

# Pandemic flu

Managing Demand and Capacity  
in Health Care Organisations. (Surge )

**DH INFORMATION READER BOX**

<b>Policy</b>	Estates Commissioning IM & T Finance Social Care / Partnership Working
HR / Workforce Management Planning / Clinical	
<b>Document Purpose</b>	For Information
<b>Gateway Reference</b>	11697
<b>Title</b>	Pandemic Flu:Management of Demand and Capacity in Healthcare Organisations
<b>Author</b>	Department of Health
<b>Publication Date</b>	30 Apr 2009
<b>Target Audience</b>	PCT CEs, NHS Trust CEs, SHA CEs, Care Trust CEs, Foundation Trust CEs , Medical Directors, Directors of PH, Directors of Nursing, Local Authority CEs, Directors of Adult SSs, PCT PEC Chairs, NHS Trust Board Chairs, Special HA CEs, Directors of HR, Directors of Finance, Allied Health Professionals, GPs, Communications Leads, Emergency Care Leads, Directors of Children's SSs
<b>Circulation List</b>	Voluntary Organisations/NDPBs, Royal College of GPs, BMA, RCN and CNO office, Intensive Care Society.
<b>Description</b>	This guidance is an updated version of the draft surge capacity and patient prioritisation guidance issued in August 2008.
<b>Cross Ref</b>	N/A
<b>Superseded Docs</b>	draft surge capacity and patient prioritisation guidance 39661
<b>Action Required</b>	N/A
<b>Timing</b>	N/A
<b>Contact Details</b>	#REF! Pandemic Influenza Preparedness programme Skipton House 80 London Road SE1 8AA 0207972 5595 <a href="http://www.dh.gov.uk/pandemicflu">www.dh.gov.uk/pandemicflu</a>
<b>For Recipient's Use</b>	

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# Foreword

Pandemic influenza will be a widespread, rising-tide phenomenon threatening to overwhelm health and social care services in the UK, and necessitating changes to the scope and delivery of health and social care. It is important to remember that it is the sheer numbers of people affected by the pandemic influenza at any one time, which will disrupt the normal provision of services throughout society. As the pandemic develops, it is likely that some treatments will need to be deferred, clinical care standards will be modified and access to some treatments and services will be restricted. The impact on people's health will be minimised, but when the numbers of people requiring care exceed available capacity, it is inevitable that the health and care of some people will be affected. The challenge will be to provide sufficient or reasonable care to as many people as possible, balancing the need to provide a minimum level of comfort to everyone.

Preparations for dealing with a surge of patients and service users – and how services and patients are prioritised – need to be developed, agreed and in place amongst all caring agencies before a pandemic strikes. It is important that a common set of prioritisation criteria be used across the UK. Clarity and transparency will be essential, as will consistent planning according to the national planning assumptions and principles as set out in *Pandemic flu: A national framework for responding to an influenza pandemic*<sup>1</sup>.

This guidance restricts itself primarily to recommending the principles and approaches that should be adopted by health services. Nevertheless, it recognises that the interface with social care (and other sectors) is critical and that, to ensure effective management of patients, a common understanding of how patients should be managed and cared for across health and social care is required. This includes the need for plans to be agreed with social care commissioners and providers before a pandemic occurs.

A large number of stakeholders have been involved in the development and review of this document (please see Appendix 15). This guidance provides a framework and some clinical outcome tools that services will find helpful in their planning for pandemic. It is recognised that, as a pandemic develops, science may change according to what appears to be the emerging evidence. If so, advice to clinicians will need to change to reflect the most up to date knowledge. This will be available on [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

# Executive summary

Since the influenza pandemic in 1968/69, changes to health service delivery and the growth of the UK population, particularly in the older age groups, have meant that the excess capacity to accommodate sudden influxes of patients, which historically existed in the healthcare system, no longer exists. It is estimated that given a 50% clinical attack rate, a locality with 100,000 people could expect 11,000 clinical cases of influenza-like illness in the peak week of a pandemic, with 440 of these people requiring hospitalisation. With these projected numbers, it is likely that health services will be overwhelmed rapidly, unless steps to preserve the provision of essential care are taken, as well as measures to control access to such care are taken.

This document provides guidance on managing the managing the demand and the capacity needed to respond to this volume of patients and the ability of the health service to expand beyond normal capacity to meet an increased demand for clinical care

Chapters 1 and 2 provide context for the guidance. Chapter 3 outlines the ethical principles underpinning the development of the guidance with projections of the expected healthcare demand in chapter 4.

Guiding principles for health service planning are listed in chapter 5, and a conceptual model of the response is described. It is recognised that the majority of people who are ill will have to be cared for outside of hospital, and the presumption must be that they will remain at home with such support as relatives/neighbours/friends/volunteers and health and social care can give.

In chapter 6 a concept of operations, consistent with *Pandemic flu: A national framework for responding to an influenza pandemic* covers the timing and organisation of the healthcare response at a local level. Three suggested stages to the local health service response are described (increasing capacity, prioritising services, and prioritising patients and treatments), along with examples of the types of activity that might take place at each stage.

Chapter 7 deals with service prioritisation in more detail. The identification in the pre-pandemic period of priority services is critical. A Service Priority Assessment Tool and guidance on its usage has been developed to facilitate this prioritisation process. Service strategies and actions based on local triggers are outlined. Checklists are provided which address some of the broad issues relating to preparation that may be faced locally in healthcare facilities.

Chapter 8 introduces a model of stepped levels of care and emphasises the need to understand and mitigate any potential adverse effects of proposed service alterations. In chapter 9 admission and discharge from services is discussed. A system for prioritising patients is proposed, which includes a process for assessing their continuing need for secondary care in the context of the ethical framework for policy and planning in a pandemic.

In chapter 10, a framework for implementation of phased response patterns and triage for the care of critically ill patients is presented.

The remaining chapters of the guidance cover the provision of paediatric care, non-invasive ventilatory support, End of Life care, Ambulance services, communications and security.

Key challenges in implementing guidance for managing the demand and capacity in health care organisations include:

- Helping the public and professionals to understand the need for, and to be involved in, the prioritisation of services, treatments and patients during the pandemic
- ensuring that appropriate frameworks are in place to support clinical decisions on prioritisation made during a pandemic
- developing the infrastructure in local communities to encourage self-care, to avoid admission of those patients for whom only symptomatic or end of life care is deemed appropriate and to support the early discharge of patients from hospital
- defining the geographical and health service footprint of a locality for the purposes of activating demand and capacity responses, for example health board/primary care trust groupings.



# 1 Scope and purpose

This document contains guidance for primary and secondary care services in England on managing demand and capacity and the prioritisation of services and patients during an influenza pandemic. The Devolved Administrations will have similar guidance.

This guidance should be used to inform current planning during World Health Organisation (WHO) Phase 3 and to assist in the development of pandemic preparedness plans. It is intended for operational use in the UK once WHO declares Phase 6 and the Department of Health in England (as the UK lead agency for pandemic influenza) declares UK alert level 1 (see Appendix 1).

Once an influenza pandemic is declared, if new clinical data on the course and outcome of the illness emerge from experience in the UK or elsewhere, then health services may have to modify their response. Health services should ensure that they refer to the most up-to-date version of this guidance at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu)

This guidance should be read in conjunction with the following documents or their country-specific counterparts:

*Responding to pandemic influenza: The ethical framework for policy and planning*

*Pandemic influenza: Guidance on preparing acute hospitals in England*

*An operational and strategic framework: Planning for pandemic influenza in adult social care*

*Pandemic influenza: Guidance for ambulance services and their staff in England*

*Guidance for pandemic influenza: Infection control in hospitals and primary care settings*

*Pandemic influenza: Human resources guidance for the NHS*

*Pandemic influenza: Guidance on preparing mental health services in England*

*Pandemic influenza: Guidance on the delivery and contract arrangements for primary care dentistry*

*Pandemic influenza: Guidance for dental practices*

*Pandemic influenza: Guidance on preparing maternity services in England*

*Pandemic influenza: Surge capacity and patient prioritisation in health services – provisional UK guidance*

*Pandemic influenza: Guidance on planning for vulnerable groups*

*Possible amendments to medicines and associated legislation during an influenza pandemic*

*Pandemic influenza: Guidance on the management of death certification and cremation certification*

*Planning for a possible influenza pandemic: A framework for planners preparing to manage deaths (Home Office)*

*Planning for a possible influenza pandemic: Registrar General's guidance on death registration services for Registration Service Managers and Practitioners (Home Office/General Register Office)*

*Supporting people with long term conditions to self care: A guide to developing local strategies and good practice (a section on where to find further advice and case studies is given on pages 36–37)*

*NHS emergency planning guidance 2005*

*Strategic command arrangements for the NHS during a major incident*

***NHS Emergency Planning Guidance 2005: Critical care contingency planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity.***

All of the above guidance is available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu), and other country- specific guidance is available at:

[www.scotland.gov.uk/pandemicflu](http://www.scotland.gov.uk/pandemicflu)

[www.dhsspsni.gov.uk/index/phealth/pandemicflu/pandemic-contingency.htm](http://www.dhsspsni.gov.uk/index/phealth/pandemicflu/pandemic-contingency.htm)

[www.Wales.gov.uk/topics/health/protection/communicabledisease/flu/?lang=en](http://www.Wales.gov.uk/topics/health/protection/communicabledisease/flu/?lang=en)

## 2 Audience

The guidance is aimed at:

- Pandemic Influenza Coordination Committees (or equivalent committees/forums),
- Chief Executives of, Strategic Health Authorities and Primary and Secondary care Trusts,
- Mental Health services,
- Medical Directors,
- Directors of Public Health,
- Heads of Services,
- Emergency Planners
- Primary and Secondary care clinicians.

It is also of relevance to other stakeholders, such as

- Ambulance services/trusts,
- Local Authorities
- Private and Voluntary sector providers.

# 3 Ethical issues

In preparing for and responding to an influenza pandemic, people working at all levels, from Government to those on the front line, will face difficult decisions and choices. These will impact on the freedom, health and, in some cases, survival prospects of individuals. Many people are also likely to face individual dilemmas and tensions between their personal, professional and work obligations. Given expected levels of additional demand, capacity limitations, staffing constraints and potential shortages of medical supplies, hard choices and compromises are likely to be necessary in the fields of health and community care.

It is important that any guidance advocating the prioritisation of healthcare resources to certain groups of patients must have a sound and defensible ethical basis. People are more likely to accept the need for and the consequences of difficult decisions if these have been made in an open, transparent and inclusive way. National and local preparations for an influenza pandemic should therefore be based on widely held ethical values. Choices that may become necessary should be discussed openly as plans are developed so that they reflect what most people will accept as proportionate and fair.

The UK Committee on Ethical Aspects of Pandemic Influenza ([CEAPI](#)) was set up to advise on the ethical issues in health and community care and in public health arising from an influenza pandemic, and has developed an ethical framework to inform the development and implementation of health and community care and public health response policy. The systematic use of the principles it contains can act as a checklist to ensure that all the ethical aspects have been considered.

The overarching ethical principle of equal concern and respect (with its eight component principles listed in the guidance document *Responding to pandemic influenza: The ethical framework for policy and planning*) has been used to help develop this guidance. The way that these principles have been used in this guidance is detailed in Appendix 2.

# 4 Context and what to expect

## 4.1 Context

The impact on the UK healthcare system of previous pandemics has been variable. In his annual report for 1957, the then Chief Medical Officer commented that there was 'considerable pressure on hospitals for the admission of patients with acute chest infections'<sup>2</sup>. In the report for 1969, the Chief Medical Officer commented: 'the intensity of the demand may well have been masked by the availability of a large number of beds normally empty at Christmas.'<sup>3</sup>

Could the NHS in 2009 cope to a similar degree? There are a number of differences between the situation today and that in 1957/58 and 1968/69:

- Over the last 35 years, there have been considerable changes to the way health services are delivered: there have been clinical innovations, changes to practice and the development of community services. The excess bed capacity that was previously in the system to accommodate large numbers of inpatients no longer exists.
- There have been changes to the way in which primary care services are delivered, with a greater emphasis on chronic disease management and health promotion and the development of out-of-hours services. The increasing complexity of the organisation of primary care services presents challenges in gearing the system to respond to a pandemic.
- Since the last pandemic, the UK general population has grown by 8% (from 55.9 million in 1971 to 60.6 million in 2006). The number of people over 65 years of age – the group usually hardest hit by influenza and traditionally high users of healthcare resources – has increased by 31% (from 7.4 million to 9.7 million).<sup>4</sup>
- The health service in 2008 is already working at or near capacity. For example, in 2005/06 the NHS in England had an average, overall, staffed bed occupancy of 85%,<sup>5</sup> leaving little scope to accommodate sudden increases in demand for inpatient healthcare.
- Treatment modalities have changed and critical care has developed and become more widely used than was the case in 1957 and 1968. It is likely that, in a pandemic, the demand for critical care will be high and the current 3,637 adult critical care beds<sup>6</sup> and 320 paediatric critical care beds in England could be rapidly overwhelmed.<sup>7</sup>

## 4.2 What to expect

Over the entire period of a pandemic, up to 50% of the population may show clinical symptoms of influenza. This could result in the total healthcare contacts for influenza-like illness increasing from around 1 million during a 'normal' season up to 30 million; it will not be possible to refine estimates until a pandemic occurs and person-to-person transmission begins.

Of those developing symptoms, up to 28.5% (including all affected children under one) will require assessment and treatment by a GP or other health professional, and up to 4% may require hospital admission if sufficient capacity is available. Average length of stay for those with complications may be six days (ten days if in intensive care). Of those who become symptomatic, up to 2.5% may die.

Table 1 illustrates the potential impact of a pandemic based on a population of 100,000.

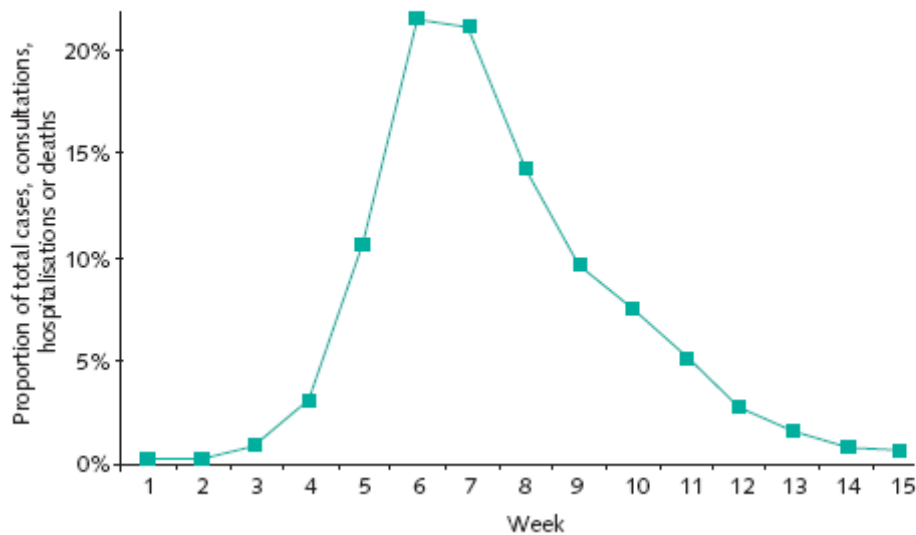
**Table 1: Expected healthcare demand over the course of a pandemic**  
25% attack rate 35% attack rate 50% attack rate

per 100,000		per 100,000	per 100,000
Clinical cases	25,000	35,000	50,000
GP consultations	7,130	9,880	14,250
Hospital admissions	1,000	1,400	2,000
Deaths (fatality rate of 2.5%)	625	875	1,250

Hospitalisations and deaths are likely to be greatest if the highest attack rates are in elderly people. The lowest burden on healthcare might be associated with higher attack rates in adults aged 15–64.

