Nonpharmaceutical Interventions

Emergency hospital during influenza epidemic, Camp Funston, Kansas.
National Museum of Health and Medicine

Learning Objectives

- List the three goals of implementing NPIs to mitigate the effects of pandemic influenza
- Name and describe four community-based NPIs
- Identify the roles and responsibilities of the WHO and national authorities related to NPIs and rapid containment of pandemic influenza

Outline

- Nonpharmaceutical intervention (NPI) overview
- NPI use for pandemic influenza
- WHO recommendations
- Summary

Overview of Nonpharmaceutical Interventions (NPIs)

What are NPIs?

Nonpharmaceutical interventions (NPIs)

- Measures, other than vaccines and antiviral medicines, that may reduce transmission rate
- NPIs can be implemented at:
  - Borders
  - Community level
  - Individual level

NPI Examples

Purpose	Potential NPI
Limit spread across borders	Travel screening and entry/exit restrictions
Reduce spread within national/local populations	Social distancing; Quarantine exposed; Isolation
Reduce an individual person's risk	Personal protective measures (masks, gloves)
Communicate risk to the public	Public health communication campaign

NPI Definitions

Isolation: Separation or restriction of movement of persons ill with infectious disease

Quarantine: Restriction of persons who *are not ill* but presumed exposed, in the home or a designated facility

Social Distancing: Measures to increase the space between people and decrease the frequency of contact among people

NPI Definitions (Continued)

Infection Control: Hygiene and personal measures that reduce the risk of transmission of an infectious agent from an infected person to uninfected persons

Mitigation: Efforts undertaken to decrease the impact of pandemic influenza on the community

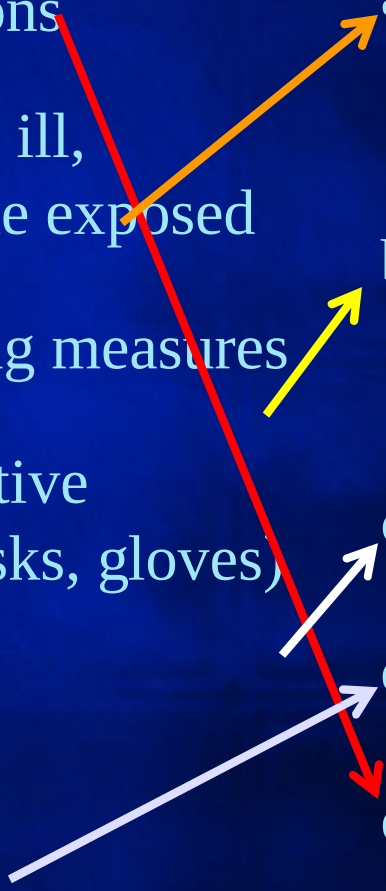
Containment: Efforts undertaken to confine early pandemic cases to a geographic area or population

Cluster: A laboratory-confirmed index case and at least one laboratory-confirmed epidemiologically-linked case

Review Question 1

Match the NPI listed on the left to the correct purpose given on the right.

1. Travel restrictions
2. Isolation of the ill, quarantine of the exposed
3. Social distancing measures
4. Personal protective equipment (masks, gloves)
5. Public service announcements



a. Reduce spread within national and local populations with individual-level measures

b. Reduce spread within national and local populations with community-level measures

c. Reduce an individual person's risk

d. Communicate risk to the public

e. Limit the international spread of the virus

NPI Use for Pandemic Influenza

Why Use NPIs?

- During the first months of a pandemic influenza outbreak:
  - Vaccines made from the pandemic influenza strain will probably not to be available
  - Antiviral medicines may be insufficient in quantity, ineffective, and/or difficult to distribute in a timely way
- In many countries, there may be a significant delay before vaccines or antiviral medicines are available in sufficient quantity

