

Planning Assumptions for the First Wave of Pandemic Influenza at the U of A

July 2009

Purpose

These planning assumptions relate to the current A(H1N1) epidemic and are appropriate for the first wave. They provide a common agreed basis for learning across all U of A campuses.

These planning assumptions are based on analysis and modeling of data from both inside and outside Alberta and Canada including the U.K and Australia.

They will be kept under review, and are subject to change as further data become available on the current pandemic strain of Influenza.

There are a number of parameters each taken at their 'reasonable worst case' value. Taken together they represent a relatively unlikely scenario; they should therefore not be taken as a prediction of how the pandemic will develop. Planning against the reasonable worst case scenario will ensure, however, that plans are robust against all likely scenarios up to the reasonable worst case and be capable of adjustment as they are implemented.

As further Canadian and international surveillance data emerges we will be looking to develop these planning assumptions and extend them beyond this initial period. It is possible that the virus may mutate, becoming more or less virulent, and it is important to remain prepared for the full range of possibilities. Therefore, any planning for future periods should be based on the standard reasonable worst case assumptions promulgated in per-pandemic planning as set out in the framework for responding to an influenza pandemic Section III

Timing and duration of the pandemic

It is unclear whether the pandemic will unfold as a single extended 'wave' or multiple waves separated by periods of reduced case numbers. At the current time, late July 2009, the rate at which new cases accumulate is continuing to accelerate, consistent with an exponentially growing epidemic. If the current growth in cases is sustained, a substantial wave of cases with up to 30% of the population experiencing symptoms could peak in early November, although a smaller but earlier peak is also possible.

Alternatively, seasonal effects might substantially slow the epidemic in July and August – perhaps to the extent of leading to a decline in weekly cases in August, before resurgence in the autumn, for example when schools and universities reopen. If so, the overall peak of the pandemic might be delayed to November or even later.

Geographic Spread

There may be a variation in epidemic profile from one campus area to another (even for a given overall clinical attack rate).

Summary of the Planning Assumptions for the pandemic in 2009

The tables below summarize the key planning assumptions. As noted above, this represents a “reasonable worst case” for which to plan, **not a prediction**. The first table covers the specific period until the end of August, while the second covers the first major wave of A(H1N1) infection more generally. They are explained in more detail in the supporting text below. All apply to a general population mix.

<i>Planning Assumptions to August 31st 2009</i>	
Assumption	
Clinical Attack Rate	5%-10%
Peak clinical attack rate	2-5% per week
Complication rate	15% of clinical cases
Hospitalization rate	2% of clinical cases
Case fatality rate	0.10% of clinical cases
Peak Absence rate	9% of workforce

<i>Planning Assumptions for first major pandemic wave</i>	
Assumption	
Clinical Attack Rate	30%
Peak clinical attack rate	6.5% (local planning assumption 4.5%-8%) per week
Complication rate	15% of clinical cases
Hospitalization rate	2% of clinical cases
Case fatality rate	0.10%-0.35% of clinical cases
Peak Absence rate	12% of workforce

Clinical Attack Rate

Description: The proportion of the population who *become* ill with influenza, totaled over a complete wave of infection. (These are the clinical cases.)

Assumption: Up to 30% of the university population may become ill (i.e. have influenza-like-illness) in the first major wave of infection. The clinical attack rate by 31st August may be as high as 60%. This is because in addition to the 25-30% who develop clinical symptoms a further 25-30% may be infected but show no or insignificant symptoms. Extrapolating the current trends, and assuming no seasonal impact on transmission, gives a worst case attack rate up to 10% by the wave of 30%.

Alternatively, if seasonal factors become important, the overall attack rate may be as little as 5% by September.

The Peak Clinical Attack Rate

Description: The proportion of the population who become ill in the peak week (highest week of infection).

Assumption: The local area planning assumption is that up to 8% of the population in any given locality may become ill per week at the height of the pandemic this year. This peak rate might be sustained for a two week period. The maximum weekly attack rate at the end of August may be up to 5%.

Commentary: The 8% figure is for a local area or campus. It is higher than the typical H1N1 planning assumption of 6.50%. This is due to variation both in the clinical attack rate and in the epidemic profile. However, it should also be recognized that some areas may have less peaked, longer-lasting epidemics. Because both highly-peaked and more lengthy epidemics pose challenges, planning should take account of the full range of possibilities.

At a U of A level, simple extrapolation of the case curve to date would predict a peak attack rate at the end of August of 2% to 5% depending on how seasonal factors affect transmission.

The forecasting of the timing of 'Week 1' of a U of A epidemic should become possible when the number of cases exceeds influenza like illness rates, as predicted by Alberta Health Services (AHS). If the epidemic continues to grow at the current rate then this could be as early as the first week in September. However 'Week 1' of the local epidemic curve may vary from campus to campus.

Complication Rate

Description: The proportion of those ill who are expected to require additional treatment, such as the prescription of antibiotics (but not necessarily hospitalization, see below).

Assumption: The complication rate may be up to 15% of clinical cases over the current wave of infection.

Commentary: Complication rates (and hospitalization and deaths) are expected to be higher, as a proportion of those who become ill, in the very young, clinical at-risk groups and older people.

Case Hospitalization Rates

Description: The proportion of those ill who (if capacity exists) should be hospitalized.

Assumption: Up to 2% of clinical cases may require hospitalization over the current wave of infection, of whom 25% could, if the capacity exists, require intensive care.

Commentary: Hospitalization rates for seasonal influenza are typically in the range 0.50% to 1.0% of those who become ill. Current experience with the A(H1N1) virus suggests that planning should continue on the basis of the assumption given above.

Case Fatality Ratio:

Description: The proportion of those ill (clinical cases) who die due to influenza, totaled over a complete wave of infection.

Assumption: For the current H1N1 epidemic, the case fatality ratio is expected to be in the range for seasonal influenza, that is 0.10% - 0.35% of clinical cases. Current experience from abroad suggests a figure closer to 0.10% at present but ratios up to 0.35% cannot be ruled out on the basis of current data. In addition, there remains a risk that the case fatality ratio may increase in the autumn (e.g. due to a higher incidence of bacterial co-infection, viral evolution or host susceptibility factors).

Commentary: Case fatality ratios are particularly difficult to estimate. To do so requires knowledge of (a) the total number of cases, including those that are very mild, and (b) the number who die because of influenza but whose deaths have been recorded as due to an underlying condition made worse by influenza. Both these factors are difficult to ascertain. The delay between the onset of illness and report of death must also be taken into account when calculating this ratio.

Absence from work due to illness

Description: The proportion of the workforce who may be absent from work at the peak of the local epidemic because they are ill themselves or because they are looking after ill family members.

Assumption: Absence rates from illness may reach 12% of the workforce in the peak weeks of the current wave and up to 9% by the end of August.

Commentary: This estimate assumes an average absence of 5 working days (Centre for Disease Control estimation) for those without complications, 10 working days for those with complications, and some allowance for those at home caring for ill family members. This estimate is for absence over and above "normal" holiday leave and non-pandemic illness. It does not include any additional absence due to fear of pandemic illness or the need to look after ill dependent relatives or friends other than children.

If schools or daycares are closed due to influenza during term-time (due to lack of availability of staff or planned closure), absence rates may increase as parents may need to stay at home to look after children. (It has been estimated that this could cause an additional 15% of the workforce to be absent.)