

Pediatric Considerations for Pandemic Planning

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Objectives

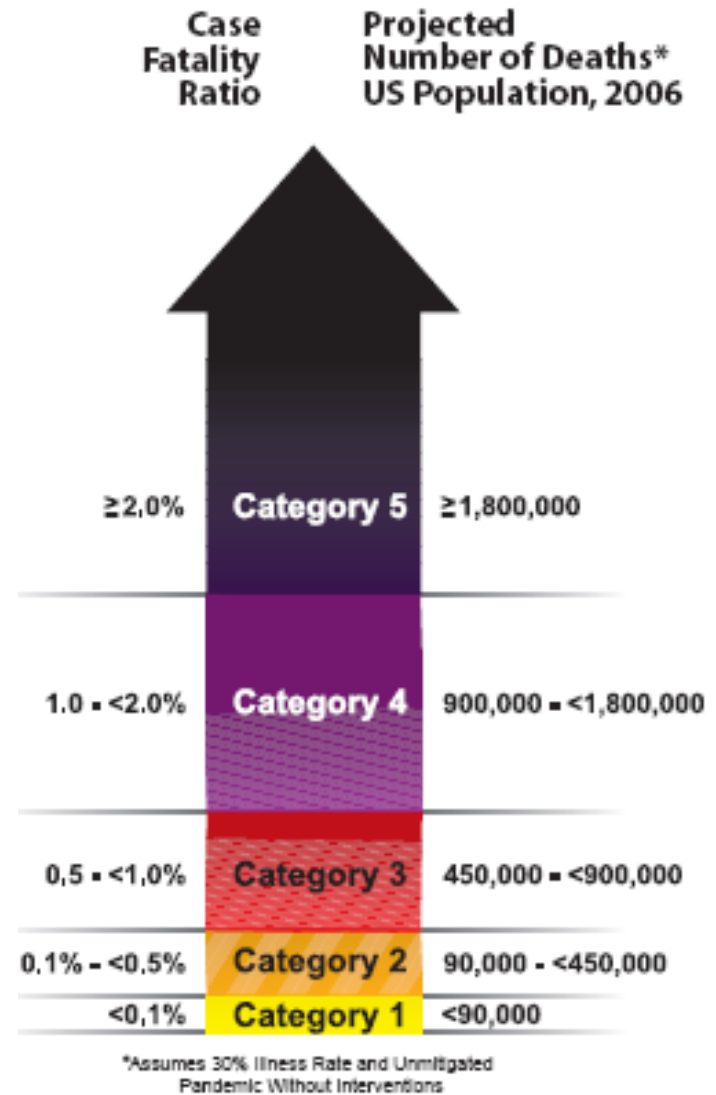
- List the key elements of pediatric pandemic preparedness
- Identify reasons for increased susceptibility in children
- List advantages of sentinel surveillance in children
- Discuss challenges of capacity building for pediatric care
- Describe examples of best practices



- **Seasonal** (or common) flu is a respiratory illness that can be transmitted person to person. Most people have some immunity, and a vaccine is available.
- **Avian** (or bird) flu (AI) is caused by influenza viruses that occur naturally among wild birds. Low pathogenic AI is common in birds and causes few problems. H5N1 is highly pathogenic, deadly to domestic fowl, and can be transmitted from birds to humans. There is no human immunity and no vaccine is available.
- **Pandemic flu** is virulent human flu that causes a global outbreak, or pandemic, of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no pandemic flu.

Source: <http://www.pandemicflu.gov/>

Pandemic Severity Index



Source:

http://www.pandemicflu.gov/plan/community/community_mitigation.pdf

Table 1. Pandemic Severity Index by Epidemiological Characteristics

Characteristics	Pandemic Severity Index				
	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
20 th Century U.S.Experience	Seasonal Influenza (illness rate 5-20%)	1957,1968 Pandemic	None	None	1918 Pandemic