The Evidence for NPIs

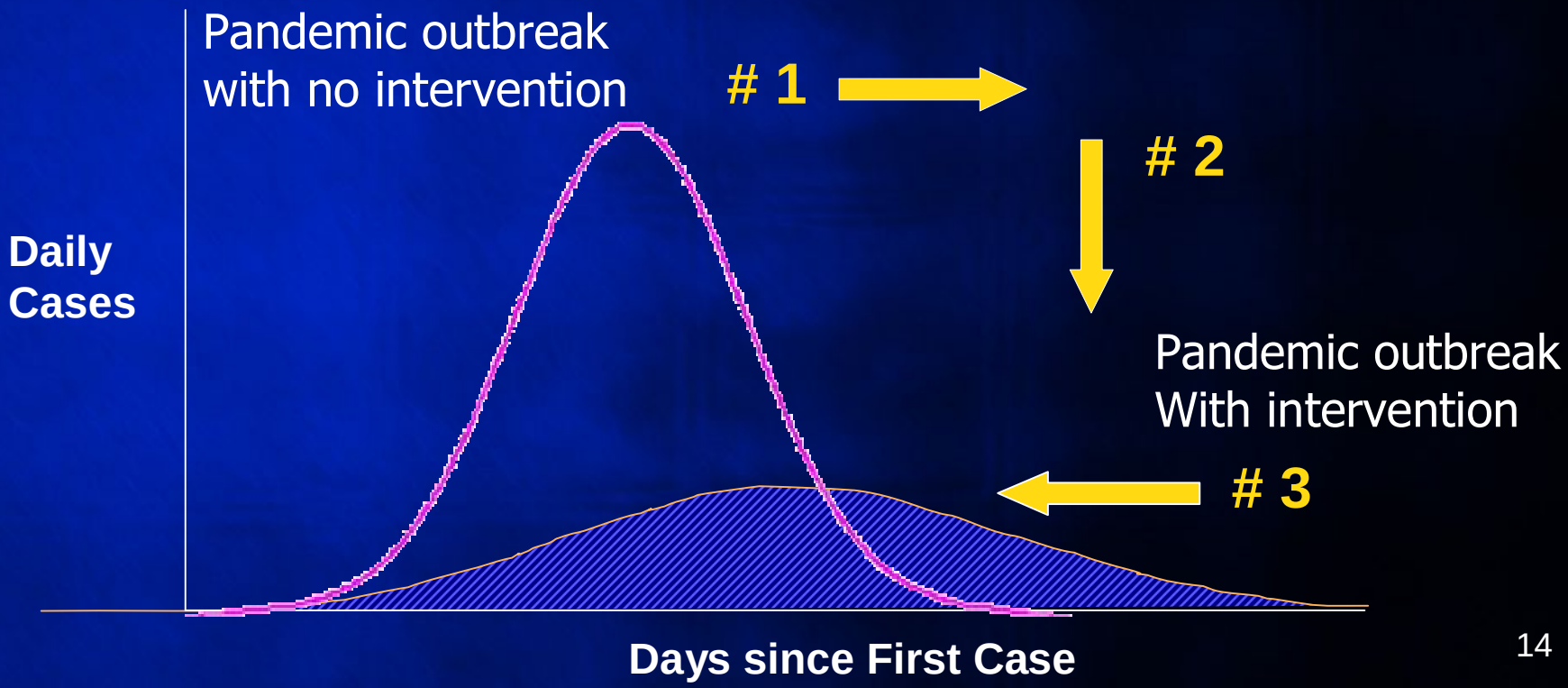
- Data from 1918 pandemic
- Epidemiological studies of seasonal influenza outbreaks
- Mathematical modeling

1918 Pandemic Control Measures

- Influenza was made a reportable disease
- Isolation of sick individuals
- Quarantine of households with sick family members
- Infection Control
  - Encouraged mask use
- Containment
  - Sequestration of children or adults
- Social Distancing
  - Closed schools
  - Cancelled worship services
  - Closed public gathering places (saloons, theaters, etc.)

