

# PANDEMIC FLU



A national framework for  
responding to an influenza pandemic

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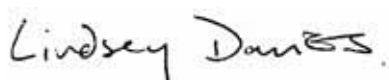
# Foreword

The possibility of a worldwide influenza epidemic (a pandemic) presents a real and daunting challenge to the economic and social wellbeing of any country and a serious risk to the health of its population. Planning and preparing now will help to lessen its impact and to avoid panic later. The Government will therefore continue to take every practical and proportional step to ensure that the UK prepares well for a pandemic and to mitigate its health and wider socio-economic effects.

This framework is part of that effort. It provides information and guidance to assist and support public and private organisations across all sectors in understanding the nature of the challenges and developing, testing and maintaining their plans. We recognise that some aspects may require more detailed guidance and that further government decisions are necessary on a small number of more complex issues. However, we believe that – with the range of accompanying guidance documents available from the various websites it signposts – the framework now provides the base assumptions, presumptions and other information that will allow all organisations to further develop and improve their response and business/service continuity plans.

The extent of the uncertainties associated with pandemic influenza is a major challenge for emergency planners and some elements of the UK response will need to be initially implemented with incomplete information and in the context of an evolving picture. The various assumptions, presumptions and response measures outlined in the framework will therefore need to be reviewed and, where necessary, changed as the pandemic develops, further information becomes available and impacts are better understood. The threat itself is also evolving, our knowledge and understanding are improving and new countermeasures are being developed. Response arrangements need to be progressive and we will constantly review and update the framework itself as additional information becomes available.

Although pandemic influenza remains one of the most severe natural challenges likely to affect the UK, by working together and preparing proportionately, we can all do a great deal to lessen its potential impact on our health and our social and economic wellbeing.



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# Introduction

Influenza pandemics are natural phenomena which occurred three times in the last century. Their severity has ranged from something similar to seasonal influenza to a major threat, with many millions of people worldwide becoming ill and a proportion of these dying. No country can expect to escape the impact of a pandemic entirely, and when it arrives most people are likely to be exposed to an increased risk of catching the virus at some point. Influenza pandemics therefore pose a unique international and national challenge. As well as their potential to cause serious harm to human health, they threaten wider social and economic damage and disruption. Measures to prevent, detect and control them require coordinated international effort and cooperation, with one country's action – or inaction – potentially affecting many others.

Although it is highly likely that another influenza pandemic will occur at some time, it is impossible to forecast its exact timing or the precise nature of its impact. This uncertainty is one of the main challenges for policy makers and planners. Even if – as seems likely – a pandemic originates abroad, it will probably affect the UK within two to four weeks of becoming an epidemic in its country of origin, and could then take only one or two more weeks to spread to all major population centres here.

In addition to collaborating actively in multi-national prevention, detection and research, the Government's aims at a national level are to ensure that the UK is prepared to limit the internal spread of a pandemic and to minimise health, economic and social harm as far as possible.

This framework sets out the Government's strategic approach to achieving these aims and is intended for use by all those involved in planning for and responding to an influenza pandemic. It builds upon and supersedes the most recent version of the *UK Health Departments' UK Influenza Pandemic Contingency Plan* (published in October 2005), expanding it to cover a more comprehensive range of impacts and responses. The framework will also inform the development of community and organisational arrangements that are appropriate to local circumstances and are sufficiently consistent to ensure an equitable and sustainable national response. It includes information to support planning and, where necessary, provides signposts to additional sources of technical information and guidance.

An effective response will require the cooperation of a wide range of organisations and the active support of the public. As there may be very little time to develop or finalise preparations, effective pre-planning is essential. Many important features of a pandemic will not become apparent until after it has started (ie when person-to-person transmission has become sustained), so plans must be:

- constructed to deal with a wide range of possibilities
- based on an integrated, multi-sector approach
- built on effective service and business continuity arrangements



- responsive to local challenges (eg rural issues) and needs
- supported by strong local, regional and national leadership.

Given the limited scope to avoid the increased risk of infection when the pandemic is in the UK, the framework advises that in most circumstances the public should carry on with their daily lives for as long and as far as that is possible within the constraints the pandemic will impose, whilst adhering to government advice, taking sensible personal precautions and adopting good hygiene measures.

The framework also identifies some actions that, if taken now, could have a positive impact on health and the economy in advance of a pandemic, as well as during one. Good hygiene practices, for example, will play an important role in slowing the spread of a pandemic, whether people are attending work, socialising, travelling on public transport or using public places. Improving such practices has the potential to reduce ill health this year and every year.

Given the national scale, complexity and international dimensions of a pandemic, central government coordination, advice and support will be critical at the planning and response phases. However, in the UK, the primary responsibility for planning for and responding to any major emergency rests with local organisations, acting individually and collectively through Local Resilience Forums (LRFs) and Strategic Coordination Groups (SCGs). All public and private organisations need to work with and through their local forum to develop plans for maintaining services and business continuity during a pandemic and to respond to the wider challenges that will result. A list of LRFs and their contact details can be found at [www.ukresilience.info](http://www.ukresilience.info)

The pandemic threat and the UK's level of preparedness are constantly evolving and this framework is a living document that will be reviewed and updated regularly. Readers should therefore check appropriate websites for the current position.

# 1 Strategic approach

## 1.1 Purpose

This document describes the Government's strategic approach to and preparations for an influenza pandemic. It provides general information on the likely impact and sets out some of the key assumptions for use in response planning. It also provides a national framework within which organisations responsible for planning, delivering or supporting local responses should develop and maintain integrated operational arrangements that are flexible enough to respond to local needs and circumstances, whilst providing the wider degree of consistency necessary for an effective, sustainable and equitable national approach.

## 1.2 Aim

The primary aim of this document is to guide and support integrated contingency planning and preparations for pandemic influenza across government, in health and social care and in public and private sector organisations. Additionally, it describes arrangements for coordinating the UK's response and provides references to sources of more detailed information.

## 1.3 Scope

The arrangements described relate specifically to an influenza pandemic. They do not cover planning for or the response to seasonal influenza outbreaks or any incidents involving the prevention or control of avian (eg A/H5N1) influenza or other animal influenza virus infection in birds or humans, which remain the responsibility of the appropriate government departments and public health, animal health and local authority bodies in accordance with normal procedures. However, they do cover the recognition and management of cases of influenza-like illness in humans that raise suspicions of a new influenza virus variant that might cause a pandemic, which may have its origin as an avian virus.

A range of public and private sector organisations and agencies – acting individually and collectively – are responsible for supporting the health and social care response, managing a pandemic's wider impacts, minimising social and economic disruption and maintaining business continuity. Whilst not intended to provide detailed operational guidance, this document provides general information and planning assumptions to inform and encourage wider contingency planning.

Although these arrangements provide for a consistent and coordinated UK-wide approach, health and social care is a devolved responsibility and some differences in organisational structures, responsibilities and operational arrangements apply in Northern Ireland, Scotland and Wales. Each country

produces a national response plan, which should be read in conjunction with this document for information on the specific arrangements that apply in those parts of the UK.

## 1.4 Audience

This guidance is intended primarily for those responsible for developing policies and strategies or coordinating, managing, maintaining or testing contingency arrangements for responding to an influenza pandemic. Additionally, it will be of interest to those seeking general information or an overview of the UK's general preparedness for, and planned response to, a pandemic.

## 1.5 Strategic objectives

In planning and preparing for an influenza pandemic, the Government's strategic objectives are to:

- protect citizens and visitors against the adverse health consequences as far as possible
- prepare proportionately in relation to the risk
- support international efforts to prevent and detect its emergence and prevent, slow or limit its spread
- minimise the potential health, social and economic impact
- organise and adapt the health and social care systems to provide treatment and support for the large numbers likely to suffer from influenza or its complications whilst maintaining other essential care
- cope with the possibility of significant numbers of additional deaths
- support the continuity of essential services and protect critical national infrastructure as far as possible
- support the continuation of everyday activities as far as practicable
- uphold the rule of law and the democratic process
- instil and maintain trust and confidence by ensuring that the public and the media are engaged and well informed in advance of and throughout the pandemic period
- promote a return to normality and the restoration of disrupted services at the earliest opportunity.

A more prolonged pandemic with lower 'peak' incidence of illness and work absence will be less disruptive to most services and businesses than a shorter period of very high impact. Therefore, as the pandemic emerges, the Government will also review strategies that may delay its arrival or slow its spread in the UK if time and data allow.

## 1.6 Operational response arrangements

Achieving these strategic objectives will require the development, maintenance, testing and, when necessary, implementation of operational response arrangements that are:

- able to respond promptly to any changes in alert levels
- developed on an integrated basis, combining local flexibility with national consistency and equity
- capable of implementation in a flexible, phased, sustainable and proportionate way
- based on the best available scientific evidence
- based on existing services, systems and processes wherever possible, augmenting, adapting and complementing them as necessary to meet the unique challenges of a pandemic
- understood by and acceptable to service providers and the general public
- adaptable to other threats, to the extent that this is practicable without compromising their effectiveness for pandemic influenza
- implemented in advance of a pandemic if this action has significant potential to mitigate the effects of a pandemic and, where possible, other threats or hazards
- designed to promote the earliest possible return to normality.

Although the intention will be to maintain normal services for as long and as far as that is possible, the unique nature of the challenges presented by a pandemic and their likely duration will inevitably require the curtailment of some services and activities in order to limit the spread of infection, allow the diversion of resources or protect those who may be particularly vulnerable. The impact on the provision of healthcare in particular is likely to last well beyond the pandemic itself, and restrictions on elective and other activity will inevitably result in additional discomfort, pain and suffering for many people. Minimising the impact and securing the gradual resumption of services at the earliest possible opportunity are key planning aims. All organisations should take the potential

effects on others of curtailing their services, and the impact on their own business continuity and response arrangements of curtailments by others, into account when developing their plans.

## 1.7 Underpinning scientific advice

Planning and preparedness for an influenza pandemic need to be informed by the best available scientific evidence at all levels. Continuing to improve the evidence base – and applying the results of research and modelling to the development of plans – is of critical importance to the strategic and operational approach to an influenza pandemic. As knowledge and information are constantly advancing, regular reviews and revisions of plans at all levels are essential.

A Pandemic Influenza Scientific Advisory Group advises the UK health departments (directorates in Scotland). The minutes of its meetings are published on the Department of Health website. Health departments/directorates also receive advice from the Joint Committee on Vaccination and Immunisation (JCVI) and the Advisory Committee on Dangerous Pathogens, and work closely with the Government's Chief Scientific Adviser and the Government Office for Science to ensure that government is making best use of expert scientific advice in this area. National and international scientific review processes are also organised as required.

## 1.8 Legal framework

### 1.8.1 International

The World Health Organization (WHO) adopted new International Health Regulations (IHRs) in 2005. These place a duty on states that are parties to the IHRs to notify WHO of any event – irrespective of cause – occurring in their territory which may constitute a public health emergency of international concern. Annex 2 of the IHRs is designed to assist states in deciding whether to notify WHO of an event and makes clear that any case of 'human influenza caused by a new subtype' must be notified. The IHRs also set out core requirements for surveillance and response.

The IHRs came into force on 15 June 2007 and the World Health Assembly passed a resolution in May 2006 urging states to implement those provisions deemed relevant to pandemic influenza early. The goal is to create a framework within which WHO and others can actively assist states in responding to international public health risks by directly linking the regulations to WHO's alert and response activities.

Article 4 of Decision 2119/98/EC of the European Parliament requires member states to inform the European Commission (EC) and each other via the Communicable Diseases Early Warning and Response System (EWRS) of any relevant infectious disease threats with public health implications for other member states and the control measures applied. The decision also requires member states and the EC to collaborate in the control of communicable disease threats.

### 1.8.2 National

Public health powers in England and Wales are provided by the Public Health (Control of Disease) Act 1984 (c.22), which is currently under review. The Public Health (Scotland) Acts of 1897 (c.38) and 1945 and the Health Services and Public Health Act 1968 (c.46) provide such powers in Scotland; and the Public Health Act (Northern Ireland) 1967 (c.36) provides powers in Northern Ireland.

Powers under public health Acts generally rest with local authorities (in Northern Ireland the health and social services boards (HSSBs)) or their proper officer (in Scotland the designated medical officer, in Northern Ireland the HSSB Director of Public Health). Key provisions include:

- powers to seek orders from a justice of the peace (or sheriff in Scotland or resident magistrate in Northern Ireland) requiring a person to be medically examined or to be removed to or detained in hospital
- powers for a local authority proper officer (or equivalents) to request that a person does not attend work, with a view to preventing the spread of infection; to require a child who has been exposed to infection not to attend school; and to place restrictions on children's places of entertainment
- the creation of criminal offences where people expose others to the risk of infection
- some powers to require the provision of information to help control the spread of disease.

In Scotland, these powers are applicable to infectious diseases generally. In other parts of the UK, the Acts relate mostly to specific diseases and generally to people suffering from them who have been infected and gone on to develop symptoms, not to those thought to have been exposed and potentially infected.

The National Health Service Act 2006 provides other relevant powers in relation to England. These include:

- the Secretary of State for Health's duty to provide a range of services to such extent as he/she considers necessary to meet all reasonable requirements (Section 3), a duty exercised by primary care trusts (PCTs)
- the Secretary of State's power to provide additional services or to do anything calculated to facilitate, or be conducive or incidental to, discharging his/her duties under the Act (Section 2), again exercisable by PCTs
- the Secretary of State's power to direct certain types of health service body about their exercise of any functions (Section 8)
- the power to provide a microbiological service (paragraph 12 of Schedule 1).

The provision of health and social care during an influenza pandemic may also be affected by a range of other legislation, for example the Human Rights Act 1998 and health and safety, equality and medicines legislation.

Part 2 of the Civil Contingencies Act 2004 established a new generic framework for emergency powers. Emergency powers allow the Government to make special temporary legislation (emergency regulations) as a last resort in the most serious of emergencies, where existing legislation is insufficient to respond in the most effective way. Emergency regulations may make provision of any kind that could be made by an Act of Parliament or by exercise of the Royal Prerogative, so long as such action is needed urgently and is both necessary and proportionate in the circumstances. For further information about the powers and safeguards in Part 2 of the Civil Contingencies Act, please consult Chapter 13 of *Emergency response and recovery* or the *2004: A short guide (revised) Civil Contingencies Act*, which can both be found on [www.ukresilience.info](http://www.ukresilience.info)

For planning purposes, the presumption should be that the Government will rely on voluntary compliance with national advice and that it is unlikely to invoke emergency or compulsory powers unless they become necessary, in which case the least restrictive measures that are likely to achieve the objective will be applied first.

## 1.9 Ethical considerations

In preparing for and responding to an influenza pandemic, governments, policy makers, public and private sector organisations, professional leaders, clinicians, health workers and many others involved in caring professions or leadership roles will face difficult decisions and choices that may impact on the freedom, health and in some cases prospects of survival of individuals. Many people are also likely to face individual dilemmas and tensions between their personal, professional and work obligations.

Given the expected levels of additional demand, capacity limitations, staffing constraints and potential shortages of essential medical material, hard choices and compromises are likely to be particularly necessary in the fields of health and social care.

People are more likely to accept the need for and the consequences of difficult decisions if these have been made in an open, transparent and inclusive way. National and local preparations for an influenza pandemic should therefore be based on widely held ethical values, and the choices that may become necessary should be discussed openly as plans are developed so that they reflect what most people will accept as proportionate and fair. At the request of the Department of Health, an independent committee with cross-UK representation has developed an ethical framework to inform the development and implementation of response policy. The systematic use of the principles it contains can act as a checklist to ensure that all the ethical aspects have been considered at all levels.

Further details of the ethical framework are available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## **1.10 Research and development**

Research and development into animal and human influenza has made – and continues to make – an important contribution to shaping and informing pandemic preparedness planning and remains particularly vital to improving understanding of the health and wider impacts of any new virus, which by definition are difficult to predict. Behavioural science is also important to our understanding of how people are likely to react.

Pandemic influenza research is coordinated across government departments and research councils by the Pandemic Influenza Research Funders Coordination Group. The Government actively supports national and international programmes of work in this area, encourages the exchange of information and experiences at all levels and contributes to efforts to support those countries whose plans and preparations are less developed. The UK participates in WHO, World Organisation for Animal Health (OIE) and European Union (EU) research programmes and jointly leads the influenza pandemic work-stream of the G8 countries. It also hosts one of the four WHO Collaborating Centres for Influenza at the National Institute for Medical Research. That Institute receives viruses for detailed virological analysis, and its laboratories – together with those of the National Institute for Biological Standards and Control and the National Influenza Reference Laboratory at the Health Protection Agency (HPA) – work closely together. Industry and governments are also devoting considerable



research efforts to developing pharmaceutical countermeasures and finding ways of reducing the time taken for testing and production.

Epidemiological models help understanding of how the disease might spread and the likely effectiveness of countermeasures, whilst operational models look at how we might best implement those countermeasures. Where possible, assumptions for models derive from data from previous pandemics, but where data are not available, information about known influenza viruses provides a source for estimates. UK modellers are amongst the world leaders in this work.

## 2 Setting the scene

### 2.1 Seasonal influenza

Influenza is an acute infectious viral illness that spreads rapidly from person to person when in close contact. It is characterised by the sudden onset of fever, chills, headache, muscle pain, severe prostration and usually cough – with or without a sore throat – or other respiratory symptoms. The acute symptoms generally last for about a week, although full recovery may take longer. In most years, seasonal influenza occurs in the UK predominantly during a six to eight week period in winter and affects some 5% to 15% of the population.

There are three broad types of influenza virus – A, B and C. Influenza A viruses cause most winter epidemics (and pandemics) and can affect a wide range of animal species as well as humans. They have a remarkable ability to adapt and change – which is what keeps them in circulation – and the resulting viruses can have widely differing impacts. Influenza B viruses only infect people. They circulate most winters but generally cause less severe illness and smaller outbreaks, particularly amongst children. Influenza C viruses are amongst the many causes of the common cold.

About half of those who become infected have no symptoms and are therefore not even aware of the infection. For the majority of the other half, 'seasonal' influenza is an unpleasant but self-limiting and not life-endangering illness. However, in some it may be more severe, or complicated by secondary bacterial infections such as bronchitis or pneumonia. The very young, older people and those with underlying diseases such as heart or chest disease are particularly at risk of serious illness. Without interventions, those in high-risk groups can suffer significant ill health, and a small percentage of those affected die. An estimated 12,000 – mainly older – people die each year from seasonal influenza in England and Wales. The cornerstone of reducing the impact of seasonal influenza is selective annual vaccination of those groups most at risk of serious illness, complications and death with an appropriately formulated vaccine.

More information on seasonal influenza is available from the Department of Health's immunisation information website at [www.immunisation.nhs.uk](http://www.immunisation.nhs.uk)

### 2.2 How influenza spreads

Influenza is one of the most difficult infectious diseases to control because the virus spreads easily from person to person via the respiratory route when an infected person talks, coughs or sneezes. It also spreads through hand-to-face contact if hands are contaminated.

Experimental studies suggest that influenza viruses may survive for some time on various surfaces, surviving longer on hard non-porous surfaces than on soft porous materials. Studies have also shown that careful hand washing,

commercially available alcohol-based hand disinfectant and domestic cleaning products can easily deactivate the virus.

The incubation period (the time from exposure to first symptoms) is in a range of one to four days, typically two to three. Without intervention – or significant immunity in the population – historical evidence suggests that one person infects about two others on average and that influenza spreads particularly rapidly in closed communities such as schools or residential homes. People are most infectious soon after they develop symptoms, though they can continue to shed virus for usually up to five days after the onset of symptoms (seven days in children).

It is sometimes stated that patients are infectious shortly before they develop symptoms; however, the evidence for this is limited. Spread from a person before they develop symptoms has rarely been recorded, though experimental studies have shown that some people start shedding low doses of virus in the 24 hours before symptoms occur. Some people can be infected without showing symptoms and, as they may shed the virus, be able to pass on the infection.

### 2.3 An influenza pandemic

Pandemic influenza occurs when an influenza A virus subtype emerges or re-emerges which is:

- markedly different from recently circulating strains
- able to infect people
- readily transmissible from person to person
- capable of causing illness in a high proportion of those infected
- able to spread widely because few – if any – people have natural or acquired immunity to it.

Whilst such a virus could first emerge anywhere in the world – including the UK – South East Asia, the Middle East and Africa are widely considered to be the most likely potential sources. It would initially spread to cause outbreaks and epidemics within the country of origin and its immediate neighbours before spreading globally to cause a pandemic. The conditions that allow a new virus to develop and spread continue to exist, and some features of modern society, such as air travel, could accelerate the rate of spread. Experts therefore agree that there is a high probability of a pandemic occurring, although timing and impact are impossible to predict.

More detailed information on influenza viruses, the illness they can cause and the impact of past pandemics is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## 2.4 Avian influenza

Avian influenza ('bird flu') is an infectious disease of birds caused by influenza A viruses that spread mainly through contact with contaminated faeces (droppings) but also via respiratory secretions. Although they do not readily infect species other than birds and pigs, scientists believe that human-adapted avian viruses were the most likely origin of the last three human influenza pandemics.

The highly pathogenic A/H5N1 avian influenza virus – which is extremely contagious and rapidly fatal in domestic poultry species – has prompted particular concerns in recent years. There has been rapid spread within and from the Far East, with incursions into Europe and Africa caused by movement of infected poultry and poultry products, and possibly via migratory birds. Whilst the virus has also infected humans, such infections have only been recognised in a small proportion of those who have been exposed to infected birds. To date there has only been limited evidence of person-to-person transmission and, even where that has occurred, it has been with difficulty and has not been sustained.

A growing reservoir of infection in birds, combined with transmission to more people over time, increases the opportunities for the A/H5N1 virus either to adapt to give it greater affinity to humans or to exchange genes with a human influenza virus to produce a completely novel virus capable of spreading easily between people and causing a pandemic. However, the likelihood of and time span required for such mutations are not possible to predict.

Experts agree that A/H5N1 is not necessarily the most likely virus to develop pandemic potential. However, due to the potential severity of a pandemic originating from an H5N1 virus, this possibility cannot be discounted. For planning purposes, it is important to be aware of the many other avian viruses that are endemic in birds and have the potential to infect humans.

Further information on the human and animal health aspects of avian influenza – including contingency arrangements for responding to an avian influenza outbreak in the UK – is available from the Department for Environment, Food and Rural Affairs (Defra) at [www.defra.gov.uk](http://www.defra.gov.uk), the Department of Health at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu), HPA at [www.hpa.org.uk](http://www.hpa.org.uk), WHO at [www.who.int/csr/en](http://www.who.int/csr/en) and the OIE at [www.oie.int](http://www.oie.int)

## 2.5 What an influenza pandemic might look like

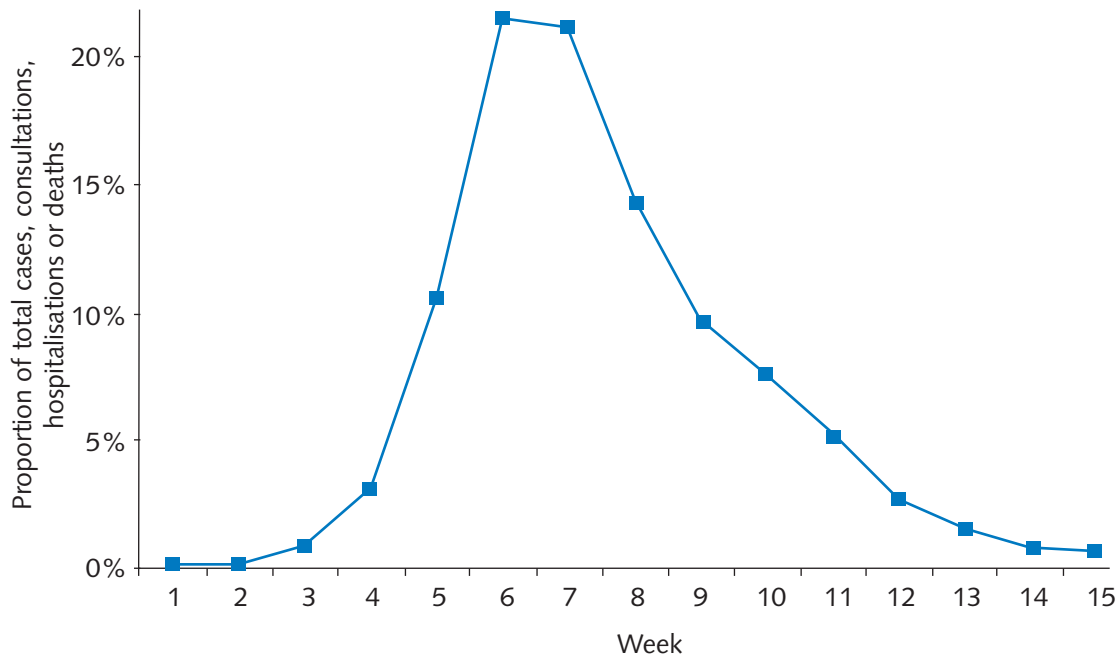
Past pandemics have varied in scale, severity and consequence, although in general their impact has been much greater than that of even the most severe winter 'epidemic'. There have also been material differences in the age groups most affected, the time of year they occurred and the speed of spread, all of

which influenced their overall impact. Although little information is available on earlier pandemics, the three that occurred in the 20th century are well documented. The worst (often referred to as 'Spanish flu') occurred in 1918/19. It caused serious illness, an estimated 20–40 million deaths worldwide (with peak mortality rates in people aged 20–45) and major disruption. Some residual health problems attributed to it lasted for many years thereafter. Whilst the pandemics in 1957 and 1968 (often referred to as 'Asian' and 'Hong Kong flu' respectively) were much less severe, they also caused significant illness levels – mainly in the young and the elderly – and an estimated 1–4 million deaths between them.

