

PANDEMIC FLU

UK HEALTH DEPARTMENTS

UK INFLUENZA PANDEMIC CONTINGENCY PLAN

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Executive summary

Pandemics of influenza have swept the world from time to time throughout history, three times in the last century. They caused widespread illness, large numbers of deaths, including among children and young adults, and huge societal disruption, concentrated in just a few weeks. There is currently rising concern that a new influenza virus with pandemic potential will emerge and spread, and a further pandemic can be expected. When that will be is not known, but the consequences, when it does, will be serious. Around a quarter of the population could be affected, with over 50,000 deaths in the UK alone. This could be over one or more waves, each lasting around 3 months.

This document updates the UK's 1997 Multiphase Contingency Plan for Pandemic Influenza. It sets the scene and outlines the UK's plan for responding to an influenza pandemic. It is based on the framework currently recommended by the World Health Organization for national pandemic plans. The response is divided into phases, starting with work to be done before a pandemic happens, followed by a step-wise escalating response as a pandemic evolves.

The prime objectives are to save lives, reduce the health impact of a pandemic and minimise disruption to health and other essential services, while maintaining business continuity and reducing the general disruption to society that is likely to ensue, serious though this will be.

Strong leadership, organisation and co-ordination and clear lines of accountability and communication will be key to preparing for, and responding to a pandemic. The Department of Health (England) is the lead Government Department, supported by the Health Protection Agency. The Department of Health will

- co-ordinate the UK health response
- procure appropriate antiviral drugs and develop strategies for their optimal use
- facilitate the development, manufacture and supply of an effective vaccine and develop strategies for its use
- lead work with the devolved administrations to secure consistent public health and health service responses across the UK
- lead the public health and health service responses in England (the devolved administration Health Departments will undertake this role in their countries)

- provide information and input to other Government Departments and other services to assist them in their response arrangements, particularly those for maintaining essential services.
- provide information for the media and public in co-ordination with the Government News Co-ordination Centre.

The Health Departments will be advised by a UK National Pandemic Influenza Committee. Once the pandemic is confirmed, cross-Government co-ordination and liaison with the Devolved Administrations for the civil emergency response will be provided through the Civil Contingencies Committee.

The roles and responsibilities of the key organisations at UK national, devolved administration, regional and local levels are described. These organisations need to develop their own plans, covering their part of the response and consistent with both the UK plan and their own plans for other relevant emergencies. Further guidance for NHS organisations, and a check list for other organisations, will be developed alongside this plan.

Two key medical interventions may help to reduce the health impact: immunisation, and the use of antiviral drugs active against influenza. Both vaccine and drugs are likely to be in limited supply and will need to be used in the most effective way, according to nationally agreed principles and protocols.

A vaccine will need to be developed specifically against a new pandemic influenza strain when the strain is known. Preparatory work will be undertaken which should facilitate development of a suitable vaccine when the need arises, but even routine influenza vaccines take several months to manufacture, and there may be additional technical difficulties in the development of a pandemic vaccine because of the particular properties of the virus. This means that it will take time before vaccine can be produced on a large scale and it may not be available at all for the first wave of a pandemic. Clear, transparent policies are described for prioritising its use as and when it becomes available.

In the meantime, antiviral drugs will be used to gain maximum benefit according to their availability. The Department of Health, in liaison with Health Departments in the Devolved Administrations, is actively working on building up stockpiles of suitable antiviral drugs, and on strategies for their optimal use. Assessment of their effectiveness in use will be important during all phases of the response to further inform these strategies.

In the event that medical interventions such as vaccines and antiviral drugs are absent or in limited supply or prove ineffective, other public health or social interventions may help to limit or slow the spread of the disease. Measures such as hand washing, isolation of cases, effective handling of contacts and limiting non-essential travel and mass gatherings of people may 'buy' valuable time, particularly in the early phases. Real time modelling and any new evidence will be used to assess whether such measures should be used.

Communications are a crucial element of the response. Many groups, not least the public, will need clear, accurate information and advice about the actions they can take. They will also need assurance that their concerns are being addressed.

A pandemic is, by definition, an international event. The UK has certain international obligations in communicable disease control, to the World Health Organization and the European Union. The UK also expects to play a full part in supporting these organisations in their efforts to control an influenza pandemic.

Preparedness planning is an ongoing activity and this plan will be regularly reviewed and updated. Comments are invited to feed into this review

Abbreviations

A&E	Accident and Emergency
ABPI	Association of British Pharmaceutical Industry
ABTA	Association of British Travel Agents
ACDP	Advisory Committee on Dangerous Pathogens
BIS	British Infection Society
BTS	British Thoracic Society
CCC	Civil Contingencies Committee
CDSCNI	Communicable Disease Surveillance Centre, Northern Ireland
CCDC	Consultant in Communicable Disease Control
CCS	Civil Contingencies Secretariat
CDC	(USA) Centers for Disease Control
CE/CEO	Chief Executive/Chief Executive Officer
CEPR	(HPA) Centre for Emergency Preparedness and Response
Cfi	(HPA) Centre for Infections, Colindale
COBR	Cabinet Office Briefing Room
COSHH	Control of Substances Hazardous to Health (Regulations)
CSM	Committee for Safety of Medicines
DA	Devolved Administration
DEFRA	Department for Environment, Food and Rural Affairs
DH	Department of Health
DPH	Director of Public Health
EISS	European Influenza Surveillance Scheme
EU	European Union
European Network	European Network for the Epidemiological Surveillance and Control of Communicable Diseases
EWRS	Early Warning and Response System (of the European Network)
FCO	Foreign and Commonwealth Office
GCN	Government Communications Network
GP	General Practitioner
HEPA	High Efficiency Particulate Arrestance (filter), or Health Emergency Planning Adviser
HEPO	Health Emergency Planning Officer
HPA	Health Protection Agency
HPU	Health Protection Unit
HPS	Health Protection Scotland
HSE	Health and Safety Executive
ICT	Infection Control Team
ILI	Influenza-like illness
ITU	Intensive Therapy Unit
JCVI	Joint Committee on Vaccination and Immunisation
JHAC	Joint Health Advisory Cell
LA	Local Authority
LaRS	(HPA) Local and Regional Services

LHB	Local Health Board
LHI	Laboratory for Hospital Infection
MHRA	Medicines and Healthcare Products Regulatory Agency
MRC	Medical Research Council
NaTHNaC	National Travel Health Network and Centre
NBS	National Blood Service
NAW	National Assembly for Wales
NCC	News Co-ordination Centre
NEPNEI	National Expert Panel on New and Emerging Infections
NHS	National Health Service
NIBSC	National Institute for Biological Standards and Control
NIMR	National Institute for Medical Research
NIPC	National Influenza Pandemic Committee
NIRL	National Influenza Reference Laboratory
NPHS	National Public Health Service (Wales)
PASA	(NHS) Purchasing and Supply Agency
PCR	Polymerase Chain Reaction
PCT	Primary Care Trust
PPE	Personal Protection Equipment
QA	Quality Assurance
Ro	Basic Reproduction Number
RCGP	Royal College of General Practitioners
RCN	Royal College of Nursing
RCP	Royal College of Physicians
RCPATH	Royal College of Pathologists
RCPC	Royal College of Paediatrics and Child Health
RDPH	Regional Director of Public Health
SARS	Severe Acute Respiratory Syndrome
SHA or StHA	Strategic Health Authority
SITREP	Situation Report
SOP	Standard Operating Procedure
TIDO(R)	Official Committee on Domestic and International Terrorism – Resilience
UK	United Kingdom
UKNIPC	United Kingdom National Influenza Pandemic Committee
UVIG	United Kingdom Vaccine Industry Group
VLA	Veterinary Laboratories Agency
WHO	World Health Organization

1. Introduction

This plan provides the framework for the UK's response to an influenza pandemic. It replaces the 1997 UK Health Departments' Multiphase Contingency Plan for Pandemic Influenza.

A **pandemic** is the worldwide spread of a disease, with outbreaks or epidemics occurring in many countries and in most regions of the world. **Influenza** (flu) pandemics have swept the globe from time to time throughout history with devastating effect, far in excess of that resulting from the 'seasonal' influenza which (in the UK) occurs most winters. Three pandemics occurred in the last century – in 1918/19 ('Spanish' flu), 1957/58 ('Asian' flu) and 1968/69 ('Hong Kong' flu). Up to a quarter of the UK population developed illness each time, many thousands of people died and the associated economic and social disruption was huge. The most severe – that of 1918/19 – is estimated to have killed around 250,000 people in the UK and between 20 and 40 million people worldwide, a greater toll than the whole of the First World War.

A pandemic of influenza results when a new influenza virus emerges which is markedly different from recently circulating strains and is able to:

- infect people (rather than, or in addition to, other mammals or birds)
- spread readily from person to person
- cause illness in a high proportion of the people infected, and also
- spread widely, because most people will have little or no immunity to the new virus and will be susceptible to infection (because it is a new virus, they will have had no opportunity to develop immunity as a result of previous infection or vaccination with it or a similar virus).

The conditions in which a new virus might emerge and spread continue to exist and thus further pandemics of influenza are expected. The timing, extent and severity remain uncertain, but sufficient is known from previous pandemics to indicate the likely range of impact. A future pandemic is likely to spread rapidly to all parts of the globe and cause sudden and sharp increases in illness over a matter of weeks. A pandemic could therefore rapidly overwhelm health and other services. The overall impact is likely to be even more far reaching, affecting daily life, business and consequently national and global economies.

As there is likely to be little warning, good planning is essential, to establish contingency arrangements and improve our preparedness, so that we are in the best possible position to manage an emergency on such a scale and ameliorate its impact. Disruption is likely to be less if people know what to expect and what to do and have had time to think through the consequences for themselves, their families, communities and organisations.

An influenza pandemic is therefore one of the contingencies for which the UK regularly reviews and revises its plans. This revised plan takes into account:

- guidance from the World Health Organization
- scientific advances in the prevention, diagnosis and treatment of influenza
- lessons learned during an outbreak of avian influenza in Hong Kong in 1997, which had pandemic potential, and the SARS outbreaks of 2003
- greater experience in planning for national emergencies at local, national and global levels following the events of 11 September 2001
- changes in the arrangements for health protection and delivery of health services in the UK since 1997
- devolution of health to Devolved Administrations and the fact that NHS and health protection infrastructures are different in England, Scotland, Wales and Northern Ireland, and, more recently
- the implications of the extensive outbreaks of avian influenza in poultry in Asia since 2003, which have been of unprecedented scale, and the associated human infections.

The Plan recognises the importance, when responding to a new event, of building on existing systems and infrastructures with which people are familiar, such as the current national infrastructure for the prevention and control of seasonal influenza, and plans and organisational arrangements for other outbreaks and emergencies.

Not least among the uncertainties of a flu pandemic will be our ability to reduce its impact through medical countermeasures such as vaccination and the use of antiviral drugs. The normal annual influenza vaccine will not protect against a pandemic strain, and a specific vaccine will need to be developed and manufactured. Preparatory work is being undertaken which should hasten development of a vaccine once the virus causing a pandemic is known but vaccine production will take time and may meet technical and other delays. A stockpile of antiviral drugs is being built up, but until the pattern of a new pandemic emerges it will not be known

how effective they will be. An important part of the Plan therefore concerns arrangements for optimising the use of these and other countermeasures so that resources are used as effectively as possible.

An influenza pandemic, or the threat of one, will create a high demand for information and advice, from health professionals, businesses and organisations, the general public and the media, about the threat and the responses to it. Rapid and effective communications, making difficult policy decisions transparent and managing people's concerns, are an integral part of the Plan.

This plan concentrates on the central response, but it also provides the framework and information for all organisations involved in preparing for and responding to an influenza pandemic, in order to provide a coherent approach with each part knowing its role in relation to others. It identifies actions to be taken at each phase of the pandemic as defined by WHO, with clear modifications to adapt the WHO phases to the UK situation.

The plan is also intended to be flexible so that our response can be adapted as a pandemic evolves and knowledge about the new virus, its impact and the effectiveness of available countermeasures emerges.

Improving our preparedness is a continuous activity and this plan will be regularly reviewed and updated, in particular to take account of new advice relevant to national plans from the World Health Organization.

2. Aim and objectives

2.1 Aim

The aim of this document is to provide a national framework for an integrated UK-wide response to an influenza pandemic, with clear guidance for those developing more detailed operational plans for their own part of the response at all levels.

The response is based on phases as currently defined by the World Health Organization (WHO) which trigger public health action, starting with plans which need to be put in place, and exercised, during inter-pandemic periods.

An inter-agency response is indicated and the roles of relevant organisations and their lines of communication are defined.

2.2 Objectives

The objectives of contingency planning for an influenza pandemic are to:

- set up a system for a flexible response to unpredictable events
- prevent the emergence of a potentially pandemic virus, to the extent that this is possible
- recognise a novel strain of influenza virus with pandemic potential, and clinical illness due to it
- minimise the spread of the new virus, and if possible prevent a pandemic developing
- rapidly assess the emerging epidemiology of a new pandemic to inform control measures eg the age groups predominantly affected
- limit morbidity and mortality due to infection with the pandemic strain
- provide treatment and care for large numbers of people ill from influenza and its complications
- cope with the eventuality of large numbers of people dying
- reduce the impact on health and social services consequent to an influenza pandemic, including any consequences for other patients as a result of re-prioritisation of services or cancellation of routine work
- provide timely, authoritative and up to date information for professionals, the public and the media throughout the period of a potential or actual pandemic
- ensure that essential services are maintained
- reduce the impact on daily life and business
- anticipate and plan for other consequences
- minimise economic loss.

However, even if all these objectives are achieved, the consequences of a flu pandemic are likely to be serious.

2.3 Principles underlying the response

The following principles underly this contingency plan:

- The priorities in an influenza pandemic are to reduce the impact on public health (ie reduce illness and save lives) and maintain essential services. Interventions will therefore be applied where they will achieve maximum health benefit, but also where they are needed to help maintain essential services. There may sometimes be a conflict between these two aims, when political decisions will need to be made about priorities for the use of interventions
- In the absence of medical interventions to protect large numbers of the population against the new virus, public health and/or 'social' interventions which might slow its spread, and possibly extend the time until alert levels rise, may help services to cope.
- The response to pandemic influenza in the UK will require collaboration between central Government, Devolved Administrations, the Health Protection Agency, Health Protection Scotland, Wales National Public Health Service and NHS infrastructures at all levels together with many partner organisations and the public

3. The phases of an influenza pandemic

The response to an influenza pandemic requires actions before, during and after the pandemic.

3.1 International phases

For international planning purposes, the World Health Organization (WHO) has defined phases in the progression of an influenza pandemic from the first emergence of a novel influenza virus, to wide international spread. These phases allow a step-wise escalating approach to preparedness planning and response. They are global classifications based on the overall international situation and are used internationally for planning purposes. The UK framework is built into the current WHO phases (**we understand the WHO phases will soon change and the UK Plan will then be brought into line**):

Interpandemic period

- Phase 0** No reports of a new virus received by WHO
- Phase 0.1** The first report of a new influenza strain from a person, without clear evidence of spread or of associated outbreak activity
- Phase 0.2** Two or more people infected with a new virus subtype, but the ability of the virus to spread directly from person to person remains in doubt
- Phase 0.3** Clear evidence of person to person spread as evidenced by: spread to close contacts of an index case; spread within the population; outbreaks; or cases in more than one country with no explanation other than contact between infected people

Pandemic period

Phase 1 Confirmation of onset of pandemic

The pandemic will be confirmed when several outbreaks have occurred in at least one country and spread has occurred to other countries, with a disease pattern suggesting that serious morbidity and mortality is likely in at least one segment of the population

Phase 2 Regional and multiregional epidemics

Outbreaks and epidemics occurring in multiple countries and spreading region by region across the globe

Phase 3 End of first wave of pandemic

Activity has stopped in those countries or regions initially affected, although it may be continuing in other parts of the world

Phase 4 Second or later waves

Past experience suggests that second, and possibly further, waves of illness caused by the new virus are likely 3-9 months after the first. The second wave may be as, or more, intense than the first

Post pandemic period

Phase 5 End of the pandemic

Influenza activity back at normal baseline levels. Widespread immunity to the new virus is likely in the general population

3.2 Implications for the UK

For UK purposes, the activity within the UK is more relevant and may not fit neatly into the international classification. A four point UK-specific alert mechanism has therefore been developed, consistent with the alert levels used in other UK infectious disease response plans (see Table 1):

Alert level 0 No cases anywhere in the world

Alert level 1 Cases only outside the UK

Alert level 2 New virus isolated in the UK

Alert level 3 Outbreak(s) in the UK

Alert level 4 Widespread activity across the UK

The assumption is that an influenza pandemic starts outside the UK and becomes established in one or more countries before reaching the UK. UK alert levels 1-4 then occur in WHO Phase 2 and this is where they are placed in the Plan. However, virus could newly emerge within the UK or be imported into the UK at an earlier (or even later) WHO phase. The UK alert levels would then apply at the earlier (or later) phase.

A move to a higher alert level may be triggered, after assessing the risk, if influenza due to a pandemic strain is affecting another country geographically close to the UK, although technically it is still ‘outside the UK’.

Table 1 Relation of UK Alert levels to the international phases

International phases		UK Alert levels	
0	No cases worldwide	No cases worldwide	Alert level 0
0.1	First report of new virus	Virus/cases only outside the UK	Alert level 1
0.2	Two or more people infected		
0.3	Person to person spread	Virus isolated in the UK	Alert level 2
1	Several outbreaks with spread to more than one country	Outbreak(s) in the UK	Alert level 3
2	Outbreaks/epidemics in more than one WHO Region	Widespread activity across the UK	Alert level 4
3	End of first wave		End of first wave
4	Second or later waves		Alert levels as above according to activity
5	End of pandemic		End of pandemic

Transition between phases

Transition between phases may be rapid and the distinction blurred. The crucial interval is between WHO Phases 0.3 and 2, which will determine to a large extent whether vaccine can be developed in time for the first wave of illness in the UK.

3.3 Mechanism for declaring a pandemic

The WHO will announce the various phases as soon as they are confirmed, indicating the level of preparedness expected of WHO and its individual Member States.

National Authorities are expected to be prepared to activate their national contingency plans following announcement of WHO Phase 0.3. Before announcing this phase, WHO will have consulted international experts to rule out other possible explanations, such as subversive activity.

WHO will normally consult internationally before confirming Phase 1, ie the onset of a pandemic.

Action in the UK

On being informed by WHO of the isolation of a new influenza virus with pandemic potential (normally when person to person spread has been confirmed, ie **Phase 0.3**), the Secretary of State for Health, on the advice of the Chief Medical Officer, England, will convene the UK National Influenza Pandemic Committee (UKNIPC, Annex A) which advises all four UK Health Departments. The Department of Health (England) will inform the Devolved Administrations (DAs) and the Civil Contingencies Secretariat (CCS). The CCS will inform other Government Departments. The Civil Contingencies Committee (CCC) is likely to meet to review preparedness across all sectors and take appropriate strategic decisions. A CCC subgroup may be established at this stage. The Health Departments may decide to advise the NHS in their relevant countries.

On receipt of confirmation from WHO of the onset of a likely pandemic, ie **Phase 1**, the Department of Health will immediately cascade this information to the Devolved Administrations, HPA, the Civil Contingencies Secretariat, other Government Departments and Agencies, NHS in England and other relevant services and agencies. The DAs will inform the NHS in their countries. The Civil Contingencies Committee will be convened at this stage, if not already convened at Phase 0.3, and similar committees will be convened in the DAs, if appropriate.

In exceptional circumstances, the UK may **convene the UKNIPC** on the strength of advice from the HPA or the National Expert Panel on New and Emerging Infections (NEPNEI), in the absence of, or where this differs from, advice from WHO, on the grounds of UK national interest. The UK may also **implement its pandemic plans** in the absence of a WHO declaration, on the advice of the UKNIPC, and after consultation with other European Member States through the European Communicable Diseases Network.

Should a potential pandemic subsequently fail to evolve, the UKNIPC will be stood down and other bodies informed as described above.

4. The likely impact of an influenza pandemic

4.1 Seasonal influenza

Influenza is an acute viral infection characterised by the sudden onset of fever, chills, headache, muscle pains, severe prostration and usually cough, with or without a sore throat or other respiratory symptoms. The acute symptoms last for about a week, although full recovery may take longer. In most years in the UK, influenza occurs predominantly during a six to eight week period during the winter. For most people, this 'seasonal' influenza is an unpleasant but self-limiting and not life-endangering illness, but in some people it may be more severe, or complicated by secondary bacterial infections such as bronchitis and pneumonia. The very young, the elderly and people with underlying diseases such as heart or chest disease are particularly at risk of serious illness from influenza. Without interventions such as annual influenza immunisation, the elderly and those of all ages in disease-based risk groups suffer significant morbidity and mortality even in a non-pandemic year. An estimated 12,000, mainly elderly, people die each year from seasonal influenza in England and Wales. Further information on influenza viruses and the illness they cause is at Annex B.

4.2 Pandemic influenza

In past pandemics, the scale and severity of illness, and hence the consequences, have varied considerably but in general they have been of much greater magnitude than even the most severe 'epidemic' winters. There have also been material differences in the age groups most affected (for example, working age adults rather than the elderly), the time of year of outbreaks and the speed of spread, all of which influence the overall impact.

Despite their variability and unpredictability, much can be learned from previous pandemics (Annex C). But much has also changed since the last pandemic in 1968, including

- the demography of the population (a greater proportion of elderly people)
- health care opportunities and expectations
- the greater emergence of antimicrobial resistance among the bacteria which may cause infections such as pneumonia following influenza, and
- the extent of 'surge' capacity in health care systems.

Theoretical modelling is being used as 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 be factored into plans. Further information on the modelling used is at Annex D.

4.3 Planning assumptions

This plan is based on planning assumptions derived from known evidence, expert opinion and the modelling work described above. It should be understood that these are working estimates for planning purposes, and not predictions of the next pandemic. It is anticipated that real time modelling will be used to inform plans using information emerging during the evolution of a pandemic.