Source: http://www.pandemicflu.gov/plan/community/community_mitigation.pdf

Sentinel Surveillance

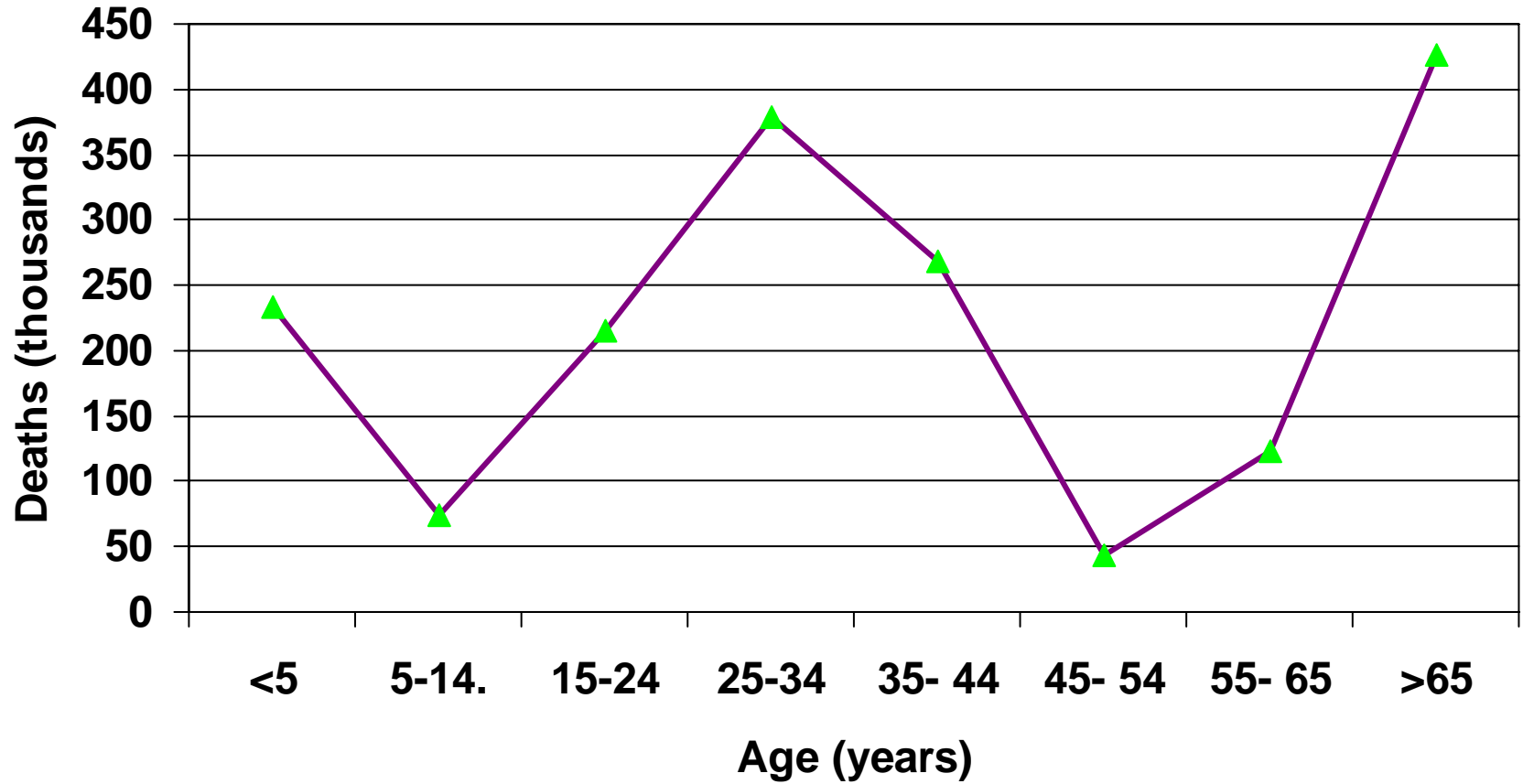
- Great dependency on passive surveillance
- Children are an important target population for surveillance
 - Infection in children may be a highly sensitive marker (with limited specificity)
- School/Day care attendance may serve as a reliable and accessible source of data

Past Influenza Pandemics

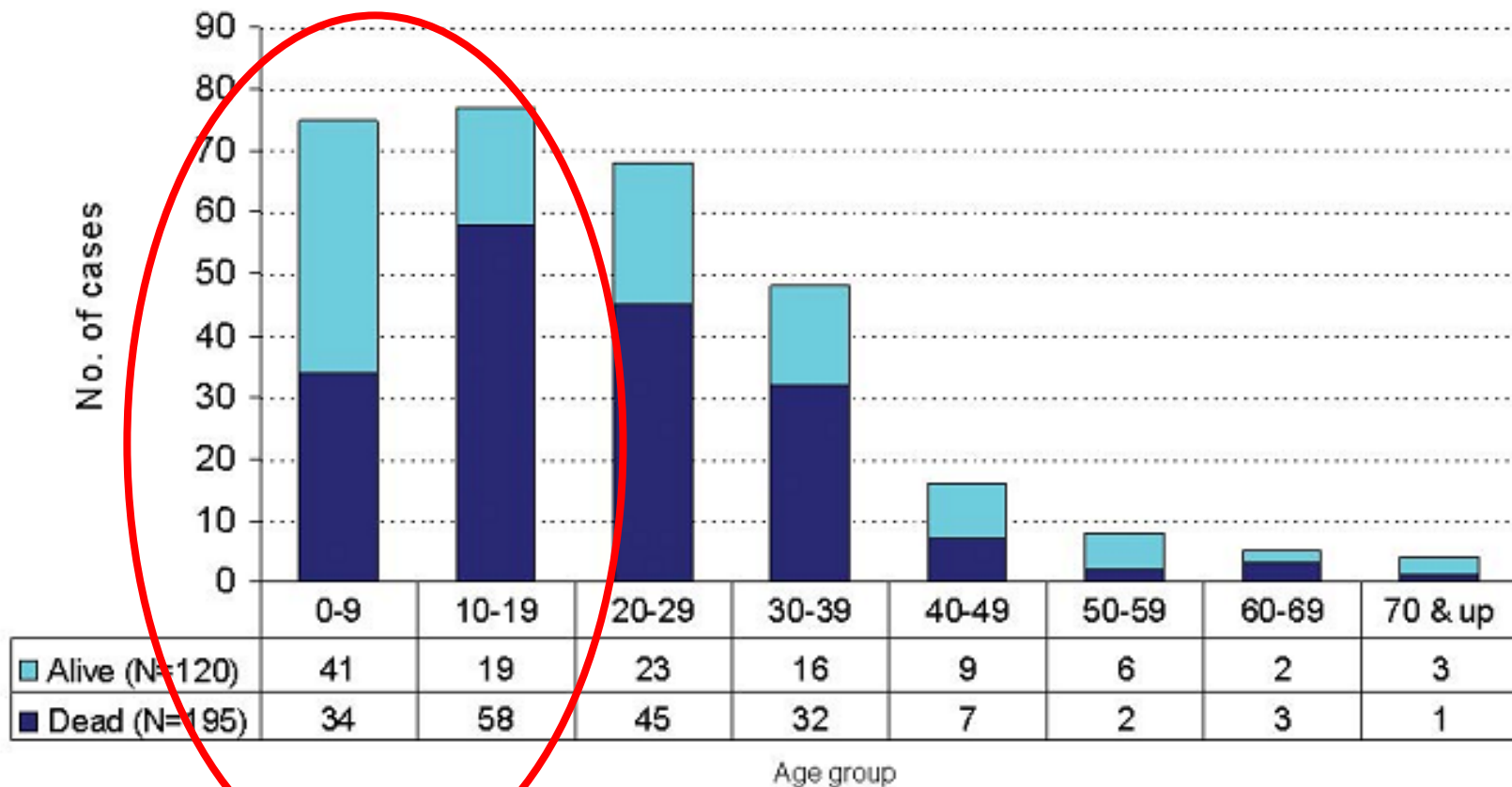
Pandemic	Deaths in the US	Deaths Worldwide	Population Affected
Spanish Flu (H1N1) 1918-1919	500,000	40 million	Persons 20-40 years old
Asian Flu (H2N2) 1957-58	70,000	1-2 million	Infants, elderly
Hong Kong Flu (H3N2) 1968-69	36,000	700,000	Infants, elderly
Russian Flu (H1N1) 1977-78	8,300		Persons under 20 years old