It is impossible to forecast the precise characteristics, spread and impact of a new influenza virus strain. Modelling suggests that from the time it begins in the country of origin it may take as little as two to four weeks to build from a few to around 1,000 cases and could reach the UK within another two to four weeks. Once in the UK, it is likely to spread to all major population centres within one to two weeks, with its peak possibly only 50 days from initial entry.

An influenza pandemic can occur either in one wave, or in a series of waves, weeks to months apart. To inform preparedness planning, a temporal profile based on the three pandemics that occurred in the last century and current models of disease transmission has been constructed (see Figure 1). This shows the fastest overall national progression of a pandemic from the time it becomes the dominant form of influenza-like disease, when the number of cases rises above the background of such diseases. Although there is a significant number of pandemic influenza cases in week 1 of the profile, most recorded influenza-like infections at this stage will not be pandemic influenza. By week 2 most influenza-like infections will be pandemic influenza, which will overtake the background level of similar illness. The earlier stages of the UK epidemic, before pandemic influenza becomes the dominant respiratory disease, are much harder to predict because they depend on chance events. The epidemic may take off only a couple of weeks after the first reported case or it may take significantly longer. Local epidemics might be over more quickly (six to eight weeks) with a proportionately higher peak.

**Figure 1: Single wave national profile showing proportion of new clinical cases by week**



Vaccination or mass treatment with antiviral medicines can be expected to modify this profile, assuming their efficacy is similar to that against seasonal influenza.

## 2.6 Predicting the health and wider impacts of a pandemic

It is impossible to predict the exact nature, timing or impact of any future pandemic because the root cause will be the circulation of a new strain of influenza virus and such viruses differ in their attributes and effects. For planning purposes, impact assessments are derived from a combination of current virological and clinical knowledge, expert analysis, extrapolations from previous pandemics and mathematical modelling.

Despite their variability, previous pandemics provide a valuable source of planning information and experience, but much has changed since the last in 1968. An increased proportion of older people in the population, improved healthcare opportunities and expectations, the growing emergence of antimicrobial resistance amongst the bacteria that may cause secondary infections following influenza, reduced 'surge' capacity in most healthcare systems and various pharmaceutical advances are some examples of factors that limit the reliability of data from past pandemics as predictors of future impact.

Mathematical modelling provides an adjunct to previous experience to help inform both strategic and operational planning for a future pandemic. The

models enable current circumstances and the likely impact and effectiveness of interventions to inform plans. However, models are only as good as the data fed into them and the assumptions made in their design. In the case of new influenza viruses, there are few data, and a wide range of plausible assumptions can be made. The main role of modelling in advance of a pandemic is to map out the range of possible risks and to investigate which responses are robust over the range of uncertainties. It is therefore important to emphasise that all impact predictions are estimates – not forecasts – made to manage the risks of a pandemic, and that the actual shape and impact may turn out to be very different. Impact predictions will therefore be compared against emerging data as the pandemic develops.

When influenza pandemics occur, many millions of people around the world can become ill, and a proportion will die from the disease itself or from complications such as pneumonia. Depending upon the virulence of the influenza virus, the susceptibility of the population and the effectiveness of countermeasures, up to half the population could have developed illness and between 50,000 and 750,000 additional deaths (that is deaths that would not have happened over the same period of time had a pandemic not taken place) could have occurred by the end of a pandemic in the UK.

In the absence of early or effective interventions, society is also likely to face much wider social and economic disruption, significant threats to the continuity of essential services, lower production levels, shortages and distribution difficulties. Individual organisations may also suffer from the pandemic's impact on business and services. Difficulties in maintaining business and service continuity will be exacerbated if the virus affects those of working age more than other groups, and fear of infection, illness, care-providing responsibilities, stress, bereavement and potential travel disruption are all likely to lead to higher levels of staff absence. Staffing is therefore the critical element in business and service continuity plans.

High levels of public and political concern, general scrutiny and demands for advice and information are also inevitable at all stages of an influenza pandemic. An effective communications strategy that provides timely advice and information on the situation in the UK and in other countries must form a key part of the management strategy.

Given the lack of relevant information, assessments of impact on the overall economy are necessarily simplistic and can only be illustrative. One such illustrative assessment suggests that illness-related absence from work of 25% of employees over the course of the pandemic (only half of what may be expected in a widespread pandemic) could reduce the year's gross domestic product (GDP) by between £3 billion and £7 billion. Additional premature deaths could

cause a further reduction of between £1 billion and £7 billion depending on whether case fatality rates are low or high and whether earnings or gross output are used in the calculation. Overall, therefore, an influenza pandemic might be expected to reduce current year GDP by some 0.75%. In the longer term, the impact of premature deaths could reduce future lifetime earnings by between £21 billion and £26 billion at a low case fatality rate and by between £145 billion and £172 billion at a high case fatality rate; estimating this impact depends critically on assumptions about the age ranges affected and about future economic trends.

Further information on the principles underlying the use of modelling in preparing for an influenza pandemic and some of the results thus far are available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

Further advice on business continuity aspects is available on the UK Resilience website at [www.ukresilience.info/ccact/index.shtm](http://www.ukresilience.info/ccact/index.shtm)



# 3 Planning assumptions and presumptions

## 3.1 Key planning assumptions

The precise characteristics and impact of an influenza pandemic will only become apparent as the virus emerges. Therefore, some assumptions about a pandemic's course – and presumptions as to the UK's likely response in a number of key areas – are necessary to describe the impact the Government is currently planning for. Although these are included in the relevant parts of this framework, they are summarised here for ease of reference. The use of common assumptions and presumptions across all public and private sector organisations avoids confusion and facilitates integrated preparation. Given the uncertainties, these should be regarded as working estimates rather than predictions. Response arrangements must be flexible enough to deal with a range of possibilities and be capable of adjustment as they are implemented. If the origin of a pandemic is outside the UK, emerging surveillance data might also allow the use of real-time modelling to confirm and/or refine these assumptions and presumptions.

### 3.1.1 Origins of a pandemic

- A pandemic will be caused by a new subtype of the influenza A virus.
- The emergence of new influenza A viruses is highly probable.
- The virus may be a re-emerging, previously known human subtype that has not recently been in circulation, or a new virus – most likely of avian origin – emerging either through stepwise adaptation conferring greater affinity for people or through a process of genetic re-assortment between the genes of an avian and a human virus.
- From time to time, avian influenza viruses will infect people directly exposed to infected poultry or animals but will not necessarily evolve into pandemic viruses.
- A new strain is likely to transmit more easily to people if it contains genetic material from a human influenza virus.
- Although an influenza virus with potential to cause a pandemic could develop anywhere, it is most likely to emerge from South East Asia, the Middle East or Africa.
- The close proximity of humans to poultry, pigs and domestic animals in many parts of the world facilitates mingling of human and animal viruses and increases the risk that these may then exchange genetic material, resulting in a new re-assorted human strain. The wide dissemination of the A/H5N1 virus in domestic poultry and waterfowl provides one seedbed for such re-assortment, but such viruses may also re-emerge from unrecognised or unsuspected reservoirs in other animal species.

- Whenever such a virus, or another new influenza virus, is isolated following human infection, its potential to spread directly from person to person and cause outbreaks of illness needs assessment.
- False alarms are likely but the pandemic potential of a new virus must remain under consideration until it can be determined whether person-to-person transmission has occurred. Such investigations will inevitably consume resources.

### 3.1.2 Timing and duration

- A future influenza pandemic could occur at any time. Intervals between the most recent pandemics have varied from about 10 to 40 years with no recognisable pattern, the last being in 1968/69.
- A new virus may emerge at any time of the year.
- Initially, pandemic influenza activity in the UK may last for three to five months, depending on the season. There may be subsequent waves, weeks or months apart.

### 3.1.3 Geographic spread

- Although it may be theoretically possible to contain the initial spread of a pandemic virus originating in rural parts of Asia, the Middle East or Africa, the measures required to do so are likely to prove difficult to implement.
- In the event of a new influenza virus causing significant outbreaks of human illness elsewhere in the world, it is unlikely that the UK could prevent importation except by closing all borders entirely – modelling suggests that even a 99.9% restriction on travel into the country could only be expected to delay importation of the virus by up to two months.
- Spread from the country of origin is likely to follow the main routes of travel and trade.
- Increasing use of routes where surveillance is not as well developed may result in the failure to document the early stages of a virus's spread.
- Spread from the source country to the UK through movement of people is likely to take two to four weeks. Experience of the dissemination of severe acute respiratory syndrome (SARS) from Hong Kong suggests modern travel may result in even more rapid international spread.
- From arrival in the UK, it will probably be a further one to two weeks until sporadic cases and small clusters that will act as initiators of local epidemics are occurring across the whole country.

### 3.1.4 Infectivity and mode of spread

- Influenza spreads through the respiratory route by droplets of infected respiratory secretions which are produced when an infected person talks, coughs or sneezes.
- It may also spread by hand-to-face contact after a person or surface contaminated with infectious respiratory droplets has been touched.
- Finer respiratory aerosols (which stay in the air for longer and are therefore more effective at spreading infection) may occur in some circumstances.
- The incubation period is in the range of one to four days (typically two to three).
- People are highly infectious for four to five days from the onset of symptoms (longer in children and those who are immunocompromised) and may be absent from work for up to ten days.
- Children have been shown to shed virus for longer and at higher levels than adults.
- Some people can be infected without showing symptoms, but nevertheless may shed the virus and therefore be able to pass on the infection.
- Without intervention, and with no significant immunity in the population, historical evidence suggests that one person infects about 1.4 to 1.8 people on average (the  $R_0$  or 'basic reproduction number'). This number is likely to be higher in closed communities such as prisons, residential homes or boarding schools.

### 3.1.5 Clinical attack rate, severity of illness and deaths

- Important differences are likely in the incidence (clinical attack rate), age distribution and severity of illness – including the number of deaths attributable to influenza (case fatality rate) – compared with annual seasonal influenza. These will not become apparent until person-to-person transmission starts and epidemiological data become available.
- Most people will be susceptible but not all will develop clinical illness. Previous experience suggests that roughly equal numbers will be infected but have no symptoms (be asymptomatic) as will develop symptomatic infection.
- All ages are likely to be affected but children and otherwise fit adults could be at relatively greater risk as older people may have some residual immunity from previous exposure to a similar virus earlier in their lifetime.

- Any age-specific differential attack rate will affect the overall impact. If working-age adults are predominantly affected, this will have a more direct impact on provision of services and business continuity, whilst illness in very young children and older people is likely to have an indirect impact and will present a greater burden to health and social services.
- Although the potential for age-specific differences in the clinical attack rate should be noted, they are impossible to predict, and a uniform attack rate across all age groups is assumed for planning purposes.
- More severe illness than the usual seasonal influenza is likely in all population groups – rather than predominantly in high-risk groups as with seasonal influenza – with a higher number of people than usual developing severe prostration and rapidly fatal overwhelming viraemia, viral pneumonia or secondary complications. It is not possible to give numbers in advance.
- In previous pandemics, the overall UK clinical attack rate has been of the order of 25% to 35%, compared with the usual seasonal range of 5% to 15%.
- Cumulative clinical attack rates of up to 50% of the population in total are possible, spread over one or more waves of around 15 weeks, each some weeks or months apart. If they occur, a second or subsequent wave could possibly be more severe than the first.
- The actual incidence (clinical attack rate) of illness will only become evident as person-to-person transmission develops, but response plans should recognise the possibility of a clinical attack rate of up to 50% in a single-wave pandemic.
- Up to 4% of those who are symptomatic may require hospital admission if sufficient capacity were to be available.
- Mortality due to pandemic influenza is expected to be much higher than in inter-pandemic years, when an average of 12,000 influenza-related deaths are estimated to occur in England and Wales each year.
- The UK case fatality rate in previous pandemics was between 0.2% and 2%.
- The reported mortality for humans infected with the A/H5N1 avian virus is currently over 50% but it should be noted that this is primarily an avian virus with its own specific characteristics and treatment has often been delayed.
- Diverse views regarding the link between virulence and ability to transmit between humans have been published, although a majority of scientists currently believe virulence to be independent of transmission ability.

- The likelihood of the current (avian) A/H5N1, or any other virus, developing pandemic potential cannot be quantified. In the face of these uncertainties, most experts agree that accepting the evidence from previous influenza pandemics suggesting a maximum case fatality of 2.5% is a reasonable worst case scenario (as distinct from a worst case scenario) for planning purposes.
- To inform planning, the following table shows the potential impacts of a 25%, 35% and 50% clinical attack rate and overall case fatality rates of 0.4%, 1%, 1.5% and 2.5% of those with influenza symptoms.

**Table 1: Range of possible excess deaths for various permutations of case fatality and clinical attack rates, based on UK population**

Overall case fatality rate (%)	Range of possible excess deaths in the UK		
	25% clinical attack rate	35% clinical attack rate	50% clinical attack rate
0.4	55,500	77,700	111,000
1.0	150,000	210,000	300,000
1.5	225,000	315,000	450,000
2.5	375,000	525,000	750,000

### 3.2 UK planning presumptions

Table 2 outlines the UK's current planning presumptions for developing response plans and maintaining essential services during an influenza pandemic. These presumptions are based on provisional decisions by ministers and current planning across essential services, using information and planning assumptions published in previous versions of the *UK health departments' UK influenza pandemic contingency plan* (March and October 2005) and the Cabinet Office's *Guidance on contingency planning for a possible influenza pandemic* (February and July 2006), which included advice on peak staff absences based on a 50% clinical attack. These presumptions will be revised regularly and reviewed when the nature of any pandemic virus is known, and may be altered because of international actions or evolving advice from WHO.

The Cabinet Office's *Guidance on contingency planning for a possible influenza pandemic* is available at [www.ukresilience.info](http://www.ukresilience.info)

Table 2: UK planning presumptions

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
<b>Transport/travel</b>				
Foreign and Commonwealth Office (FCO) travel advice for other countries	FCO travel advice will take as its starting point the advice issued by WHO at each stage of a developing pandemic. British missions overseas will consider a full range of options for informing British nationals of the developing situation and its associated risks. This will include ensuring that British nationals continue to monitor FCO travel advice. From WHO Phase 4, the FCO will recommend that British nationals in affected and neighbouring countries consider returning to the UK.			
	Advice against non-essential travel to affected and neighbouring countries.			
	If the situation in a country is judged severe enough to significantly affect British nationals (eg the healthcare system is unable to treat them or there has been a breakdown in law and order), a decision may be made to advise against all travel. Where possible, travellers will be given a timeframe for moving, from advising against all but essential travel to advising against all travel, based on the predicted spread of the pandemic. Such a decision would be subject to agreement between the FCO, the Department for Transport and the Department of Health and would be subject to ministerial clearance.			
International travel restrictions/Border closures	The possible health benefits that may accrue from international travel restrictions or border closures need to be considered in the context of the practicality, proportionality and potential effectiveness of imposing them, and balanced against their wider social and economic consequences. Given the complexity of this issue, the Government will keep under review the evidence on the benefits and disadvantages of various approaches.			
Airport closures	No imposed closures in the UK (subject to the above) but airports may find they have operational difficulties in Phase 6 if staff are absent and/or if airports or carriers overseas have operational difficulties or close.			
Health screening	Based on available evidence, no entry or exit screening will be imposed in the UK. If recommended by WHO, or if other countries impose requirements (such as requiring outgoing flights to undergo exit screening), the Government will consider screening on a case-by-case basis, bearing in mind the lack of evidence to support it.			

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Financial assistance to airlines/travel industry	No plans for government assistance. Subject to the extent of impacts, the Government may consider assistance at the time and/or during the recovery phase.			
Domestic travel restrictions	Business as usual.		Subject to the nature and spread of virus, the Government may advise against non-essential travel but will not impose restrictions.	
Hygiene measures on public transport	Public advice from the Department of Health and the HPA will encourage general good hygiene practice in reducing the spread of infectious diseases, eg regular hand washing.		Advice to keep using public transport whilst adopting good hygiene measures and staggering journeys where possible.	
<b>International</b>				
Repatriation issues	Subject to the extent of disruption to air travel, British nationals may be stranded overseas at any phase (although this is more likely at Phases 5 and 6). Given the potential scale and number of countries involved, the Government is unlikely to arrange repatriation. The FCO already advises British nationals, through its avian influenza fact sheet on its website and its missions overseas, that the Government will not be in a position to offer repatriation.			

Area of policy response	WHO Phase 4 Small cluster of cases with limited person-to-person transmission	WHO Phase 5 Large cluster(s) of cases with person-to-person transmission	WHO Phase 6 Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1 Cases outside the UK	UK alert levels 2–4 Outbreaks in the UK
Repatriation of dead bodies	Normal arrangements will apply at airports to receive any dead British nationals who may be part of the early clusters. Family/insurance to meet costs.		Repatriation may be difficult due to circumstances at the time in other countries and possible flight disruption. Ports of entry will continue to provide normal arrangements for as long and as far as that is practical. Family/insurance to meet costs.	
Advice from British missions to British nationals overseas	Plan for Phase 6, including whether to stay or leave and local access to healthcare. Advise British nationals in affected or neighbouring countries to consider returning to the UK at Phases 4/5.		Plan for arrival of the virus in host country or, if it has already arrived, review local access to healthcare. Flights and/or consular support may be reduced.	
Medical assistance to British nationals overseas	British nationals will be advised to plan for a potential pandemic, including arranging for their own medical care and discussing whether they will have access to antiviral treatment during a pandemic with their healthcare provider. The FCO is already advising British nationals, through the avian influenza fact sheet on its website and through its missions overseas, that British diplomatic missions cannot provide medical treatment or antiviral medicines.			
Government liaison with other countries	The FCO will lead on liaison with governments in other countries to ensure full understanding			



Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
Assistance to foreign nationals in the UK	The current policy will apply during a pandemic, ie no assistance apart from emergency healthcare. For public health reasons, visitors who develop influenza symptoms whilst in the UK will be given emergency treatment with antiviral medicines if necessary.			
<b>Essential services</b>				
Healthcare	Normal service levels.		The NHS plans to care for large numbers of cases and will only provide essential care.	
Domestic travel/public transport	Normal service levels.		Business as usual for as long and as far as that is possible. Some disruption is expected at the peak of a pandemic. Relaxation of regulations on drivers' hours may be considered if required to maintain services.	
Essential repairs or maintenance of power lines, telecommunications, gas pipelines and energy supply	Normal service levels.		Essential repairs will continue. Routine repairs may be curtailed by staff shortfalls, particularly at the peak of the pandemic.	

Area of policy response	WHO Phase 4 Small cluster of cases with limited person-to-person transmission	WHO Phase 5 Large cluster(s) of cases with person-to-person transmission	WHO Phase 6 Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1 Cases outside the UK	UK alert levels 2–4 Outbreaks in the UK
Capacity of telecommunications and level of service	Normal service levels.			Near-normal service levels expected. Staff shortfalls may result in a gradual increase in time taken to respond to customer calls and routine repairs. Those organisations planning to increase home working should discuss plans with their service provider at an early stage (see section 8.6.1).
Availability of fuel	Normal service levels.			Fuel supplies expected to be maintained. May be occasional short-lived local shortages if peak absences coincide with technical or weather-related supply difficulties.
Maintenance in the energy, telecommunications and fuel sectors	Maintenance programmes as normal.			Routine programmes may be disrupted if peak absences coincide with technical or weather-related supply difficulties.

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Provision of water and sewerage services	Normal service levels.			Near-normal service levels. Essential repairs to maintain water and sewerage pipe-work, but non-essential work may be curtailed.
Food/supplies	Normal service levels.			Near-normal service levels; may be reduced choice and localised short-term disruption to availability due to staff absences.
Finance – cash circulation, banking and payment systems	Normal service levels.			Near-normal service levels, but there may be some disruption to customer-facing services due to staff absence at peak. Demand for cash in circulation will be met, but there may be some short-lived disruption if bank branches are closed and cash machines take longer to restock.

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Postal services	Normal service levels.			May be some disruption due to staff absence at the peak of the pandemic, but daily deliveries and collections will be sustained as far as possible.
Provision of local services, eg refuse collection	Normal service levels.			Subject to staff absences, particularly at the peak, there may be some short-lived disruption to essential services such as refuse collection.
<b>Education/social mixing</b>				
School and early years/childcare settings closures	Business as usual.			Subject to the impact of the pandemic, the Government may recommend that schools and early years/childcare settings close to children when the first clinical cases are confirmed in the LRF area and that they remain closed until the local epidemic is over.

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	UK alert level 1 Cases outside the UK	UK alert levels 2–4 Outbreaks in the UK
Further and higher education	Business as usual.		No plans to advise further/higher education establishments to close. Each institution to decide how it operates based on a risk assessment and its situation.	

Area of policy response	WHO Phase 4 Small cluster of cases with limited person-to-person transmission	WHO Phase 5 Large cluster(s) of cases with person-to-person transmission	WHO Phase 6 Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1 Cases outside the UK	UK alert levels 2–4 Outbreaks in the UK
Advice on social gatherings, such as attending UK sporting or arts events and conferences	Business as usual.			Business as usual for as long and as far as that is possible, subject to good hygiene precautions, including robust advice to customers that they should stay at home if they are ill or have influenza-like symptoms. If schools and early years childcare facilities are advised to close to children, information will be made available to parents and carers to enable them to assess the risks of infection associated with different out-of-school activities so that they can act appropriately to protect children. In the early stages of Phase 6, the Government may advise against holding international events in the UK if delegates, teams or performers are expected from affected countries.

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Advice on use of public places	Public health advice from the Department of Health, devolved administrations and the HPA will encourage general good hygiene practice to reduce the spread of infectious diseases, eg regular hand washing.			Business as usual for as long and as far as that is possible. The public will need to take good hygiene precautions.
<b>Broadcasting</b>				
Public service broadcasts	Business as usual.			Business as usual, for as long and as far as that is possible. May be some readjustment of services.
<b>Sickness and other benefits</b>				
Sickness absence policy, including statutory sick pay	Business as usual.			Business as usual for as long and as far as that is possible. Advice may be issued as pandemic develops.
Benefits payments	Business as usual.			Business as usual, for as long and as far as that is possible.
<b>Pharmaceutical and medical interventions</b>				
Antiviral medicines	<p>Initial allocations (two-week supply) from national stockpiles pre-distributed to PCT level.</p> <p>In Scotland, additional supply from its national stockpile will be distributed to NHS boards in addition to the supplies pre-distributed at Phase 3.</p> <p>Normal supplies may remain available in the pharmaceutical chain for seasonal influenza cases at Phases 4 and 5.</p>			For rapid treatment and limited initial containment efforts. Move to treatment only as a pandemic is established.

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Access to antiviral medicines	National stockpile allows for treatment of some 25% of the population in the pandemic period (UK alert levels 2–4).		All symptomatic patients treated if indicated, but stockpile consumption to be monitored and clinical prioritisation introduced if necessary.	
Face masks	Advice to public and business regarding government policy (face masks necessary for healthcare workers dealing with suspect cases or others at particular risk). Occupational risk assessments in other settings should be conducted jointly with staff. There is little evidence to support the routine wearing of face masks by the public and they will not generally be provided for those who are well.		Protection advised for health workers and should be considered for others in close/regular contact with infectious patients or at occupational risk.	
Antibiotics	Government reviewing available stock levels and options for enhancing.		Administered for secondary infection complications as per guidelines.	
Pre-pandemic vaccines	UK currently stockpiling around 3.3 million doses of A/H5N1 vaccine (primarily to protect health workers).		May offer limited protection if used as a pre-pandemic vaccine prior to cases in the UK, depending on match with pandemic virus, but stocks are limited.	
Pandemic-specific vaccine	A specific vaccine can only be produced once the pandemic virus has been isolated and the vaccine has been developed and manufactured (which will take four to six months).		The UK will secure sufficient vaccine to protect the population as soon as it is available (likely to be at least four to six months, ie well after the first wave strikes the UK). Delivery of supplies would make clinical prioritisation inevitable.	



Area of policy response	WHO Phase 4 Small cluster of cases with limited person-to-person transmission	WHO Phase 5 Large cluster(s) of cases with person-to-person transmission	WHO Phase 6 Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1 Cases outside the UK	UK alert levels 2–4 Outbreaks in the UK
Other consumables and essential medicines	The Department of Health will consider options for enhancing stocks and supply of those essential medicines for which there is likely to be a greater demand.		Implement changes to medicines legislation or regulations where necessary, to ensure ease of access.	
The Government will consider the relaxation of medicines and NHS regulations where necessary to ensure ease and speed of access.				
<b>Communications</b>				
Isolation of cases/staying at home if ill	Possible implications for returning travellers with symptoms and their contacts, ie isolation of confirmed cases and voluntary quarantine at home of suspect cases and/or their close contacts.		Those who believe they are ill will be asked to stay at home in voluntary isolation. Voluntary home isolation may also be recommended for close contacts at early stages of the pandemic in the UK to contain/slow the spread.	
Health messages to the public	Increase in public information at Phase 4 – proportionate to levels of risk. Different communication products, such as leaflets and door drops, will be used during Phases 4 and 5, emphasising good hygiene measures and reassuring the public. Regional/local communications to be consistent with national messages.		Main messages to include: stay at home if ill; adopt good hygiene practices; and how to obtain help and antiviral medicines. Other messages may include information on face masks and health and safety advice on issues such as air conditioning in the workplace. Messages must be consistent.	

