

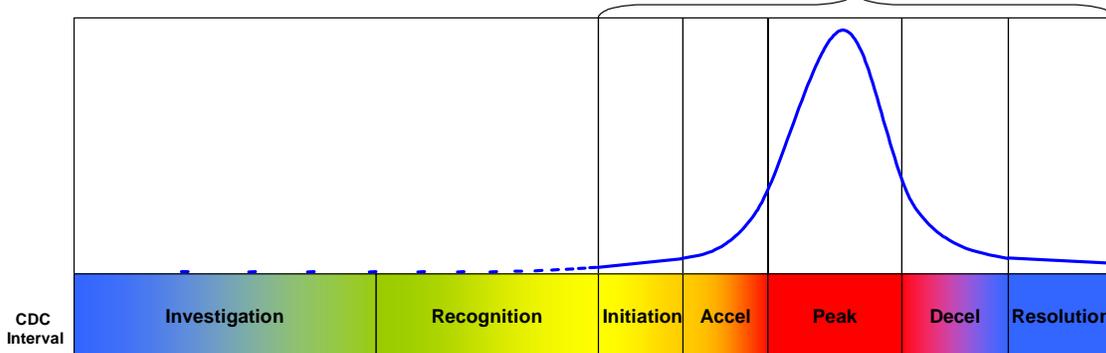
Triggers and Actions for Influenza Pandemic Response in Wisconsin

Prepared by the Communicable Disease Epidemiology Section, 7/15/08

This document describes surveillance triggers for major state and local pandemic response activities in Wisconsin. It is based on a CDC framework introduced in March 2008¹ that describes seven pandemic intervals. The diagram below shows the CDC intervals as they relate to an idealized epidemic curve and to previously described USG Phases and WHO Stages.

WHO Phase	Inter		Pandemic Alert Period			Pandemic Period		
	1	2	3	4	5	6		
USG Stage	New Domestic Animal Outbreak in At-Risk Country	Suspected Human Outbreak Overseas	Confirmed Human Outbreak Overseas	Widespread Outbreaks Overseas	First Human Case in N.A.	Spread Throughout United States		Recovery
	0	1	2	3	4	5	6	

Intervals provide additional specificity for implementing state and community level interventions during stages 4-6.



Pre-Pandemic Intervals

- Investigation
- Recognition

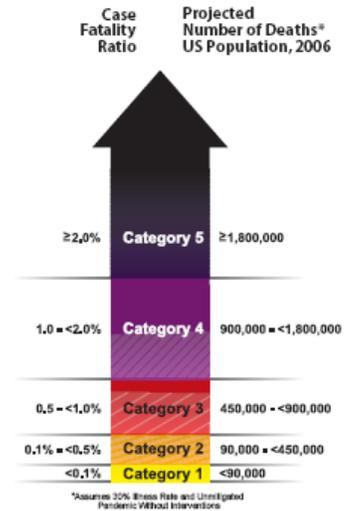
Pandemic Intervals

- Initiation
- Acceleration
- Peak Transmission
- Deceleration
- Resolution

During an actual pandemic it will be more difficult than this model suggests to know precisely when one interval ends and another begins. Nevertheless, the intervals are useful in that they capture the natural progression of an influenza pandemic and are more closely aligned with prevention and response activities than the USG Phases and WHO Stages. They also provide a standard terminology that will aid communication between jurisdictions. CDC has proposed measurable surveillance triggers to mark the start of each interval, and Wisconsin DPH has adopted these with some modifications, taking into account the state's influenza surveillance capacity.

¹ Centers for Disease Control and Prevention (CDC). Use of Intervals, Triggers, and Actions in CDC Pandemic Influenza Planning. March 2008.

The intervals framework recognizes that a pandemic may affect different jurisdictions at different times. Actions taken in a given jurisdiction will depend on which **interval** has been reached, whether the jurisdiction is **affected** by the interval or **unaffected** (i.e. the interval has been reached elsewhere but not yet in the jurisdiction), and the **severity** of the pandemic, as measured by the Pandemic Severity Index² (PSI, see CDC Figure at right). For example, a jurisdiction experiencing the acceleration interval of a Category 4 pandemic may implement school closure at a time when an unaffected jurisdiction continues to focus on isolation and treatment of individual cases.