***Sources:** NIAID: Focus on the flu; HHS: Influenza pandemics; Kilbourne 2006; Simonsen 2004; Webster 1997

Projected US Deaths



Human Avian Influenza A (H5N1) Cases by Age Group and Outcome (as of 10 September 2007)



As of 10 September 2007, total of 328 cases were reported officially to WHO.
The 12 cases in Turkey were excluded.



Avian Flu (H5N1)

Clinical Presentation in Children

- **Fever**
- **Cough**
- **Vomiting**
- **Diarrhea**
- **Dehydration**
- **Tachypnea**
- **Hypoxia**
- **Coma**
- **Lymphopenia**
- **Thrombocytopenia**
- **Elevated Liver Enzymes**

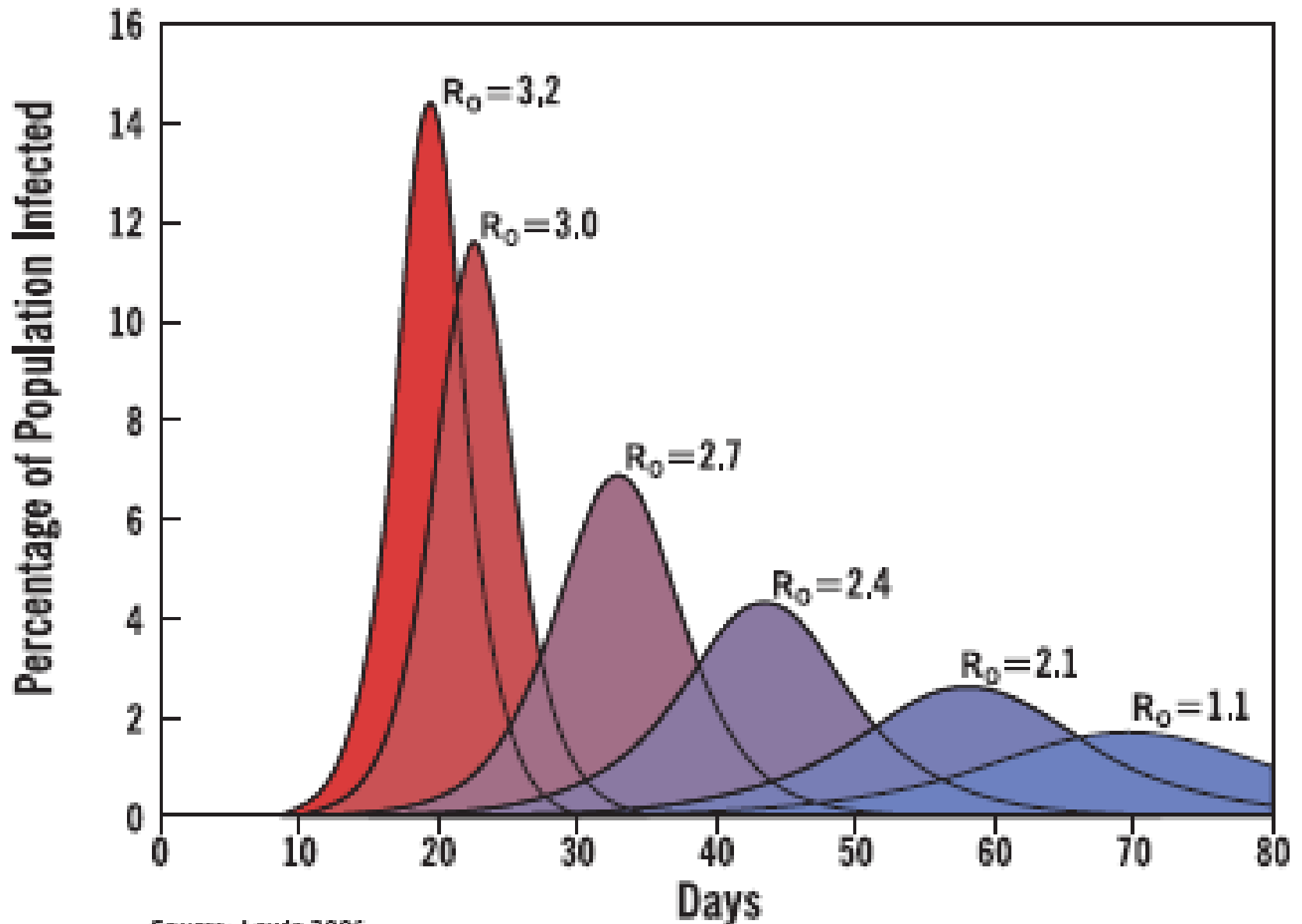
Pandemic Waves

- Multiple waves of disease outbreaks
- First wave: six to eight weeks locally
- Interval between waves*
 - Variable
 - Unpredictable
- Wave specific severity*
 - Variable
 - Unpredictable

*Related to R_0 and acquisition of immunity

Figure 2.

Effect of R_0 on Epidemic Curves

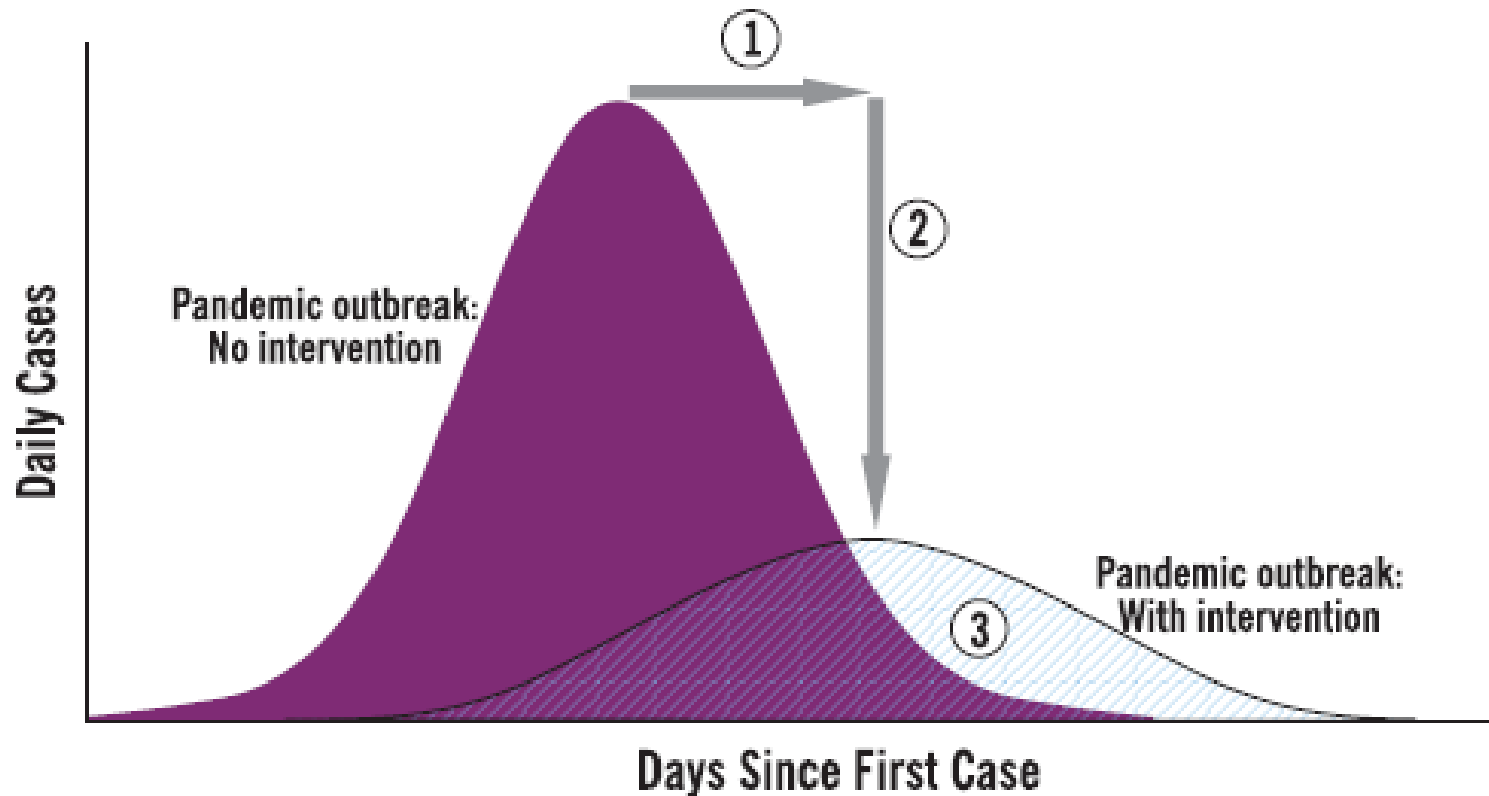


Source: Lewis, 2005

Figure 1.

