

Pandemic Influenza Planning Assumptions

University of North Carolina at Chapel Hill

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UNC is taking steps to prepare and plan for the possibility of pandemic influenza. This document is to help UNC's pandemic planning by establishing a common set of assumptions. These are only assumptions—pandemics are unpredictable, and there is no way to know the characteristics of a pandemic virus before it emerges. The following specific assumptions have been gleaned from a variety of sources or developed from campus consensus. Many of the assumptions were taken from the *National Strategy for Pandemic Influenza Implementation Plan*, some verbatim.¹ If you have a question or comment, please contact Mary Beth Koza, UNC EHS Director, at mbkoza@ehs.unc.edu

The planning assumptions below are reasonable worst-case assumptions. We all hope that the next pandemic is no worse than the one in 1968, which had a relatively small impact on UNC. However, our plans will be most useful if we prepare UNC for the high risk pandemic predicted by reasonable public health experts.² An extreme 1918-like scenario is not considered here. So, keep in mind that these assumptions depend on the severity of the pandemic. We hope our assumptions are pessimistic, and fear that they are not optimistic.

A Possible UNC Pandemic Influenza Scenario

- UNC assumes that the first pandemic influenza outbreaks will occur outside of the U.S., most likely in Southeast Asia. The pandemic's first impact to UNC will likely be to students and faculty who are traveling abroad, or plan to do so. WHO, CDC and UNC will impose travel restrictions. UNC may call some people back and cancel some planned travel. As with SARS, international travelers will be subject to restrictions and screening. UNC assumes that—in the U.S.—the pandemic influenza wave will last approximately 10 weeks, during which multiple community outbreaks will occur across the country. (10 weeks is the average of 8 to 13 weeks, which

¹ *National Strategy for Pandemic Influenza Implementation Plan*, U.S. Department of Homeland Security, May 2006,

www.whitehouse.gov/homeland/nspi_implementation.pdf, p 25.

² A pandemic's severity depends on influenza's transmissibility, morbidity and mortality. H5N1 influenza appears to have a high human case fatality rate (over 50%), but experts believe that even a severe pandemic would have a much lower case fatality rate. CDC's pandemic model uses attack rates (people with clinical cases) of 15-35%, which compare to 20, 25 and 40% for seasonal flu, the 1957 pandemic and the 1918 pandemic, respectively. CDC's model uses case fatality rates of 0.2-0.4%, which compare to 0.008, 0.2 and 2.5% for seasonal flu, the 1957 pandemic and the 1918 pandemic, respectively.

is the estimated wave length in the *National Strategy for Pandemic Influenza Implementation Plan*.)

- For planning purposes, UNC assumes that the wave will occur during the fall or spring semester. (Historically, the largest waves have occurred in the fall and winter, but the seasonality of a pandemic cannot be predicted with certainty.)
- We assume that the first U.S. outbreaks will occur in major metropolitan areas where there is a high rate of international travel.
- On their own initiative, UNC students may begin to leave campus when the first outbreaks occur.
- We assume that Chapel Hill’s outbreak will last approximately 7 weeks. (7 weeks is the average of 6 to 8 weeks, which is the estimated community outbreak length in the *National Strategy for Pandemic Influenza Implementation Plan*.)
- **Our greatest risk** is an easily transmissible virus and 7,400 students in residence halls living in close proximity and sharing facilities. According to CDC’s FluAid Model³ (see below), 2,600 students in our residence halls would become ill, and 1,900 of those would seek outpatient care at Campus Health Services. Caring for this large number of ill students would severely strain resources of Housing and Residential Education, Campus Health Service and the UNC Healthcare System, especially if the community was similarly impacted and staff resources were similarly depleted.

CDC FluAid 2.0 Model Estimates⁴

	All UNC-Chapel Hill Students	Students in Our Residence Halls
Students	27,276	7,400
Clinical cases	9,500	2,600
Outpatient visits	7,000	1,900
Hospitalizations	100	28
Deaths	26	7

- If a severe outbreak were to occur, we should expect to suspend on-campus classes for 7-10 weeks. We will want to make the class suspension decision

³ FluAid is a software model created by the CDC to assist planners in preparing for the next influenza pandemic by providing estimates of potential impact specific to their population. Compared to the 1918 pandemic, it appears to be conservative.

⁴ Assuming 35% gross attack rate; student population split 50:50 among 0-18 and 19-64 yrs age groups; using 0.3% case fatality rate (maximum) estimates. The numbers for outpatient visits, hospitalizations and deaths are not inclusive. See <http://www2.cdc.gov/od/fluaid/>

early in the period of contagion (wave) to allow residential students to return to a less-risky home environment.⁵

- After the on-campus class suspension decision has been made, it will take about 72 hours (3 days) for students in UNC residence halls to vacate, although about 700 will remain there (see below).
- Even after on-campus classes are suspended, we assume that 5,700 students and student families will remain in Chapel Hill because of international travel restrictions, other travel difficulties, or because they do not have a suitable alternative living option. These include:
 - 700 students (e.g., international students) remaining in residence halls.
 - 1,000 people in family housing. This group may be at somewhat high risk due to the close quarters of apartment-style living and the presence of children, which are likely to have higher illness rates—see below.
 - While classes are suspended, we assume 4,000 students will remain in Chapel Hill, living in off-campus housing (e.g., apartments, fraternities, sororities, Granville Towers, etc.).
- Of those 5,700 students who will remain in Chapel Hill while classes are suspended, we expect about 1,500 of them will seek outpatient care at Campus Health Services.⁶

While Classes are Suspended⁷

	Students and Student Families	Employees
People	5,700	11,036
Clinical cases	2,000	3,900
Outpatient visits	1,500	2,000
Hospitalizations	20	50
Deaths	5	8

Impact to UNC Employees

- UNC’s early impact from a community outbreak will be employees who choose to stay home, and employees who need to stay home to care for children (see below).