Surveillance triggers and major state and local response activities in Wisconsin are indicated below for each of the seven intervals. The list of actions is not exhaustive, but illustrates the kinds of activities that will be undertaken during each interval state, regional and local public health officials. Some activities listed would be carried out by other government agencies, clinical laboratories and health care providers. Operational details, including the agencies and roles responsible for each action, are or will be provided in relevant sections of the Wisconsin Pandemic Influenza Operations Plan at <http://pandemic.wisconsin.gov>.

1. Investigation Interval

Trigger: Identification of animal outbreak or sporadic human cases of novel influenza A anywhere in the world.

As of June 2008, all U.S. states would be categorized in this interval due to ongoing overseas outbreaks of H5N1 avian influenza A causing sporadic human cases with limited human-to-human transmission. Major activities during this interval center around pandemic planning.

State actions if unaffected	Local actions if unaffected
Maintain state-level surveillance systems (e.g. Sentinel Provider Network, WSLH virology surveillance)	Maintain local ILI surveillance systems (e.g. testing and isolation of suspect H5N1 in travelers)
Develop and promote state pandemic operational plans for Communications (public, LHDs, health care providers) Surveillance SNS and antiviral distribution Pre-pandemic and pandemic strain vaccine distribution Community mitigation (e.g. school closure) Healthcare surge capacity Continuity of operations	Develop and promote local pandemic operational plans for Communications (with providers, local partners, public) Surveillance SNS antiviral distribution (identify treatment centers) Distribution of pre-pandemic and pandemic strain vaccines Community mitigation (e.g. school closure) Continuity of operations Addressing the needs of vulnerable populations
Build and place caches of antivirals and surge supplies	Conduct drills

² Centers for Disease Control and Prevention. Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States—Early, Targeted, Layered Use of Nonpharmaceutical Interventions. February 2007.

Establish response protocols for highly-pathogenic avian flu	
Establish protocols for screening and isolation of suspect cases of H5N1 (travelers with ILI returning from endemic country)	
Conduct drills	

Trigger indicating that state is affected: Identification of animal outbreak or sporadic human cases of novel influenza A in Wisconsin.

State actions if affected by animal outbreak	Local actions if affected by animal outbreak
Implement highly-pathogenic avian influenza response protocols	Implement highly-pathogenic avian influenza response protocols
Enhance state surveillance for animal and human cases	Enhance state surveillance for animal and human cases
Implement communication plans	Rapidly investigate suspect cases; collect and ship specimens to WSLH
Review and enhance operational plans	Implement communication plans

State actions if affected by sporadic human case	Local actions if affected by sporadic human case
Enhance state surveillance for human cases	Initiate avian influenza investigation and control measures
Support rapid investigation, isolation and testing of suspect cases	Enhance local surveillance for animal and human cases
Ensure laboratory capacity to support expanded testing	Rapidly investigate suspect cases; collect and ship specimens to WSLH
Implement communication plans (LHDs, health care providers, state partners, public)	Implement communication plans (health care providers, local partners, public)
Review and enhance operational plans	
Test healthcare surge plans	

2. Recognition Interval

Trigger: WHO or CDC confirms cluster of novel influenza A with sustained and efficient human-to-human transmission anywhere in the world.

State actions if unaffected	Local actions if unaffected
Partially activate state EOC and DPH EOC including Joint Information Center	Partially activate local EOC including Joint Information Center
Declare “on alert” for statewide Public Health Emergency	Enhance local surveillance for human cases
Conduct enhanced surveillance for human cases	Prepare for rapid case investigation and response
Prepare for rapid case investigation and response	Launch pre-event vaccine campaign (if pre-event vaccine available)

Alert WSLH and back-up laboratories of increased testing	Implement communication plans
Implement communication plans	
Launch pre-event vaccine campaign (if pre-event vaccine available)	
Prepare to receive SNS countermeasures	
Implement screening of travelers as directed by CDC	

Trigger indicating that state is affected: One or more clusters of novel influenza A with sustained and efficient human-to-human transmission in Wisconsin or border state.

This represents detection of a pandemic strain in Wisconsin before recognition elsewhere in the world. Although possible, this is unlikely. In this case the Recognition and Initiation intervals would be the same for Wisconsin and response actions are listed below under “Initiation interval, affected state.”