Origins of a pandemic

- A new pandemic will be due to a new subtype of influenza A
- Emergence of new influenza A viruses is inevitable

- A new virus may be a re-emerging previously known human virus subtype which has not recently been in circulation, or a virus of avian origin, emerging either through stepwise 'adaptation' conferring greater affinity for humans or through a process of genetic 'reassortment' between the genes of an avian and a human virus. (There are 15 haemagglutinins (HAs) which exist in nature all of which can infect birds. So far, H1, H2 and H3 have been associated with widespread human disease and it is known that at least H5, H7 and H9 have the potential to cause human disease, that from H5N1 being particularly severe. Aquatic birds (possibly ducks) harbour avian influenza viruses that have only rarely or never previously infected humans).
- From time to time, avian influenza viruses will infect people directly exposed to infected poultry, as occurred in Hong Kong in 1997, Holland in 2003 and China and the Far East since 2003, but they will not necessarily evolve into potential pandemic viruses
- A new strain is likely to transmit more easily to people if it contains genetic material from a human influenza virus
- Such a strain could first emerge anywhere, including the UK, but is most likely to emerge in China or the Far East – the birthplace of recent pandemics – because:
 - the close proximity of humans, ducks, other poultry and domestic pigs in farming communities in South East Asia and China facilitates mingling of human and animal viruses which may then exchange genetic material, resulting in a new 'reassorted' strain
 - viruses may directly transfer from birds (or animals) to humans and adapt to become 'fitter' for infecting people
 - viruses may re-emerge from unrecognised or unsuspected reservoirs
 - for H5N1 there is already wide dissemination of H5N1 infection in poultry, domestic fowl and wild birds.
- Whenever a new or novel influenza virus is isolated from an infected person, its potential to spread directly from person to person and cause outbreaks of illness needs to be assessed
- False alarms are likely, but until it is known whether or not a new virus has resulted in person to person transmission, its pandemic potential must remain under consideration (and investigations will inevitably consume resources)

Timing

- A future influenza pandemic could occur at any time (intervals between the most recent pandemics have varied from 11 to 42 years with no recognisable pattern, the last being in 1968/9)
- A new virus may not follow the usual seasonal pattern of influenza, and may occur at any time of year (seasonal variation is in any case less distinct in the tropics)

Geographical spread

- In the event of a novel influenza virus causing significant outbreaks of human illness elsewhere in the world, it is unlikely that the UK could prevent importation; even closing all borders is likely only to delay importation of the virus
- Spread from an origin in Asia is likely to follow the main routes of travel and trade. Greater travel within mainland China and between mainland China and Hong Kong may facilitate the early spread of a virus emerging from that area
- Increasing use of routes out of China such as through Cambodia and Vietnam, where surveillance is not well developed, may result in the failure to document the early stages of its spread
- Spread from the source country to the UK, through the movement of people, is likely to take less than 3 months and experience of the dissemination of SARS from Hong Kong suggests modern travel may result in wide international spread even more rapidly than this
- Previous experience suggests that it will take about ten weeks (or even less) from the first reported case in the UK until influenza activity across the country rises above the UK threshold for 'baseline' activity; it will then take a further 2-4 weeks until high levels are established across the country.

Duration

- Once influenza levels exceed our baseline threshold of 30 new GP consultations/100,000 population per week, influenza activity in the UK may last for 3-5 months, depending on the season, and there may be subsequent waves, weeks or months apart.

Infectivity and mode of spread

- Influenza is mainly spread by the respiratory route, through droplets of infected respiratory secretions or by fine respiratory aerosols (which stay in the air for longer and are therefore more effective at spreading infection) produced when an infected person talks, coughs or sneezes; it may also be spread by hand/face contact after touching a person or surface contaminated with infectious respiratory droplets
- People are highly infectious from the onset of symptoms for 4-5 days (longer in children and people who are immunocompromised). 10% of people are likely to be infectious just before the onset of symptoms. Children have been shown to shed virus from 6 days before to 21 days after the onset of symptoms
- People who acquire infection will become ill – asymptomatic infection – shed virus and are therefore also likely to be infectious to some extent and pass the infection on, although they are unlikely to be the source of an outbreak
- The incubation period is 1-3 days
- Without intervention one person infects on average about 1.4 people (the R_0 or 'basic reproduction number'). This number is likely to be higher in closed communities.

The extent and severity of illness

- Important differences in the extent, age distribution and severity of illness are likely compared with annual seasonal influenza, but will not be known until person to person transmission is underway
- Most people will be susceptible, although not all will necessarily develop clinical illness. Previous experience suggests an equal number will have asymptomatic as have symptomatic infection.
- For planning purposes the most likely scenario, based on previous pandemics in the 20th Century, is a cumulative clinical attack rate of 25% of the population (the figure advised by WHO) over one or more waves of around 12 weeks each, weeks or months apart. This compares with a usual seasonal influenza attack rate of 5-10%. Ten percent and 50% clinical attack rates have also been considered. The second wave may be the more severe. For planning purposes a 25% clinical attack rate over a single wave is described
- All ages will be affected, but children and otherwise fit adults could be at relatively greater risk, particularly should elderly people have some residual immunity from exposure to a similar virus earlier in their lifetime. For planning purposes, a uniform attack rate has been used across all age groups

- The age-specific differential attack rate will affect the overall impact: if working age adults are predominantly affected this will impact more seriously on provision of services and business continuity, while illness in the very young and the elderly is likely to present a greater burden on health services.
- More severe illness than the usual seasonal influenza is likely in all population groups rather than predominantly in high risk groups, with a higher number of people than usual developing severe prostration and rapidly fatal overwhelming viraemia/pneumonia or secondary complications. It is not possible to give numbers for this in advance.

Deaths

- Excess mortality due to influenza is expected to be higher than that due to seasonal influenza in inter-pandemic years (when 12,000 excess deaths are estimated to occur). The impact of overall case fatality rates between 0.37% (based on inter-pandemic and 1957 experience) and 2.5% have been considered.

Table 2 Range of possible excess deaths based on various permutations of case-fatality and clinical attack rates, England and Wales

Overall case fatality rate	Clinical attack rate		
	10%	25%	50%
0.37%	19,300	48,400**	96,700
1.00%	51,700	129,200	258,400
1.5%	77,100	192,700	385,400
2.5%	129,200	323,000	645,900

** Value used for planning purposes

Table 3 Range of possible excess deaths based on various permutations of case fatality and clinical attack rates, based on UK population

Overall case fatality rate	Clinical attack rate		
	10%	25%	50%
0.37%	21,500	53,700	107,500
1.00%	56,700	141,800	283,700
1.5%	85,100	212,800	425,500
2.5%	141,800	354,600	709,300

- Average deaths from all causes in the UK are normally around 12,000 per week. In a pandemic, deaths resulting from influenza are likely to gradually rise to 50% higher than normal at the peak of a pandemic wave, and then gradually decline. However, there is the potential, based on the worst case scenario modelled, for as many deaths in 12 weeks of a pandemic as there would be over the course of a whole year.
- Mortality rates are likely to vary considerably between different age groups. At least a third of the total excess deaths are likely to be in people under 65 years compared with less than 5% in inter-pandemic years.

Impact on health and social services

- The impact of a flu pandemic on health and social services is likely to be intense, sustained and nation-wide; they may quickly become overwhelmed as a result of:
 - the increased workload of patients with influenza and its direct complications
 - the particular needs for high dependency care and infection control facilities and equipment
 - a secondary burden on health caused by anxiety and bereavement
 - depletion of the workforce and of existing numbers of informal carers, due to the direct or indirect effects of flu on themselves and their families, e.g. the need to provide childcare or care for ill members of their families
 - logistical problems due to interruption of supplies, utilities and transport as part of the general disruption caused by the pandemic, including blood and other essential supplies
 - delays in dealing with other medical conditions
 - the longer term macro effects of the pandemic on the national [and world] economy and the structure of society.
- Innovative approaches will be needed to many aspects of health care, including staffing, triaging of patients and coping with those patients needing more intense care than is normally possible at home but who may not be able to be admitted to hospital
- There will be pressure on mortuary facilities (possibly exacerbated by delays in death registrations and funerals).

GP consultations and potential need for hospital admission

- The tables contains estimates of anticipated cases, GP consultations, hospital admissions and deaths for different overall clinical attack rates (again based on a uniform attack rate across all age groups). Further detail is at Annex C.
- Total GP consultations for influenza-like illness could increase from around 1 million during the period of a 'normal' season to around 6 million during a pandemic
- New general practice consultations for influenza-like illness can be expected to exceed 500/100,000 population per week during the main pandemic period (the base line is up to 30, and peak consultations during season flu periods in recent years have been 200-250/100,000 population per week). At the peak of a pandemic, rates could reach 600-1,000/100,000 population or even more for 1-2 weeks.
- In a population of 100,000 people, general practices should expect to see at least 500 new influenza patients a week during the pandemic period, and up to 1000 a week or more at the peak.
- This will put especial pressure on single-handed practices.
- Hospital admissions for acute respiratory and related conditions are likely to increase by **at least 25%** with around 19,000 new patients a week requiring hospitalisation at the peak (in the absence of pandemic data, these are projected from current hospital admissions for influenza which may under-estimate the needs in a pandemic).
- Hospitalisations and deaths will be greatest if the highest attack rates are in the elderly. The lowest burden on health care would be associated with higher attack rates in adults aged 15-64 years.
- A short sharp epidemic would put greater strains on services than a lower level but more sustained one.

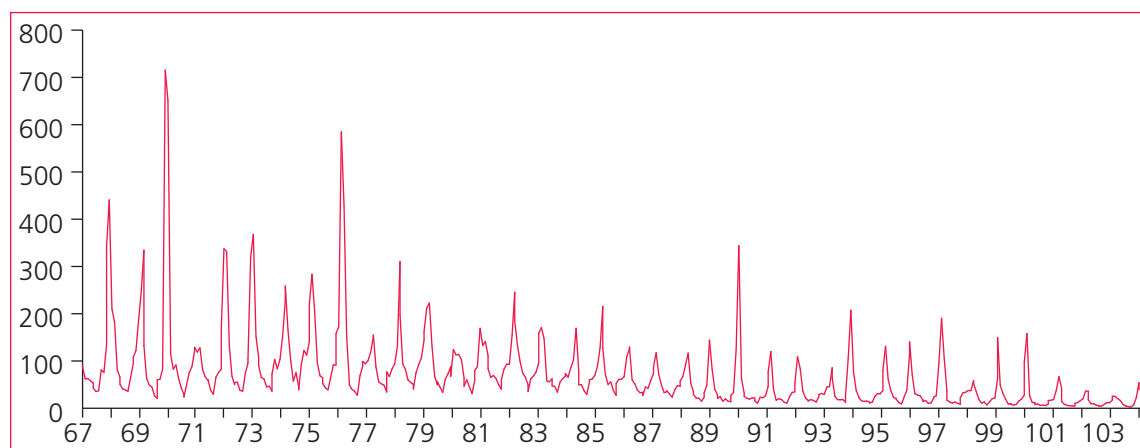


Figure 1 Historical record of GP consultations for new episodes of influenza-like illness, 1966/67 to 2003/04

Table 4 Summary of estimated burden of illness attributable to pandemic influenza over the entire pandemic based on a 25% clinical attack rate and 0.37% overall case fatality rate. Figures are rounded and represent work additional to normal background health service activity. (Figures in parentheses illustrate the range from 20% (lower limit) to 30% (upper limit) attack rates)

Population	People ill	GP consultations	Minimum total excess	Excess deaths hospitalisations required
Population of 1,000	250 (200-300)	50 (40-60)	2 (0-2)	1 (0-2)
Population of 100,000	25,000 (20,000-30,000)	5,000 (4,000-6,000)	150 (120-180)	100 (80-120)
Population of 1,000,000	250,000 (200,000-300,000)	50,000 (40,000-60,000)	1500 (1,200-1,800)	1,000 (800-1,200)
England (population 49,138,831)*	12.1m	2.4m	65,900	44,400
Scotland (population 5,062,011)*	1,250,000	250,000	6,600	4,500
Wales (population 2,903,085)*	720,000	140,000	4,100	2,800
Northern Ireland (population 1,685,267)*	420,000	83,000	2,000	1,300
England and Wales (population 52,041,916)*	13m (10m-16m)	2.6m (2.1-3.1m)	72,000 (58,000-86,000)	48,000 (38,000-58,000)
UK (population 58,789,194)*	14.5m	2.9m	79,600	53,700

* Based on Census 2001

Table 5. Estimated clinical cases, GP consultations, hospitalisations required, beds occupied and number of excess deaths in England and Wales during a 17 week (single wave) influenza pandemic (using assumptions as above)

Week	Clinical cases	GP consultations	Minimum total excess hospitalisations required	Bed occupancy (end of wk)	Excess deaths
1	103,300	40	600	400	400
2	175,100	67	1,000	900	700
3	292,000	112	1,600	1,500	1,100
4	474,000	182	2,600	2,500	1,800
5	736,700	283	4,100	3,900	2,700
6	1,071,700	412	5,900	5,800	4,000
7	1,420,000	546	7,800	7,900	5,300
8	1,669,500	642	9,200	9,700	6,200
9	1,712,900	658	9,400	10,600	6,400
10	1,533,400	589	8,500	10,300	5,700
11	1,216,900	468	6,700	8,900	4,500
12	878,000	337	4,800	7,100	3,300
13	591,300	227	3,300	5,200	2,200
14	380,000	146	2,100	3,600	1,400
15	237,000	91	1,300	2,400	900
16	145,100	56	800	1,600	500
17	87,800	34	500	1,000	300

* Note that in Scotland, GP consultation rates are traditionally higher than in England and Wales

Table 6 Estimated clinical cases, excess GP consultations, excess hospitalisations required, beds occupied and excess deaths for a population of 100,000 during an influenza pandemic, distributed by week of pandemic activity.*

Week	Clinical cases	GP consultations	Minimum total excess hospitalisations required	Bed occupancy (end of wk)	Excess deaths
1	200	40	1	1	1
2	300	67	2	2	1
3	600	112	3	3	2
4	900	182	5	5	3
5	1,400	284	8	7	5
6	2,100	413	11	11	8
7	2,700	547	15	15	10
8	3,200	643	18	18	12
9	3,300	659	18	20	12
10	2,900	590	16	19	11
11	2,300	468	13	17	9
12	1,700	337	9	13	6
13	1,100	227	6	10	4
14	700	146	4	7	3
15	500	91	2	5	2
16	300	56	2	3	1
17	200	34	1	2	1

*Note that the data are indicative: populations may vary in their demographics.

Absence from work

- Although data are available on sickness absence in previous pandemics, it is difficult to extrapolate with any confidence to what might happen now as work patterns are so different
- Absence from work will depend on the age-related attack rate, although even if working age people are relatively spared, additional absenteeism may result from staff needing to take time off to care for family members
- Accelerated transmission may occur in some workplaces where people work in close proximity, for example, resulting in staff being ill during a narrower time frame than in the general population

- Planning assumptions for health care workers, in the absence of vaccination, have to assume a higher sickness absence rate than other population groups because of their higher risk of exposure. In Liverpool in 1957, between 12 and 19% of nurses were absent during the first 4 weeks of the pandemic; in one hospital nearly a third were absent at the peak
- Normal sickness rates are around 2% and up to 4-6% in the NHS
- Previous pandemics suggest up to 10% or more of the population may lose working days. It is suggested however, that plans are based on a cumulative total of 25% of workers taking some time off – possibly 5-8 working days – over a period of 3 months. Absenteeism may, however, be greater because of workers' need to care for others, and difficulties – or fear – of travelling to work
- Modelling suggests absenteeism due to the pandemic will rise to a peak of 3.5% of the workforce at week 14. This would double the normal average absenteeism in a private sector company and equate to a two thirds increase in the public sector
- The skill mix required for some occupations, including health care, may limit the extent to which other staff can be re-deployed.

Schools and other closed communities

- Influenza will spread rapidly in schools. In 1957, for example, up to 50% of schoolchildren developed influenza, but even those schools which were most severely disrupted had returned to normal 4 weeks after the appearance of the first case. In residential schools, attack rates reached 90%, often affecting the whole school within a fortnight. This will impact on working parents
- Closing schools has a significant impact on business continuity and maintenance of essential services, particularly health care, due to parent workers needing to stay at home for childcare.
- Similar spread is likely in other closed communities such as residential care facilities, barracks and prisons

Impact on other services

- In the absence of early or effective interventions, there will be a widespread effect on all other services, through staff sickness, any travel restrictions imposed and through the knock on effects of other disrupted businesses and services
- This includes all non-health services (police, fire etc), the military, other essential services (eg fuel supply, food production and distribution, transport), prisons, education and businesses

- Services such as death registration and funeral directors will have an increased work load
- In addition to maintaining continuity of their work, businesses will need to consider, for example, the security of premises, including manufacturing plant (further advice on business continuity is available on the UK Resilience website at www.ukresilience.info).

Impact on travel

- Travel will be affected through
 - any explicit restrictions on travel and public gatherings as a policy option
 - people opting not to travel (eg because of cancellation of work/school etc, fear of acquiring infection through travel or fear of leaving home)
 - availability of fuel and transport workers

Public, political and media concern

- There will be high public and political concern and scrutiny at all stages of an influenza pandemic.
- Press interest, need for information and coverage will be intense
- Managing people's concerns and expectations will be a key part of the response
- People's concerns will extend to what is happening in other countries, particularly those with which they have family connections
- Interest and concern will also extend to national and international events and mass gatherings

4.4 Extent to which interventions might ameliorate the impact

- Vaccination with a vaccine specifically formulated against the pandemic virus strain, when an appropriate vaccine becomes available can be expected to achieve the greatest reduction in illness, complications and deaths, and lessening of the impact on health and other services.
- The effectiveness of a pandemic vaccine will not be known until it is in use

- Influenza vaccines do not give 100% protection: in inter-pandemic years, when vaccine and circulating virus strains can be predicted and are well matched, vaccine reduces infection by around 70-80%, hospitalisations in high risk individuals by around 60% and deaths by around 40%
- The effectiveness of antiviral drugs in a pandemic of influenza is not known, particularly their effectiveness in reducing mortality in cases of severe disease (including viral pneumonia). If treatment with antiviral drugs is as effective in a pandemic as during seasonal influenza, early treatment (within 48 hours of onset of illness) should shorten illness by around one day, may ameliorate symptoms, and should reduce hospitalisations (by an estimated 50%)
- More work is being done on the most effective strategies for the use of antiviral drugs.

5. The key elements of the response

The key elements of the response to an influenza pandemic are considered under the following broad headings:

Leadership, organisation and co-ordination

Communications

Strategic communications and advice

Professional information and guidance

Communications with the public and the media

Surveillance and information gathering

Microbiology and virology

The public health response: reducing the health impact

Vaccine development licensing, registration and supply

Immunisation strategy

Antiviral agents and their use

Other public health control measures

The health service response

Investigation and management of cases and contacts

Infection control

Organisation and reinforcement of health services

The civil emergency response: reducing societal disruption

Workforce, education and training

Essential preparatory work and research, legal and indemnity issues

International issues

These headings are used as the framework for the check list of actions listed for each phase of the response in Chapter 7. Each requires a strategy, and structures and systems to deliver them, either in place or ready to be established should the need arise, with enough flexibility to adapt to the specific circumstances of a new pandemic which at the current time remain unknown or uncertain. These key elements are described briefly below, and where relevant in more detail in the Annexes. Up to date guidance is maintained, or will be provided, on the web site addresses listed at the end of this Plan.

5.1 Leadership, organisation and co-ordination: the chain of command

One of the lessons learned from the SARS outbreaks of 2003 was the importance, in the event of an incident on the likely scale of an influenza pandemic, of strong international and national leadership and co-ordination, and a clear national 'command and control' structure. The appropriate people at all levels must have authority to make key decisions and act on them, and there must be a clear chain of accountability. The response to an influenza pandemic would be on a UK-wide basis, and therefore clear demarcation of roles is required between the separate UK administrations and other key organisations. These organisations and their roles and responsibilities are outlined in Chapter 6. These build on the structures developed for other contingencies.

5.2 Communications

Effective communications provide the backbone for an effective and co-ordinated response. A wide range of groups at all levels will need accurate, timely and consistent information and advice, and rumours and misinformation will abound. Inevitably, the media will sometimes report information before it can be confirmed through official channels. The information to be exchanged will concern currently known facts, assessments of the risks and the public health relevance, and information and advice to help manage those risks, at all stages of the pandemic.

The overall communications strategy is considered in more detail at Annex I. This covers the gathering, collation and dissemination of information for a variety of audiences, which can be divided broadly into:

Strategic communications

Two way strategic communications will involve central Government Departments, the Devolved Administrations and all other agencies and organisations involved in the response, including the health protection organisations and NHS at all levels and international agencies.

The Government's News Co-ordination Centre will be set up and co-ordinated by GCN to co-ordinate cross-Government briefing and public information once a pandemic is declared.

Professional information and guidance

Regular information bulletins to health professionals will be issued as required, and as urgency indicates, via already established routes (CMO letters, Public Health Link). Up to date information will be maintained on the DH and HPA websites.

Clinical guidance and public health advice will be maintained on the HPA website, and issued directly to relevant groups as necessary.

Communications with the public and the media

Risk communication both before and during a pandemic is a key element of the response, with emphasis in the inter-pandemic period on the uncertainties surrounding a pandemic and the constraints faced by Governments in preparing their response. Clear, active engagement of the public will be a priority throughout a pandemic through, for example:

- regularly updated information and advice
- sharing the advice of expert groups with the public
- having lay members on expert advisory groups
- briefing the specialist media on the preparations and plans
- establishing patient fora and focus groups to help identify public concerns
- possibly a separate independent challenge group
- Regional Media Emergency Forums
- working with the media to promulgate public health messages
- training trusted spokespeople in advance
- the patient choice agenda.

NHS Direct and its equivalents in the DAs, and NHS Direct on-line and will be the main sources for individual health-related advice other than the information directly disseminated to the public and that available from GP surgeries and walk-in centres, and will be one mechanism for providing feedback on concerns they are identifying.

Media communications will be co-ordinated initially by the Department of Health press office. They will be supported by the News Co-ordination Centre who will co-ordinate cross government communication and depending on the scale will also co-ordinate the media and public communication for the other Government Departments involved. As far as possible, draft briefing will be prepared in advance of the next phase – for completion later.

5.3 Surveillance and information gathering

Timely surveillance information will be key to early identification of an influenza pandemic, and to the development of evidence based interventions at all stages during one. The objectives of surveillance will change as the pandemic evolves and the different phases will trigger enhancements – such as closer monitoring of particular population groups, including laboratory workers – or changes in emphasis.

