MEDICAL AND SCIENTIFIC DATA ON H1N1 INFLUENZA 09

BACKGROUND

In April 2009, the WHO declared outbreaks of the novel H1N1 Influenza 09 virus infection a Health Emergency of International Significance. On 11 June 2009 the WHO raised its level of pandemic alert to level 6 declaring a pandemic of H1N1 Influenza 09. This alert level is based on the geographical spread not the virulence of the virus.

Over the last 7 weeks, the delay of the virus entering Australia and the containment of small outbreaks has allowed time to better understand its key scientific and clinical characteristics.

H1N1 VIRUS

This virus is made up of two swine, a human and a bird genetic components. H1N1 Influenza 09 is a highly transmissible virus between humans. This genetic form is new and there is no immunity to this viral infection in the Australian population. However, the infection rates appear lower in people over 60 years for reasons that are not clear. It has been speculated that exposures to similar viruses in 1957 and 1968 may have conferred some protection. However expert advice to me is that such minimal immunity, if present in some of over 60 year old Australians cannot be relied on as a public health measure. Therefore, we must consider the population is unprotected until a specific vaccine is available or people obtain immunity following infection.

We also know that such viruses drift genomically and their genome can reassort more substantially at anytime changing its virulence for the worse or attenuating the virulence. Such genetic changes could also confer antiviral drug resistance as is the case with some current seasonal influenza strains.

CLINICAL DESCRIPTION

The clinical picture of the disease is now well described. H1N1 Influenza 09 is a disease that is mild in the great majority of cases but severe in some. The overall characterisation of this infection is a moderate disease.

This virus appears more transmissible between individuals than seasonal influenza and because the population does not have immunity, it is expected that more people will be affected than with seasonal influenza.

The clinical picture is that of influenza symptoms, mainly affecting young people with the average age of patients of around 15 years. The symptoms are short lived and mild in the great majority of cases. The patient may not have all the symptoms of influenza making the disease hard to differentiate from other minor seasonal infections in some cases. Some cases are of moderate or severe intensity but these cases respond well to the antiviral treatment, provided it is given early particularly in the first 48 hours. Those with poor outcomes overseas are primarily those with other medical conditions especially asthma, chronic obstructive airways disease (COAD, emphysema), heart failure, diabetes, renal disease and

gross obesity. The deteriorating influenza patient has been characterised by respiratory difficulty (hypoxia) that should act as a trigger for rigorous medical intervention.

Like all influenza, pregnant women can have a poor outcome. Since this disease is predominantly in the young, the above medical conditions are less likely to occur. However, healthy young people can also have moderate or severe disease, albeit at low frequency.

TRANSMISSION OF H1N1 INFLUENZA 09 IN SCHOOLS

There is evidence of the importance of schools in the transmission of new pandemic viruses which have a higher infection and transmission rate in children. The public health evidence about the optimal method of school intervention is not as strong at this time. However, the attack rates in adults residing with school children is 2 to 3 times higher and school holidays prevent seasonal influenza by around 20%. During this outbreak school intervention policies have been pursued successfully in the UK, Japan, Hong Kong and the USA.

THEORETICAL POPULATION MODELLING

This influenza season the impact will likely be substantially mitigated by public health measures. Efforts to contain the disease, isolate affected individuals or the use of antivirals can mitigate and substantially reduce this projection based on this expert modelling.

The expected hospitalisation rates in Australia are less clear. In the USA hospitalisation rates of 2–5% were reported but many mild cases may not have sought help and this would drop this percentage. Modelling in Australia has been performed based on hospitalisation rates of 1% or 2%, however this is uncertain and unmitigated. Around 10% of hospitalisations may require intensive care admission, as seen in the USA. The peak for this infection would be late July or the first week in August. The number of ICU admissions should be mitigated by successful early treatment of moderate or severe cases.

If large numbers of paediatric cases emerge the burden on the health system that would be a particular challenge for paediatric ICU especially in late July and early August.

The numbers of possible deaths would also be mitigated by containment of spread, early treatment with antivirals and home isolation reducing spread. However, expert advice suggests current evidence supports a case fatality rate similar to or possibly lower than seasonal influenza. Using the same case fatality rate as seasonal influenza, the predicted numbers of deaths are higher for H1N1 Influenza 09. This is because more people would be infected because it transmits between people more efficiently and because the population is unprotected without prior immunisation or past infections. However, if successful mitigation and treatment should be able to reduce that impact of this disease in Australia and deaths also would be substantially reduced.

IMPLICATIONS FOR THE FUTURE

Efforts to successfully mitigate the spread and impact of the infection should substantially lower possible poor outcomes. Further monitoring has been recommended to provide real evidence to replace this theoretical modelling.

In addition, the best advice cannot predict whether the above impacts will be additive to seasonal influenza or replace seasonal influenza. Thus the best current public position is that this coming influenza season will be relatively severe.

Given this information and the uncertainty of current modelling, the public health measures have been aimed to prudently limit the spread of the infection until the impact on our population is better known, delay the expected peak of disease in July and August and to flatten the peak of severe infections to reduce the possibility of ICU admissions.

SUMMARY

In summary, this is a transmissible new type of influenza mainly affecting young people. It has quickly spread around the world triggering a pandemic alert by the WHO. It is mild in most, severe in some – so its best characterised publicly as of moderate severity.

The public health dilemma is that while moderate, if H1N1 Influenza 09 infects a large number of people in Australia this winter, the small percentage of people with poor outcomes represents a substantial number of people. To reduce possible deaths in this group, specific health focus is needed in groups more likely to die or more at risk of poor outcomes or those with deteriorating severe disease leading to poor outcomes.

This disease should respond well to antiviral therapy and be successfully mitigated by modern medicine. However, there is uncertainty about our ability to identify those at risk for poor outcomes, to treat early, mitigate and salvage poor outcomes, the impact of seasonal influenza in addition, the likelihood of viral genomic change, the true hospitalisation rate and the surge capacity of our hospitals especially paediatric ICU. These issues will be better defined in the next few weeks as we carefully monitor this pandemic.

A range of sensible and proportionate mitigation actions now may prevent a possible large surge of cases later as well as avoiding severe illness or deaths.