Planning Assumptions for the First Wave of Pandemic A (H1N1) 2009 in Europe
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As it is summer in Europe the 2009 pandemic has yet to really accelerate in EU countries but the experience in temperate Southern Hemisphere countries suggests it is inevitable that Europe will be affected by a major first A(H1N1) 2009 pandemic wave in the autumn and winter [1]. The 2009 pandemic is less severe than might have been expected and ECDC has been made aware by two European Union countries (Norway and the UK) of the updating they have made of their planning assumptions specifically for a first wave of an A(H1N1) 2009 pandemic [2,3]. As for most planning assumptions they were developed to provide a common agreed basis for planning across public and private sector organizations in the country [4]. The UK planning assumptions (see Table bellow) were based on analyses and modeling of data from both inside and outside the UK while, because it has yet to be much affected, the Norwegian assumptions relied on international data, including UK data. The UK estimates also look at a shorter period running to the end of August 2009 [3].

Some revised planning assumptions for the pandemic – first wave A(H1N1) 2009

These represent a reasonable worst case applying to one European country (the United Kingdom) with data available as of July 2009. They should not be used for predictions
Source: UK
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_102892

- Clinical attack rate: 30%
- Peak clinical attack rate: 6.5% (local planning assumptions 4.5% to 8%) per week
- Complication rate: 15% of clinical cases
- Hospitalisation rate: 2% of clinical cases
- Case fatality rate: 0.1% to 0.2% (cannot exclude up to 0.35%) of clinical cases
- Peak Absence Rate: 12% of workforce

Note: This is a reasonable worst case scenario, it should not be used to predict numbers of cases, deaths etc.

It is important not to see these planning assumptions as predictions. Often (but not always) they represent reasonable worst cases for the first wave of this pandemic [4]. They are developed this way because planning against such scenarios will ensure that plans are robust against all likely circumstances. Considered collectively the specific national planning assumptions actually represent relatively unlikely scenarios. Earlier UK planning assumptions were published before in the UK national framework for responding to an influenza pandemic. That in turn has been informed by a consensus modeling group which works under the UK Department of Health Scientific Advisory Group on Pandemic Influenza. See http://www.dh.gov.uk/ab/SPI/index.htm and http://www.advisorybodies.doh.gov.uk/spi/minutes/spi-m-modellingsummary.pdf

UK parameters and their broader applicability
The UK paper is based on a model using parameter estimates from the UK and abroad on the 2009 strain and fitted using real data on UK cases over the period when the majority of cases were confirmed and reported daily.

Clinical attack rate
This is 30 % (The UK clinical attack rate is based on an assumption that half of the infected become symptomatic so this would imply a total infection attack rate of about 60 %). WHO assumptions are that two thirds become symptomatic [5]. Whether the UK or WHO is correct will be determined later when the results from serology become available. The UK assumptions imply a basic reproductive number Ro in the interval 1.4 – 1.5 which seems to be the case at present in the UK. A Ro of value 1.4 implies a total infection attack rate of about 50 % (which would imply a clinical attack rate of 25 % in the UK planning assumptions). A higher value of Ro of 2.0 implies a total infection attack rate of about 80 % (hence a clinical attack rate of 40% in the UK planning assumptions).

Peak clinical attack rate
This can depend on a number of factors such as seasonality, immunity in the population and interventions that might prolong the epidemic but also reduce the peak attack rate [6]. A particularly important point to note is that local epidemics are often shorter and sharper in a pandemic than national rates and so there is a higher value for the peak clinical attack rates for local application [1,3].

Case fatality rate
This is one of the most eagerly sought parameters but it is also amongst the hardest to determine with any accuracy. The earliest studies of this pandemic gave a high CFR of about 0.4 % [7] compared to lower rates for the 1957 and 1968 pandemics but higher rates for 1918 [8]. The UK estimates are of a CFR of 0.1-0.2 though values of up 0.35% cannot be ruled out as impossible [3]. The CFR number reported in the UK are thus as stated the reasonable worst case scenario unless the virus changes its characteristics in terms of lethality while the Norwegian figure is more based on what has been directly observed, adjusted for assumed underreporting.

ECDC comment (28/07/09)
Major drivers for the pandemic at present in Europe include the value of Ro and seemingly also the effect of seasonality (influenza always spreads less efficiently in the spring and summer in temperate zones; the reasons for this remain unclear). For European planning assumptions and with possible changes of the virus a broader span of Ro outside the 1.4 – 1.5 range could be considered as a highest estimate population value of 1.8 [9] has been reported. Some other studies have reported even higher values [10], but these have been from settings with more close contacts like schools or some other epidemiological background parameters like the generation time, taking these factors into account the Ro value is also between 1.4 – 1.5 in these studies. Early estimates from Australia have given estimates of Ro around 2 which may reflect seasonal effects in Australia where it is winter and also by very noisy data at the beginning. Later analysis

have given estimates in Australia between 1.2 – 1.5 (ECDC communication with Australian modellers). A study of the situation in New Zealand [14] have estimated R0 to around 2.3 but this is also based on very noisy data why its credibility is low. When trying to estimate Ro value for the general population, most modelers agree that it is mostly 1.5, which is also what the UK is using in their plan as the most extreme reasonable value. The UK predicted peak absenteeism rate of 12 % of the workforce is interesting and fits with the mild illness seen for most people. It suggests that the social disruption effects of the pandemic will be less than feared for other pandemics and that severe social interventions will not be necessary given good business continuity planning.

Case Fatality Rates (CFR) will also change as more data become available and more stable estimates will take some time to emerge. As some cases will be very mild and not reported the reported figures from official tables of cases and deaths will most often be an over-estimate of the true CFR. Equally though many deaths which result from influenza (seasonal or pandemic) are not attributed to the infection in official causes of deaths and so officially reported influenza deaths are always an underestimate, sometimes grossly so [11,12]. In previous pandemics it has only been computed with any accuracy once the pandemics were over [8]. It is also important to appreciate that CFR is especially subject to social effects. In poor social settings such as Africa even seasonal influenza can result in CFR's that are higher than seen in pandemics [13].

European pandemic planning assumptions were considered at an ECDC meeting of EU specialists in January this year [4]. They concluded it would not be desirable or possible to reach consensus on a single set of European planning assumptions. That was because different EU countries approached planning assumptions in different ways. Some did so by looking at what their health care systems could handle, others from the worst reasonable case approach. Instead it was agreed there could usefully be agreement on the underlying technical parameters and work on that is being undertaken by ECDC with the EU funded modelling consortium FluModCont. It is possible that the virus may re-assort, becoming more or less virulent, and it is important to remain prepared for the full range of possibilities [1]. The planning assumptions for the major first wave are of broader European value and interest and other countries could usefully compare them to what they are using. However in general when it comes to pandemic planning assumptions the variability between even EU countries needs to be taken into account. Countries will most probably be affected to a varying degree and at varying times [1]. Partially this reflects the heterogeneous nature of influenza epidemics and pandemics. However it also represents important social and structural differences between countries including EU countries. That is another reason why these planning estimates should not be used for making predictions.

Comments on this report are welcome as are details of other adjusted planning assumptions. They should be sent to phe.H1N1v@ecdc.europa.eu

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