3. Initiation Interval

Trigger: Laboratory-confirmed case of pandemic influenza detected within the United States.

This interval marks the first human case of pandemic influenza in the U.S. It assumes that a strain of novel influenza A with documented pandemic potential has been characterized to the extent that it can be accurately detected by available laboratory tests.

State actions if unaffected	Local actions if unaffected
Expand state EOC and DPH EOC as needed	Expand local EOC as needed
Declare statewide public health emergency	Prepare for intensive active case\cluster investigation and response
Prepare for intensive, active case\cluster investigation and response	Prepare to augment disease surveillance staffing
Prepare to augment disease surveillance staffing	Prepare for healthcare surge
Implement communication plans (LHDs, health care providers, state partners, public)	Continue pre-event vaccination campaign (if pre-event vaccine available)
Continue pre-event vaccination campaign (if pre-event vaccine available)	Standby for community mitigation if PSI category 4 or 5
Prepare for healthcare surge	Implement communication plans (health care providers, local partners, public)
Standby for community mitigation if PSI category 4 or 5	Standby antiviral treatment centers
Implement SNS antiviral distribution plan—deliver antivirals to distributors	
Review and prepare to deploy mortuary surge plan	

Trigger indicating that state is affected: Laboratory-confirmed case of pandemic influenza detected in Wisconsin or border state.

State actions if affected	Local actions if affected
Conduct enhanced pandemic surveillance	Conduct enhanced pandemic surveillance
Implement active case-based investigation, treatment and containment	Implement case-based investigation and containment
Confirm all suspect cases at WSLH	Collect and ship specimens to WSLH
Standby back-up reference laboratories for increased testing	Implement voluntary contact quarantine and prophylaxis
Implement voluntary contact quarantine	Implement communication plans (health care providers, local partners, public)
Continue pre-event vaccination campaign (if pre-event vaccine available)	Place antiviral treatment centers on alert
Implement communication plans (LHDs, health care providers, state partners, public)	Standby for community mitigation if PSI category 4 or 5
Implement SNS antiviral distribution plan—treatment centers open	
Standby for community mitigation if PSI category 4 or 5	

Background to the Acceleration Interval

The start of the acceleration interval marks a critical moment for pandemic response, when influenza begins to spread community-wide. It is at this point, during severe pandemics (PSI category 4 or 5), that the most costly community mitigation steps should be implemented, such as school and daycare closure. If these interventions are triggered too early, significant economic and social costs will be incurred with little public health benefit. Fatigue may set in, undermining efforts to sustain interventions for the duration of the epidemic. If triggered too late, preventable illnesses and deaths will occur.

Analysis of the 1918 pandemic suggests that cities that implemented social distancing measures prior to the point when 3-6% of the population was infected fared best³. Some pandemic models indicate that the optimal timing of school closure and other social distancing measures is prior to the point when 1% of the population has been infected.⁴ The challenge for public health surveillance is to reliably detect the earliest indications that the acceleration interval has begun.

CDC has proposed two triggers to mark the start of the acceleration interval:

The first of these is sensitive: *two or more laboratory-confirmed pandemic cases in a state that are not epidemiologically linked to any previous case.* Although this trigger ensures early

³ Hatchett R, Mecher CE, Lipsitch M. Public health interventions and epidemic intensity during the 1918 influenza pandemic. PNAS 2007;104:7582-87. Available online at www.pnas.org.

⁴ Markel H, Lipman HB, Navarro JA et al. Nonpharmaceutical interventions implemented by US cities during the 1918-1919 influenza pandemic. JAMA 2007;298(6):644-54

implementation of community mitigation steps, there is a risk that interventions will begin *too* early. During the 1957 pandemic, for example, multiple self-limited clusters were documented in New York City over a period of several weeks before the community-wide phase of the epidemic began⁵.

The second of the proposed CDC triggers is less sensitive: *increasing numbers of cases exceed resources to provide case-based control measures*. A limitation of this trigger is that the definition will vary from one jurisdiction to the next depending on how intensive “case-based control measures” are and what resources are available to carry them out. It is possible that by the time this point has been reached the community-wide phase of the pandemic would be well underway.