Community-based NPI Goals

1. Delay disease transmission & outbreak peak
2. Decrease burden on healthcare infrastructure
3. Reduce number of cases



Philadelphia *vs.* St. Louis, 1918

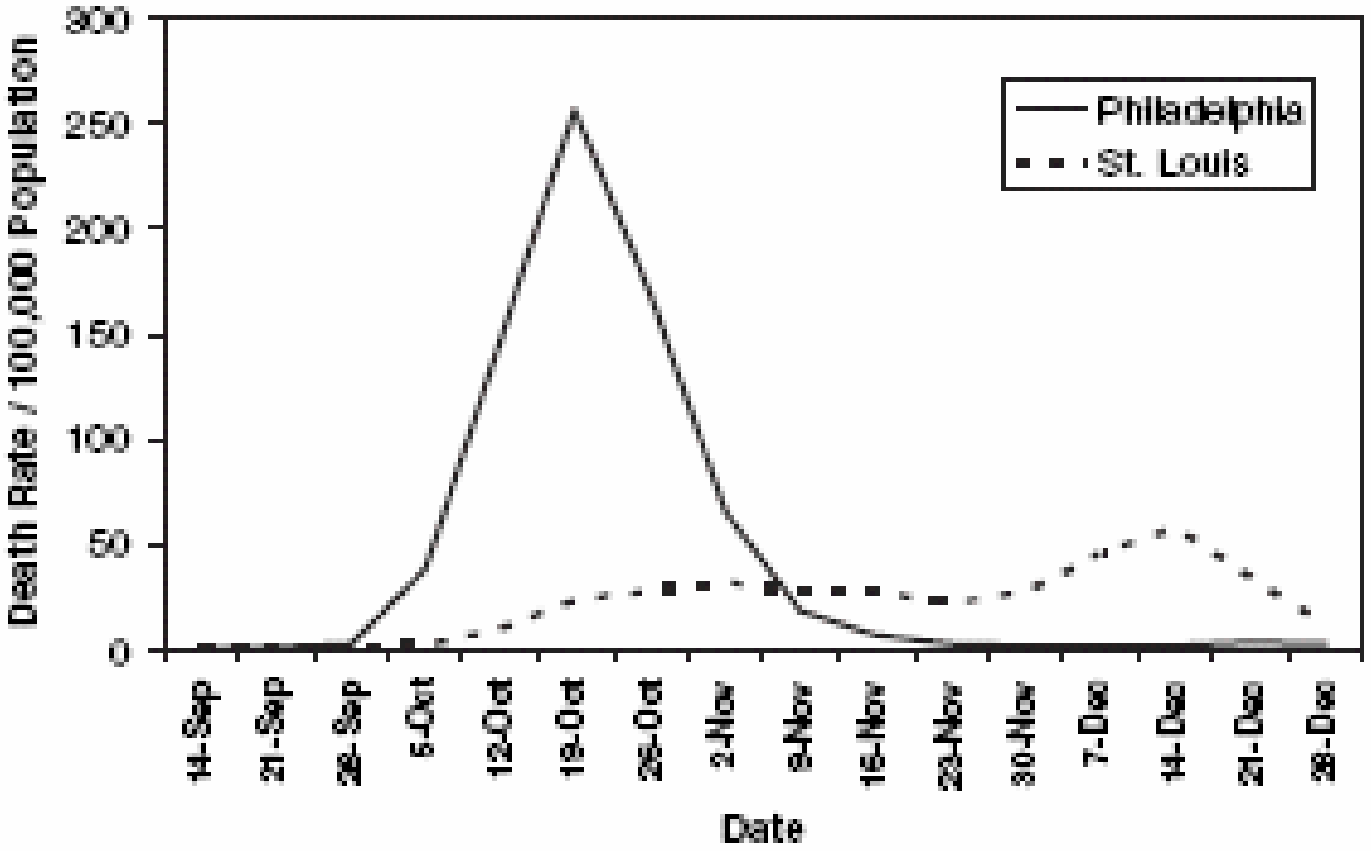