A temporal profile of a pandemic wave, based on the three pandemics from the last century and current models of disease transmission, has been developed and is illustrated in Figure 1.

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



The profile attempts to show the fastest overall national progression of a pandemic from the time it becomes the dominant form of influenza-like disease, when the number of cases rises above the background of such diseases. Local epidemics might be over more quickly (six to eight weeks), with a proportionately higher peak lasting two to three weeks.

Given a 50% clinical attack rate in a pandemic wave, up to 22% of the total number of influenza cases will occur during the 'peak week', resulting in 11,000 new healthcare contacts per 100,000 population (including people accessing the National Flu Line service, which offers antiviral medication) (Table 2). At the peak of the pandemic, there could potentially be up to **440 new cases per 100,000 population requiring hospitalisation each week, 110 of whom could require access to critical care facilities**. Local health planners should plan for this reasonable worst-case scenario.

NHS Ambulance services are expected to experience significant rises in both 999 calls from the general public and requests for transportation from other health professionals. This will be coupled with an increase in patient transfers to step down facilities.

**Table 2: Expected healthcare demand during the peak week of a pandemic\* 25% attack rate 35% attack rate 50% attack rate**

<b>per 100,000</b>		<b>per 100,000</b>	<b>per 100,000</b>
Clinical cases	5,500	7,700	11,000
GP consultations	1,570	2,200	3,135
Hospital admissions	220	310	440
Deaths (fatality rate of 2.5%)	140	200	280

\*A week-by-week analysis is available in the *National framework*.



# 5 Managing Demand and Capacity in healthcare (Surge)

The emergency response in the following two situations has some common features, but there are also important differences.

- A sudden focal event (“Big Bang”) will produce large numbers of casualties over a short period, with the primary impact on secondary healthcare facilities;
- a ‘rising tide’ event will continue to produce large numbers of sick people for considerable periods and the impact will be across all healthcare facilities, including primary and community care and social care. It is recognised that most ill people will have to be cared for outside hospital and the presumption must be that they will remain at home with such support as relatives/neighbours/ friends/volunteers and health and social care can give.

The current healthcare response to a sudden focal event relies on mutual aid agreements with other hospitals. In the rising tide situation, where widespread disruption may be present over a prolonged period and across a wide geographical area, health communities will not be able to rely on this assistance because those facilities, which would normally be involved in mutual aid, will themselves be disrupted by the pandemic.

This document focuses on the response to pandemic influenza, a ‘rising tide’ event. Guidance on the NHS response to a sudden focal event already exists.<sup>8</sup>

## 5.1 Defining ‘Demand and Capacity

In this guidance, the term demand and capacity is being used to describe:

“The ability of the health service to expand beyond normal capacity to meet an increased demand for clinical care”.

The term “Surge” is used in Healthcare to describe the above and is used in this guidance to mean the same as Demand and Capacity.

## 5.2 Guiding principles

There are seven guiding principles that need to be considered when planning for an increase in demand and capacity in healthcare:

- The care that can be given to people when resources are stretched should be maximised.
- Plans should be consistent with the overall aim of preserving and maintaining essential healthcare services.
- Changes to services and clinical standards should be incremental and should reflect changes in local demand and the resources that are available.
- Changes should be consistent with the established ethical principles.
- Plans should take a whole-system approach and encompass primary, community and secondary care.
- Plans should support the attainment of strategic objectives at each stage of a pandemic.
- Implementation of this guidance should be coordinated at a strategic level in a health economy to ensure consistency of interpretation and effect.

NHS organisations should also be aware of their legal duty to involve people in the development of their plans. Under Section 242 (1B), PCTs, NHS Trusts and Foundation Trusts are required to make arrangements to involve people in the planning of health services for which they are responsible. Further information about the duty to involve and supporting guidance is available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_089787](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_089787)

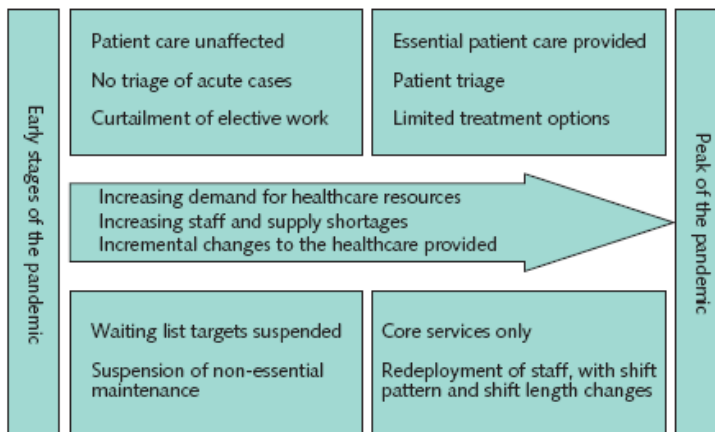
In addition to Section 242, NHS organisations have a duty to consult local overview and scrutiny committees where they are considering substantial variations or developments in local health services; exceptional arrangements apply in cases of urgency. Early, proactive engagement with the OSC is always a good idea. Further information about this duty is available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsLegislation/DH\\_4009607](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsLegislation/DH_4009607)

NHS organisations should also be aware, in developing their plans, of their statutory Equality duties.

## 5.3 Managing Demand and Capacity

Designing a structure able to respond to an increase of hundreds or even thousands of patients, when the healthcare system is itself affected and already almost at capacity, will require exceptional solutions. Initially, it may be possible to increase capacity in line with increased demand, without affecting standards of care. However, as the pandemic develops, it will be necessary to alter the level of care provided until at the peak the emphasis will be on managing the demand for healthcare by prioritising patients and procedures. A conceptual model is shown in Figure 2.

Figure 2: Surge capacity – a conceptual model



Source: Adapted from *Mass medical care with scarce resources: A community planning guide*, Agency for Healthcare Research and Quality, 2007, emergency publication no. 07-0001.

In developing demand and capacity systems in the context of pandemic influenza, there are three interrelated elements to consider:

- the physical aspects of creating extra capacity, i.e. creating space, providing staff, supplying resources and/or managing the process (section 5.4)
- prioritising services to release capacity (chapter 7)
- prioritising patients and clinical interventions to control demand.

These three elements will be present to a greater or lesser extent along a spectrum of actions, depending on the magnitude of the challenge and the resources available.

## 5.4 Increasing capacity

This component of Demand and Capacity management involves ‘the four Ps’: **P**rocesses, **P**remises, **P**roviders and **P**eople.

Each of these components should be considered individually, as well as considering how they would operate together.

- **Processes** – all local health communities should have clear arrangements for command and control (see the *National framework* for further information on command and control arrangements). Systems changes, such as staffing levels, require planning so that any changes can be implemented easily and quickly during a pandemic.
- **Premises** – all hospitals should be able to make significant expansions in their acute bed capacity and double the provision of critical care beds<sup>9 10</sup> within a one-to two-day period. In primary care,<sup>10</sup> extra capacity could be created for additional clinical contact opportunities through the suspension of health promotion and some chronic disease management clinics. As far as possible, non-flu patients should access and receive care in the ways in which they would do so in ‘normal’ circumstances (eg practice-based care). Influenza patients will need to be supported to remain at home, for example through home visiting and telephone assessment. Expansion of community hospital and continuing care capacity should also take place where possible.
- **Providers/provisions** – healthcare organisations should consider what their key vital supplies are and what is likely to be required to meet the surge in demand for emergency care. They should make provision for these items well in advance of the pandemic. However, certain commodities such as blood and blood components cannot be stockpiled, and reference should be made to the national plans<sup>11 12</sup>.
- **People** – healthcare organisations will need to determine and maximise the pool of skills they have at their disposal from their employed, reserve, trainee and volunteer staff, so that redeployment is managed to best effect. Detailed guidance on this can be found in *Pandemic influenza: Guidance on preparing acute hospitals in England* and *Pandemic influenza: Guidance for primary care trusts and primary care professionals on the provision of healthcare in a community setting in England*, available at [www.dh.gov.uk/pandemicflu](http://www.dh.gov.uk/pandemicflu); . Guidance on workforce issues is also available.<sup>13 14</sup>

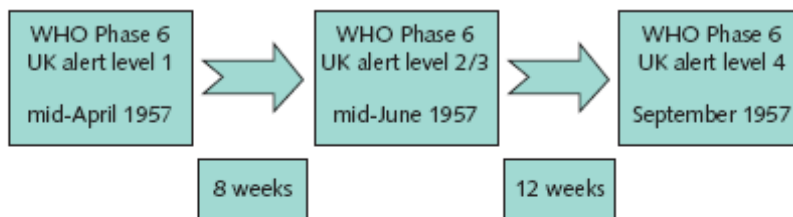
# 6 Concept of operations – a proposed operational response

## 6.1 Timing

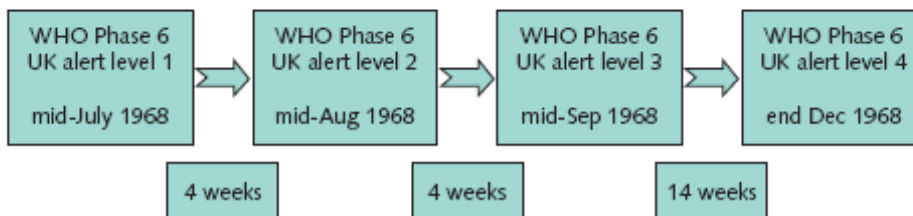
In planning the operational response to pandemic influenza, clarity around the signs or events that would trigger the implementation of demand and capacity plans, and some indication of the timing between each trigger, are important. Evidence from previous pandemics suggests that this will not be straightforward as it is impossible to forecast the precise characteristics, spread and impact of a new influenza virus strain.

Figure 3 illustrates the course of the 1957/58 Asian flu pandemic with the current UK alert levels; Figure 4 illustrates the 1968 Hong Kong flu pandemic similarly. These tables show a delay of weeks (12 and 18 weeks respectively) between the influenza being identified in the UK (alert level 2) and it becoming widespread (alert level 4).

**Figure 3: Course of the first wave, 1957/58 Asian flu pandemic**



**Figure 4: Course of the first wave, 1968/69 Hong Kong flu pandemic**



Current modelling suggests that, from the time a pandemic begins in the country of origin – likely to be in South-East Asia, the Middle East or Africa – it may take as little as two to four weeks to build from a few cases to around 1,000 cases and could reach the UK within another two to four weeks. Once in the UK, it could spread to all major population centres within one to two weeks, with its peak potentially only 50 days from initial entry to the UK.

This would give a range of seven to 18 weeks between UK alert levels 2 and 4. Furthermore, in the period after the first wave, the UK will probably be at UK alert level 2 for an indefinite period before renewed influenza activity causes a sudden escalation to UK alert level 3/4 or the World Health Organization (WHO) declares the pandemic over and there is a global move to WHO Phase 1 or 2.

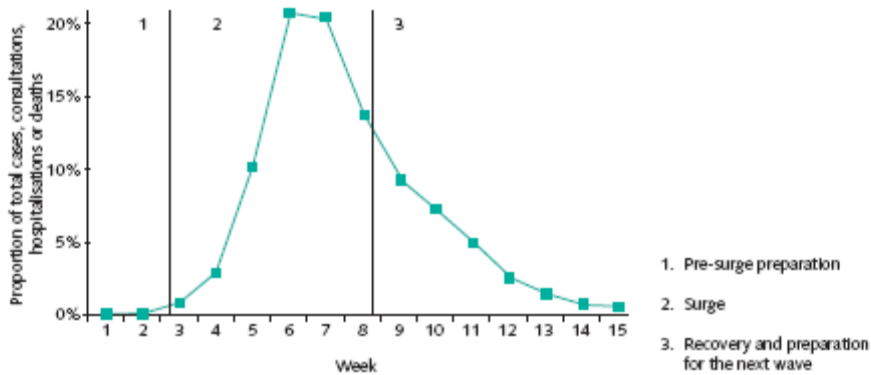
While the current UK alert levels are useful indicators of seminal events at a national level, they are probably not sensitive enough or specific enough to determine local operational responses. Knowing that the pandemic strain is in the UK (UK alert level 2) is a seminal event, triggering increased surveillance and preparedness; suspending elective surgery at this point could result in operations being deferred for a prolonged period in some regions and could give the feel of a 'phoney pandemic' to those involved. Whether an outbreak in a locality signifies the start of UK alert level 3 or 4 will be a matter of historical perspective.

## 6.2 Stages of managing increased demand and capacity (Surge)

From an operational perspective, a pandemic consists of three stages:

- **Pre- surge** – when UK alert level 1 is declared. It will continue into UK alert level 2. Even at alert level 3 there will be places unaffected and still in the pre- surge phase
- **surge** – when local triggers indicate the potential for a sudden escalation in patient numbers, eg an influenza death, an outbreak in a school or other institution or increased staff absence
- **Recovery** – when it is clear that local influenza activity is declining.

**Figure 5: The pandemic curve**



Source: *Pandemic flu: A national framework for responding to an influenza pandemic*

### 6.2.1 Pre-surge

General preparation for a pandemic and activation of business continuity plans would take place at WHO Phase 5; however, the declaration of UK alert level 1 would trigger the pre-surge preparation for the NHS. This would involve making sure that operational plans are tested; staff education, training and skilling up strategies are implemented; and stores and supplies are topped up. Surveillance would be enhanced and the algorithms on returning travellers developed by the Health Protection Agency would be widely distributed. Examples of the types of activity that might take place at this stage are listed in Table 3.

**Table 3: Examples of activities in the pre-surge stage, UK alert level 1**

#### Primary care

- Ensure that business continuity plans are in place and tested
- Normal local admission and referral criteria apply
- Consider identifying patients with chronic problems for review
- Initiate training/upskilling programmes for staff with specific pandemic support and cross-cover roles
- Update staff infection control guidance Outpatient referrals as normal Electives as normal Reinforce messages on self-care and how to protect and look after yourself

#### Secondary care

- Ensure that business continuity plans are in place and tested
- Normal local admission criteria apply
- Initiate training/skilling up for staff with specific pandemic support and cross-cover roles Update staff infection control guidance
- Some hospitals may wish to use this period to fast-track urgent elective procedures and investigations
- Links between district general hospitals and paediatric intensive care units should be reinforced and any extra training needs addressed

On the declaration of UK alert level 2, processes commenced in UK alert level 1 would continue but, in addition, surveillance should be intensified to allow the start of the surge to be identified locally, since the start of any local pandemic activity may differ by two to three weeks across the UK (Table 4). This stage would also see the activation of the arrangements and procedures for the assessment and management of people with influenza-like illness, as described in *Pandemic influenza: Guidance for infection control in hospitals and primary care*. See also *Pandemic influenza: Guidance for primary care trusts and primary care professionals on the provision of healthcare in a community setting in England* and equivalent guidance in the devolved administrations, for guidance on specific primary care access arrangements.