⁵ When on-campus classes are suspended, some distance learning, independent study, research activities and study abroad may continue on a case-by-case basis. Specific policies have not yet been developed.

⁶ In a normal year, CSC provides healthcare services to nearly all undergraduates and professional students, spouses of students, and about half of graduate students.

⁷ Assuming 35% gross attack rate; student and family population split 50:50 among 0-18 and 19-64 yrs age groups; using 0.2% case fatality rate (most likely) estimates for employees.

- According to the *National Strategy for Pandemic Influenza Implementation Plan*, among working adults, more than 20 percent will become ill during a community outbreak.
- In accordance with the *Implementation Plan*,⁸ UNC assumes that absenteeism will reach 40 percent for periods of about 2 weeks at the height of a pandemic wave, with lower levels of staff absent for a few weeks on either side of the peak. Absenteeism will increase not only because of personal illness, but also because employees may be caring for ill family members, under voluntary home isolation due to an ill household member, minding children dismissed from daycare or school, following public health guidance, or simply staying at home out of safety concerns.
 - **More Pessimistic Scenario:** Employee absenteeism may be worse. Certain public health measures (closing schools, isolation of household contacts of infected individuals, “snow days”) are likely to increase rates of absenteeism. A study by the Harvard School of Public Health suggests that approximately 70% of the public will chose to remain at home in an influenza pandemic.
 - **More Optimistic Scenario:** Absenteeism may be less severe. Public health officials are planning several measures to quench a pandemic, which would result in fewer infections (see below).

Continuity of Operations During a Pandemic

- The suspension of on-campus classes does not mean that the University will close. Essential functions have been identified and Communicable Disease Emergency Mandatory Employees have also been identified in the event of closure. Continuity of Operations Plans have been developed for nearly all units on campus for and will be activated in the event of closure.
- During the period of contagion (wave), assume there will be significant economic disruptions, including inventory shortages, shipment delays, and reduced business activity. International shipments and travel may be severely curtailed.
- Critical supplies may not be available. For planning purposes, assume that 50% of your critical supplies will not be available during the 7-10 week period of contagion.
- For the purposes of fiscal impact planning, UNC assumes that there will be two 10 week waves, one each during the fall and spring semester. In each wave, UNC will suspend classes and be otherwise impacted for a period of 7-10 weeks.
- Essential functions must continue. Personnel who support remaining UNC essential functions must report to work, if they have not been exposed.

⁸ *National Strategy for Pandemic Influenza Implementation Plan*, p. 13.

- Assume that contagious employees will come to work—both asymptomatic employees and symptomatic employees who feel compelled to work. Steps need to be taken to minimize this risk.
- For planning purposes, assume that absent employees include key personnel, who will be unable perform their duties. Key personnel include leaders, heads and essential personnel with primary responsibility for essential functions.
- After the wave has passed, assume that resumption of normal campus activities will be slow and difficult. There will be grieving and adjustment for those who have lost loved ones, friends and coworkers. Those who became ill and survived may take months to fully recover. Exhausted caregivers will need rest, time off to get their affairs in order, and mental health support. Business will be slow to recover, slow to replenish inventories, and slow to replace labor. Economic losses during the pandemic will cause business to contract, cut costs, and layoff workers. Students, faculty, staff and their families will fear for the next wave.

Assumed Characteristics of an Influenza Pandemic

- We assume that the clinical disease attack rate will be 35 percent in the overall population during the pandemic. Susceptibility to the pandemic influenza virus will be universal. Illness rates will be highest among school-aged children (more than 40 percent) and decline with age.⁹
- The typical incubation period (interval between infection and onset of symptoms) for influenza is approximately 2 days.
- Persons who become ill may shed virus and can transmit infection for one-half to one day before the onset of illness. Viral shedding and the risk of transmission will be greatest during the first 2 days of illness. Children will play a major role in transmission of infection as their illness rates are likely to be higher, they shed more virus over a longer period of time, and they control their secretions less well.
- On average, infected persons will transmit infection to approximately two other people. Some persons will become infected but not develop clinically significant symptoms. Asymptomatic or minimally symptomatic individuals can transmit infection and develop immunity to subsequent infection.
- Risk groups for severe and fatal infection cannot be predicted with certainty but are likely to include infants, the elderly, pregnant women, and persons with chronic or immunosuppressive medical conditions.

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⁹ The *National Strategy for Pandemic Influenza Implementation Plan* assumes a 30% attack rate, but CDC's FluAid model uses 35%. The 1918 pandemic had a 40% attack rate.