

## H23 (DH)

Overall Assessment = VERY HIGH

Overall Impact Score = Catastrophic (5)

Likelihood Score = Medium-High (4)

### Risk

Influenza type disease (pandemic).

### Outcome Description

Each pandemic is different and the nature of the virus and its impacts cannot be known in advance. Previous pandemics have led to different outcomes. Based on understanding of previous pandemics, a pandemic is likely to occur in one or more waves, possibly weeks and months apart. Each wave may last between 12-15 weeks. Up to half the population could be affected. All ages may be affected, but until the virus emerges we cannot know which groups will be most at risk.

The reasonable worst case scenario is based upon the experience and mathematical analysis of influenza pandemics in the 20th century:

- Up to 50% of the population could experience symptoms of pandemic influenza during one or more waves lasting 15 weeks.
- Up to 4% of symptomatic patients could require hospital care if the virus results in severe illness, 25% of whom require level 3 critical care.
- Up to 2.5% of those with symptoms could die as a result of the pandemic.
- This scenario informs planning for pandemics but does not take into account the response measures we put in place.
- While combining these figures can be misleading and it is relatively unlikely to have both high end illness and death rates resulting in around 750,000 deaths, this is the advised reasonable worst case for guiding planning nationally. This figure has been recommended by the Scientific Pandemic Influenza Sub-Group on modelling.
- Local planners, however, are advised to prepare for up to 300,000 additional deaths across the UK over a 15 week period. This would mean a Local Resilience Forum (LRF) planning for a population of 700,000 should consider planning for around 3,000 additional deaths and an LRF planning for around 7 million for the order of 30,000 additional deaths.

Essential services: An effective response to an influenza pandemic relies upon cross-government and cross sector collaboration to manage wider societal impacts, and the interdependencies between health responses and other sectors. Chapter 7 of the UK Influenza Pandemic Preparedness

duration of about 3.5% of a working year (roughly 1.5 weeks per person absent from work).

Result: A loss of approximately £28 billion (given a UK GDP of about £1.6 trillion).

If only 25% workers were absent, rather than the 50% assumed above, then this loss would be halved. This loss could be mitigated through effective business continuity planning.

Communications: Consistent, clear public messaging, aligned at national and local level, is critical to a successful and collaborative UK-wide response to a pandemic. This will help to maintain public trust and support, as well as increasing uptake of recommended actions such as good respiratory and hand hygiene practices, effective and responsible use of antiviral medicines, and uptake of vaccination. The Department of Health launched a Communications Strategy<sup>52</sup> in December 2012 which covers health related communication in the stages leading up to a UK pandemic, during a pandemic itself and during the recovery phase. As well as communications with the public the Strategy highlights the need for health and social care professionals to access timely and accurate clinical information and advice to enable them to treat patients appropriately.

Antimicrobial Resistance: It is important that the possibility of sensitivity to existing anti-microbial agents is assessed on the emergence (or re-emergence) of an infection<sup>53</sup>.

In the case of influenza, consideration needs to be made of the effectiveness of antimicrobials in the treatment of bacterial pneumonia to which persons infected with influenza are often more susceptible. Common causative agents are *Staphylococcus aureus* and *Streptococcus pneumoniae*.

### **Specific Assumptions**

- 50% of the population falling ill spread over one or more waves.
- A case fatality ratio of up to 2.5% in a reasonable worst case scenario and a corresponding care hospitalisation demand ratio of 4%, 25% of whom may require level 3 critical care.
- Peak illness rates of around 10-12% (measured in new clinical cases per week as a proportion of the population) in each of the weeks in the peak fortnight.
- Absence rates for illness reaching 15-20% in the peak weeks.