**Table 4: Examples of activities in the pre-surge stage, UK alert level 2**

**Primary care**

- Increase surveillance for influenza-like illness and ensure that reporting mechanisms and reporting of influenza-like illness are agreed and in place
- Reinforce infection control advice and procedures in consultation with strategic health authorities and the health departments of the devolved administrations. Consider suspending screening programmes and health promotion clinics to ensure that patients with chronic conditions are reviewed and any developing issues addressed
- Be prepared to switch to surge mode of operating at short notice Normal local admission and referral criteria would apply
- Reinforce messages on self-care and how to protect and look after yourself

**Secondary care**

- Increase surveillance for influenza-like illness and ensure that facilities and procedures for the triage, isolation, assessment and treatment of affected patients and their contacts are in place
- Reinforce infection control advice and procedures in consultation with strategic health authorities and the health departments of the devolved administrations. Consider suspending screening programmes and moving to symptomatic testing of suspected cancers
- Be prepared to switch to surge mode of operating at short notice Normal local admission criteria still apply

It should be recognised that the end of surge activities may represent the initiation of surge activities in other sectors e.g. social care. The planned reduction /cancellation of elective procedures may have implications for the continuation of domiciliary care services to some or hasten the need for care home placement for others.



## 6.2.2 Managing increased Demand and Capacity (surge)

For reasons described in section 6.1, the use of the UK alert levels beyond alert level 2 will be of limited value in determining when to introduce locally planned surge responses. It is likely that the activation of the this stage will be determined in consultation with Strategic Health Authorities in England It is likely that there will be two steps to the surge response:

- Initially, efforts will concentrate on expanding capacity: cancelling all elective procedures, dealing with emergencies only, early discharge and redeployment of staff. This is likely to offer increased capacity for only a few days.
- The second stage of the surge response will involve the introduction of prioritisation criteria and restrictions on treatment options – to be introduced when deemed necessary in the local setting. This should be introduced for as short a period as practicable, due to the nature of the restrictions.

It is important to remember that it is likely that over 40% of the total patient volume will occur over a two-week period at the peak of the pandemic. Examples of activities in the surge stage are given in Table 5.

### Table 5: Examples of activities in the surge stage

#### Primary care

- Business continuity plans activated
- Quality and Outcomes Framework in England and similar schemes in the devolved administrations suspended
- All but essential elective procedures cancelled
- Emergency admissions only introduce phased responses to any increasing demand Balance of probability for urgent referrals shifts from possible to probable, eg overt cancer signs
- End of Life care facilities supported and expanded if possible and feasible

#### Secondary care

- Business continuity plans activated
- Quality assurance and performance management frameworks and targets suspended
- All but essential elective procedures cancelled
- Phased admissions and treatments policy introduced and implemented as necessary End of Life care facilities supported and expanded if possible and feasible

### 6.2.3 Recovery

On the basis of previous pandemics, it is likely that the initial local surge will last for three to four weeks before there is evidence of patient numbers tailing off. The decision about the relaxation of prioritisation criteria will have to be made locally, according to resource availability and dictated partly by staff availability. It is likely that the priorities will be to restore pre-surge standards of clinical care in the emergency setting, followed by the gradual resumption of urgent and then non-urgent elective procedures (Table 6). During this recovery period, the emphasis will be on getting services back to normal, learning from the experiences of the first wave, refining the response and preparing for a potential second wave. However, this needs to be set against the situation where they may be many tired and bereaved people and large backlogs of annual leave.<sup>15 16</sup>

**Table 6: Examples of activities in the recovery stage**

#### Primary care

- Gradual relaxation of restrictions on admissions
- Phased reintroduction of general consultations
- Gradual reintroduction of non-emergency outpatient referrals and investigations  
Reintroduction of screening programmes
- Gradual reintroduction of quality assurance and performance frameworks and targets

#### Secondary care

- Gradual relaxation of restrictions on admissions and treatment policies
- Reintroduction of pre-pandemic standards of clinical care for emergencies
- Phased reintroduction of elective treatments and investigations
- Gradual reintroduction of quality assurance and performance frameworks and targets

## 6.3 Command and control

The command and control arrangements pertinent to an influenza pandemic are described in the *National framework*. However, there are specific decisions relating to operational issues that need clarification.

Any phased reduction of the quality and performance frameworks in primary and secondary care during pre-surge and surge periods would need to be agreed and understood in advance of the pandemic.

The trigger to activate surge plans should be authorised by Strategic Health Authorities<sup>17</sup>, taking account of the local epidemiology during the pandemic. Once activated, local escalation would occur in response to the demand for

healthcare and the availability of local resources. For example, suppose that during UK alert level 2, three outbreaks of influenza are identified in a locality in England. The Strategic Health Authority, local health services and Health Protection Agency will quickly convene to decide whether this indicates the beginning of the pandemic in the locality. If it is considered likely that the data indicate the beginning of the local surge, then a decision will be made about the area to which the activation trigger should apply and local health organisations will then move to this mode. Any further escalation of the response will be determined locally in the light of local influenza activity and the availability of local resources.

What will be essential in the pre-pandemic period will be discussion and agreement about who makes the decision in the locality around further escalation of the pandemic response after the surge been activated.

# 7 Service prioritisation

- Service prioritisation is an important component of Surge management.
- A whole-system approach must be taken in service prioritisation.
- Service prioritisation should be implemented in a phased way, to reflect the local availability of health care and social resources.
- Service prioritisation should be performed in an open and consistent manner across services.
- Service providers should identify ways to mitigate any negative impacts of having to defer services.
- Service providers should identify service-related actions to be taken as the pandemic progresses based on local, regional and national triggers.
- A robust mechanism should be in place to implement service prioritisation decisions within facilities.
- Clear documentation of service prioritisation decisions should occur.
- Generic checklists addressing issues of surge preparation should be augmented to include relevant local and regional factors.
- Specific provision for transportation should be developed in conjunction with appropriate providers

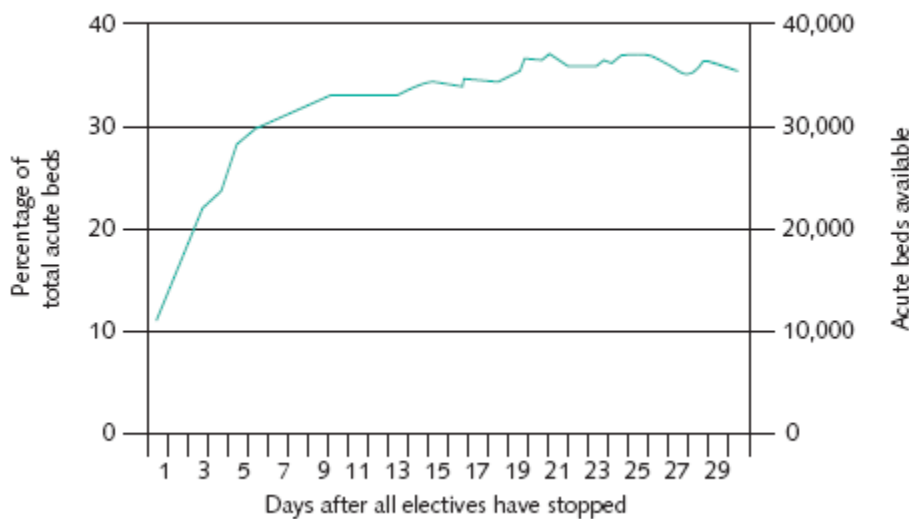
A key component of surge management is the identification in the pre-pandemic period of essential or priority services in health and social care organisations across all levels of care. This will then allow:

- The assessment of the potential gain in capacity by deferment of non-essential services,
- Staff training plans and staff deployment plans to be made to support prioritised services
- The impact of service prioritisation on other health and social care organisations will need to be considered

- Any negative impact of service prioritisation on potential service users to be minimised
- Optimal utilisation of limited resources during the pandemic.

For example, analysis has suggested that it would be possible to release almost 33% of the total acute bed capacity – over 30,000 acute beds in England – within five to ten days of any decision to cease elective work. This measure will not only increase bed availability but will also release staff.<sup>18</sup>

**Figure 6: Effect of stopping elective admissions on bed availability**



## 7.1 The Service Priority Assessment Tool

To facilitate the prioritisation process, a Service Priority Assessment Tool has been developed under the guidance of the multidisciplinary Service and Patient Prioritisation Project Board; a Service Prioritisation Assessment Tool has been developed. Its purpose is to facilitate the prioritisation process and it is based on the results of a workshop organised in collaboration with the Chief Scientist Office (Scotland).

It has been designed to aid service providers in the task of service and treatment prioritisation by:

- Setting out a range of criteria for the prioritisation of key services

- Identifying key interdependencies between services
- Identifying alternative or novel methods of service delivery during an influenza pandemic.
- Robust arrangements for transportation implications.

In order to facilitate the work of local and regional planners, national organisations (eg medical Royal Colleges and their faculties) have been asked to participate in the prioritisation of medical services. The prioritisation of services remains an ongoing process. Current details of the services prioritised can be accessed online. Local and regional planners should access the website to obtain the most up-to-date information, which can be adapted to local circumstances. Further details on how to use the tool are given in Appendix 3, and some examples from the College of Emergency Medicine are in Appendix 4.

### **7.1.1 Using the Service Priority Assessment Tool**

Prior to a pandemic, regional planners should ensure that they have available a locally agreed matrix of services with possible deferral periods and alternative ways of delivering care. For example, in the secondary care setting, the following issues should be addressed:

- elective inpatient work which can be deferred during a pandemic
- identification of any elective inpatient work that should be continued if possible
- which non-urgent admissions are essential to prevent subsequent mortality
- which non-urgent outpatient work can be deferred
- any components of long-term outpatient care which need alternative or modified delivery
- a mechanism for dealing with urgent new referrals.

Using the Service Prioritisation Assessment Tool, services can readily be grouped into broad categories appropriate to local planning needs, eg hospital services could be grouped into those dealing with:

- non-life-threatening conditions with no severe adverse health consequences if delayed
- non-life-threatening conditions with severe adverse consequences anticipated if delayed
- life-threatening conditions.

Using the prioritisation tool, planners should be able to:

- identify services which are prioritised to continue in a pandemic
- consider alternative modes of delivery for these services

- identify strategies to mitigate any negative impact of having to defer services
- identify key resources for delivery of prioritised services, eg blood and blood components
- identify staff available for redeployment to high priority services (from services with a 'low' priority for continuation in an influenza pandemic and other areas including non-priority NHS teaching and research).<sup>19</sup>

### 7.1.2 Service prioritisation interactions

Any decision to reduce or create a service needs to consider the potential impact this may have on other services across the health and social care system. For instance, availability of blood and blood components may impact on both the continuing provision of services and reintroduction of deferred services.<sup>20, 21, 22</sup>

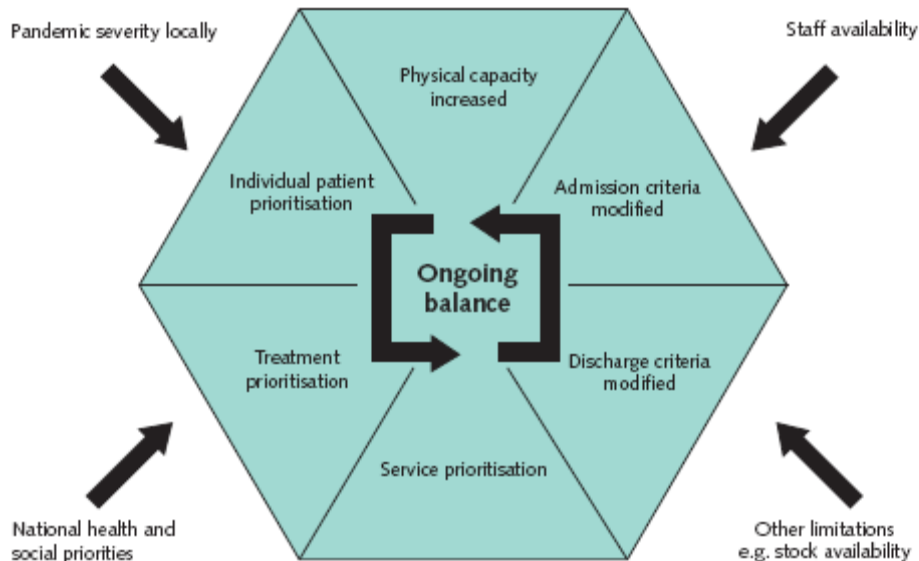
Therefore, issues of service prioritisation should be considered in conjunction with other changes to the health and social care system, which may have to be made in a pandemic, namely

- increasing physical capacity
- altering admission and discharge processes
- restricting the range of treatments offered
- prioritisation of patients for health and social care facilities.

Prioritisation will need to occur in primary and secondary care so that clinicians offering the highest levels of intervention do not become the only clinicians making decisions around clinical priorities.

The interplay between these surge strategies will depend on a range of factors, including the severity of the pandemic, local demand for services and national guidelines as illustrated in Figure 7. The most stringent measures should be instituted for as short a period as possible, and only when other options have been considered.