Many people at all levels (eg local, regional, national) will require information relating to the impact and the effectiveness of interventions, to inform their decision making during the response. This will include information not normally collected as part of influenza surveillance, and will put demands for data collection, collation and dissemination on people whose main priority may be delivering health or other care. Important components of the information strategy therefore relate to identifying the needs of these different groups in advance, and agreeing what is feasible and how the information can be collected and managed to ensure a swift flow of relevant information without unnecessary data collection and duplication of effort.

Surveillance for influenza starts with good internationally co-ordinated monitoring of prevalent influenza viruses world-wide and the illness due to them, primarily to inform routine vaccine production but also to assess their virulence and antigenic diversity. The UK contributes to this surveillance, which is co-ordinated by the World Health Organization. To improve international surveillance, more robust clinical and virological surveillance is required in China and SE Asia. International surveillance must be linked to surveillance of influenza viruses in birds and relevant mammals.

The main aims of surveillance in the UK will be to:

Identify a novel virus at the earliest opportunity (including in birds or mammals)

- to identify the virus
- to inform vaccine development work
- to enable early interventions to contain it or at least delay or slow its spread
- to define its susceptibility to antiviral drugs.

Influenza is a common condition and has symptoms similar to those of many other viral respiratory infections. Early detection of a new virus therefore requires clinicians as well as laboratory staff to be alert to the possibly unusual, for example respiratory illness in a patient, with a link to areas where a new virus has been already identified, or to poultry farming and to report these unusual events promptly.

Identify clusters of unusual respiratory illness that may be caused by a new virus

Monitor the spread of a new virus and define its epidemiological features

As a pandemic progresses, epidemiological surveillance must adapt to provide adequate information on the type and severity of illness, its spread, and the impact in different population groups, in order to inform policy and planning

Monitor the causes, and antimicrobial susceptibility, of complications to inform treatment policies.

Monitor the overall impact on health services and other parameters

This will require collation of information outside that usually regarded as 'surveillance', for example hospital admission data, absenteeism data, but nonetheless essential to assessing the impact of the pandemic. A proforma of the information to be collected and who is to provide it will be drawn up and tested during the inter-pandemic period.

Monitor the uptake and effectiveness of any interventions (including possible adverse reactions)

Monitor any changing characteristics of the virus

In order to adapt policies (including vaccine recommendations) if necessary.

Key concerns for UK surveillance are to:

- make a full contribution to international influenza surveillance through the WHO and European surveillance schemes
- co-ordinate with veterinary surveillance to assess the risks of a new human or mammal/bird influenza virus crossing species
- maintain flexibility in the indices collected as a pandemic progresses
- establish a case based field information management system that links epidemiological and laboratory data
- disseminate a wide range of surveillance information, including monitoring of vaccine uptake and the impact of interventions, to inform practice and planning
- include monitoring of long term health sequelae of infection with a pandemic strain of influenza virus

Microbiology and virology

Laboratories are essential to confirm diagnosis, elucidate of characteristics of the virus, and to overall surveillance. A UK capability and capacity to identify novel influenza strains will be maintained, with the ability to roll out a diagnostic capability to a network of peripheral laboratories if required. The UK has a network of clinical virology laboratories with the capability to isolate influenza viruses. A proportion of isolates, including all unusual ones from the whole of the UK, should be referred to the National Influenza Reference Laboratory at the HPA, Colindale for detailed identification.

Once a pandemic is established, laboratory surveillance must map the evolution of the virus, its antiviral susceptibility, and the causes and antimicrobial susceptibility of bacterial complications.

The UK virological surveillance strategy is expanded on in Annex F (to be added) and covers

- maintaining alertness among clinicians and virologists to recognise the unusual
- maintaining laboratory methods at the cutting edge
- developing and maintaining reagents for routine and reference laboratory diagnostic tests
- surge capacity in virology laboratories at local and reference levels in the event of a pandemic

- capacity for antiviral susceptibility testing
- surge capacity for bacteriological diagnosis of complications of influenza
- laboratory staff protection and compliance with all necessary biosafety and security requirements.

5.4 The public health response: reducing the health impact

The public health response includes the field investigation, handling and feedback of information from suspected incidents and outbreaks by appropriately trained personnel, using appropriate protocols and proforma, and the application of population control measures. The results of epidemiological investigations need regular review to redefine the protocols and develop or adjust the recommendations to prevent or control the (further) spread of the disease.

The following control measures are aimed at reducing the health impact of an influenza pandemic:

- 'Medical' interventions
 - Immunisation
 - Antiviral drugs
- Other public health or 'social' measures to reduce transmission or slow the spread of infection

Immunisation

In inter-pandemic years, immunisation is the cornerstone of influenza prevention. Production of an appropriate vaccine is possible each year because of scientists' ability to predict the strains of virus most likely to be circulating that year. These routine vaccines will not protect against a pandemic strain of influenza. Pandemics – and the viruses causing them – are by their very nature impossible to predict with certainty. So, although as much work as possible will be undertaken to pave the way for production of a suitable vaccine, **a specific vaccine is unlikely to be available in any quantity at least in the early stages of a pandemic.** There will therefore be 3 stages in the public health strategy:

- 1.No vaccine available
- 2.Vaccine in limited supply
- 3.Vaccine widely available

Even when a good match is achieved between an influenza vaccine and the prevalent circulating virus or viruses, vaccination is not 100% effective in preventing illness and the protection afforded can vary from year to year. There is evidence to suggest that a vaccine against a new influenza strain to which no-one has been exposed before may require a larger dose, or more than one dose, to achieve optimal protection. Nonetheless, an appropriately formulated vaccine can be expected to reduce the impact of pandemic influenza, particularly by reducing complications, hospitalisations and deaths among those groups most at risk of serious illness and death.

Vaccine development

One of the greatest challenges in responding to a pandemic will be to develop a safe, immunogenic vaccine which protects against the pandemic strain of virus in the shortest possible time. Influenza vaccine production takes time and is subject to various rate-limiting factors. There may be additional technical problems in preparing a pandemic vaccine.

Work will be undertaken in the inter-pandemic period to facilitate development of a suitable candidate vaccine through

- improving routine influenza vaccines
- developing 'candidate' pandemic vaccine strains, based on forecasting of possible genetic changes relevant to a pandemic, or assessment of the pandemic potential of a new virus
- banking of possible potency testing reagents
- undertaking clinical trials to assess safety, immunogenicity and dosing schedules of candidate vaccines
- taking a 'mock' pandemic vaccine through the regulatory framework in order to speed the process for a subsequent pandemic vaccine made the same way
- optimising manufacturing capacity and capability, in discussion with manufacturers
- understanding the implications of a pandemic vaccine being different from routine influenza vaccines, for example containing components of one, rather than three viruses or containing an adjuvant to increase its immunogenicity
- establishing liability arrangements for possible unexpected adverse reactions to the vaccine and for the contingency that manufactured vaccine is later not required
- resolution of issues relating to intellectual property rights.

Further details of current vaccine development, testing and licensing are at Annex G. Potential problems in developing a pandemic vaccine are also outlined together with vaccine development, production and licensing issues which need to be addressed.

Vaccine supply

Even with advance work to improve our preparedness for vaccine production, the lead time before a new vaccine becomes available in quantity is likely to be at least 4-6 months. There may be no vaccine initially and then availability will depend on production rates. At the same time, international demand for vaccine will be high. Vaccine will have to be distributed equitably and administered to pre-determined priority groups first, according to nationally agreed recommendations.

The Department of Health (England) will lead on purchasing and supplying a pandemic vaccine on behalf of the whole UK, liaising with the devolved administration Health Departments. We are working closely with other countries, The World Health Organization, the European Commission and manufacturers to ensure that a vaccine can be developed as quickly as possible once a pandemic flu strain emerges and to put arrangements in place to ensure production of vaccine for the UK population.

The UK currently achieves the 70% target uptake for immunisation of people aged 65 and over, set as part of our national annual influenza immunisation programme. This, together with immunisation of other clinical risk groups, means that 20-25% of our population currently receives a routine influenza immunisation each year. Strategies will be developed to immunise a greater proportion of the population with a pandemic influenza vaccine as one becomes available, bearing in mind that a two dose schedule may be required and may further constrain more extensive coverage.

It is possible that limited supplies of a suboptimal, and possibly experimental, vaccine may be available before a definitive licensed pandemic vaccine. This would have potential use to offer protection to the highest risk groups such as laboratory staff who are working directly with the new virus.

Immunisation strategy

A tiered approach to immunisation is planned, immunising tranches of the population in stages according to the availability of vaccine. The increased risk faced by health care workers treating patients, and the need to keep health and other essential services running, means that if vaccine supplies are limited, health care workers and other essential service key workers may need to take precedence over some of the risk groups prioritised for vaccine in inter-pandemic years.

The Joint Committee on Vaccination and Immunisation (JCVI) has recommended the following provisional aims, in order of priority:

- protect health care workers occupationally most at risk. Health care workers with patient contact, in addition to being essential to the health service response, are likely to be at increased risk of acquiring infection from their patients and passing it on to vulnerable patients
- prevent illness, and thus absence, among workers required to keep essential services going. These will be identified according to lists being prepared as part of other emergency planning work, subject to further assessment currently underway of the advantages and disadvantages of such an approach.
- prevent serious illness in the (anticipated or confirmed) most vulnerable groups
- reduce the spread of influenza in situations where it might spread particularly rapidly, for example in closed communities such as residential care homes
- reduce spread by immunising those more likely to transmit the virus, eg children
- prevent illness in the general population

Final decisions on priority groups will be made by the UK National Influenza Pandemic Committee, informed by any recommendations from the World Health Organization and the JCVI, using the above criteria as guiding principles. Further details of the strategy are at Annex G.

Pneumococcal immunisation may prevent some of the complications due to secondary pneumococcal infection following influenza infection (but will not, for example, prevent other bacterial complications such as staphylococcal pneumonia). Part of preparedness planning will be to improve uptake of pneumococcal vaccine among the risk groups for whom it is routinely recommended (currently people aged 65 and over and certain clinical risk groups).

Operational aspects of immunisation

Vaccine will be centrally purchased by DH on a UK basis and distributed on allocation according to estimated local needs for the predetermined priority groups. Operational guidance for delivery of vaccinations is being developed, but details such as vaccine formulation, dose and dose schedule will not be known until nearer the time, and so detailed arrangements for immunisation will need to be finalised when these are known. It is likely that

- occupational immunisation will be based in the workplace
- GPs and nurses will play a major role in mass community immunisation plans to be developed, learning from experience during the development of other mass vaccination campaigns
- the potential for treatment and administration by other groups, eg pharmacists, will be explored.

Managing public/patient expectations regarding vaccination

An important part of the communications strategy will be to inform the public about the reasons for vaccine not being generally available and to manage their expectations. The public will also need information to inform their own decisions about vaccination, for example about any possible potential for a pandemic vaccine to cause adverse reactions.

Antiviral agents and their use

Antiviral agents active against influenza are the only other major medical countermeasure available. More information on these agents is at Annex H. They may be used in the absence of, or as an adjunct to, vaccination. However, there are limitations to their use, their effectiveness in a pandemic situation has yet to be tested and anti-viral resistance may be – or become – a problem.

Manufacture of antiviral drugs takes several months, and their availability cannot be assured at the time of a pandemic, when international demand will be high. A UK stockpile of antiviral drugs is being built up against the contingency of an influenza pandemic, but as with other resources, given the possible scale of a future pandemic, **the drugs will need to be given in the most effective way on operational, clinical and cost-effectiveness grounds** taking into account the stocks available. Information on effectiveness may not be available at the start of a pandemic.

The National Institute for Clinical Excellence (NICE) has issued guidance for the use of antivirals for seasonal influenza in certain high risk groups. This guidance does not apply in a pandemic of influenza. One of the clinical challenges of a pandemic will be to identify those patients most likely to have more severe outcomes, which may be different from seasonal flu, who could have most to gain from antiviral treatment. Until epidemiological information begins to accumulate during a pandemic, we cannot say who those are most likely to be.

Strategies for the optimal use of antiviral drugs

Until more information becomes available, general principles are established in this section. More detailed guidance will be issued as necessary and as further information becomes available. Final decisions on priority groups and strategies for the use of antivirals will be made by the UKNIPC, informed by any recommendations from WHO or the relevant UK expert advisory mechanisms.

The provisional strategies proposed are:

Potential prevention of a pandemic

Antiviral agents have a role in prevention and control of avian influenza in occupational groups exposed to dead or diseased birds. This is for personal protection but also to protect against establishment and evolution of avian influenza viruses in people. Full details are in the Defra Avian Influenza Contingency Plan.

At the onset of a pandemic

At a stage when isolated cases or small confined outbreaks are occurring, antiviral drugs may have a place in trying to contain the infection or delay or slow its spread. This will be done on a case by case basis, and will involve treatment of a symptomatic case or cases and short term prophylaxis to prevent infection developing in those of their close contacts (including health care workers) potentially exposed. The drug would be taken for the duration of the incubation period, usually 7 days. This is likely to be a short-term strategy, and not the main use of antiviral drugs.

During the pandemic

Treatment of cases

Once a pandemic is established, treatment is likely to be recommended following criteria consistent with those established for the vaccination strategy. Treatment would thus be offered, in order of priority, to

- health care workers, if and when they develop fever or other flu symptoms (regardless of whether vaccinated)
- other workers required for maintaining essential services (as above)
- unimmunised people in high risk groups (or groups emerging information suggests are at special risk), to ameliorate illness and reduce complications and death
- other unimmunised people
- Immunised people, using the same criteria as above, if emerging information suggests the vaccine being used is not effective at reducing serious illness, complications or deaths

'Post exposure' prophylaxis

Limited use of antiviral drugs may be recommended to limit the spread in certain defined situations such as, for example, in a closed institution suffering an outbreak.

Longer term prophylaxis on a population level ie in the absence of effective vaccination, taking the drug to prevent infection throughout the period of possible exposure (bearing in mind the virus may be circulating in the population for several weeks or months) is not considered likely to represent an efficient use of the drugs. It would consume very large quantities of drug if implemented on any scale, and the many people who would not have developed influenza anyway would have taken the drug unnecessarily.

As with seasonal flu, it is likely that for maximum effect the drugs will need to be started as soon as possible and within 48 hours of (for treatment) onset of symptoms or (for post-exposure prophylaxis) exposure to infection.

Supply and distribution of antiviral drugs

Antivirals will be centrally purchased by DH on a UK basis, liaising with the devolved administration Health Departments, and distributed on allocation.

Operational guidance is being developed for the efficient distribution of antiviral drugs. Use of antivirals will present challenges and issues for the configuration and capacity of primary care services. Primary care organisations' dispensing plans will need to meet the requirement that patients in the designated groups start treatment within 48 hours of onset of symptoms (or, for prophylaxis, exposure). Pharmacists are likely to have a role.

UK and non-UK residents would be expected to have equal access to drugs.

Monitoring effectiveness and adverse reactions

As part of the antiviral strategy, arrangements must be in place to monitor the susceptibility of the virus to antiviral drugs and assess their effectiveness in reducing complications and deaths and incidence and patterns of adverse reactions.

Other public health and/or 'social distancing' measures to reduce morbidity and/or contain spread

In the event that medical countermeasures are absent, in limited supply, or ineffective, other 'social' interventions will be the only available countermeasures.

During the outbreaks of Severe Acute Respiratory Syndrome (SARS) in 2003, internationally agreed measures were instituted to restrict the movement of people possibly infected with SARS and were assessed by WHO to have greatly contributed to bringing the disease under control.

Influenza differs from SARS in many important respects that make it unlikely that similar interventions will do more than delay or slow the transmission of infection: it is more infectious, it is most infectious early in the course of the disease (and possibly even before symptoms begin); and it has a much shorter incubation period (1-3 days). At this time, the extent to which the spread of influenza can be delayed or slowed by measures to reduce infected and non-infected people mixing is not clear, and what may be reasonable at an early phase may not be once the pandemic is fully established.

However, simple advice such as hand washing, encouraging people suffering from the disease to stay at home and reducing unnecessary, especially long distance, travel may achieve some slowing of the spread of a pandemic.

The following public health measures, and the need for infection control guidelines in non-medical settings where people gather, are being kept under review. Clear guidance will be issued, based on the advice of the UKNIPC, guidance from the WHO or real time modelling as the evidence evolves or as need arises:

- Hygiene including respiratory hygiene and hand washing
- Travel advisories to restrict international travel to or from affected areas
- Health screening at UK ports
- Voluntary home isolation of cases
- Voluntary quarantine of contacts of known cases
- Staff rostering to minimise contact between different healthcare teams and reduce spread within healthcare premises. This may also reduce the impact on staffing if all contacts of a case in a work team are asked to remain in voluntary quarantine
- Local restrictions on the movement of people, eg in a local community or town
- Restriction of public gatherings, especially international mass gatherings
- School closures (recognising the impact this will have on maintaining the workforce in other sectors)
- The use of face masks by infected people (to reduce droplet spread), by those in contact with infected people or by the general public

Some of these measures may be required as a result of staff absence or the general disruption, or may occur by default because of public concern or other considerations. Voluntary co-operation with recommended measures would be sought. Mandatory quarantine and curfews are generally not considered necessary and are not currently covered by public health legislation.

5.5 The health service response

The health service response requires co-ordinated local arrangements for the efficient, safe clinical management of cases (and suspected cases) and their contacts in primary, secondary and long term residential care and by ambulance services, and all the logistical problems in maintaining services in the face of unprecedented demands and disruption. Health service organisations and personnel also have a role in supporting the public health response, and will be required to supply some of the data required locally and nationally to monitor the pandemic's impact and inform the response.

Management of patients

The efficient and effective care of patients will require clear national and local guidance for the public as to who should self-care (and how), and who should seek medical assistance, when, how and where. NHS Direct and NHS24 'sleeping scripts' and management protocols for patients will be agreed in advance, but kept under review to take account of experience gained as a pandemic evolves.

Draft clinical treatment protocols are being developed, led by the HPA in consultation with relevant clinical groups, and will be posted, and kept up to date, on the HPA and Health Protection Scotland (HPS) websites, taking account of clinical experience as necessary.

Health services will need to plan for the efficient dispensing of antiviral drugs within the agreed protocols, so that those recommended for antivirals are able to start them within 48 hours of onset of symptoms.

It will be important to have in place a mechanism to collect information on the outcomes of the various treatment regimens being used nationally and internationally so that best practice can be built on the results of real time evaluations.

Infection control

Clear infection control guidance for all health and social care establishments will also be required. Draft guidance is being developed, led by HPA, and will be kept under review and available on the HPA and HPS websites.

Organisation of health services

Depending on the number of cases, the NHS will need to establish ways of caring for large numbers of patients on a scale outside their normal experience, including for those of all ages requiring high dependency care. Some of the key decisions required locally will include

- Provision of staff protection equipment
- Where patients are to be seen and assessed
- How to 'triage' patients, ie to quickly assess their needs and ensure they are directed to the appropriate care, in primary care and hospitals
- Where patients are to be treated and admission criteria
- The provision of diagnostic services and the safe handling of specimens (following national protocols)
- How to maintain care for those staying in their own homes
- The logistics of maintaining supply of equipment and pharmaceuticals, including the blood supply
- Cancellation or reorganisation of routine activity
- How other work is to be re-organised
- How to roster staff to minimise the spread of infection in health care premises, maintain the right skill mixes, but ensure that they all get time off
- How additional mortuary space is to be provided and safe practice for mortuaries
- How to manage the interface between primary care and Accident and Emergency Departments when primary care services are under pressure.

Organisational issues for health care organisations are considered in more detail in separate guidance being prepared.

5.6 Reducing societal disruption: the civil emergency response

This plan is mainly concerned with the health response to an influenza pandemic, but health services will be looking to other Government Departments and other agencies to assist with the successful implementation of the health response, particularly to implement the 'social' countermeasures referred to above which may be needed as public health measures. Additionally, all organisations, including businesses, need to consider the implications for their organisations, based on the information in this plan, and make their own plans. Further detail is provided in Annex J.

The civil emergency response is covered by other contingency plans which will come into effect should the scale of a pandemic warrant it. These cover, for example:

- Maintenance of essential services such as emergency services, transport, food distribution, pharmaceutical supplies, utilities and communications
- Management of mass casualties
- Maintenance of public order
- The role of the police and armed forces

5.7 Workforce, education and training

All organisations need to consider the implications for them of staff absence because of sickness, or the need for staff to take time off to care for others, at a time when, for some, their workload may be increased. This will include

- Establishing minimum staffing levels
- Identifying a 'front line' group of essential staff
- Considering the need to transfer or redeploy staff to do jobs they may not be trained to do or familiar with, or to recruit additional staff or volunteers
- Ensuring a system for vetting additional staff, including volunteers
- Accommodation, for example portacabins with bunks for people to rest between shifts when transport home may be difficult or disrupted.

Staff rosters must allow for adequate break and leave periods to ensure a sustainable response over several weeks.

The educational and training needs of both regular staff and staff drafted in or redeployed should be considered as part of preparedness planning, but will need to continue during the response. Some of these are

- Appropriate staff training
- Training of volunteers
- Teaching staff how to handle and work with volunteers – although there will be regular volunteers, e.g. St John Ambulance staff, staff may not know who they will be working with until a shift starts and cannot assume their skills and experience
- Keeping a database of former or recently retired clinical staff or local doctors who may be called upon to help.
- Including the need for surge capacity in regular planning

Staff may also need psychological or morale building support during what will be a difficult time at work and at home.

Testing plans is part of the training framework.

5.8 Preparatory work and research

Underpinning work during the inter-pandemic period will aim to improve our preparedness across all systems and ease demands on people's time at the time of the pandemic by thinking through problems in advance.

Immediate research needs include:

- ongoing work into development of new improved influenza vaccines, in particular the development and best use of a pandemic vaccine
- the optimum use of antivirals
- the virology and epidemiology of influenza viruses, in particular previous pandemic strains.
- practical infection control issues
- behavioural research

A framework will be developed and maintained of key research issues which could be addressed during a pandemic, with protocols in place in advance, based on the following questions:

- What are the key research issues?
- What are the gaps in the evidence base for actions?
- What are the restraints?
- What ethical approval will be required and how will it be obtained?
- How can funding be mobilised quickly?

