NDMS meeting 4-06

Pandemic Planning and Preparedness: National Update

Benjamin Schwartz, M.D.
National Vaccine Program Office
U.S. Department of Health and Human Services

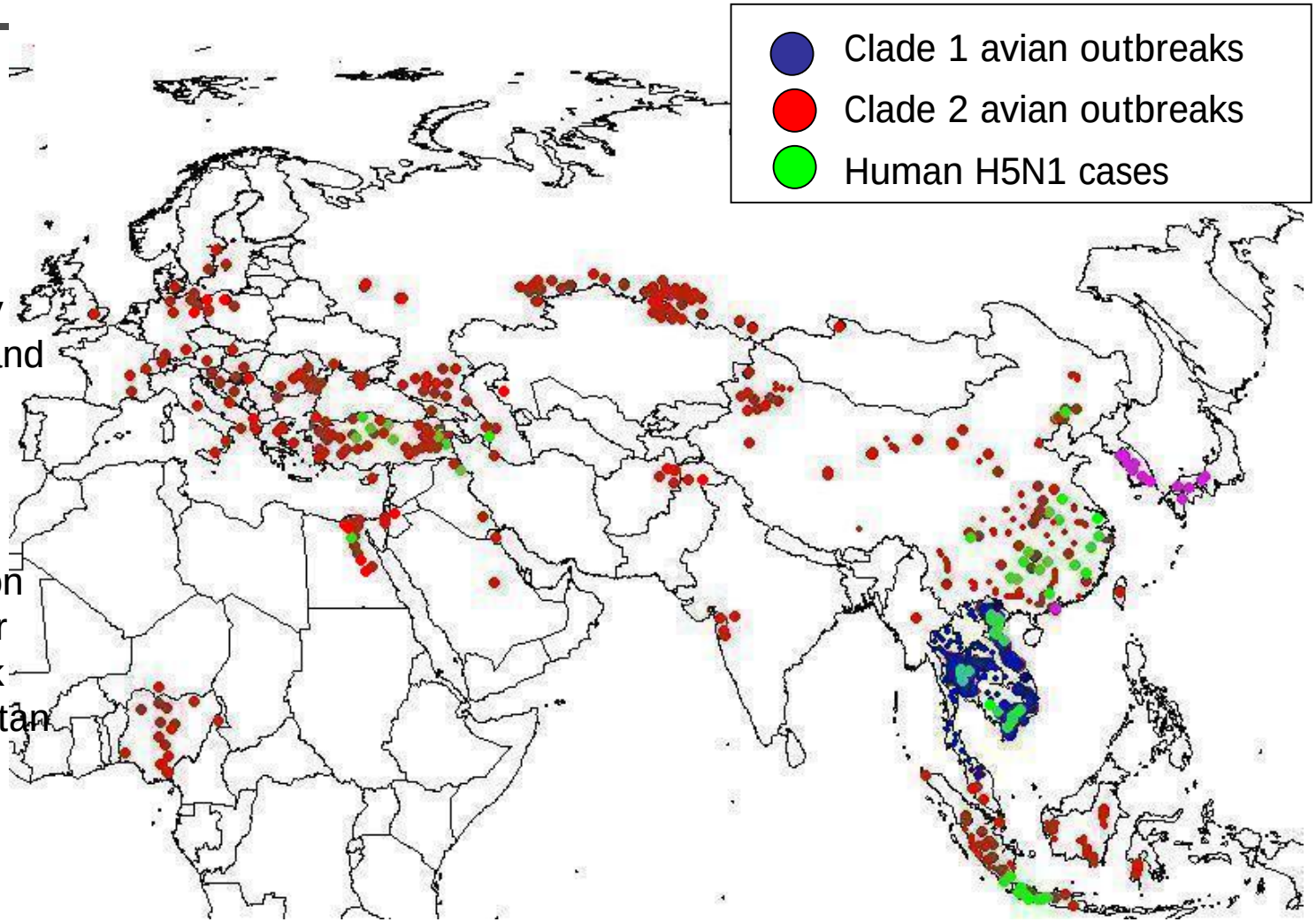
Presentation Outline

1. H5N1 update
2. National pandemic planning status
3. Pandemic response component update
   - Community interventions
   - Vaccination
   - Antiviral treatment

Human and Avian H5N1 Infections: 1/03 – 3/24/06

Countries reporting avian outbreaks since 2/06 (N = 31)