**Figure 7: The interplay between elements of the surge capacity strategy**



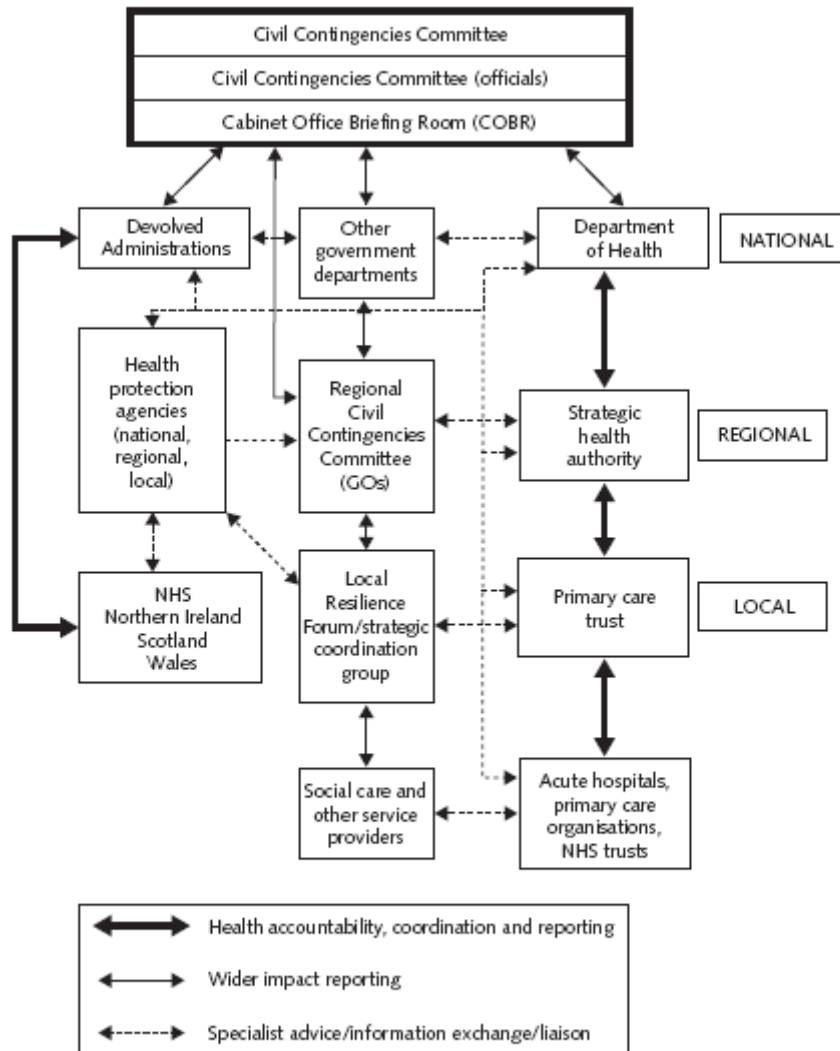
In the event of an influenza pandemic in which demand greatly exceeds resources, a major shift in the service provision of the NHS would need to occur. This could result in services that may require intensive technological or staff input not being offered, even if prioritised for delivery and are potentially life saving.

## 7.2 Facility-based plans

Pandemic flu preparations should build on familiar procedures for emergency responses. Previous experience with severe winter pressures may also be useful in developing appropriate plans. The communication of information between providers in the health and social care setting, and to regional and national command and control systems will be critical (Figure 8).



Figure 8: Reporting



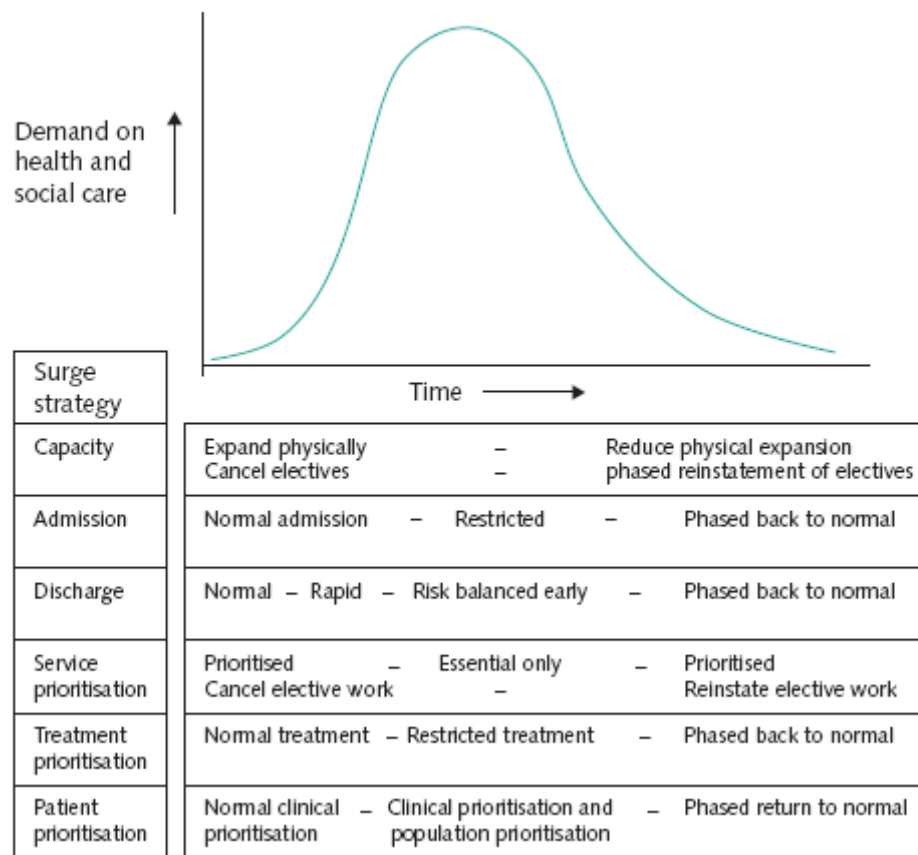
Source: *Preparing for Pandemic Influenza: Guidance to Local Planners*. London: Civil Contingencies Secretariat, Cabinet Office, 2008. [www.ukresilience.gov.uk/pandemicflu/guidance/~/\\_media/assets/www.ukresilience.info/flu\\_lrf\\_guidance1%20pdf.aspx](http://www.ukresilience.gov.uk/pandemicflu/guidance/~/_media/assets/www.ukresilience.info/flu_lrf_guidance1%20pdf.aspx)

It is unlikely that measures such as increasing capacity and prioritising services will be sufficient, on their own, to meet patient demands during an influenza pandemic. Additional measures to control the demand for hospital and community services will be needed (Figure 9, Table 7). Such measures may include:

- Prioritisation of patients for access to primary, hospital and critical care facilities
- Rapid early discharge

- Restrictions on the range of treatments available
- Restrictions on some preventive interventions and screening. The more stringent measures may have profound consequences for patients and should therefore be instituted only when necessary and for as short a period as possible.

**Figure 9: Surge strategy components over time**



**Table 7: Service strategies and actions based on local demand** (Adapted from Ontario Health Pandemic Influenza Plan, 2005)

DH: Department of Health, DAs: Devolved Administrations, HPA/S: Health Protection Agency/Health Protection Scotland

PSI (Pandemic Severity Index) is either WHO based, or based on national assessment of the likely impact based on experience in other countries.<sup>23</sup>

The local/regional/national decision maker is country-specific; eg for England this could be Primary Care Trusts, Strategic Health Authorities and the Department of Health respectively, whereas in Scotland, local decisions would be made at NHS board level and regional decisions at Scottish Government level.

Surge level	UK alert level	Strategies and actions	Decision maker	Triggered or informed by
Pre-surge	1	<ul style="list-style-type: none"> <li>• Normal staffing</li> <li>• Clinics and consultations as normal</li> <li>• Normal beds open</li> <li>• Revise patient management protocols</li> <li>• Revise admission criteria</li> <li>• Ensure that whole systems approach across health and social care is adopted</li> </ul>	<p>Local</p> <p>Local</p> <p>Local</p>	<p>DH, DAs with HPA/S</p> <p>DH, DAs with HPA/S</p>
Pre-surge, anticipatory	1	<ul style="list-style-type: none"> <li>• Identify any expansion capacity e.g. clinic space, beds</li> <li>• Modification of selected performance targets</li> <li>• Start deferral of non-essential or elective work to generate staff capacity for training</li> <li>• Bring forward anticipatory work</li> <li>• Ensure health care and social services linking</li> </ul>	<p>Local</p> <p>Regional</p> <p>Regional</p> <p>Regional</p> <p>Local</p>	<p>UK Alert Level 1</p> <p>National</p> <p>PSI</p> <p>PSI</p>

Surge level	UK alert level	Strategies and actions	Decision maker	Triggered or informed by
Surge – low	2–4	• Cancel clinics, elective surgery and inpatient admissions where no severe adverse effect anticipated	Local	Regional and national
		• Augment capacity, e.g. open closed beds, palliative care	Local	PSI
		• Use of flu treatment guidelines for admission	Local	PSI, level 2
		• Further modification or suspension of selected performance targets	Regional	National level 2
		• Essential care only when required	Regional	National level 2
		• Use alternative settings for intensive care unit (ICU) care (upgrade level 2 beds to level 3)	Local	PSI
Surge – medium	2–4	• Defer some services/ treatment for non-life-threatening conditions	Regional and local	Level 3, PSI, local HPA/HPAS input
		• Clinical care practices adopted to maximise capacity	Local	Level 3
		• Ensure rapid discharge	Local	Level 3
		• Modified flu treatment guidelines for admission	Local and national	Level 3 Clinical, HPA/HPAS
		• Adjust staff–patient ratios	Local	PSI
		• Increasingly stringent triage for ICU	Regional	ICU networks
		• Restricted treatment options in ICU	Regional	ICU networks

Surge level	UK alert level	Strategies and actions	Decision maker	Triggered or informed by
Surge – high	2–4	<ul style="list-style-type: none"> <li>• Defer all services/treatment for non-life-threatening conditions</li> <li>• Increasingly stringent triage for ICU</li> <li>• Restricted treatment options in ICU</li> <li>• Alternative care settings</li> </ul>	Regional	ICU networks
			Regional	
			Regional	
			Local	
Surge – extreme	2–4	<ul style="list-style-type: none"> <li>• No more capacity</li> <li>• Maintain services for life-threatening conditions</li> <li>• Triage for all treatment</li> <li>• Mass emergency care</li> </ul>	Regional	
			Regional	
			Regional	
			Regional	
Surge – early recovery	3–4	<ul style="list-style-type: none"> <li>• Graded resumption of non-emergency care</li> <li>• Return to normal admission and discharge criteria</li> <li>• Return to normal staffing</li> <li>• Identify priorities for 'catch-up' on deferred services and treatments</li> </ul>	Local	Regional with input from local services, surveillance data (HPA/HPAS)
			Local	Regional
			Local	Regional
			Local	Regional
Late recovery		<ul style="list-style-type: none"> <li>• Phased reinstatement of performance targets</li> <li>• 'Catch-up' on deferred services and treatments</li> <li>• Prepare for next wave</li> </ul>	Regional	National
			Local	
			Local	

Within facilities, a mechanism is needed whereby information relevant to service prioritisation can be assessed and turned into action. The mechanism for this process is best decided locally, but one way of achieving this is through a 'service prioritisation group'. Roles to enable prioritisation decisions to occur in the facility should be clearly identified to guide appropriate membership of the group. For example, in a general practice, a service prioritisation group might

consist of a practice manager, nurse and GP and community pharmacists; in an acute hospital, a service prioritisation group might have representation from senior management including operational delivery, medical, nursing and pharmacy staff, and infection prevention and control. Key actions to be addressed would include:

- ensuring that elements contributing to the demand and capacity (surge) response are appropriately balanced to minimise harm
- adapting protocols for demand and capacity management as required
- ensuring that frontline staff or triage officers are aware of any restrictions in operation
- communicating prioritisation decisions to local or regional centres as appropriate.

Clear recording of assessments and decisions taken will help avoid confusion and ensure consistency at a time of significant disruption.

A generic checklist (appendix 5) has been provided which addresses some of the broad issues relating to surge preparation that may be faced locally in health and social care organisations. Service providers may wish to adapt and add to this for their own planning purposes, taking into account central and local pandemic coordination arrangements relevant to their geographical area. The needs of any patient or client populations, which may be disproportionately affected during a pandemic, should be specifically considered.

### **7.3 Implementation of service prioritisation at a national and local level**

National agreement on the prioritisation process will give:

- reassurance of a consistent clinical approach across England
- transparency and clarity of the approach to be adopted
- public and professional discussion and sign-up in advance of a pandemic
- support for clinicians during the pandemic
- an opportunity for appropriate indemnity and professional support to be agreed and in place beforehand.

However, even with the support of these tools or policies, primary and secondary healthcare services will have to take on the role of implementing the national

guidance across their local health community in a commonly agreed and consistent manner.

Prior to the pandemic, health and social care provider organisations should have identified the services that they provide, prioritised their services and planned alternative mechanisms of service delivery where necessary. This work will need to be undertaken, in coordination with other local providers, through existing local and regional health and social care forums to ensure a joined-up, consistent approach. Health authorities/boards will have a key role to play in ensuring that health services across all levels of care are prepared.

# 8 A model of levels of care

- Service providers should take a ‘whole systems’ approach to the management of health care services during a pandemic.
- Use of a stepped level of care model can facilitate a whole systems approach to managing access to appropriate levels of care.

In developing demand and capacity plans in the context of pandemic influenza, there are three interrelated elements to consider:

- the physical aspects of creating extra capacity, i.e. creating space, providing staff, supplying resources and/or managing the process
- prioritising services to release capacity
- prioritising patients and clinical interventions to control demand.

These three elements will be present to a variable extent in the surge response, depending on the magnitude of the challenge and the resources available.

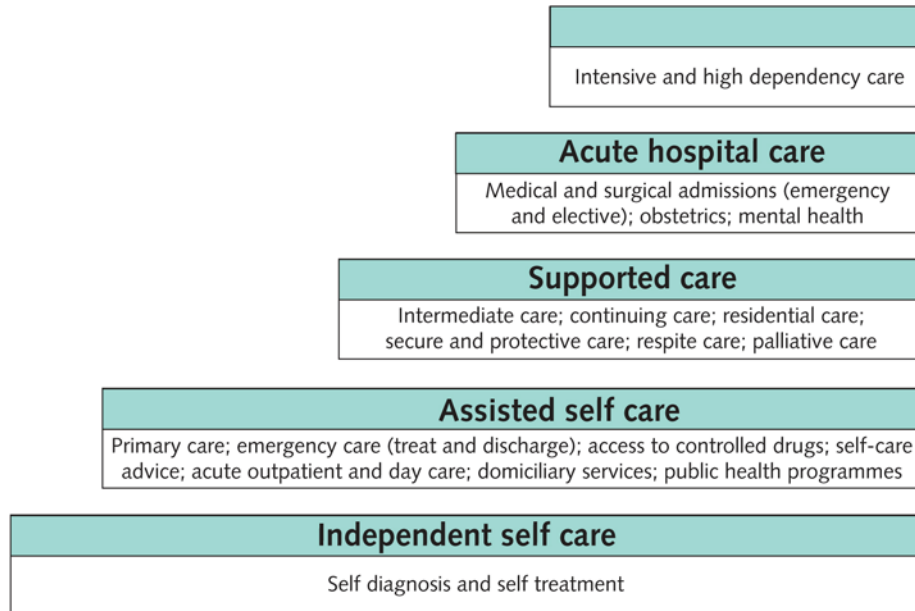
A whole-systems approach to the provision of healthcare services is essential in a pandemic. A stepped level of care model has been developed to help planners and service providers adopt this approach. This will enable them to better understand and mitigate any potential adverse effects of proposed altered service provisions.

The stepped level of care approach to the integrated management of healthcare services during a pandemic is based on a series of levels of care ranging from independent self-care through to critical care (Figure 10). In this simple model, a step up in level reflects an increasing resource requirement per patient or client and a decreasing service capacity. Some of the features associated with each level of care, and possible locations of such care, are illustrated in Figure 11. Initially in a pandemic, it may be possible to increase capacity in line with increased demand. However, as a pandemic develops, healthcare organisations will need to promote and facilitate the use of less resource-intensive levels of health care, and potentially restrict access to more resource-intensive levels of care. General practice will play a pivotal role in providing and coordinating community-based health services in a pandemic, and in managing the flow of patients to secondary care services, care homes and other residential settings.