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<sup>52</sup> The Strategy is available on the Department of Health website at <https://www.gov.uk/government/publications/communications-strategy-for-uk-flu-pandemics>

<sup>53</sup> Davies, S. C. 2013. Annual Report of the Chief Medical Officer, Volume Two, 2011. Infections and the rise of antimicrobial resistance. Department of Health, London. <http://media.dh.gov.uk/network/357/files/2013/03/CMO-Annual-Report-Volume-2-20111.pdf>

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Despite over sixty years of scientific scrutiny there is still controversy and debate over many issues related to influenza, including:

- The changes in animal viruses that are associated with human transmission and that might allow early warning;
- the genetic changes that indicate whether a new influenza virus is going to be associated with severe disease (pathogenicity) or the ease of transmission or periods of infectivity; and
- the factors or circumstances that can cause severe illness and death in apparently healthy individuals infected with the virus, or why different influenzas attack different age groups.

Major challenges therefore have to be addressed when developing response plans to pandemic influenza.

The interval between influenza pandemics is variable, ranging from 11 to 39 years during the last century. There are no known markers that herald the start of a new pandemic. H5N1 emerged as a potential threat in 1997 and again eight years on in 2003, the threat from the virus remains unchanged, although the emergence of a subtype capable of being efficiently transmitted to humans has not yet occurred naturally, despite the global spread of the virus. In contrast, the common ancestor of H1N1 (2009) is estimated to have appeared between 3 November 2008 to 2 March 2009 and caused the first pandemic of the 21 century later in 2009.

There are currently no genetic markers that will predict the pathogenicity or spread in the human population. Until the virus emerges and has infected a significant number of people, it is not possible to determine many of the features of the disease that will be important in assessing its severity or impact. There is also no known evidence of association between the rate of transmissibility and severity of infection. It is possible that a virus could be both highly transmissible and cause severe symptoms. Pandemics significantly more serious than the reasonable worst case are therefore possible.

Modern mass global transit also affords opportunities for the virus to be rapidly spread across the world, even before it has been identified. The short incubation period of influenza means that within a relatively short period of time a significant number of cases will appear across the globe. It is likely to take at least four to six months after a novel virus has been identified and isolated for an effective pandemic influenza vaccine to become available from manufacturers.

This means that it will almost certainly not be possible to contain or eradicate a new virus in its country of origin or on arrival in the UK. The expectation must be that the virus will inevitably spread and that any local measures

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taken to disrupt or reduce the spread are likely to have very limited or partial success at a national level and cannot be relied on as a way to 'buy time'.

The UK influenza Preparedness Strategy, launched in November 2011, can be found at:  
<https://www.gov.uk/government/publications/responding-to-a-uk-flu-pandemic>

Government or external research (existing or new)

The scientific evidence base reviews underpinning the UK Influenza Pandemic Preparedness Strategy were published in 2011 and were further updated in 2014 in relation to: the use of antivirals in an influenza pandemic; the impact of mass gatherings on an influenza pandemic; the use of facemasks and respirators during an influenza pandemic; and the impact of school closures on an influenza pandemic. The reviews were commissioned by the Department of Health and undertaken by Public Health England and can be found at:

<https://www.gov.uk/government/publications/review-of-the-evidence-base-underpinning-the-uk-influenza-pandemic-preparedness-strategy>

Expert judgements – A Scientific Pandemic Influenza (SPI) advisory committee and a SPI-Modelling (SPI-M) advisory committee have advised on the scientific evidence and reasonable worst case scenario.

**Likelihood**

There have been four pandemics over the last 100 years – one with a similarly high case fatality ratio to the assumptions here. Therefore, it is judged that the likelihood of this risk is approximately 1 in 20 in the next 5 years.

**Score = 4**

**Economic Impact**

Fatalities and casualties - £40 billion

Absenteeism - £42 billion

A pandemic is estimated to cost 1.8% of the year's GDP in addition to the cost of absent workers (based on World Bank estimate for rich countries)

Impact on tourism - £27 billion

**Score = 5**

**Fatalities and Casualties**

Influenza pandemic planning in the UK has been based on an assessment of the "reasonable worst case". This is derived from the experience and a mathematical analysis of influenza pandemics and seasonal influenza in the 20<sup>th</sup> century. This suggests that, given known patterns of spread of infection, up to 50 per cent of the population could experience symptoms of pandemic