Novel H1N1 influenza: clinical aspects and considerations for hospital preparedness

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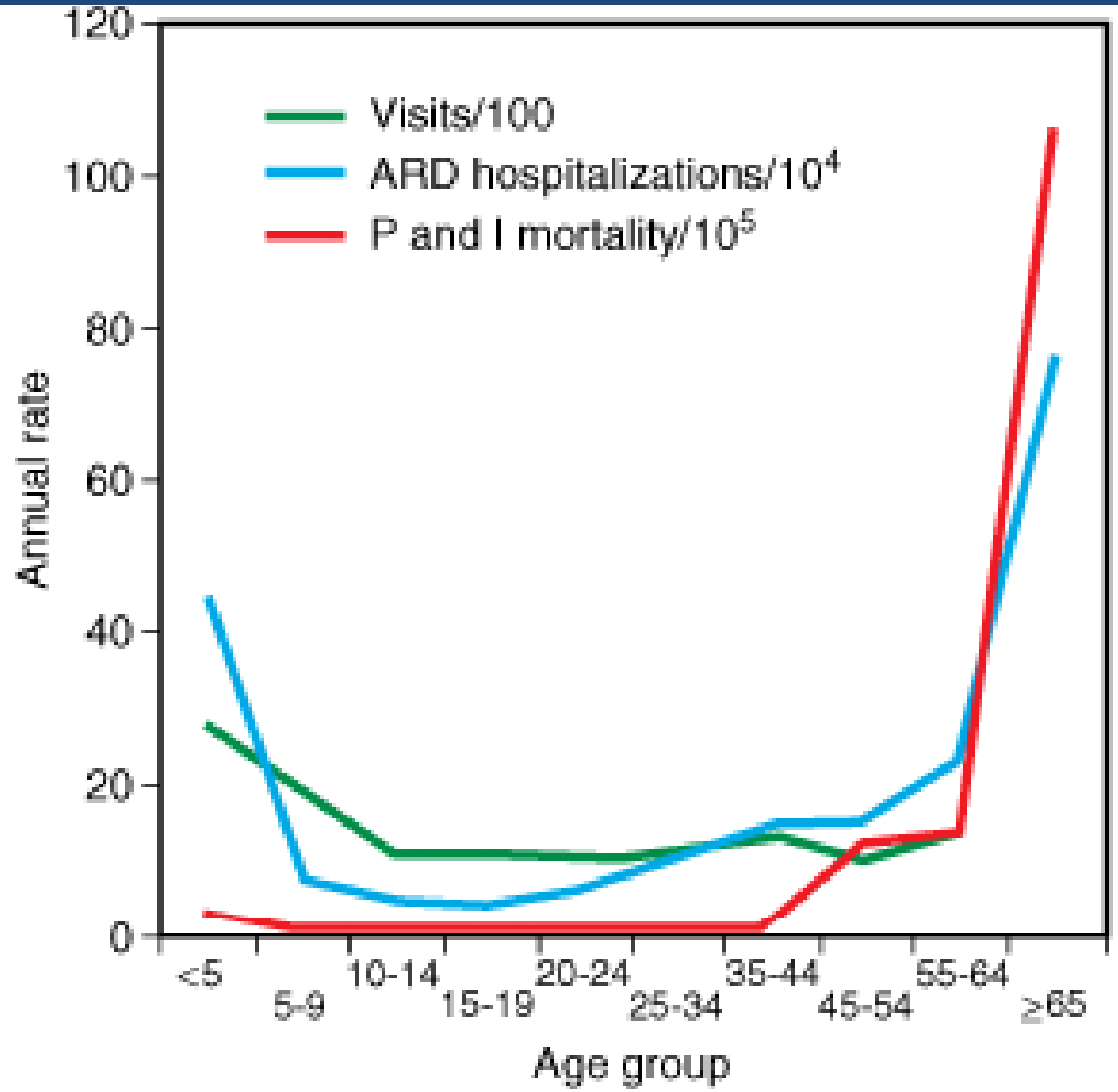
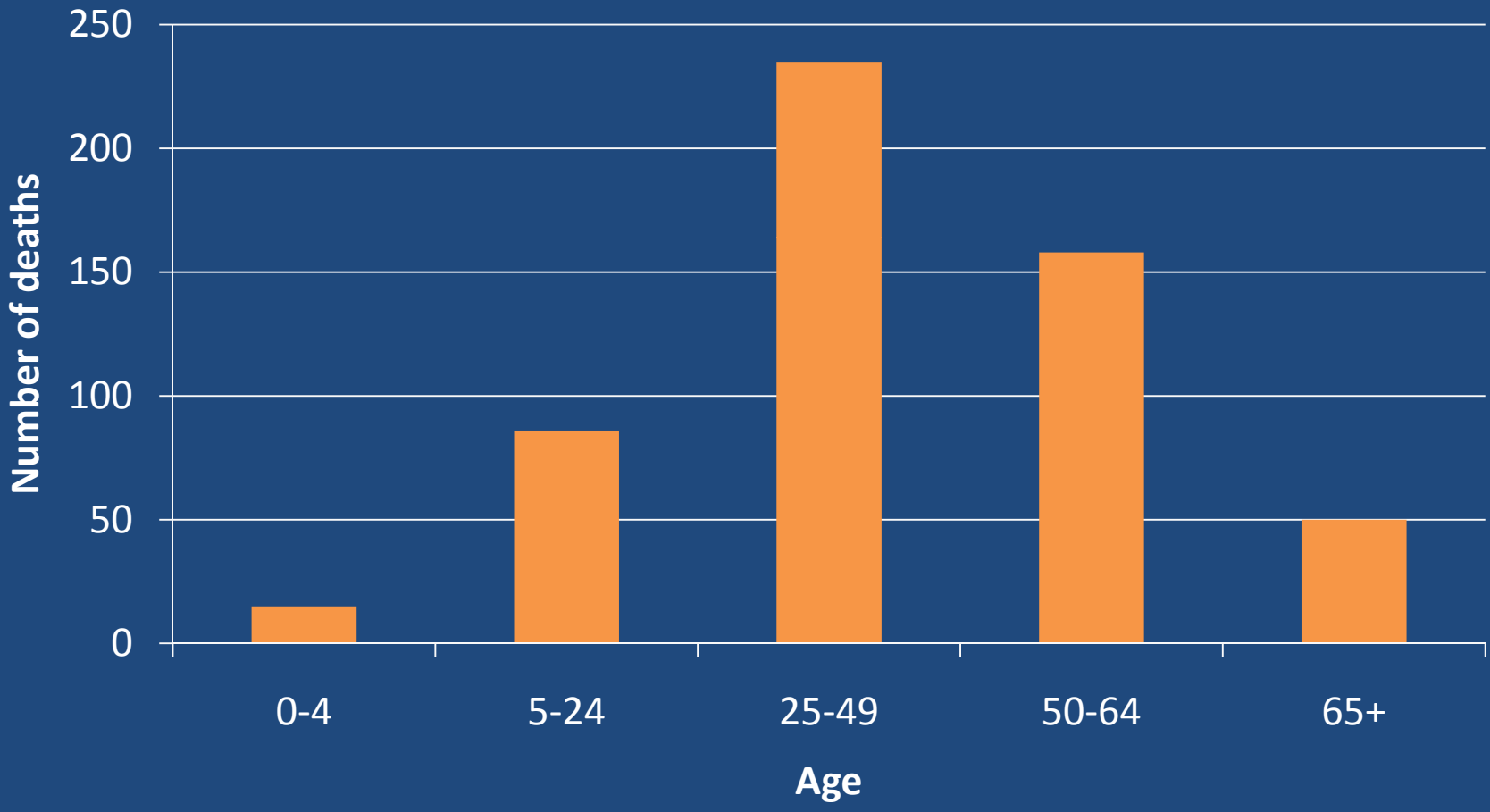
Clinical aspects of H1N1 flu