**Figure 10: Levels of care**

The resource requirement per patient/client increases with each step while the relative service capacity decreases with each step.



**Figure 11: Levels of care, features and locations**

Level	Features	Locations
<b>Independent self care</b> Self diagnosis and self treatment	<ul style="list-style-type: none"> <li>• Within individuals' knowledge/experience/capability</li> <li>• Home and over-the-counter remedies</li> <li>• Minor ailments/minor trauma/'known' conditions</li> <li>• Supported by self-service healthcare information</li> <li>• Supported by family and friends</li> </ul>	<ul style="list-style-type: none"> <li>• Home/work/leisure settings</li> <li>• Community pharmacy</li> <li>• Supermarket</li> <li>• NHS Direct/NHS 24</li> </ul>
<b>Assisted self care</b> Primary care; emergency care (treat and discharge); access to controlled drugs; self-care advice; acute outpatient and day care; domiciliary services; public health programmes	<ul style="list-style-type: none"> <li>• Beyond individuals' knowledge/experience/capability</li> <li>• Supports individuals' independence</li> <li>• Emergent and managed conditions</li> <li>• May require specialist consultation/intervention</li> <li>• May involve controlled medicines</li> <li>• Comparatively low staff/patient ratios</li> <li>• Formal/informal/voluntary carers</li> <li>• Includes telemedicine and remote assessments</li> <li>• Includes immunisation, screening, public education and protection programmes</li> </ul>	<ul style="list-style-type: none"> <li>• At home (including sheltered accommodation)</li> <li>• Primary care practices</li> <li>• Community pharmacy</li> <li>• Community hospitals</li> <li>• Emergency departments</li> <li>• Acute hospitals</li> <li>• NHS Direct/NHS 24</li> <li>• Mobile units</li> <li>• Community clinics</li> </ul>
<b>Supported care</b> Intermediate care; continuing care; residential care; secure and protective care; respite care; End of life care	<ul style="list-style-type: none"> <li>• Individuals with reduced independence</li> <li>• Involves an overnight stay in a facility at minimum</li> <li>• Longer-term care</li> <li>• Low to intermediate staff/patient ratios</li> </ul>	<ul style="list-style-type: none"> <li>• Community/cottage hospitals</li> <li>• Care homes</li> <li>• Nursing homes</li> <li>• Respite and hospice facilities</li> <li>• Acute hospitals</li> <li>• Step-up and step-down facilities</li> </ul>
<b>Acute hospital care</b> Medical and surgical admissions (emergency and elective); obstetrics; mental health	<ul style="list-style-type: none"> <li>• Involves an overnight stay at minimum</li> <li>• Requires specialist intervention and acute care</li> <li>• Intermediate to high staff/patient ratios</li> </ul>	<ul style="list-style-type: none"> <li>• A&amp;E departments</li> <li>• General medical and surgical wards in acute hospitals</li> <li>• Maternity units</li> <li>• Mental health facilities</li> </ul>
<b>Critical care</b> Intensive and high-dependency care	<ul style="list-style-type: none"> <li>• Life support</li> <li>• Organ support</li> <li>• High to very high staff/patient ratios</li> </ul>	<ul style="list-style-type: none"> <li>• Specialist facilities in acute hospital settings</li> </ul>

# 9 Admission to, utilisation of and discharge from services

- Capacity in services can be created through the active management of admissions and discharges in conjunction with prioritisation of services
- Service providers should use admission assessment tools appropriate to their service to help place patients or clients in the appropriate level of care. Within the critical care setting, Sequential Organ Failure Assessment (SOFA) scoring may be used to guide access and discharge from intensive care.
- The ethical framework for pandemic planning should be used to guide decisions on admission and discharge from services.
- If demand exceeds resources, and alternative means of increasing capacity have been exhausted, specific inclusion and exclusion criteria may be required to limit access to a service.
- Restrictions on access to services should occur for as short a period as possible, and efforts made to mitigate any adverse impact on the individual affected.
- The ongoing need for a service by an individual will need to be regularly reviewed.
- Services should have robust mechanisms for prompt discharge of individuals no longer requiring that level of care.
- During a pandemic, the threshold for discharge from a service may need to be altered – ‘reverse triage’.
- Joint health and social care planning is required to address the intermediate care needs of individuals

Maintaining demand and capacity in the health and social care system is clearly a key step in response to pandemic flu but physical measures to increase capacity are likely to be relatively limited. Increasing capacity through the prioritisation of services has already been discussed in chapter 7. However, in conjunction with prioritisation of services, another way of creating capacity is through careful management of admissions and discharges.

Between 16 percent and 52 percent of non-elective admissions to hospital are not considered to be appropriately placed.<sup>24</sup> This implies that the care could have been provided in other settings, for example in primary care. Up to 10 percent of total bed days in some hospitals are utilised by patients awaiting diagnostic assessment in the acute phase, a situation which would be particularly inappropriate in a pandemic

Using the stepped level of care model discussed in the previous section, a generic approach can be taken to the key issues of:

- access or admission to a service or level of care
- ongoing utilisation of and discharge from a service or level of care.

## **9.1 Access to a service or level of care**

During a pandemic, the routine admission threshold for a service or level of care has two elements:

1. A patient or client must, as a minimum, meet all the criteria that would normally be used to determine access to the service when there is no pandemic; and
2. The service must be running.

However, if a number of services have been deferred, the routine admission threshold may need to be raised so that care can be rationed. With increasing demand, the introduction of specific inclusion and exclusion criteria for levels of care may also be necessary. One major problem with trying to raise admission thresholds is that there is no commonly accepted universal scoring system, which can be applied across different illnesses. One approach that service providers should consider is the use of generic admission assessment tools in combination with illness specific admission tools, where appropriate. The use of any severity assessment tool does not replace clinical judgement but will aid the decision-making process.

### **9.1.1 Generic admission assessment tools**

Service providers should use generic admission assessment tools appropriate to their service to help guide the placement of patients or clients in the appropriate level of care. Although these protocols are not designed for 'gate keeping' processes, they may help bring in to focus the reasons for and expected patient benefits from admission, and the potential to achieve this benefit at a lower level of care. A few examples of the tools available for different levels of care are

discussed below. At the acute level of care, a number of tools exist to evaluate the appropriateness of acute hospital admission and stay in adult and paediatric practice. There are several protocols available including the modified Appropriateness Evaluation Protocol (AEP), Oxford Bed Study Tool, Milliman USA and InterQual Severity Discharge Criteria.<sup>25, 26</sup>

The AEP for use in adult practice is based on the level of service provided and factors associated with severity of illness (appendix 6). An adult version of the AEP has also been proposed for use in community hospitals<sup>27</sup> (appendix 7). Similar tools exist for use in paediatric practice<sup>28,29</sup>. To date, these tools have been used primarily in the analysis of factors that lead to 'inappropriate admission'. To minimise paperwork during a pandemic, an aide-mémoire of selected AEP parameters on admission checklists could be used.

Within the critical care setting, SOFA scoring<sup>30</sup> may be used to guide access to and discharge from intensive care and is discussed further in chapter 10 on critical care.

The Decision Support Tool for NHS Continuing Healthcare<sup>31</sup> is designed to ensure that a range of factors that have a bearing on the quality and quantity of care required to meet an individual's needs are taken into account when deciding on the need for healthcare. It considers an individual's needs across 11 domains, namely behaviour, cognition, psychological and emotional needs, communication, mobility, nutrition, skin and tissue viability, breathing, drug therapies and medication, and altered states of consciousness. In a pandemic, the tool could be used to help health and social services focus resources for maximum population health gain.

Following Hurricane Katrina, a patient classification scheme related to community care has been proposed, in which patients are classified into priority groups (appendix 8)<sup>32</sup>. Using such an approach can again focus attention on the specific elements of the service being provided, and the implications of service restrictions.

Health care providers should be aware of the need for transparency for the public in their decision-making approach to admission of patients during a pandemic.

### 9.1.2 Illness specific admission tools

During a pandemic, there may be patients who are either too ill or not ill enough to benefit from a specific level of care. If the available resource is insufficient for demand then scoring above the routine admission threshold value may not be the sole consideration in determining admission, but scoring below the routine admission threshold without other clinically mitigating factors would not justify admission.

A number of medical specialties already apply illness specific scoring systems in conjunction with clinical judgement to determine access to services eg pneumonia and CURB-65 (appendix 9). These illness specific scoring systems may also be of benefit in a pandemic.

One of a range of physiological 'track and trigger' systems whose use is being promoted in acute hospital settings is the Modified Early Warning Score.<sup>33</sup> An adaptation of this, the P-MEWS score<sup>34</sup> has been proposed as a method of assessing severity and assisting triage from primary into secondary care inpatients with community-acquired pneumonia (appendix 9). It includes physiological data for a MEWS-type score and patient data – age over 65, social isolation, chronic disease or impaired performance status. The use of these types of scores may permit national or regional setting of admission criteria based on physiological derangement.

Current admission criteria for influenza in adults and children are described in *Clinical management of patients with an influenza-like illness during an influenza pandemic*<sup>35</sup> (appendix 10). As a pandemic develops, information from clinical surveillance and outcome schemes will be used to modify criteria for admission and management of patients with influenza as appropriate.

The Department of Health is currently working with Clinical Reference Groups to develop outcome tools to support clinicians in their decision making in primary and secondary care services. These will be available in summer 2009.

Robust communication structures should be in place to disseminate guidance on the use of both generic and illness specific admission tools, as the use of such tools in a pandemic is an area of ongoing research and development.

### 9.1.3 Use of inclusion and exclusion criteria

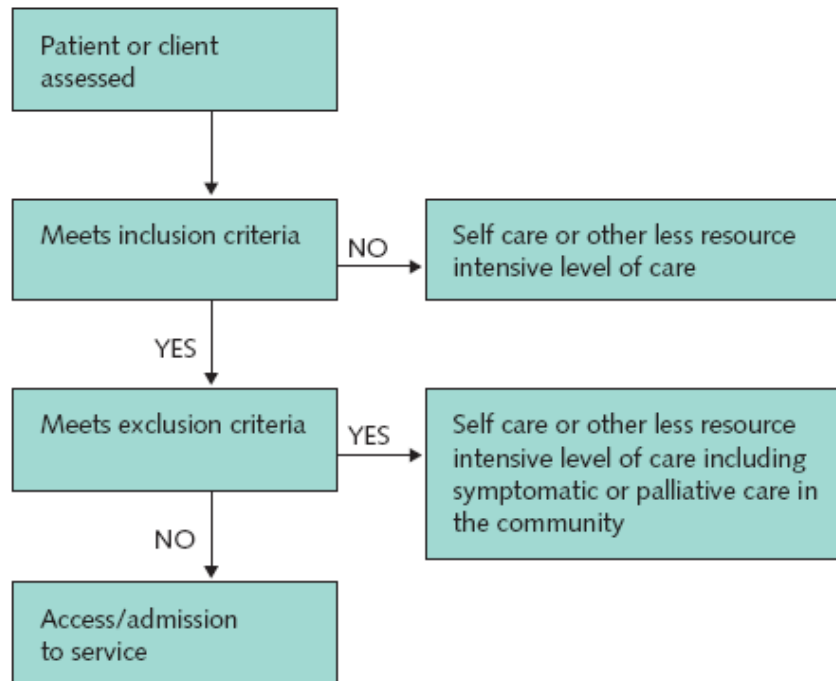
If a service is functioning, but the available resource is insufficient for demand, and alternative means of increasing capacity have been exhausted, then access to the service may have to be temporarily restricted through prioritisation of patients. This can be done through the application of inclusion and exclusion criteria for levels of health care. If the patient or client:

- meets certain inclusion criteria for access to the service
- does not meet exclusion criteria for access to the service, then the patient or client would gain access to the service if the service had been prioritised to run and capacity existed (Figure 12). Where possible, efforts should be made to mitigate any adverse impact to the patient or client who is excluded from the service.

Inclusion and exclusion criteria may need to be altered as pandemic progresses, to allow matching of resources to a national or local demand. Healthcare organisations should have a robust mechanism for dissemination of such criteria, and ensure that healthcare staff can apply them, should such restrictions become necessary.

It is currently not feasible to have a detailed list of exclusion criteria for all aspects of healthcare services. Even within the acute hospital care sector, no single, cross-specialty, objective scoring system exists which can generate a score to guide exclusion from admission. Further work is required to see if outcomes from disease specific scoring systems can be equated, so that e.g. individuals with scores associated with high mortality receive symptomatic and end of life care only.

**Figure 12: Patient or client assessment for access/admission to a service when inclusion and exclusion criteria are in operation**



Currently, exclusion criteria have been proposed for admission to secondary care from primary care and accident and emergency care, and admission to critical care<sup>36</sup> from secondary care (appendix 11). These focus on excluding those who:

- have, with an underlying illness, a poor prognosis even without the concomitant acute illness which has resulted in the presentation to the service e.g. those with advanced cancer, immunosuppression, end stage organ failure of the heart, liver or lungs
- have a poor prognosis or chance of survival even if they receive the treatment
- require a level of resource that cannot be met in a pandemic.

An essential element of this approach is the availability of facilities within either the secondary care or the primary and social care sectors to support and comfort those people for whom no further interventions are considered appropriate. Issues relating to this are discussed in chapter 13 on end of life care.

In the most extreme situation, where there are competing patients for insufficient resources, allocation of treatment will be required to be made by a clinical selection process taking into account the principles of the ethical framework (see appendix 2) .

This should only take place after assessment of:

- the patient's need for the resource
- their potential to return to their baseline health state
- the overall resource needs of the patient
- the underlying health and prognosis relating to the underlying disease.

An incremental approach to the restriction of services and the prioritisation of patients is vital, and must be tailored to the severity of the pandemic to minimise any potential harm.

Ardagh has proposed a set of questions to help clinicians prioritise access to healthcare resources, which have one or more competing patients (Table 8).<sup>37</sup>

**Table 8: Prioritising access to healthcare**

1. Would this patient meet the clinical criteria for this treatment during normal times? (That is, when there is not overwhelming demand for the resource.)
2. Is this treatment the most beneficial form of treatment for this patient?
3. Does this patient require this treatment immediately? (That is, it is not possible for this patient's treatment to be safely deferred.)
4. Could capacity to deliver this service be expanded to treat this patient, with only minimal disadvantage to others?
5. Is it impossible to mitigate the negative effects for this patient of missing out on this treatment?
6. Can this patient be ranked highly enough based on benefit from this treatment?
7. Can this patient be ranked highly enough based on order of presentation?
8. Can this patient be ranked highly enough based on random selection?

## 9.2 Ongoing utilisation of a service or level of care

The need for ongoing utilisation of the service must be regularly assessed. As already discussed, a number of tools exist to evaluate the appropriateness of acute hospital admission in adult and paediatric practice. The modified AEP can also be used to determine the appropriateness of utilisation of an acute hospital bed using the 'day of care' criteria (appendix 6). Healthcare staff should use these sorts of tools to focus on the level of service being provided, and whether this level is still required or if a less intensive level of care is more appropriate.