Iraq	Niger
Nigeria	Sweden
Azerbaijan	Germany
Bulgaria	Switzerland
Greece	Serbia
Italy	Poland
Slovenia	Albania
Iran	Austria
Germany	Cameroon
Egypt	Myanmar
India	Denmark
France	Afghanistan
Hungary	Israel
Slovakia	Pakistan
Bosnia	Jordan
Georgia	



Human Cases of Avian H5N1 Infection, 2003 – 4/06

Country	Years	Cases	Deaths
Vietnam	2003-05	93	42
Thailand	2004-05	22	14
Cambodia	2005-06	6	6
Indonesia	2005-06	31	23
China	2005-06	16	11
Turkey	2006	12	4
Iraq	2006	1	1
Egypt	2006	4	2
Azerbaijan	2006	8	5
TOTAL	2003-06	193	108 (56%)

Blue – Clade 1

Red – Clade 2

Characteristics of Human H5N1 Influenza Illness

- Most cases in children and previously healthy adults
- Initial fever and “flu-like” illness
- Progression to pneumonia and respiratory failure
- Accompanying multi-organ system failure common
- Death at day ~7-10 after illness onset

Settings of Human H5N1 Infection

- Most cases have exposure to infected poultry in rural backyard flocks
- Other exposure settings
  - Live animal markets
  - Cock fighting
- Rare transmission between close contacts

Will H5N1 Cause the Next Pandemic?

- Likelihood of mutation or reassortment leading to efficient person-to-person transmission unknown
- Spread of avian H5N1 infections increases risk
  - Recent evolutionary changes in the virus make control among birds more difficult and continued spread likely
- Other avian influenza A subtypes (H7N3, H7N7, H9N2) also have caused human infections

Pandemic Preparedness and Response Planning

- Nov 2005 – National strategy & HHS plan
- Pending national plans
  - National implementation plan
    - HHS and other departmental implementation plans
      - CDC implementation plan
- State & local plans
- Other plans
  - Hospitals
  - Businesses
  - Families

HHS Components of the $3.8 B Pandemic Influenza Budget

- ~$3.05 B to HHS to “prepare for and respond to an influenza pandemic”
  - $2.6 B to develop and purchase vaccines, antivirals, and medical supplies
  - $350 M for state and local capacity
  - $50 M for laboratory capacity and research
- ~$250 M to HHS for “related activities”
  - Global and domestic surveillance; rapid response; regulatory strengthening; vaccine registries, research, clinical trials and trial infrastructure; communications

Pandemic Stockpiling and Product Development

- Existing (expanding) stockpiles
  - Antiviral drugs, pre-pandemic vaccine, masks, PPE
- Stockpiles under consideration
  - Needles/syringes, antibiotics, pneumococcal vaccine
- Production capacity and advanced product dev.
  - Egg and cell-culture based vaccine
  - Antigen-sparing vaccine strategies (adjuvant)
  - New antiviral drugs

Key Unresolved Issues for National Decision-Making

- Travel and border
  - Restrictions and screening; land border measures
- Vaccine
  - Prioritization (prepandemic & pandemic); purchase; allocation
- Antiviral drugs
  - Prioritization; allocation
- Public health measures
  - Community guidance; domestic travel restrictions

Goals of a National Pandemic Response

- Stop, slow, or limit the spread of the pandemic to the U.S.
- Limit domestic spread and mitigate disease, suffering, and death
- Sustain infrastructure and mitigate impact on the economy and society