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
Information to the public	<p>WHO advice and updates on location(s) and areas affected will be reflected in FCO travel advice.</p> <p>UK health departments (directorate in Scotland) will run a national door drop and advertising campaign in Phase 5, alerting the public to the heightened risk, emphasising the need for personal preparation and socially responsible behaviour. A public information film will demonstrate how to slow the spread of the virus, and the National Flu Line service (see 10.7) will be available. Information materials will also be available through primary care, pharmacies and on the Department of Health website.</p>		<p>WHO will provide the Department of Health with regular updates on countries affected. The Department of Health will cascade to other government departments, devolved administrations and the NHS.</p>	<p>Department of Health and each devolved administration will report the numbers ill on a regional basis to the Civil Contingencies Committee (CCC).</p> <p>This information may be made available via the National Flu Line service, websites and media briefings.</p>
			<p>A second wave of advertising will run in Phase 6 providing basic facts and advice on the measures people can take to help slow the spread. The dedicated information line will continue to operate and an updated public information film will be made.</p>	
<b>Excess deaths</b>				
Managing excess deaths	<p>Planning will continue in preparation for the arrival of the pandemic in the UK and the consequent additional deaths expected to occur (scale will be dependent upon the nature of the virus).</p>		<p>Planning is under way to minimise delays in burials or cremations. Further measures are being considered for the reasonable worst case scenario (750,000 deaths).</p>	

# 4 Summary of roles

Area of policy response	WHO Phase 4	WHO Phase 5	WHO Phase 6	
	Small cluster of cases with limited person-to-person transmission	Large cluster(s) of cases with person-to-person transmission	Increased and sustained transmission in general population (pandemic confirmed)	
			UK alert level 1	UK alert levels 2–4
			Cases outside the UK	Outbreaks in the UK
<b>Response and coordination</b>				
Response, planning and coordination across central and local government	The CCC will meet as required to agree early policy decisions and to oversee completion of planning. Regional Civil Contingencies Committees (RCCCs) will meet as required to promulgate policy decisions/advice and maintain overview of response. Similar arrangements apply in the devolved administrations.		The Department of Health will adopt the lead department role. The CCC will meet regularly to maintain overview of the impacts on the UK, agree policy and allocate resources. As cases increase, RCCCs will meet regularly to maintain overview of regional impacts, identify resource issues and promulgate policy and information to the public.  SCGs will coordinate local responses. Similar arrangements apply in the devolved administrations.	
Civil Contingencies Act 2004	Emergency regulations may be used if it is necessary and proportionate to do so and if the legal safeguards in the Act are met. The scope and content of emergency regulations will be dependent on circumstances at the time.			
Liaison with the business community	The Government will liaise and share information with the business community through established stakeholder groups. At local level, the business community will work with the LRFs. Similar arrangements will apply in the devolved administrations.			
Support from the Armed Services	As with guidance for other major emergencies, planners should not assume that military support will be available. Such assistance might be available in exceptional circumstances if life and property are in immediate danger, but planning for an influenza pandemic should take into account that support may not be available if local units are deployed on operations, that they may not have personnel available with either the skill or equipment to undertake specialist tasks and that military personnel will themselves be vulnerable to the illness.			

## 4.1 Multi-agency planning

Planning for and responding to the health, social care and wider challenges of an influenza pandemic require the combined and coordinated effort, experience and expertise of all levels of government, public authorities/agencies and a wide range of private and voluntary organisations. Preparations require the active support of communities and, critically, that individuals take personal responsibility for protecting their own health, supporting each other and contributing to disease containment efforts. To ensure an effective response, each organisation needs to understand its responsibilities and those of others, plan adequately, prioritise its efforts and take proactive steps to ensure the continuity of its services as far as possible. This section describes the roles and responsibilities of the main participants in the UK, and of the main international bodies with whom the UK works closely during the current planning Phase and would continue to work with during a pandemic.

## 4.2 International organisations

As an influenza pandemic will be an international public health emergency, the UK works closely with international bodies and other countries to encourage coordinated surveillance, planning, research, vaccine development and response.

### 4.2.1 World Health Organization

The World Health Organization (WHO) is the United Nations (UN) specialist agency for health. Through its Global Influenza Programme, it seeks to improve epidemic and pandemic influenza preparedness and responses by coordinating international surveillance, investigation and response. WHO also provides information, technical standard-setting documents, a checklist for national plans, field assistance to member states on request, international leadership, advocacy and advice to health authorities, the media and the public.

WHO has produced a planning framework through the *WHO global influenza preparedness plan* (2005) and a planning checklist, which are available at [www.who.int/csr/resources/publications/influenza/GIP\\_2005\\_5Eweb.pdf](http://www.who.int/csr/resources/publications/influenza/GIP_2005_5Eweb.pdf) and [www.who.int/csr/resources/publications/influenza/FluCheck6web.pdf](http://www.who.int/csr/resources/publications/influenza/FluCheck6web.pdf)

### 4.2.2 World Organisation for Animal Health

The World Organization for Animal Health (OIE) is an inter-governmental organisation that collects, analyses and disseminates veterinary scientific information and provides expertise in the control of animal diseases.

### 4.2.3 European Union

The European Union (EU) Directorate for Health and Consumer Protection has a responsibility for facilitating coordination and collaboration between member states in the prevention and control of communicable disease. Several directorates have pandemic influenza policy interests, including agriculture/rural development, economy/finance, enterprise/industry, information, society and media, and research.

Decision 2119/98/EC established a European network between the European Commission (EC) and member states for the epidemiological surveillance and control of communicable disease. It also imposed obligations – including collaboration in preparedness and response, early warning and exchange of information – on the EC and member states. An Early Warning and Response System (EWRS) provides an alerting mechanism.

EC guidance on pandemic planning is available at [http://eurlex.europa.eu/LexUriServ/site/en/com/2005/com2005\\_0607en01.pdf](http://eurlex.europa.eu/LexUriServ/site/en/com/2005/com2005_0607en01.pdf)

### 4.2.4 European Centre for Disease Prevention and Control

The European Centre for Disease Prevention and Control (ECDC) was established as an agency of the EC in 2005 to support improved control of communicable diseases in Europe. Its role is to identify, assess and communicate current and emerging threats from communicable diseases. Key tasks include epidemiological surveillance, networking of laboratories, coordinating early warning and response, examining scientific opinions, providing technical assistance and communications. The centre works with the EC, member states, other agencies and international organisations to perform these tasks. It also funds and guides the European Influenza Surveillance Scheme (EISS), a clinical and virological surveillance network which collects data and information from member states and so monitors human influenza activity in Europe, including during a pandemic.

ECDC influenza information is available at [www.ecdc.eu.int/Health\\_topics/influenza/Index.html](http://www.ecdc.eu.int/Health_topics/influenza/Index.html) and [www.eiss.org/index.cgi](http://www.eiss.org/index.cgi)

### 4.2.5 European Medicines Agency

The European Medicines Agency (EMA) is responsible for the protection and promotion of public and animal health through the evaluation and supervision of medicines for human and veterinary use. The agency would assess and authorise any new pandemic vaccine.

## 4.3 UK central government

The primary responsibility for developing preparedness plans for and an effective operational response to major emergencies in the UK rests with local organisations. However, given the national scale, complexity and international dimensions of a pandemic, strong central government coordination, explicit guidance and support will be critical at the planning and response phases.

### 4.3.1 Ministers and coordination of the response

A ministerial committee (MISC 32), comprising ministers from across central government departments and the devolved administrations, oversees and coordinates national preparations for an influenza pandemic. In the event of an increased threat (ie at WHO Phase 4 or above) and during the pandemic, the Government's dedicated crisis management mechanism – the Civil Contingencies Committee (CCC) – would be activated in support of the Department of Health. The CCC will direct central government activities, coordinate the wider response, make key strategic and tactical decisions on the countermeasures required and determine national priorities. The CCC will be guided by input from central departments and agencies and from local responders through Regional Civil Contingencies Committees (RCCCs) and the devolved administrations. It will work with the national News Coordination Centre to maintain public confidence. The Civil Contingencies Secretariat (CCS) is supporting the Department of Health as lead department in planning for a possible pandemic, in particular in coordinating cross-departmental planning. During a pandemic, the CCS would provide secretariat support to the CCC and would continue to provide the focus for cross-departmental coordination of the response. Parallel coordination arrangements are also in place in the devolved administrations.

## 4.4 Government departments

All government departments are directly or indirectly involved in preparing for an influenza pandemic and play an active role in informing and supporting contingency planning in their areas of responsibility. In the lead up to and during a pandemic, each remains responsible for its policy and business areas and for coordinating the response of its specific sectors.

Departments would also work with those sectors to maintain essential supplies and services, limit wider disruption and promote the continuation of everyday activity. In addition, departments and agencies are responsible for developing pandemic plans that consider the health and safety of their employees, ensure the continuation of their normal functions as far as practicable and include appropriate engagement with their stakeholders.

The following central government departments have specific roles in relation to pandemic preparedness and response. Each is also responsible for maintaining liaison with its devolved administration counterpart as appropriate to ensure consistency and coordination.

#### **4.4.1 UK health departments (directorates in Scotland) and Chief Medical Officers**

The Department of Health is the pre-designated lead government department to respond to an influenza pandemic. It also has overall responsibility for developing and maintaining the UK's contingency preparedness for the health and social care response; establishing national stockpiles of clinical countermeasures to support that response; maintaining liaison with international health organisations; and providing the information and guidance that other government departments, organisations and agencies need to develop their own plans and responses.

In the event of a pandemic, the Department of Health – in conjunction with the health departments (directorates in Scotland) of the devolved administrations – will initiate and direct the government health response, providing specialist advice and information to ministers, other government departments and responding organisations. It will also be responsible for the effectiveness of the health response, procuring a suitable vaccine, securing and distributing supplies of clinical countermeasures, maintaining international links to WHO and the ECDC, and leading and coordinating NHS activity in England. In order to provide a health focal point and reporting channel, the Department of Health will activate its major incident coordination centre in response to an increased international alert level. The centre will link with the NHS in England via strategic health authorities (SHAs), with the devolved administrations, the Health Protection Agency (HPA) and the CCC.

England's Chief Medical Officer acts as the UK Government's principal source of public health advice and information. Each of the devolved administrations also has a Chief Medical Officer and, working collaboratively, they will ensure a comprehensive and coordinated UK-wide public health approach. They will also give strategic and tactical health policy direction, form a central focal point for clinical advice and expertise, and provide leadership for health professionals and the NHS.

#### **4.4.2 Foreign and Commonwealth Office**

The role of the Foreign and Commonwealth Office (FCO) centres primarily on the safety and protection of British nationals living or travelling overseas. Advice on the potential for, and arrangements individuals should make in the event of, an influenza pandemic and what assistance nationals who are resident or

travelling can expect from UK missions is available through FCO mission websites or via personal correspondence to resident British communities overseas. The websites are updated regularly to reflect the latest information on the possible emergence of a human influenza pandemic.

Through its website, the FCO also takes the lead on issuing appropriate country-specific travel advice in consultation with the Department of Health, the HPA and the Department for Transport. This advice follows the WHO alert phases (section 5.4), wherever deemed to be appropriate and in line with ensuring the safety of British nationals. The FCO is also responsible for keeping other governments informed of disruption to key UK services – such as transport hubs – that may affect travel, business and trade during a pandemic.

#### **4.4.3 Department for International Development**

In conjunction with other government departments and aid donors, the Department for International Development (DFID) would activate emergency crisis response plans at WHO Phase 4. The overarching aims would be to support efforts to isolate and contain the outbreak, seek to prevent further outbreaks developing, identify the circulating virus strain and obtain samples for vaccine manufacture. DFID's major contribution would be in dealing with the humanitarian consequences, and response plans would be finalised once a coherent United Nations (UN) blueprint for an emergency response was in place. Options include:

- grant allocations to the UN, Red Cross and other non-governmental organisations (NGOs)
- support to the UN, Red Cross and other NGOs in the form of qualified technical personnel and/or the procurement and transportation of items to the affected region (often from the DFID stockpile, eg vehicles, blankets, food and medical supplies)
- advocacy and information.

#### **4.4.4 Department for Environment, Food and Rural Affairs**

The Department for Environment, Food and Rural Affairs (Defra) is the lead government department for food supply, water quality and supply, environmental issues, waste management, rural communities, animal health and welfare, and the farming and fishing industries in England. It works with these sectors to explore options for minimising the impact of a pandemic and to develop business continuity measures.



During a pandemic it would act as an intermediary between those sectors and the central response – facilitating the flow of information, monitoring the pandemic's impact through regular reporting and dialogue, and liaising with other government departments, national and international agencies and the sectors themselves to implement response measures and to ensure that key issues are raised at the appropriate forums.

Defra monitors influenza viruses in the animal reservoir, including assessing their potential impact on livestock, poultry and other animals. As some of these data may have relevance for public health protection, they are shared routinely through collaborative working between medical and veterinary laboratories (see section 5.3.4). Some influenza viruses can pass between humans and animals (notably pigs); Defra will assess the risk of the new human pandemic strain and prepare advice for reducing the risk of virus dissemination in the animal population, as appropriate.

#### **4.4.5 HM Treasury**

HM Treasury is responsible for monitoring and evaluating the economic impacts of a pandemic and, as part of the tripartite authorities (HM Treasury, the Financial Services Authority and the Bank of England), shares responsibility for maintaining financial stability in the UK. The authorities have been working with the financial sector – firms, infrastructure providers and overseas financial regulators – to ensure that the financial sector is prepared to deal with the consequences of a pandemic.

#### **4.4.6 Department for Transport**

The Department for Transport (DfT) works with all transport operators to ensure that they are aware of the implications of pandemic influenza, what it means for business continuity plans and the Government's assessment of risk, and to ensure that facilities and communication channels are in place to meet any additional requirements that may be placed upon them. DfT will consider taking measures to relax regulations, such as the rules governing drivers' hours, if this proved necessary in order to maintain essential services during a pandemic.

#### **4.4.7 Department for Business, Enterprise and Regulatory Reform**

The Department for Business, Enterprise and Regulatory Reform is working closely with the fuel, energy, telecommunications and postal services sectors to ensure that they recognise the impact a pandemic would have on the UK and to factor this into their business continuity plans so that any disruption to consumers is minimised. Should it become necessary, the Department and the

industry, in consultation with other stakeholders, would introduce a range of measures to ensure the maintenance of essential supplies and services.

#### **4.4.8 Department for Children, Schools and Families**

The Department for Children, Schools and Families (DCSF) is the lead government department for schools and for services to children, young people and families in England. It works with partners in these sectors (local authorities, schools, private and third sector providers of children's services and others) to help them develop business continuity plans and explore options for minimising the impact of a pandemic. DCSF's predecessor, the Department for Education and Skills (DfES), issued planning guidance to partners in all sectors, and DCSF will review this regularly and keep partners informed. DCSF's priority in a pandemic would continue to be the wellbeing of children and young people. In a pandemic, DCSF would work with its key partners such as local authorities and various national organisations to ensure effective communication with frontline providers.

#### **4.4.9 Department for Innovation, Universities and Skills**

The Department for Innovation, Universities and Skills (DIUS) is responsible for adult learning, further and higher education, skills, science and innovation – work previously looked after by both DfES and the Department of Trade and Industry (DTI). DIUS works with partners in these sectors to encourage them to develop and maintain business continuity plans and explore options for minimising the impact of a pandemic. The DfES issued planning guidance to partners in higher and further education in 2006, and DIUS will keep this guidance under review, and keep partners informed. In a pandemic, DIUS would work with representative bodies for the sectors for which it is responsible to ensure effective communication with frontline providers.

#### **4.4.10 Ministry of Defence**

During a pandemic, the Armed Forces' priority will continue to be to maintain critical military operations. As their own personnel will be equally vulnerable to illness, they may have little or no spare resource to provide military assistance to civilian authorities. Plans should not assume that local military units would provide support or have personnel available with either the requisite skills or equipment to perform specialist tasks.

### **4.5 Specialist advice**

Chief Medical Officers will receive specialist advice on the health response from the UK National Influenza Pandemic Committee, which consists of clinical,

scientific and other experts drawn from a range of relevant organisations and agencies. The Government's Chief Scientific Adviser, the Government Office for Science, the Scientific Advisory Group and other expert committees inform and support this work.

## 4.6 Health protection agencies

The Health Protection Agency (HPA) in England – working in conjunction with its equivalent public health organisations in the devolved administrations – is the lead agency responsible for providing public health advice to the Department of Health and supporting all aspects of the public health response to an influenza pandemic. The HPA has a key role in international and national surveillance and intelligence gathering, informing public health policy development, contributing to global efforts to prevent or detect the emergence of a new virus and supporting NHS planning at all levels. In any period of heightened alert and as a pandemic develops, the HPA will provide the following specialist health protection services:

- reference virological and microbiological services
- coordination of and advice on the investigation and management of early cases and contacts
- detailed epidemiological data on the emerging virus (from WHO Phase 4 to UK alert level 2) and aggregate data thereafter
- data for national decisions such as choice of vaccine or antiviral strategy
- expertise, advice and operational support to the NHS through local and regional teams
- coordination of the collection and publication of UK-wide influenza surveillance data
- a real-time modelling capability.

## 4.7 Devolved administrations

The devolved administrations are responsible for the major areas of pandemic influenza planning and response in their respective countries.

### 4.7.1 Northern Ireland

Northern Ireland has an integrated system for the delivery of health and social services. The Department of Health, Social Services and Public Safety (DHSSPS) sets the strategic direction and allocates the annual budget for health and

personal social services. Responsibility for commissioning services lies with four health and social services boards (HSSBs), each covering defined geographical areas of the province and currently coterminous with a number of district councils. Responsibility for delivery of services lies with five trusts, which currently provide hospital-based services or community services (or a mixture of both), and a single ambulance trust.

The 'proper officer' function is currently the responsibility of each of the four Directors of Public Health in their HSSB area. In practice, this function may be devolved by the Director of Public Health to a consultant in communicable disease control, who will be a member of the public health team in their area.

The DHSSPS takes the lead in regional contingency planning for pandemic influenza and is represented in national UK pandemic planning structures by its senior medical officer/consultant epidemiologist with lead responsibility for communicable diseases. Pandemic planning work is progressed through a core DHSSPS pandemic planning group, which has a number of sub-groups that mirror those at national level. Each sub-group is charged with taking forward various streams of work. Each HSSB and health and social care trust has identified 'flu leads', who meet regularly as a group and oversee planning for their respective organisation.

Planning for the non-health aspects is coordinated across Northern Ireland government departments and other key organisations by the Civil Contingencies Group, Northern Ireland (CCG (NI)), chaired by the Office of the First Minister and Deputy First Minister (OFMDFM) through a Pandemic Influenza Sub-group and a Pandemic Fatalities Management Sub-group. Departments liaise closely with key stakeholders within Northern Ireland and with equivalent departments in the rest of the UK. The Civil Contingencies Policy Branch within OFMDFM is also represented on the UK MISC 32 Pandemic Working Group, and CCG (NI) provides regular updates on planning to the Head of the Northern Ireland Civil Service and Permanent Secretaries Group.

Northern Ireland shares a land border with the Republic of Ireland, and Northern Ireland departments maintain liaison with their opposite numbers in the Republic of Ireland to ensure that pandemic influenza planning issues are discussed and coordinated as far as possible.

#### **4.7.2 Scotland**

The Scottish Government's Cabinet Sub Committee – Scottish Executive Emergency Room (SEER) – keeps the Scottish Government's policy for managing the consequences of major disruptive incidents in Scotland under review and oversees pandemic planning.

At official level the Scottish Government's pandemic influenza preparedness work programme is managed by the Pandemic Review Group. This group, chaired by a senior official from the Justice Directorate, brings together policy leads from across the Scottish Government. The Scottish Emergencies Coordinating Committee's Sub-Group for Pandemic Influenza (SECC Flu) acts as a wider network, and also includes representatives of responder organisations.

Non-health preparations have focused on two areas: business continuity planning and corporate consequence management. Business continuity planning has been targeted at Scottish Government directorates, agencies and key stakeholders, with the onus on directorates to take work forward in their area of responsibility. Corporate consequence management work has mainly involved health, justice, finance, legal, transport and communications.

At local level, a multi-agency approach to planning is facilitated through the Strategic Coordination Groups (SCGs).

The Scottish Government Health Directorate is responsible for developing and implementing health policy, delivering healthcare services – including public health and health protection – and allocating resources. It carries out these tasks under the Cabinet Secretary for Health and Wellbeing, who is accountable to the Scottish Parliament. Healthcare services are delivered through 14 territorial NHS boards and seven special health boards. Area boards in a single healthcare system are statutorily responsible and accountable for the health of their population and the planning and delivery of services in their area, working with partner agencies such as the local authorities, police services and others.

At a very local level, community health partnerships exist to ensure that more integrated, community-based healthcare – including public health, health protection and other care services – is delivered across Scotland. These work in substantive partnership with local authorities and other key partners such as the specialist, voluntary and independent sector, to plan and deliver joint services devolved to them by the NHS Boards.

### 4.7.3 Wales

The Wales response to a pandemic aims to build on existing arrangements for managing any national emergency. A Pan-Wales Response Plan sets out the structure and recognises that the management of a pandemic will need to be in accordance with decisions made by Welsh Assembly ministers and by the UK Government.

Key elements of the Assembly's response include:

- the First Minister's Ad-Hoc Group, which will maintain policy oversight of the response

- the Wales CCC, which will manage the consequences of a pandemic, co-opting representatives of such services as the National Public Health Service Wales (NPHSW), police and the Wales Local Government Association
- an Emergency Coordination Centre Wales (ECCW), which will be established in Cardiff and linked to the NPHSW coordination centre, and a health advisory team will be established by NPHSW to provide public health advice to the Assembly and local responders
- Local Resilience Forums (LRFs), which will meet as local SCGs.

Pandemic planning integrates Welsh Assembly and UK Government arrangements with those at local level. The Welsh Assembly Government (WAG) is represented on UK groups at official and ministerial levels. The Pan-Wales Response Plan sets out arrangements for managing the consequences of any national emergency, and the *Wales framework for managing major infectious diseases* provides strategic guidance to the NHS and partner organisations. At local level, a multi-agency approach to planning is facilitated through the LRF structure.

Key elements of the planning structure include:

- the Wales Resilience Forum providing a national multi-agency overview of pandemic preparedness
- a designated senior director coordinating the WAG response (at official level)
- the Chief Medical Officer (Wales) chairing an influenza steering group comprising professional and policy leads to take strategic decisions about public health management and use of medical countermeasures appropriate to Wales
- LRFs addressing local requirements.

## 4.8 Health planning and response in England

At the operational level, planning and response in the health sector in England is delivered at regional and local levels through the following key players.

### 4.8.1 Directors of Public Health for the English regions

The Department of Health's Directors of Public Health for the English regions (who also act as the Directors of Public Health for the corresponding SHA) will play a key part in ensuring a strong public health input into contingency planning for an influenza pandemic at regional level. In their SHA role, they will also encourage, support and monitor local health planning and provide a public health focus should those plans be implemented.

#### 4.8.2 Strategic health authorities

SHAs act as the regional headquarters of the NHS. In the event of an influenza pandemic, it is anticipated that some central decision-making powers – including decisions on service priorities and suspension of targets – will be delegated to them. SHA decisions will need confirmation by the Department of Health, which will also discuss any effect on annual health checks with the Healthcare Commission and liaise with Monitor where there is an impact on foundation trusts.

SHAs provide a critical link to their respective regional Government Offices and, through designated pandemic influenza coordinators, ensure the development, maintenance and testing of effective and integrated health response plans across their areas. During a pandemic, each will also coordinate the strategic response across its health economy, be responsible for the general oversight and coordination of the delivery of healthcare and ensure the most effective deployment of available resources. SHAs will also provide health advice and information to RCCCs, act as reporting links to the Department of Health, collate and forward monitoring information, provide a communications link and support media handling and the provision of public information.

#### 4.8.3 Primary care trusts

Primary care trusts (PCTs) are responsible for assessing local risk and for commissioning, supporting and monitoring the development of integrated health response plans. They are also responsible for developing arrangements to maintain and support patients in a community setting and for ensuring that health plans take account of the needs of military bases, prisons or other establishments that may require specific planning in their area. Through designated pandemic influenza coordinators, PCTs provide a health input to LRFs, coordinate plans with those of neighbouring authorities and ensure that social care and other key partners – including private sector care and support service providers – are fully involved.

In the event of a pandemic, PCTs will coordinate and oversee the local health response and mobilise general practice and primary care resources. They will also provide advice and public information, collate and report operational information to the SHA, act as the health link with local SCGs (and with RCCCs via SHAs) and make contingency arrangements for the distribution or collection of antiviral medicines and delivering population-wide vaccination if required.

#### 4.8.4 Foundation and other hospital, primary care and specialist health trusts

Foundation and other hospital trusts, primary care trusts and specialist health trusts are directly responsible for the provision of a wide range of health

services. Those organisations should support local planning and develop their internal contingency arrangements for responding to the additional demands whilst maintaining essential healthcare throughout an influenza pandemic. Plans should pay particular attention to the projected requirement for significant surge capacity, increased demand for specialist beds, patient transport, support to maintain patients in community settings, redeployment of staff at short notice, staff protection and strict infection control.

#### **4.8.5 Health Protection Agency**

The Health Protection Agency will provide advice and, where appropriate, operational support to health responders. More detail is provided at section 4.6.

### **4.9 NHS Direct/NHS Direct Wales/NHS 24**

Demand for health advice and information is likely to increase significantly during a pandemic. NHS Direct and its equivalents in the devolved administrations will continue to play an important role in providing health advice and information through their normal telephone numbers, the NHS Direct Online website [www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk) and NHS Direct Interactive on digital satellite television, thereby alleviating pressures on other parts of the system.

In the event of the pandemic threat increasing, the Government will also activate a National Flu Line service from WHO Phase 5. Initially the service will provide advice, updated information and access to literature. At UK alert level 2 (WHO Phase 6) the service will expand to provide rapid assessment and where necessary access to antiviral treatment for symptomatic patients (see sections 9.8.1 and 10.7).

### **4.10 Regional and local planning/response – wider aspects**

Planning and response at regional and local government level will focus on wider aspects, including support of the health response, the maintenance of social care and other essential local services and managing potentially large numbers of deaths. Central–local reporting and coordination arrangements are outlined in Figure 2.