- It’s just the flu…
- But…



H1N1-related deaths



www.cdc.gov/flu/weekly accessed 9/2/09

Table 1. Pandemic Severity Index by Epidemiological Characteristics

Characteristics	Pandemic Severity Index (PSI)				
	Category 1	Category 2	Category 3	Category 4	Category 5
Case Fatality Ratio (percentage)	<0.1	0.1-<0.5	0.5-<1.0	1.0-<2.0	≥2.0
Excess Death Rate (per 100,000)	<30	30-<150	150-<300	300-<600	≥600
Illness Rate (percentage of the population)	20-40	20-40	20-40	20-40	20-40
Potential Number of Deaths (based on 2006 U.S. population)	<90,000	90,000-<450,000	450,000-<900,000	900,000-<1.8 million	≥1.8 million
20th Century U.S.Experience	Seasonal Influenza (illness rate 5-20%)	1957,1968	None	None	1918 Pandemic

Comprehensive Approach to Hospital Preparedness Against H1N1 flu

- Care for patients with H1N1
- Maintain continuity of operations
- Prevent transmission of H1N1 between patients and staff

http://www.rit.edu/~andpph/photography.html

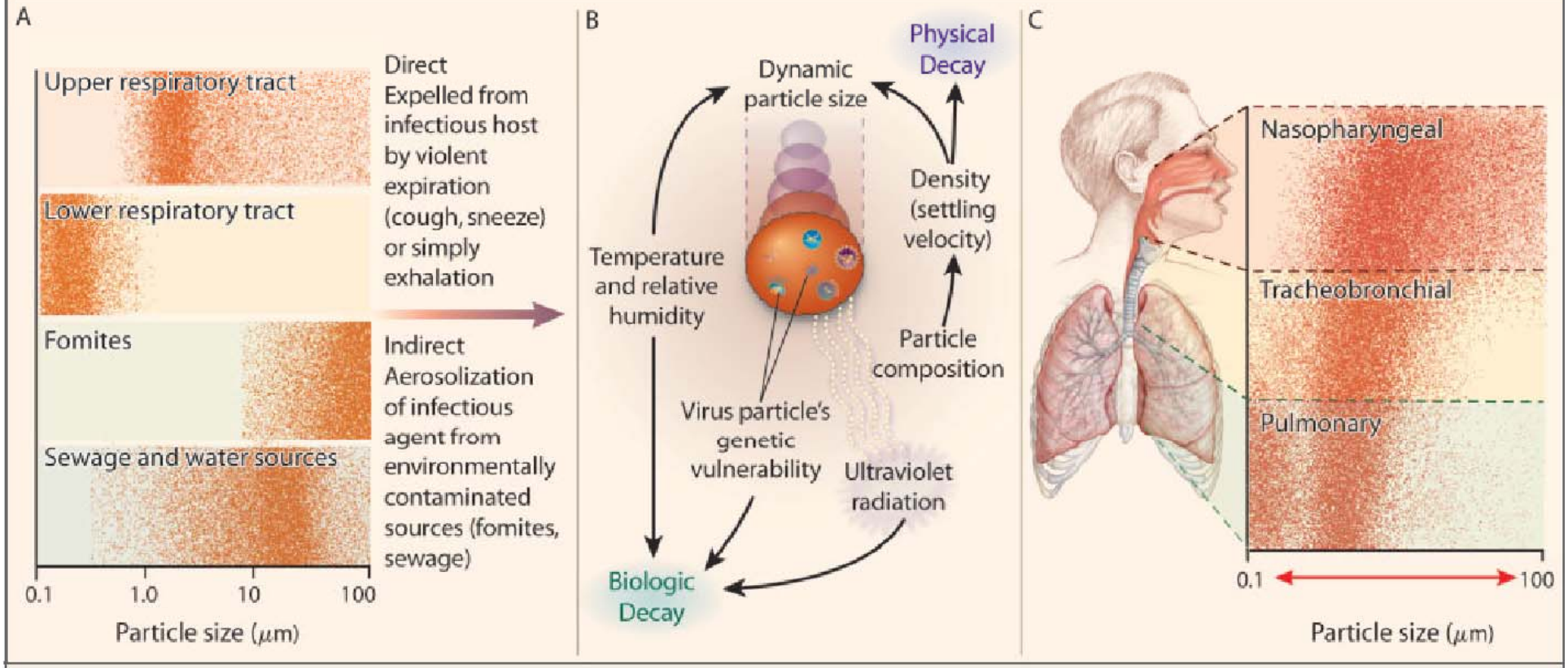


Figure. The Aerobiologic Pathway for the Transmission of Communicable Respiratory Disease.

