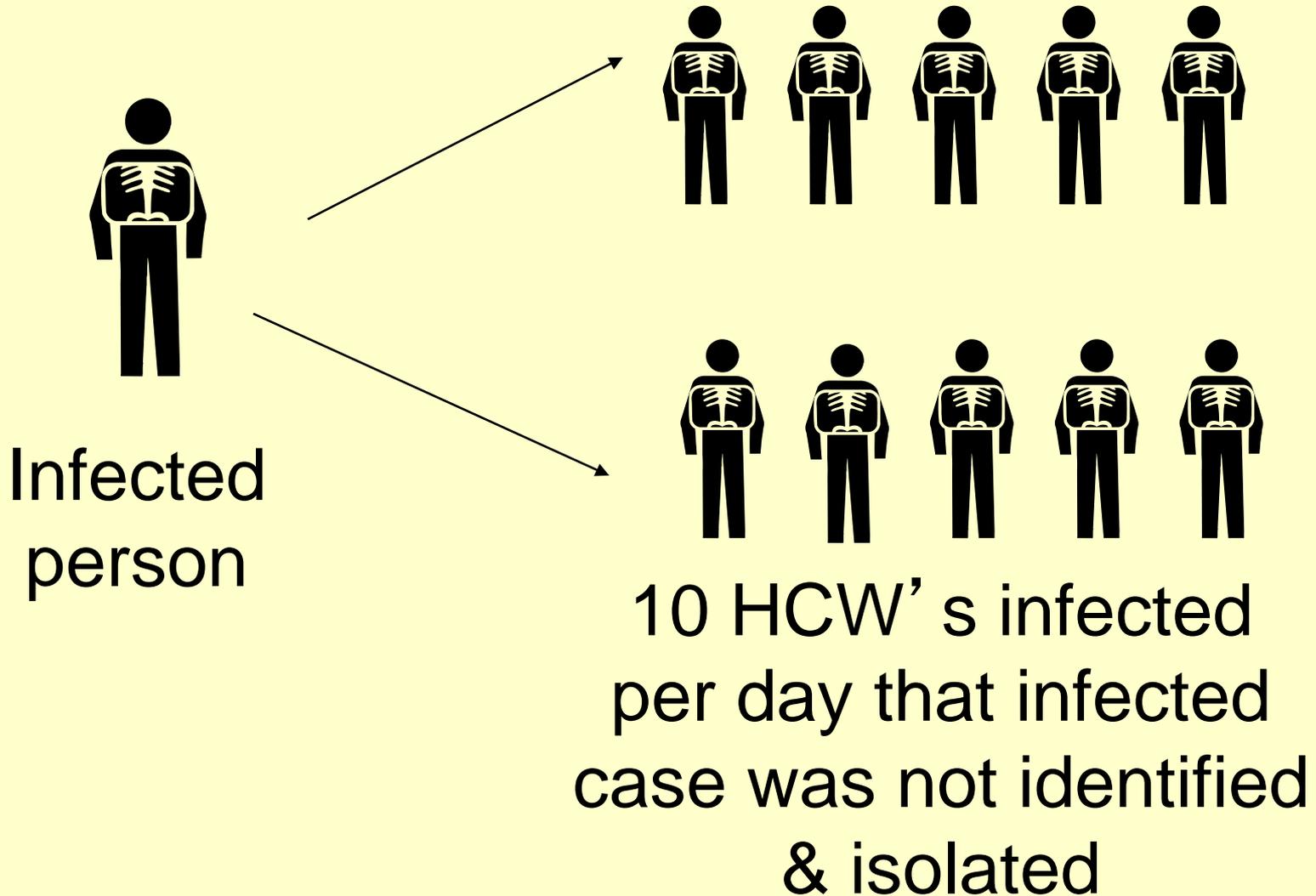
Fever & cough (kids) = Droplet & Contact