Generic response arrangements at regional and local level are set out in detail in *Emergency Response and Recovery*, which is available at [www.ukresilience.info/ccact/errpdfs/emergresponse.pdf](http://www.ukresilience.info/ccact/errpdfs/emergresponse.pdf)



#### 4.10.1 Regional resilience tier (England)

Government Offices represent central government in the English regions. Each has established a Regional Resilience Team and formed a Regional Resilience Forum, allowing key responders to plan together and improve the coordination and flow of information across and between regions and the centre. In response to wide-scale civil emergencies such as an influenza pandemic, RCCCs are likely to be established. Working closely with SHAs, the RCCCs would collate a regional picture of the evolving situation, provide an information channel between central (CCC in the Cabinet Office Briefing Room) and local tiers, identify issues that cannot be resolved locally, facilitate mutual aid, coordinate wider response efforts, advise on priorities, monitor progress and minimise disruption. RCCC members are likely to be drawn from the Regional Resilience Forums. Specific planning and response arrangements have been established for London and in the devolved administrations.

#### 4.10.2 Local level

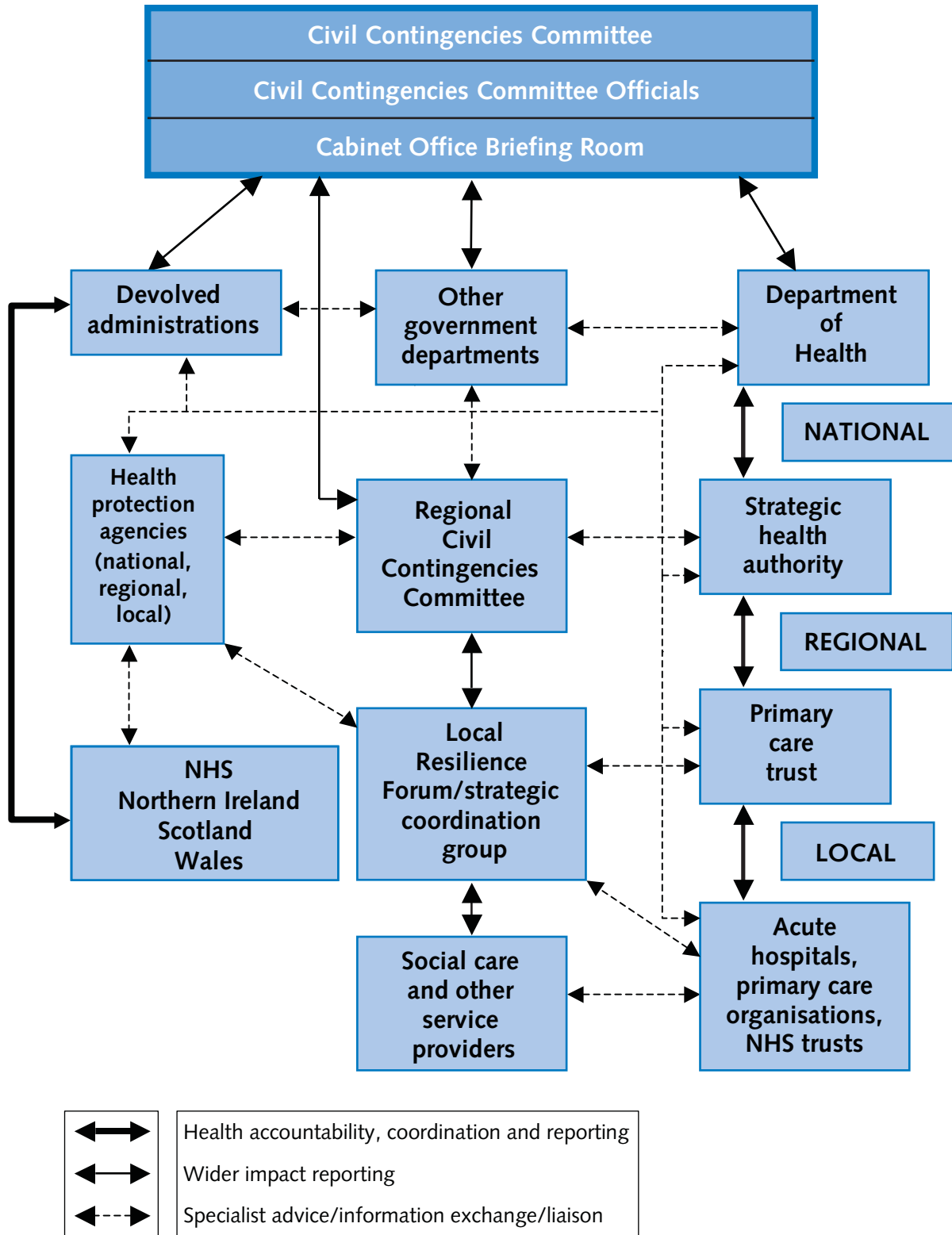
The LRF is the principal mechanism for the coordination of multi-agency planning at local level. Its membership includes all Category 1 responders (such as emergency services, local authorities and health bodies) which are subject to a range of civil protection duties under the Civil Contingencies Act 2004. In London, local influenza pandemic committees feed in at the RCCC level.

In the event of a pandemic influenza outbreak, it is likely that SCGs will be convened. The purpose of the SCG is to take overall responsibility for the multi-agency management of an outbreak at local level, working closely with PCTs. Membership of the SCG is likely to mirror the Category 1 membership at the LRF.

Local authorities play an important supporting role in planning for and responding to a pandemic influenza outbreak. They have responsibility for a wide range of functions including social care and children's services and crucially exercise a community leadership role. Additionally, in the event of an emergency that exceeds existing mortuary provision, the local authority will liaise with the coroner's office to provide emergency mortuary capacity.

As most influenza sufferers will need to be cared for in a community setting, developing integrated health and social care plans is a particularly important part of local planning. In addition, sustaining the provision or commissioning of a range of services on which many vulnerable people rely, including residential and nursing homes, is also important.

Figure 2: Central–local reporting/coordination arrangements



## 4.11 Other key contributors in planning/response

### 4.11.1 Voluntary sector organisations

Voluntary organisations offer a wide range of skills and experiences, and their membership often includes retired professionals. Many are routinely engaged in the provision of services to very vulnerable sections of the community and will therefore need to develop their own service continuity arrangements for a pandemic. Some also respond to emergencies as an integral part of their role and have personnel, expertise and facilities that could assist in providing surge capacity and support for statutory responders. Each can offer specific contributions, including providing social support to maintain sufferers in a community setting; assisting those experiencing stress, anxiety and grief; staffing telephone help-lines; or supplementing healthcare resources. Although voluntary aid assistance is generally coordinated and activated through local authorities, direct engagement between voluntary agencies and statutory providers in developing response plans will encourage realistic expectations, foster mutual understanding, identify training/protective requirements and avoid the risk of double counting. Organisations benefitting from the support of volunteers will need to ensure that they have adequate briefing, training, skills, personal protection and indemnity for the role that they are expected to perform.

### 4.11.2 Private sector organisations

Private sector organisations are increasingly responsible for the provision of many essential services, including the manufacture, supply and distribution of items critical to the response to an influenza pandemic and to minimising its social and economic effects. Planning to ensure the maintenance of supplies and services for as long and as far as that is possible is an essential part of developing effective response arrangements. Sector-specific emergency arrangements to build resilience and develop effective response frameworks are already required, and plans are in place in most key sectors. Those frameworks should recognise the unique nature of the disruptive challenges that an influenza pandemic is likely to present. A wider community of industrial and commercial organisations also plays a direct role in maintaining social normality and will want to minimise potential losses from disruption to business and promote a return to normality as soon as possible.

### 4.11.3 Employers, trade unions and other staff or professional associations

Working together, employers, trade unions and other staff or professional associations have a significant role to play in preparing for and responding to a pandemic and maintaining business continuity by educating and informing the

workforce, promoting measures that reduce the spread of infection, helping to maintain essential services and minimising social disruption.

#### **4.11.4 Community networks**

A pandemic would have significant impacts on local communities across the UK. Its course will be determined not only by what the Government does or the effectiveness of the health response, but also by the actions of a wide range of others as organisations, individuals and communities. Building and maintaining public confidence is a critical success factor. Through their leaders, well-prepared and informed communities will play a major role in supporting the planning for, response to and recovery from an influenza pandemic. Community networks can be particularly effective in such areas as disseminating information, supplying advice and reassurance, identifying those who may be at particular risk and providing support to the vulnerable. Such organisations should therefore be actively involved in developing and testing response plans.

#### **4.11.5 Individual and social responsibility**

Every part of society must prepare for a pandemic and will be part of the response. However well plans are prepared and implemented, their overall effectiveness will ultimately depend on the cooperation of individuals and their willingness to follow advice, take personal responsibility for their health and accept social responsibility for supporting each other. Plans must ensure that people's expectations of services in a pandemic are realistic and, if they are being asked to take increased risks or face increased burdens, that they are supported in doing so and that those risks and burdens are minimised as far as possible.

In inter-pandemic years, individuals should keep themselves informed, practice good hygiene habits and ensure that they are routinely vaccinated against seasonal influenza and pneumonia if they have been identified as being in a high-risk group. Should the threat increase, they should follow public health advice and consider how they and their dependants might prepare for such socially disruptive effects as potential school closures, shortages and travel constraints. Where possible, individuals should take active steps to put in place self-help measures in case of influenza and to ensure continuing care for any existing health conditions. They should also ensure that they have supplies of normal home remedies and other basic necessities, explore the potential for support from family and friends not resident with them ('flu friends') and consider how they might be able to assist others.

In the pandemic alert and pandemic stages, increased fear and apprehension are natural and individuals should listen carefully to government advice and instructions made available in the media, on the internet and in printed material. They should also familiarise themselves with local arrangements for accessing health and social care support – including antivirals – and follow public health advice and instructions. It is particularly important that anyone suspecting influenza-like symptoms should stay at home if ill and make telephone contact with health services through the National Flu Line service, rather than attending surgeries, hospitals or other health establishments.

# 5 Preparing for a pandemic

## 5.1 The critical need for pre-planning

The periods between previous influenza pandemics have varied widely and the fact that nearly 40 years have elapsed since the last should not induce complacency. As it is probable that another pandemic will emerge, spread rapidly and result in grave consequences, robust and resilient preparations are essential. The Civil Contingencies Act 2004 and its accompanying non-legislative measures provide a single framework for civil protection, and resilience forums have been established to coordinate, develop and maintain links between partner agencies and coordinate planning at regional and local level. These forums provide an effective mechanism for developing integrated plans for all major threats, including pandemic influenza. A phased approach allows for a step-wise escalation of planning and responses, proportionate to the risk at any particular time.

Further information on the Civil Contingencies Act and regional and local resilience arrangements can be found at [www.ukresilience.info/ccact/index.shtm](http://www.ukresilience.info/ccact/index.shtm)

## 5.2 International collaboration

An influenza pandemic is by definition an international event expected to affect most countries. International collaboration offers the best opportunity for early warning, mitigating the impact and gaining public confidence in the response through:

- sharing information and research
- rapid identification and alerting
- timely surveillance to monitor international spread
- sharing epidemiological information to inform national policies
- achieving coherent – though not necessarily harmonised – national responses and public information for use before and during a pandemic
- considering the effects of national policies on neighbouring and other countries.

The UK will continue to develop and strengthen its international networks, working with the World Health Organization (WHO), the European Union (EU) and other bilateral and multi-national groups. In particular, the UK will:

- work to improve WHO and EU influenza surveillance
- support the UK-based WHO Collaborating Centre
- work within the framework of the International Health Regulations

- work collaboratively to develop and support the work of the European Centre for Disease Prevention and Control in improving the detection and control of communicable diseases in Europe
- work to improve the EU Early Warning and Response System (EWRS) and the mechanisms for sharing information between member states
- support research and the development of countermeasures, including vaccines.

### 5.3 National arrangements for early detection and alert

During the inter-pandemic period, clinicians and the public need to remain vigilant in order to identify individuals with unusual influenza or other respiratory virus infections – whether arising in the UK or imported from elsewhere. This must be supported by the laboratory capacity and capability to identify a new virus promptly. Close collaboration with animal health surveillance is also required to assess the risks of a new mammal or bird influenza virus crossing species and, if possible, take steps to prevent that occurring.

#### 5.3.1 Clinical recognition

The Health Protection Agency (HPA) maintains WHO phase-specific algorithms on its website for the investigation, management and reporting of those patients of whom clinicians and virologists should maintain heightened awareness – those patients who are more likely to acquire or import novel influenza viruses. These would normally include patients with respiratory illnesses who have recently returned from an area affected by outbreaks of a novel virus in animals or humans; poultry workers; contacts of people with known avian influenza; or people who have been in contact with unusual outbreaks of respiratory disease, for example in a healthcare setting. Decisions on whether (and how) to investigate such patients should be taken in consultation with the local health protection unit. As alert levels increase, the Department of Health will reinforce the need for heightened awareness and provide relevant information to health professionals and the public.

#### 5.3.2 Laboratory diagnosis

The UK has a network of regional laboratories capable of providing a specialist diagnostic service for influenza A, influenza B and a specified potential pandemic influenza subtype (currently H5). Any new or unusual virus is sent to the National Influenza Reference Laboratory at the HPA Centre for Infections in Colindale for detailed characterisation. The Centre for Infections will also develop diagnostic reagents if necessary, validate any new diagnostic tests, roll

out new tests as appropriate, and undertake antiviral susceptibility testing. The HPA will immediately inform the Department of Health if a new influenza virus from a human infection is confirmed.

### **5.3.3 Capacity and capability**

Should it be required, the HPA Centre for Infections will be able to draw on the expertise, resources and containment facilities of the HPA Centre for Emergency Preparedness and Response, including the Special Pathogens Reference Unit.

### **5.3.4 Liaison with veterinary laboratories**

The National Influenza Reference Laboratory and the Veterinary Laboratories Agency maintain links to ensure a continuous flow of new knowledge about the epidemiological, biological and genetic characteristics of influenza viruses.

## **5.4 WHO international phases and UK alert levels**

WHO has defined phases in the evolution of a pandemic (see Table 3) which allow for a step-wise escalation in planning and response that is proportionate to the risk from first emergence of a novel influenza virus. WHO will inform its member states of any change in the alert phase, and this classification is used internationally. If a pandemic were declared, action would depend on whether cases had been identified in the UK and the extent of spread. For UK purposes, four additional alert levels have therefore been included within WHO Phase 6; these are consistent with those used for other communicable disease emergencies.



**Table 3: WHO international phases and UK alert levels**

Phase	WHO international phases	Overarching public health goals
<b>Inter-pandemic period</b>		
1	No new influenza virus subtypes detected in humans	Strengthen influenza pandemic preparedness at global, regional, national and sub-national levels
2	Animal influenza virus subtype poses substantial risk	Minimise the risk of transmission to humans; detect and report such transmission rapidly if it occurs
<b>Pandemic alert period</b>		
3	Human infection(s) with a new subtype, but no (or rare) person-to-person spread to a close contact	Ensure rapid characterisation of the new virus subtype and early detection, notification and response to additional cases
4	Small cluster(s) with limited person-to-person transmission but spread is highly localised, suggesting that the virus is not well adapted to humans	Contain new virus or delay its spread transmission to gain time to implement preparedness measures, including vaccine development
5	Large cluster(s) but person-to-person spread still localised, suggesting that the virus is becoming increasingly better adapted to humans	Maximise efforts to contain or delay spread, to possibly avert a pandemic and to gain time to implement response measures
<b>Pandemic period</b>		
6	<p>Increased and sustained transmission in general population</p> <p><b>UK alert levels</b></p> <p>1 Virus/cases only outside the UK</p> <p>2 Virus isolated in the UK</p> <p>3 Outbreak(s) in the UK</p> <p>4 Widespread activity across the UK</p>	Minimise the impact of the pandemic

## 5.5 Inter-pandemic period (WHO Phases 1–2)

The inter-pandemic years have provided opportunities to improve knowledge, refine policies, build capacity and prepare for the likely emergence of an influenza pandemic. Work has also focused on contributing to multi-national efforts to reduce the opportunities for a new influenza virus to emerge, developing capability for effective surveillance and detection in every country, and improving domestic preparations in all sectors to address the threat.

Scientists believe that it is highly probable that the next pandemic will emerge from an animal reservoir. Expanding and improving coordination and cooperation between the organisations responsible for human and animal health has therefore remained an important objective. Through the Department for International Development and the Department for Environment, Food and Rural Affairs, the Government has been working with international agencies to support a range of veterinary and social strategies – in particular improved animal husbandry, veterinary control and education – in potential source countries to strengthen veterinary and human health services related to the control of avian influenza. The Government has also supported WHO and EU initiatives to improve the capacity to detect and monitor the emergence of a novel virus in those parts of the world with poorly developed health surveillance systems.

Domestic preparations have focused on developing surge capacity in health and social care, and preparing measures to ensure wider business continuity and maintain essential services and supplies in a pandemic scenario. Health priorities include the management of seasonal influenza; facilitating arrangements for the rapid development, manufacture and supply of a specific vaccine; maintaining adequate supplies of essential pharmaceutical and other materials; developing an ethical framework to underpin planning; and improving hygiene awareness amongst the general population. Regular joint reviews, testing and exercising of business continuity and response plans across all sectors have been critical to the development and robustness of UK arrangements throughout this period.

## 5.6 Pandemic alert period (WHO Phases 3–5)

As international phases change, the Government will monitor developments, reassess national risk and review preparedness arrangements at all levels across each sector. The general aim is to accelerate, consolidate and test preparedness efforts before Phase 4, and to be fully prepared to initiate and implement response actions during any phase thereafter.

The initial UK response depends significantly on the location of an incident or outbreak and the extent of travel or trade connections with that region. Should

a case, cases or outbreak originate in the UK, the overriding priority will be to halt, limit or slow the spread. If outside the UK, the priorities would include:

- supporting the efforts of WHO and governments to limit or control the spread of infection
- maintaining international liaison
- providing advice and information to UK citizens abroad
- initiating domestic measures to increase vigilance, and alerting the NHS to look for and investigate any illness that might be due to the virus in the UK
- reviewing the likely efficacy of any possible travel or other restrictions, and making UK policy clear
- contributing to vaccine research and development
- securing access to vaccine supplies, other pharmaceuticals and non-consumable supplies as they become available
- providing information that builds public awareness and understanding
- preparing to implement all response arrangements.

During Phase 4, all organisations should review their business and service continuity arrangements, consider initiating measures to enhance and preserve essential supplies, and finalise plans for pre-distribution of any stockpiled items. Expert groups will convene to review emerging information, provide advice on adjustments in response strategies and make recommendations in respect of optimal clinical practices. Steps to prepare and inform the public will be accelerated, with particular emphasis on enhancing understanding, explaining the likely issues and limitations, describing how essential services will respond, and advising people on self-help and community help. Information messages will also emphasise the importance of staying at home if ill, taking sensible precautions, adopting good hygiene habits and identifying friends or relatives who may require or be able to provide assistance and support during the pandemic.

During Phase 5, response plans must be ready for instant implementation and activated when required. National and local coordination and communication arrangements may be activated, the National Flu Line service established and arrangements for the development and supply of a specific vaccine reviewed. Health departments (directorates in Scotland) will be monitoring the development and emerging epidemiology of the pandemic, and considering proportionate response measures – including the implementation of service restrictions to allow healthcare organisations to finalise preparations, adjust working practices and

release capacity in preparation for a pandemic. Advertising campaigns and a door-to-door leaflet drop will be implemented; the messages will emphasise that people should maintain essential activities as far as possible and will explain how services will operate and how they should be accessed. There will be particular emphasis on the fact that symptomatic patients should stay at home if ill and seek assistance via the National Flu Line service.

## **5.7 Preventing a pandemic's initial development**

Theoretical modelling suggests that it may be possible to contain (or at least slow) the spread of infection from rural parts of the country of origin at the source – provided that the virus is detected early, area quarantine and stringent social distancing measures are quickly applied, and prophylactic antiviral medicines are given promptly to the 50,000 people nearest to the original source. WHO has established an antiviral stockpile for this purpose, but the success of such measures depends critically on early detection and the effectiveness of local planning and response in parts of the world where such systems are not well developed. Although these continue to improve, there can be little certainty that a containment policy would succeed. Even if the measures fail to contain the outbreak completely, they might delay the spread by about a month, giving others more time to prepare.

Should the virus originate in the UK, rapid detection, isolation and treatment of sufferers, the application of stringent containment measures and the use of antiviral prophylaxis for all close contacts may possibly contain or limit its spread. However, if the virus enters the UK through travellers from infected areas, such internal containment efforts are considered unlikely to succeed due to the large number of initial contacts expected.

# 6 The pandemic period

## 6.1 Declaring a pandemic

The World Health Organization (WHO) will inform the Department of Health of any change in alert levels, usually after international consultation. The Department of Health will communicate this information, together with an assessment of risk to the UK, to the devolved administrations, other government departments, the NHS, healthcare professionals, the public and relevant organisations. The Department of Health will also notify responders of the relevant UK alert level, informed by surveillance information from the Health Protection Agency (HPA).

## 6.2 UK alert levels 1–4 (WHO Phase 6)

The UK response during an influenza pandemic has the following major elements:

- monitoring its emergence, spread and the impact/effectiveness of interventions
- slowing and limiting the spread of disease
- the targeted use of available pre-pandemic vaccine stocks
- ensuring that those who are vulnerable or affected receive appropriate treatment and care
- maintaining business/service continuity and social order
- dealing with additional deaths
- ensuring that all involved in the response, including the public, are consistently well informed
- wider vaccination as pandemic-specific vaccine supplies become available.

## 6.3 UK alert level 1 (no cases in the UK)

### 6.3.1 Planning

At this heightened alert phase all organisations need to review and test their response plans and operational arrangements again, paying particular attention to staffing, logistics and supply issues.

### 6.3.2 Health and social care response

The health and social care response at this stage will be an extension of activity at Phase 5, but with the certainty that the UK will be affected. This stage could

last between two and four weeks or longer, during which time heightened public concern, suspected cases and false alarms can be anticipated before the virus actually reaches the UK. All organisations therefore need to be prepared for that demand and ensure that it does not detract from steps to maintain core services and finalise preparations for the arrival of the pandemic.

### **6.3.3 Public information**

Public information messages will acknowledge concerns whilst preparing the public for the imminent arrival of the pandemic, provide advice on the response measures and encourage those who are well to adopt sensible precautions and preparations, but continue to attend work and undertake other essential activities.

## **6.4 UK alert level 2 (virus isolated in the UK)**

This level is anticipated to last about two weeks, until cases are occurring in all major centres of population in the UK.

### **6.4.1 Planning**

Public and private sector organisations need to focus on essential activities, implementing pre-planned measures to maintain core service/business continuity and adjusting activity levels to cope with additional demand and allow for potential disruption.

### **6.4.2 Health and social care response**

As suspected cases occur in the UK, public health priorities will be to:

- investigate cases and contacts promptly to confirm or refute the diagnosis at the earliest possible time
- provide appropriate care
- apply measures to control/slow the spread of infection
- collect sufficient epidemiological and virological information to refine projections and inform public health and clinical management policies. (The HPA will maintain a central database on the first few hundred cases for this purpose.)

### **6.4.3 Public information**

Anyone who is ill and suspects they may have influenza-like symptoms will be advised to stay at home, contact the National Flu Line service, inform a relative

or friend and if necessary ask them to collect their antiviral medicines. Otherwise, the overall aim will be to maintain normal services and continue social and economic activities for as long and as far as that is possible. Personal and respiratory hygiene messages will be reinforced ahead of an escalation to UK alert level 3.

## 6.5 UK alert level 3 (outbreak(s) in the UK)

### 6.5.1 Planning

By the time outbreaks are occurring in centres of population, preparatory steps should have been completed. National and local response measures should be implemented proportionately as the pandemic spreads. National priorities will include:

- reviewing/revising the response strategy
- coordinating the implementation of response measures
- monitoring the initial adequacy and effectiveness of response measures
- maintaining antiviral, antibiotic and other essential pharmaceutical and clinical supplies
- maintaining public communications.

### 6.5.2 Health and social care response

As the pandemic becomes established, health priorities will include:

- ensuring that patients have access to appropriate assessment, treatment and care, including rapid access to antiviral medicines for those with symptoms compatible with pandemic influenza
- adapting health and social care services to ensure that the maximum amount of surge capacity is available in primary and secondary care in anticipation of additional demand
- implementing and maintaining staffing contingency plans
- ensuring that infection control measures are strengthened in all health and social care settings.

### 6.5.3 Public information

In addition to reinforcing previous public messages and providing advice and general information, local information and advice on service provision, any school closures, and restrictions or other countermeasures should be available.

## 6.6 UK alert level 4 (widespread activity across the UK)

It is anticipated that activity will rise to a peak across the UK about seven weeks from the first recognition of cases, following the pattern described. Initially, all organisations should monitor the impact on their service or business against planned expectations in order to modify responses appropriately, if necessary.

### 6.6.1 Planning

National priorities are to:

- monitor the spread and impact (including deaths), refine projections, review response effectiveness, and adapt strategies and tactics accordingly
- maintain essential services and supplies and critical infrastructure
- minimise social disruption
- identify unexpected impacts or problems.

Many services are likely to be under increased pressure, particularly from staff absences and possibly from disruption of supplies. Some, including health and social care organisations and funeral directors/burial services, will experience rapidly escalating demand as the pandemic evolves.