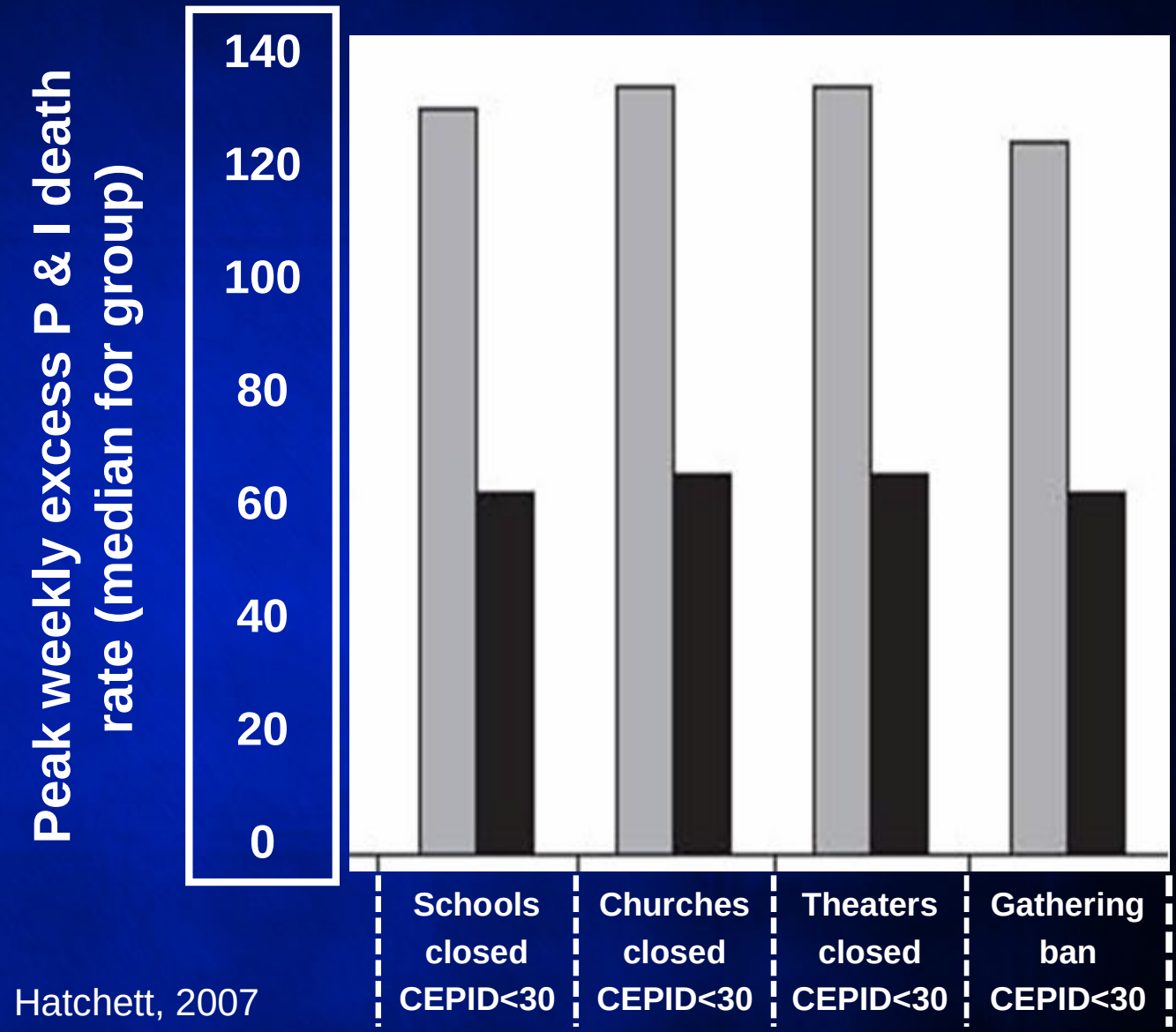
Fig. 1. Excess P&I mortality over 1913–1917 baseline in Philadelphia and St. Louis, September 8–December 28, 1918. Data are derived from ref. 10.

(Hatchett, 2007)