Fever, cough, bloody sputum, & wt loss = Airborne

Eye infection or drainage = Standard

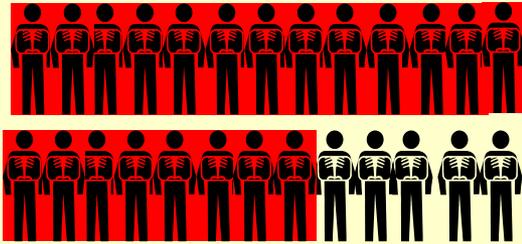
See table in APIC document

Better to over-isolate SARS Outbreak in Canada

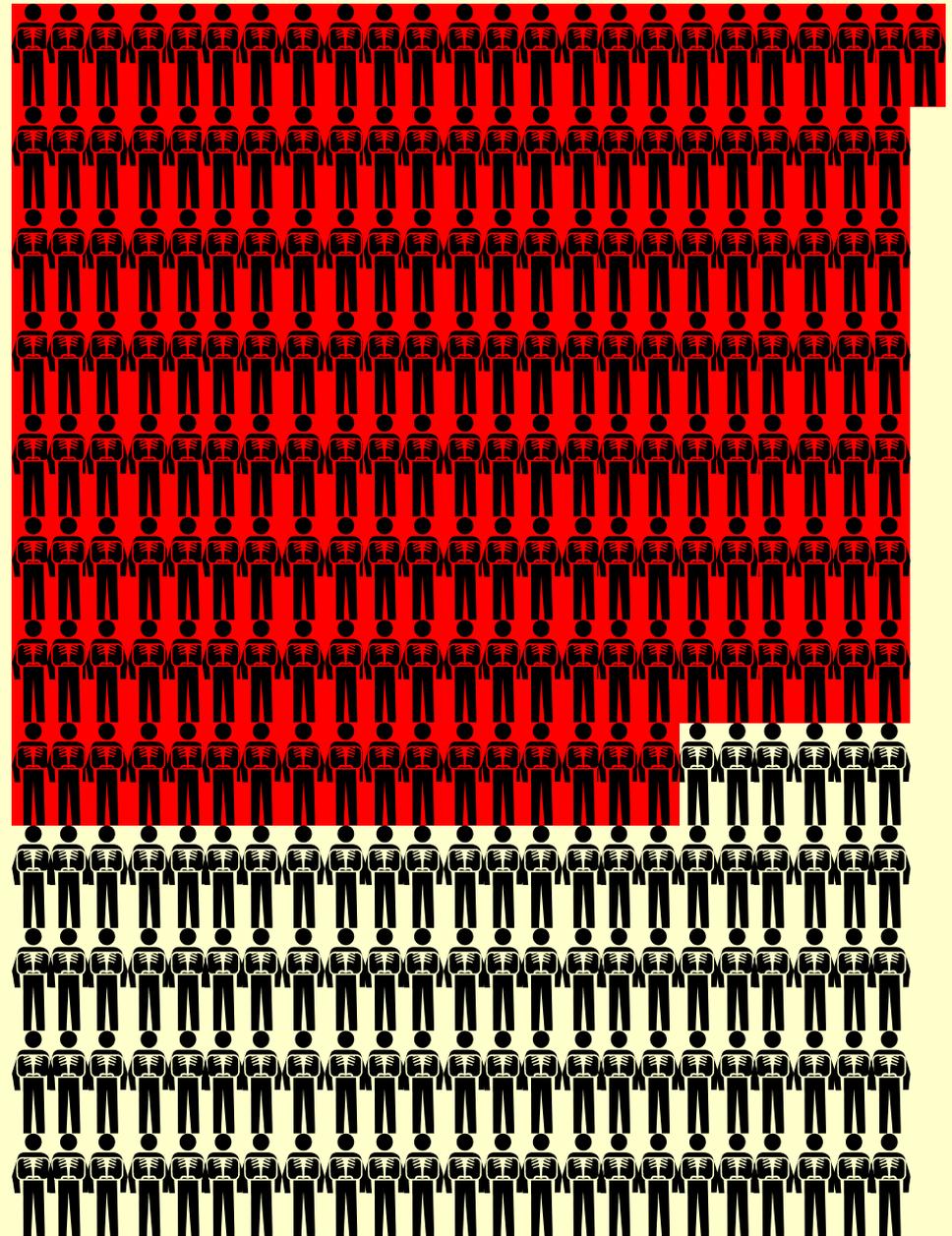


H1N1 in NYC*

 = Symptomatic for ILI

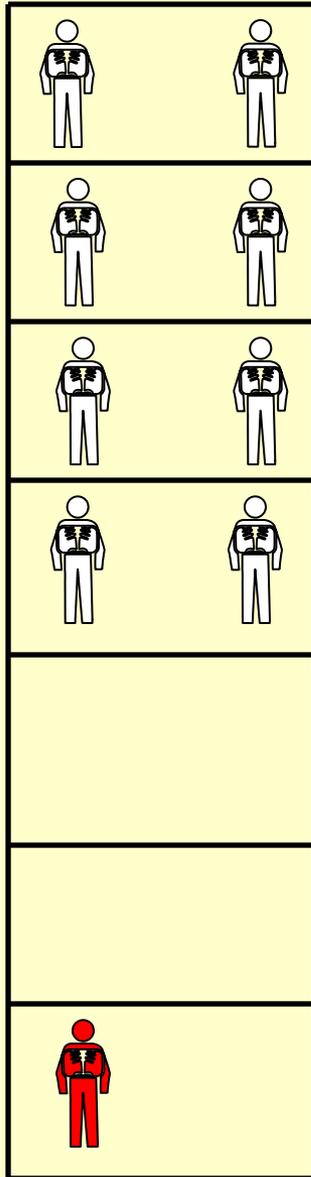


26 H1N1 pts
associated
with 277
unprotected
staff
exposures



*Banach, et al., 2011

Improvised Isolation Area



- Improvising isolation area
 - Physically separate the pt
 - Building or area outside can be used
 - Best if room/area has walls & a door
 - Makeshift walls/doors
 - Plastic or other barrier material
 - Hang isolation sign near entrance

May Need Negative Pressure Surge Capacity



Discontinuing Isolation

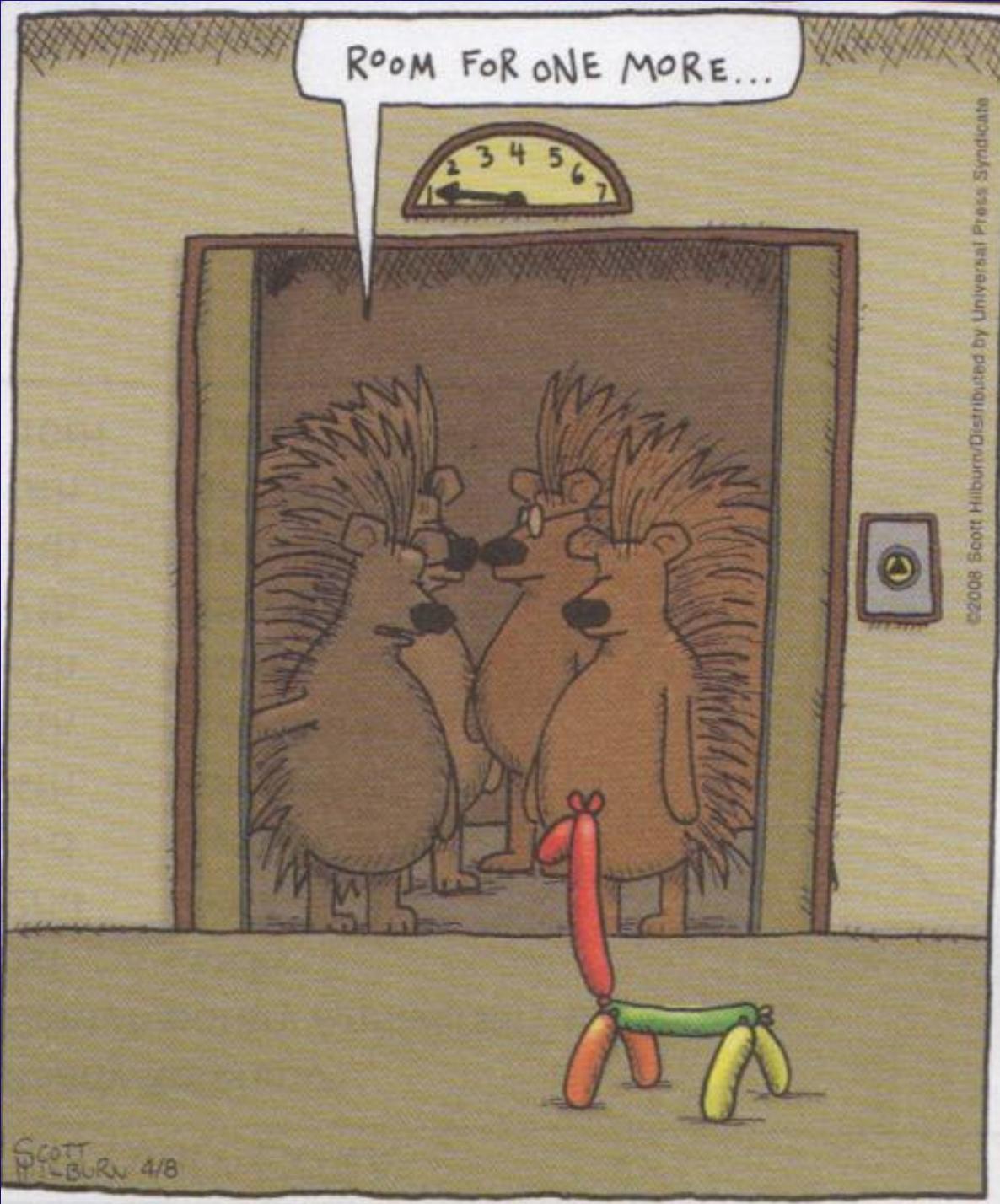
- Do not D/C isolation until anti-infective therapy sensitivity is verified