### 6.6.2 Health and social care response

Priorities include:

- surveillance – the HPA will have moved from detailed to aggregate reporting of cases by geographic region together with assessment of the efficacy of antiviral medicines (and, if relevant, vaccine), monitoring of the cause and antimicrobial susceptibility of bacterial complications, and reviewing the clinical effectiveness of the response
- providing health and social care advice and information.
- monitoring antiviral consumption against expected use and adapting policies accordingly
- monitoring and responding to pressures on health and social care services, maximising the effective use of the capacity available, supplementing staffing, maintaining essential care for those who are suffering from other emergencies or illness, conserving essential supplies and maintaining services
- developing a specific vaccine and securing UK supply.



## 6.7 End of the first wave: preparing for subsequent waves

A single-wave pandemic profile with a sharp peak provides the most prudent basis for planning, as that would put a greater strain on services than a lower-level but more sustained wave or the first wave of a multi-wave pandemic. However, second and subsequent waves have occurred in some previous pandemics, weeks or months after the first. Whilst the priority at the end of the first wave will be to further develop recovery plans and gradually restore supplies, services and activities depleted or curtailed during the pandemic, plans must assume that some regrouping may be necessary in anticipation of a future wave. In this respect, national priorities should be to:

- assess the overall attack rate during the first wave, in order to assess the susceptible population and construct models of a second wave
- continue to monitor the virus for genetic variations that might affect the degree of protection afforded by previous infection or vaccination, and thus vaccine formulation
- continue to monitor antiviral susceptibility of the virus
- review the efficacy of all interventions to inform future policies
- review antiviral and other pharmaceutical needs/supplies.

Health plans should assume that heightened monitoring and surveillance will be required for some time beyond the first wave and that all plans require review and revision in the light of lessons learnt. In particular, the likelihood of ongoing constraints on supplies and services and continuing pressures on health and social services, combined with the loss of key staff, should be taken into account. Updated information on the epidemiology of the virus, effectiveness of treatment, availability of countermeasures and lessons learnt from the first wave will help inform and shape the response measures that may need to be maintained or implemented for second and subsequent waves. In addition, health plans may be required for targeted or mass vaccination programmes during this period.

## 6.8 Second and subsequent waves

Second and subsequent waves may be more or less severe than the first: UK alert levels 3 and 4 will come into play again, informed by epidemiological and mathematical modelling following the first wave. The Department of Health will issue guidance to inform health response plans following a review of the first wave and the availability of countermeasures.

## 6.9 The recovery phase: returning to normality

As the impact of the pandemic wave subsides and it is considered that there is no threat of further waves occurring, the UK will move into the recovery phase. Although the objective is to return to inter-pandemic levels of functioning as soon as possible, the pace of recovery will depend on the residual impact of the pandemic, ongoing demands, backlogs, staff and organisational fatigue, and continuing supply difficulties in most organisations. Therefore, a gradual return to normality should be anticipated and expectations shaped accordingly. Plans at all levels should recognise the potential need to prioritise the restoration of services and to phase the return to normality in a managed and sustainable way.

Health and social services are likely to experience persistent secondary effects for some time, with increased demand for continuing care from:

- patients whose existing illnesses have been exacerbated by influenza
- those who may continue to suffer potential medium- or long-term health complications (eg the encephalitis lethargica that may have been linked to the 1918 pandemic)
- a backlog of work resulting from the postponement of treatment for less urgent conditions.

The reintroduction of performance targets and normal care standards also needs to recognise the loss of skilled staff and their experience. Most others will have been working under acute pressure for prolonged periods and are likely to require rest and continuing support. Facilities and essential supplies may also be depleted, resupply difficulties might persist and critical physical assets are likely to be in need of backlog maintenance, refurbishment or replacement. Impact assessments will therefore be required.

Other sectors and services are likely to face similar problems and may also experience difficulties associated with income loss, changes in competitive position, loss of customer base, lack of raw materials, the potential need for plant start-up and so on. This should be acknowledged and addressed in recovery plans.

# 7 Options for mitigating the impact in the UK

The demands and uncertainties associated with an influenza pandemic require flexible plans based on a combination of strategies to develop an effective and sustainable response. Medical or pharmaceutical countermeasures, combined with public health and personal infection control initiatives, and the possible application of measures to reduce social mixing, form the basis of the UK's mitigation strategy. The Government will need to make final decisions and issue advice on the application of additional measures or the scaling back of applied measures, as the exact nature or impact of the emerging strain of influenza virus becomes evident. Public support and compliance with infection control and other measures will be critical to the success of that strategy.

## 7.1 International travel, border restrictions and screening

International travel is increasingly central to world commercial, economic and recreational activity, and significant or lengthy interruptions have a range of disruptive effects. The movement of people is also a significant determinant of the speed of spread of infectious diseases, and as a major destination and international travel hub, the UK is particularly vulnerable.

Although the imposition of restrictions on travel to and from affected areas has made an important contribution to the control of some infectious diseases in the past, modelling and evidence from previous outbreaks of infectious diseases suggest that no practical level of travel restriction is likely to allow a country to avoid a pandemic altogether. However, modelling does suggest that the imposition of restrictions on all travel to the UK is likely to delay the arrival of the virus by one or two weeks if measures were 90% effective, and by some two months if 99.9% effective.

The possible health benefits that may accrue from international travel restrictions or border closures need to be considered in the context of the practicality, proportionality and potential effectiveness of imposing them, and balanced against their wider social and economic consequences. Given the complexity of this issue, the Government will keep under review the evidence on the benefits and disadvantages of various approaches.

The UK also needs to strengthen port health vigilance and develop capacity to implement any recommendations or restrictions, including entry or exit screening, that may be issued by the World Health Organization (WHO), the European Union (EU) or other governments. As an integral part of their preparation, port and airport operators, carriers and those authorities with

specific responsibility for port health should therefore review their arrangements for screening individuals with suspected illness on arrival, protecting their staff and rapidly implementing wider entry or exit control measures if required.

Advice to British nationals intending to travel to, or in, affected countries would be available from the Foreign and Commonwealth Office (FCO) and on government and Health Protection Agency (HPA) websites.

## 7.2 Pre-pandemic vaccination

Pre-first wave immunisation with an influenza vaccine related but not specific to the pandemic strain might offer some limited, but nonetheless useful, protection. Currently, the UK has very limited stocks of an A/H5N1 vaccine purchased specifically for the protection of healthcare workers. Pre-pandemic vaccination would be initiated based on national and international expert advice and delivery would primarily be the responsibility of employers.

Given sufficient additional stocks, a suitable vaccine could be used to provide partial protection for other workers likely to be frequently exposed to symptomatic patients or key staff crucial to the maintenance of essential services. Pre-pandemic vaccination of those most likely to spread the disease or suffer complications could also help reduce hospitalisations and deaths in vulnerable groups. Decisions on use would need to follow assessments of the likely degree of cross-protection afforded (if any) and a balance of risks against benefits as the pandemic alert phases change.

More widespread immunisation with a pre-pandemic vaccine could have a substantial effect, but this would require large stocks of such a vaccine and is not currently part of the UK health departments'/directorate's plans. Anticipating a suitable vaccine strain also has the inherent risk of it being ineffective against the ultimate pandemic strain. The Department of Health will continue to monitor the evolution of viral strains and options for pre-pandemic vaccination and will inform planners of any policy changes. In the meantime, response plans should assume that arrangements for limited pre-pandemic vaccination of targeted groups might become necessary.

### 7.3 Isolation, voluntary quarantine and social distancing

Whilst it might be possible to isolate initial cases and quarantine their immediate contacts, such an approach will become unsustainable after the first few hundred or so cases. Geographic quarantining measures ('cordons sanitaires') have been used in an attempt to isolate affected communities in the past, but are unlikely to be effective against pandemic influenza in the UK as infection is expected to affect all major population centres within one to two weeks of initial cases being identified.

Whilst those without symptoms will be encouraged to carry on as normal, symptomatic patients will be asked to stay at home or in their place of residence (voluntary home isolation and quarantine) whilst ill. If, in exceptional situations, staying at home becomes impossible, for example because of the need to be transferred to hospital, symptomatic patients should wear a disposable face mask to reduce transmission of infection.

Influenza is likely to spread rapidly in closed establishments such as prisons, residential homes and boarding schools where people are in close contact and where they may also be in higher-risk groups. Such establishments may also be more vulnerable to higher levels of staff absence, supply disruption or transport difficulties. As opportunities for closure, quarantine, isolation or social distancing may be limited, it is vital that resilient arrangements are developed in advance of an outbreak.

### 7.4 Antiviral medicines

Although the targeted and effective use of antiviral medicines or other definitive pharmaceutical interventions is an important countermeasure, they may be in limited supply. When used to treat seasonal influenza, antiviral medicines reduce the length of symptoms (by around a day) and usually their severity, as long as they start to be taken within two days of the onset of symptoms. Whilst it is impossible to predict whether antiviral medicines will be equally effective against a new or modified pandemic virus, it is reasonable to anticipate a similar effect and associated substantial reductions in severe morbidity.

The UK has established national stockpiles of oseltamivir (Tamiflu) – a neuraminidase inhibitor that works by preventing the influenza virus from reproducing and leaving the host cell. The existing stockpiles allow for the treatment of all symptomatic patients at clinical attack rates of up to 25% and arrangements to make it rapidly available are a critical part of the health response. Although a number of alternative strategies are also being evaluated, scientific advice confirms that prompt treatment of all symptomatic patients is currently the most effective use of the antiviral stocks available. Higher clinical

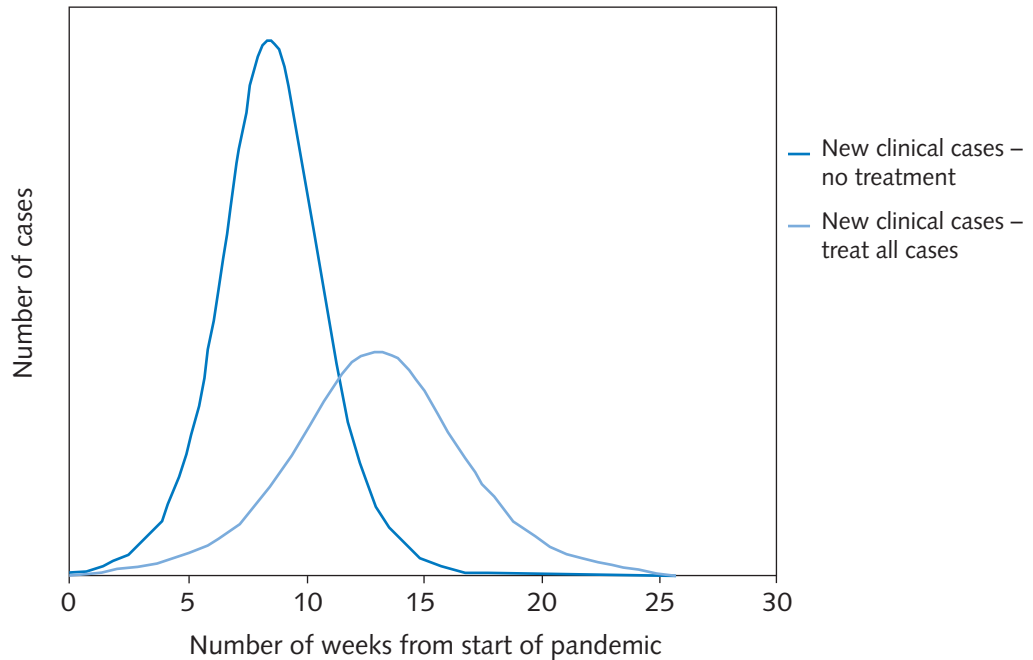
attack rates would require prioritisation of use, but operational plans should initially aim to make antiviral medicines available to all patients who have been symptomatic for less than 48 hours, preferably within 12 and no more than 24 hours from reporting symptoms indicative of influenza.

Adult treatment courses are stored as pre-packed capsules, but children weighing 23kg and under (about seven years old) require a weight-related dose of oseltamivir. Some of the stock is therefore in powder form for reconstitution into a suspension. Unless the child is obviously overweight or underweight, the dose is determined by age as a proxy:

Age	Indication	Dosage
Under 1 year	Oseltamivir is not licensed for use in this age group	Any decision to use requires expert clinical judgement, with dose according to weight
1–2 years	Body weight up to and including 15kg	30mg every 12 hours for five days
3–6 years	Body weight over 15kg and up to 23kg	45mg every 12 hours for five days
7+ years	Body weight 24kg and above	75mg every 12 hours for five days

Pre-identified licensed hospital pharmacy manufacturing units will be notified to manufacture the solution when the pandemic is declared, and other options for developing alternative formulations are being examined.

The prompt use of antiviral medicines will benefit individual patients and may also produce public health benefits by decreasing the overall clinical attack rate, shortening the period that individuals are able to shed virus and thus able to pass on the infection to others. Although there is considerable uncertainty over the level of reduction possible, one model suggests a relative lowering of the attack rate by up to one-third over the course of a pandemic (see Figure 3).

**Figure 3: Indication of effects of antiviral treatment**

The HPA will implement measures to monitor the susceptibility of the virus to antiviral medicines, assess their effectiveness in reducing complications and deaths and inform policy decisions. The Medicines and Healthcare products Regulatory Agency (MHRA) will identify the incidence and patterns of any adverse reactions.

It is also possible to use antiviral medicines as a preventive measure (prophylaxis) to protect against infection. Although some prophylactic use may help contain spread from initial cases and thus slow the development of the pandemic, protecting significant numbers of people for its entire duration would consume large numbers of treatment courses and still leave those treated susceptible to infection as soon as they stopped taking the medicine. Therefore, apart from attempts to contain initial spread, general prophylaxis is not currently regarded as an effective or practical response strategy. An alternative may be 'household prophylaxis', which provides post-exposure prophylaxis to immediate contacts at the same time as treating a symptomatic patient on the grounds that some of the contacts may already be incubating the infection. This could mitigate and delay the progress of a pandemic, particularly when combined with measures such as school closures. However, such a strategy would consume significantly greater stocks of antiviral medicines and mean that some people would need multiple treatment courses initially to prevent and then possibly treat infection. The potential effects of countermeasure strategies on resistance to antiviral medicines also requires further investigation. The Department of Health and devolved administrations will continue to review the supply and optimal use of pharmaceutical countermeasures.

## 7.5 Infection control and personal hygiene

Once efficient person-to-person transmission is established, preventing an influenza pandemic developing is unlikely to be possible, as most people are likely to be exposed to the virus at some stage during their normal activities. In order to protect others and reduce the spread of infection, anyone ill with influenza-like symptoms should stay at home, minimise social/family contact and go out only if absolutely necessary until symptoms have resolved. Those who are not symptomatic should continue normal activities for as long and as far as that is possible. They can reduce – but not eliminate – the risk of catching or spreading influenza by avoiding unnecessary close contact with others and routinely adopting high standards of personal and respiratory hygiene.

Applying basic infection control measures and encouraging compliance with public health advice are likely to make an important contribution to the UK's overall response. Simple measures will help individuals to protect themselves and others. The necessary measures include:

- staying at home when ill
- covering the nose and mouth with a tissue when coughing or sneezing
- disposing of dirty tissues promptly and carefully – bagging and binning them
- washing hands frequently with soap and warm water to reduce the spread of the virus from the hands to the face, or to other people, particularly after blowing the nose or disposing of tissues
- cleaning frequently touched hard surfaces (eg kitchen worktops, door handles) regularly using normal cleaning products
- avoiding crowded gatherings where possible, especially in enclosed spaces
- if suffering with influenza symptoms, wearing a disposable face mask to protect others should it become absolutely essential to go out (eg to go to hospital)
- making sure that children follow this advice.

Adopting such measures can help mitigate the overall health and wider impact of a pandemic by lowering the clinical attack rate and slowing its development, thereby spreading peak demand on services and enabling them to respond more effectively.



## 7.6 The use of face masks and respirators

Surgical face masks or respirators (masks that incorporate a filter) provide a physical barrier against the influenza virus provided that they are of an appropriate type, are worn correctly, changed frequently, removed properly, disposed of safely and used in combination with good universal hygiene behaviour. Face masks can be used to help protect those who may, for example, be at occupational risk from close or frequent contact with symptomatic patients and by those who are symptomatic to avoid contaminating others if they have no choice but to leave their home, though significant communication, supply, logistic and training aspects will need to be addressed. Disposable masks or respirators should generally only be worn once, for no longer than the time recommended by the manufacturer, and then discarded in an appropriate receptacle.

Although the perception that wearing a face mask in public places may be beneficial is widely held, there is little actual evidence of proportionate benefit from widespread use. The Government will not therefore be stockpiling face masks for general use. If individuals who are not symptomatic choose to purchase and wear face masks in public places, they should be worn properly and disposed of safely to reduce infection spread. Wearing masks at all times is not practical; so decisions in occupational settings must take account of the degree of risk associated with particular occupations or activities and be based on joint risk assessments carried out by employers and staff representatives.

Although further clarification and guidance on the use of face masks may become available in due course, the planning presumptions should be that anyone who is ill with influenza-like symptoms will be advised to stay at home. The general wearing of face masks in public places by those who do not have influenza symptoms will not be recommended and the Government will not supply face masks for that purpose. Judgements on respiratory protection in specific occupational or other settings will need to be based on joint risk assessments. Guidance to employers is available via the Health and Safety Executive website at [www.hse.gov.uk/biosafety/diseases/influenza.htm](http://www.hse.gov.uk/biosafety/diseases/influenza.htm)

## 7.7 Internal travel restrictions

Modelling suggests that internal travel restrictions would have little positive impact on the total number infected by influenza over the entire course of a pandemic. Even a 60% reduction in all travel, including commuting to work, would only result in a small flattening of the profile of the pandemic across the country – reducing the national peak incidence by 5–10% and lengthening its period by a week, but also exacerbating the economic impact, increasing social disruption and adding to business/service continuity problems. These conclusions are consistent

with the lack of important observable differences between the course of seasonal influenza outbreaks in London – where there is considerable mixing on commuter and underground trains – and their course in other parts of the UK.

On balance, the planning presumption should be that the Government is unlikely to impose any restrictions on internal travel unless it becomes necessary to do so as the pandemic develops for public health reasons, in which case it is likely to be on an advisory basis.

The public may be advised to minimise non-essential (leisure/social) travel as a personal precautionary measure but to continue using public transport for essential journeys, adopting good personal hygiene measures and staggering journeys where possible.

## 7.8 Restrictions on public gatherings

Large public gatherings or crowded events where people may be in close proximity are an important indicator of ‘normality’ and can help maintain public morale during a pandemic. Whilst close contact with others – especially in a crowded confined space – accelerates the spread of an influenza virus, there is little direct evidence of the benefits or effects of cancelling such gatherings or events. Individuals may benefit from reduced exposure by not attending such events, but there would be very little benefit to the overall community. Reduction in travel to such events may also reduce spread, although the benefits of even major reductions in all travel are small.

Although evidence does not support a blanket ban on such events, individuals may decide not to attend them, parents might well choose to avoid the potential infection risk to children and organisers might decide to cancel to avoid any economic risks. If schools and early years childcare facilities are advised to close to children (see section 7.9), information will be made available to parents and carers to enable them to assess the risks of infection associated with different out-of-school activities so that they can act appropriately to protect children.

Transport difficulties, public order, crowd safety or other similar considerations may also affect decisions on staging such events. Organisers and/or governing bodies and licensing authorities (where relevant) might therefore decide to cancel events to minimise difficulties or avoid economic or other risks. Decisions can only be taken in the light of information and the circumstances at the time.

For planning purposes, the presumption should be that the Government is unlikely to recommend a blanket ban on public gatherings. However, informed judgements by the event organiser and/or governing body in conjunction with the regulatory authority may become necessary at the time. If international

events are due to be held in the UK with participants from affected areas, the Government may recommend postponement.

## 7.9 School closures

Influenza transmits readily wherever people are in close contact and is likely to spread particularly rapidly in schools. As children will have no residual immunity, they could be amongst the groups worst affected and can be 'super spreaders'. In the 1957 pandemic, up to 50% of schoolchildren developed influenza and, in some residential schools, attack rates reached up to 90%, often affecting the whole school within a fortnight.

Closing schools to pupils as an adjunct to the antiviral treatment planned for a pandemic might reduce its peak impact by an additional 10%, and the total number of clinical cases could also reduce by 10%, compared with antiviral treatment alone. Most of this reduction would be in school-age children, where the reduction in the number of clinical cases might be as high as 50%.

Advising all schools in an affected area to close may offer the most practical option. Whilst this would disrupt education and have a significant negative effect on services and businesses, particularly those highly dependent on working parents, these disadvantages would be outweighed by the children's lives saved. The same would apply to group early years/childcare settings where groups of children and parents often mix. Although there is less evidence relating to this sector than to schools, the same principles would apply. If schools were advised to close, it would be logical to extend that advice to all group early years/childcare settings, although this would increase the impact of closures upon services and businesses where working parents are employed. Reducing mixing between children outside school or other group early years/childcare settings may also be necessary for maximum benefit, but the impact would depend on the nature of that mixing. The Government would issue guidance on this as the pandemic develops.

The Department for Education and Skills (whose work has since been split between the Department for Children, Schools and Families and the Department for Innovation, Universities and Skills – see sections 4.4.8 and 4.4.9) issued guidance to local authorities, schools and providers of childcare services advising them to plan both for continuing to operate and for possible closures of schools and group early years/childcare settings during a pandemic. Similar advice has been issued by the devolved administrations.

The Government would take decisions on whether or not to advise closures on the basis of an assessment of the emerging characteristics and impact as the

pandemic develops. The trigger for advice to close would be confirmation of initial cases in the area.

On balance, plans should be prepared on the basis that:

- some school and group early years/childcare closures are likely
- decisions on whether to advise schools and group early years/childcare settings to close can only be made in the light of emerging information as a pandemic develops
- schools and early years/childcare settings will be advised to close only if it is anticipated that this will produce significant health benefits
- if the Government advises schools and group early years/childcare settings to close to pupils, the initial advice is likely to be to close for a few – probably two to three – weeks, after which the position would be reviewed, but the closure may be extended beyond this period
- any advice to close schools and group early years/childcare settings would be communicated to them through the local authority, which would be told through local resilience arrangements
- even if there is no general advice to schools and early years/childcare settings in an area to close, some may decide to do so because of staff shortages or local health and safety reasons.

Further guidance to local authorities, schools and group early years/childcare settings is available at [www.teachernet.gov.uk/humanflupandemic](http://www.teachernet.gov.uk/humanflupandemic)

## **7.10 Pandemic-specific vaccination**

Vaccination is widely used in the UK to offer protection against the seasonal influenza strains most likely to be circulating in that particular year. As a pandemic will result from the emergence of a new or modified strain, these routine vaccines are unlikely to offer protection and it will not be possible to develop a matching vaccine until the emerging influenza strain has been identified.

The Government has finalised advance supply contracts with manufacturers to make sufficient supplies of a matching vaccine available as soon as it is developed and is also working actively with the international community and pharmaceutical industry to speed development, testing and licensing. However, it may take four to six months before a matching vaccine is available and evaluated for safety, and considerably longer before it can be manufactured in sufficient quantities for the entire population given that international demand will be high. Realistically, it is therefore unlikely that a matching vaccine will

contribute much to dealing with the initial wave of a pandemic, unless its evolution, or the effectiveness of early control measures, result in a significantly slower developing pandemic than anticipated. However, it could be an important tool in preventing further cases, particularly if a second wave occurs.

For planning purposes, the presumption should be that a population-wide vaccination campaign is unlikely to be possible before or during the first pandemic wave, but may contribute to reducing the impact of subsequent waves if they occur.

## 8 Maintaining business continuity/public order

Contingency planning for a range of disruptive risks is a key business activity, and maintaining adequate staffing levels is critical to every organisation's ability to maintain its essential functions. A major infectious disease outbreak such as an influenza pandemic will place considerable pressure on all organisations and most individuals. Although business continuity plans made for other disruptive challenges provide a solid base, contingency arrangements for an influenza pandemic need to recognise the unique nature of some of its characteristics, particularly its likely duration and the fact that higher levels of staff absence are likely to be a major factor.

During a pandemic, the Government's overall aim will be to encourage those who are well to carry on with their daily lives normally for as long and as far as that is possible, within the constraints imposed by the pandemic, whilst taking basic precautions to protect themselves from infection and lessen the risk of spreading influenza to others. However, staff absence is likely to be significantly higher than normal across all sectors. Uncertainty surrounding the actual impact of the pandemic virus will continue until it emerges, so plans to mitigate the effects of staff absence need to be capable of coping with a range of potential levels.

To support the Department of Health in preparing and planning for a possible influenza pandemic, the Cabinet Office has issued advice to assist business continuity planning comprising *Guidance on contingency planning for a possible influenza pandemic*, *Pandemic influenza checklist for businesses* and *Introductory advice to staff on planning for pandemic influenza*, which are available at [www.ukresilience.info](http://www.ukresilience.info) and [www.pfe.gov.uk](http://www.pfe.gov.uk)

### 8.1 Factors leading to possibly high levels of staff absence

Over the course of a pandemic, staff are likely to be absent from work for a combination of reasons including personal illness, the need to look after family members who are ill, bereavement, fear of infection, the impact of public health measures such as school closures and other factors such as possible transport difficulties. Levels of absence may vary due to the size and nature of a workplace, the kind of activity that takes place there and the composition of the workforce.

### 8.2 Key assumptions

The following key assumptions, based on a uniform clinical attack rate across all age groups, should assist in carrying out impact assessments and developing contingency plans. As the attack rate may not be uniform across all age groups, plans need to retain flexibility to adapt as information emerges.