Goals of Community Mitigation

- ① Delay outbreak peak
- ② Decompress peak burden on hospitals / infrastructure
- ③ Diminish overall cases and health impacts



Summary of Community Mitigation Strategy by Pandemic Severity

Pandemic Severity Index			
Interventions* by Setting	1	2 and 3	4 and 5
Home Voluntary isolation of ill at home (adults and children); combine with use of antiviral treatment as available and indicated	Recommend†§	Recommend†§	Recommend†§
Voluntary quarantine of household members in homes with ill persons¶ (adults and children); consider combining with antiviral prophylaxis if effective, feasible, and quantities sufficient	Generally not recommended	Consider**	Recommend**
School Child social distancing -dismissal of students from schools and school based activities, and closure of child care programs -reduce out-of-school social contacts and community mixing	Generally not recommended Generally not recommended	Consider: ≤4 weeks†† Consider: ≤4 weeks††	Recommend: ≤12 weeks§§ Recommend: ≤12 weeks§§
Workplace / Community Adult social distancing -decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings) -increase distance between persons (e.g., reduce density in public transit, workplace) -modify postpone, or cancel selected public gatherings to promote social distance (e.g., postpone indoor stadium events, theatre performances) -modify work place schedules and practices (e.g., telework, staggered shifts)	Generally not recommended Generally not recommended Generally not recommended Generally not recommended	Consider Consider Consider Consider	Recommend Recommend Recommend Recommend

Source: http://www.pandemicflu.gov/plan/community/community_mitigation.pdf

Community Mitigation Strategy

- **HOME**
 - Voluntary isolation
 - Voluntary quarantine
- **SCHOOL / DAY CARE**
 - Child social distancing
- **WORKPLACE / COMMUNITY**
 - Adult social distancing

COMMUNITY MITIGATION

Challenges of Pediatric Care

School closure

- Interruption in education
- Interruption in social interaction
- Workforce and economic consequences

Child care closure

- Change in care giver
- Potential for lack of supervision by “alternate caretakers”
- Special needs children
- Jurisdiction and feasibility of closure

Nutrition

- Subsidized school meal programs serve almost 40 million children in 2005

Alternative Childcare

- **2-3 year old children in group care with > 6 kids have a 2.2 fold risk of URIs***
- **Arrange collective and consistent care for small groups of children**
 - Psychosocial and epidemiologic advantages
- **Avoid gatherings larger than family-size units**
- **Based on expert opinion**

* Bradley, RH. Child care and common communicable illnesses in children aged 37 to 54 months. Arch Pediatr Adolesc Med. 2003 Feb;157(2):196-200.



- **Facemasks**
 - Recommended for individuals who are:
 - Sick with flu
 - Live with someone who has flu symptoms
 - Spending time in a crowded public place

- **Respirators**
 - Recommended for individuals for whom close contact with an infectious person is unavoidable

Source: Summary of Interim Public Health Guidance for the Use of Facemasks and Respirators in Non-Occupational Community Settings during an Influenza Pandemic, May 3, 2007

PandemicFlu.gov



AvianFlu.gov

FDA Approves First U.S. Vaccine for Humans Against the Avian Influenza Virus H5N1

April 2007

HOSPITAL

Pediatric Care Considerations

- Established respiratory screening
- Experience opening additional units for respiratory care
- Surge capacity care issues
 - Staff
 - Stuff
 - Structure