Whether it is an infected human or a contaminated environmental matrix, each source (Panel A) generates particles with a characteristic range of sizes. The length of time a particle resides in the air (physical decay, Panel B) depends on its initial size, its composition, and environmental factors. Similarly, the length of time an airborne organism remains infectious (biologic decay) is affected by the infectious agent's initial metabolic state, genetic characteristics, and environment. The portion of the respiratory tract of a susceptible host in which inhaled particles are deposited (Panel C) is a function of the particles' aerodynamic size; in the middle of the range, particles may be deposited in both the upper and the lower airways.

A story…

- Three persons arrive to the hospital in mid-November. H1N1 flu is rampant through the community.
- Mr. A has fever, cough, and is short of breath
- Mrs. B is 6 months pregnant and comes for pre-natal care
- Ms. C wants to visit her father who is in the ICU with the flu

The first encounter

- A triage station is set up at the hospital entrance. A nurse sits behind a glass and administers a symptom questionnaire to every person.
- Mr. A is given a mask, asked to sanitize his hands, and directed to the “Flu Clinic”.
- Mrs. B is sent to the off-site OB clinic.
- Ms. C is turned away. No visits are allowed. The policy is clearly posted by the entrance. She is given a contact number where she can inquire about her father.

The Flu Clinic

- All employees working in the flu clinic are vaccinated and have volunteered to be dedicated to this assignment. Some have recovered from the flu themselves.
- A nurse wearing gown, gloves, a fit-tested N95 respirator, and a face shield (full PPE) performs a secondary triage and directs Mr. A to the severe illness area.

The admission process

- Mr. A is evaluated by a physician in full PPE, and a CXR and blood gas analysis are performed in the area. He is admitted to the hospital.
- The registration and admission process is done electronically and using telehealth capabilities. All necessary paperwork, including an armband, print in the unit and are given to the patient by the nurse.
- Patient is transported with a surgical mask over his oxygen cannula, using a back hallway and a dedicated elevator.

The inpatient unit

- The hospital has dedicated flu inpatient and intensive care units, which have been configured to be in negative pressure relative to the rest of the hospital.
- All the staff has been vaccinated, is dedicated to the unit, and have been trained extensively in all appropriate protocols. They all use full PPE.
- No ‘large teams’ or teaching activities are conducted in these units.

The inpatient units

- Hand hygiene and PPE stations are ubiquitous in the units and are being replenished continuously

The OB clinic

- Mrs. B arrives to a secondary triage station set up in the entrance to the clinic. They inquired about symptoms and about sick contacts.
- Staff was vaccinated and followed strict hand hygiene practices
- Staff was screened for symptoms at the beginning of each shift. Any symptomatic staff member is sent home for 7 days.
- Only standard precautions are used as PPE.

Preventing transmission (in order of reliability, not of importance)

- Elimination of potential exposures
- Engineering controls
- Administrative controls
- Personal Protective Equipment

Elimination of Potential Exposures

- Minimize contact between infectious patients or staff and those who are not
  - No visitors
  - Dedicated staff
  - Postponing elective visits and procedures
  - Keeping ill personnel at home