Exposure to patient
with anthrax :
alcohol-based
gels/foams are OK

Exposure to Anthrax
spores:
Need soap & water



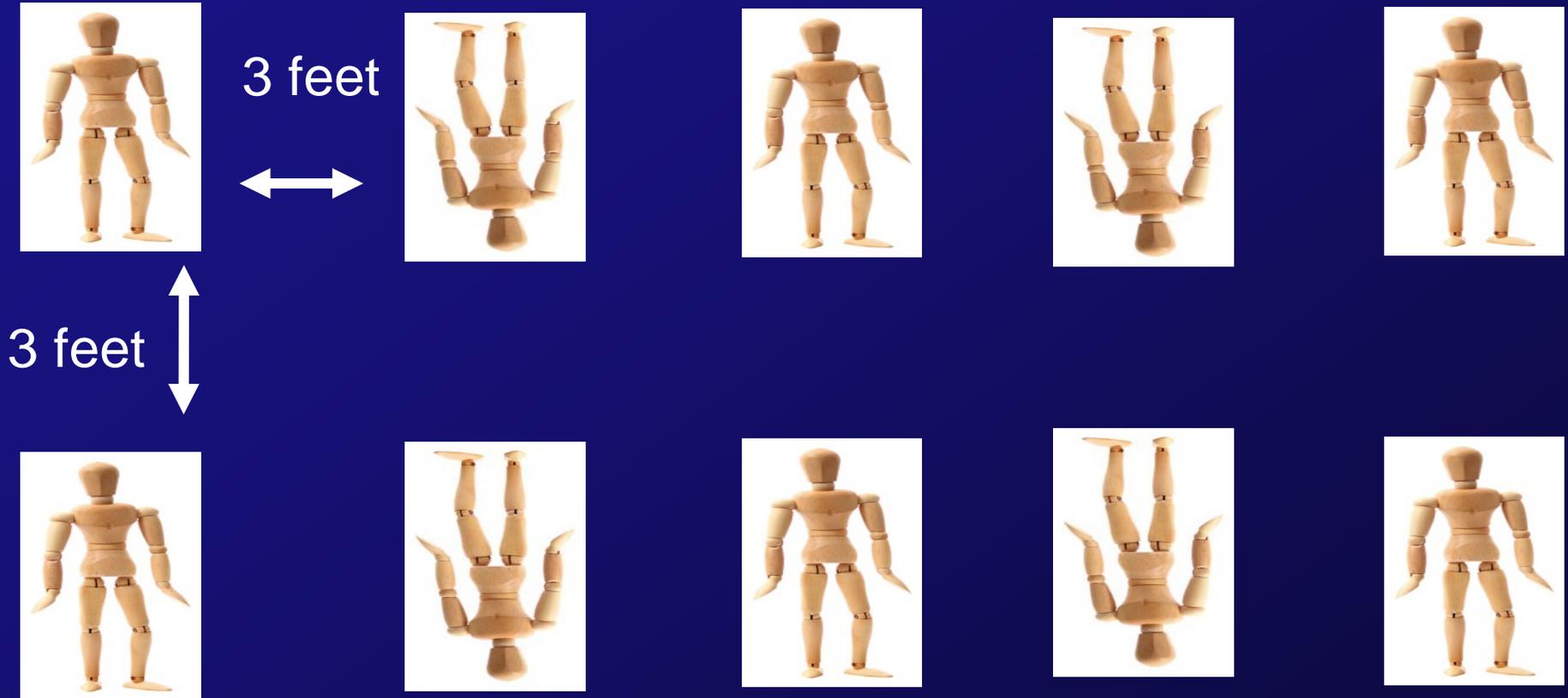


Cohort Staff

- Assign dedicated staff
- Use vaccinated staff



Social Distancing Principles

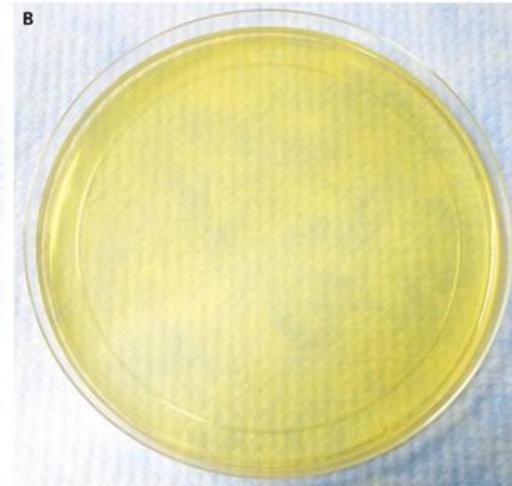


Bed/stretcher/cot configuration in surge areas



Hand Hygiene

NEJM:
Med student tied to MRSA outbreak
- Failure to wash hands





Need PPE

- Adequate amounts
- Teach healthcare personnel how to use it

"Wait a minute! ... McCallister, you fool!
This isn't what I said to bring!"

PPE Estimates for Planning & Stockpiling

Category of Staff	Respirator	Gown (disposable)	Gloves (disposable)	Goggles
Little to no exposure	1 disposable per contact/exposure	1 per exposure	1 per contact	None
Prolonged exposure	1 reusable per outbreak (plus 2 cartridges/month*)	1 per exposure	1 per contact	1 per outbreak
Infrequent exposure(s)	1 reusable per outbreak (plus 2 cartridges/month*)	1 per shift	1 per contact	1 per outbreak

***Disposable respiratory cartridges are needed for reusable respirators.**

Radonovich et al. (2009)

Remove Mask/Respirator



Don't



**Do: Remove
from behind**



Hard to be compliant with N95s
over long periods of time



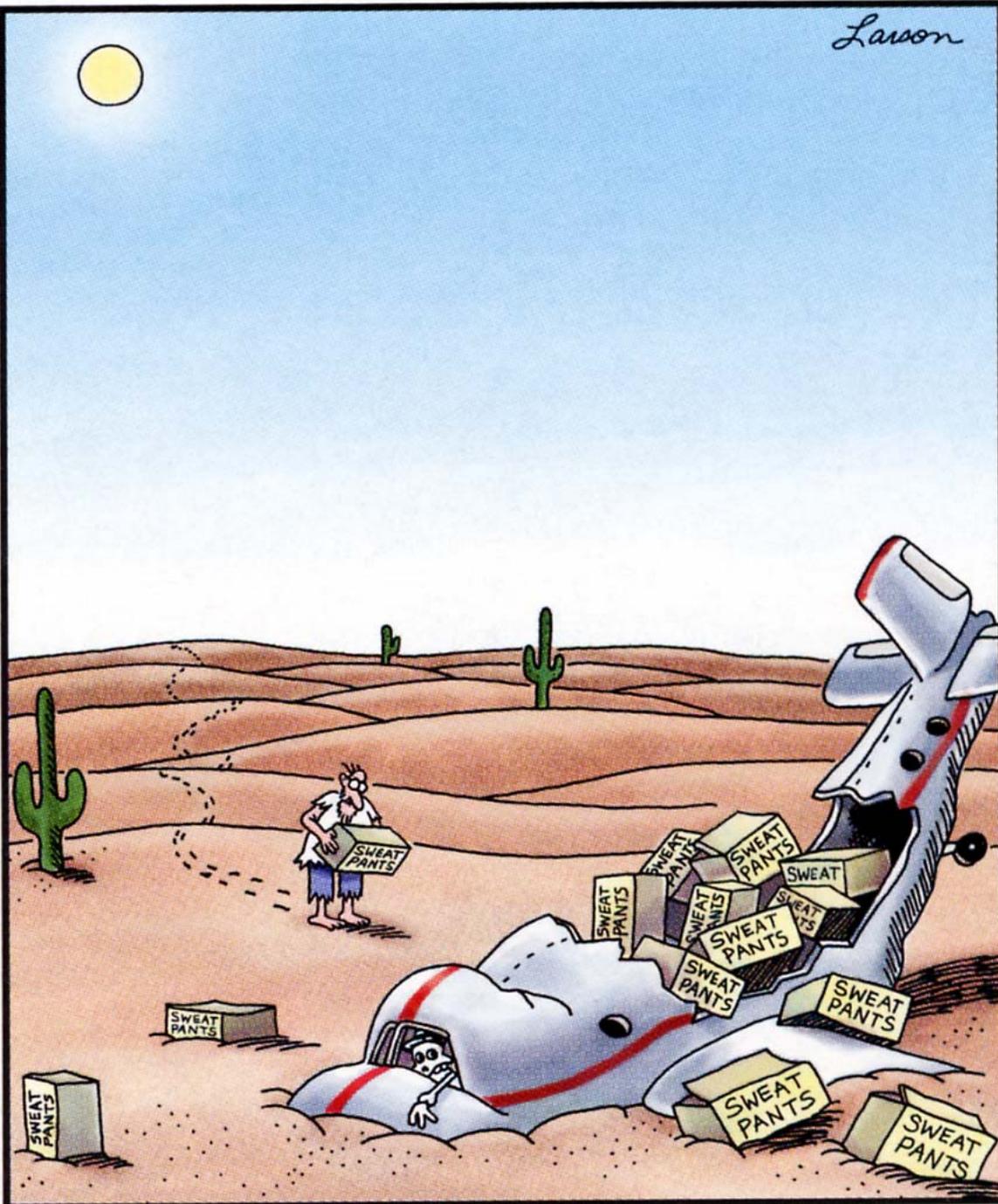
Not considered respiratory protection.....