- Up to 50% of the workforce may require time off at some stage over the entire period of the pandemic, with individuals absent for a period of seven to ten working days. Staff absence should follow the pandemic profile with an expectation that it will build to a peak lasting for two to three weeks – when between 15% and 20% of staff may be absent – and then decline.
- Additional staff absences are likely to result from other illnesses, taking time off to provide care for dependants, family bereavement, other psychosocial impacts, fear of infection and/or practical difficulties in getting to work.
- The Government may advise schools and group childcare settings in an area to close in order to reduce the spread of infection amongst children. Initial advice would probably be to close for a few – probably two to three – weeks, but closures may be extended if the pandemic remains in the area.
- Modelling suggests that small organisational units (5 to 15 staff) or small teams within larger organisational units are likely to suffer higher percentages of staff absences – up to 30–35% over a two- to three-week period at the local peak.

### 8.3 Estimating likely absence levels in individual organisations

Each organisation needs to estimate the level of staff absence and its potential impact on its own activities in the period leading up to and during an influenza pandemic. The actual impact will depend to some extent on the composition of the workforce, the environments in which people work and the extent to which the absence of even small numbers of highly specialist staff might constitute a material risk. In order to derive estimates for the total numbers likely to be absent, employers should consider the demographics of their work teams, including the percentage who have childcare or other family care responsibilities, 'normal' absence levels and options for home or remote working.

### 8.4 Protection in an occupational setting

In a pandemic setting, employers still have a duty to provide a safe place of work for their workers (Health and Safety at Work etc. Act 1974 as amended) and are required to maintain safe working systems and to implement protective measures based on local risk assessments. The risk assessment should consider whether an employee's work activity increases the risk of exposure beyond that of community-acquired exposure and what proportionate control containment and protection measures may be available. Most of the general principles for infection control in hospitals and other settings (see section 9.20) can be equally effective if applied in the general workplace.

Consultation and jointly conducted risk assessments by employers, staff and their trade unions or representatives, combined with documented procedures during the planning phase, can help ensure that employees are well educated and informed. Joint risk assessments can also assist in identifying and exploring any subjective perceptions of risk, the opportunities for more flexible working arrangements, and training requirements to help cover staff absences.

Identifying those staff with co-morbid conditions or other factors that may put them at higher risk may also allow proportionate individual precautions.

Making temporary changes to working practices – eg reducing close face-to-face contact; providing physical barriers to transmission; enhancing cleaning regimes; ensuring that the necessary protective equipment is available; having hand washing, waste disposal and other hygiene facilities in place – and actively promoting these and other similar measures can help encourage and maintain attendance at work during the response phase.

Aside from their obligations under health and safety legislation, employers can help to minimise the spread of the virus and support good infection control practice by positively encouraging any employee who reports feeling unwell with influenza-like symptoms to stay at home until their symptoms resolve, by sending people home who develop influenza-like illness at work (avoiding public transport and wearing a face mask if possible) and by ensuring that stocks of surgical facemasks are available in the workplace for symptomatic staff to wear until they get home.

Non-punitive personnel policies and reassurances should emphasise and support those aims. Follow-up contact with absent employees, the provision of occupational health advice and other similar measures indicated in the Health and Safety Executive's existing guidance can help minimise other absences and encourage return to work as soon as possible. Making best use of recovered staff should also be an important aspect of planning.

Further guidance for employers is available at [www.hse.gov.uk/biosafety/diseases/influenza.htm](http://www.hse.gov.uk/biosafety/diseases/influenza.htm)

## 8.5 Dealing with a large number of deaths

The projected scale of excess deaths during a pandemic, particularly at the upper end of the planning assumptions (which range from 55,000 to the reasonable worst case of 750,000 in the UK over 15 weeks), is likely to present many challenges for local services, with many more people dying at home. A key aim for planning and the response will be to minimise funeral delays and to treat those who have died with dignity and their families with consideration and respect.



Even well developed and robust local plans and preparations are unlikely to be successful during a pandemic without the active support of individuals, families, faith groups and communities. Local authorities will want to reassure their communities that every reasonable preparation for high volumes of additional deaths has been made and to consider how to manage the potential demands for advice, support and other needs before, during and after a pandemic.

During the early stages, local services will probably not know the precise scale of deaths in their area – although projections may become available – so plans need to be flexible and adaptable. Local service providers should aim to maintain current processes for as long as that is possible, but as numbers of additional deaths increase, those may soon become unsustainable. When that becomes the case, local services are likely to need to work differently and ways in which deaths are certified and funerals, burials and cremations arranged are likely to change.

Local authority emergency planners should work in conjunction with local health planners to develop plans and arrangements. They will also want to ensure that arrangements for local authority services (eg registrars, burial and cremation authorities) work with the health response (eg GPs and NHS mortuaries) and engage with local businesses (eg funeral directors and private cemeteries and crematoria) and faith groups.

To assist and inform those developing local contingency arrangements the Home Office – working with relevant government departments, representatives of the funeral industry, the Faith Communities Consultative Council, the Coroners' Society, the Local Government Association and others – has published draft guidance *Planning for a Possible Influenza Pandemic – A Framework for Planners Preparing to Manage Deaths* for comment.

## 8.6 Business continuity/maintenance of the UK's essential services

Planning in all sectors must recognise that no pharmaceutical countermeasures (antiviral medicines or vaccines) are likely to present a 'silver bullet' solution, particularly during the first wave of a pandemic. The Government has recommended that the UK's essential services – including essential public services provided by local government and other sectors – should build on and review their generic business continuity arrangements to reflect the potentially large number of staff who might be absent during a pandemic and identify other key interdependencies. The overall aim is to maintain business as usual for as long and as far as that is possible and at the very least to maintain core services and business activities for several weeks, particularly around the peak of a UK epidemic when staff absences are likely to be at their highest.

### 8.6.1 Communications

At the onset of a pandemic, the telecommunications industry would expect to be able to provide a near-normal service. However, like other sectors, the degree to which services may be affected will depend on a number of factors including the nature of the crisis, the number of workers who contract the virus and the resulting level of absenteeism. Above-normal absenteeism rates during a pandemic are likely to result in a gradual increase in the time taken for telecommunications providers to deal with customer requests and in carrying out routine maintenance.

The telecommunications industry would respond to a crisis by seeking to limit the impact on services by prioritising fault repairs at the expense of routine maintenance and the provisioning of new services. New services provided during such a crisis would generally be restricted to urgent requests from emergency responders recognised as Category 1 and Category 2 responders under the Civil Contingencies Act 2004.

Whilst telecommunications networks have the capacity to support a significant increase in home working, the reconfiguration of networks to enable them to handle significant short-term changes in the location and pattern of access cannot be achieved overnight. Organisations planning to increase home working in a pandemic must therefore talk to their telecommunications providers well in advance and will also need to ensure that they have the necessary hardware and software in place and appropriate arrangements to ensure support, oversight and audit of home workers

There may be some disruption to postal services due to the high level of staff absence at the peak of the pandemic, although a wide range of postal operators should ensure that the market maintains priority delivery services. Any reduction to Royal Mail's services would be overseen in accordance with a list of corporate priorities agreed with the regulator, focusing on those services involving high social responsibility (access to cash/benefits). Deliveries and collections would be maintained as far as possible with managed degradation.

### 8.6.2 Energy

The energy sector is planning to maintain supplies of gas and electricity at near-normal service levels during a pandemic. Whilst routine maintenance is likely to be afforded lower priority if there are staffing shortfalls, essential repairs will continue to be carried out. Similarly, planning by fuel suppliers is aimed at maintaining near-normal levels. In both cases, there may be some service disruption if peak staff absences coincide with technical or weather-related supply difficulties, leading to potentially longer periods of service loss than

would normally be expected, and imports from main overseas suppliers may also be disrupted.

### 8.6.3 Finance

Pandemic planning in this sector is being led and coordinated by the tripartite authorities (HM Treasury, the Financial Services Authority and the Bank of England), which share responsibility for maintaining financial stability in the UK. Planning – involving financial firms, infrastructure providers and overseas financial regulators – is advanced and has primarily focused on business continuity (ie maintaining core business activities whilst experiencing above-normal staff absence levels) and provision of basic services, such as cash circulation, banking and payment systems. Further information on the financial sector plan is available at [www.fsc.gov.uk/section.asp?catid=434](http://www.fsc.gov.uk/section.asp?catid=434)

### 8.6.4 Food

Companies across the food sector will work together through their representative organisations and the Department for Environment, Food and Rural Affairs to maintain supplies as far as possible. However, at the peak of the pandemic, there may be a reduction in choice and accessibility if some local outlets close due to non-availability of staff.

### 8.6.5 Public transport

Public transport operators aim to run as near to normal services for as long and as far as that is possible during a pandemic and their plans provide for emergency timetables, redeploying staff and operating revised working (shift) patterns, if required. Although the Government is not planning to impose closure of transport hubs/facilities in the UK, all sectors may experience operational difficulties when the pandemic virus is circulating and staff absence levels are significantly higher than normal. The aviation sector may also experience difficulties if non-UK airports or airlines have operational problems or stop operating.

### 8.6.6 Water

All water and sewerage companies have identified the minimum staffing levels required to maintain essential supply and sewerage operations, and have factored in potential staff absences in a pandemic scenario. As many key operations are automated, companies are confident that they will have sufficient staff to sustain these essential operations during a pandemic. Water companies have generic contingency plans for continuity of essential supplies. They have

worked with suppliers and contractors to check preparedness arrangements, particularly in critical areas such as chemical supplies for water treatment.

Essential repairs to maintain water and sewage pipe work will continue, but staff shortages may reduce or halt non-essential work.

### **8.6.7 Emergency services**

Business continuity planning is well developed in emergency services across the UK, and multi-agency exercises have been conducted to test arrangements. The general aim will be to maintain emergency provision at near-normal levels and to support the wider response to a pandemic, although there are likely to be constraints caused by loss of key or retained staff. Some routine and non-emergency functions could be affected by the need to redeploy and by higher staff absence levels.

### **8.6.8 Judicial process**

All the delivery agents involved in the judicial process (police, Crown Prosecution Service, courts, judiciary, Prison Service and Probation Service) are working through the Office for Criminal Justice Reform and local criminal justice boards to develop pandemic plans. Similar work is being undertaken for civil and family business. The overall aim is to minimise disruption to each element of the process, although high levels of staff absence may lead to difficulties in maintaining normal activity.

### **8.6.9 Financial support**

The Department for Work and Pensions (DWP) and HM Revenue and Customs (HMRC) provide and administer financial support to a range of customers, including children and their carers, people of working age, disabled people and their carers, and pensioners. DWP also supports customers in finding employment. During an influenza pandemic, DWP will aim to continue services that support people into work, but will give priority to maintaining financial support. Customer payments – which are largely automated – will continue to be paid. DWP and HMRC have robust business continuity plans in place to ensure that the administration and key services that support these payments can be maintained during a pandemic. Using existing legislation, a number of changes can be made to the way key services are delivered during a pandemic, to take account of priorities at that time. Suppliers that provide key services to DWP and HMRC, such as postal delivery or IT support, have their own business continuity plans in place to ensure that these services can continue during an influenza pandemic.

### 8.6.10 Planning by local authorities

Local authorities will be key players in the local-level multi-agency response to an influenza pandemic and are planning accordingly in the following main areas:

- business continuity to sustain key local services
- arrangements to support central government in communicating public messages
- implementation of possible social measures that the Government may recommend on an advisory basis to reduce the risk to individuals of infection
- supporting the health and social care response
- preparing for the wider impacts of a pandemic in their area, including reporting information to the Regional Civil Contingencies Committees at regional level
- reviewing capacity to handle excess deaths.

British Standard BS25999 may be helpful in reviewing those business continuity and emergency arrangements.

### 8.6.11 Public order

Whilst the population usually responds in a calm and responsible way to any major disruptive challenge, an influenza pandemic is likely to cause public concern and anxiety, particularly if the virus causes high levels of illness and death and/or the communications strategy has limited success.

Under the worst-case scenario, factors such as capacity pressures on health establishments, the need to prioritise medicines, the application of measures to control the spread of infection, possible shortages of basic necessities or short-lived disruption to essential services could result in disturbances or threaten breakdowns in public order.

Preserving the rule of law, maintaining the democratic process and ensuring public safety will be important elements of the UK's response. Engaging the public in the development of policies, plans and choices, and ensuring that expectations are realistic and that advice and information are readily available prior to and during a pandemic are key elements of planning and should assist in minimising the risk of civil disorder.

In the event of any civil disorder, the Government would rely on existing legislation and normal enforcement measures as far as possible, but may consider the need for additional powers should that become necessary. Response plans should, therefore, anticipate that operational or logistical

assistance might be required to support health efforts to control the outbreak or treat patients, or to respond to civil disorder. In this regard, it should be recognised that any request for police support is likely to be in the context of reduced police availability through illness and the need to service similar requests for policing support from other sectors.

# 9 The health and social care response

An influenza pandemic will result in intense and sustained pressure on all parts of the health and social care system, limiting the scope for mutual aid and threatening to overwhelm services at its peak. Protecting human health is the primary objective of the UK's response strategy. An effective response has the potential to reduce the proportion of the population that may develop influenza or become critically ill, thereby saving lives, alleviating suffering and reducing the social and economic impact. To limit the spread of infection, national and local messages will emphasise that anyone with influenza-like symptoms should stay at home and seek help by telephone via the National Flu Line service rather than attending surgeries, hospitals or other healthcare facilities, unless by prior arrangement. Organisations therefore need to adapt and reorganise to provide treatment and support in a home setting whilst maintaining other essential care and critical services.

More detailed operational guidance for health and social care organisations is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## 9.1 Aims

The health and social care response to an influenza pandemic should reduce mortality and morbidity by:

- maintaining surveillance to detect the emergence of a novel virus strain or any illness attributable to it, monitor its spread and health impact, describe the illness and inform the response
- providing prompt access to rapid and reliable diagnostic tests
- reducing the severity of illness and incidence of complications in infected individuals
- reducing disease transmission and rates of illness by applying individual and community infection control measures
- adjusting responses to reflect emerging epidemiological data
- developing surge capacity to meet expected demand, recognising that this will require a redefinition of boundaries between primary and secondary care
- making targeted and effective use of potentially scarce healthcare skills, facilities and resources
- reducing or ceasing non-essential activity as demand increases but maintaining essential care for emergencies or patients with chronic or other illnesses
- assessing all symptomatic patients rapidly and treating promptly with antiviral and other medicines if indicated

- providing effective treatment for those suffering complications
- educating the community and providing public advice and information
- providing vaccination, if and when suitable vaccines are available
- providing data to monitor the impact, effectiveness and adverse effects of interventions.

## 9.2 Principles underlying planning and response

Health and social care organisations should apply the following principles to their planning and response.

- Response arrangements should be based on strengthening and supplementing normal delivery mechanisms as far as is practicable.
- Interventions will be applied where they achieve maximum health benefit, but may also be required to help maintain essential services – political decisions will be necessary if there is a conflict of interest.
- Plans should be developed on an integrated multi-agency basis with risk sharing and cross-cover between all organisations.
- Plans should encourage pan-organisational working, seeking to mobilise the capacity and skills of all public and private sector healthcare staff (including students and those who are retired), contractors and volunteers.
- Although visiting all cases will not be possible, primary care plans should be based on influenza patients avoiding leaving home as far as possible.
- Initial telephone-based assessment is likely to be necessary to meet demand.
- Primary care response strategies should focus the available capacity and clinical skills primarily on treating those suffering with the complications of influenza or requiring other essential clinical care and assessing young children or patients in groups identified as being at particular risk.
- Antiviral medicines should initially be available to all patients who have been symptomatic for less than 48 hours within 12–24 hours of reporting symptoms.
- Response measures should maintain public confidence and 'feel fair'.
- Treatment and admission criteria should remain clinically based and hospital admission criteria should be applied in a transparent, consistent and equitable way that uses the capacity available for those who are most seriously ill and most likely to benefit.



- Plans should recognise the need to respond to psychosocial issues and concerns such as anxiety, grief and distress and for sympathetic arrangements to manage additional fatalities.

### 9.3 Assumptions for health and social care planning

In order to allow sufficient lead time to finalise and implement operational response arrangements, respective health departments will need to make decisions to reduce or change NHS services and, where appropriate, to modify or suspend some normal performance targets at UK alert level 2. A graded approach based on decisions proportionate to local impact made by SHAs in England and their equivalents may be appropriate.

Health and social care organisations need to ensure that their response plans include provision for enhancing, scaling down, or ceasing some services as the pandemic threat increases. They should use the following planning assumptions to ensure that response arrangements are resilient and robust, but must be prepared to modify plans should emerging information change.

#### 9.3.1 Severity of illness

- Up to 50% of the population may show clinical symptoms of influenza over the course of a pandemic, and up to 25% of those may develop complications.
- Up to 2.5% of those who become symptomatic may die.
- Up to 22% of influenza cases can be expected during the 'peak week' of a pandemic wave.
- Up to 28.5% of symptomatic patients (including all children under three) will require assessment and treatment by a general medical practitioner or suitably experienced nurse.
- Up to 4% of those who are symptomatic may require hospital admission if sufficient capacity is available. Average length of stay for those with complications may be six days (ten if in intensive care).

#### 9.3.2 Health and social care demand

- A short epidemic would put greater strain on services than a lower-level but more sustained one.
- Hospitalisations and deaths are likely to be greatest if the highest attack rates are in older people. The lowest burden on healthcare might be associated with higher attack rates in adults aged 15–64.

- Total healthcare contacts for influenza-like illness could increase from around 1 million during a 'normal' season up to 30 million, given a 50% clinical attack rate during a pandemic, but it will not be possible to refine estimates until person-to-person transmission begins.
- New healthcare contacts for influenza-like illness can be expected to reach 11,000 per 100,000 population per week (50% clinical attack rate) during the peak pandemic period. Peak consultations during seasonal influenza periods in recent years have been between 200 and 250 per 100,000 population per week.
- Peak demand could last for one to two weeks and local epidemic waves for six to eight weeks.
- Most patients will be treated at home with antiviral medicines initially.
- Children within the normal weight range for their age who have high fever and cough or influenza-like symptoms should:

<b>Under 1 year</b> or at high risk of complications (due to severe co-morbid disease)	Be seen and assessed by a GP or hospital emergency department
<b>1–2 years</b>	Be seen and assessed by a GP or other health professional suitably qualified and experienced in the care of children
<b>3 years +</b>	Be assessed by the National Flu Line service using a clinically based paediatric triage protocol and referred for antivirals or to a medical practitioner if indicated.

- Assuming a complication rate of 25%, a 50% clinical attack rate and those under three needing to see a health professional, general practice can expect to see 3,135 influenza patients per 100,000 population per week at the peak.
- Some 2,000 per 100,000 population may require hospital admission for acute respiratory and related conditions at a 50% clinical attack rate – an increase of at least 50% on normal demand.
- Demand for hospital admission can be expected to increase up to 440 new cases per 100,000 population per week at the peak, given a 50% clinical attack rate, and will exceed available acute hospital capacity.
- Demand for critical care beds could rise up to 110 per 100,000 population per week at the peak, given a 50% clinical attack rate, and would exceed available capacity.

- An increase in the number suffering from influenza and its direct complications may be accompanied by other demands caused by anxiety and bereavement and by service provision challenges exacerbated by the depletion of the workforce and logistical difficulties.

Tables 4 and 5 estimate anticipated cases, healthcare contacts, GP consultations, hospital admissions and deaths based on a range of clinical attack rates and a uniform attack rate across all age groups.

**Table 4: Expected healthcare demand over the course of a pandemic**

	25% attack rate		35% attack rate		50% attack rate	
	Per 100,000 people	Per GP practice	Per 100,000 people	Per GP practice	Per 100,000 people	Per GP practice
Clinical cases	25,000	1,500	35,000	2,100	50,000	2,900
GP consultations	7,130	430	9,980	600	14,250	830
Hospital admissions (rate 4%)	1,000	60	1,400	90	2,000	120
Deaths (fatality rate 2.5%)	625	40	875	60	1,250	80

**Table 5: Expected healthcare demand during the peak of a pandemic**

	25% attack rate		35% attack rate		50% attack rate	
	Per 100,000 people	Per GP practice	Per 100,000 people	Per GP practice	Per 100,000 people	Per GP practice
Clinical cases	5,500	330	7,700	470	11,000	640
GP consultations	1,570	95	2,200	135	3,135	185
Hospital admissions (rate 4%)	220	15	310	20	440	30
Deaths (fatality rate 2.5%)	140	10	200	15	280	20

(Indicative demand per general practice is based on practice numbers from the Office for National Statistics.)

### 9.3.3 Finance and performance targets

As 'core' business is traditionally focused on those activities that relate to performance and financial targets, the UK health departments (directorates in Scotland) should recognise that decisions to modify or suspend some performance targets at UK alert levels 2/3 will be necessary. Further guidance will be issued in due course.

## 9.4 Healthcare delivery modes

Normal patient pathways and service delivery arrangements will need to be adapted in a pandemic scenario as additional demand saturates or threatens to overwhelm available capacity, staffing or other resources. Alternative arrangements and strategies need to be developed to cope with likely numbers and implemented as demand increases. These are likely to include:

- the introduction of a telephone-based initial assessment sift of all symptomatic patients and authorisation for antiviral collection or referral to general practice assessment by trained lay operators following clinically approved algorithms
- provision of a wider range of treatments by health professionals other than GPs (eg nurses, paramedics, pharmacists, dentists) following agreed guidelines and using prescription-only medicines under agreed authorisations
- care of patients, who under normal circumstances would be admitted to hospital, in their own home, residential setting or temporary intermediate facilities by GPs and community-based healthcare teams
- treatment of severely ill patients in areas of a hospital not normally used for providing acute medical care by medical and nursing teams who do not normally manage such patients
- treatment of patients in private healthcare facilities not normally used for acute medical care by healthcare teams that do not normally manage such patients.

The Department of Health will consult on any necessary changes to medicines or other legislation that may be required to implement these alternative operational arrangements.

## 9.5 Clinical guidance

The British Thoracic Society, British Infection Society and Health Protection Agency (HPA) have produced joint provisional guidelines for the clinical management of patients with an influenza-like illness during a pandemic. They describe the clinical features and cover assessment and treatment of adults and

children in hospital or community settings once cases are identified in the UK (alert level 2). The guidelines are regularly reviewed and updated, are based on optimal or most desirable care standards and may need to be varied to reflect capacity, shortages or constraints as the pandemic develops.

Guidance on the clinical management of patients with influenza-like symptoms during a pandemic is available at [www.brit-thoracic.org.uk/PandemicFlu.html](http://www.brit-thoracic.org.uk/PandemicFlu.html), [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu), [www.britishinfectionsociety.org](http://www.britishinfectionsociety.org) and [www.hpa.org.uk/infections/topics\\_az/influenza/pandemic/default.htm](http://www.hpa.org.uk/infections/topics_az/influenza/pandemic/default.htm)

## 9.6 Dealing with initial cases

If a pandemic emerges in another country, the UK would be at a heightened state of alert and an increased demand for advice and consultations can be anticipated for all kinds of respiratory tract infections, including many that would normally be managed using over-the-counter remedies. During any heightened alert period, it will be important to ensure that this demand is effectively managed to maintain service continuity.

The consultant responsible for communicable disease control in the relevant area will provide initial advice on patient management, containment strategies and follow-up actions. At UK alert levels 1 and 2 – and initially during level 3 – all patients fulfilling the case definition criteria and presenting with influenza-like symptoms should have samples taken and sent for virological and, if relevant, microbiological investigation.

Epidemiological information should be collected and forwarded to the HPA's central database for collation and analysis. Once activity is widespread (UK alert levels 3 and 4) treatment will be largely empirical. Virological tests are not routinely recommended or likely to be readily available and bacteriological testing should be informed by the current clinical guidelines. The HPA will maintain a detailed database for the first few hundred cases, switching to aggregate surveillance data thereafter.

## 9.7 Providing care in a community setting

Most sufferers are likely to experience typical influenza symptoms of varying severity that can usually be appropriately managed using an approach based on care in the home. Developing effective arrangements that ensure a sustainable community-based response providing for initial patient assessment, access to antiviral medicines, treatment of complications, home care and access to hospital care, should that become necessary, is therefore pivotal in all local plans.

GPs and community health teams will continue to provide the initial health response, and normal primary and social care delivery mechanisms may remain adequate and maintainable in the early and latter phases of a pandemic, although they will need to adapt significantly. Ceasing non-clinical activities and similar measures may make some additional capacity available but pressure on individual practices will be heavy, additional demand for care in the home will be high, and single-handed or smaller practices are likely to experience disproportionate difficulties caused by the absence of key staff.

In addition to maintaining essential provision for non-influenza patients, the resources and skills available in general medical practices should focus primarily on patients who:

- are suffering influenza complications
- are less than three years of age
- are pregnant
- have relevant pre-existing medical conditions
- are in identified 'at-risk' groups
- are not responding to treatment
- need higher levels of care but cannot be admitted to hospital
- need terminal care
- need bereavement support.

Differences in operational arrangements and organisational responsibilities may apply in Northern Ireland, Scotland and Wales. Each administration's country-specific plan will outline arrangements for the provision of care in community settings.

## **9.8 Supplementing primary care – arrangements in England**

Reinforcing individual practice and inter-practice service continuity arrangements, developing mutual aid, enhancing out-of-hours arrangements, providing for those who are unregistered or away from home and exploring the potential contribution of pharmacists and other healthcare professionals should form an integral part of planning by primary care organisations. Response plans should be developed in consultation with local professional representative committees. Normal primary care arrangements are likely to require significant supplementation as the pandemic wave or waves develop, and an effective support system during the peak week(s) of a pandemic should incorporate:

- 24/7 telephone-based access via the National Flu Line service for the majority of those patients who believe they are symptomatic, with an appropriate and timely response across the PCT area
- the use of non-clinical staff to provide initial telephone assessment for most patients and either to authorise the collection of antivirals or refer patients to their GP as appropriate (see section 9.8.1 and Figure 4)
- secure systems allowing for the collection of an antiviral treatment course and self-care leaflet by the patient's friend or relative from a designated centre or, exceptionally, home delivery (see section 9.9)
- advice to parents/guardians of symptomatic children weighing 15kg or less (under three years of age) to contact their general practice for assessment and antiviral solution
- prompt reference to a GP if history/signs/symptoms indicate influenza complications or failure to respond to treatment
- agreed and consistently applied clinical criteria and thresholds for hospital admission
- continuing provision for emergency treatment and for maintaining other essential primary care
- social support to help maintain patients in their home or residential setting
- protocols recognising that some symptomatic patients will present at accident and emergency departments, general practice, pharmacies or other health facilities irrespective of advice or plans
- arrangements for targeted vaccination as/when/if a suitable pre-pandemic or specific vaccine becomes available.