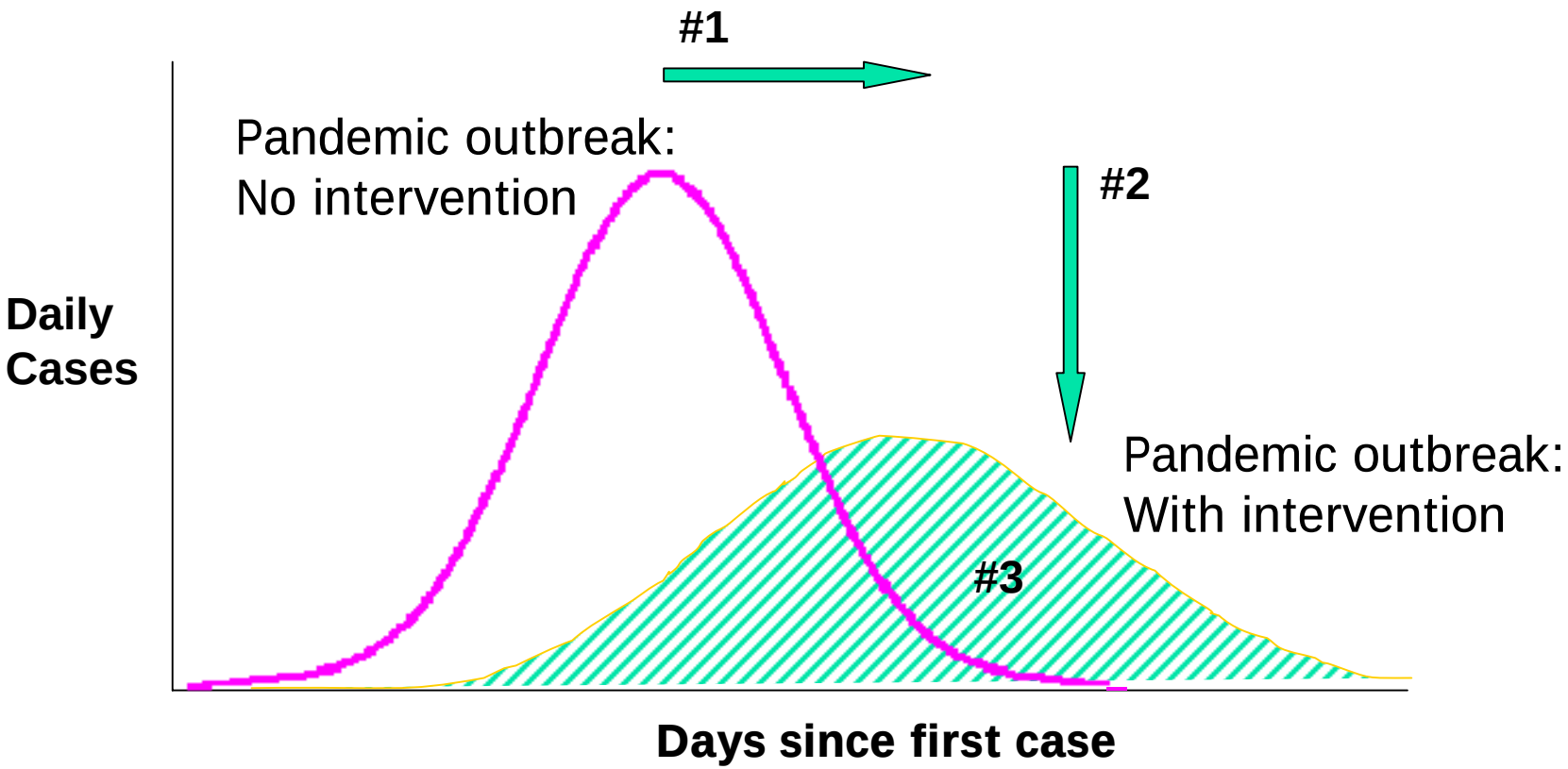
Pillars of the National Strategy

- Preparedness and Communication
  - Roles and responsibilities of all levels of government, segments of society, and individuals
- Surveillance and Detection
  - Early warning and continuous situational awareness
- Response and Containment
  - Reduce spread and mitigate impacts

“The federal government will use all instruments of national power to address the pandemic threat”

Community-Based Interventions

1. Delay disease transmission and outbreak peak
2. Decompress peak burden on healthcare infrastructure
3. Diminish overall cases and health impacts