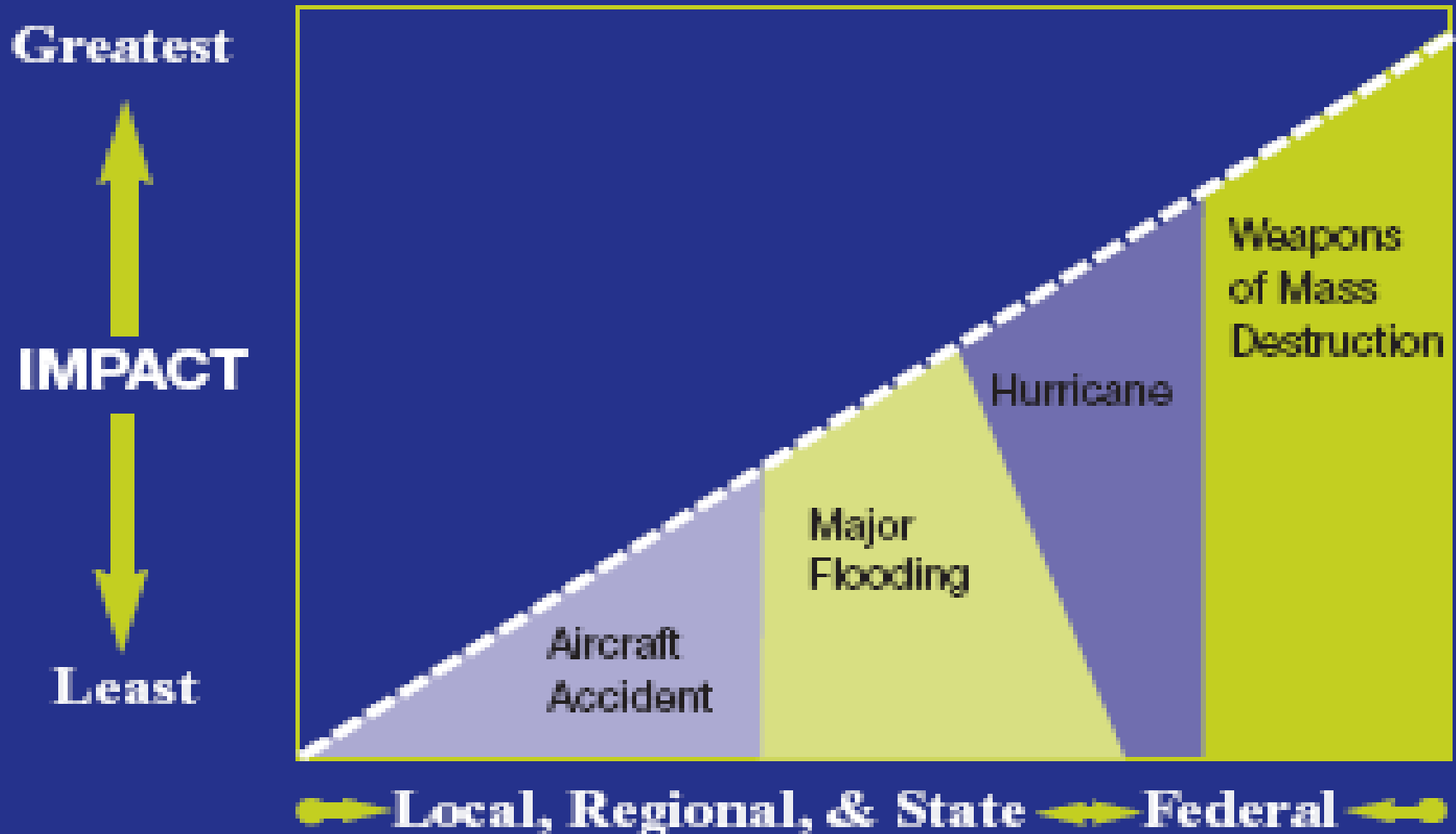
Surge capacity is a health care system's ability to expand quickly beyond normal services to meet an increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies.

REF: AHRQ. Addressing Surge Capacity in a Mass Casualty Event, in Bioterrorism and Health System Preparedness. Issue brief #9.