5.9 The international context

A pandemic is, by definition, an international event. The UK must keep abreast of international developments and thinking. It also has certain international obligations (in particular in respect of the World Health Organization and the European Union) to report disease incidents and outbreaks and the actions we are taking. The UK will play its full part in contributing data, knowledge and expertise to help towards a co-ordinated and coherent international response. Where possible the UK will also deploy personnel to join response teams assisting third countries with their response.

6. The roles and responsibilities of the main organisations contributing to the response

This section outlines the roles and responsibilities of key organisations with particular emphasis on the roles and responsibilities of the UK Health Departments working together within a UK framework in which the Department of Health (England) has the lead. The Plan recognises that organisational structures and responsibilities differ in England, Scotland, Wales and Northern Ireland. Some Government functions (including health) are devolved or partly devolved, others are not.

All other organisations should have their own preparedness plans in place, based on the advice in this document but consistent with other relevant contingency plans.

6.1 The UK Health Departments

- Department of Health (England) (DH)
- Scottish Executive Health Department (SEHD)
- National Assembly for Wales – Office of the Chief Medical Officer (OCMO)
- Northern Ireland Department of Health, Social Services and Public Safety (DHSSPS)

The Department of Health (England) will take the overall UK lead, and will retain some specific UK-wide responsibilities, but all four Health Departments will work in close collaboration to ensure a coherent and co-ordinated UK-wide response. The Department of Health will work closely with the UK Health Departments in Devolved Administrations to ensure this overarching Plan is consistent with their organisation, structures and responsibilities.

6.2 The role of the Department of Health

UK Role: Direction and co-ordination of the UK health response

The Department of Health has overall responsibility for planning, initiation, direction and central co-ordination of the UK health response. It will take full account of devolved responsibilities in providing the overall UK lead to:

- i. develop and ensure ongoing revision of the overall UK Health Departments' Pandemic Plan
- ii. improve preparedness across all health systems, UK-wide
- iii. oversee implementation of the plan
- iv. provide policy direction for the public health response and develop strategies to reduce the impact on the health of the UK population
- v. brief Ministers
- vi. provide the information and guidance other UK Health Departments, Government Departments and Agencies and other organisations need to plan and respond appropriately at national, regional and local levels
- vii. provide the necessary health input to the national civil emergency response through the Civil Contingencies Committee, and
- viii. provide UK input to the international response, in particular through WHO and the EU, and liaise internationally through its formal channels.

England only role: Co-ordination of the Public Health and NHS Response in England

Additionally, the Department of Health (England) will co-ordinate the public health and health service response in England.

Other specific roles of the Department of Health

DH, in partnership with the other UK Health Departments and other organisations (indicated in brackets), will:

- facilitate, as far as it is able, the development and licensing of a pandemic vaccine
- secure supplies for the UK of an effective vaccine, antiviral agents, antimicrobials and other pharmaceutical products and other essential supplies eg face masks, surgical gloves etc, if required (with PASA, NHS Logistics, NIBSC, HPA, manufacturers), liaising with the other Health Departments regarding supplies for the Devolved Administrations
- develop strategies and priority groups for use of vaccine and use of antiviral agents for prophylaxis and treatment (advised on vaccines by the Joint Committee on Vaccination and Immunisation (JCVI) and NICE for antivirals), liaising with the other health Departments
- control, on a UK basis, the issue of vaccine, antivirals and antimicrobials (PASA) liaising with the other Health Departments
- monitor adverse reactions in the UK to vaccines and drugs (MHRA)
- co-ordinate provision of consistent, accurate advice to health professionals, managers, the public and the media (HPA, with HPS)
- agree research protocols with DH Research and Development Division (RDD), HPA, the Medical Research Council (MRC) and other research bodies which can be activated in the event of a pandemic
- liaise with international agencies e.g. WHO and the European Union, including over the worldwide distribution of vaccine and antivirals for the UK
- negotiate for additional resources if necessary for the overall UK response and for the NHS in England (Treasury)
- establish a central DH team to respond rapidly when the time comes (DH Recovery and Support Unit) to carry out the UK and England only functions and to liaise with equivalent Health Department teams in the Devolved Administrations
- collate and produce a report after the event (HPA/ONS).

6.3 The UK National Influenza Pandemic Committee (UKNIPC)

The Department of Health (England), in consultation with the other UK Health Departments, will appoint a UK National Influenza Pandemic Committee (UKNIPC) to advise all four Health Departments on the UK response. Its composition and remit are at Annex A. The UKNIPC membership includes representatives from the Health Departments of the Devolved Administrations. The UKNIPC will be supported by an Executive at working level of DH and HPA officials representing the relevant work areas and led by a Co-ordinator who will assume overall accountability for the organisational arrangements and the NHS response in England. The UKNIPC will be convened by DH on its own initiative or in the event of a potential or actual pandemic.

6.4 The role of the Civil Contingencies Committee and Civil Contingencies Secretariat

At a UK level the Civil Contingencies Committee (CCC), with the support of the Civil Contingencies Secretariat (CCS), provides the central focus for cross-departmental and cross-agency commitment, co-ordination and co-operation to enable the UK to deal effectively with disruptive challenges and crises. CCC will work alongside equivalent committees in the DAs who are responsible for co-ordinating their part of a response to a pandemic.

Should a pandemic lead to consideration of disease control or other measures with implications for Departments and agencies other than the Health Departments, the CCC will co-ordinate strategic decision making on UK national priorities across Departments and with Devolved Administrations to ensure an integrated UK response. This will be indicative of a major ratcheting up of the response and will lead to significantly increased interaction between the Health Departments, the Health Protection Agency and Health Protection Scotland and the CCS, with increased information flow and downward tasking. The CCS would gather information from all other Departments and Devolved Administrations for a daily situation report (SITREP). Devolved Administrations will gather information in their own countries which they will share with CCS.

6.5 Other Government Departments

The following Government Offices and Departments will be directly or indirectly involved in the response to an influenza pandemic, or will have client groups who need advice and/or need to be kept informed (eg utilities, schools, colleges, business and transport):

- Department for Education and Skills (DfES)
- Department for Environment, Food and Rural Affairs (defra)
- Department for International Development (DfID)
- Department for Media, Culture and Sports (DCMS)
- Department of Trade and Industry (DTI)
- Department for Transport (DfT)
- Food Standards Agency (FSA)
- Foreign and Commonwealth Office (FCO)
- Government Offices of the Regions (England) (GO)
- Home Office (HO) (mass fatalities lead)
- Ministry of Defence (MoD)
- Office of the Deputy Prime Minister (ODPM)
- Office of Science and Technology (OST)
- The Veterinary Laboratory Agency (VLA) and State Veterinary Service (SVS)
- Cabinet Office

Other Government Departments would be consulted either directly, or via the collective decision making mechanism provided by the Civil Contingencies Committee before any actions were agreed or taken that would impact on their sector or area of business, and would provide assistance with any discussions with their sectors over health measures required, or to mitigate against an outbreak of infectious disease.

6.6 Devolved Administrations

The Devolved Administrations are responsible for:

- Policy and planning within their administrations
- Ensuring their own capacity and capability to respond
- Oversight of their national and health service response
- Co-ordination of the civil emergency response and their country's Health Departments

The Role of the Devolved Administrations

Health Departments and Office of the Chief Medical Officer (Wales): Direction and co-ordination of the response in the Devolved Administrations

Health Departments in Scotland and Northern Ireland and the Office of the Chief Medical Officer in Wales have responsibility in Scotland, Northern Ireland and Wales for planning, initiating, directing and centrally co-ordinating the health response in the Devolved Administrations, working within a UK context where the Department of Health (London) leads. Health Departments of Devolved Administrations take the lead to:

- work with the Department of Health (England), on the development and ongoing revision of the UK Influenza Pandemic Plan and the detailed implementation plans for the Devolved Administrations.
- improve preparedness across all health systems in the Devolved Administrations and provide advice to other devolved areas where appropriate.
- provide a policy direction for the public health response in the Devolved Administrations and develop strategies to reduce the impact on the health of their populations working within the context of the overall UK public health response.
- brief Ministers in their administrations
- provide information and guidance to other Departments and Agencies in the Devolved Administrations and other involved organisations, to enable them to make their own plans and respond appropriately, working within the UK framework.
- provide the necessary health input to the civil emergency response in Devolved Administrations through their Co-ordinating Committees

- contribute to the international response through liaison with DH, who will lead on international issues through WHO and EU.
- co-ordinate the response of the NHS in Scotland, Wales and Northern Ireland to provide the best possible treatment and care for those affected and provide information and guidance to the NHS in Devolved Administrations to enable the service to make plans working within the UK framework.

Devolved Administrations will each send a representative to the UK National Influenza Pandemic Committee (UKNIPC) which advises all four UK Health Departments. They will also appoint their own Committees to provide strategic implementation advice on health issues and co-ordination of the health response in Devolved Administrations working within the overall UK framework set by UKNIPC.

Other specific roles of Devolved Administrations

Working within an overall UK context and in partnership with other organisations (indicated in brackets):

- liaise with the Department of Health to secure supplies for Devolved Administrations of an effective vaccine, antiviral drugs, antimicrobials and other pharmaceutical products and other essential supplies, eg face masks, surgical gloves.
- ensure an effective distribution mechanism, for supplies of vaccine and antivirals within Devolved Administrations.
- acting on JCVI advice determine strategies and priority groups for vaccination in discussion with other Health Departments, and develop strategies and priority groups for use of antivirals for prophylaxis and treatment advised by NEPNEI and NICE and in discussion with other Health Departments.
- control the issue of vaccine, antivirals and antimicrobials in Devolved Administrations.
- ensure monitoring of adverse reactions to drugs and vaccines by MHRA.
- co-ordinate provision of consistent, accurate advice to health professional, managers, the public and media in Devolved Administrations. (HPA/HPS)
- negotiate for additional resources, if necessary, for the response of the Devolved Administrations and for the NHS in their countries.
- establish central health department teams to respond rapidly, liaise with DH and support Devolved Administrations implementation committees.
- collate and produce a report for after the event and contribute to overall UK report.

These responsibilities will be undertaken by the health departments working with the Department of Health (England) and advised by UKNIPC on overall UK issues and by the Devolved Administrations' committees on strategic implementation issues for the Devolved Administrations.

Co-ordination and Resilience in Devolved Administrations

Devolved administrations are responsible for co-ordinating the civil emergency response in their areas. Co-ordinating Committees provide the focus for cross-sectorial commitment, co-ordination and co-operation to enable them to respond effectively to disruptive challenges and crises. These committees co-ordinate with the CCC through their Ministers.

6.7 English Regions

In England, Regional Directors of Public Health (RDs PH) will ensure a 24 hour capability to support both Strategic Health Authorities and the rest of the Department of Health, and where necessary will co-ordinate public health resources in responding to public health emergencies. RDsPH provide the health link with other regional Government Departments and to Regional Resilience mechanisms, and chair Regional Civil Contingencies Committees in public health emergencies to maintain an overview of regional impacts and response and report into CCC at national level.

6.8 The Health Protection Agency (HPA)

The HPA is the lead agency responsible for advising and supporting the UK national public health response to major infectious disease incidents and outbreaks, acting through its component parts:

- the Centre for Infections, Colindale
- the Centre for Emergency Preparedness and Response (CEPR), and
- Local and Regional Services (LaRS) (England only)

Health protection organisations in the Devolved administrations, although not directly equivalent, are:

- in Scotland, Health Protection Scotland (HPS)
- in Wales, The Wales National Public Health Service (PHS)
- in Northern Ireland, The Communicable Disease Surveillance Centre, NI

If the epicentre is in one of the Devolved Administrations rather than in England, the equivalent health protection organisation will be in the lead, but the HPA will still be expected to play its UK co-ordinating role.

The HPA will, where appropriate in co-ordination with colleagues in the health protection organisations in the DAs, will:

- liaise with WHO and other international agencies
- provide specialist public health advice together with operational and investigative support, to DH, the NHS in England, English Regional Public Health Groups and others with formal responsibilities for dealing with pandemic influenza
- provide a co-ordinated UK national public health response
- provide reference virological and microbiological services for the UK
 - characterise strains of influenza virus isolated in the UK, both through routine and structured sampling
 - assess and monitor antiviral susceptibility
 - if indicated, assess antibody status of a sample of the population
 - assess the spectrum of secondary bacterial infections complicating influenza and their antimicrobial susceptibility and make recommendations to incorporate into clinical guidance
- lead the laboratory investigation of samples, arrangements for laboratory testing and development of a strategy for escalation
- co-ordinate national influenza surveillance: obtain and analyse information on national and international influenza activity (including laboratory, clinical and mortality data) and distribute it on the HPA website, in a weekly, or more frequent, influenza bulletin
- provide virological and epidemiological data on which UK national decisions, such as the choice of vaccine strategy and use of antiviral agents, must be based
- co-ordinate development of UK national guidelines for health professionals
- monitor vaccine uptake, when vaccine becomes available
- in England, through local Health Protection Units, co-ordinate the local public health response, support NHS Trusts and local authorities in their response and ensure cross linkages between HPUs and NHS units are specified in local plans
- provide specialist emergency planning advice to DH, the NHS (England) and English Regional Directors of Public Health.

6.9 Health Protection Organisations in the Devolved Administrations

Health Protection Scotland, the Wales National Public Health Service and the Communicable Disease Surveillance Centre Northern Ireland, working with HPA, will:

- participate in HPA-led UK arrangements to ensure as far as possible a consistent UK-wide public health response
- co-ordinate and communicate influenza surveillance in the DAs and provide HPA with timely data to produce UK surveillance data
- provide specialist advice to the Office of Chief Medical Officer/Health Departments of the DAs
- provide scientific, operational and logistical support to the NHS in DAs on public health management
- co-ordinate the implementation of the public health response by their local health protection organisations

6.10 The Health Service The National Health Service

In England:

- Strategic Health Authorities (SHAs)
- NHS Trusts (Primary Care, Acute Hospital, Ambulance, Mental Health)
- NHS Direct

In Scotland:

- NHS Boards, their Operating Divisions and Community Health Partnerships (CHPs)
- NHS Special Health Boards (Scottish Ambulance Service, NHS National Services, Scotland)
- NHS 24 Scotland

In Wales:

- Local Health Boards
- Wales Ambulance and Hospital Trusts
- Wales National Public Health Service
- NHS Direct Wales

In Northern Ireland:

- Health and Social Services Boards
- Acute, Community and Ambulance Trusts

The independent hospital and nursing home sector

The independent health and social care sector will be affected, and will need to be involved in planning at all levels of response.

Roles of health organisations

At *strategic level* (Strategic Health Authorities in England, NHS organisations in each of the three health regions in Wales, relevant Health Boards in Scotland), Health Service organisations are responsible for:

- strategic control of any incident that affects or seems likely to affect a number of hospitals or have a significant impact on primary care
- ensuring command and control structures are in place across the NHS within its area and have been tested
- agreeing with HPA/HPS and the RsDPH/DsPH in devolved administrations escalation triggers and mechanisms
- ensuring escalation policies are clearly described, and that capacity plans are available
- ensuring links within the NHS, with neighbouring SHAs, Health Regions or NHS Boards, with RsDPH/DsPH in DAs, the HPA/HPS and across into the other sectors – including social care – are effective and durable
- ensuring local provision for an influenza pandemic
- monitoring the plans of NHS organisations within its area
- they may have to clarify which routine NHS targets can be dropped or modified, ie what business will not be continued 'as usual' in the event of a pandemic disrupting normal work.

In addition, all *NHS Organisations* should have contingency plans which cover:

- the command and control structure, escalation policies and links to other sectors
- arrangements to appoint a named influenza co-ordinator, normally the Director of Public Health, and a pandemic planning committee with appropriately wide representation
- arrangements for the optimum care for those affected, including ability to mobilise and direct health care resources to local hospitals at short notice to support them and to sustain patients in the community should hospital services be reduced or compromised for a period
- ensuring they have the appropriate facilities for infection control
- arrangements for liaison with Local Authority colleagues and Social Services, including coherence of emergency plans and joint working
- arrangements to have mutual support arrangements between neighbouring NHS organisations
- arrangements to decide which routine NHS work can be dropped or modified, ie what business will not be continued as usual. These arrangements should include appropriate bodies with lay representation to debate and agree in public difficult rationing decisions
- managing the disruption caused by influenza on other NHS services and other medical conditions
- contingency staffing arrangements for primary, acute and public health services
- arrangements to cope with staff absenteeism and increased patient loads
- arrangements to immunise and provide antiviral prophylaxis to essential staff according to UK guidelines
- plans for emergency vaccination programmes according to UK guidelines, including an estimate of local vaccine and antiviral needs and arrangements for ensuring the vaccine and antivirals are distributed and administered appropriately
- communication arrangements to healthcare professionals, the public and media, including timely cascade of information from national and international sources

- arrange to have laboratories investigate influenza like illness, isolate strains of influenza, test antimicrobial susceptibility of secondary bacterial infections and report findings for local and UK surveillance according to UK-wide agreed protocols
- ambulance Trusts/Special Health Boards may need to consider central co-ordination of all patient transfers during Phase 3 of the response
- staff training
- a media handling strategy.

NHS Direct (and the equivalent in the DAs) is responsible for developing and maintaining up to date advice algorithms for influenza, with HPA and others, and activating them when instructed by the HPA or the Department of Health (England).

6.11 Other local level organisations

Key agencies, including local authorities, the police and voluntary sector will need to meet to consider local issues relating to the pandemic. Key agencies will usually meet as part of the local resilience committee or strategic co-ordinating group (SCG) or 'Gold (Strategic) Group'. In England, local Directors from Health Protection Units may be asked to chair the local resilience committee/SCG for the duration of the outbreak. Public health staff may be asked to undertake a similar role in the devolved administrations.

6.12 Other key organisations

The WHO Collaborating Centre for Influenza at the National Institute for Medical Research (NIMR) will:

- contribute to international surveillance of influenza viruses by determining the antigenic characteristics of strains of influenza virus received from countries world-wide
- as a result of personal contacts with laboratory workers in other countries and its WHO role it will hear of the appearance of a new strain at the earliest stage and obtain isolates for further characterisation which may be suitable for vaccine production
- collaborate with NIBSC over potential vaccine candidate strains
- collaborate with the National Reference Laboratory in testing the antiviral susceptibility of isolates.
- improve and maintain links with national influenza laboratories in other European countries.

The National Institute for Biological Standards and Control (NIBSC) will:

- produce and distribute candidate vaccine strains, including high growth reassortants (hgr), and vaccine potency reagents for standardisation and research
- liaise with vaccine manufacturers and other control laboratories and advise DH, WHO and the EC on vaccine strains
- assess the serological response to immunisation
- advise DH on licensing issues
- batch release influenza vaccines.

The Medical Research Council has a coordinating role for research, for example for clinical trials of new vaccines and anti-viral agents, and for setting up collections of samples of clinical material or isolates for storage for later investigation.

The RCGP Research Unit, CDSC Wales and Northern Ireland and Health Protection Scotland

- monitor new consultations for influenza-like illness and other respiratory infections in primary care through sentinel practice reporting schemes. In England and Wales, reports are also aggregated by 'region', ie North, Central and South.
- contribute to virological surveillance through structured surveillance
- contribute to monitoring vaccine uptake

The UK Vaccines Industry Group (UVIG) and the ABPI

Liaison with the vaccines and pharmaceuticals industry is key to development and supply of vaccine and other pharmaceutical supplies.

6.13 International bodies

The World Health Organization

Through its Global Agenda on Influenza, the WHO co-ordinates the international response to a potential or actual influenza pandemic, with particular emphasis on:

- Co-ordination of international surveillance
National Influenza Reference Centres in 83 countries, including the UK, submit the results of their own surveillance to one of four WHO Collaborating Centres (Atlanta, London, Melbourne and Tokyo).

- Advice and recommendations for pandemic planning, particularly strategies for public health interventions
- Provision of expert field assistance to Member States on request (including provision of field response teams)
- Co-ordination of international investigations and responses
- Provision of international information and advice to health authorities, the media and the public

The European Union

The European Commission

- Assists the exchange of information between Member States through the European Network for the Epidemiological Surveillance and Control of Communicable Diseases (the 'European Network') and its Early Warning and Response System (EWRS)
- Co-ordinates Member States responses through the European Network and other mechanisms
- Prioritises European research funding.

In future the co-ordination function is likely to be provided by the European Centre for Disease Prevention and Control, due to be established in 2005.

7. The phased response

The interpandemic period: Phase 0

No new virus types reported

Planning assumptions

- Seasonal influenza will be the major focus of attention
- A new virus is most likely to emerge in the Far East
- WHO will have the lead for investigating any such events but the UK will expect to contribute effectively

Priorities

- Improving knowledge and management of seasonal influenza
- Maintaining vigilance over international surveillance (including animal/bird influenza surveillance)
- To be in a position to identify a novel virus promptly should one occur in the UK
- Improving preparedness across all sectors

Main capabilities required

- Clinical and animal surveillance and laboratory diagnostic capabilities to recognise and provide warning of a new virus with pandemic potential from human (and animal) specimens

Actions**Leadership, organisation and co-ordination**

Department of Health, in collaboration with the Office of the Chief Medical Officer/Health Departments of DAs

- maintain an effective annual influenza programme
- set and regularly review national policy for annual influenza immunisation, advised by JCVI
- indicate the membership for the pandemic influenza committee
- name a pandemic co-ordinator
- keep UK national contingency plans up to date, assisted by a pandemic planning steering group
- improve UK preparedness for a pandemic, working with each other and other organisations
- issue planning guidance for other Government Departments, the NHS and other relevant organisations to assist the development of their own contingency plans
- consider workshops to discuss implications of a pandemic for other organisations
- provide UK input to pandemic planning at international level, including the EU

The Health Protection Agency, in collaboration with health protection organisations in the DAs

- maintain and regularly review operational aspects of the annual influenza programme
- advise the Department of Health (England) on control policies for seasonal and pandemic influenza
- develop HPA operational response plans applicable to a pandemic across all its Divisions

Health Organisations

- maintain an annual influenza immunisation programme according to national policy, including maintenance of 'at risk' patient registers
- ensure local contingency plans applicable to influenza are kept up to date and make local organisation and accountability clear
 - consider exercises to test local plans.

