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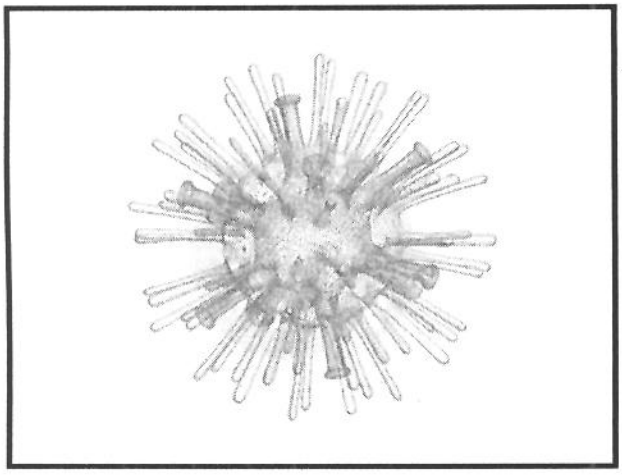
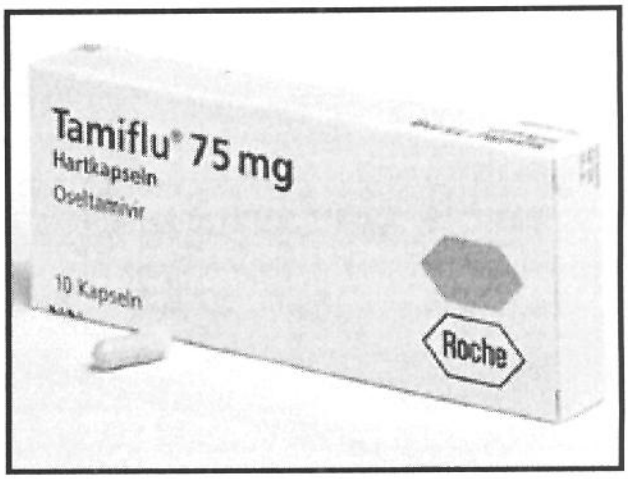
H I N I Influenza ("Swine Flu") – Planning Scenario





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1 Introduction

This document takes a view on the possible course of events in the development of the H1N1 influenza ("Swine Flu") outbreak over the next 12 months. It represents the views of a number of technical experts in the field of influenza epidemiology and social sciences. This is not intended as a prediction, rather a scenario against which we can make advance plans.

This document replaces Issue 1 dated 11 May 2009 and will be updated at intervals to reflect current circumstances and changing advice and guidance.

1.1 Technical Terms

This document uses the following technical descriptions relating to infectious diseases:

- **Clinical Attack Rate (CAR)** – Percentage of the whole population who become infected at some stage during the pandemic, not al of whom will exhibit significant symptoms.
- **Case Fatality Rate (CFR)** – Percentage of those who become ill who subsequently die as a direct result of the illness.
- **Excess Mortality** – the number of additional deaths in the population caused by the disease

Note that the World Health Organisation (WHO) defines a pandemic as a disease that affects more than 25% of the world's population over the course of the outbreak which could be 12 – 18 months in the case of an influenza outbreak.

1.2 Expressing Probability

All descriptions of possible future events are presented with an indication of confidence, using the expressions of probability listed in Table 1-1; they are set in bold upper case text. Owing to the high number of variables, not least in the operation of chance and the interventions of human beings, trends-based analysis can never offer precise predictive analysis and these terms provide an indication of confidence based on the available evidence and an assessment of the risk.

Table 1 – 1
Assessment of Probability

Description	Probability (%)	Confidence Level
WILL / WILL NOT	100%	Certainty
VERY LIKELY	> 85%	Near Certainty
LIKELY / PROBABLE	> 60%	High
MAY / POSSIBLY	> 10%	Low – Medium
UNLIKELY	< 10%	Low

2 Disease Development

2.1 Current Situation

The World Health Organisation (WHO) declared a pandemic Phase 4 alert on 27 April 2009 followed by a Phase 5 alert on 29 April and subsequently a Phase 6 Alert on 11 June. These alerts were based on the revised definition of the pandemic alert phases issued in early April 2009 which substantially reduced the alert criteria from those that had been in existence for some time and against which most national contingency plans (and Serco's Contingency Plan) had been developed. The result of this change has been to raise the alert level much earlier in the development of the disease in terms of its geographic spread and its severity.