### 9.8.1 Telephone-based access arrangements (National Flu Line service)

Face-to-face clinical assessment for every patient will not be feasible at the peak of a pandemic, even assuming that most would be well enough to attend surgeries or other healthcare facilities. Department of Health analysis suggests that general medical practices will not be able to expand their collective telephone call-taking capacity sufficiently to meet the level of demand anticipated. Whilst patients may still choose to make contact via their GP surgery, call centres using trained call takers operating to a clinically based algorithm offer a viable and acceptable alternative.

To provide public information and advice before and during a pandemic, the Government – in conjunction with the Central Office of Information, and NHS

Direct and its equivalents in the devolved administrations – will establish a National Flu Line service at WHO Phase 5 (see also section 10.7).

From UK alert level 2 (WHO Phase 6), the service will expand to provide initial patient assessment and antiviral authorisation and both functions will then remain operational until the impact of the pandemic and the threat of further waves subside.

The key objectives of the National Flu Line service are to:

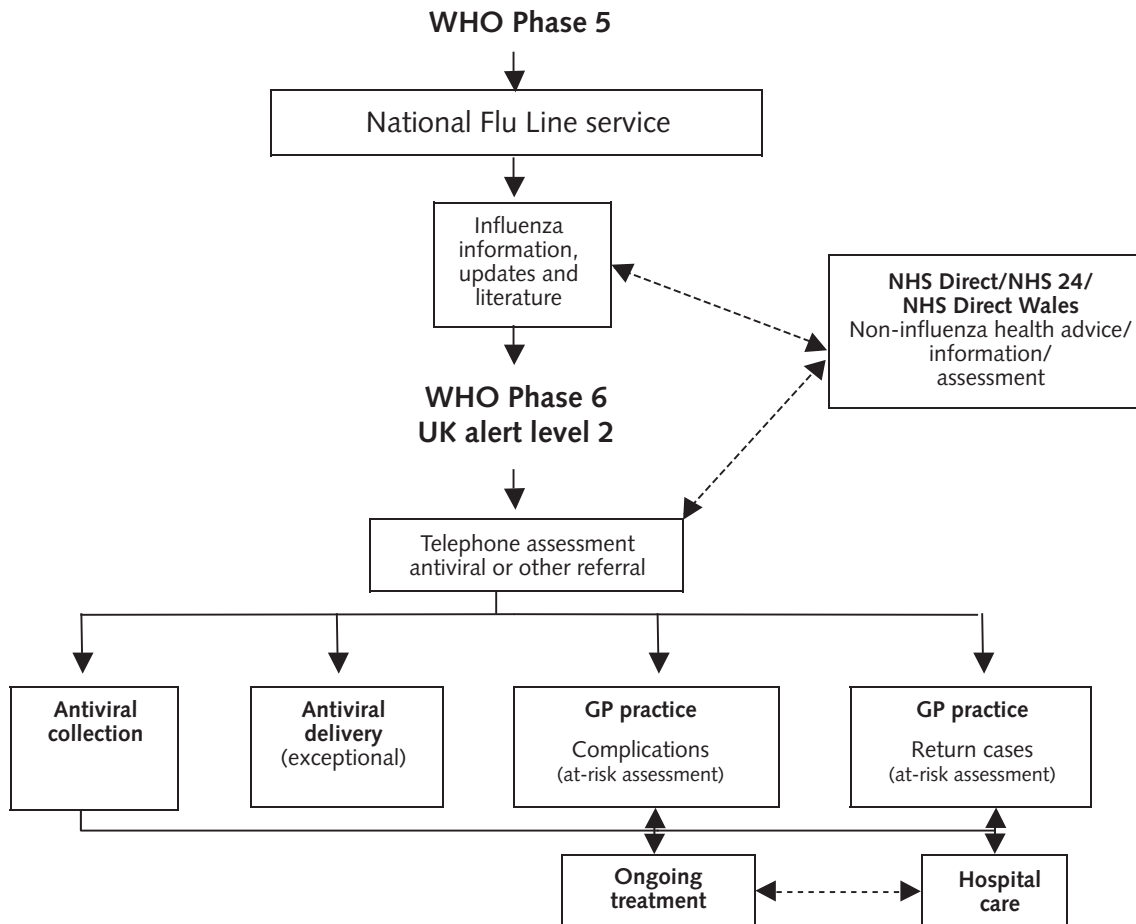
- provide pandemic influenza-related advice and information
- provide access to pandemic-related literature
- provide situation reports and daily updates
- provide access to mechanisms for rapidly assessing those suffering influenza-like symptoms
- authorise access to antiviral treatment (if that is indicated)
- give information on the nearest antiviral medicines collection point
- refer to some other part of the health and social care system if that is a more appropriate disposition
- facilitate the capture of critical surveillance information (number of people calling who are symptomatic, demographics of those accessing treatment, take-up of treatment etc) to inform the local and national pandemic response.

Initial assessment will focus on confirming that the caller has signs and symptoms of influenza, no indicators of complications, is aged three or over, has been symptomatic for less than 48 hours and antiviral treatment is not otherwise contraindicated. Suitably trained staff using a clinically based decision tree algorithm could perform these tasks and authorise the collection of antiviral medicines for the patient. Analysis suggests that, at a 50% clinical attack rate, such a service might need the capacity to handle a minimum of 11,000 influenza-related telephone calls per 100,000 population and 28 staff per 100,000 population per day to provide 24-hour cover during the peak week.

The Department of Health is developing a suitable algorithm and producing model protocols/guidelines to allow the supply of oseltamivir (Tamiflu) following a telephone assessment. It also proposes to make the necessary amendments to medicines legislation to enable alternative prescription and supply arrangements in a pandemic and will be consulting on the proposals (in conjunction with the Department for Health, Social Services and Public Safety, which is responsible for medicines in Northern Ireland).



Figure 4: Proposed model of care from a patient's perspective



### 9.8.2 Local influenza health coordination arrangements in England

Each PCT will need to establish and resource an effective mechanism for directing and coordinating the local health response.

In terms of functionality that should:

- act as a focal point, providing a link to and oversight of the local health response
- monitor and coordinate the overall health response on a pan-organisational, whole-systems basis
- maintain the continuing provision of general practice and primary care services both in and out of hours
- collect, collate and report information on the local health situation
- link with social care and other agencies to support the delivery of care and to maintain patients at home

- provide a local link and health input and advice to the wider local coordination arrangements
- ensure that national messages are cascaded and reinforced and that the public are well informed and advised of local response arrangements.

Further guidance on the provision of care in a community setting in England is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## 9.9 Providing rapid access to antiviral medicines

In order to limit the spread of infection and maximise individual health benefits, patients should take an antiviral medicine as soon as possible after the onset of symptoms – ideally within 12 but in any case within 48 hours. Therefore, rapid antiviral provision is an important planning aim. At the initial stages of a pandemic, any patient who has been symptomatic for less than two days should be offered treatment with antiviral medicines unless contraindicated, although this policy will be reviewed as information on the actual attack rate, clinical impact, optimum dosage regime, stock consumption, any resistance and timeframe within which treatment remains useful emerges.

During WHO Phase 6 (UK alert level 2), initial allocations based on a 25% clinical attack rate and their resident population will be pre-distributed to PCTs (and their equivalents in Northern Ireland and Wales). In Scotland a proportion of its national stockpile has already been pre-distributed to the NHS health boards (5% to mainland boards and 10% to the island boards). Subsequent supplies will be adjusted to reflect the actual attack rate, transient populations and supply position. Response plans should provide for local distribution to hospitals, health establishments, closed institutions and GPs, and should ensure that supplies are conveniently accessible to those local communities from pre-designated collection points (which are likely to include some community pharmacies) across the area. Storage and distribution arrangements should address the need to protect stock and staff security in consultation with the police and local pharmacy adviser. Self-management advice leaflets, information and contacts for support should also be available at these antiviral collection points.

In England, plans should assume that a friend or relative will be available to collect the patient's antiviral treatment course from the designated collection points on production of authorisation from the National Flu Line service or nominated health practitioner. Pre-pandemic messages will ask everyone to try to arrange such helpers ('flu friends'), but for the small proportion unable to do so, alternative arrangements such as a home delivery service by courier/taxi should be developed.

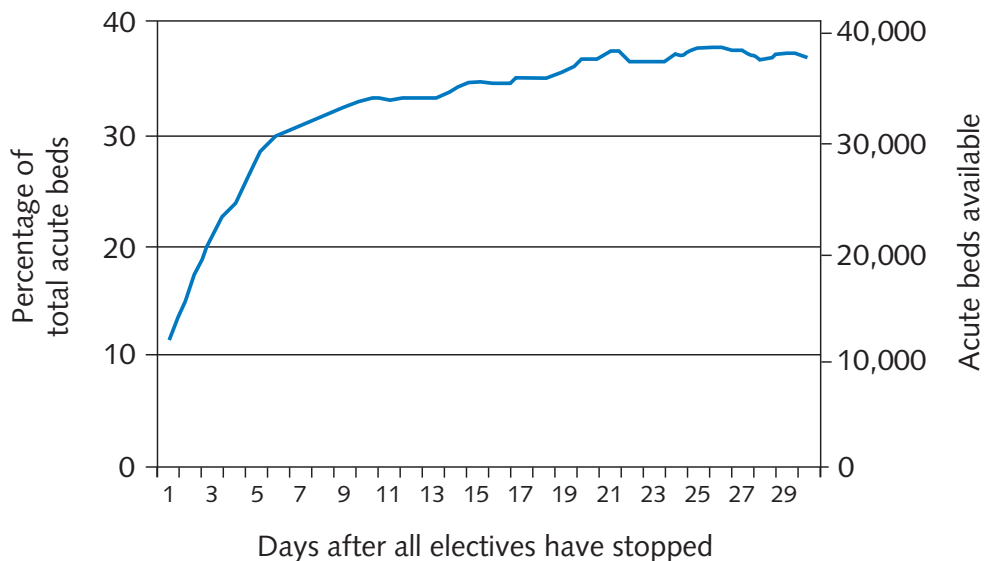
## 9.10 Essential medicines

Demand for essential medicines and over-the-counter remedies is likely to be high in a pandemic and resupply may be uncertain. The Department of Health and the devolved administrations are reviewing available stock levels and working with the pharmaceutical sector and others to consider enhancing stocks, improving supply chain resilience and considering other options for meeting demand and maintaining supply. There will be a consultation on proposed changes to medicines legislation and related regulations, designed to ensure adequate patient access, with a view to implementing those changes in the event of a pandemic.

## 9.11 Hospital admission

Although adults with uncomplicated influenza infection do not usually require hospital treatment, patients with worsening pre-existing medical conditions or suffering influenza-related complications such as bronchitis and pneumonia may need referral. Children with severe illness may also need referral for assessment for admission. Normally, there are some 159,600 beds (including day beds) in use across the UK, of which 3,900 are for patients requiring critical care. Generally, bed utilisation tends to be high (85%) and analysis suggests that it would be possible to release almost 33% of the total acute bed capacity – almost 40,000 in England – within five to ten days of any decision to cease elective work (see Figure 5).

**Figure 5: Acute care bed availability for pandemic influenza in England**



Even with this additional capacity – and the implementation of other measures to improve utilisation and supplement availability – the expected level of additional demand, combined with increased staff absences and possible increases in length of stay, will make hospital overcrowding inevitable and capacity a major limiting factor. Other limiting factors, such as shortages of medical supplies (including blood and blood components) and limited availability of diagnostic support services, are also likely to have an impact. In particular, hospitals may need to be prepared to respond to the probable activation of the NHS integrated national blood shortage plans in the event of any collection or processing difficulties.

Estimates suggest that existing hospital capacity may only meet 20% to 25% of the expected demand at the peak. Further guidance on developing ‘surge’ capacity will be available in due course. It is highly probable that proportionate admission thresholds based on the clinical management guidelines will need to be agreed and progressively applied. Consistency and equity in the application of such thresholds will be an important factor in gaining public understanding and maintaining confidence. Common understanding and interpretation of those guidelines by health professionals at the primary, secondary and social care interfaces are particularly important.

Therefore, local response plans should focus primarily on ways of supplementing and making the most effective use of staffing and beds, with particular attention to factors that facilitate rapid discharge arrangements. Plans should also address establishing alternative care sites, utilising private hospital/clinic facilities, staffing, other options for increasing capacity and whether to designate some hospitals for influenza cases.

Internal hospital plans should consider pharmaceutical and other supplies, practical changes in configuration to segregate influenza patients, flexible staffing and other changes to normal practices that may free up or improve the utilisation of beds, improve throughput and maintain infection control. Hospitals should also consider such factors as limiting the spread of infection, security of staff/supplies and the control of exit/entry.

## **9.12 Emergency departments**

In a pandemic, all symptomatic patients will be advised to stay at home, seek help by calling the National Flu Line service and not attend surgeries or health facilities unless by prior arrangement, but contingency arrangements should recognise that some self-referral is inevitable. The level of self-referral is likely to be significantly higher if there are breakdowns in primary care provision, loss of confidence or access difficulties in provision for assessment, treatment or antivirals both in and out of hours. The interface between hospital and primary

care arrangements, therefore, needs joint review and appropriate protocols agreed with primary care and PCT representatives at the planning phase. Hospital pandemic plans should also ensure that measures are in place to:

- control entry
- immediately identify, assess and separate symptomatic patients prior to and during assessment and treatment
- protect staff and control contamination of emergency facilities
- provide appropriate treatment and/or self-management advice
- manage patients according to agreed protocols
- monitor and review the effectiveness of these arrangements.

### 9.13 Critical care

Estimates suggest that up to 25% of the symptomatic patients who would warrant admission to hospital if sufficient capacity were available may require critical care. The indications for transfer to a high dependency or intensive therapy unit (HDU/ITU) in those infected by influenza are no different when compared with other patients and most will have influenza-related pneumonia or a severe exacerbation of underlying co-morbid illness.

Demand, particularly for ventilation, is likely to exceed available resources rapidly as the pandemic develops, even where all possible local measures to supplement and expand capacity have been implemented. Prioritisation of all patients on an individual basis matched against available resources will become necessary, and additional guidelines for clinical management are being developed jointly with the Intensive Care Society.

Further guidance on hospital planning and critical care aspects is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

### 9.14 Blood, tissue and organ donation

Continuation of blood, tissue and organ supply will be vital to the provision of emergency healthcare. Health messages should encourage the public to continue to give blood and healthcare providers should promote and encourage tissue and organ donation. NHS trusts will often be contacted in emergencies by members of the public wishing to donate blood. Such callers should be referred to the National Blood Service on 0845 7 711 711 or visit [www.blood.co.uk](http://www.blood.co.uk)

## 9.15 Ambulance services

Demand on ambulance services is likely to increase significantly in a pandemic scenario, particularly if the capacity available in primary care proves insufficient to ensure a timely response. The primary focus of service continuity plans is the maintenance of capacity to answer all emergency and urgent calls, although some prioritisation and reduction in normal response time standards may become unavoidable. Plans should also recognise the need to facilitate rapid discharge or transfer arrangements and explore opportunities to utilise any organisational and communication capacity that services may have available from the curtailment of non-essential activities to support the delivery of home care to influenza sufferers.

Pandemic-specific pre-hospital patient assessment and treatment protocols should recognise that hospital capacity will be extremely limited, emphasising treatment at home and ensuring that only patients with life-threatening conditions are actually conveyed to emergency departments. Local response plans should also consider the extent to which the field assessment and treatment skills of ambulance staff could be utilised to support the wider delivery of home care.

Further guidance on ambulance planning is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## 9.16 Mental health

Mental health establishments will face specific challenges. Many, particularly those providing secure care, are relatively closed environments with the attendant risk of rapid spread of influenza amongst patients and staff. The welfare of patients being cared for in the community is largely dependent on staff availability for domiciliary visits and the supply of psychopharmacological agents necessary to maintain health.

Contingency plans should include infection control measures to minimise the spread of influenza in residential establishments, based on the assumption that it will not be possible to move those with significantly disturbed behaviour to other settings, and should contain explicit agreements for utilising available staff according to greatest need. Community services should also consider how to prioritise resources to identify vulnerable individuals, help them to take appropriate precautions against infection and provide support should they develop influenza.

Mental health trusts may also experience increasing demands on services due to the impact of the pandemic on individuals and families, and the skills and experience of their staff may be particularly helpful in the development of

mechanisms for counselling and support. The Department of Health is currently developing further guidance for mental health trusts in England.

### 9.17 Pharmacy

The contribution that pharmacies can make in a pandemic scenario will depend on the setting in which they routinely provide services and the qualifications, expertise and area of practice of their pharmacists. Community pharmacies are often located in the heart of communities. They can make an important contribution in support of self-care, dispensing/repeat dispensing of routine medicines, signposting other NHS services, supplying regular medicines to vulnerable people such as residents of care homes or those with long-term conditions and maintaining medicine supplies under contracts with other bodies such as mental health trusts, hospices and prisons as far as possible.

To ease pressure on GP surgeries and community services, new powers may be given to community pharmacists (subject to consultation and parliamentary approval) to supply medicines and provide pharmaceutical services in a more flexible manner. Formal consultation will precede any proposed changes to legislation.

Hospital pharmacists and their staff will play an important part in making the best use of available medicines including the appropriate use of patients' own medicines and facilitating the discharge of patients with adequate supplies of medicines. Where there are shortages of some medicines, pharmacists are well placed to advise on the use of alternative medicines that have a similar effect. Pharmacies will play an important part in educating the community, providing positive health messages and advising patients and members of the public on medicine supply issues.

As the pandemic escalates, some of the routine functions and services provided by pharmacies may have to be reduced, or stopped for short or longer periods, as demands increase elsewhere. Specialist clinical pharmacists may be able to support doctors and other healthcare professionals in all settings, including primary care, hospitals and the community. Pharmacists working in primary care could also be deployed to support GPs in their practices or in community pharmacies.

### 9.18 Dentistry

Current infection control advice suggests that health professionals should avoid aerosol-generating procedures on symptomatic patients as far as possible during a pandemic and wear respirators and suitable protective equipment where that is not possible. Many dental procedures have the potential to generate aerosols

and risk assessments will therefore be necessary. Local plans should ensure that emergency care remains available throughout a pandemic, but dental practitioners may find normal demand reduced because of limits on the procedures they are able to carry out on those with respiratory symptoms and patients themselves deferring treatment or facing travel difficulties. Local planning should explore opportunities to use the assessment and treatment skills of dental practitioners or other health professionals to support the wider delivery of healthcare in a pandemic.

### 9.19 Prison health

HM Prison Service has an established Influenza Pandemic Working Group, which reports directly to the Cabinet Office to inform planning for managing the impact upon the prison system. This group has wide-ranging representation from partners, including the Department of Health, Prison Escort and Custody Services, Civil Contingencies Planning Office, UK Immigration Service and the National Probation Service.

The Prison Service instruction for prison governors, *Contingency Planning for Pandemic Influenza*, was issued to all governors in October 2006. This sets out the requirements and parameters for the preparation of governors' plans to meet the contingencies of pandemic influenza. Plans are to be signed off as fit for purpose by area managers, with prison senior medical staff involved at all stages of planning. The governor must establish links with the local health protection unit and the PCT to finalise arrangements for antiviral access and infection control management, and to adapt local community policies to a prison setting. This is necessary to establish the appropriate lines of command and control between the governor, the consultant in communicable disease control and the Director of Public Health. This agreed division of authority and responsibility must be specified in the contingency plan.

In addition, *Planning for Pandemic Flu in Prisons and Places of Detention* will provide guidance for governors and healthcare staff on the management of specific issues identified. This guidance is informed by evidence-based practice where that exists for specific interventions or actions.

### 9.20 General principles of containment and infection control

Specific infection control guidance is available for hospitals, primary care and some other settings but, generally, limiting the transmission of pandemic influenza requires the application of tried, tested and proportionate basic infection control measures such as:

- staff and public education



- local risk assessments to inform decisions on control and protective measures as required by the Control of Substances Hazardous to Health Regulations 2002
- documenting proportionate procedures, operational protocols and checklists
- the consistent application of good hygiene and infection control measures
- timely recognition of symptomatic patients
- segregating (isolating) symptomatic patients in their homes and limiting external contact
- using voluntary quarantining measures if necessary
- clustering symptomatic patients who are in hospital, residential homes or other closed establishments in specific wards or designated areas
- ensuring that staff are well informed about and adhere to procedures for the prevention of influenza transmission
- providing personal protective equipment if occupational risk assessments have indicated that to be necessary, and ensuring that staff are trained in its correct wear, limitations and use
- implementing enhanced cleaning routines to minimise the risk from contact with hard surfaces.

Further guidance on infection control measures is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu) and [www.hpa.org.uk/infections/topics\\_az/influenza/pandemic/fluplan.htm](http://www.hpa.org.uk/infections/topics_az/influenza/pandemic/fluplan.htm)

### 9.21 Face masks/respirators in care settings

Various types of surgical face masks and respirators are available, offering differing levels of protection and meeting agreed European and/or international normative standards. WHO recommends the use of surgical masks and particulate respirators at 95% efficiency by healthcare workers during a pandemic and that symptomatic patients could themselves wear surgical masks to protect others if circumstances make it absolutely necessary for them to leave home and logistical arrangements allow. However, standard Health and Safety Executive guidance calls for higher specification FFP3 respirators for healthcare workers whenever respiratory protection is indicated in the UK, although it recognises that this may not be sustainable in the special circumstances of an influenza pandemic. Based on available evidence and current UK pandemic influenza infection control guidance:

- fluid-repellent surgical masks should be worn by healthcare workers who may be in close and/or frequent contact (within one metre) with symptomatic patients
- FFP3 standard disposable respirators should be worn when carrying out clinical procedures likely to generate aerosols of respiratory secretions from infected patients (eg dental drilling, intubations, aspiration), although such procedures should be avoided as far as possible. It should particularly be noted that fit testing and specific training are essential.

## 9.22 Other protective equipment

If close contact with an influenza-infected patient is considered inevitable or highly likely, health workers should adopt sensible barrier precautions in addition to face masks. Disposable protective equipment, such as aprons and gloves, provide a physical barrier and help avoid spreading contamination. Although the ocular route is not regarded as a major route of transmission for normal human influenza viruses, it is nevertheless biologically plausible and eye protection (preferably disposable) may be necessary when carrying out aerosol-generating procedures or if risk assessment indicates that this is necessary.

Further guidance for employers is available at [www.hse.gov.uk/biosafety/diseases/pandemic.pdf](http://www.hse.gov.uk/biosafety/diseases/pandemic.pdf)

## 9.23 Coping with stress and bereavement

In the lead-up to a pandemic, many are likely to be anxious, apprehensive and to have their own subjective perception of the degree of risk. As the pandemic develops, they may also feel fears for their own health, grief for loss of relatives or friends, concerns for family members, a sense of social isolation or other potential causes of psychological distress. Whilst most are likely to be resilient enough to cope with little or no professional or specialist intervention, local plans should consider how self-help and other explanatory material might be made available, how those experiencing particular problems can access assistance and how mental health services, voluntary organisations and social care agencies might best be organised to offer support.

## 9.24 Social care support

Effective contingency arrangements developed jointly by health and social care agencies will be critical to the relief of suffering and to achieving the wider public health aims of keeping symptomatic patients at home, caring for them in a community setting and reducing the burden on healthcare facilities. Estimates suggest that up to 1.7 million adults rely to varying extents on social care

support provided by or through local authorities. Those services cover a wide range of needs such as care in residential/nursing homes, day centre provision, meals on wheels, home care and personal assistant schemes. The 2001 census also indicated that over half a million people care for a relative or friend for between 20 and 49 hours per week – and over 1 million people for over 50 hours a week – in England and Wales. Many of these informal carers will be affected over the pandemic period and alternative care arrangements may be required.

Social care providers are aware of, and are in regular contact with, many vulnerable individuals in the community, and those clients might be either more vulnerable to, or more affected by, pandemic influenza. In addition to maintaining services for those who will continue to rely upon them, social care providers must also anticipate additional short-term and short-notice demand from influenza sufferers no longer able to cope independently and others whose normal care arrangements have been disrupted. Voluntary, private or independent sector organisations provide many of the services on contract and all forms of social care provision will need factoring into local contingency plans. Key challenges in maintaining social care services include:

- sustaining indirect care services that form an essential lifeline for some people, eg meals on wheels, provision of community equipment, community alarm services, with reduced staff
- meeting the additional burden on already overstretched local social care services and intermediate care services due to the additional pressures on acute hospital beds
- ensuring that the necessary lines of communication exist to relay essential national, regional and local messages to the diverse range of social care services across all sectors (statutory, voluntary, independent and private)
- relieving additional pressures on caring time to support care home residents and people cared for in their own homes when they have influenza
- sustaining people with complex disabilities who are currently supported with intensive care packages in the community
- providing emergency respite care for vulnerable people looked after at home by informal carers for the period their carer is ill
- maintaining a balance between appropriate safety and infection control measures and ensuring that the quality of life of vulnerable adults is maintained as far as possible.

## 9.25 Staffing

The availability of sufficient human resources is critical to the maintenance of all health and social care. Therefore, planning for optimum staffing levels should be a key focus for influenza pandemic preparedness.