Communications

Strategic

- Keep senior colleagues informed of influenza activity as required
- Issue planning guidance
- Agree pandemic communication needs, strategy and structure

Professional

- Maintain annual letter on national influenza immunisation programme to healthcare professionals
- Prepare draft briefings and guidance to health professionals, for completion should need arise

The public and media

- Maintain routine information on flu and flu immunisation for the public via leaflets, posters, NHS Direct and its equivalents and websites
- Increase awareness of influenza and influenza immunisation policy through media campaigns
- Use opportunities to prepare and inform the public about pandemic influenza

- Prepare draft pandemic information, frequently asked questions etc for the public
- Prepare draft briefings and public information that can be finalised later and issued in the event of escalation of the response

Surveillance (HPA/HPS lead)

- Maintain and regularly review routine national clinical and virological influenza surveillance, co-ordinated across the UK
- Contribute to WHO and European influenza surveillance schemes
- Maintain close links with WHO surveillance
- Ensure that significant infection events abroad, for example outbreaks of unexplained respiratory illness or outbreaks of avian influenza infection in poultry flocks, are recognised, sufficient detail is obtained for assessment and the threat posed to the UK is monitored
- Improve regional coverage and data on hospital admissions
- Investigate outbreaks of influenza, particularly if related to travel to the Far East
- Alert clinicians to incidents/outbreaks which could be linked to a new strain and the actions they should take
- Monitor influenza vaccine uptake (including pneumococcal vaccine)
- Maintain a UK-based WHO Collaborating Centre with a capability and capacity to contribute effectively to WHO's Global Influenza Surveillance Network (DH lead)

Microbiology and virology

- Maintain reference capability and capacity to monitor prevalent viruses and their antiviral resistance
- Improve and standardise NHS laboratory investigation of influenza-like illness, including identification of influenza viruses and protocols for referring isolates/specimens to the National Influenza Reference Laboratory
- Maintain structured virological surveillance linked to clinical surveillance
- Optimise laboratory capability and capacity to identify a novel virus and monitor antiviral resistance
- Collaborate with veterinary colleagues on laboratory methods/surveillance

- Collect data on bacteria complicating influenza and their antimicrobial susceptibility

Reducing the impact: the public health response

Vaccine development

- Contribute to WHO meetings to advise on the strains to be used for vaccine production each year (NIMR/NIBSC/HPA NIRL)
- Support development of improved influenza vaccines
- Optimise preparedness for vaccine production including
 - Technical aspects
 - Regulatory aspects
- Discuss needs of vaccine manufacturers in the event of a new pandemic strain

Immunisation policy

- Regularly review influenza immunisation policy
- Maintain pneumococcal immunisation programme
- Develop policy for immunising poultry workers in the event of an avian influenza outbreak
- Consider maintaining a small stockpile of the annual influenza vaccine for use should an outbreak of highly pathogenic avian influenza occur in poultry in the UK
- Establish policy options for pandemic immunisation
- Estimate vaccine needs
- Plan for pandemic vaccine purchase and supply
- Plan for pandemic vaccine distribution and administration
- Plan for monitoring uptake and possible adverse reactions

Antiviral strategy

- Agree options for use of antivirals
- Estimate antiviral needs
- Establish arrangements for antiviral supply, distribution and administration
- Plan monitoring of effectiveness

Other measures for reducing spread

- Identify other strategies, work out wider implications and outline implementation plans

The health response***Clinical***

- Draft outline treatment and case management protocols (HPA with professional organisations)
- Draft outline infection control guidelines (HPA with the Health and Safety Executive)
- Estimate pharmaceutical supply needs and consider supply issues (DH with PASA)

Organisation of services

- Prepare guidance to the NHS on, for example, recommendations for triaging and secondary care and staffing strategies, for future use

Cross Government and Civil Contingencies response

- Consider implications for all Government Departments

Manpower, education and training

- Address implications for staffing
- Plan recruitment and training
- Consider training exercises

Research

- Identify priorities for research, particularly
 - mathematical, epidemiological and operational modelling to inform planning
 - to support vaccine development
 - to support other public health/social interventions
- Discuss research needs with relevant stakeholders in the event of a pandemic and develop and maintain research protocols to implement during the pandemic

The interpandemic period: Phase 0.1

Trigger: First report of a novel virus subtype from a single human case

Planning assumptions

- A single case outside the UK still represents a very small risk to the UK. However, closer vigilance will be required if it is associated with significant outbreaks of avian influenza in poultry, particularly if geographically close to the UK
- A single case within the UK requires full investigation, containment and a risk assessment

Priorities

- Maintaining close liaison with international organisations such as WHO and with animal health colleagues
- Assisting with identification of the virus and its characteristics
- Assessing preparedness and identifying actions needed to fill the gaps

Main capability required:

- Diagnostic capability for the new virus
- To recognise illness in people potentially due to a new strain, confirm it virologically and investigate the possible source.

Actions

Leadership, organisation and co-ordination

As before

Communications

Strategic

- WHO will announce the phase following international consultation
- HPA informs and advises DH
- Agree full circumstances and implications, involving Defra if associated with animal/avian influenza

- Inform relevant people through normal channels
- If in the UK, inform WHO and the EU Early Warning System
- DH advises CCS on risk

Professional

- The need for guidance will be determined by the risk assessment

Public and media

- Consider needs of stakeholders and media following the risk assessment

Surveillance

If in the UK

- Exclude laboratory error or artefact
- Collect information on possible source of infection and contacts
- Monitor contacts
- Assess antibody levels in contacts

Outside UK

- Heighten surveillance as indicated by circumstances of the case, for example country of origin, other related infections, connections with the UK

Microbiology and virology

- Prepare reagents for identification of the new strain
- If in the UK, assess pathogenicity, antiviral susceptibility and other characteristics

Public health response

Public health control measures

- If in the UK, manage the case and contacts on the principles of investigation, surveillance and containment, using antiviral drugs for treatment and prophylaxis of immediate contacts as indicated
- Outside the UK, consider strategies to prevent the spread of infection to the UK from affected areas should the need arise

Vaccine development

- Consider what possible existing candidate vaccines or vaccine strains may be available should the need arise
- Liaise with NIBSC over possible vaccine development plans

Health and social care response***Clinical care***

- If in the UK, and diagnosed within 48 hours, consider appropriateness of antiviral treatment of the case plus prophylaxis for close contacts who may have been infected
- Ensure appropriate infection control measures in place

The civil emergency response

- CCS maintains a watching brief

The interpandemic period: Phase 0.2

Trigger: Two or more human infections with a new virus subtype confirmed (no confirmed evidence that the virus is able to readily spread from person to person)

Planning assumptions

- Cases outside the UK are still likely to present a small risk to the UK; the risk increases if many cases and strong travel links to the UK or in a geographically close country.
- If cases are associated with widespread avian influenza outbreaks, the risk of further cases increases, especially if control measures are thought to be late or inadequate
- The longer such outbreaks continue, the greater the concern
- If within the UK, prompt investigation and assessment of risk is required

Priorities

- Assisting identification of virus and its characterisation
- Assisting international investigation
- If associated with avian/animal influenza, close liaison with veterinary colleagues
- Review pandemic plans
- Preliminary assessment of potential candidate vaccine strains

Main capability required

- If in the UK: ability to identify related cases of influenza in people due to the new strain suggesting person to person spread

Actions**Leadership, organisation and co-ordination**

Department of Health, in collaboration with Office of Chief Medical Officer/Health Departments in DAs

- Review UK pandemic plan
- Continue to assess preparedness and fill any gaps

Communications**Strategic**

- If in the UK, report to WHO
- If outside the UK
 - Phase announced by WHO
 - HPA informs DH
 - DH advises CCS on the risk. On the basis of the risk assessment, DH and CCS consider whether to call the CCC to co-ordinate the cross Government response (unlikely at this stage)
- Remind organisations at what stage to update their plans
- Ensure mechanism in place for rapid assessment of risk should circumstances change

Professional

- Consider the need to enhance professional awareness

Media/public

- *If in the UK:* issue statement on a regular basis, put information on web and provide briefing to NHS Direct (and its equivalent organisations)
- *If outside UK,* consider the need for information for websites and travel advice
- Continue to inform

Surveillance***If in the UK***

- Obtain full details of circumstances and contacts
- Work with WHO to enhance surveillance and diagnosis and organise special investigations to increase understanding of the possible transmission and impact of the new virus
- With WHO, develop case definition for use in surveillance
- With WHO, consider assessment of prevalence of antibody to the new virus (serological surveillance)

Cases only outside the UK

- Prepare plans to enhance surveillance to identify clusters/outbreaks, particularly among communities with travel contact with site of initial identification of virus

Microbiology and virology

- Ensure timely laboratory diagnosis available centrally

Public health response***Vaccine development***

- In collaboration with WHO, develop and evaluate candidate virus strains for a vaccine against the novel strain
- Develop reagents to determine identity and potency of vaccines
- Conduct clinical trials of potential vaccines as they become available
- Consider work to develop a specific vaccine

- Test investigational lots of vaccine
- Discuss shelf life of potential vaccines with manufacturers

Antivirals

- *In the UK:* assess virus strain for antiviral susceptibility
- *Outside the UK:* assess emerging information from use of drugs

Other public health measures

- If in the UK: continue containment strategy of previous phase; identify close contacts of cases

Health and social care response

If in the UK

- If hospitalised, treat patients in single rooms with full infection control measures
- Treat patients with antivirals, if appropriate, and give close contacts antiviral prophylaxis
- Review treatment protocols

Cross Government and Civil Contingencies response

- Liaise with Defra and its equivalent in Scotland over any implications for poultry in the UK

International

- Support and assist international outbreak investigation and response and characterisation of the virus and the disease epidemiology as national situation allows

The interpandemic period: Phase 0.3

Trigger: Clear evidence of person to person spread in the general population (eg secondary cases linked to an index case; at least one outbreak lasting a minimum of two weeks; identification of the new virus subtype in several countries with no explanation other than contact with infected people)

Planning assumptions

- Risk to UK now significantly increased

Priorities

- Putting organisational arrangements in place
- Vaccine development
- Review of antiviral supply
- International co-ordination of actions

Main capability required

- To monitor clinical and virological spread

Actions

Leadership, organisation and co-ordination

Department of Health, in collaboration with Office of Chief Medical Officer/Health Departments in DAs

- Convene the UK National Influenza Pandemic Committee to review all information related to the potential pandemic and advise on the response
- If it becomes apparent that the new virus is not spreading widely in the world, the UKNIPC will be stood down and the relevant organisations informed accordingly. Some activities will continue on a precautionary basis.
- DAs will send representatives to the UKNIPC and convene strategic implementation committees in DAs.

Health Protection Agency, in collaboration with DAs

- Implement its own preparedness plan and co-ordinate activity across its Divisions

Civil Contingencies Committee and Co-ordinating Committees in DAs

- Prepare Horizon Scanning assessment of risk and preparedness
- CCC (if convened) considers preparedness across all sectors

Communications***Strategic***

- WHO will announce the pandemic phase following international consultation (UK input from NIMR, NIBSC and NIRL)
- HPA to provide DH with daily (or less if circumstances indicate) briefings
- DH advises CCS on the risk to the UK. DH and CCS consider whether to call the CCC to consider UK preparedness across all sectors
- Information shared with other agencies as appropriate

Professional

- Issue initial information to health professionals with an assessment of the significance

Public and media

- As before
- Consider background briefing of specialist health and science correspondents.
- Ensure phone lines adequate for any future public/media information lines
- All Departments/organisations prepare near-ready materials, including Q&As
- Public communications to inform about the immunisation strategy and manage public expectations of vaccine
- Prepare travel advisories as appropriate in conjunction with FCO and the National Travel Health Network and Centre

Surveillance

- NIMR (WHO Collaborating Centre) continues to identify and monitor international viruses
- Collaborate with international organisations to assess epidemiology of the disease and efficiency of person to person transmission
- NIMR/NIBSC/NIRL contribute to international consultation (led by WHO) on assessment of the pandemic potential
- Implement plans to enhance national surveillance and identify suspect cases and/or introduction of a novel virus into the UK, including dissemination of WHO agreed case definition for surveillance purpose
- Assess age distribution and risk groups for severe morbidity
- Consider need to assess antibodies in banked/recently collected sera (HPA)

Microbiology and virology

- Develop and evaluate diagnostic tests against novel strain
- Ensure availability of diagnostic reagents for the virus
- Provide reference laboratory support to test clinical specimens for influenza and identify a novel strain
- Prepare to roll out a diagnostic testing service to laboratories in the agreed network
- Assess the antiviral susceptibility of the novel strain

Public health response***Vaccine development***

- NIMR obtains and prepares strains for possible vaccine manufacture, if necessary from colleagues overseas
- NIBSC and NIRL assess candidate vaccine strain(s)
- NIBSC:
 - produces a high growth reassortant (hgr) from the pandemic virus
 - distributes the hgr and/or pandemic virus to manufacturers and National Collaborating Laboratories
 - liaises with WHO, DH, NCLs and manufacturers

- WHO advises on vaccine strains and arranges distribution of candidate vaccine strains to manufacturers
- Contribute to WHO expert group on development and clinical trials of vaccines
- Liaise with MHRA over licensing of new vaccines

Vaccination strategy

- Contribute to WHO and European consultations on appropriate use of vaccines in different regions

Vaccine supply and delivery

- Finalise vaccine supply requirements
- Liaise with vaccine manufacturers over production plans
- Discuss acceleration of vaccine production
- Start negotiating central purchase of vaccine

Implementation of immunisation

- Develop a framework for delivery of mass vaccination
- Assess serological response to immunisation

Antiviral drugs

- Liaise with antiviral manufacturers over antiviral supply
- Finalise plans for use, distribution and access

Other public health interventions

- If in UK, implement intensive control measures (isolation of case(s), quarantine of contacts in addition to antiviral treatment of cases and prophylaxis for contacts)
- Investigate possible reservoirs of infection
- Issue guidance on other control measures including travel advisories as appropriate

Health and social care response

- Issue guidance on case management
- Issue guidance on infection control procedures

Underpinning work and research

- Alert the MRC

International

- Contribute personnel and materials to support international outbreak investigation and containment activities, as the national situation allows

Pandemic period

Phase 1

Trigger: Confirmation of onset of pandemic: a new haemagglutinin sub-type compared to recent epidemic strains beginning to spread from one or more initial focus (several outbreaks in at least one country and spread to other countries with consistent disease patterns indicating that serious morbidity and mortality is likely in at least one segment of the population)

Planning assumptions

- If not already in the UK, spread to the UK inevitable
- May take 2-4 weeks before sustained activity in the UK

Priorities

- Enhanced surveillance and diagnostic capability to detect cases in the UK
- Vaccine development and supply
- Implementation of immunisation as vaccine becomes available
- Other interventions to reduce the impact
- Effective communications strategy

Actions

Leadership, organisation and co-ordination

Department of Health, in liaison with other UK Health Departments

- Convene the UK National Influenza Pandemic Committee, if not already done so at Phase 0.3
- Convene strategic implementation committees in DAs
- Convene the Civil Contingencies Committee and Co-ordinating Committees in DAs
- Contribute to co-ordinated activities with other European Member States via the European Communicable Disease Network,
- Organise a central DH operations room with surge capacity, and central Health Department Operations Rooms in DAs

Communications

Strategic

- WHO declares onset of pandemic whether or not preceded by earlier levels of preparedness
- HPA informs DH
- DH informs CCC and the NHS
- Ask NHS Organisations to activate their plans
- Exchange information with European colleagues
- Keep NHS organisations, NHS microbiologists and local authorities informed
- Monitor all information coming in and prepare daily brief for Ministers and senior officials
- Review daily situation reports from the NHS
- Refine communications strategy – communications to be more centralised

Professional

- Distribute information to health professionals (GPs, nurses, pharmacists etc) with advice about access to website guidance
- Distribute information about the immunisation strategy

- Update professional guidance on HPA and HPS websites
- Issue guidance on best use of available antivirals, including dose, number of doses and how to handle those who are not to be immunised

Public and media

- Update NHS Direct/NHS Direct Wales/NHS24 briefing daily
- Set up designated public enquiry and press lines
- In liaison with other UK Health Departments, prepare daily press briefing
- Consider the needs of special groups eg FCO staff and other UK nationals in affected areas, community groups with links to affected areas, educational establishments
- Tailor information to the needs of each sector

Surveillance (HPA/HPS)

- Monitor WHO and other surveillance information
- Increase surveillance with careful interpretation of observations to avoid spurious reporting of outbreaks
- Distribute information via the bulletin CDR weekly, although when new information appears, inform labs and consultants in communicable disease control through web based technology
- Set up the mechanism developed for receiving information, ready for activation
- Contribute to WHO and European clinical and virological surveillance to assess age/severity/sequelae/response to treatment
- Consider additional data collection to assess impact at next Phase, for example absenteeism in some large organisations

Microbiology and virology

- Characterise new isolates
- Determine antiviral susceptibility
- Investigate local outbreaks/sporadic cases
- Collate antibiotic susceptibility and resistance patterns of bacteria complicating influenza

Public health response***Vaccine development***

- Contribute to WHO led recommendations on composition, development, manufacture and use of vaccines, if not already done
- Liaise with manufacturers over production and supply
- Ensure licensing issues addressed

Immunisation strategy

- Finalise advice on priority groups to be vaccinated
- Distribute package of advice to the general public including explicit information about priority groups for vaccine, to manage demand for vaccine

Implementation of immunisation strategy

- Implement national immunisation strategy, adapted according to emerging information on the specific characteristics of the new subtype and vaccine availability
- Monitor adverse reactions to vaccines

Antiviral drugs

- Ensure equitable distribution of antivirals
- Recall existing antivirals in system
- Monitor adverse reactions to antivirals

Other control measures

- Issue guidance about travel, and for schools and workplaces
- Issue advice to the public about the use of masks

Health service response

- All health organisations to activate their Pandemic Influenza Plans

Clinical care

- Issue guidance on case management and infection control
- Advise, after consultation with CDSC Laboratory of Hospital Infection on the most appropriate management of pneumonia, liaising with appropriate bodies in DAs

- Liaise with manufacturers on the availability of appropriate antibiotics

Organisation and pressures on health services

- HAs in England and Boards in DAs report to DH/DA Health Departments on preparedness and prepare daily situation reports on the NHS in its area
- Devolved Administration Health Departments provide DH with information on the situation within their area
- Remind NHS of the need for restriction of hospital admissions to meet the expected increased demand for hospital beds and that some contracts may need to be suspended. Some service level agreements may need to be renegotiated to reflect new circumstances.

Manpower, education and training

Consider ongoing training needs of redeployed staff or staff who are likely to have to undertake other duties

International

- NIMR WHO Influenza Collaborating Centre monitors the course of the pandemic outside the UK
- If activity is all or predominantly outside the UK, consider the feasibility of offering assistance to other countries via WHO

Pandemic period: Phase 2

Trigger: Outbreaks and epidemics in multiple countries spreading region by region across the world

For UK purposes this phase is divided into

Alert level 1: no virus isolated in the UK (Phase 1 activities apply)

Alert level 2: sporadic cases in the UK, ie new virus in the UK

Alert level 3: outbreaks or epidemics in the UK

Alert level 4: widespread activity in the UK, i.e. pandemic established in the UK

Planning assumptions

- From Alert level 2, it may take 2-4 weeks for the virus to become established in the UK and 7-9 weeks for activity to reach a peak
- Once Alert level 3 has been reached, there will be intense pressure on health and all other services for at least 6-8 weeks

Priorities

- Continued implementation of immunisation strategy
- At alert level 2, surveillance and containment of cases
- At alert level 3, the full strategic response:
 - maintaining health and other essential services
 - keeping everyone informed and maintaining morale
 - health and social care response, to provide treatment and care
 - civil emergency response, to reduce social disruption

Main capabilities required

- Surveillance adapted to inform treatment and planning
- Interventions to reduce the impact
- Health and social care response, to provide treatment and care
- Civil emergency response, to reduce social disruption
- Effective communications strategy

Actions**Leadership, organisation and co-ordination**

- Convene regular meetings of the UK National Influenza Pandemic Committee and technical and other advisory groups
- Convene Civil Contingencies Committee and equivalent co-ordinating committees in DAs
- Move staff from other areas to assist the DH, NHS and cross-Government co-ordination of the response

- Put in place a daily 'battle' rhythm
- Consider if and when to call a UK emergency
- Give clear guidance to ensure local co-ordination and leadership, drawing on local systems, processes and networks

Communications

Strategic

- Phase announced by WHO
- Daily situation reports from HPA, DH and the NHS reviewed by DH and CCC

Professional

- HPA continues to lead on updating clinical and other guidance in the light of emerging findings, including advice on:
 - clinical management
 - best use of available antiviral drugs
 - infection control procedures

Public and media

- All information and advice for the public regularly updated
- Regular press briefings
- Press telephone enquiry lines maintained

Surveillance (HPA/HPS)

- Continue to monitor the course of the pandemic outside the UK
- Surveillance in the UK adapted to monitoring the course of the outbreak, including
 - Occurrence and cause of complications
 - Deaths

Microbiology and virology

- Roll out diagnostic reagents to local NHS laboratories
- Continue to provide reference microbiology to monitor antigenic drifts in the virus and antiviral susceptibility

- Identify and test antimicrobial susceptibility of co-pathogens

Public health response

Overall response

- Identify particular problems eg disruptions of essential service,
 - Consider extending data collection to include:
 - Bed bureaux (NHS)
 - Undertakers' returns (Home Office/Local authorities)

Immunisation

- Continue implementation of immunisation strategy according to evolving circumstances and availability of vaccine
- Monitor
 - Feedback on emerging problems delivering the programme
 - Availability and use of vaccine
 - Vaccine uptake
 - Effectiveness of vaccine
 - Adverse reactions associated with vaccination

Antiviral drugs

- Monitor use and supply
- Monitor efficacy and adverse reactions
- Review strategy for use as immunisation programmes extended

Health and social care response

Clinical care

- Establish studies to monitor outcome of treatment

Organisation of services

- Provide daily SITREPS to DH
- In accordance with local plan
 - consider bed and staffing availability

- administer vaccine (if available)
- advise on use of antivirals
- liaise with local authorities

Pandemic period: Phase 3

Trigger: End of first pandemic wave: outbreak activity in the initially affected countries stopped. For UK purposes this is taken as the end of the first wave in the UK.