Not yet tested for safety.....



Larson



Might not
get the
supplies
we need

- Respirators during H1N1

Extending the Use/Reusing Respirators



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APIC Position Paper: Extending the Use and/or Reusing Respiratory Protection in Healthcare Settings During Disasters

Co-authored by APIC Emergency Preparedness Committee, Public Policy Committee and
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- APIC
Guidance
 - APIC
website
 - Free

Linens Management

- Laundry staff need PPE
- Consider using disposable linens
- Bag at point of use

Smallpox is a major risk
for laundry personnel



Need Rapid Mass Distribution of Medical Countermeasures

- Meds: 48 hours
- Vaccine: 4 – 6 days

Push:

Mail carriers

Pull:

PODs



Innovative POD Design

If you build it, they will come...



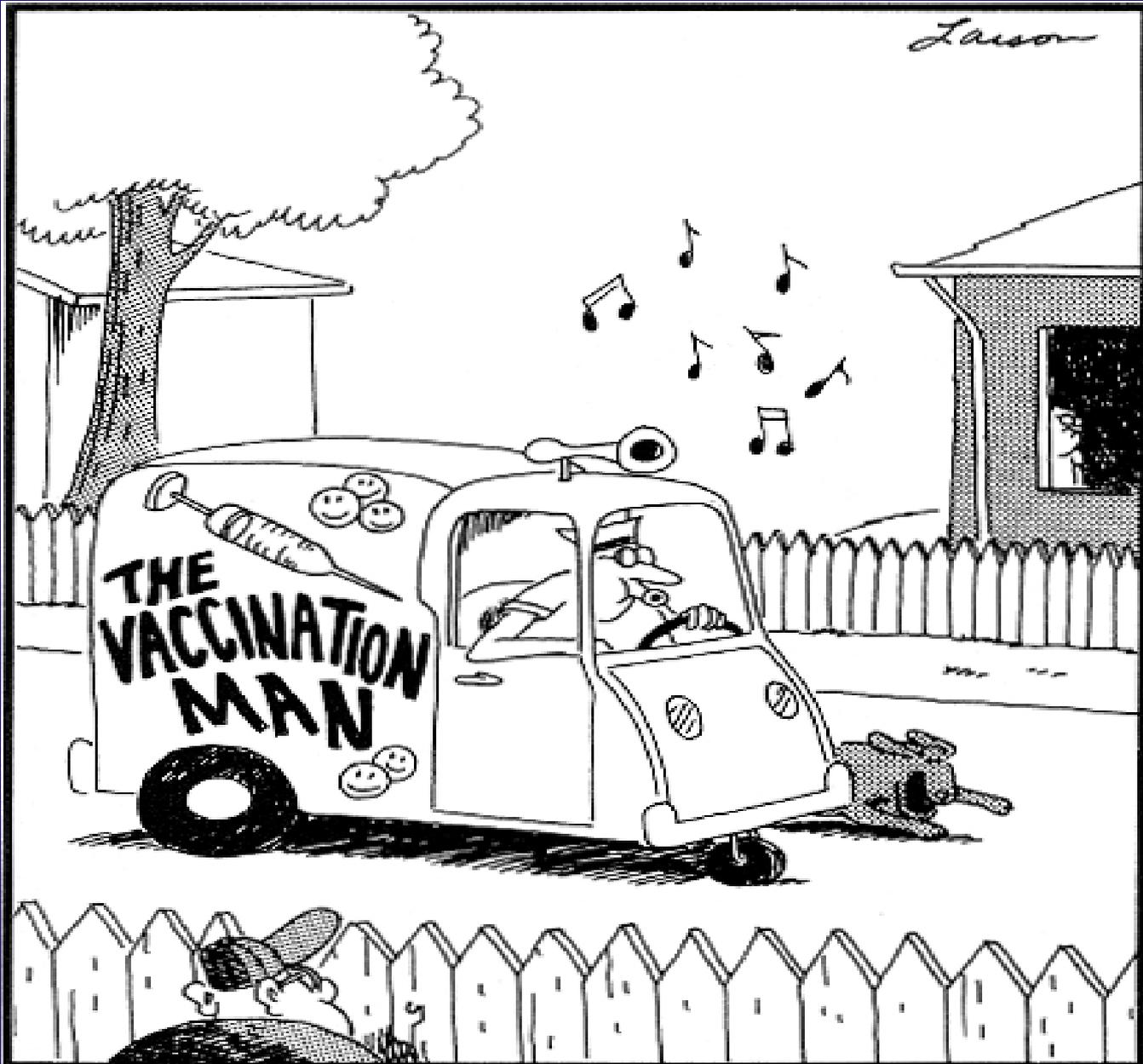
Drive through vaccine program



**No adverse events in 15 years
(> 50,000 shots & 2,000 intranasal
vaccines administered)**

Carrico et al. (2012)

Larson



Innovative Mass Immunization Program

Slowly he would cruise the neighborhood, waiting for that occasional careless child who confused him with another vendor.



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Leigh

We have great medicines & vaccines, but we have to convince people to take them

Technology advances; people stay the same.

Infection prevention in points of dispensing

Terri Rebsman, PhD, RN, CIC,* Bill Coll, BA, M.P.H.,[†] and the 2009 AJIC Emergency Preparedness Committee
St. Louis, Missouri, and Austin, Texas

Background: Community-based points of dispensing (POD) will be used during disaster to distribute mass quantities of anti-infective therapy/prophylaxis and/or vaccination to an entire community in a short period of time. Without proper planning, staffing, and implementation of infection prevention strategies, disease transmission is possible in PODs. The purpose of this paper is to outline infection prevention recommendations for PODs.

Methods: A literature review and Internet search were conducted in April 2009. A spreadsheet was created that delineated infection prevention issues in PODs that were identified by each source. Infection prevention recommendations were divided into thematic domains for simplification and clarity.

Results: Thirty-one articles, planning documents/reports, and Web-based training programs were identified and screened. Of these, 19 were deemed relevant: 8 were journals articles and 11 were published reports, planning documents, and/or training programs. Infection prevention themes for PODs identified in the literature included (1) planning for infection prevention in PODs, (2) screening and triage of visitors, (3) using personal protective equipment, (4) implementing hand hygiene, (4) following food and water safety, (5) performing environmental decontamination, (6) communicating and training staff and visitors, and (7) having occupational health protocols.

Conclusion: Infection prevention in PODs is important to prevent communicable disease spread. This article can assist emergency managers in developing an infection prevention program for PODs.