Wisconsin may be able to find a middle ground between these two proposed CDC triggers. If the pandemic is caused by something other than an H1 or H3 strain of influenza A, PCR testing currently available at the Wisconsin State Laboratory of Hygiene (WSLH) and the Milwaukee Public Health Laboratory (MPHL) can be used to confirm cases of novel influenza A with a reasonable degree of confidence. Additionally, clinical laboratories, such as the Marshfield Laboratory, can provide confirmation of influenza A and would help handle the surge in specimen testing. Rapid investigation of suspect influenza cases and clusters, aggressive efforts to collect specimens, immediate/overnight shipping, rapid turnaround of laboratory test results, and close monitoring of illness in contacts could provide Wisconsin public health officials with specific information regarding the spread of laboratory-confirmed pandemic influenza within well-defined clusters.

DPH therefore proposes the second trigger below (in bold red text) as optimal. It requires both laboratory confirmation of a pandemic strain as well as epidemiological evidence of expanding transmission to immediate contacts and potentially second and third generation contacts as well. The decision by DPH to recommend community mitigation measures statewide or in one area of the state will be based on all available information and will be discussed between state and local health officials on regular (likely daily) conference calls. A pandemic strain that has already been shown to cause severe, community-wide illness in other U.S. jurisdictions, particularly in states bordering Wisconsin, would provoke a more rapid response based on more sensitive triggers, while a milder strain would require stronger evidence that the acceleration interval had truly begun. The more sensitive CDC trigger and two less sensitive CDC and DPH triggers are also listed to reflect uncertainty regarding the optimal trigger for this interval.

4. Acceleration Interval

CDC trigger (sensitive): Two or more laboratory-confirmed pandemic cases in a state that are not epidemiologically linked to any previous case.

⁵ Personal communication, Don Olson, based on Fuerst, Widlock and Greenberg. The influenza epidemic of 1957 and 1958. *Q Rev Pediatrics* 1959;14(2):73-78.

Wisconsin DPH recommended trigger (sensitive): Two or more clusters of laboratory-confirmed pandemic cases with evidence of sustained, expanding transmission (i.e. onset of influenza-like illness (ILI) among first, second and potentially third generation contacts of a confirmed case).

CDC trigger (less sensitive, probably too late): Increasing numbers of cases exceed resources to provide case-based control measures.

Wisconsin trigger (less sensitive, too late): Surveillance data indicating that the number of cases of influenza-like illness is increasing over baseline in a manner consistent with the start of community-wide transmission.

Wisconsin has two well-established statewide influenza surveillance systems that would provide timely information available for decision-making during a pandemic: the Sentinel Provider Network and Wisconsin State Laboratory of Hygiene (WSLH) Viral Laboratory surveillance. There are a variety of other near real-time surveillance systems operating in Wisconsin, including emergency department syndromic surveillance systems in the Milwaukee and Madison area, school absenteeism surveillance operating in 214 schools around the state, outpatient ILI data from the Marshfield clinic, and the nascent Wisconsin Health Information Exchange (WHIE).

A summary of these systems will be presented in an Annex to this chapter, including their sensitivity, specificity and timeliness for detecting the acceleration interval of seasonal influenza. This work is ongoing.

State actions if unaffected	Local actions if unaffected
Prepare for transition from case-based to community containment	Prepare for transition from case-based to community containment
Prepare for healthcare surge	Prepare for local healthcare surge
Review and prepare to deploy mortuary surge plan	Implement communication plans
Implement communication plans	Continue pre-event vaccine campaign (if pre-event vaccine available)
Continue pre-event vaccination campaign (if pre-event vaccine available)	Continue SNS antiviral distribution plan—treatment centers open
Continue SNS antiviral distribution plan—treatment centers open	

State actions if affected	Local actions if affected
Recommend community mitigation measures in affected areas	Implement local community mitigation measures
Promote individual infection control measures	Promote individual infection control measures
Transition from case-based containment to community interventions	Transition from case-based containment to community interventions
Transition to ILI, hospitalization, and mortality monitoring	Continue pre-event vaccine campaign if available

Implement communication plans	Continue SNS antiviral distribution plan
Implement hospital surge plan	Implement communication plans
Evaluate need for deploying mortuary surge plan	
Continue pre-event vaccine campaign if available	
Continue SNS antiviral distribution plan	
Monitor vaccine coverage, antiviral use, and adverse events	
Monitor adherence to community mitigation interventions	

5. Peak Interval

Trigger that state is affected: > 10% of specimens from patients with influenza-like illness submitted to the state public health laboratory are positive for the pandemic strain during a seven day period; or, “Regional” pandemic influenza activity is reported by the State Health Department using CDC surveillance criteria; or, the health care system surge capacity has been exceeded.