Planning assumptions

- UK may not have been an initially affected country and may still have significant activity. For UK purposes, therefore, this phase is assumed to refer to the end of the UK first pandemic wave

Priorities

- Returning systems and services to 'normality'
- Reviewing all aspects of the response and regrouping in light of the first wave experience
- Continued surveillance and preparation for next phase

Main capabilities required

- Ability to pick up re-emergence (clinical illness and laboratory confirmation)

Actions

Leadership, organisation and co-ordination

Department of Health, in collaboration with Office of Chief Medical Officer/Health Departments in DAs

- Review response and report to DH/other Health Departments
Departmental Boards

CCC

- Review response in terms of UK preparation for this and other emergencies

All organisations

- Review response and modify plans as appropriate

Communications*Strategic*

- Inform WHO and the EU Early Warning System of any change in UK control measures

Professional

- Inform health professionals and the NHS that first wave considered over, but activity may be ongoing in other countries

Public and media

- Inform the public and media of the UK situation and any areas that might still be affected

Surveillance

- Put systems in place to detect possible re-emergence

Microbiology and virology

- Continue to monitor influenza viruses for antigenic 'drift' and advise on vaccine suitability
- Consider serological surveys to assess population immunity
- Restock laboratory reagents and equipment

Public health response*Immunisation strategy*

- Review vaccine uptake
- Review vaccine efficacy
- Consider duration of protection afforded by vaccine
- Review short and longer term adverse events from vaccine
- Estimate vaccine needs to complete immunisation programme and continue immunising in anticipation of second wave

Antiviral strategy

- Review antiviral use
- Review efficacy of antivirals
- Review adverse events from antivirals
- Review antiviral strategy
- Estimate future needs and replenish stocks

Health and service response

- Put plans in place to resume business continuity
- Prepare for future wave(s)

Cross Government and Civil Contingencies response

- Consider actions needed to resume business continuity
- Prepare for future wave

Manpower, education and training

- Consider future needs

Research

- Review the models
- Review research in place during the pandemic
- Review information needs for future waves
- Encourage collaborations, including international collaborations, over research on the pandemic and how it was handled

Pandemic period: Phase 4

Trigger: Onset of second or later waves of the pandemic (likely to be within 3-9 months of the first wave, most likely the winter following the first wave)

Planning assumptions

- Virus may have evolved
- Impact may be equal or even worse than first phase

Priorities

- Early detection of the second wave in the UK

Actions

- Most of the actions required will be covered by reactivation of Phase 2, Alert level 3, informed by experience of the first wave of the pandemic

Surveillance

- Continue to monitor global spread and impact
- Maintain awareness and reporting of possible new cases

Microbiology and virology

- Continue to monitor influenza viruses for antigenic 'drift' in order to advise on vaccine suitability
- Consider serological surveys to assess population immunity

Pandemic period: Phase 5

Trigger: End of pandemic (expected to be after 2-3 years)

A pandemic will be deemed to have ceased when the epidemiological indices have returned to background levels. The UK National Influenza Pandemic Committee will prepare a report, reviewing the effectiveness of and lessons learned from the plan. The chairman will then decide if the Committee should be stood down.

All contingency plans should be reviewed in the same way in the light of experience during the pandemic.

Planning assumptions

- This or a similar virus likely to remain in circulation
- It may take months or even several years for some national services to recover

Priorities

- Assessment and evaluation: review and revise plans

Actions

- Assessment and evaluation across all sectors
- Returning to normal business continuity may take some time and recovery plans may need to be drawn up
- A communications strategy will need to accompany recovery plans

8. Sources of guidance

www.dh.gov.uk/pandemicflu

www.immunisation.nhs.uk

www.hpa.org.uk

www.who.int/csr

Avian flu

www.defra.gov.uk

www.oie.int

www.who.int/csr/disease/avian_influenza/chronology/en/

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ANNEX A

Proposed composition of the Health Departments' UK National Influenza Pandemic Committee (UKNIPC)

REMIT

To provide specialist advice to the UK Health Departments on the health response during an influenza pandemic

MEMBERSHIP

Chair

Minister, Chief Medical Officer England or senior DH official

Members*

Government Chief Medical Officer, if not chair

Department of Health

Chief Nursing Officer

Chief Pharmaceutical Officer

Chief Dental Officer

Head of Health Protection, International Health and Scientific Development

Head of Delivery Unit

Head of Health Protection

Head of Emergency Preparedness and Response

Head of Communications

Representative from DH Press Office

A Regional Director of Public Health (representing also Regional Resilience)

Representatives from

UK Devolved Administration Health Departments

Medicines and Healthcare products Regulatory Agency

The NHS (a Strategic Health Authority, Primary Care Trust, Hospital/Foundation Trust, Ambulance Trust)

The Health Protection Agency

Chief Executive

Directors of HPA Divisions, as appropriate

A Consultant in Communicable Disease Control

Director of NIBSC

Director of the NIMR WHO Collaborating Centre

Representative of the Health and Safety Executive

Secretariat: provided by HPIH&SD-HP

* Members may be represented by an appropriate official with sufficient seniority and expertise to take executive decisions on behalf of their organisation

Members who may be co-opted/observers as required, or members of subgroups

Department of Health

Economical and Operational Research Division

Chairs or representatives of Government Advisory Committees

Joint Committee in Vaccination and Immunisation

JCVI Influenza Subgroup

Advisory Committee on Dangerous Pathogens

National Expert Panel on New and Emerging Infectious Diseases

Representatives of other bodies:

PASA (NHS Purchasing and Supplies Agency)

National Institute for Clinical Excellence (NICE)

Royal College of Anaesthetists

Royal College of General Practitioners

RCGP Research Unit, Birmingham

Royal College of Nursing

Royal College of Paediatrics and Child Health

Royal College of Pathologists

Royal College of Physicians (ID Physician)

British Medical Association

Royal Pharmaceutical Society

Medical Research Council

Vaccine and other Pharmaceutical manufacturers

Relevant charities/Non-governmental Organisations (NGOs)/patient organisations

A general/respiratory and/or infectious disease physician, geriatrician, occupational physician and/or paediatrician

A veterinary virologist/pathologist

Other Government Departments

International representatives

CDC Atlanta

WHO

A mathematical modeller

Other media representatives and/or telecommunications and media relations experts

Leaders of major religious groups, business, education, sporting and other recreational communities

Annex B

Influenza: background information

Influenza viruses

Influenza has been known for centuries, but influenza viruses were first identified only in 1933. Influenza viruses infect humans and a large spectrum of birds and mammals. The viruses are grouped into three types, influenza A, B and C, subtypes of all of which can cause infection in humans. Influenza A viruses circulate most years, generally cause more serious illness than B and C and are the cause of most winter epidemics and all known pandemics. Influenza B viruses circulate at low levels most years causing sporadic and generally less severe outbreaks and epidemics, particularly among young children in school settings. Influenza C viruses usually cause only minor respiratory illness, such as symptoms of the common cold, and are generally not considered a public health concern.

Frequent genetic modification of the human influenza A viruses which circulate each year results in changes to their main surface antigens, the haemagglutinin (H) and neuraminidase (N). These year on year changes in influenza viruses are usually minor (and referred to as 'antigenic drift'), but they help to maintain the viruses in circulation, as the immunity people develop to one year's strain no longer provides ideal protection against subsequent viruses. This phenomenon also explains why influenza vaccines need to be re-formulated every year.

The pandemic potential of influenza viruses

Influenza A viruses mutate much more readily than type B viruses. They can also infect pigs, horses, sea mammals and birds, in addition to humans. From time to time, a major step-wise adaptation of a virus, or exchange of genetic material between influenza viruses, including between those of human, pig and avian origin to produce a 'genetic hybrid, results in a major change in the surface antigens (called 'antigenic shift'). Antigenic shift is specific to influenza A viruses, and these are the changes that can confer pandemic potential, as long as the resulting virus:

- can infect and cause disease in people (rather than just mammals or birds)
- can spread efficiently from person to person, and
- a high proportion of the population is susceptible.

False alarms may occur, when a new virus is identified but proves not to have the characteristics necessary for it to spread in the human population. This happened in 1976, 1997 and 1998, and has so far been the case during the H5N1 outbreaks of avian influenza that have affected poultry flocks across China and SE Asia during 2004 and 2005.

Influenza – the illness

Influenza is an acute viral infection characterised by the sudden onset of fever, chills, headache, muscle pains, prostration, and usually cough, with or without a sore throat or other respiratory symptoms.

In the non-pandemic situation, most otherwise healthy people recover from influenza without complication after about a week, although they may feel tired and with 'low spirits' for longer.

Death may occur early (within 24-36 hours of onset of symptoms) apparently from overwhelming virus infection, but is more common later, as a result of complications. Roughly 50% of all infections are however asymptomatic; asymptomatic infection is especially common in children.

Complications are mainly respiratory, due to secondary bacterial infections such as otitis media (in children), bronchitis and pneumonia which may require admission to hospital and may result in death. Influenza may also exacerbate underlying diseases such as asthma, diabetes or heart disease. Primary viral pneumonia occurs more rarely but can be rapidly overwhelming and fatal.

Those at higher risk of more serious illness should they catch flu include:

- Older people (generally taken as those aged 65 and over) and the very young
- People with chronic chest, heart or kidney disease, diabetes, or reduced immunity due to disease or treatment.

Extent of illness

Influenza viruses circulate in the community to some extent every year. This annual 'seasonal' influenza causes a variable amount of illness in local populations, which in the northern hemisphere is mainly during a 6-8 week period each winter. About one in 5 people who become ill consult their GP and GP consultations for 'influenza-like illness' usually rise sharply over 2-4 weeks during this period, from a baseline (in England and Wales) of up to 30 new consultations per 100,000 population per week to a peak varying from around 200 in most years, to over 400 in more severe years. Rates from 30-200 are regarded as 'normal winter activity' and the term 'epidemic' is usually reserved for rates >200. (The equivalent levels in Scotland are: baseline, up to 50; normal seasonal activity 50-600; higher than normal activity 600-1000; epidemic activity >1000.) The age-specific incidence and the severity of illness both vary from year to year.

The estimated number of people admitted to hospital as a result of influenza equates to roughly one in every 30 of the GP consultations, although this varies considerably with age.

Mortality

In inter-pandemic years, death is reported in 0.5-1 per 1,000 cases of influenza, mainly in the elderly. It is estimated that without interventions such as vaccination, influenza results in up to 12,000 excess deaths (more deaths than would have been expected) in England and Wales, although the figure has been substantially higher in severe epidemic years (29,000 in 1989/90, for example)

Infectivity and spread

Influenza is highly infectious, spreading from person to person mainly via the respiratory route through infected respiratory secretions produced when an infected person talks, coughs or sneezes. Transmission may also occur through hand/face contact after touching a person or surface contaminated with infected respiratory secretions. Adults may be infectious from just before until 4-5 days after the onset of symptoms; children and people who are immunocompromised tend to excrete virus for much longer (up to 14 days for children and 21 days for immunocompromised persons). The incubation period is normally 1-3 days, typically 2.

Influenza may spread very rapidly in crowded conditions and among people in enclosed communities especially where the residents are particularly vulnerable, such as in long stay residential care.

Diagnosis

Influenza is essentially a clinical diagnosis, although the symptoms and signs of influenza are similar to those caused by other acute respiratory viruses. Diagnostic accuracy increases with increasing levels of influenza activity.

Confirmation of the clinical diagnosis is by one or more of the following laboratory tests:

- Immunofluorescence
- PCR
- Culture of the virus
- Serological confirmation of a four-fold increase in antibodies

The most informative patient sample is a good quality respiratory specimen (combined nose and throat swab) taken early on in the illness when viral excretion is highest. Near-patient tests are also available.

It is essential that a representative proportion of viruses are identified and sequenced, for the purposes of surveillance and for monitoring the evolution of influenza viruses. Confirmation should especially be sought if there are unusual circumstances, such as a travel history to an area of the world (or country) currently experiencing outbreaks of highly pathogenic avian influenza in poultry, during institutional outbreaks and for infections occurring at the beginning and end of the winter season.

Treatment of influenza

Influenza is a viral infection and antibiotics therefore do not work, unless there is a secondary bacterial complication such as pneumonia.

For most people, influenza is a self-limiting illness and self-treatment with symptomatic remedies is indicated.

The National Institute for Clinical Excellence (NICE) has issued guidance on the use of antiviral drugs for the treatment and prevention of seasonal influenza (www.nice.org.uk). Treatment with a neuraminidase inhibitor is recommended, within the licensed recommendations of the drug, for adults (oseltamivir or zanamivir) and children (oseltamivir only) who fall within certain 'high-risk' groups, who become ill when influenza is circulating in the community, and in whom the drugs can be started within 48 hours of the onset of symptoms.

More information on antiviral drugs is at Annex H.

Influenza prevention and control

Interventions against seasonal influenza are currently targeted at reducing the severity of illness, complications, hospital admissions and deaths in those most at risk. They are not aimed at reducing transmission of infection other than in long stay residential care accommodation and between health and social care workers and their patients.

Immunisation

The mainstay of influenza control is immunisation. New vaccine is prepared each year to provide protection against the three strains of influenza virus predicted to be most prevalent during the forthcoming winter. It is recommended as part of public policy for those people most at risk of serious illness should they catch influenza, in the UK these being:

- All people aged 65 and over
- People with chronic respiratory, heart or renal disease or diabetes
- People with impaired immunity due to disease or treatment
- People in long stay residential care

Immunisation is also offered to health and social care workers involved in direct patient care. Around 12 million doses of influenza vaccine are now administered each year in the UK, with the 70% target uptake in those aged 65 and over now achieved in England (71% in 2003).

These recommendations are reviewed regularly by the Joint Committee on Vaccination and Immunisation.

More information on influenza vaccines and their production is at Annex G.

Antiviral prophylaxis

NICE has also issued guidance on the use of antiviral drugs for the prophylaxis of influenza during seasonal influenza.

Where it is known that influenza A or B is circulating in the community, oseltamivir is recommended for the post-exposure prophylaxis of influenza in at risk-people aged 13 or older who are not actively protected by vaccination and who have been exposed to someone with influenza-like illness and are able to start prophylaxis within 48 hours of exposure.

Oseltamivir is also recommended for the post-exposure prophylaxis of influenza, with the same caveats, for people whether or not they have been vaccinated if they live in a residential care establishment where a resident or staff member has ILI.

NICE does not recommend the use of amantadine for treatment or prevention of seasonal influenza, but it may have a place, particularly in prophylaxis, in an influenza pandemic, if the pandemic virus is susceptible.

More information on antiviral drugs for influenza is at Annex H.

Influenza in mammals and birds and its relevance to human infection

There are 15 haemagglutinin subtypes of Influenza A (designated 1-15), and 9 neuraminidase subtypes (1-9). While relatively few infect humans, all have been detected in free-flying birds which can harbour the viruses without their causing symptoms. Since 1959, rare, but serious, outbreaks of highly pathogenic avian influenza in poultry have been caused by H5 and H7 virus subtypes. These were thought to cause only mild symptoms such as conjunctivitis in humans. However, since an outbreak of H5N1 infection in poultry in Hong Kong in 1997, these viruses have been shown to be able to jump the species barrier and cause severe infection with a high mortality in humans.

So far these viruses only appear to have spread from person to person with difficulty, and with no further onward transmission, but concern is twofold:

- That step-wise adaptation of the viruses will give them greater affinity to infect and transmit between humans;
- That exchange of genetic material between the avian and a 'regular' circulating human virus – during co-infection, for example, in a pig or possibly a person - will have the same effect.

The longer the outbreaks of H5N1 influenza that took hold in Asia in early 2004 last – and there are signs that the virus has become endemic in birds in the region - the more likely it is thought to be that a new virus will emerge. Even if the disease such a new virus is then able to cause in humans is attenuated, the potential remains for a future virus with pandemic potential to emerge and spread. Such a strain is likely to be antigenically different from the H5N1 strains currently circulating in Asia. The degree of cross protection that would be afforded by an H5N1 vaccine prepared against the current H5N1 strain cannot be predicted.

ANNEX C

PREVIOUS INFLUENZA PANDEMICS

1. Influenza pandemics have occurred throughout recorded history and have been documented since the 16th century. There have been substantial differences between them, including between the three pandemics of the last century. There is therefore considerable uncertainty about both the timing of a future pandemic and its precise impact - the severity of illness caused by the new virus strain, the rapidity of its spread and the groups of the population which will be most susceptible are all unknown factors. Nonetheless, for planning purposes, reports of previous pandemics give an interesting insight into the likely range of impact.

When will the next pandemic be?

2. Intervals between previous pandemics have varied from 11 to 42 years with no recognisable pattern. The last pandemic was in 1968/69. Prior to that pandemics occurred in 1957/58 and 1918/19.

Pandemic virus strains and their origins

3. Previous pandemics have been due to influenza A viruses. That of 1918/19 (before influenza viruses were discovered) was due to an H1N1 virus, possibly derived by adaptive mutation of an avian virus. The 1957/58 pandemic was due to an H2N2 virus containing a mixture of avian and human virus genes, as did the H3N2 virus causing the 1968/69 pandemic.

4. In recent years, strains of both Influenza A(H1N1) and A(H3N2) viruses have co-circulated. Re-emergence of an H2 or N7 component, or more recently an H5 component, has been anticipated by some as the most likely event leading to a pandemic, although several other haemagglutinins exist in nature and could emerge.

Spread

4. In 1918/19 the first cases were reported from Europe and the USA, although the origin of the new virus has not been established. More typically, new influenza viruses have emerged in the Far East and spread along trade and transportation routes. In inter-pandemic years, spread of a new variant of an existing strain takes about 18 months, allowing the new strain to be incorporated into the annual vaccine before it causes widespread illness. Previous pandemic strains have spread worldwide in about 6 months, although successive waves of illness may occur over a longer period.

5. The 1889 pandemic was believed to have originated in China and spread via Russia to Western Europe and thence to North America and then Japan. While the origins of the 1918 pandemic are not so clearly mapped, it was recognised in Spain in the early months of 1918 and by April was widespread in Western Europe. During that spring and summer, large numbers of people were affected with relatively mild disease. The high mortality occurred in the later waves that occurred in the autumn and then the early part of 1919.

6. The 1957 Asian flu pandemic took 6-7 months from the first isolate being identified in China (Feb 1957) until the peak of illness in the UK, although some cases occurred in the UK as early as June 1957 in people travelling from abroad (by ship and air) and in small groups and closed communities. The explosion of cases in September occurred after children went back to school after the summer holidays; the first wave was over by December.

7. 'Hong Kong' flu, which was a less dramatic virus 'shift', was first isolated in Hong Kong in July 1968. It then spread worldwide during the following two winters, causing greater morbidity in some countries the first winter and others the second. In the UK, contrasting patterns occurred during the two seasons:

First isolate	Hong Kong, July 1968
First isolate in Britain	London, August 1968
Isolates from people with contacts abroad	Autumn 1968
Outbreaks in closed communities	Autumn 1968
First community outbreaks	December 1968
Increased influenza activity	until April 1969
Sharp epidemic	Dec 1969/Jan 1970

8. The following changes since 1968 can be anticipated to shorten the time taken for the virus to spread:

- a. The opening up of China to trade and tourism;
- b. Increasing international movement of people and greater use of more rapid methods of transportation.

9. In addition, increasing use of new routes out of China such as through Cambodia and Vietnam where surveillance is not well developed may result in failure to document the early stages of spread of a new virus.

Time of year

10. Pandemic influenza may appear at any time of the year, not necessarily during the 'normal' influenza season (November-March):

Year		Peak illness in UK
1889/90		January
1918/19	1st wave	July
	2nd wave (worst)	November
	3rd wave	February
1957/58		September/October
1968/69	1st wave	March/April
1969/70	2nd wave	January

Length of activity in the UK

11. In most epidemics activity can be expected to last 6-8 weeks. The same applies to pandemic influenza activity in the UK, although in 1968/69 lower levels of activity continued for 3-4 months.

Incubation period

12. On past experience, this is likely to be 48-72 hours. Adult patients are likely to be infectious for about 4-5 days: virus titres in nasopharyngeal washes usually fall to low levels by the fifth day, although virus shedding is usually more prolonged in children.

Estimates of incidence of illness

13. Studies of the 1918 pandemic indicate that about 23% of the UK population developed influenza. In the 1957/58 Asian influenza pandemic an estimated 17% of the UK population suffered influenza illness (9 million cases). In 1969/70, the Hong Kong virus produced illness in an estimated 8% of the UK adult population, although antibody levels in two groups of adults investigated showed that subclinical infection was more common: one quarter had been infected in the first year and an additional one third in the second.

14. The World Health Organisation suggests that plans are in place against a pandemic causing illness in 25% of the population. The worst possible – although unlikely - scenario would be a 100% attack rate.

Incidence by age and sex

15. In normal years, although most influenza infection is in children, the serious morbidity and mortality is almost entirely among elderly people with underlying chronic disease. A different pattern may emerge in a pandemic.

16. The 1918-19 pandemic affected mainly healthy young adults and seemed to spare those at the extremes of life. Similarly, in 1957, the brunt fell on schoolchildren and young adults with attack rates as follows:

Age	Attack rate
0-4 years	31%
5-14	49%
5-39	27%
40-59	25%
60+	12%

Males and females were equally affected.

17. In contrast, during the peak of activity in 1968/69 and 1969/70 low rates were recorded in children aged 5-14. During the first year the highest rates were in children under 5 years and the lowest in adults over 65 years, while the following year the highest rates were in adults aged 45-64 and the greatest increase was recorded in adults over 64.

Mortality

18. The increase in mortality during influenza epidemics and pandemics far exceeds that recorded as being due to influenza.

19. The mortality worldwide in 1918-19 has been estimated to be upward of 20-40 million. In some areas this reduced life expectancy by around 10 years. In England and Wales, 200,000 excess deaths occurred of which 150,000 were ascribed to influenza – just over 3,000 deaths from influenza per million population were recorded in 1918 and 1,170 per million in 1919.

20. In 1957, which was on the whole a milder illness, the global death toll was estimated to be around 2 million. An excess 30,000 deaths occurred in England and Wales of which 6,716 were ascribed to influenza itself. Estimates ranged from 1.3 to 3.5 deaths/1,000 cases. An estimate from 29 general practices was 2.3 deaths per 1,000 cases attended. Two thirds of the deaths were in people aged over 55 years.