The current WHO alert level is Phase 6 indicating community level outbreaks across more than one WHO region. There are now confirmed cases in the majority of countries across the world with significant outbreaks in the USA, Canada and the UK and increasing numbers of cases being reported in South America, Australia and a number of counties in South-East Asia.

2.2 Possible Course of Development

1.1.1 Most Likely Scenario

With the number of confirmed and possible cases in a large number of countries and with human-to-human transmission verified, it is **VERY LIKELY** that there will be continue to be large numbers of new cases confirmed in countries where the disease is already confirmed and in other countries which have not yet had identified cases. Currently, the disease is classed as "mild" and many of the various Government's contingency measures planned to be introduced at the Phase 6 level of alert have not been implemented, at least not currently, because of the mild nature of the disease for the majority of those infected.

Figure 2–1 shows the **POSSIBLE** profile for the current H1N1 influenza outbreak which has taken the mortality impact of the 1918 / 19 H1N1 "Spanish flu" outbreak in the UK with current dates superimposed assuming a starting date of the end of May 2009 for significant pandemic activity. If the current outbreak of H1N1 influenza follows the same course of events in the UK as the 1918 / 19 outbreak which killed 20 – 40 M people world-wide, there will **VERY LIKELY** be a "first wave" of infections lasting up to 8 weeks (May – end June 2009) causing only mild illness and affecting a small percentage of populations. This is **LIKELY** to be followed by a "second wave" of more severe illness that **MAY** commence in late September 2009 and **MAY** last until mid-December 2009. This **MAY** be followed almost immediately by a "third wave" in the period mid January – late-March 2010 before the pandemic outbreak subsides.

It is **LIKELY** that a similar profile will be followed in most developed countries, although timings of the peaks and the mortality rates are **LIKELY** to be different. In lesser developed countries including India and China, the pandemic profile **MAY** follow this profile, but this is very uncertain.

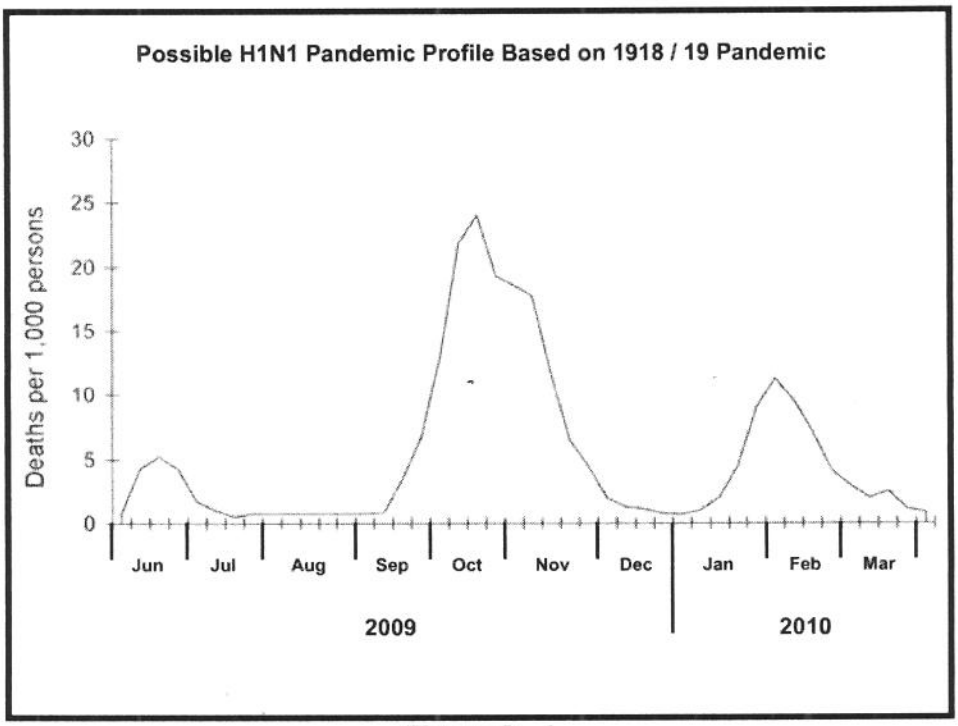

Figure 2 - 1
Possible H1N1 Pandemic Profile

The H1N1 influenza virus, in the form that is currently being experienced, appears to be moderately infectious but causes only mild symptoms in the majority of people. It is now considered **VERY LIKELY** that during the summer months in Europe and North America, the current "first wave" of new infections will have peaked by early July 2009 and the disease will continue to exhibit a moderate rate of infection and cause only mild symptoms and few deaths.