Key Words: Point of dispensing, emergency management, infection prevention, infection control.

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(Am J Infect Control 2009;37:695-702)

Mass casualty events involving a biologic agent (ie, an infectious disease disaster), such as a bioterrorism attack, large-scale outbreak of an emerging infectious disease, or a pandemic, will require rapid identification and response to reduce morbidity and mortality related to the event. The 2009 swine influenza A (H1N1) outbreak illustrates that these events can occur rapidly and with little warning. Communities need to be prepared to respond quickly when such an event occurs, especially when the causative agent is a contagious disease, such as swine flu.

One critical aspect of response to an infectious disease disaster is to implement pharmacologic interventions, including mass vaccination, treatment, or prophylaxis. Pharmacologic interventions must be administered in a short time frame to reduce morbidity and mortality. Time frames for intervention vary, depending on the disease involved, but usually range from 1 to 6 days.^{1,2} For example, postexposure prophylaxis must be provided within 1 to 2 days following exposure to airborne *Yersinia pestis* or a person infected with pneumonic plague to prevent disease from occurring.¹ Smallpox vaccination needs to be administered within 4 to 5 days of exposure to reduce the risk of disease and death.¹ The Centers for Disease Control and Prevention and the Cities Readiness Initiative indicate that communities need to be able to administer prophylaxis and/or vaccination to their entire population within 48 hours.³ Whereas time and efficiency in undertaking such large community distribution processes are important, ensuring worker and visitor safety during this process are also very important.

Dispensing mass quantities of anti-infective therapy/prophylaxis and/or vaccination to an entire community in a short period of time is a complex endeavor that requires extensive planning and practice. Mass distribution of prophylaxis or vaccination can be accomplished through a push or pull system. Push

Infection Prevention in PODs

- Published in AJIC

Institute of Biosecurity, Saint Louis University, School of Public Health, St. Louis, MO,[‡] and Austin-Travis County Emergency Medical Services System, Austin, TX.[†]

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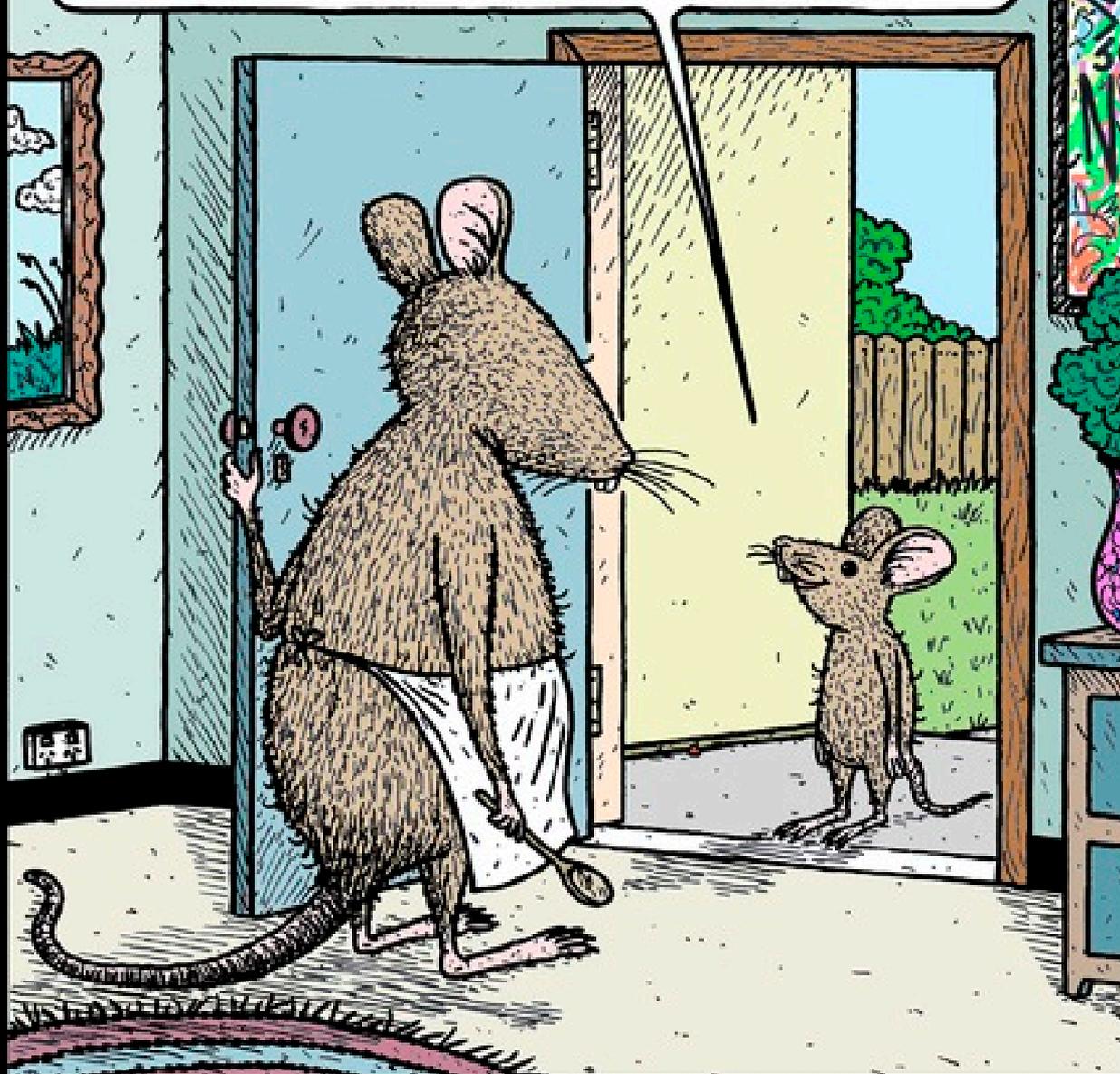
Conflicts of interest: None to report.

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doi:10.1016/j.ajic.2009.09.001

HELLO, Mrs. KRABRANDSKI, CAN
RODNEY COME OUT AND PLAGUE?