Engineering controls

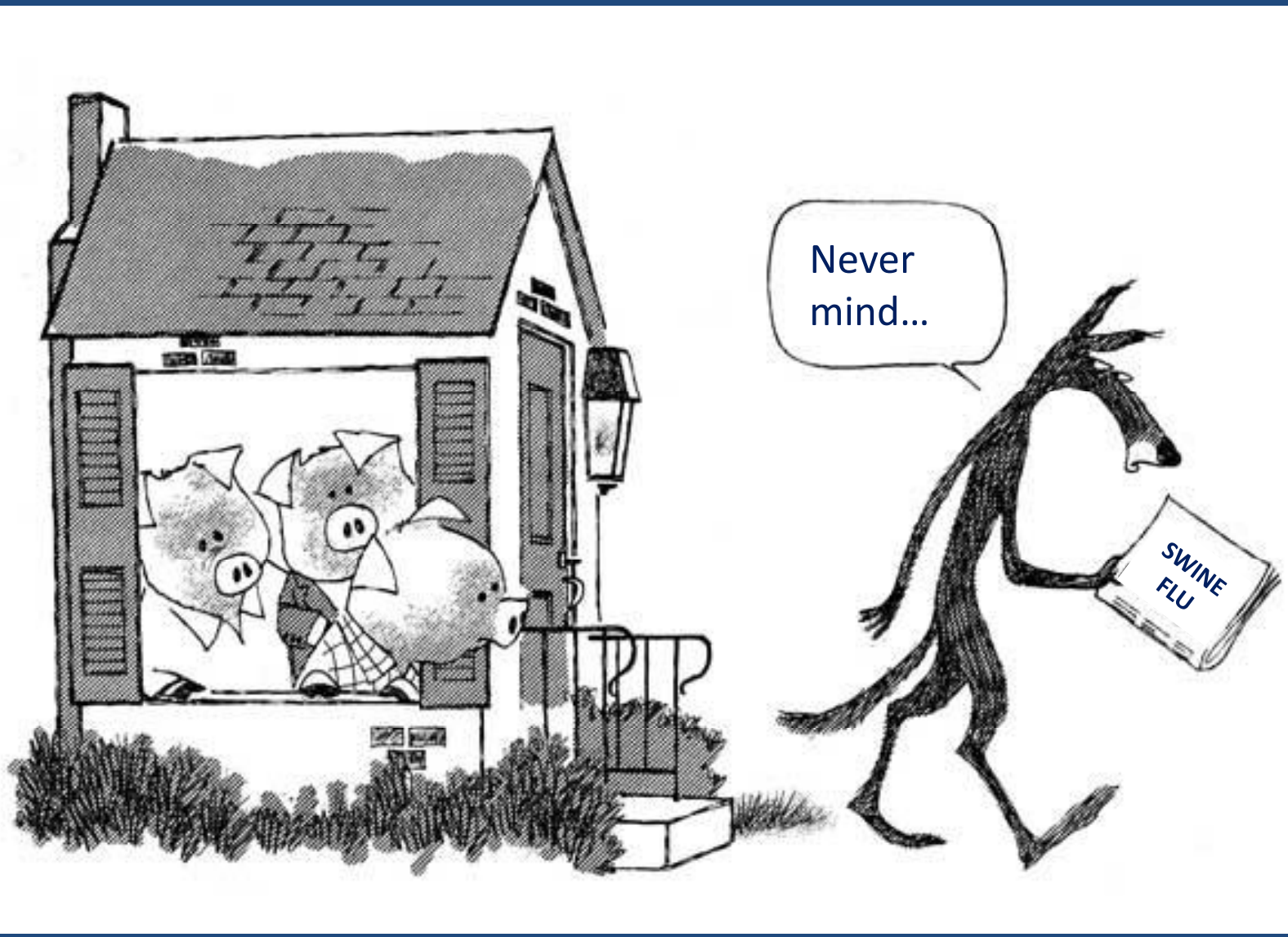
- Physical separation between infected and uninfected
- Not dependent on human behavior
  - Triage ‘behind a glass’
  - Dedicated ER, inpatient unit, ICU
  - “off-station” clinic for high-risk patient
  - Ventilation configuration in units
  - Use of technology for administrative functions

Administrative Controls

- Specific work practices and policies
- Dependent on quality of implementation
  - Vaccination
  - Exclusion of ill HCW
  - Hand hygiene and respiratory hygiene
  - Management of patient flow
  - Triage

Personal Protective Equipment

- Last line of defense
- Effectiveness user-dependent
- Must be used throughout the exposure period
- Does not protect against unanticipated exposures


Never mind…
SWINE FLU