Based on currently available data for Europe and North America, the disease characteristics for the "first wave" in the UK are shown in Table 2–1. The clinical attack rate figure is comparable to "normal" seasonal influenza but the case fatality rate is significantly lower, reflecting the relatively mild nature of the disease and low representation of the over 60 age group in the reported cases.

Table 2 – 1 "First Wave" Disease Characteristics (UK)	
Clinical Attack Rate	<5%
Case Fatality Rate	<0.1%

Note: There is evidence that the clinical attack rate may be significantly higher than indicated with large numbers of those infected not showing significant symptoms.

In South-East Asia, South America and Australia, where weather conditions are more conducive to the survival and spread of the virus, the disease **MAY** exhibit greater rates of infection and cause more severe symptoms including significant numbers of deaths over the period June – October 2009.

It is considered **POSSIBLE** that the virus will mutate as it spreads across the human and animal populations, with a **POSSIBLE** scenario being that it acquires the characteristics of the H5N1 avian influenza strain as the current outbreak affects significant number of the populations of South-East Asia and China.

It is currently considered **PROBABLE** that a "second wave" of the pandemic caused by a mutated virus will occur in Europe and North America in late autumn and early winter 2009, coinciding with the beginning of the seasonal flu period. If it occurs, it is **LIKELY** that this second wave will be have a much greater rate of infection, cause a more severe illness and cause a significant number of deaths. The **POSSIBLE** disease characteristics for the "second wave" in the UK are shown in Table 2–2 although there is substantial uncertainty at this stage. These figures are comparable to the 1957 pandemic.

Table 2 – 2
Possible "Second Wave" Disease Characteristics (UK)

Clinical Attack Rate	25 – 35%
Case Fatality Rate	0.1 – 0.4%

Given the start of a mass-vaccination programme in September 2009 in the UK, Europe and North America, it is considered **UNLIKELY** that there will be a significant third wave of infection in these regions.

1.1.2 Alternative Scenario

The alternative scenario where this outbreak of H1N1 influenza quickly diminishes and does not subsequently reappear is, at present, considered **UNLIKELY**.

2.3 Disease Impact

Table 2-3 below from the UK Influenza Pandemic Contingency Plan sets out, for different clinical attack and case fatality rates, the range of possible excess mortality during a pandemic in the UK which has one or more waves spread over a period of up to 12 months:

Table 2 – 3
UK Excess Mortality

Overall Case Fatality Rate	Clinical Attack Rate			
	5%	25%	35%	50%
0.4%	12,000 **(Seasonal Flu)**	60,000 **(Base scenario)**	84,000	120,000
1.0%	30,000	150,000	210,000	300,000
1.5%	45,000	225,000	315,000	450,000
2.5%	75,000	375,000	525,000	750,000 **(Worst case)**

Based on UK population of 60 million

Currently, the UK base planning scenario for pandemic flu predicts that the **LIKELY** outcome is that 25% of the population will develop clinical symptoms over the whole period of the pandemic (up to 12 months), spread over one or more waves with a case fatality rate over the period of 0.4% of those infected (analogous to the 1957 pandemic) giving a possible 60,000 excess deaths in the UK. A reasonable worst case, but **UNLIKELY**, scenario is based on a clinical attack rate of 50% and a case fatality rate of 2.5% (analogous to the 1918 pandemic); this would lead to over 750,000 excess deaths.

For comparison, the clinical attack rate for seasonal influenza is typically 5% with a case fatality rate of up to 0.4% leading to an estimated 12,000 excess deaths in the UK, primarily from high risk groups. The number of deaths in the UK from all causes in a typical year is approximately 600,000 (approximately 1% of the population).