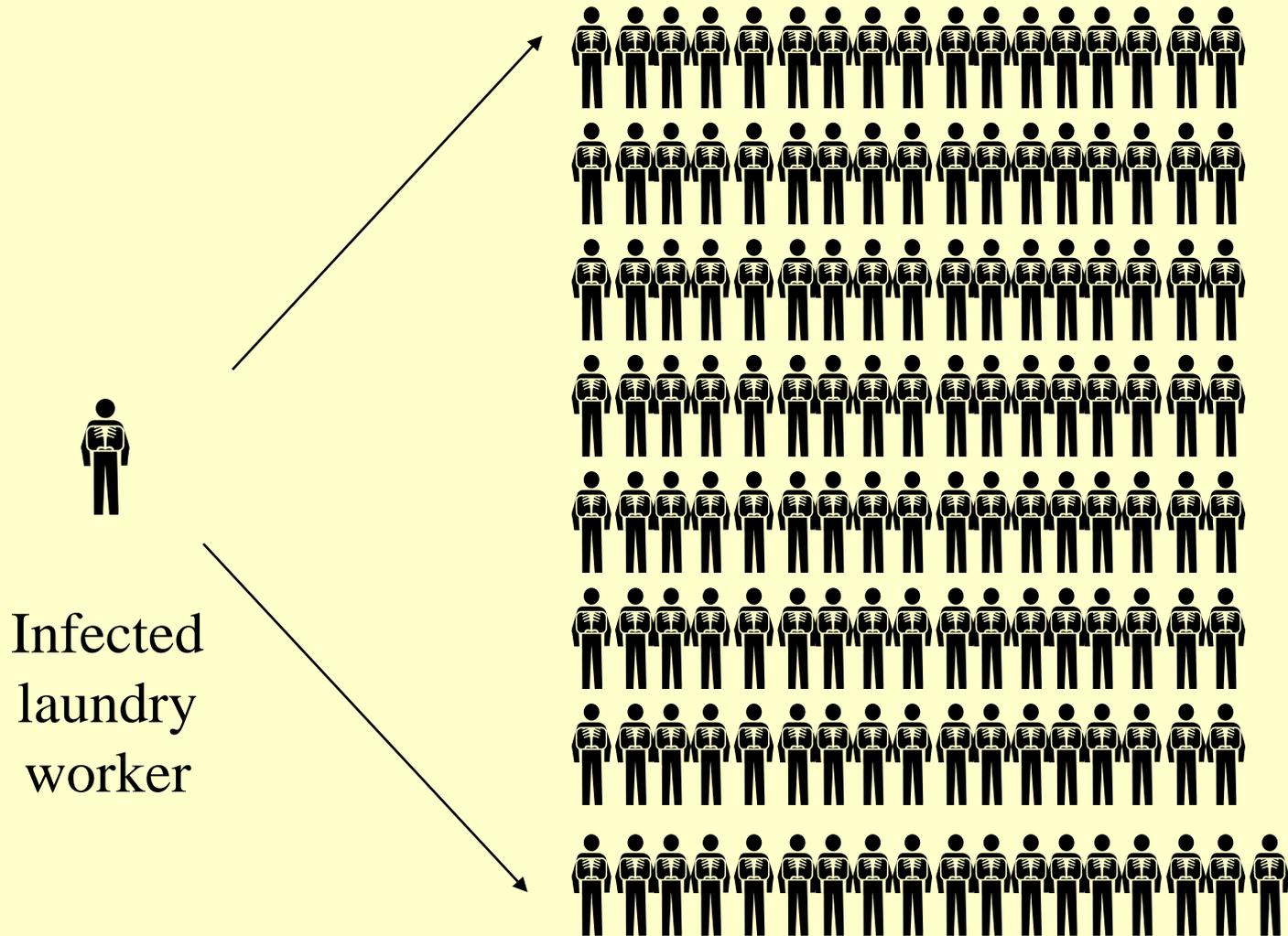


Need liberal
sick leave
policy for
disasters

HCW role in
disease spread

True or False:
25% of unvaccinated
HCWs claim they
don't have a role in
disease tx

SARS Outbreak in Taiwan



137 Secondary Cases

Planning Documents

- Free of charge on APIC Website

www.apic.org

Infection Prevention and Control for Shelters During Disasters*

Prepared by:
2007/2008 APIC Emergency Preparedness Committee

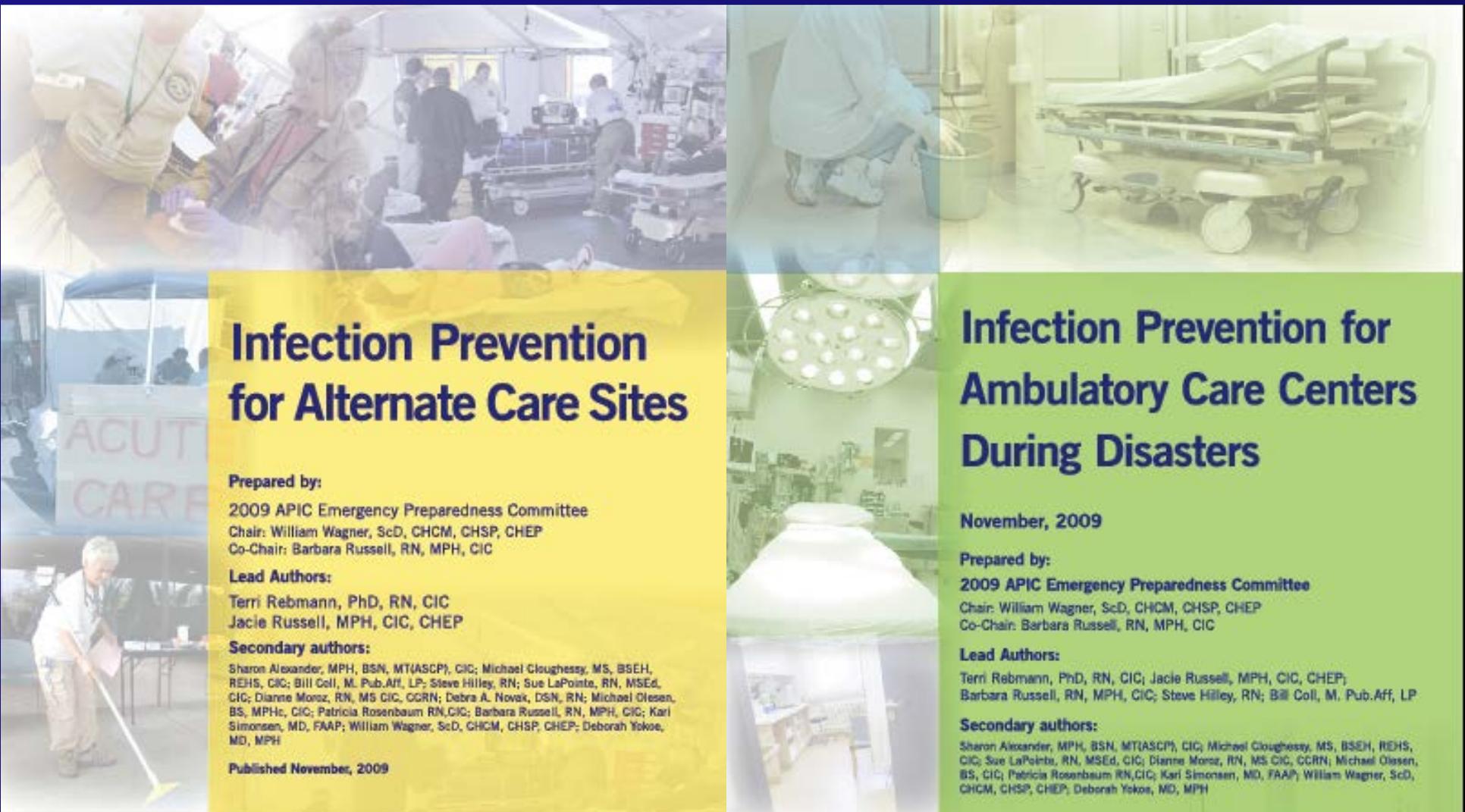
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*This document is not intended for writing shelter and for idealized populations (masses, abused individuals, etc). These recommendations should only be used for disaster situations during which there are large numbers of displaced individuals who require shelter.

Photos from FEMA Photo Library. Top right & bottom left photo: FEMA/Wia Henderson. Left middle photo: FEMA/Audra Dooker. Photos from FEMA Photo Library. Top right & bottom left photo: FEMA/Wia Henderson. Left middle photo: FEMA/Audra Dooker.