21. The 1968/69 pandemic, which was milder, is thought to have caused around 1 million deaths worldwide. The two years contrasted in England and Wales:

	1968/69 (4 months)	1969/70 (2 months)
Peak deaths /week	2,550	10,500
Total XS flu deaths	1,000	10,000
Total XS BPI* deaths	12,000	>32,000
Total XS deaths (all causes)		31,000 47,000

* Bronchitis, pneumonia, influenza

22. Deaths are mainly in the very young and the elderly. The exception was in 1918/19 when a high death rate among young adults was observed - 99% of the mortality was in people under 65 years of age.

23. The main complication of influenza is secondary bacterial infection, particularly of the lungs, staphylococcal pneumonia being the most serious. In 1957, of patients with pneumonia studied mainly in London teaching hospitals, 28% of those with staphylococcal pneumonia and 12% with non-staphylococcal pneumonia died. The death rate among patients with pneumonia fell during the course of the epidemic from around 20% to 13%. Deterioration can be very rapid and a high proportion of those hospitalised who die, do so within 48 hours of admission, ie so rapidly that antibiotics may have little or no effect.

24. In 1957, in common with all major influenza epidemics, although influenza, pneumonia and bronchitis accounted for nearly all the excess admissions to hospital during the epidemic, half the deaths were assigned to other causes.

Effect on general practice

25. The number of new general practice consultations for influenza-like illness can be expected to exceed 500/100,000 population/week during a pandemic; a practice of 10,000 patients would therefore expect to see at least 50 new patients a week.

26. Lower rates might be recorded if the period of activity was prolonged. Similarly, a short sharp epidemic puts considerable strains on general practice: during the peak of the 1957 epidemic, practitioners recorded seeing 80-100 cases/day and at the peak of the 1969/70 pandemic consultation rates reached 1,260/100,000 population in two successive weeks.

Effect on hospital admissions

27. During September and October 1957, the two main months of the epidemic, it was estimated between 25,000 and 30,000 more cases of acute respiratory infection were admitted to NHS hospitals in England and Wales than would have been expected at that time of year. Hospital admission and bed bureaux could barely cope with the demand placed upon them, the following figures being recorded by bed bureaux:

Year	Total admissions Liverpool Bed Bureau (Sept/Oct)	Acute resp admissions London Bed Bureau (23 Sept-5 Nov)
1953	1781	
1954	1710	734
1955	1671	924
1956	1654	1015
1957	2808	2477

28. Discharges from Departments of General Medicine in Liverpool increased by 27%. Influenza, pneumonia and bronchitis accounted for nearly all the excess admissions.

Absence from work

29. In 1957, new sickness benefit claims in those working aged 15-64 increased by 2.5 million (out of 17.5 million insured). An additional 1.5 million absences were estimated from the uninsured. The rise began at the end of August, peaked at the beginning of October, and then fell rapidly. 8-10% of the insured population was estimated to have lost 3 or more working days at some time during the epidemic. The percentage absenteeism during this period increased by 4.5-6.0% in several large organisations, though some smaller factories suffered more severely.

30. In 1968/69 just over 1 million excess sickness claims were received over 5 months and, in 1969/70, 1.5 million over 6 weeks.

Health care staff

31. In Liverpool in 1957 12.6-19.4% of nurses were absent during the first 4 weeks of the epidemic; in one hospital, nearly a third were absent at the peak.

Effect on schools

32. Influenza can spread rapidly in schools. In 1957, up to 50% of schoolchildren developed influenza, but even those schools which were severely disorganised had returned to normal 4 weeks after the appearance of the first case. In residential schools, attack rates reached 90%, often affecting the whole school within a fortnight.

Control measures

33. There is some evidence that big gatherings of people encourage spread, and measures to flatten the epidemic curve can be helpful in easing the most intense pressure on health services. In general, however, quarantine has been ineffective, at the most postponing epidemics of influenza by a few weeks to 2 months and even the most severe restrictions on travel and trade have gained only a few weeks. The exception was Australia, in 1918, when maritime quarantine was instituted. This delayed the onset of illness in Australia until 1919 when the virus appeared to have lost some of its virulence. The subsequent epidemic was of milder illness but longer duration than in other countries. Nonetheless, 60% of the mortality was in people aged 20-45 years.

ANNEX E

PANDEMIC INFLUENZA CONTINGENCY PLAN

THE LEGAL FRAMEWORK

International

1. Although influenza has the potential to spread rapidly and has demonstrated its ability to have a serious public health impact, there is currently no international obligation to notify cases to the World Health Organization (WHO). However, the voluntary international surveillance network co-ordinated by WHO provides an international alerting mechanism.

2. The European Commission funds a European Influenza Surveillance Scheme (EISS). Under Decision 2119/98/EC of the European Parliament and of the Council (Setting up a network for the epidemiological surveillance and control of communicable diseases in the Community), Article 4, the UK is required to inform the Commission and other Member States of any relevant infectious disease threats with public health implications for one or more other Member States, together with information on control measures applied. The recently established EU Centre for Disease Prevention and Control in Stockholm is developing its capacity and capability.

3. Current International Health Regulations (IHR) are based on a narrow list of specified infectious diseases that must be reported, which does not include influenza. These Regulations are being revised by WHO with a view to incorporating a decision support algorithm that could assist in the identification and notification of other infectious diseases that may constitute an international threat.

National

4. Public health powers in the UK are provided by the Public Health (Control of Disease) Act 1984 (c.22) in England and Wales, The Public Health Act (Northern Ireland) 1967 (c.36) and in Scotland, the Public Health (Scotland) Act 1897 (c.38) and Health Services and Public Health Act 1968 (c.46). There are other relevant powers in the National Health Service Act 1977 (such as the power to direct as to exercise of functions in Section 17 (Secretary of State's directions; exercise of functions) and the power to provide a microbiological service in Section 5(2) (other services) of the 1977 Act).

5. Powers under Public Health Acts generally rest with local authorities (in N. Ireland, the Health and Social Services Board (HSSB)) or its 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 (sheriff in Scotland or resident magistrate in N Ireland) requiring a person to be medically examined and to be removed to and detained in hospital
- powers for the local authority/its proper officer (or equivalents) to request a person not to 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

6. In Scotland those powers are available for infectious diseases generally. In other parts of the UK, the Acts relate to specific diseases and generally to people suffering from them – i.e. have been infected and gone on to develop symptoms – not to those thought to have been exposed and therefore potentially infected. However, regulation-making powers in the Acts can be used to make provision in respect of an infectious disease, whether or not specified. For example, under Section 13(1)a of the 1984 Act, regulations can be made “with a view to the treatment of persons affected with any epidemic, endemic or infectious disease and for preventing the spread of such diseases”.

7. Public health legislation contains no specific provisions for the notification of influenza but regulation making powers could be used to introduce that requirement. Generally this legislation does not cover submission of samples or laboratory reporting although sections of the NHS Act 1977 could apply.

8. Under the Civil Contingencies Act a range of provisions could become available if the situation causes or may cause amongst other things ‘loss of human life, human illness or injury or disruption of services relating to health’ (Section 19 (2)- a,b,h), in the event of a pandemic affecting the UK.

9. Those powers allow senior Ministers of the Crown to arrange by Order in Council to make emergency regulations where:

- an emergency has, is, or is about to occur
- it is necessary to make provision for the purpose of preventing, controlling or mitigating an aspect or effect of the emergency
- the need for such provisions is urgent.

10. Amongst other things those regulations may:

- prohibit or require, or enable the prohibition or requirement of, movement to or from a specific place
- prohibit, or enable the prohibition of, assemblies of specified kinds, at specific places or at specified times
- prohibit, or enable the prohibition of, travel at specified times
- prohibit, or enable the prohibition of, other specified activities
- create an offence of failing to comply with a provision of the regulations or direction or order given under them or obstructing a person in the performance of a function under the regulations

Summary

11. There is no international or national legislation aimed specifically at influenza pandemics and, given its seasonal nature, a requirement to notify any outbreak of the virus could be both onerous and ineffective. Voluntary agreements and professional networks provide mechanisms for identification of new events and changing trends.

12. Existing public health legislation and emergency powers can be utilised to limit and control the spread of the disease.

ANNEX G

INFLUENZA VACCINES

Current vaccine development and production

Influenza vaccines currently in use are trivalent, containing representative recent variants of an influenza A (H1N1), A (H3N2) and B virus. The annual cycle of vaccine production starts in February each year, when the vaccine composition is recommended by WHO and ratified for use in the EU by the Committee for Human Medicinal Products (CHMP). Suitable 'seed viruses' are identified and developed which are suitable for manufacture and grow well in eggs. Vaccine viruses are grown in embryonated hens' eggs and the infected allantoic fluid harvested. The viruses are purified, inactivated and further treated to produce either a whole virus, split or subunit vaccine. Currently only split and subunit vaccines are licensed in the UK although a whole virus vaccine may be licensed later this year. The lead time for vaccine production is approximately 6 months.

Numerous clinical trials have confirmed the effectiveness of influenza vaccines in reducing clinical illness, hospital admissions and deaths. Following a strain change, the licences for EU vaccines have to be varied. In support of any strain changes, each vaccine is studied in a small number of healthy young and elderly adults to evaluate its reactogenicity and immunogenicity.

Vaccine development and production in the event of a pandemic

There will be uncertainty about which influenza subtype will cause the next pandemic until a new strain has been confirmed to be causing sustained person to person spread.

Once a pandemic virus is identified, it is anticipated that there will be worldwide efforts (co-ordinated by the WHO) to develop monovalent vaccines. In view of past experience it is likely to take at least 6 months before the first doses of vaccine are available. Current research is directed at speeding up this process. It is expected that the various manufacturers of influenza vaccine will develop their own product according to their usual production methodology.

Type of vaccine, dose and dosing schedule

Past and recent clinical experience has shown that the dose used in routine influenza vaccines (15µg of influenza haemagglutinin per strain) is unlikely to provide adequate protection in the pandemic situation. In unprimed populations it may be necessary to use one dose to prime and at least one more dose to boost and to maintain immunity throughout the duration of a pandemic. Thus the time needed to develop an initial protective immune response is likely to be longer than normal.

Furthermore, there is evidence that conventional split or subunit vaccines may be less immunogenic than whole virus vaccines in a pandemic situation. In order to improve the immune responses and also possibly reduce the amount of vaccine antigen needed, the use of adjuvants may be beneficial. (A proviso is that if the pandemic is caused by a virus that has previously circulated (e.g. an H2N2 virus), a conventional vaccine dose should be immunogenic in older people.) Thus, although information from new research may help, it is difficult to formulate a clear immunisation strategy in advance of a pandemic.

Unless the strategy of developing a “mock-up” vaccine is employed in advance of a pandemic (see below), it is possible that the dosage regimen of a pandemic vaccine that is presumed to be necessary may be unlicensed at the onset of a pandemic. This could mean that unlicensed vaccines have to be used until enough data have been amassed to support formal licensure.

Production capacity

The capacity for vaccine production will depend upon many factors. The overall world-wide manufacturing capacity is based on the demand for annual routine influenza vaccines. This varies considerably between countries. National immunisation policies are based on selective immunisation of identified risk groups. The UK achieves high coverage in the main risk group (those aged 65 and over) and delivers nearly 13 million doses of influenza vaccine each year (i.e. about 20-25% of the total population).

If a monovalent vaccine is used, vaccine yield will be increased by a factor of three. If a whole virus vaccine is used, normal losses during processing of a subunit vaccine will be avoided and yield can be increased by a factor of two (i.e. net gain, 6 fold). However, two (or even more) doses of vaccine may be needed, halving the effective yield of vaccine (i.e. net gain, perhaps 3 fold). Current research suggests that use of an adjuvant may result in half the normal dose being immunogenic (i.e. net gain, 6 fold). The number of doses currently produced could therefore be potentially increased by a factor of up to 6 if an adjuvanted whole virus vaccine is used.

All these strategies will be kept under review as and when new information about a pandemic or potentially pandemic virus becomes available.

Rate limiting factors in vaccine availability

Rate limiting factors for the availability of vaccine are likely to be:

- Availability of hens' eggs
- Development of a suitable vaccine seed virus
- The growth rate of the vaccine virus in hens' eggs
- The time for development of reagents for vaccine potency tests
- Licensing of new vaccines (but this might be optional in case of dire emergency)
- National authority batch release tests
- Agreement on indemnity issues on production and use of vaccine.

New developments in vaccine technology may significantly affect our ability to immunise the population against pandemic influenza. Steps that can be considered to speed up vaccine availability in future are as follows:

- Develop safe and productive vaccine strains by genetic modification using reverse genetics technology. This process is likely to be more reliable than conventional techniques. There are no GM influenza vaccines currently licensed, but steps could be taken now to license the principle of GM vaccine strains. The commercial use of reverse genetics is subject to Intellectual Property control. This has been recognised by the WHO and manufacturers. (Potential time saving, approximately 2 months)
- Libraries of vaccine strains and corresponding reagents for vaccine testing could be produced for different avian influenza subtypes in advance, ready to use in vaccine manufacture. Assuming one provided a reasonable match with a pandemic virus strain, vaccines could be made (depending on availability of eggs) which, even though it may not be an exact match with the pandemic virus, may protect against the worst consequences of infection. Its use could be phased out as vaccines from the pandemic virus were produced. Development of reagent libraries is already in progress in the EU and the USA. (Potential time saving, approximately 5 months.)

- The first (limited) doses of vaccine could be made by inactivation of the unmodified pandemic virus after growth under stringent biological containment conditions. This vaccine could be used to immunise personnel who may be exposed to a pandemic virus before the rest of the UK (e.g. vaccine manufacturers, laboratory staff working with the pandemic virus at HPA, NIMR, and NIBSC) and other key personnel. (Potential time saving, approximately 3 months.)
- In order to shorten the licensing procedure for a new pandemic vaccine, manufacturers could prepare prototype pandemic vaccines in advance and submit a 'mock' pandemic influenza vaccine dossier for approval (e.g. covering new immunisation schedules, adjuvants, use of vaccines licensed elsewhere, GM vaccine strains, the need for clinical trials; streamlined national authority batch release testing). In the case of a pandemic, the strain in the vaccine could then be supplanted (if necessary) and the final pandemic vaccine could be approved by a fast-track variation. The CHMP has already adopted guidance and procedures to cover this approach (Potential time saving, 1-2 months.)
- If eggs are not available for pandemic vaccine production, it may take several months to secure extra supplies. Contracts could be put in place to secure year-round supplies of eggs (accepting the large wastages likely most years).
- Alternatively, manufacturers of vaccines should be encouraged to develop and license vaccines using mammalian cell culture technology, which is far more responsive to emergency demand. In an emergency, mammalian cell culture vaccines could be produced quicker and in larger quantities than egg-based vaccines. Cell culture vaccines are now licensed for use in the Netherlands. For other manufacturers, additional investment may be required to change to cell culture vaccine production, but this should be considered. (Potential time saving, 0-6 months, depending on availability of eggs.)
- Recent research with H5N3 influenza vaccines has demonstrated the improved immunogenicity of adjuvanted vaccines. It may be possible to use half or quarter strength vaccine doses by the use of adjuvants.
- Time may also be saved by prior negotiation of contracts with vaccine manufacturers. There may be a European Union component of vaccine supply negotiations.
- One of the issues that delayed the mass 'swine flu' immunisation campaign in 1976 in the USA was the need to negotiate for product liability i.e. ensuring a guaranteed market for the vaccine and organising who would take liability in the event of adverse reactions. Vaccine manufacturers would not begin full-scale vaccine production until such agreements were in place. Time could be saved by addressing these issues in advance.

Live influenza vaccines are not yet licensed in the EU and expert opinion would be very much against developing a live attenuated pandemic vaccine in these circumstances.

Vaccine policy, strategy and delivery

Although antiviral agents are now available for influenza therapy and prophylaxis, there are a number of limitations to their use. Immunisation remains a priority, as and when vaccine becomes available.

Immunisation with appropriately formulated influenza vaccine can be expected to reduce the impact of a pandemic, particularly among the population groups most at risk of serious illness or death from influenza. However, as vaccine is likely to be in short supply and demand will be high in the UK and worldwide, vaccine must be administered as it becomes available to predetermined priority groups. The reasons for the priorities must be defensible. The public will need information about vaccine not being generally available.

The priority groups for immunisation will be based on a number of factors, including the need to maintain the elements of community infrastructure in order to carry out the pandemic plan; to limit mortality among high-risk groups; to minimise social disruption and economic losses; to reduce morbidity in the general population. The priority groups will be subject to review, depending on the epidemiology and clinical features of the new pandemic virus and depending on availability of vaccine. It is likely that advice will be given by WHO about priority groups for immunisation, as soon as epidemiological data from the emerging pandemic is obtained. The following table suggests priority groups for immunisation, according to gradually increasing availability of vaccine.

Priority 1

Group Healthcare staff with patient contact (including ambulance staff) and staff in residential care homes for the elderly.

Advantage Disruption of vital health care delivery is minimised

Priority 2

Group Providers of essential services e.g. fire, police, security, communications, utilities, undertakers, armed forces.

Advantage Vital community functions which would be affected by mass absenteeism would be minimised.

Priority 3

Group Those with high medical risk e.g. chronic respiratory or heart disease, renal failure, diabetes mellitus or immunosuppression due to disease or treatment, women in the last trimester of pregnancy.

Advantage Consistent with normal influenza immunisation policy. Demand for health care will be minimised.

Priority 4

Group All over 65 years of age

Advantage Consistent with normal influenza immunisation policy. Demand for health care will be minimised.

Priority 5

Group Selected industries

Advantage Maintenance of essential supplies of e.g. pharmaceuticals. Minimise disruption to the economy.

Priority 6

Group Selected age groups, depending on advice from WHO eg children

Advantage Minimise spread by those most likely to transmit virus and the impact in population groups showing highest impact

Priority 7

Group Offer to all

Advantage Prevent illness and minimise the impact of pandemic in the UK

Operational plans for delivery of an immunisation programme will be developed during the interpandemic period. These plans will need to take account of the likelihood of two doses being needed about 21 days apart for optimal protection.

Vaccine monitoring

Even if the pandemic vaccine has been the subject of a prior “mock-up” dossier, there will be very limited data on safety and immunogenicity and no data on efficacy. In addition, the “mock-up” vaccine strain may differ from the pandemic strain so that there will be no such data with the final product before it has to be used.

Thus, Regulators have made it clear that, in addition to the usual pharmacovigilance measures to assess vaccine safety during use (such as the yellow card scheme operated by the MHRA/CSM in the UK), the immunogenicity and efficacy of pandemic vaccines (there will be several different ones from different companies in use simultaneously) will need to be assessed during actual use. This will be important since lessons learned during the first months may demonstrate the need for a different regimen and/or further doses to be given to achieve optimal efficacy. Also, following subsets of vaccinees for immune responses may show that further doses should be given to cover an anticipated “second wave” of the pandemic.

In the case of a pandemic and the use of vaccines that have been subjected to a minimum of clinical testing, it will be particularly important that the monitoring of safety is pre-planned and comprehensive. In addition, there would be an advantage in UK bodies such as the HPA having plans in place to conduct prospective evaluations of vaccine safety and effectiveness during the pandemic. All the data generated within countries or regions will need to be shared rapidly.

ANNEX H

Antiviral agents for influenza

Available drugs

Three antiviral agents are currently licensed in the UK for the treatment of influenza; two are also licensed for prophylaxis.

Amantadine

Amantadine is an 'M2 inhibitor' active against influenza A only (it has no activity against influenza B). It is taken orally and excreted through the kidneys. It is licensed for the treatment and prophylaxis of influenza A.

It is not licensed for use in children under 10 years of age and is contra-indicated in individuals subject to convulsions, with a history of gastric ulceration or severe renal disease and during pregnancy and breast feeding. It should be used with caution in individuals in confused or hallucinatory states, with underlying psychiatric disorders, or with liver, kidney or cardiovascular disorders. It has a number of drug interactions.

Some strains of influenza A virus rapidly develop resistance when exposed to amantadine. This is reported to be more common when it is used for both prophylaxis and treatment in the same household.

The treatment dose is 100mg daily for 4-5 days; for prophylaxis the dose is 100mg daily for up to 6 weeks. Higher doses have been reported to be associated with a higher incidence of adverse reactions.

Zanamivir

Zanamivir is a neuraminidase inhibitor which is taken using an inhaler (Diskhaler). Virtually none is absorbed from the respiratory tract. It is licensed for the treatment of influenza A and B in people aged 12 years or older, if given within 48 hours of onset of symptoms and when influenza is circulating in the community.

Zanamivir is contra-indicated in women who are breast feeding and should be used with caution in people with asthma or chronic obstructive pulmonary disease because of a risk of bronchospasm, and in people with unstable chronic illness or compromised immune systems and during pregnancy.

The dose is 10mg by inhalation twice daily for 5 days. Some elderly and disabled people may have difficulty using the diskhaler.

Oseltamivir

Oseltamivir is an orally administered neuraminidase inhibitor, excreted mainly through the kidneys. It is licensed for the treatment of influenza A and B in people one year of age or more, within 48 hours of the onset of symptoms, when influenza is circulating in the community. It is also licensed for the prophylaxis of influenza A and B in people aged 13 years or more when influenza is circulating.

The treatment dose is 75mg twice daily for 5 days, which should be adjusted for children according to weight and in people with severe renal impairment. The recommended dose for prophylaxis is 75mg daily for at least 7 days following contact with influenza and for up to 6 weeks during a community outbreak.

Resistance to neuraminidase inhibitors has been documented.

Guidance on the use of antivirals in the treatment of 'seasonal' influenza

The National Institute for Clinical Excellence (NICE) has issued guidance on the use of antivirals for the treatment of influenza in interpandemic years.

Influenza vaccination remains the first line of prevention.

NICE has recommended that amantadine should not be used in the treatment of flu. It also recommends that zanamivir and oseltamivir should not be used to treat a flu-like illness in people who are otherwise healthy.

Neuraminidase inhibitors can be expected to shorten illness by around one day and may reduce complications in high risk patients. They are recommended to treat flu-like illness in people who are considered to be at risk of developing complications, when influenza is circulating in the community, provided that they can start treatment within 48 hours of the symptoms starting.

People considered at risk are those who are in at least one of the following groups:

- aged 65 or over
- those with long term ('chronic') lung disease (including asthma and chronic obstructive pulmonary disease)
- heart disease (not including uncomplicated hypertension)
- long term kidney disease
- diabetes
- an immune system that does not work well.

Use of antivirals in an influenza pandemic

The NICE guidance does not apply in an influenza pandemic.