3 Societal and Business Impacts

3.1 Staff Absence

During a pandemic, staff will be absent from their normal place of work if:

- They are ill with flu. Numbers in this category will depend on the clinical attack rate. If the attack rate is 25%, a quarter of staff in total will be sick (and hence absent from work for a period of 5 – 8 days) at some point during the whole course of the pandemic.
- They need to care for family members who are ill with flu.
- They have non-flu medical problems.
- Their employers have advised them to work from home.
- They decide to absent themselves for other reasons (eg fear of infection).

Estimates of the **POSSIBLE** peak levels of absence from work caused by influenza are set out in Table 3-1 against a range of assumptions on the clinical attack rate of the pandemic virus. The peak period could be 2 – 3 weeks. These figures do not include "normal" absenteeism levels, people taking time off work due to family bereavement or psychosocial impact of the pandemic.

Table 3 – 1
Possible Absence Rates

	Clinical Attack Rate		
	25%	**35%**	**50%**
Large Organisation			
% of people ill & carers taking time off at peak	7%	10%	15%
Small Organisation / Team (Up to 15 people)			
% of people ill & carers taking time off at peak	14%	22%	30%

It is **LIKELY** that, when faced with an outbreak of pandemic flu, staff will give their priority to protecting themselves and their families rather than attending work, and typical levels of absence would be expected to rise as people decide not to use crowded public transport or to attend work at sites where people have already fallen ill or where direct contact with the public is involved.

3.2 Society

The UK government has produced a set of pandemic flu planning presumptions for essential public services that are summarised in the Our World resilience area under "Pandemic Flu". The impact of pandemic flu on public services (eg public transport, utilities, local council services etc) is **LIKELY** to be severe and there **WILL** be a major impact on health services where primary care services and hospitals are **VERY LIKELY** to be overwhelmed.

There **MAY** be a more general breakdown of public services, law and order and distribution services with uncollected rubbish, unburied dead, high levels of crime and food and fuel shortages. **POSSIBLE** worst case scenarios resulting from a severe outbreak of pandemic flu include:

- Hospitals / medical services overwhelmed
- Death registration and burial / cremation services overwhelmed
- Shortage of food / fuel / medical supplies due to distribution problems
- Disruption of financial services
- Breakdown of utilities (electricity, gas, water, telecommunications including the Internet)
- Localised breakdown of civil order
- Business / market decline or recession

Faced with this situation, **POSSIBLE** Government planning options include:

- Closure of schools, places of entertainment (cinemas, theatres etc)
- Rationing / prioritisation of limited supplies of anti-viral vaccines and medicines
- Cancellation of sports and other major events
- Restricting access to government buildings and sites
- Imposition of local quarantine and / or travel restrictions
- Suspension of international travel and / or border closures

It is **UNLIKELY** that the government would be able to provide military aid to the civil authorities or communities because of military commitments and because the military forces themselves will be affected by illness.

POSSIBLE, but predictable, public reactions include:

- Panic buying (food, fuel, medicines)
- Increased demand for primary medical services
- Avoiding crowded places (including schools, places of entertainment, general retailers, public transport etc) with consequent impact on those business sectors
- Significant reduction in travel, particularly overseas, for both business and holidays
- Changed attitude to work / life balance, with a greater priority given to personal / family protection

4 Implications for Serco

There are **LIKELY** to be particular impacts of some of Serco's business sectors affected by government policies of changes in working practices during the period of the pandemic. These include:

- Hospitals treating the very large number of patients and with Serco support staff exposed to the highest risk of infection.
- Schools and leisure centres closed by government order with a consequent impact on contract payments.
- Prisons / detention centres where infection in the closed community is likely to be rapid and with the possibility of a high mortality rate because of the high percentage of at risk groups (eg drug users).
- Closure of safety critical operations (eg rail, aviation, nuclear) where the absence of key staff affects safety.
- Rail services affected by absenteeism of staff, loss of essential services provided by others and a substantial reduction in passenger numbers.
- Support offices where open plan, air-conditioned buildings may promote the spread of infection.
- Internal IT services that rely on the availability of key IT support staff and external telecommunications services (including the Internet) that may be significantly affected

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