If demand for healthcare is of a level at which exclusion criteria are in operation, these criteria should apply not only to those seeking access to a service, but also to those currently using the service.

If the individual's condition has changed such that:



- they now meet exclusion criteria for access to the service, and
- there is insufficient capacity to accommodate all those competing for the resource,

Then they should no longer receive that service if there are others who meet the inclusion criteria and do not meet the exclusion criteria.

An example of how the approach to ongoing utilisation of a service might be applied to acute hospital care at the peak of a severe pandemic, when inclusion and exclusion criteria are in operation, is shown in Figure 13 and discussed below.

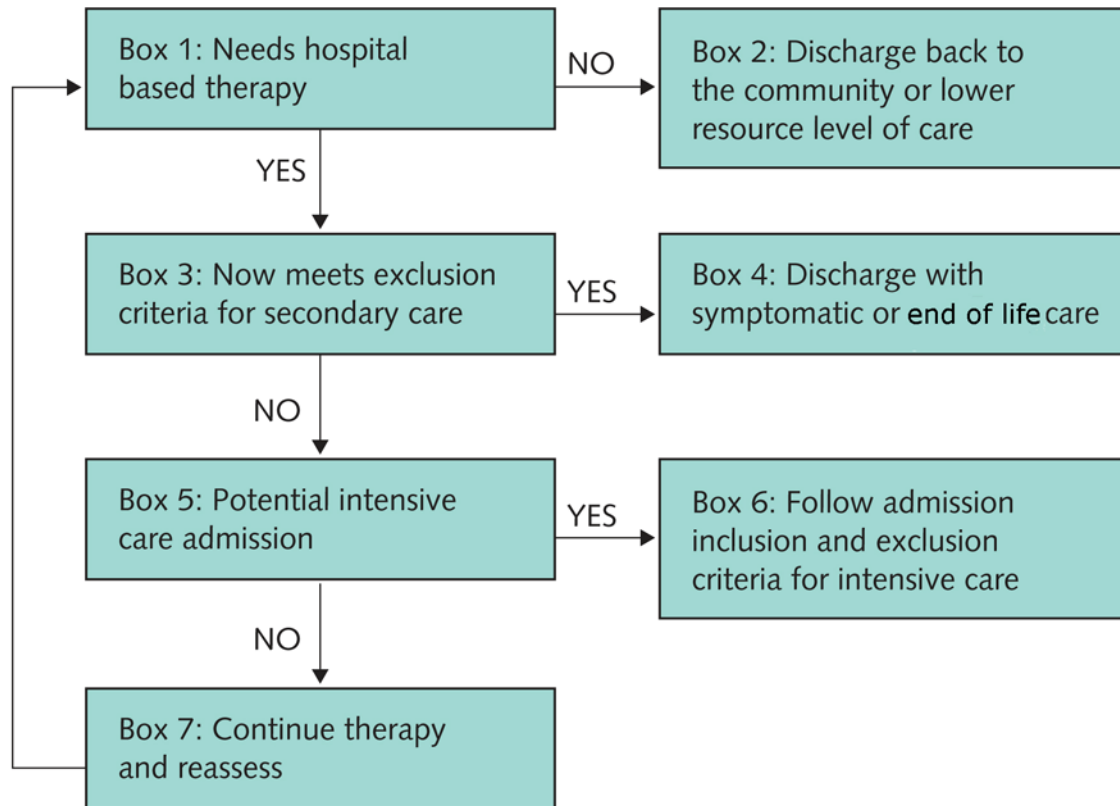
Box 1: After meeting the criteria for admission to secondary care and treatment is commenced, it is important that each patient should have regular, formal periodic assessments to determine whether they are fit enough to be discharged (Box 2) or need ongoing treatment.

Box 3: If an inpatient's condition has changed such that they would now meet the exclusion criteria for secondary care, they should be discharged with symptomatic or end of life care (Box 4).

Box 5: If a patient is not responding to treatment, or deteriorating despite treatment, referral to critical care may be required. If so, the inclusion and exclusion criteria for admission from secondary care to critical care should be applied (Box 6). Otherwise, therapy is continued (Box 7) and the patient reassessed at an appropriate time interval.

### Figure 13: Example of the use of inclusion and exclusion criteria

Patient assessment for ongoing secondary care when inclusion and exclusion criteria are in operation.



### 9.3 Discharge from a service or level of care

A range of discharge strategies may be required during a pandemic (illustrated in Figure 9, chapter 8). Following assessment of an individual, it may be clear that they no longer require the service and therefore can be discharged. Discharge guidelines for adults and children with pandemic flu are described in *Clinical management of patients with an influenza-like illness during an influenza pandemic* (appendix 10)<sup>38,39</sup>.

Prompt or rapid discharge from high-level resource facilities will be vital during a pandemic. This can only be achieved through good liaison with other partner agencies both before and during a pandemic. All service providers must address mechanisms to ensure that rapid discharge of patients/clients can occur during a pandemic. Due attention should be paid to vulnerable patient/client groups and local geographical constraints in the planning process.

With increasing pressure on services during a pandemic, there may be insufficient capacity to accommodate all those competing for the resource. The

threshold for discharge from a service may then need to be altered. Wherever possible, action should be taken to mitigate any negative effects from an altered threshold for discharge.

As a pandemic progresses, the identification of patients or clients for safe early discharge from the service – so-called ‘reverse triage’ or ‘risk-balanced early discharge’ – may be necessary. Reverse triage in the hospital setting has been discussed, as a means of allowing a refocus of resources to those in even greater need<sup>39</sup>.

*‘During overwhelming disasters, health systems must be considered lifeboats with insufficient capacity to minister to all, and thus decisions regarding who is best served by the lifeboat must be made. Under this tenet, inpatients, disaster victims, and others with acute care needs must be considered on equal terms and compete for limited resources.’<sup>40</sup>*

The underlying principle of reverse triage is that the potential medical benefits to incoming patients should ideally be greater than the potential risks of not receiving care for those discharged. A pandemic may necessitate such an approach to patient care in the health and social care arena. With such an approach, there has to be a level of risk tolerance of a consequential medical event as a result of discharge. An event may occur for a wide range of reasons including medical deterioration of the patient, a new medical problem or the untoward effect of the withdrawal of a continuing treatment.

Even under routine conditions, up to 19 percent of patients in the two-week period following hospital discharge experience adverse events<sup>41</sup>. Kelen et al. have proposed a system of patient categorisation, developed by an expert panel based on risk tolerance relating to a consequential medical event (appendix 12)<sup>42</sup>. Such an approach may help in maintaining a population perspective on the balance between restriction of admission to a service and early discharge from a service.

The concept of cessation of certain services from one group of patients to favour another group is a difficult one for many health and social care professionals whose focus in normal practice is on the welfare of the individual patient or client.

It is important to remember the key points of the underlying ethical framework for pandemic planning, which are that:<sup>43</sup>

- 1. Everyone matters**
- 2. Everyone matters equally – but this does not mean that everyone is treated the same**
- 3. The interests of each person are the concern of all of us, and of society**
- 4. The harm that might be suffered by every person matters, and so minimising the harm that a pandemic might cause is a central concern.**

Dependent on the magnitude and duration of a pandemic, the accepted routine standard of care may change to a 'sufficiency of care'; that is, the standard of care is different to that delivered under non-emergency conditions, but is sufficient for need.

## **9.4 Alternative provision of care**

Alternative provision of care at a less resource intensive level is the preferred option for those who do not gain admission to a service. NHS organisations may want to discuss with their Independent Sector healthcare providers plans for alternative provision of care in a pandemic. Wherever possible, action should be taken to mitigate any negative effects from failing to gain access to a service. It is recognised that most ill people will remain at home with such support as relatives/neighbours/friends/ volunteers and health and social care can give, but that some will be unable to do so. This will be especially true for those who are unable to care for themselves and do not have family members/friends/carers ('flu friends') able to support them in remaining at home.

Unless some form of support is available in the community for people who are unable to self-care or access care from their own homes, then it is likely that:

- Patients in the secondary care setting will not be discharged rapidly
- Patients not considered a priority for hospital care will have nowhere to go
- Primary and secondary care services will rapidly become overwhelmed.

The option of some form of accommodation or facility for the provision of intermediate care, (covering the aspects of care normally given by these services) should therefore be considered. This will require planning in the context of local needs and available resources, with close liaison between healthcare and social services.

# 10 Critical Care

- Critical care services should be able to expand capacity by 100%.
- ‘*Phased Responses*’ provides a framework for considering the implementation of phased response patterns and triage for the care of critically ill patients.
- The decision-making processes around the withholding/withdrawal of care should be fully documented.

The following guidance has been produced in conjunction with the Intensive Care Society.

## 10.1 Building capacity

Existing guidance on expanding critical care capacity<sup>44</sup> recommends a target of a 100% increase from normal bed availability, though it is clear that this is still unlikely to be sufficient to meet all demand. This is recognised by the guidance:

‘In planning for this expansion of capacity, it must be recognised that only a basic or limited level of critical care may be possible. Local circumstances, including access to additional ventilators and the layout and proximity of facilities – such as the size of the normal elective workload or the location and size of facilities such as post recovery areas – will mean that some services may not be able to identify as much potential additional capacity as others.

‘Modelling has been undertaken to examine the impact of a variety of scenarios involving pandemic influenza. It is clear that in the worst-case scenarios services, including critical care will not be able to provide the usual standards of care. Therefore, in seeking to identify additional capacity including independent providers, NHS critical care services should take into account that it is assumed that all but the most urgent scheduled care will have been suspended and that it is anticipated that care in additional capacity will be at a basic level only with levels of staffing appropriate to an emergency. In these circumstances, it is understood that ways of working and clinical practices may have to be adapted but should be sustainable for a period of up to three months.

To support this guidance, ‘*Phased Responses*’ has been developed by the Intensive Care Society with contributions from the expert

working group and is helpful advice that can be applied during an emergency including pandemic influenza. 'Phased Responses' provides a framework for considering the implementation of phased response patterns and triage for the care of critically ill patients in the event of an emergency.<sup>45</sup>

The Intensive Care Society document on 'Phased Responses' (extract in appendix 13) has been published in the *Journal of the Intensive Care Society*.<sup>46</sup>

## 10.2 Admission and discharge criteria in the critical care setting

Despite such expansion plans, the potential number of referrals to critical care is likely to exceed bed availability. Calculations based on the *National framework*<sup>47</sup> suggest that even if existing critical care bed capacity can be maximally escalated, during the peak of a pandemic there may be ten times as many patients requiring mechanical ventilatory support as the number of beds available.

In such context, the principles that must apply are that:

- critical care is preferentially provided for individuals who are most likely to benefit, so as to minimise the number of avoidable deaths<sup>48</sup>
- people with an equal chance of benefiting from critical care should have an equal chance of receiving it
- triage/treatment decisions are made on a rational, non-arbitrary basis, supported by objective evidence.

There is an emerging literature from Canada and the USA around prioritisation and triage in a pandemic;<sup>49</sup> Christian et al.<sup>50</sup> have proposed a protocol for triaging patient access to critical care during a pandemic. It consists of inclusion criteria, exclusion criteria, minimum qualifications for survival and a prioritisation tool that can be modified according to resource availability. The exclusion criteria consist of three categories of patients:

- those who have a poor prognosis even if cared for in an intensive care unit;
- those who require resources that will not be available during a pandemic;
- those with advanced illness whose underlying illness means that they have a high likelihood of death even without their current, concomitant critical illness (appendix 11).

The inclusion/exclusion criteria for intensive care may have to be applied in the primary care setting to avoid admitting inappropriate patients to hospital.

During a pandemic, if the usual standard of care were to be applied in intensive care, then it could be days or even weeks before the inevitability of a poor outcome was accepted, by which time several patients who might have benefited from treatment would have been denied treatment. When staffed critical care and

acute beds are scarce, it will be important to identify at an early stage those patients not responding to treatment and therefore likely to have a poor outcome. It is proposed that, once treatment and care start, in addition to any routine monitoring and assessment each patient should have regular, formal periodic assessments to determine whether:

- They are responding to treatment and either are fit enough to be discharged or still need further treatment
- They are not responding to treatment or are deteriorating despite treatment, and so further treatment should be withheld in favour of symptom relief.

There are currently no universally accepted systems available for scoring illness severity for the purposes of triage in this context. Christian *et al* have however assessed a number of different severity scoring systems and opted for the Sequential Organ Failure assessment (SOFA), given its physiological basis and its ease of use (a table showing the components of the system is given in Appendix 14).

The SOFA scoring system for sick patients provides a simple and reproducible measure of illness severity, and may provide useful support for decision making. Rising scores indicate progression of organ system failure, the severity of organ failure, and therefore increasing probability of death. A SOFA score greater than 11 is associated with only a 10% chance of survival, and on this basis a SOFA score of 11 or higher may be reasonably considered to represent 'a ceiling on the amount of resources that can be expended on any one patient'<sup>52</sup> However, because of individual patient variations and potential uncertainty arising from how a patient's condition may respond to core stabilisation procedures they should be viewed as indicators to assist clinicians' assessments based on additional information, patient history and examination, and not as definitive triaging values.

Using this method clinicians responsible for initial patient admissions or for ward-based care will be able to use SOFA scale assessment as an assessment in deciding whether to refer patients to critical care if their condition is unstable or deteriorating. If, based on the patient's history and their clinical condition it seems clear to the assessing clinician that escalation to critical care would be inappropriate, a SOFA score of greater than 11 will provide reassurance on this decision. Similarly, if the assessment is that critical care admission would seem appropriate and this is supported by a relatively low SOFA score, then this would fully justify referral.

There will however inevitably be circumstances where the patient's clinical assessment and the SOFA scores seem incompatible, necessitating further focus on the decision-making process. If the clinical view, based on fully available history, information and clinical examination – is that the patient is unlikely to benefit from mechanical ventilation, but has a relatively low SOFA

score then further assessment by an experienced clinician may be required; critical care referral may still be inappropriate despite the low SOFA score – and should be discussed with the intensive care consultant if necessary. If a patient has a high SOFA scale of greater than 11, but the clinical view is that despite the implied reservations mechanical ventilation would still be beneficial, then referral to the intensive care team for further assessment may be appropriate.

The same principles with have to be included in subsequent re-assessments of patients who receive intensive care, with SOFA scores made on admission, at 48 hours (or earlier if their condition is unstable or deteriorating) and subsequently at 12-hourly periods, the SOFA score being used to support decisions relating to further action (Table 9). Full details of the process are described in the paper by Christian et al.

**Table 9: Example of 48-hour assessment in critical care**

SOFA score	Action
SOFA score >11 or score stable at 8–11 with no change from initial assessment	Discharge from critical care and provide symptomatic or palliative care
SOFA score $\leq$ 11 and decreasing	Priority for continuation of therapy
SOFA score stable at <8 with no change	Intermediate priority for treatment, depending on availability of resources
No longer dependent on ventilator	Discharge from critical care

The potential workload implications for intensive care specialists will clearly be significant – and experienced clinicians should continue to work towards identifying other criteria or conditions which may assist in prediction of patients who have not been excluded by SOFA scale assessment but are unlikely to have sustained benefit from mechanical ventilation.