Exhibit 1

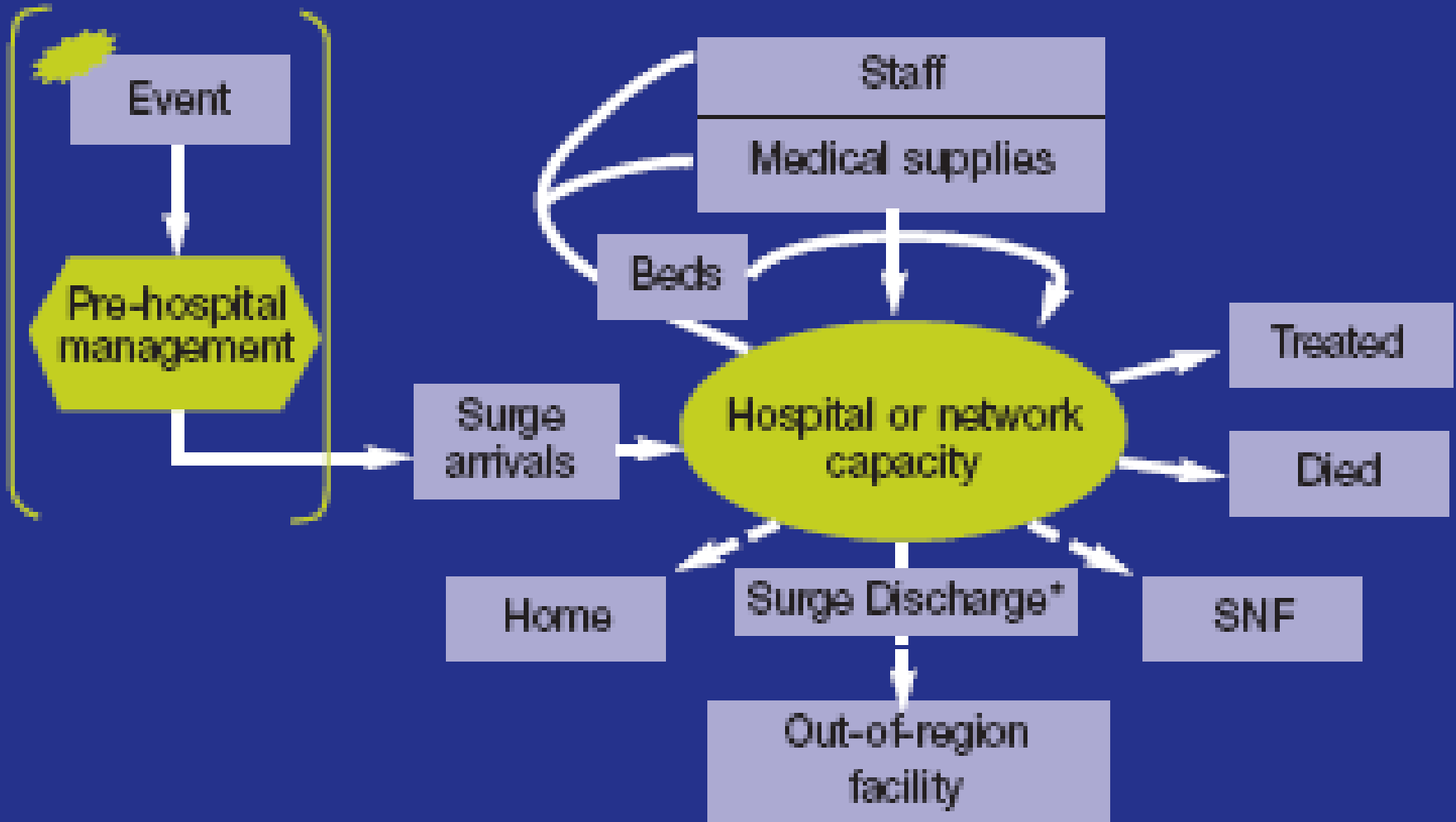
Surge

Generated From Both Natural and Man-Made Events



REF: AHRQ. Addressing Surge Capacity in a Mass Casualty Event, in Bioterrorism and Health System Preparedness. Issue brief #9, Exhibit 1.

Determinants of Surge Capacity



*Note: I am indebted to Sam Benson, EMT-P, New York City Office of Emergency Management for the notion of "surge discharge" —N. Hupert, M.D., M.P.H.

Potential Psycho-Social Impact

Short-term

- Regression
- Aggression
- Sleep disruption
- Withdrawal
- Amotivation

Long-term

- Attachment related disorders
- Anxiety disorders
- Depression
- Post-traumatic Stress Disorder
- Cognitive impairment

Reducing Psycho-Social Insult

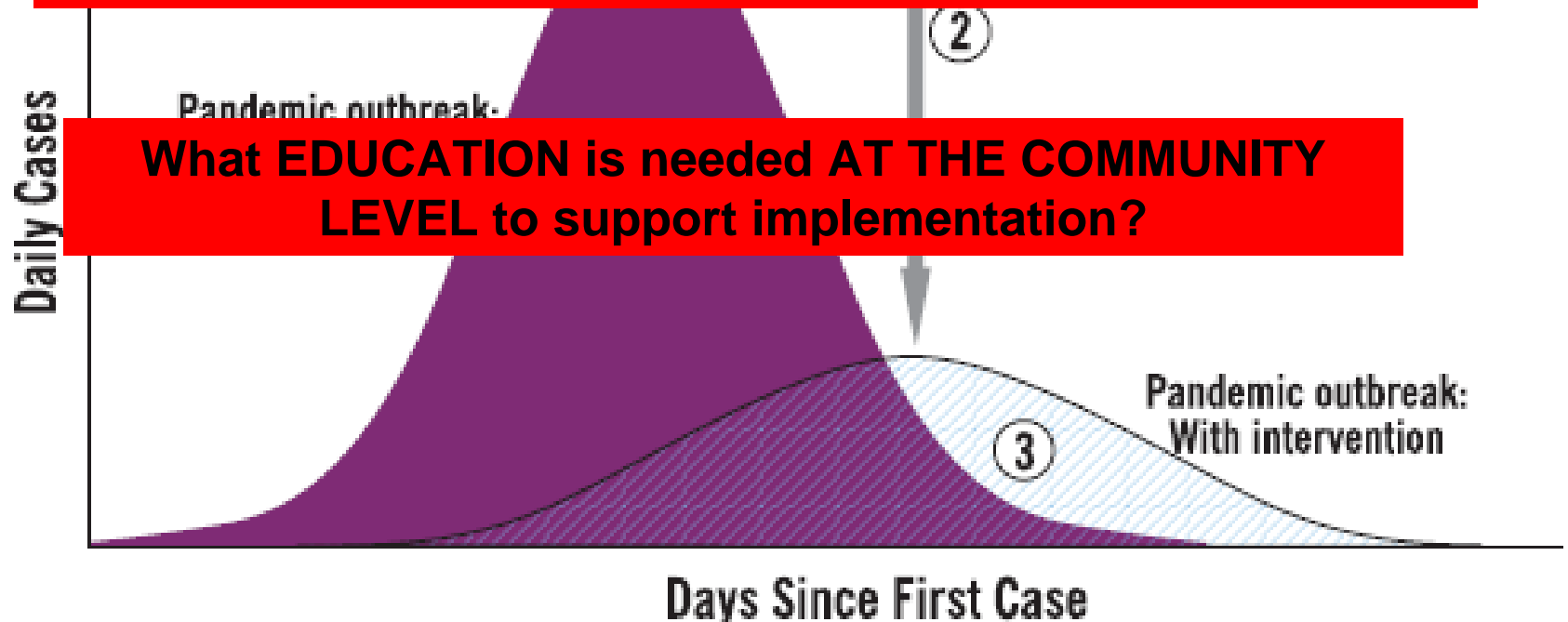
- **Mitigation**
 - Planning
 - Training
- **Surveillance**
 - Short and long-term
- **Interventions for recovery**
 - Evidence-based best practices

Figure 1.

Goals of Community Mitigation

- ① Delay outbreak peak
- ② Decompress peak burden on hospitals / infrastructure
- ③ Diminish overall cases and health impacts

What types of community level support systems will minimize the negative consequences of interventions?



Pediatric Best Practices

ARE THERE ANY????