An Ill-Advised 1918 Gathering

Liberty Loan Parade, September 28, 1918

NPI Timing and Excess Death Rates



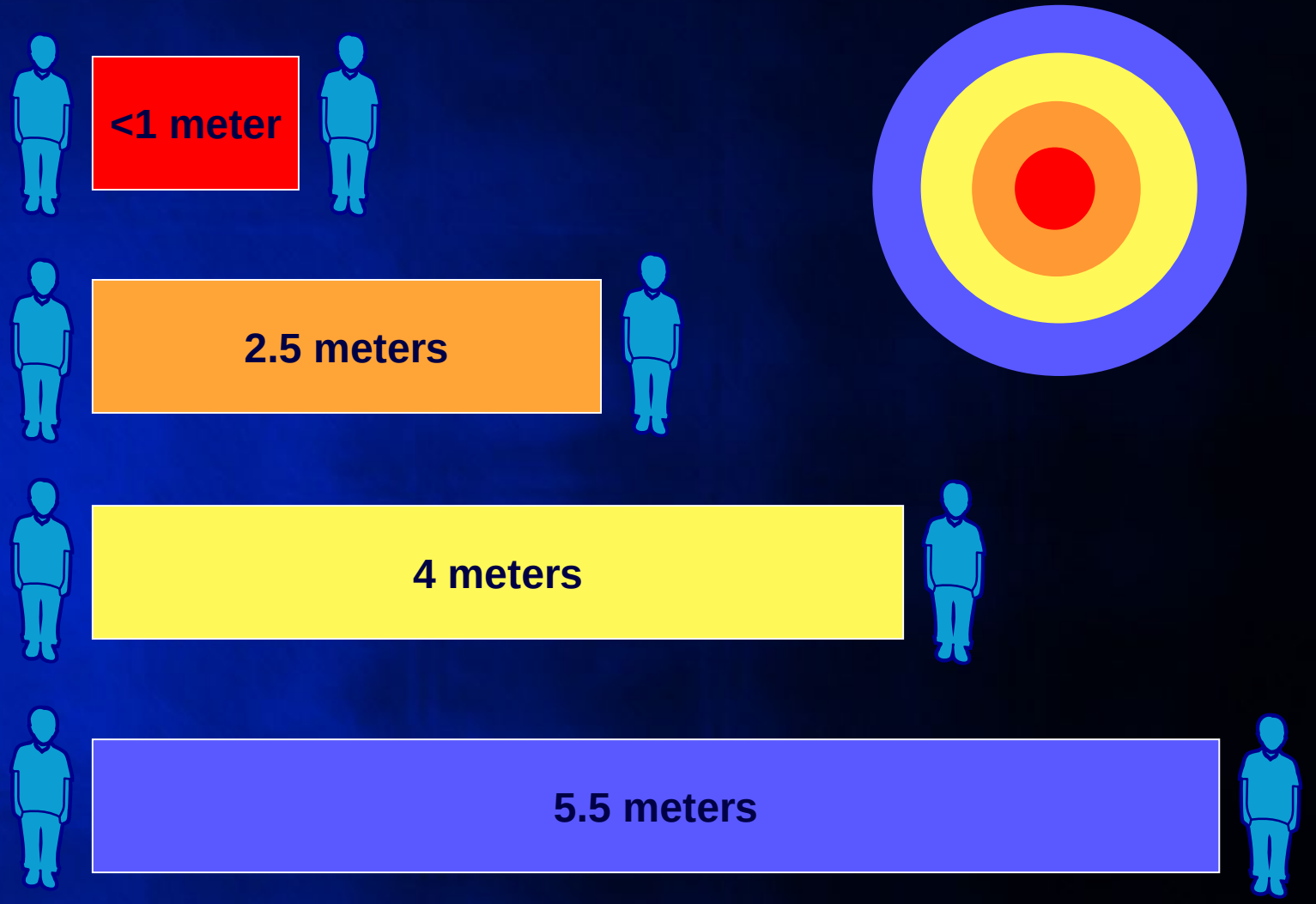
Intervening late or not at all

Intervening early

CEPID= cumulative excess P&I death rate

Hatchett, 2007

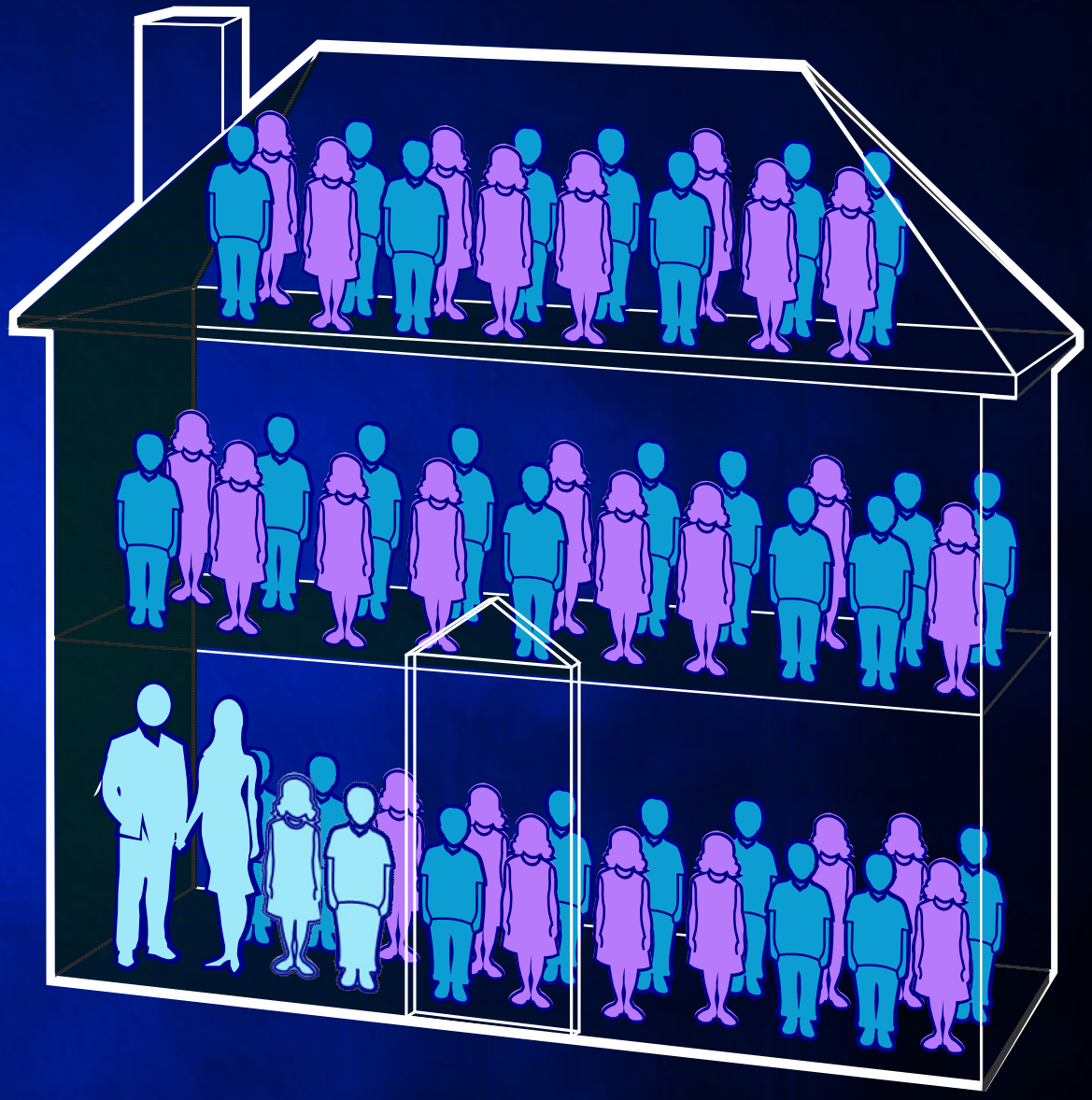
Workplace and Classroom Density



Typical U.S. Home

*Based on avg. 2,600 sq. ft. per single family home

Typical U.S. School



Reducing Social Density

- Isolation
  - Contagious period
  - Appropriate medical facilities
- Quarantine
  - Residence is preferred setting
  - Least disruptive
  - Perform an evaluation of the home

NPIs and Healthcare Surge

- Surge not met by increasing capacity
- Use NPIs to reshape demand
- Spread demand by reducing caseload and severity

NPIs and Infection Control Measures

Infection control measures include:

- Hand hygiene
- Cough etiquette
- Environmental cleaning
- Personal Protective Equipment (PPE)

Recommendations from practitioners may focus on a variety of NPIs but should emphasize hand washing and social distancing.

Review Question 2

Which of the following is not one of the 3 goals of implementing NPIs in a community in order to mitigate a pandemic?

a.Shift disease burden to healthier populations
b.Delay disease transmission and outbreak peak
c.Decrease burden on healthcare infrastructure
d.Reduce the number of cases

Answer: a.

WHO NPI Recommendations

WHO Recommends NPIs to Reduce Impact of a Pandemic

- Screening/quarantining at international borders has little effect
- WHO international recommendations:
  1. Provide outbreak information to international travelers
  2. Screen travelers departing affected countries
- Focus on *national* and *community* levels

National and Local Measures

- Ill persons remain home when symptomatic