The fact that the SOFA system has not been validated in this regard highlights the necessity for further research to refine its role and the potential benefits of other scoring systems in this setting. The results of such research could provide a robust tool of considerable practical value for clinicians in difficult circumstances. When such data emerges critical care guidance will be updated appropriately.

Clinicians should be alert to the possibility of emerging outcome/predictive clinical indicators which may become available from information accumulated during the evolution of a pandemic. For patients in whom mechanical ventilatory support has already been initiated, it is recommended that subsequent decisions



(including treatment withdrawal) can be based on several factors. These include the overall severity of illness, likely prognosis, the clinical course of similar patients in earlier phases of the pandemic, and resource availability in the context of the evolving pandemic.

While the SOFA system (or other triaging schemes that succeed it) can provide some support for clinical decision making in this context, these decisions are likely to be difficult and controversial, and it must be recognised that they will add additional challenges to the responsibilities of critical care teams. The problem with this approach in the context of a range of aspects of care, including mechanical ventilation in intensive care, is that withdrawal of some elements of the care can be reasonably predicted to result in death.

This is distinct from the situation in which aspects of intensive care are withdrawn on the basis of futility, where it is normally accepted that there is no ethical difference between withholding and withdrawal of such care. Where such decisions are made on the basis of triage or prioritisation, an additional ethical dimension is introduced.

For patients with a low probability of survival, or for whom the predicted duration of critical care is likely to be such that many others will be denied access to critical care, in certain circumstances agreement needs to be reached on the limits to provision of some aspects of treatment, whilst recognising that this raises ethical and legal issues. The priority of care may then need to change to the maintenance of care and dignity.

The necessity to triage critical care admissions using criteria that will differ from those used in routine clinical practice, will cause controversial ethical issues and the prospect of litigation (in 'real time' or retrospectively) directed against clinicians responsible for these decisions.

In order to help maintain staff morale and prevent the potential of inappropriate professional criticism or litigation, triaging decisions should be shared by at least two experienced consultants, and should be in accordance with explicit local policies based on national standards agreed with high-level local and regional management. Full documentation of the decision-making process should be recorded. There is guidance available from the General Medical Council titled "General Medical Practice: Responsibilities of doctors in a National Pandemic" This is available at ([GMC guidelines](#))

Such agreements do not remove the responsibilities of staff to prioritise patient welfare, but should ensure that they will not be vulnerable for doing the best that can be done under difficult circumstances. Additional security measures may be necessary because of the potential risks of conflict directed at staff making triage decisions.

The required strictness of triaging decisions will vary according to the scale of the problem and its geographical extent. The necessity for triaging patients will also be influenced if additional critical care capacity exists elsewhere and if transport logistics allow these to be accessed. Accordingly, a staged triaging structure should be created, with the progression criteria being agreed by local consultation. A staged approach to triaging is outlined in appendix 13.

Ranking according to benefit (including considering the benefit of ICU treatment, the harm of missing out and the potential to mitigate the harm should the patient miss out) will determine access for many patients. However, in the face of high demand there may be patients between whom the clinicians cannot differentiate on the basis of benefit. At this stage, allocation of ICU treatment may required to be made by a clinically based selection process, taking into account the principles of the ethical framework (appendix 2).

# 11 Non-invasive respiratory support

In the UK, non-invasive ventilation (NIV) is currently provided predominately in acute respiratory units/respiratory high dependency units, and much of the expertise in NIV resides in respiratory team members. This is likely to be the situation in an influenza pandemic where critical care beds are likely to be filled with patients receiving mechanical ventilation. The following guidance on NIV has been developed in conjunction with the British Thoracic Society and the Intensive Care Society.

The role of NIV in the treatment of pandemic flu remains controversial.<sup>51</sup> It has been demonstrated previously that NIV does not have an extensive role in the management of acute respiratory failure due to pneumonia,<sup>52</sup> although it may improve outcome in those with underlying lung disease e.g. chronic obstructive pulmonary disease (COPD). It is also clear that NIV is not likely to be successful in individuals with severe/rapidly progressive acute lung injury, extensive bilateral pulmonary shadowing on chest X-ray, or >1 system failure.

There is therefore the potential for NIV to:

- reduce the need for intubation in influenza-related pneumonia when used as an early intervention, particularly in those with co-morbidities such as COPD
- widen the provision of ventilatory support outside the critical care unit, thereby reducing pressure on intensive care unit beds
- provide step-down respiratory support to recovering patients to speed discharge from critical care
- act as a ceiling to ventilatory care in patients with severe COPD/congestive cardiac failure in whom existing co-morbidities would diminish the prospect of survival if invasive ventilation were initiated.<sup>53</sup>

This should be set against the likelihood of droplet dissemination during the delivery of NIV, increasing the risk of infection to healthcare workers, other patients and family members.<sup>54</sup> In a pandemic in which the infection is relatively mild in normal individuals, but produces ventilatory decompensation in those with chronic conditions, the balance is tipped towards providing NIV; if the pandemic is associated with high mortality in previously healthy individuals, the balance moves away from providing NIV unless strict safety measures for healthcare workers are effective. NIV is classed as a potential aerosol generating procedure and appropriate infection control procedures should be followed (gown, gloves and eye protection should be worn and use of an FFP3 respirator instead of surgical mask may be prudent; see *Pandemic influenza: Guidance for infection*

*control in critical care* for further information<sup>55</sup>). Pragmatically the risks of NIV should also be set against providing high flow oxygen to patients, which at very high  $F_{iO_2}$  begins to approximate flows generated by NIV and continuous positive airway pressure (CPAP). The extent of the risk to healthcare workers and patients should be clarified by further research assessing droplet dissemination around ventilatory support and oxygen delivery systems.

Local healthcare providers should be aware of the type and quantity of NIV used locally and the potential to increase capacity, should this be required.

NIV should be applied by teams experienced in the use of NIV in acute respiratory failure, as expertise in ventilator settings and rapidly applying interfaces is essential. A range of interfaces including non-vented full facemasks and helmets should be available. There is no evidence that any particular ventilator is superior to another in acute respiratory failure, although bi-level ventilation is likely to offer advantages over single level ventilation. Local training needs should be addressed in the pre-surge period.

Monitoring is vital and teams should be able to identify patients in whom NIV is failing in order to escalate to Invasive Positive Pressure Ventilation (IPPV) or withdraw therapy/provide end of life care as appropriate. Decisions as to whether patients should proceed to IPPV if NIV fails or NIV is to be the ceiling of care should be made pre-treatment, or early in the course of treatment (e.g. after 2 hour trial) if sufficient evidence is not available at start of therapy.

There should be close liaison between respiratory NIV units and critical care units so that patients can receive step up or step down care expeditiously, and Demand and Capacity triage guidelines are followed. Ideally, units should be contiguous or close to minimise transfers.

Teams providing NIV should be familiar with end of life care guidelines and withdrawal of therapy in patients in whom NIV fails and where it represents the ceiling of therapy.<sup>56</sup>

# 12 Paediatric Care

At a clinical attack rate of 50%, some 5.9 million children under 16 years old will be affected by pandemic influenza; approximately 750,000 of these will be under 5 years old. The two age groups in which the severity of the illness was greatest in the most recent pandemic were those under the age of five and those over the age of 50.<sup>57</sup>

It is important that Children and Adults are recognised as distinct clinical groups needing specific specialist care and treatment. There are several reasons for this position. Flu can present differently in young children than in adults. In children, flu symptoms are similar to those of other serious treatable illnesses. Pandemic flu could coincide with an endemic bronchiolitis season. There is greatly increased morbidity and mortality in very young children. The sequelae of pandemic flu in children may include a surge in meningococcal disease, myocarditis and encephalopathy.

An algorithm to authorise provision of antiviral medication to children aged one year and older with influenza is being developed as part of the National Pandemic Flu Line Service. Children under one year old are expected to be assessed by General Practitioners or delegated health care professionals with appropriate training and experience.

The provisional UK pandemic influenza clinical management guidelines set out paediatric physiological variables for monitoring clinical progress.<sup>58</sup> It also suggests points at which access to primary, secondary and critical care services is indicated for influenza-like illness during a pandemic.

Detailed paediatric plans are being developed. These include; a tool to assist the decision in the community to admit a sick child with flu-like illness to the nearest hospital and hospital in-patient pathways.

The provision of paediatric intensive care has been centralised within regions at tertiary hospitals. This model of service requires the collection and transport of children from secondary to tertiary hospitals by specialist retrieval teams. Given the existing number of paediatric intensive care beds, it is likely that the demand will outstrip capacity. General hospitals will be able to provide some high-dependency and intensive care services, particularly to older children, with paediatricians working closely with their general-trained anaesthetic colleagues. Local arrangements for providing this service to children should be explored before a pandemic occurs and should form part of local Demand and Capacity plans. In these circumstances, regional paediatric consultants and paediatric intensivists should provide clinical support and advice at a distance, as resources allow.

In the pre-pandemic period, links between general hospitals and paediatric intensive care units should be strengthened; training needs identified and training packages should be developed and provided. Information and training packages will be available via the Paediatric Intensive Care Society website ([www.ukpics.org](http://www.ukpics.org)) and the Children's Acute Transport Service website ([www.cats.nhs.uk](http://www.cats.nhs.uk)).

# 13 Overview of Ambulance Services

NHS Ambulance services are expected to see significant rises in demand for the 999 Emergency service, coupled with additional requests for transportation from Health professionals such as General Practitioners (to potentially more distant locations) alongside increases in transportation and discharge requests from the health community.

Ambulance services will need to build on their pivotal role as one of the main gateways into Healthcare. They will need to ensure enhanced triaging arrangements and strong partnership links with local PCTs, GPs, out-of-hours services, NHS Direct, A&E Departments, minor injury units, walk - in centres, social services, mental health agencies and others that provide access to NHS services; including the devolved administrations where appropriate.

Ambulance Trusts will need to ensure their essential role in telephone call handling, (particularly in the 999 scenario) triaging and inter health agency coordination is robust and able to manage limited resources against acute need; in an environment of significant increase in activity over weeks and possibly months during a Influenza Pandemic.

Trusts will play a key link in the chain of effective communication both inward and outward facing, and will need to ensure robust arrangements are in place to manage raised public expectations at a time of limit resources in conjunction with other health bodies; in particular NHS Direct.

Ambulance Trusts will be key in assisting the wider health system with Strategic command and control arrangements; and provide a key link between Healthcare and the resilience community including supporting PCTs at LRFs and in the response phase, Strategic Coordination Groups.

# 14 End of Life care

In order to preserve acute and emergency care in the primary and secondary care settings at the peak of a pandemic, it will be necessary to restrict the types of treatment available to patients with pre-agreed clinical conditions and levels of illness. This will inevitably result in significant numbers of people with advanced terminal illnesses in need of symptom relief and comfort.

The ability of the primary and secondary care services to meet this increased demand for end of life and symptomatic care will be critical to support the difficult decisions that clinicians in primary and secondary care will need to make during the peak of a pandemic, if acute and emergency care services are to be maintained.

The actions needed to support end of life care in this situation may involve the bolstering of community services by hospital staff or the provision of areas within a hospital where end of life care can be delivered. Some voluntary sector organisations have particular expertise in this area and it is likely that they would be able to provide valuable insights into how this type of care might be delivered and the role that they might be able to play in supporting this work. The provision of increased end of life care may require increased amounts of certain drugs, and this issue will need to be addressed. It will be for the healthcare system in each area to agree how this type of care will be addressed, taking account of the unique circumstances of each locality and the guidance within primary care,<sup>59</sup> and to make this part of local demand and capacity plans.

Unless those patients for whom active, curative treatment is no longer deemed appropriate can be supported, the provision of acute and emergency care could be severely compromised.



# 15 Communications

Effective internal and external communications will be vital before, during and after an influenza pandemic. They will provide the backbone for a reliable and coordinated response.

While the Government will be responsible for providing national messages regarding pandemic flu, strategic health authorities/ and primary care trusts have a responsibility for cascading and supporting national messages and for adding local advice and information on service provision and treatment. These organisations have a key communication role and so there will need to be a clear understanding of the process for communicating with the public and a mechanism for ensuring that there is consistency and rigour to any information that is issued.

During a pandemic, clear and simple information for patients and the public on any changes to access in primary and secondary care, disruption to services and what local provision is being made for delivery of medicines (e.g. antivirals and vaccination) will also be required.

Successful management of the expectations and fears of the public (including healthcare staff) is crucial if the response to an influenza pandemic threat is to be effective. As part of the preparedness, planning there should be a clear process for communication with staff to ensure they know what will be expected of them during a pandemic.

## 15.1 Aims and objectives

The main aims of communications planning should be to:

- engage staff in planning and preparation from an early stage so that they understand and have confidence in the plans and are willing to implement them
- build trust among the local population and achieve their support for the local response and contingency measures around the management of demand and capacity that will be operating locally at the peak of a pandemic
- encourage discussion of pandemic response options, limitations and constraints in an inclusive and transparent way

- convey accurate, timely, consistent and credible advice and information to the public, businesses and health professionals at the pre-surge, surge and recovery stages
- ensure that all staff in primary and secondary care settings, including community pharmacists, are aware of the stage the pandemic is at in a locality, of the plans for dealing with the local demand and capacity , of any restrictions on treatments, of when triage is being instituted and of the nature of the triage
- ensure that staff understand the nature of the disease, and the national and local response, so they have enough information to explain to patients what they can do to help themselves if they develop symptoms and how best to minimise the risk of spread
- Ensure that the needs of people not served by mainstream communications channels are met and that they have access to information on local assessment, healthcare and other support services.

## 15.2 Key elements

Key elements of the communications plan should include:

- planned and tested, multi-channel and multilingual materials to provide local information.
- access to various sources of accurate and up-to-date local information, e.g. local websites
- planned and tested internal communications
- planned media engagement to ensure timely and accurate information is available and spokespeople are identified and trained.

# 16 Security

The changes to the provision of healthcare, which will occur during the peak of a pandemic, are likely to affect the community at large. The proposed changes will mean that some aspects of healthcare will not be available to patients who may need or want them, and there may be shortages of key supplies such as antibiotics and/or antivirals medication., Training in communication skills and conflict resolution will help frontline staff to manage difficult situations where they may be the first person responding. These skills should benefit all staff facing such situations.<sup>60</sup>

During the peak of a pandemic, it is likely that the police will be severely stretched and health services should not plan for significant support. Primary and secondary care services should work with their local police force in the pre-pandemic phase to develop a security assessment and vulnerability analysis. This plan should prioritise hospital/practice assets for protection and should rely, where possible, on physical and technological – rather than human – solutions. Proactive communication with the public can reduce the potential for civil unrest and should be part of community and institutional plans.