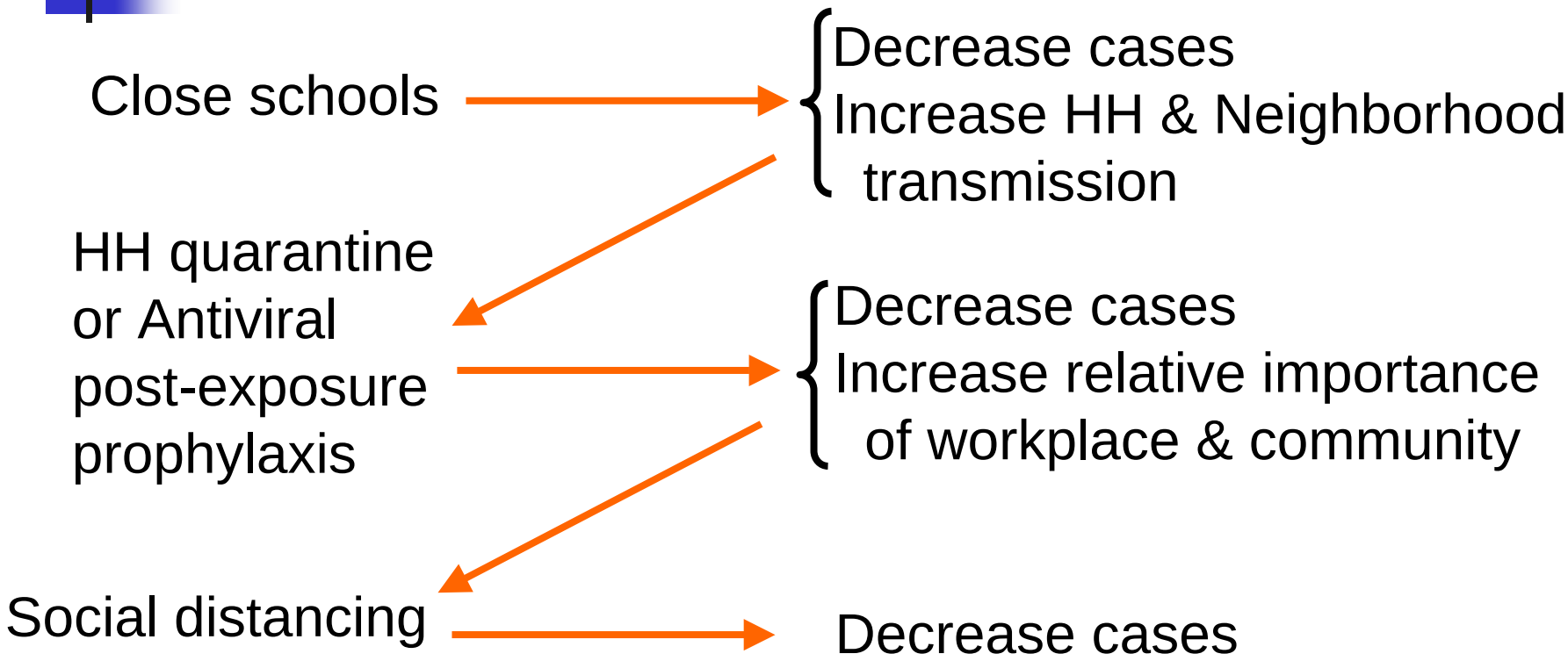


Modeled Impact of Single and Combined Community Interventions

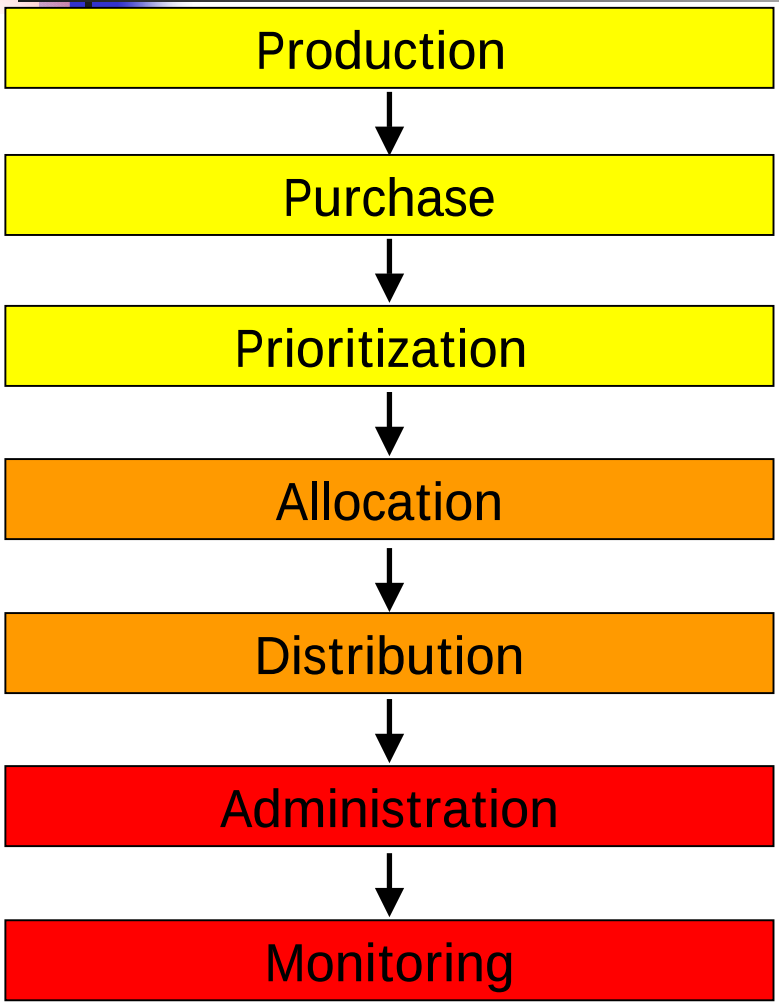
Parameter	R_0 = 1.9	R_0 = 2.4
Absent intervention:		
Attack rate (AR)	43.5%	53.7%
Peak of epidemic	85 d	64 d
Daily # new cases at peak	4.5 M	7.9 M
AR with intervention:		
School closure	29.3%	46.4%
Local social distancing	39.2%	50.3%
Travel restrictions	44.0%	54.1%
Targeted antiviral prophylaxis/ school closure/social distancing	0.07%	2.8%