In England, the Department of Health is working with NHS Employers to produce guidance for human resource management during a pandemic, which will be available in due course.

An influenza pandemic will put staff under considerable pressure and there are likely to be conflicts between staff members' professional and/or contractual obligations, personal or family responsibilities and concerns about risks.

The forthcoming guidance on human resource issues will have relevance to the ethical and professional obligations of staff. When this guidance is available, trusts will need to work with staff to explain what will be considered appropriate professional practice mechanisms to support them in resolving any ethical dilemmas that may arise out of their work.

# 10 Communication and public engagement

## 10.1 Current perceptions and understandings

Preparing for, responding to and recovering from an influenza pandemic will depend significantly on cooperation between the Government, public authorities, business, non-governmental organisations, the voluntary sector and individuals. An effective two-way communication strategy that positively engages each of these key groups prior to and during a pandemic is therefore a major strand of the Government's preparations. Any emergency on this scale also needs strong national direction of public information from the outset. Timely advice and information will help prepare the population for the potential impact of a pandemic and will be critical to its subsequent management.

Research commissioned by the Department of Health suggested that the general level of awareness and understanding of influenza amongst health professionals and the public is very limited. Influenza itself is not generally regarded as a serious illness except by those within traditional 'at-risk' groups and there is general confusion between antiviral medicines and vaccines, and their availability for treatment. 'Bird flu' is frequently confused with pandemic influenza, making pandemic communications prone to misinterpretation, and it is widely assumed that effective medical countermeasures will be available. Media information is perceived as sporadic, inconsistent and not associated with communications from the Government (even when Government spokespeople are quoted).

## 10.2 Aims and objectives

The main aims of the Government's communication and public engagement strategy are to:

- improve general awareness and understanding of influenza amongst the population and promote good hygiene and other general precautionary measures
- prepare the country for the probable emergence of a new or re-emerging influenza virus and explain what is being done to detect any such virus and prevent its spread
- achieve public support for national response and contingency measures
- explain the uncertainties and what can be done by the Government, the NHS, other organisations and individuals to reduce the impact of a pandemic and some of the constraints that entails
- encourage discussion of pandemic response options, limitations and constraints in an inclusive and transparent way
- mobilise the population as partners at the response phase

- convey accurate, timely, consistent and credible advice and information to the public (including all hard-to-reach groups), professions and businesses at the response and recovery stages
- provide advice and information for travellers and UK citizens overseas and for foreign residents and visitors in the UK
- provide specific advice on response strategies and tactics as the actual characteristics and impact of an emerging virus are identified
- provide multilingual information on how assessment, healthcare and other support services should be accessed by symptomatic patients
- encourage the continuity of normal and essential activities as far as possible
- uphold the rule of law and democratic process
- promote individual and social responsibility
- address the needs of all groups.

During the inter-pandemic period, the main objectives are to provide accurate advice and information, encourage the adoption of high standards of personal hygiene and prepare the population for the emergence of an influenza pandemic and its potential impacts. During any period of increased alert and throughout the response phase, the objectives are to promote and reinforce individual and collective actions that reduce the spread of influenza and minimise its health and wider impact on the UK.

### 10.3 Key elements

The key elements of the Government's communication and public engagement strategy are:

- encouraging prior public debate to explore the ethical, professional and practical implications of an influenza pandemic, condition public expectations and ensure that decisions are made in an inclusive and transparent way
- active media engagement to ensure that timely and accurate information and technical explanations are available to support informed reporting
- provision of open access to various direct sources of accurate and current information such as telephone helplines and websites
- research and pre-testing to identify communication priorities and ensure that messages are clear and effective and meet public needs

- multi-media and multilingual public information campaigns delivered directly and/or through healthcare and service providers
- specialist advice and information for particular settings and sectors
- clinical information to support healthcare professionals in primary and secondary care
- rapid information sharing within and between all sectors.

#### 10.4 Government News Co-ordination Centre

The Government's News Co-ordination Centre (NCC) is set up to manage the communications aspects of a crisis, major emergency or other disruptive challenge. In any period of increased alert and during a pandemic, the NCC will become operational in support of the Department of Health as the lead government department. It will work to the policy direction of the Cabinet Office Briefing Room to ensure that messages from central government departments are consistent and coordinated at national and regional levels, and explain national or international differences in response. A government media centre will also be established.

#### 10.5 Cascading information

The Department of Health will inform the Cabinet Office, the health departments of the devolved administrations (directorates in Scotland) and the Health Protection Agency (HPA) should the World Health Organization (WHO) declare a pandemic or update threat assessments. The Cabinet Office will alert other government departments and work with the Department of Health to develop, update and circulate top-line briefings via the NCC. The Department of Health will also alert health and social care organisations and professionals in England through strategic health authorities and via the Chief Medical Officer's established public health link mechanism. Similar arrangements are in place in the devolved administrations. Messages would include clinical information for health professionals. Other government departments will arrange sector-specific briefings.

Foreign nationals visiting or resident in the UK should maintain contact with their respective embassies, which should receive regular briefings, advice and information from relevant government departments.

#### 10.6 Health communications

The Department of Health will be the primary source of health-related messages and will work closely with the Cabinet Office, the devolved administrations,

other government departments and the HPA to deliver a nationally coordinated communication strategy. Effective internal two-way communication will also be vital to an effective response in a pandemic. Strategic health authorities/boards will play a key part in linking to health services and will support and coordinate the activities of primary care trusts and other local NHS organisations in delivering locally tailored press notices and key fact sheets, and in identifying suitable spokespeople.

All mainstream information and campaign materials need to be accessible to the widest possible audience, including hard-to-reach groups. Explanatory leaflets, a guide explaining pandemic influenza and other informative material are already available on the web. An information pack has been distributed to GP surgeries, pharmacies and NHS Direct call centres and walk-in centres. Plans for a print and broadcast advertising campaign and a public information film have also been developed and will be held on standby. A national leaflet door drop will be activated at WHO Phase 5.

Chief Medical Officers have an important professional leadership role in a pandemic. In conjunction with expert groups, professional bodies and health protection agencies, they will provide multidisciplinary advice and information and may need to adapt initial guidance as the characteristics of the emerging influenza virus become more apparent or if pressures on capacity, pharmaceuticals or other supplies make tactical changes necessary.

Further information on health communication in a pandemic is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

## **10.7 Public information and advice (National Flu Line service)**

From WHO Phase 5, the Government will make public information, advice, access to literature and updated situation reports available through the National Flu Line service (see also section 9.8.1).



# 11 Pandemic influenza – key national decisions/actions

Before and during a pandemic, decisions about how best to protect and assist the whole population will need to be based on the likely effectiveness and proportionality of the response measures, ethical considerations, the availability of countermeasures and acceptability. Such decisions also need to be capable of translation and communication in the form of consistent and easily comprehensible public advice. Implementing mitigation or response measures that are not proportionate, effective or ethical – or doing so at too early or too late a stage – will damage public confidence and have undesirable health, economic and social consequences.

During a pandemic, some elements of the Government's response are likely to require implementation in the face of incomplete information, or in the context of an evolving picture of the disease and its impacts. As a result the response, and any public health or wider measures, are likely to shift and change as the pandemic evolves, further information becomes available and impacts are better understood. Even if the novel virus were to emerge elsewhere, the UK warning period may be as short as two to four weeks, giving little time to obtain and evaluate available epidemiological or scientific information or review and refine planning assumptions.

Given its compact area, population density and other demographic features, internal spread within the UK is also likely to be rapid – with its peak possibly at 50 days – all limiting the potential effectiveness of planning for a layered, graduated or localised approach. Dealing with a novel virus that first emerges within the UK would place even more reliance on the effectiveness of pre-planning and require a much more rapid operational reaction. For planning purposes, the following tables suggest some of the key decisions/actions that are likely to be required at various alert stages and levels, if the pandemic were to originate outside the UK. It is not – and cannot be – comprehensive or prescriptive. When a pandemic arrives, national and local response decisions must be based on the actual observed severity and spread of the outbreak, its effects, the practicality, effectiveness, benefit, impact and acceptability of available countermeasures and public reaction.

Table 6: Key national decisions/actions

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CO	DH	DAs/ OGDs	CMO	Other		
WHO Phase 3							
Monitor risk to UK and potential effectiveness of available intervention strategies	✓	●	● DAs Defra	●		Scale, impact and spread in affected areas	WHO/DH/ Defra/ DAs/OGDs
Maintain disease surveillance arrangements and international contacts		✓	● DAs	●	● HPA	Surveillance reports	DH/Defra/ HPA/DAs
Commission scientific/specialist assessments	✓	✓	● OGDs	●	● HPA	Impact/spread/ characteristics of emerging virus	WHO/ECDC/ HPA/CSA
If necessary revise advice to travellers	●	●	✓	FCO	●	Scale and spread of influenza	WHO/ECDC/ HPA
Respond to any request for UK support	✓	●	✓ FCO DFID	●	● HPA	International situation reports	WHO/FCO/ DFID
Test all critical national infrastructure preparedness and response plans	✓	✓	✓ DAs OGDs		● all pro- viders	Audit and assessment reports	All essential service providers

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
WHO Phase 4							
Activate CCC (COBR)	✓		●	●		Monitor and coordinate UK response	WHO/DH/HPA
Monitor international developments	✓	✓	● Defra	●	● HPA	International situation reports	Governments/ WHO/OIE/ ECDC/HPA
Revise risk and impact assessment	✓		●	●	●	Mortality/ morbidity/ spread	WHO/DH/ HPA
Instigate heightened internal surveillance/ review reporting and investigation arrangements	●	✓	✓ DAs	●	● HPA	Monitoring reports	HPA/SHAs
Review arrangements for investigating and managing any suspected cases in the UK		✓	✓ OGDs	●	● HPA	Emerging epidemiological information	WHO/HPA
Review travel links and advice/ information for travellers	●	●	✓ FCO	●	● HPA	Emerging epidemiological information	WHO/ECDC/ HPA
Review all planning assumptions/ presumptions including case for travel/entry restrictions	✓	✓	●	●		Attributes of emerging virus	WHO/HPA/ CSA/SAG/ modellers

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
WHO Phase 4							
Review implications/ advice for farming/poultry industries	●		✓ Defra DAs			Emerging virus source and impact information	WHO/OIE
Review/test NHS/ social care/essential service arrangements including those for supplementing supply and distribution of essential medicines/supplies	✓	✓	✓ DAs	●	● SHAs LAs	Assessment of anticipated health impact	WHO/HPA/ specialist advisers
Confirm/test data collection and coordination arrangements	✓	✓	✓ DAs		● HPAs	Agreed data set	Regional/local resilience and health organisations
Review options for use of pre-pandemic vaccine stocks		✓	✓	✓	✓ HPA	Options for effective use	SAG/UKNIPC/ JCVI
Review progress on developing a pandemic specific vaccine and arrangements for manufacturing and UK supply		✓	✓	✓	✓ HPA	Identification and characteristics of new subtype of emerging virus. Information from researchers/ vaccine manufacturers	WHO/ECDC/ EMEA/HPA/ NIBSC/CSM/ JCVI/MHRA/ CSA
Audit/review arrangements for additional deaths	✓		✓			Feedback	Local authorities

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
WHO Phase 5							
Revise risk and impact assessments and arrangements for international coordination	✓	●	● DAs OGDs	●	● HPA	Epidemiological and wider impact	WHO/ECDC/ HPA
Place cross-government emergency management structures/ procedures on standby	✓	✓	✓ DAs	●		Information on international developments	WHO/ECDC/ HPA
Review UK assumptions, presumptions and proportionate intervention strategies	✓	●	● DAs OGDs	●	● HPA	Information on international developments	WHO/ECDC/ HPA
Revise advice and information for travellers and UK nationals abroad and consider repatriation arrangements	●	●	✓ FCO	●	● HPA	Information on international developments	WHO/ECDC/ HPA
Review travel links and any case for border controls/ screening or restrictions	✓	●	● FCO DfT	●	● HPA	Actual data and modelling	WHO/EU/ HPA/academic institutions/ expert advisers
Alert health service and professions, enhance surveillance/ diagnostic capability		✓	✓ DAs	●	● HPA	Recognition/ testing/ treatment protocols	HPA/advisory bodies

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
Alert UK advisory bodies and convene as necessary	●	✓	●	●		Emerging epidemiological clinical and scientific information	WHO/ECDC/OIE/HPA
Place all response and coordination arrangements on standby	✓	●	✓ DAs	●	● HPA	Emerging epidemiological and impact data	WHO/ECDC/HPA/other governments
Place arrangements for dealing with additional deaths on standby	✓		✓ DAs			Local/regional feedback	Local authorities
Test response, communication and coordination links and instigate daily reporting	✓	●	●	●	● HPA	Audit feedback	Operational agencies
Agree and implement arrangements for pre-pandemic vaccination	●	✓	✓ DAs	●		COBR decision	WHO/ECDC/HPA/DAs/OGDs
Activate National Flu Line service, national door drop leaflet and other arrangements to inform and prepare the population	✓	✓	● DAs COI	●	● HPA	COBR decision	WHO/ECDC/HPA/DAs/OGDs
Review arrangements for supplementing all essential health supplies/ countermeasures and prioritisation should that be required	✓	✓	✓ DAs OGDs			Impact assessments and forecasts	COBR

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
WHO Phase 6 UK alert level 1							
Recommend proportionate response strategies	✓		✓		● DAs	Impact assessments and forecasts	WHO/ECDC/ HPA
Revise information for travellers and advice for UK nationals abroad	●	●	✓ FCO	●	● HPA	Impact assessments and forecasts	WHO/ECDC/ HPA
Review travel links and any case for border controls, screening or travel restrictions	✓	●	●	●	● HPA	Actual data and modelling	WHO/EU/HPA/ academic institutions/ expert advisers
Prepare guidance on association risks to children when schools close	●	●	✓ DAs DCSF	DIUS	●	Emerging data	WHO/EU/HPA/ NHS/academic institutions/ expert advisers
Place response and reporting arrangements on immediate alert	✓	✓	✓ DAs		●	Progress reports	WHO/HPA
Activate NCC and step-up public information and health advice campaign	✓	✓	✓	●	● HPA	Progress reports	COBR/DH/ HPA
Review/revise patient management protocols, admission criteria and clinical guidelines		✓	✓ DAs	●	● HPA	Emerging clinical data	WHO/ECDC/ HPA
Prepare to expand National Flu Line service capability to assess patients	●	✓		●	●	Progress reports	WHO/HPA

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
UK alert level 2							
Revise threat assessment and implement appropriate wider response measures	✓	●	●	●	● HPA	Outbreak progress and forecasts	DH/HPA/NHS
Alert NHS, social care and all key stakeholders	✓		✓		✓	Outbreak progress and forecasts	DH
Implement heightened surveillance/ virological testing/reporting arrangements	●	✓	✓ DAs	●	● HPA	Outbreak progress and forecasts	NHS/HPA
Activate patient assessment/antiviral capability of National Flu Line service and local coordination links	●	✓		●	● NHS HPA	Outbreak progress and forecasts	NHS/HPA
Alert primary care and all professional groups		✓	✓ DAs	●		Outbreak progress and forecasts	NHS/HPA
Authorise SHAs (England) to move NHS to essential care only when required		✓	✓ DAs	●	● SHAs	Outbreak progress and forecasts	HPA/ advisory groups
Consider timing/implementation of wider non-pharmaceutical measures	✓	●	✓ DAs	●	● HPA	Impact assessment/ scientific advice	Field information and expert advice/ forecasts
Distribute initial antiviral stocks to PCTs		✓		✓	DAs	Population and emerging pandemic data	ONS/HPA



Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
<i>UK alert level 2</i>							
Update public advice and information	✓		✓		✓	Prepared material and updates	NCC/DH/HPA/OGDs
Monitor/review effectiveness of initial case management/investigation		✓	✓ DAs	●	● HPA	Operational feedback	SHAs/PCTs/ NHS/HPA
Monitor/review wider interventions/impacts	✓	●	● DAs OGDs	●		Operational feedback	Operational agencies

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
<b>UK alert level 3</b>							
Revise threat assessment and review planning assumptions	✓	●	● DAs	●	● HPA	Feedback/ projections	Regional/ operational agencies/scientific advisers/ modellers
Review/implement additional mitigation measures, authorise agreed statutory/regulatory derogations and any relaxations	✓	●	● DAs OGDs	●	● HPA	Feedback/ projections	Regional/ operational agencies/ scientific advisers/ modellers
Develop/implement/monitor national response strategy	✓	●	● DAs OGDs	●		Feedback/ projections	Regional/operational agencies/ scientific advisers/ modellers
Monitor/support local health and social care response		✓	✓ DAs	●	● HPA	Feedback/ projections	Regional/operational agencies/ scientific advisers/ modellers
Authorise use of antiviral stockpile protocols for empirical patient treatment and agreed derogations from regulations/standards		✓	✓ DAs	●		Feedback/ projections	PCTs/SHAs/ HPA/ professional and advisory bodies
Review and issue guidance on association risks to children when schools close	●	●	✓ DAs DCSF	DIUS	●	Emerging data	WHO/EU/ HPA/NHS academic institutions/ expert advisers

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
<i>UK alert level 3</i>							
Monitor critical infrastructure, essential services and business continuity	✓		✓ DAs OGDs			Emerging data	Regional and operational agencies
Review emerging clinical management and mortality/morbidity data and provide clinical advice		✓	✓ DAs	●	● HPA	Emerging data	PCTs/SHAs/ professional bodies

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
<b>UK alert level 4</b>							
Revise threat assessment, monitor impact and spread, review all planning assumptions	✓	✓	●	●	● HPA	Feedback/ projections	Regional/ operational agencies/ advisers/ modellers
Monitor mitigation, critical infrastructure and business continuity measures supplementing/relaxing as required	✓		● DAs OGDs			Feedback	Public/ regional and operational agencies
Review need for any additional legislative or regulatory powers	✓	●	● DAs OGDs	●		Feedback	Public/ regional and operational agencies
Monitor and maintain public advice, information and engagement	✓	●	● DAs	●	● HPA	Feedback	Public/ regional and operational agencies
Monitor/support health and social care response and staffing arrangements		✓	● DAs	●	● HPA SHAs PCTs	Feedback	Public/SHAs/ PCTs/HPA/ professional bodies
Monitor staffing, antiviral consumption/essential supplies and logistics		✓	✓ DAs	●	● SHAs PCTs	Feedback	Public/SHAs/ PCTs/HPA/ professional bodies
Explore options for mutual support as pandemic develops		✓	✓ DAs		● SHAs	Feedback	Public/SHAs/ PCTs/HPA/ Professional bodies
Explore opportunities for gradual resumption of non-emergency care as appropriate		✓	✓ DAs	●	● SHAs	Feedback	NHS trusts/PCTs/ primary care providers

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
Post 1st wave							
Assess threat of subsequent waves and review response capability for any potential impact	●	✓	●	●	● HPA	Assessment, advice and epidemiological data	WHO/ECDC/HPA/expert opinion/modellers
Assess health/social care threat of subsequent waves, regroup and prepare for any potential impact		✓	✓ DAs	●	● HPA	Assessment, advice and epidemiological data	WHO/ECDC/HPA/expert opinion/modellers
Review vaccination strategies/developments/options	●	✓	● DAs	●	● HPA	Vaccine information	WHO/EU/HPA/NIBSC/manufacturers
Maintain surveillance arrangements		✓		✓	DAs	Epidemiological data	WHO/ECDC/HPA
Assess NHS impact and plan recovery process		✓	✓ DAs	●	● SHAs	Operational feedback	NHS organisations

Trigger	Lead responsibility = ✓ Support = ●					Critical information/ action	Primary information source
	CCC (COBR)	DH	DAs/ OGDs	CMO	Other		
<i>Post pandemic</i>							
Assess general impact and instigate/ implement/ support recovery measures	✓	●	●	●		Feedback/ assessments	All sources
Identify and act upon lessons learnt	✓		✓		✓	Evaluations	All sources
Review research results and opportunities and monitor for ongoing effects		✓		●	● HPA	Research projects	All sources
Provide ongoing public information, advice and support for affected individuals or groups	✓	✓	● DAs	●		Clinical, operational and impact reports	All sources

# Acronyms

CCC	Civil Contingencies Committee
CMO	Chief Medical Officer
CO	Cabinet Office
COBR	Cabinet Office Briefing Room
COI	Central Office of Information
CSA	Chief Scientific Adviser
CSM	Committee for Safety of Medicines
DAs	devolved administrations
DCSF	Department for Children, Schools and Families
Defra	Department for Environment, Food and Rural Affairs
DFID	Department for International Development
DfT	Department for Transport
DH	Department of Health
DIUS	Department for Innovation Universities and Skills
ECDC	European Centre for Disease Prevention and Control
EMA	European Medicines Agency
EU	European Union
FCO	Foreign and Commonwealth Office
GNC	Government News Co-ordination Centre
HPA	Health Protection Agency
JCVI	Joint Committee on Vaccination and Immunisation
LA	local authority
MHRA	Medicines and Healthcare products Regulatory Agency
NCC	News Co-ordination Centre
NHS	National Health Service
NHSD	NHS Direct
NIBSC	National Institute for Biological Standards and Control
OGDs	other government departments

OIE	World Organization for Animal Health
ONS	Office for National Statistics
PCT	primary care trust
SAG	Scientific Advisory Group
SHA	strategic health authority
UKNIPC	UK National Influenza Pandemic Committee
WHO	World Health Organization



# Glossary

A/H5N1	Highly pathogenic avian influenza virus, endemic in birds in South East Asia.
Antiviral medicines	Type of medicines used to treat viral infections such as influenza.
Asymptomatic	Infected but not showing symptoms.
Avian	Pertaining to birds.
Case fatality rate	Proportion of individuals contracting a disease who die from it.
Clinical attack rate (Attack rate)	The cumulative proportion of people infected and showing symptoms over a specified period of time.
Containment	Measures to limit the spread of infection from an affected area(s).
Countermeasures	Interventions that attempt to prevent, control or treat an illness or condition.
Epidemic	The widespread occurrence of significantly more cases of a disease in a community or population than expected over a period of time.
Epidemiological models	Mathematical simulations of the spread of a disease and the likely effectiveness of countermeasures.
Epidemiology	The study of the patterns, causes and control of disease in groups of people.
Exit/entry screening	Institution of special measures at points of exit/entry into a country to detect individuals who have – or may have – been exposed to an infection as a measure to reduce the spread of infection.
FFP	International normative standard for respirators.
Hand hygiene	Thorough, regular hand washing with soap and water, or the use of alcohol-based products containing an emollient that do not require the use of water to remove dirt and germs at critical times, eg after touching potentially infected people/objects and before touching others or eating.
Incubation period	The period from entry of infection to the appearance of first symptoms.

Infectivity	The extent to which a given micro-organism infects people (or animals), ie the ability of the organism to enter, survive and multiply in people and cause disease.
Isolation	Separation of individuals infected with a communicable disease from those who are not for the period they are likely to be infectious in order to prevent further spread.
Modelling (risk)	Quantitative assessment from available data of a range of possible risks and identification of those responses that are likely to be both effective and robust over the range of uncertainty.
NHS 24 (Scotland)	National Health Service telephone helpline (Scotland).
NHS Direct	National Health Service telephone helpline (England).
NHS Direct Wales	National Health Service telephone helpline (Wales).
Operational models	Theoretical consideration of all the relevant factors and their interactions to inform implementation plans.
Outbreak	Sudden appearance of, or increase in, cases of a disease in a specific geographical area or population, eg in a village, town or closed institution.
Pandemic	Worldwide epidemic – an influenza pandemic occurs when a new strain of influenza virus emerges which causes human illness and is able to spread rapidly within and between countries because people have little or no immunity to it.
Pathogenic	Able to cause disease.
Prophylaxis	Administration of a medicine to prevent disease or a process that can lead to disease – with respect to pandemic influenza, this usually refers to the administration of antiviral medicines to healthy individuals to prevent influenza.
Quarantine	Separation of those who are thought to have been exposed to a communicable infection but are well, from others who have not been exposed in order to prevent further spread.
Re-assortment	The fragmentation and re-assembly of the genetic material of two similar viruses infecting the same cell to produce a new virus strain.

Reproduction number (Ro)	The average number of secondary infections resulting from each individual case – the ‘basic’ reproduction number is the number of secondary cases in a fully susceptible population without intervention. It measures the degree of transmissibility of an infection.
Respirator	A face mask incorporating a filter. In this document, it implies a particulate respirator, usually of a disposable type, often used in hospital to protect against inhaling infectious agents. Particulate respirators are ‘air-purifying’ respirators because they filter particles out of the air as one breathes.
Segregation	Separation from others (in this case, influenza cases from non-influenza cases).
Shed/shedding virus	Excreting, releasing or casting off the infectious particle (virus).
Social distancing	Strategies that reduce the number, duration and/or intimacy of social contacts with the aim of limiting the opportunities for transmission of influenza.
Surge capacity	The ability to expand provision beyond normal capacity to meet transient increases in demand, eg to provide care or services above usual capacity, or to expand manufacturing capacity to meet increased demand.
Surgical mask	A disposable face mask that provides a physical barrier but no filtration.
Surveillance	The continuing scrutiny of all aspects of the occurrence and spread of disease pertinent to effective control in order to inform and direct public health action.
Symptomatic	Showing symptoms of disease or illness.
Transmission	Any mechanism by which an infectious agent is spread from a source or reservoir (including another person) to a person.
Treatment course	The strength of a medicine, number of doses or length of treatment required to treat a disease.
Viraemia	The existence of viruses or viral particles in the bloodstream.
Virulence	The degree to which a micro-organism is able to cause serious disease.

Wave

The period during which an outbreak or epidemic occurs either within a community or aggregated across a larger geographical area. The disease wave includes the time during which the disease occurrence increases, peaks and declines back towards baseline.



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