Principles

Strategies for the use of antivirals in an influenza pandemic are provisional and will be informed by emerging scientific evidence on their most effective use in a pandemic situation, and by epidemiological information and evidence about their efficacy obtained as a pandemic develops.

The principles for the use of antivirals will be consistent with the overall principles of managing an influenza pandemic: to minimise serious illness and deaths, to maintain essential services and to minimise societal disruption.

During a pandemic all classes of antiviral drugs to which the pandemic strain is susceptible will be used in the most effective way.

The use of antivirals will also have to take into account that vaccines, although the preferred intervention for prevention, may not be available, at least in the early stages of an influenza pandemic.

Options

The following options have been considered. They will be further developed during the interpandemic period, informed by research and national and international expert advice.

During phase 0, preparedness levels 2 and 3 and Phase 1, until widespread outbreaks occur:

- treat cases if they present within 48 hours
- give short-term prophylaxis to close contacts.

Early outbreaks in a closed community e.g. residential care for the elderly:

- treat cases if they present within 48 hours of onset of symptoms
- give short-term prophylaxis to staff and residents.

Phases 1-3 with multiple outbreaks/epidemic influenza in the UK

Policies and strategies will need to be confirmed at the time. Options which may be considered include:

- treat those epidemiologically most at risk of severe or complicated illness, if able to start treatment within 48 hours of onset of symptoms
- treat health and other essential service workers
- widespread prophylaxis is unlikely to be recommended, but prophylaxis may be recommended, according to availability, in certain priority groups, for example:
 - to control of outbreaks in high-risk residents of institutions (nursing homes or other chronic care facilities)
 - certain essential health care and other workers
 - high risk persons hospitalised for illnesses other than influenza
 - high risk persons in the community
- Treatment may additionally be considered for
 - people hospitalised for influenza (who are outside the 48-hour period since symptoms began).

ANNEX I

COMMUNICATIONS PLAN

BACKGROUND

This communications plan supports the UK Health Department's Influenza Pandemic Contingency Plan

It is set in the context of there being no vaccine available during the initial stages of an influenza pandemic and a growing stockpile of antiviral drugs.

The communications plan offers messages to the public, health professionals and key stakeholders to be used in conjunction with the publication of the Pandemic Influenza Contingency Plan and during the inter-pandemic period. It then maps out a communications strategy based on the expected evolution of a pandemic.

Stocks of antiviral drugs are being established and the subsequent messages are modified to reflect their availability as stocks build up. However, the strategy needs to be flexible to take account of the availability and effectiveness as well as emerging information about the way the pandemic is developing.

AIMS

The main aim of the communications plan is to convey accurate, timely and consistent advice to the public and health professionals and to aid understanding of the pandemic amongst the general population.

A secondary aim is to explain the ability of the NHS, DH and the Government as a whole to minimise the impact of a pandemic as far as possible but also to explain some of the constraints.

INTER-PANDEMIC PERIOD

PUBLICATION OF THE PANDEMIC INFLUENZA CONTINGENCY PLAN

Messages

The following key messages support the publication of the plan.

- Pandemic flu is different from 'normal' seasonal UK flu in important ways, which are...
- We do not know specifically when a pandemic of flu outbreak will happen. There are signs that suggest an outbreak could happen soon.
- The plan forms an integral and on-going part of the Department's work to protect the public from infectious diseases. Being prepared is part of the Department's mandate.
- This is a key part of the Department's preparations to deal with infectious diseases. These are prudent precautions for a modern society.
- There is likely to be very little warning of a pandemic of flu. Global tourism and air travel can accelerate international spread should this occur. This is why it is essential to be ready to respond before the pandemic begins.
- Flu vaccine cannot be available at the start of a pandemic flu outbreak. A new vaccine can only be developed once a pandemic strain has been identified. This ensures that the vaccine matches the pandemic strain as closely as possible. This may take a minimum of six months because each flu strain is different and will need to be developed and tested.
- 'Ordinary' flu vaccine will not protect against pandemic flu
- Antiviral drugs can help treat those who have become infected with pandemic flu. Antivirals are currently being stockpiled. The initial stocks will be used for priority groups. It will take time for manufacturers to make sufficient stocks for us to build up our stockpile. As the availability of the drugs increases, treatment will be rolled out to the general population who need them.
- Antiviral drugs can help treat those who have become infected with pandemic flu. Antivirals are currently being stockpiled. These initial stocks will be used for priority groups. As the availability of the drugs increases, treatment will be rolled out to the general population who need them. It will take time for manufacturers to make sufficient stocks for us to purchase to treat the whole population.

- The Government's detailed contingency plans for responding to a flu pandemic are being shared with all health workers and NHS staff so they will know what to do if a pandemic occurs.
- Information and advice for the public on how best to protect themselves and their families will be made widely available through information leaflets, websites and the media. Such advice will include when, where and how to seek medical assistance.

Preparation in advance of a possible pandemic of influenza

- Identify key DH spokespeople at central communications level and within the pandemic influenza communications programme
- Identify key spokespeople within SHA's and PCT's
- Prepare a detailed brief and Q&A for use by key spokespeople, DH Media Centre, Regional Public Health communications leads, NHS Direct and others who will need to speak with the media
- Publish the CMO's guide Explaining Pandemic Flu. The guide will aid accurate dissemination of the facts on pandemic flu
- Produce a leaflet offering basic information and pointers to where more advice and information can be obtained. The leaflet will be made available at or soon after the publication of the contingency plan. It will be distributed to GP surgeries, community pharmacies, immunisation co-ordinators etc and posted on the DH and immunisation website.
- Produce a poster to be displayed in GP surgeries
- Produce a flu pandemic information microsite on the DH website carrying basic and more detailed information and advice including a Q&A.
- Conduct scoping research amongst the public and health professionals to establish attitudes, levels of understanding and information needs on pandemic flu. This will inform any subsequent information campaign.
- Based on research findings, an information and advertising campaign will be prepared for the general population and health professionals and held in readiness

PANDEMIC PERIOD

First wave

The communications plan assumes rising – but probably limited – stocks of antivirals during this period and no vaccine. A vaccine can only be developed after the pandemic virus has been identified.

Target groups for messages

Messages will be tailored to the needs of different audiences

Identified groups include:

- **Health workers in direct contact with patients**
Healthcare workers are essential to the health service response and are likely to be at increased risk of infection from contact with patients
- **Other workers who maintain essential services**
To prevent disruption to key services through absence due to illness. The need to care for others or other service disruption eg transport.
- **High risk groups**
To prevent serious illness, reduce hospitalisations and deaths
- **Enclosed communities**
Such as residential care homes, schools and prisons.
- **The public**
To prevent illness in the population as a whole.
To advise on treatment and when to seek medical advice.

General messages

- As soon as the virus is identified, the development of a vaccine will begin
- What pandemic flu is, its incubation period, how it spreads, who it effects
- Essential health workers will be the priority group to be given any available antivirals, to treat them if they get ill. This is because their work puts them at increased risk, and in the event of an outbreak of pandemic flu front line health workers and carers will be essential to provide care for others

- Look out for signs and symptoms. If you think you or your child might be infected, stay at home;
 - visit www.nhsdirect.nhs.uk
 - go to NHS Direct Interactive on digital satellite TV by pressing the interactive button on the remote control
 - call NHS Direct on 0845 4647
- Listen out for government advice and information broadcast on television and radio (self-help measures, why need to stay at home, status and progress of epidemic etc)
- Local restrictions on movement of people and possible school closures may be announced but until that happens proceed as normal unless you have symptoms
- It is likely that there will be two 'waves' of the pandemic, with the second wave occurring 3 – 9 months after the first. The second wave may be more or less severe than the first.

Communications plans

NHS staff

The Department uses established and well-tested procedures for handling the public communications aspects of health-related incidents. These procedures are continually reviewed and updated. (See the CMO Guide)

In the event of a flu pandemic happening now, immediate actions would be communicated quickly and accurately to key NHS workers, other organisations (other government departments, emergency services, private sector bodies and international partners) and the public.

Information would be cascaded as follows:

- Once a flu pandemic has been confirmed, the Cabinet Office Briefing Room (COBR) would be activated.
- On the CMO's advice the Secretary of state for Health will convene an expert committee – the UK National Influenza Pandemic Committee (UKNIPC) – to advise the UK Health Departments.
- The Civil Contingencies Secretariat will provide the focal point for UK wide strategy and priority decisions, cross government/multi-agency action and key decisions on any non-health measures required
- CMO would rapidly alert the SHA's and regional Directors of Public Health who would implement the flu pandemic plan.
- SHA's would cascade information down to PCT's

SHA comms leads

SHAs will play a key role in communications with NHS services in both interpandemic and post pandemic periods. Authorities will be provided with materials to support local NHS trusts in preparing for a possible flu pandemic and throughout a pandemic period.

Materials and supportive arrangements will be developed in association with the specific NHS organisations and will include FAQ, stock and locally tailored press notices, key fact sheets and access to regional spokespersons.

The media

It will be vital to reassure a worried population that robust plans are already in place to cope with an epidemic or pandemic of flu (or other infectious diseases). That is why extensive explanatory media activity will have been undertaken in the inter-pandemic period, starting with the launch of the plan. The pre-prepared brief, updated as necessary, would be used by DH media centre. This brief would ensure consistency of the messages to be disseminated across government and through SHA and Regional Public Health communications leads.

The media – regional/national newspapers, radio, rolling TV news bulletins – will be a crucial mechanism for ensuring our key messages reach the full range of audiences. Key spokespeople previously identified, will ensure that accurate information is communicated through briefings, statements and interviews. Through the media, people can be referred to the CMO explanatory guide. Regional spokespeople will cover the widest possible network of media.

Regional Directors of Public Health already have communications integrated into their operational plans – the national plan reflects this.

The public

In the event of pandemic influenza in the UK, the media would be the primary communication channel for the public, who would also be directed to other sources for more detailed information, e.g. NHS Direct, Ceefax/Teletext and websites

NHS Direct

NHS Direct will be part of the public information strategy

NHS Direct staff will also provide feedback to DH about new messages and materials that need to be developed to respond to public needs.

NHS Direct's normal telephone number – 0845 4647 would be used in such an event, although the NHS Direct Online website (www.nhsdirect.nhs.uk) and NHS Direct Interactive on digital satellite TV would be prominently promoted as sources of information, to help manage the potentially high demand.

Advertising and public information announcements

Government Communications Network (GCN) already have agreements with broadcasters to put out public service factual information in the event of a chemical, biological, radiological or nuclear (CBRN) incident or other public health threat.

Since February 2003 the Department as part of its plans to provide a rapid response to a CBRN incident, has been working with COI Communications and one of the COI/DH roster agencies to produce protocols to enable quick-to-prepare information based advertising.

The national information campaign, held in readiness, would be run based on earlier scoping research findings and recommendations and subsequent pre-testing of such materials among the public and health professionals.

Website information

In the event of a major flu outbreak the DH will publish content on the web site at a dedicated site in line with protocols agreed with the Cabinet Office and other government departments. Both the Media Centre and web team operate a 24/7 'on call' system.

Websites will be used as a central component in managing the surge in public information requests. The web can be used to quickly provide basic information on the nature of a flu pandemic, updates, fact sheets, Q&As, and patient and public education materials, to a broad audience.

Information on Interactive digital TV

NHS Direct Interactive is now available to around 7 and a half million homes with digital satellite television. During 2005, the aim is to roll the service out across the digital cable and Freeview platforms, extending access to up to 14 million homes.

New information can be published on NHS Direct Interactive within a few hours, once the content has been produced. It is suggested that basic information could be prepared in advance and stored in the content management system in readiness for publishing should the need arise.

There would be the opportunity for broadcasters to create 'red button' links from linear TV programmes on digital TV e.g. news programmes, to the NHS Direct Interactive service, for more advice and information.

Information materials

Based on earlier research amongst the general population and health professionals, an information pack will be sent to all SHA's, PCT's and health professionals. The pack and its components will be available to the general public.

The pack is likely to contain:

1. A leaflet offering advice and information
2. The CMO 'Explaining Pandemic Flu' guide
3. A Q&A sheet
4. A surgery or clinic poster on what precautions to take
5. Sources of further information; websites, links to scientific papers etc

As mentioned above, most of this material will have been pre-prepared.

Second wave

A second wave of the flu pandemic is likely to occur between 3 and 9 months after the first wave. Limited stocks of vaccine and antivirals may be available to counter the outbreak, depending on how soon the second wave arrives. The Communications strategy and content will be reviewed regularly according to the current situation.

Messages

- There are limited stocks of antivirals available for health workers and other priority groups.
- Look out for signs and symptoms. If you think you might be infected, stay at home
- Listen out for government advice and information broadcast on television and radio (self-help measures, why need to stay at home, status and progress of epidemic etc)
- For advice and information, visit www.nhsdirect.nhs.uk; go to NHS Direct Interactive on digital satellite TV by pressing the interactive button on the remote control; or call NHS Direct on 0845 4647,
- Call NHS Direct on this special number for advice and information or visit their website at www.nhsdirect.nhs.uk
- The World Health Organization is working with countries around the world to produce enough vaccine as soon as possible

ANNEX J

INFORMATION FOR OTHER ORGANISATIONS

Interim advice on the risks of an influenza pandemic

Purpose

This note is to inform emergency and business continuity planning by local authorities, schools and other education establishments, essential services and the business sector for the contingency of a world-wide pandemic of influenza. It highlights key issues to take into account in such planning. Further details are available in the main body of the UK Health Departments' Influenza Pandemic Plan.

Context

The main source of information for this guidance is the UK Health Departments' Influenza Pandemic Contingency Plan. It also draws on the results from consultation during 2004 by the World Health Organisation on preparedness for an influenza pandemic, which was largely driven by concerns amongst public health experts that the current outbreaks of avian influenza in parts of Asia could give rise to a pandemic.

The Pandemic Contingency Plan highlights, among other things, that Health Departments would implement a public education campaign, early on in a pandemic, on the nature of the infection and the measures the public and organisations can take to reduce its spread. Information would be widely available on Health Departments' websites and in leaflet form. However, a key message to the public would be that the ability of health services to reduce the impacts of a flu pandemic on health are limited, and as a result, infection is likely to be widespread.

This guidance is issued to local responders to provide advice on the likely impacts of an influenza pandemic in order to inform and assist emergency and business continuity planning. The guidance is not intended either to be prescriptive or to be an operations manual, nor does it place any obligations on local authorities or service providers. The guidance is intended to help establish a co-ordinated national framework for effective local contingency planning. The guidance is interim because thinking and planning continue to evolve.

* WHO consultation on priority public health interventions before and during an influenza pandemic
http://www.who.int/csr/disease/avian_influenza/consultation/en/

Background

Influenza pandemics have occurred at irregular intervals throughout history, three in the last century: in 1918 ('Spanish flu'), 1957 ('Asian' flu) and 1968 ('Hong Kong' flu). Each of these events was associated with illness, deaths and general societal disruption far in excess of that experienced in a 'normal' winter. The 1918/19 pandemic, for instance, is estimated to have caused over 20 million deaths world-wide with 200,000 deaths in the UK. A further pandemic is thought to be inevitable. There may not be much warning and therefore advanced planning is essential for a smooth response.

Nature and scale of a flu pandemic

The **outbreaks** or **epidemics** of influenza which occur most winters affect some 5 to 10% of the population. The vast majority will have an unpleasant but self-limiting illness or even no symptoms, with less than 0.05% consulting their GP. Those most at risk of serious illness or death (the elderly, and those with chronic underlying diseases) are offered annual vaccination. Death from flu is usually due to complications such as secondary bacterial infections, e.g. pneumonia, or exacerbation of an underlying disease, rather than the direct effects of the influenza virus itself.

An influenza **pandemic** arises when an entirely new strain of influenza virus emerges to which most people are susceptible. Thus it is able to spread widely. Some important features of influenza pandemics are:

- They are unpredictable;
- They may occur at any time of year;
- They are most likely to start in Asia, or at least outside the UK, and gradually spread; this spread has been divided into phases allowing an escalating response according to the scale and geographic spread of the pandemic;
- Spread to the UK may take several months, but may be shorter;
- Once established in the UK, the disease is likely to spread rapidly over 2-3 weeks and then gradually decline over the next 4-6 weeks; a second wave of illness may occur 6-9 months later;
- some 20 to 30% of the population or even more may be affected over a 1-2 year period, including children and normally fit young adults; and
- a far greater proportion of people are likely to require hospitalisation or die than for seasonal flu.

Confirming a Flu Pandemic

The World Health Organisation (WHO) monitors influenza across the world. Once a new influenza virus has been identified and shown to have pandemic potential, the WHO will announce the various phases of a pandemic and inform national Governments (further details in Chapter 3 of main Plan). The UK Government will then put its own plans into action with the Department of Health in the lead working closely with the Health Departments in the Devolved Administrations (DAs) and supported by the Health Protection Agency and its equivalents in the DAs. This will include guidance and advice from Health Departments and/or the Health Protection Agency for the public and for planners across all sectors.

Department of Health influenza pandemic planning assumptions

Based on previous pandemics and current internationally agreed arrangements co-ordinated by the WHO, UK Health Departments have agreed the following planning assumptions (further details in Chapter 4 of main Plan):

- (i) Spread from the source country to the UK will take no more than three months. Once in the UK, it is unlikely that we will be able to stop the spread of pandemic influenza. Our aims are to slow its spread, at least in the short term, in order to buy time and spread the load on health and other services, and to reduce its impact.
- (ii) Most people will be susceptible to the new virus, although not all will necessarily develop clinical illness. All ages will be affected, but children and otherwise fit adults could be at relatively greater risk should elderly people have some residual immunity from exposure to a similar virus earlier in their lifetime.
- (iii) Vaccine will not be available in the early stages. A pandemic vaccine cannot be stockpiled in advance: it must be produced specifically for the virus concerned so development cannot start until the virus is known. Everything will be done to produce a vaccine as quickly as possible, but it is likely to take at least 6 months.
- (iv) As vaccine becomes available it will be given according to nationally agreed priorities, starting with health care and other essential workers. Beyond that, the final decisions will be based on early information about the age groups being affected most severely. When vaccine supplies become more widely available, vaccination will be offered to the general population.

- (v) Antiviral drugs are available for treating influenza, but even with a national stockpile, there will not be an unlimited supply. They may be used initially to try to contain small outbreaks. Later they will be used to treat certain narrowly-defined priority groups according to agreed guidelines in order to achieve the maximum health benefits.
- (vi) Planning should be based on a cumulative total of 25% of workers taking some time off – possibly 5-8 working days – over a period of 3 months. This first wave is likely to be followed by a second wave of similar duration. The interval between each wave could be several weeks or months. Absenteeism may be more than this either due to a higher rate of illness, the need to care for sick family members or fear of exposure to infection. Past pandemic experience indicates that between 10-35% of the workforce may be absent from work. The absentee rate is expected to peak for 1-2 weeks at the height of the outbreak (around weeks 8 to 9).
- (vii) Total deaths in the UK normally run at around 12,000 per week. During a pandemic, without effective interventions, total deaths are likely to gradually rise to 50% higher than normal at the peak of a pandemic wave, and then gradually decline. However, there is the potential for as many deaths in 12 weeks of a pandemic as in the rest of the year (around 600,000 excess deaths across the UK).
- (viii) Slowing down the spread and reducing the number that will be affected in the first wave may be achieved by implementation of :
 - Hygiene including respiratory hygiene and hand washing
 - Travel advisories to restrict international travel to or from affected areas
 - Health screening at UK ports
 - Voluntary home isolation of cases
 - Voluntary quarantine of contacts of known cases
 - Staff rostering to minimise the impact on staffing if all contacts of a case in a work team are asked to remain in voluntary quarantine
 - Local restrictions on the movement of people, eg in a local community or town
 - Restriction of public gatherings, especially international mass gatherings

- School closures (recognising the impact this will have on maintaining the workforce in other sectors)
- The use of face masks by infected people (to reduce droplet spread), by those in contact with infected people or by the general public

These measures are being kept under review as public health interventions during a pandemic, and clear guidance will be issued by Health Departments, based on the advice of the UK National Influenza Pandemic Committee or guidance from the WHO or real time modelling as the evidence evolves or as need arises.

Some of these measures may be required as a result of staff absence or the general disruption, or may occur by default because of public concern or other considerations, such as concerns about possible exposure to infection when using public transport. Voluntary co-operation with recommended measures would be sought. Mandatory quarantine and curfews are generally not considered necessary and are not currently covered by public health legislation.

General advice to local authorities, educational establishments and businesses

For the purposes of business continuity planning, local authorities, educational establishments and businesses will wish to consider the likely effects of a pandemic on their organisations outlined above and the measures that may need to be taken to manage these. For example, by:

- Considering the likely impact on their organisations and businesses;
- Considering their needs to maintain continuity of core business activities and putting appropriate plans in place taking into account high levels of staff absences;
- Providing information to staff and students (this will be available on the Department of Health website and in printed form);

In addition, research on the spread of infectious diseases suggests that the spread of an influenza pandemic may be slowed down by:

- cancellation of public events; for example this may include large-scale national or international events held in the UK (involving inter-regional/UK and international travel by participants), such as sporting fixtures, concerts, competitions, conferences, agricultural shows, exhibitions. In practice, possible lack of ambulance cover due to increased health care pressures associated with a pandemic might result in the cancellation of such events;

- curbing unnecessary travel; for example this may include encouraging people to travel intra- and inter-regionally in UK only if absolutely necessary (as part of nationally-produced communication messages);
- if there was a particular flu hotspot in a region, local authorities may need to issue advice to the public about not travelling to and from that region.

Decisions on such actions will normally remain for local determination, based on advice and recommendations issued by Health Departments.

Particular advice to educational establishments

The pandemic virus may spread readily in schools and other education establishments (attack rates of up to 90% were reported in some boarding schools in previous pandemics). If this is confirmed as a characteristic of the virus, Health Departments will inform Education Departments to advise local education authorities and the education sector about measures to be taken to slow down spread of the virus. This advice would particularly apply to younger children, childcare settings and education establishments and may include closing down for a short period, and management of pupils/students travelling within, to and from the UK. Education Departments will assist in disseminating the advice to the various education sectors.

The decision on such closures will normally remain for local determination having regard for the possibility that such establishments may have insufficient staff and/or pupils/students to remain open and for the possible implications for increased work absence because of workers' child-care responsibilities.

Department of Health
February 2005