State actions if affected	Local actions if affected
Continue Acceleration Interval actions	Continue Acceleration Interval actions
Assess and plan for cessation of community mitigation measures	Arrange specimen collection and shipping to WSLH of a sample of cases
Initiate targeted cessation of surge capacity strategies	Manage local health care surge
Maintain infection control measures and surveillance	Implement local continuity of operations plan
Implement communication plans	Maintain critical infrastructure and key resources
	Implement communication plans (health care providers, local partners, public)

6. Deceleration Interval

Trigger that state is affected: <10% of specimens from patients with influenza-like illness submitted to the state public health lab are positive for the pandemic strain for at least two consecutive weeks; or, the health care system capacity is below surge capacity.

State actions if affected	Local actions if affected
Continue Peak interval actions	Continue Peak interval actions
Assess and plan for cessation of community mitigation measures	Assess and plan for cessation of community mitigation measures
Initiate targeted cessation of surge capacity strategies	Initiate targeted cessation of surge capacity strategies
Maintain infection control measures and surveillance	Maintain infection control measures and surveillance

7. Resolution Interval

Trigger: Laboratory-confirmed pandemic influenza cases are occurring sporadically or the health care system capacity is approaching pre-pandemic levels.

State actions if affected	Local actions if affected
Declare end of statewide public health emergency	Rescind community mitigation measures
Recommend rescinding community mitigation measures	Scale down local EOC
Scale down state EOC and DPH EOC	Transition to case-based surveillance
Transition to case-based surveillance to verify resolution of pandemic wave and to detect emergence of second wave	Stand by for second wave
Standby for second wave	Conduct after-action review for lessons learned, revise plans
Conduct after-action review for lessons learned, revise plans	
Replenish stockpiles/caches as able	

Future Work on Wisconsin Triggers and Actions PHP Priority Project:

Review and enhance protocols for case and cluster investigation, including surveillance staff surge needs at state and local level.

Create an Appendix to the Triggers document that includes a description and evaluation of influenza surveillance systems in Wisconsin including:

- Population coverage.
- Completeness and timeliness of reporting.
- Correlation with pneumonia and influenza (P&I) hospitalizations and deaths.
- Estimated point at which the system provides clear indications that the community-wide phase (acceleration interval) of seasonal epidemics begin.

Although not available in a timely manner, P&I hospitalization and mortality data serve as a gold standard for influenza surveillance against which more timely morbidity data can be compared and evaluated⁶.

Identify the specific action steps involved in implementing community mitigation measures, and the likely time that would elapse between making a state-wide recommendation and implementing the measures at the local level.

State Epidemiologist reviews surveillance data, confers with other state and local officials, and decides to recommend community mitigation measures. *How is this recommendation made?*

Local Health Officer agrees with recommendation, and issues order to close schools and daycare centers. *How is order issued?*

Department of Public Instruction and local school authorities implement the order. *What specific steps are involved?*

Integrate Triggers document and “Community Disease Control and Prevention” document into the Wisconsin Pandemic Influenza Operational Plan.

In 2007 representatives from Wisconsin state and local public health agencies, state and local emergency management, regional public health planners, law enforcement, and risk communications staff formulated a community disease prevention plan to implement social distancing measures that provides more details regarding the legal authority, state and local responsibilities, and action steps.⁷ This needs to be integrated into the Operational Plan.

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⁶ Olson D, Heffernan R, Paladini M, et al. Monitoring the impact influenza by age: emergency department fever and respiratory complaint surveillance in New York City. PlosMed 2007;4:e247:1-13. Available online at www.plos.org.

⁷ Wisconsin Division of Public Health, Bureau of Communicable Diseases. Community Disease Control and Prevention. August 2007.