More Free Planning Products



Infection Prevention for Alternate Care Sites

Prepared by:

2009 APIC Emergency Preparedness Committee

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Published November, 2009

Infection Prevention for Ambulatory Care Centers During Disasters

November, 2009

Prepared by:

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Assessing Hospital Plans (in AJIC)

Table 1 Infection Prevention Components of a Hospital Emergency Management Plan

Hospital Emergency Management Plan and Biological Annex
- Addresses all biological events, including bioterrorism, emerging infectious diseases, and pandemic influenza ^{3-7,9,10,11,14,19-31}
- Identifies contact names and numbers for local and state health dept, state health association, and tribal health association ⁴
- Is coordinated with local, state, and federal emergency management plans ^{4,5,7,9,14,23,24-29,31,33}
- Identifies the person(s) authorized to implement/activate the biological annex plan and the organizational structure that will be used, including the delegation of authority to carry out the plan 24/7 ^{4,14}
- Describes the responsibilities of key personnel and departments (and back-ups for key personnel) within the facility related to executing the biological annex component of the Plan ^{4,27}
- Defines how biological events are different from other types of MCEs ^{11,24,27}
- Has planning committee focusing on biological events that includes an infection preventionist and/or hospital epidemiologist ^{3-5,7,8,14-16,24,26-29}
- Stratifies implementation of specific actions on the basis of the WHO Pandemic Phases, US Government Pandemic Stages, and the pandemic severity index level worldwide, in the US, and at the local level ^{4,24}
- Stratifies implementation of specific actions for a bioterrorism attack on the basis of whether the attack is overt or covert, and on the basis of high-risk syndromes or suspected routes of disease transmission ^{5,24,27}
- Describes the epidemiological signs of a potential bioterrorism attack ^{7,24}
- States how often the annex will be updated and by whom, including contact names/information, incorporating lessons learned from exercises/drills, and changes in recommendations related to managing biological events ^{3-5,7,10,14,21,27}
Assessing Hospital Readiness for MCE
- States how and when a facility assessment will be performed that addresses infection prevention issues, such as location and amounts of hand hygiene products, isolation rooms/areas, etc. ^{5,7,8,24,27}
- Incorporates biological scenarios, such as pandemic influenza or bioterrorism, into a disaster exercise; whenever possible, this exercise should be community-wide ^{3-5,7,10,11,14-16,19-22,24,26-31,34-36}
Infection Prevention Policies and Procedures
- Has a protocol for providing 24/7 infection prevention and control coverage, including coverage for outpatient facilities or alternate care sites owned/operated by the hospital ^{3-5,7-9,11,14-16,28}
- Has a protocol for authorizing the hospital epidemiologist, Infection Control Committee or its designee to rapidly implement

Assessing Home Health Plans (in AJIC)

Infection Prevention Components of a Home Health Emergency Management Plan

Home Health Agency Emergency Management Plan
<input type="checkbox"/> - Addresses all biological events, including bioterrorism, emerging infectious diseases, and pandemic influenza
<input type="checkbox"/> - Identifies contact names and numbers for local and state health dept, state health association, and tribal health association
<input type="checkbox"/> - Is coordinated with local, state, and federal emergency management plans
<input type="checkbox"/> - Identifies the person(s) authorized to implement/activate the plan and the organizational structure that will be used, including the delegation of authority to carry out the plan 24/7
<input type="checkbox"/> - Describes the responsibilities of key personnel and departments (and back-ups for key personnel) within the agency related to executing the Plan
<input type="checkbox"/> - Defines how biological events are different from other types of MCEs
<input type="checkbox"/> - Has planning committee focusing on biological events
<input type="checkbox"/> - Stratifies implementation of specific actions on the basis of the WHO Pandemic Phases, US Government Pandemic Stages, and the pandemic severity index level worldwide, in the US, and at the local level
<input type="checkbox"/> - Stratifies implementation of specific actions for a bioterrorism attack on the basis of whether the attack is overt or covert, and on the basis of high-risk syndromes or suspected routes of disease transmission
<input type="checkbox"/> - Describes the epidemiological signs of a potential bioterrorism attack
<input type="checkbox"/> - States how often the Plan will be updated and by whom, including contact names/information, incorporating lessons learned from exercises/drills, and changes in recommendations related to managing biological events
Assessing Agency Readiness for MCE
<input type="checkbox"/> - States how and when an agency assessment will be performed that addresses infection prevention issues, such as location and amounts of hand hygiene products and PPE, how to implement home isolation, etc.
<input type="checkbox"/> - Incorporates biological scenarios, such as pandemic influenza or bioterrorism, into a disaster exercise; whenever possible, this exercise should be community-wide
Infection Prevention Policies and Procedures
<input type="checkbox"/> - Identifies an infection preventionist and/or hospital epidemiologist who will serve as the point-of-contact for questions or consultation related to infection prevention during an MCE
<input type="checkbox"/> - Has a protocol for personal protective equipment (PPE) use and hand hygiene
<input type="checkbox"/> - Includes policies for modifying admission criteria on the basis of current agency capacity and disease status, including procedures for closing the agency to admissions of potentially infectious patients or non-infectious patients