Checklists, Guidelines and Tools

- **Individuals & Families**
- [Pandemic Flu Planning Checklist for Individuals and Families](#) multi-languages
- [Family Emergency Health Information Sheet](#)
- **Schools**
- [Child Care and Preschool Pandemic Influenza Planning Checklist](#)
- [School District \(K-12\) Pandemic Influenza Planning Checklist](#)
- [Colleges and Universities Pandemic Influenza Planning Checklist](#)

Seattle-King County

Pandemic Influenza Response Plan

January, 1 2007 – Version 13

- **Vulnerable Populations Action Team**

Mitigation:

1. Needs assessment
2. Culturally appropriate technical assistance to local agencies, CBOs, and large informal networks serving vulnerable populations
3. Active outreach to underserved populations
4. Assist PIOs on message development targeting vulnerable populations

<http://www.metrokc.gov/health/pandemicflu/plan/>

Rhode Island Dept of PH

Pandemic Influenza Plan

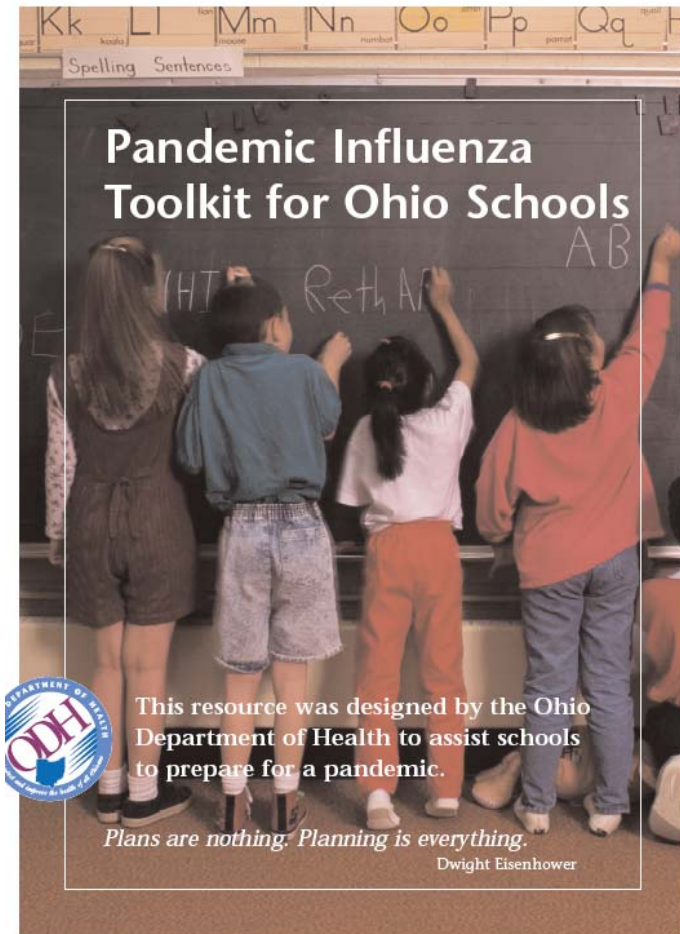
- **Special Populations Section**
 - More Vulnerable to:
 - Infectious illness
 - Disruption of regular services
 - Loss of work
 - Focus on Health Care, Mental Health Care and Social Service Systems
- **Provides strategies**

<http://www.health.state.ri.us/pandemicflu/pandemicfluplan.pdf>

Pgs. 68-76.

Ohio Pandemic Influenza Toolkit for Schools

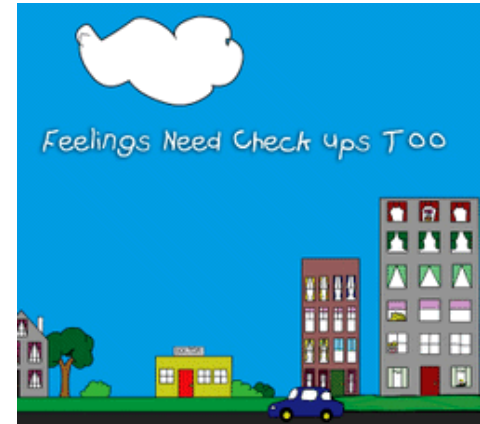
- Planning
- Disease Surveillance and Reporting
- Infection Control Measures in the School
- Mental Health Considerations
- Parent Information
- Media Material
- Posters
- Resources



<http://www.ohiopandemicflu.gov/docs/panfluschooltoolkit.pdf>

American Academy of Pediatrics Disaster Planning

- Family readiness kit and 4-step disaster plan
- “Feelings need checkups too”
- Responding to emotional needs of children
- Bereavement
- Children with special needs
- Health Topics: bioterrorism, chemical, radiological agents, disaster planning...
- Compilation of pandemic flu resources (CDC, WHO, HHS)
- Resources for pediatric health care providers



New York City HD: Ped Surge Capacity

Pediatric Disaster Toolkit: Hospital Guidelines for Pediatrics
During Disasters (2nd Edition, 2006)

Specifically addresses issues relevant to hospital preparedness

- Security
- Dietary needs
- ED/In-house bed assignments
- Equipment
- Training
- Transportation
- Staffing
- Decontamination
- Pharmacy needs
- Psychosocial needs
- Infection control
- Disaster triage
- Family information and support center (FISC)