Germann, et al. PNAS 2006;103:5935-40

Layered Community Interventions



Components of a Pandemic Vaccination Program



Fed contracts to expand egg & establish cell-based capacity in the U.S.

No decisions

No decisions

(To DoD, Feds, & *pro rata* to States)

(From mfr using current systems)

State-based planning

Systems being developed

Pre-pandemic and Projected Pandemic Vaccine Supply, 4/06

Antigen dose and formulation	**Number of two-dose vaccine courses**	
	Pre-pandemic vaccine	**Pandemic vaccine (1 year prodn)**
90 ug x 2 doses (unadjuvanted)	6 million	14 million
45 ug x 2 doses (unadjuvanted)	12 million	28 million
30 ug x 2 doses (adjuvanted)	18 million	42 million

Prioritization and Allocation Principles for Pandemic Vaccine

- Targeting principles
  - Use pre-pandemic and pandemic vaccine to preserve national security, constitutional government, and critical infrastructure
  - State decision making on specific priority groups
- Priority group order may differ based on pandemic severity and vaccine supply

Potential Critical Infrastructures

- Health care
- Military and government
- Other critical infrastructures
  - Public safety (police, fire, and corrections)
  - Utilities (electricity, gas, water)
  - Telecommunications
  - Information technology (IT)
  - Transportation (food & medical supplies)
  - Sanitation
  - Mortuary

Pandemic Antiviral Drugs

- Doctrine: stockpile antiviral drugs for 25% of the population and for containment & outbreak control
  - 75 million treatment courses (federal & state purchase)
  - 6 million courses for containment & outbreak control
- SNS assets
  - 4.4 M neuraminidase inhibitor courses
  - Up to 5 M rimantadine courses
- U.S. based oseltamivir production 1.5 M courses/mo

Proposed Use and Allocation of Antiviral Drugs

- Focus on treatment rather than prophylaxis
- Proposed antiviral drug allocation
  - Contain an initial pandemic outbreak
  - Slow spread following first U.S. cases
  - Preserve constitutional government
  - Support federal health care providers
  - Allocate remainder to states *pro rata*
- Implementation challenges – targeting, distributing, dispensing, and monitoring

Estimated Hospital Demand at the Peak of a Pandemic

Estimated needs per 1,000 population during the peak week of community pandemic outbreaks

	Mild Pandemic	**Severe Pandemic**	**Available + surge capacity**
Hospital Beds	0.58	6.59	2.69 + .54 surge
ICU Beds	0.14	1.70	0.27 + ? surge
Mechanical Ventilation	0.07	0.84	0.33 + .013 surge

Health Care System Preparedness

- Plan inpatient surge capacity
  - Increase number of beds in hospitals
  - Establish makeshift hospitals
  - Identify additional health care workers
  - Cross train for critical functions
- Establish hotlines and maintain outpatient care to decrease burden on hospitals
- Stockpile supplies and equipment
- Develop altered standards of care

Next Steps in Pandemic Preparedness

- Complete National implementation plans
- Make national decisions & provide guidance
- Complete and exercise State/local plans
- Promote and support planning by hospitals, businesses, and others
- Increase production & stockpiles of vaccine, antiviral drugs, masks, and other materiel
- Enhance international surveillance and response capabilities