Practice Makes.... Better



**Public Health
POD drill**



**Bioterrorism
scenario tests
coordination
with law
enforcement**

Infectious Disease Scenarios

Smallpox
moulage

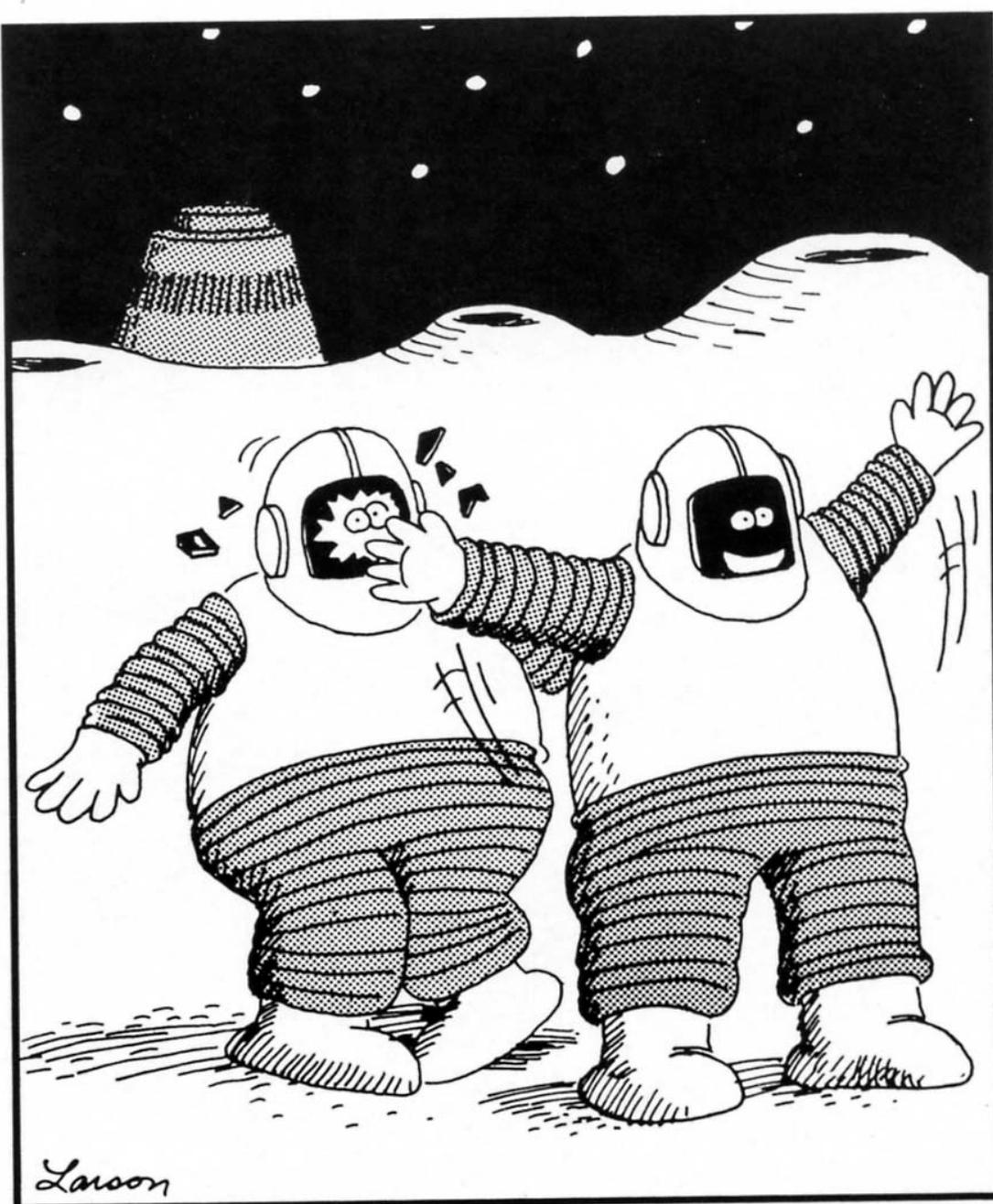


Measles
moulage



Disaster Planning Never Ends

- Keep
working at it



"We've made it, Warren! ... The moon!"

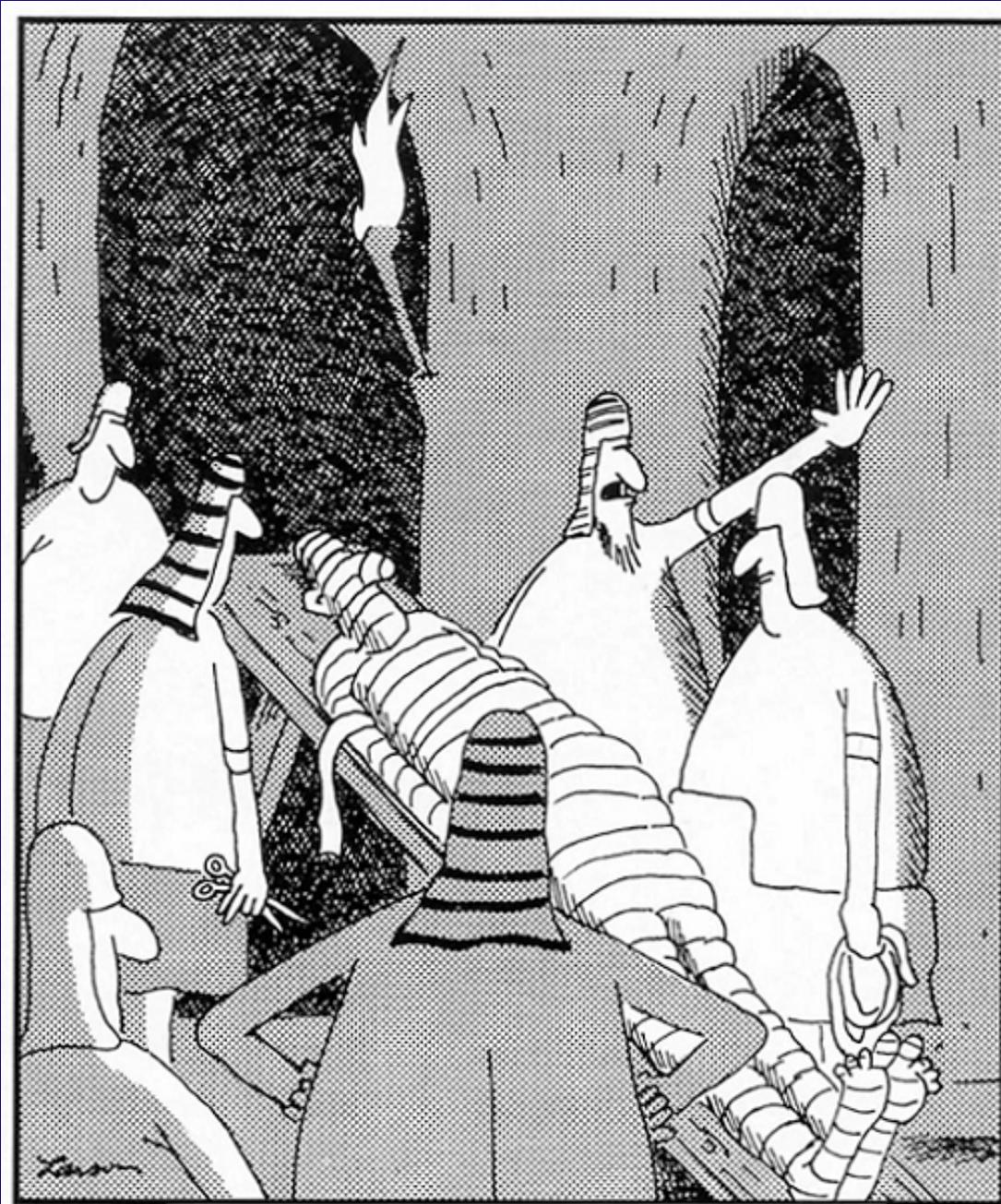
Conclusions

- Risk of disease spread during IDDs is high
- Disaster planning r/t infection prevention is essential
- We need to test our plans

References

- Radonovich, L. J., Magalian, P. D., Hollingsworth, M. K., and Baracco, G. (2009). Stockpiling supplies for the next influenza pandemic. *Emerging Infectious Diseases*, 15(6). Retrieved August 17, 2010 from: <http://www.cdc.gov/EID/content/15/6/e1.htm>
- Rebmann, T. (2005). Management of patients infected with airborne-spread diseases: An algorithm for infection control professionals. *American Journal of Infection Control*, 33(10), 571-579.
- Rebmann, T. (2009). Assessing hospital emergency management plans: A guide for infection preventionists. *American Journal of Infection Control*, 37(9), 708 – 714.e4.
- Rebmann, T., and Coll, W. E. (2009). Infection Prevention in Points of Dispensing (POD). *American Journal of Infection Control*, 37(9), 695-702.
- Rebmann, T., Citarella, B. B., Subramaniam, D. P., and Subramaniam, D. S. (2011). Assessing the infection prevention components of home health emergency management plans. *American Journal of Infection Control*, 39(10):849-857.
- Volkman, J. C., Rebmann, T., Hilley, S., Alexander, S., Russell, B., and Wagner, W. (2012). Infection prevention disaster preparedness planning for long-term care facilities. *American Journal of Infection Control*, 40, 206-210.
- Rebmann, T., Alexander, S., Cain, T., Citarella, B., Cloughessy, M., Coll, B., et al. (2009). APIC Position Paper: Extending the Use and/or Reusing Respiratory Protection in Healthcare Settings During Disasters. Retrieved November 20, 2009 from: <http://www.apic.org>
- Rebmann, T., Russell, J., Russel, B., Hilley, S., Coll, B., Alexander, S., et al. (2013). Infection Prevention for Ambulatory Care Centers During Disasters. Retrieved from: <http://www.apic.org>
- Rebmann, T., Russell, J., Alexander, S., Cloughessy, M., Coll, B., Hilley, S., et al. (2009). Infection Prevention for Alternate Care Sites. Retrieved from: <http://www.apic.org>

Questions



OK, folks....it's a wrap!