  - Forced isolation/quarantine: ineffective & impractical
- If pandemic influenza outbreak is severe
  - Use social distancing measures
  - Defer domestic travel to affected areas
  - Implement routine hand & respiratory hygiene
  - Mask use depends on setting and risk
  - Disinfect contaminated household surfaces

Summary

- NPI for pandemic influenza
  - Multiple interventions (targeted, layered containment) more effective than single intervention
  - Effectiveness depends on timing of and compliance with interventions
- NPIs may be the only interventions available
- However
  - Consequences of interventions need to be considered
  - Additional research needed

Glossary

Non-pharmaceutical Interventions (NPIs): Measures other than vaccines and antivirals that may reduce the risk of transmission of influenza to individuals and communities. NPIs can be implemented at borders, or at the level of the community and the individual

Isolation: Separation or restriction of movement of persons ill with an infectious disease in order to prevent transmission to others

Quarantine: Restriction of persons who *are not ill* but presumed exposed, usually in the home or a designated facility

Social Distancing: Measures to increase the space between people and decrease the frequency of contact among people

Glossary

Infection Control: Hygiene and personal measures to reduce the risk of transmission of an infectious agent from an infected person to uninfected persons

Containment: Efforts undertaken to confine early cases of pandemic influenza to a geographic area or population

Mitigation: Efforts undertake to lessen the impact of pandemic influenza on the community

Cluster: A laboratory confirmed index case and at least one laboratory confirmed epidemiologically-linked case

References

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