

Swine Flu

UK Planning Assumptions

Issued 16 July 2009

Planning Assumptions for the First Wave of Pandemic Influenza

16 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 planning across all public and private sector organisations. Working to this common set of assumptions will avoid confusion and facilitate preparedness across the UK.

These planning assumptions are based on analysis and modelling of data from both inside and outside the UK. 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. Response arrangements must be flexible enough to deal with the range of possible scenarios up to the reasonable worst case and be capable of adjustment as they are implemented.

As further UK and international surveillance data emerges we will be looking to develop these planning assumptions and extend them beyond this 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 pre-pandemic planning as set out in the 'National Framework for responding to an influenza pandemic' Chapter 3.

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, mid 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 September, 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 reopen. If so, the overall peak of the pandemic might be delayed to October or even later.

Geographic Spread

There may be a large variation in epidemic profile from one local area to another (even for a given overall clinical attack rate). The planning assumptions are thus shown both across the UK and for local areas where different¹.

¹ Throughout this document a "local area" refers to a population of about 100,000 to 750,000. National refers to the UK population of about 62,300,000.

Summary of the Planning Assumptions for the pandemic in 2009

The tables below summarise 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 both across the UK and to local areas except where specific local assumptions are shown.²

<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
Hospitalisation rate	2% of clinical cases
Case fatality rate	0.1% of clinical cases ³
Peak Absence rate	9% of workforce

<i>Planning assumptions for first major pandemic wave</i>	
Clinical Attack Rate	30%
Peak clinical attack rate	6.5% (local planning assumption 4.5%-8%) per week
Complication rate	15% of clinical cases
Hospitalisation rate	2% of clinical cases
Case fatality rate	0.1-0.35% of clinical cases
Peak Absence rate	12% of workforce

Clinical attack rate

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

Assumption: Up to 30% of the 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 10%.

Commentary: These are averages over all ages in the population. Currently it is thought that final attack rates among children may reach 50%, with significantly lower rates than 30% in older people. The proportion of the population infected (the serological attack rate) may, finally, 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 end of August, with the epidemic going on to peak in September with an overall attack rate for the wave of 30%. Alternatively, if seasonal factors become important, the overall attack rate may be as little as 5% by September.

² At present, the local assumptions differ from those for the UK only as regards the peak clinical attack rate. However, this may change as more evidence becomes available.

³ The 0.1% figure is based on experience outside the UK. Figures up to 0.35%, though unlikely, cannot be currently ruled out from UK data.

The peak clinical attack rate

Description: The proportion of the population who *become* ill in the peak week.

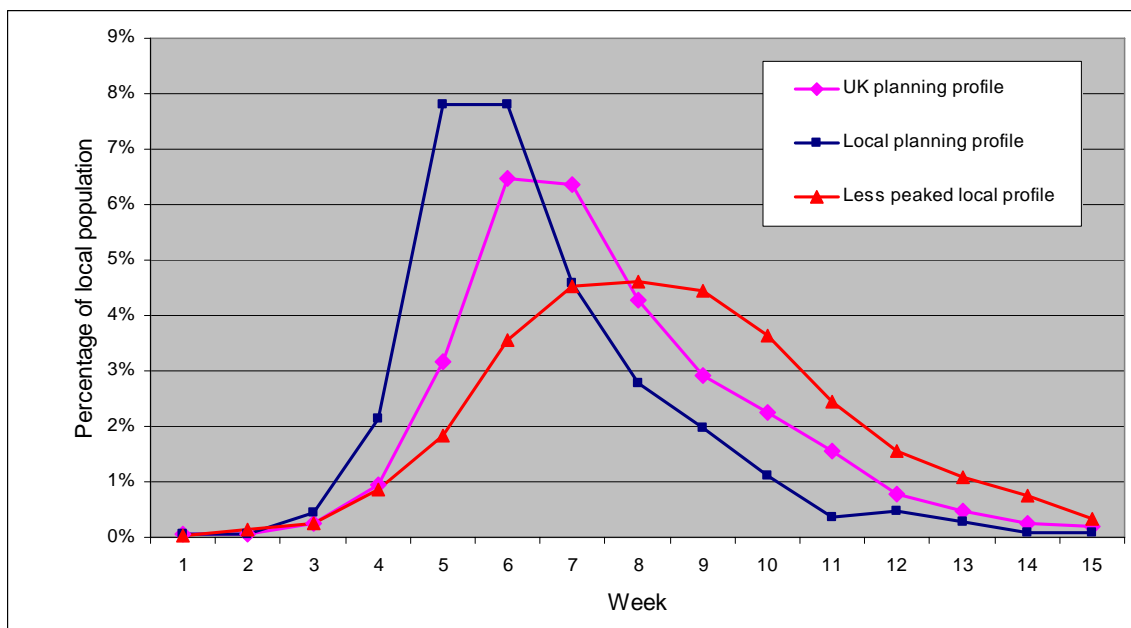
Assumption: The local area planning assumption is that up to 8% of the population in any given locality may become ill per week at the height of the pandemic this year. This peak rate might be sustained for a fortnight. The maximum weekly attack rate at the end of August may be up to 5%.

Commentary: The 8% figure is for a *local area*. It is higher than the UK planning assumption of 6.5%. Indeed, if the UK epidemic is extended over a relatively long period, local epidemics may have peak clinical attack rates substantially higher than the UK epidemic as a whole. This is due to variation both in the clinical attack rate and in the epidemic profile (see below). However, it should also be recognised 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 UK 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 graph below illustrates three possible profiles for local epidemics, one following the UK planning profile exactly and the others demonstrating possible local variations. Each has a total clinical attack rate of 30% (represented by the area under each curve).

Figure: Local Planning Profiles: Proportion of Local Population Becoming Ill per week



The forecasting of the timing of 'Week 1' of the UK epidemic should become possible when the number of cases exceeds influenza like illness rates. If the epidemic continues to grow at the current rate then this could be as early as the first week in August. However 'Week 1' of the local epidemic curve may vary from local region to local region.

Complication rate

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

Assumption: The complication rate may be up to 15% of clinical cases⁴ over the current wave of infection.

Commentary: Complication rates (and hospitalisations 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. As noted previously, older people may be less likely to become ill with this infection, but they are more likely to suffer from complications if they do become ill.

Case hospitalisation rates

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

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

Commentary: Hospitalisation rates for seasonal influenza are typically in the range 0.5 -1.0% of those who become ill. Current experience in the UK 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, totalled 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 0.1% - 0.35% of clinical cases. Current experience from abroad suggests a figure closer to 0.1% at present but ratios up to 0.35% cannot be ruled out on the basis of current UK 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 coinfection, 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 children.

Assumption: Absences rates for illness may reach 12% of the workforce in the peak weeks of the current wave and up to 9% by the end of August⁵.

Commentary: This estimate assumes an average absence of 7 working days for those without complications, 10 working days for those with complications, and some allowance for those at home caring for ill children. This estimate is for absence over and above "normal" holiday leave

⁴ a person infected and with symptoms of influenza.

⁵ Note these numbers are based on data from previous epidemics during the 20th century and are subject to some uncertainty.

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 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.)