Health services may wish to consider the following generic security measures:

- increased monitoring of hospital/practice premises and surroundings
- single or few designated entrances
- limiting visiting (e.g. to a single visitor per patient or to no visitors at all).
- Training staff in conflict resolution and developing effective communication skills

# Appendix 1: World Health Organization international

Phase	WHO international phases	Overarching public health goals
<b>Inter-pandemic period</b>		
1	No new influenza virus subtypes detected in humans	Strengthen influenza pandemic preparedness at global, regional, national and sub-national levels  Minimise the risk of transmission to humans; detect and report such transmission rapidly if it occurs
2	Animal influenza virus subtype poses substantial risk	
<b>Pandemic alert period</b>		
3	Human infection(s) with a new subtype, but no (or rare) person-to-person spread to a close contact	Ensure rapid characterisation of the new virus subtype and early detection, notification and response to additional cases  Contain new virus or delay its spread to gain time to implement preparedness measures, including vaccine development Maximise efforts to contain or delay spread, to possibly avert a pandemic and to gain time to implement response measures
4	Small cluster(s) with limited person-to-person transmission but spread is highly localised, suggesting that the virus is becoming increasingly better adapted to humans	
5	Large cluster(s) but person-to-person spread still localised, suggesting that the virus is becoming increasingly better adapted to humans	
<b>Pandemic period</b>		
6	<p>Increased and sustained transmission in general population</p> <p><b>UK alert levels</b></p> <p>1 Virus/cases only outside the UK</p> <p>2 Virus isolated in the UK</p> <p>3 Outbreak(s) in the UK</p> <p>4 Widespread activity across the UK</p>	Minimise the impact of the pandemic

## Appendix 2: Ethical principles

The principle of equal concern and respect draws together a number of different ethical principles, each of which is outlined below. The individual principles are numbered for convenience but are not ranked in order of significance – they are all important.

When a particular decision has to be made, using the list of principles systematically as a checklist can help to ensure that the full range of ethical issues is considered.

In thinking about the principles, decision-makers will need to use the best information that is available to them at the time (for example, about the likely effects of a particular decision). Whether or not a decision was ethically appropriate has to be judged in relation to the situation that existed at the time it was made, rather than by reference to facts that only became apparent at a later stage.

## Guiding ethical principles <sup>61</sup>

### Guiding ethical principles <sup>62</sup>

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#### Respect

- *people should be kept as informed as possible*
- *people should have the chance to express their views on matters that affect them*
- *people's personal choices about their treatment and care should be respected as much as possible*
- *when people are not able to decide, those who have to decide for them should take decisions based on the best interests of the person as a whole rather than just based on their health needs.*

A draft version of the guidance was made available for the public to express their views on the processes and criteria outlined in it.

It is also recognised that communication with the public and health professionals will be important, should it become necessary to implement triage and prioritisation.

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#### Minimising the harm that a pandemic could cause

- *help other countries to fight a pandemic if it starts abroad, to stop it developing further and reaching this country*
- *try to minimise the spread of a pandemic if it reaches this country. Everyone has a role to play, for example by covering the face when sneezing, or staying at home when ill*
- *minimise the risk of complications if someone is ill, for example by the appropriate use of antiviral treatment*
- *learn from experience both at home and abroad about the best way to fight the pandemic and to treat people who are ill*
- *minimise the disruption to society caused by a pandemic.*

Unless scarce health resources are prioritised during a pandemic, then at the peak of the pandemic the maintenance of even a limited emergency service may be compromised.

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**Fairness**

- *everyone matters equally*
- *people with an equal chance of benefiting from health or social care resources should have an equal chance of receiving them; however, it will not be unfair to ask people who could get the same benefit from an intervention at a later date to wait.*

Wherever possible, physiological, evidence-based triage criteria have been proposed or recommended so that people with an equal chance of benefiting from health or social care resources should have an equal chance of receiving them. Deferring the treatment of elective patients where there will be no adverse effect on their health can be justified on the basis that it is fair to ask people who could get the same benefit from an intervention later to wait.

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**Working together**

- *working together to plan for, and respond to, a pandemic*
- *helping one another*
- *taking responsibility for our own behaviour, for example by not exposing others to risk*
- *being prepared to share information that will help others.*

Effectively managing the surge in healthcare demand will need all parts of the health service to work together and the cooperation and support of the public. Without these prerequisites, the provision of even an emergency service could be compromised.

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**Reciprocity**

- *if people are asked to take increased risks, or face increased burdens, during a pandemic, they should be supported in doing so, and the risks and burdens should be minimised as far as possible.*

The guidance recommends that the difficult decisions relating to clinical prioritisation should be made across primary and secondary healthcare services, where possible, rather than expecting any single group of clinicians to make these decisions for all patients. The approach to service prioritisation incorporates the need for consideration of alternative methods of service delivery to mitigate any adverse effects of having to defer services.

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### Keeping things in proportion

- *those responsible for providing information will neither exaggerate or minimise the situation and will give people the most accurate information*
- *decisions on actions that may affect people's daily lives, which are taken to protect the public from harm, will be proportionate to the relevant risk and to the benefits that can be gained from the proposed action.*

The use of prioritisation criteria will have a profound impact on some people. It is therefore essential that these measures reflect the local resources and disease incidence and are introduced for as short a period as practicable.

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### Flexibility

- *plans will be adapted to take into account new information and changing circumstances*
- *people will have as much chance as possible to express concerns about or disagreement with decisions that affect them.*

The guidance is not fixed, and it will be changed to reflect new information on the clinical course and outcomes of the pandemic strain or the impact of new countermeasures. The guidance also allows local health services to adapt their response in light of local attack rates, staff and equipment shortages, and patient demand.

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### Good decision-making

*Respect for this principle involves the following components:*

- *openness and transparency*
- *inclusiveness*
- *accountability*
- *reasonableness.*

The publication of the provisional surge capacity and prioritisation guidance enabled public and professional engagement. The guidance provides information on why prioritisation will be necessary, how decisions will be made and the prioritisation criteria that it is proposed to apply.

As far as possible, the guidance is evidence-based. Where there is no evidence, the underlying rationale is explained.

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# Appendix 3: Practical guidance on completion of the Service Priority Assessment Tool

## a. Service intervention or treatment

*List key elements of the service or service programme/workstream.*

It is important to identify systematically key elements of a service or service programme for prioritisation. In doing this, it may be helpful to first identify the broad generic components that comprise the service or service programme. Within each of these broad generic components, specific elements of the service can then be identified and prioritised.

For a hospital, primary care trust or primary care organisation the key clinical activities/specialties provided need to be identified. For a hospital based specialty, eg respiratory medicine, this would include identifying specific activities/treatments provided (emergency and routine) across a range of settings including emergency room, inpatient, outpatient and day care. Any hospital outreach services, interventional activities, diagnostic or public health services provided should also be listed.

Conditions or treatments that make up the majority of the workload, as well as highly specialised services or services to medically vulnerable sectors of the population, should be identified. *The survey should be completed for each of the service treatments/interventions identified.*

The aim is to prioritise the service, workstream or treatment offered and not the individual – so it may be helpful to focus on a specific treatment for an average patient with no co morbidity. This is indicated by the phrase ‘single morbidity assessment’ on the survey sheet.

## **b. Categories**

Select the category that best captures the nature of the identified service, intervention or treatment.

Select one of the following:

- Immediately life threatening
- Emergency
- Semi-elective (semi-urgent)
- Elective.

## **c. Rate of deterioration**

Without intervention, what would be the rate of deterioration for the 'average' patient using the service? Select one of the following:

- Rapid – over days
- Moderate – over weeks
- Slow – over months
- Not predicted – when at the time of assessment the rate of deterioration cannot be usefully estimated.

## **d. Impact of doing nothing**

Without intervention, what would be the anticipated impact on the health state of the average patient (or on the population)? Select one of the following:

- Death
- Severe
- Moderate
- Mild
- None.

## **e. Maximum deferral period**

Using clinical judgement and any available evidence, what would be the maximum clinically acceptable deferral period for this service, intervention or treatment?

Select one of the following:

- None – <6 hours
- 6 hours – <24 hours
- 24 hours – <3 days
- 3 days – <1 week
- 1 week – <2 weeks

- 2 weeks – <1 month
- 1 month – <2 months
- 2 months – <3 months
- 3 months – <6 months
- 6 months – <1 year
- 1 year and over.

**f. Current delivery setting**

Identify the range of settings where the service or treatment is currently delivered.

**g. Current delivery personnel**

Identify the personnel who currently deliver the service or treatment.

**h. Current impact on other health and social services upstream and downstream**

Identify other key staff, services or supplies that are required to enable the service to be provided, or are impacted upon by the service. For example, these may be in community, primary or secondary care, the NHS, social care or voluntary sector.

**i. Alternative delivery setting** In a pandemic, working practice will alter. What would be the alternative setting/s in which this service or treatment could be delivered?

**j. Alternative delivery personnel** Who might be an alternative deliverer of the service or treatment in a pandemic?

**k. Impact on other health and social services upstream and downstream**

What might be the impact on other services or supplies of the altered setting and delivery personnel?

**Practical check on the completed Service Priority Assessment Tool**

Now consider the scenario where it is the peak of the pandemic and 50% of staff are off work. High levels of clinical activity relating to pandemic flu and its complications are occurring. Which services or treatments would you choose to maintain? Are they those with the shortest deferral period?

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment:</b>										

## Service and patient prioritisation for pandemic influenza survey

### Specialty:

#### Categories

Immediately life threatening  
 Emergency  
 Semi-elective  
 Elective

### Proposer:

#### Rate of deterioration

Rapid  
 Moderate  
 Slow  
 Not predicted

#### Impact of doing nothing

Death  
 Severe  
 Moderate  
 Mild  
 None

### Date:

#### Maximum deferral period

None – <6 hours  
 6 hours – <24 hours  
 24 hours – <3 days  
 3 days – <1 week  
 1 week – <2 weeks  
 2 weeks – <1 month  
 1 month – <2 months  
 2 months – <3 months  
 3 months – <6 months  
 6 months – < 1 year  
 1 year and over

# Appendix 4: Prioritisation example

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Cardiac Arrest	ILT	Rapid	Death	None	Community ED MAU Hospital ward/ departments	Paramedics EMed and General medical staff Nursing staff	Community CCU, ITU Cardiology Rehabilitation service Pharmacy Mortuary Medical wards Pathology	Home Survivors only to hospital Any medical bed Hospital at home or their residential care home for elderly survivors Direct to specialist cardiology hospitals	Paramedics Medical and nursing staff Supervised HCA Need to be robust and sensible end of life discussions for appropriate patients with a system that ensures widespread communication of these decisions	As before Cardiology services

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Multiple trauma	ILT	Rapid	Death	None	ED	Paramedics EMed staff Trauma team	Community Radiology Theatres Critical care Surgical wards Rehab services Pathology Blood transfusion service	None	None	As before
STEMI	ILT	Rapid	Death	None	Community ED MAU	Paramedics EMed staff Acute med staff Chest pain nurses Cardiology medical staff	Community CCU Pharmacy Angiography suite Cardiac rehab services Pathology	Community Direct admission to specialist cardiology hospitals Any available bed in hospital	Paramedics GPs	As before

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
NSTEMI	ILT	Not predicted	Severe	6-24hrs	ED MAU	Paramedics EMed staff Acute med staff Chest pain nurses Cardiology medical staff	Community CCU Pharmacy Angiography suite Cardiac rehab services Pathology	Community Direct admission to specialist cardiology hospitals	Paramedics GPs Cardiology	Pharmacy Pathology
Arrhythmia eg VT	ILT	Rapid	Death	None	ED MAU	Paramedics EMed staff Acute med staff Chest pain nurses	Community CCU Medical wards Cardiology Pathology Pharmacy	Community ED MAU Direct to specialist cardiology hospitals	Paramedics EMed staff Acute med staff	As before
Arrhythmia eg AF	Emergency	Moderate	Severe – Moderate	6-24hrs	ED MAU	Paramedics EMed staff Acute med staff Chest pain nurses	Community CCU Medical wards Cardiology Pathology Pharmacy	Community Specialist cardiology hospitals	Paramedics GP Cardiology	Pharmacy Pathology



Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Sepsis	ILT	Rapid	Death	None	ED MAU	EMed staff Acute med staff	Critical care Medical wards Pharmacy Radiology	Critical care Any available bed	Hospital at home service (for elderly) Hospital staff	Pharmacy Pathology Radiology
Pneumothorax	ILT	Rapid	Moderate	None	ED MAU	EMed staff Acute med staff	Respiratory service (wards & OPD) Radiology	ED Home Any medical bed	EMed staff GP Community respiratory team OP F/U	Radiology Chest drain
Significant Overdose	ILT	Not predicted	Death/ Severe	None	ED MAU	EMed staff Acute Med staff	Paramedics Critical care Pharmacy Pathology Psychiatry Medical or CDU bed	Some investigate and treat in community Others ED	Paramedics GP ED/Medical staff	Pharmacy Pathology Community nurses HTT TOXBASE
Minor Overdose	Emergency	Slow	Mild	None	ED	EMed staff	GP surgery Psychiatry liaison Pathology Pharmacy	Community MIU	Paramedics GP HTT	Pharmacy Pathology Access to TOXBASE

Service/ intervention/ workstream/ treatment	Category	Rate of deterioration (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Physical self harm (minor)	Semi urgent	Slow	Mild	6-24hrs	ED GP surgery MIU	EMed staff GP	Psychiatry Procurement Radiology	Community MIU	Paramedics GP HTT	Wound Care supplies
Sprain	Emergency	None	Mild	24hrs- 3 days	ED GP surgery Physiotherapy surgery MIU	EMed staff GP Physio- therapists	Radiology Medical supplies Pharmacy Physiotherapy	Community MIU	GP Physiotherapy	Pharmacy Medical supplies crutches etc
Simple laceration or incised wound	Semi-elective	Slow	Mild	6 hrs	ED GP surgery MIU	EMed staff ENP GPs	Radiology Medical supplies Pharmacy	Community MIU	GP ENPs Self Paramedic	Radiology Medical supplies Pharmacy
Complicated laceration	Emergency	Moderate	Moderate	None	ED	EMed staff Plastic surgery Orthopaedics	Radiology Medical supplies Pharmacy Operating departments OPD	Community Direct to OPD	GP Plastics Orthopaedics	Radiology Medical supplies Pharmacy

Service/ intervention/ workstream/ treatment	Category	Rate of deterioration (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Fractures – Simple e.g. buckle	Emergency	Slow	Mild	6-24hrs	ED MIU	EMed staff Orthopaedics ENPs	Radiology Fracture clinic Medical supplies Pharmacy	Community MIU (after radiology)	GP Orthopaedics ENPs	Radiology Supplies of splints
Fractures – complicated	ILT	Rapid	Death – severe	None	ED	EMed staff Orthopaedics Plastic surgery	Radiology Operating departments Orthopaedic wards	Hospital Could aim for earlier hospital discharge with home physio and iv antibiotics	ED medical staff Orthopaedics	As before
Dislocation – simple	Emergency	Moderate	Moderate	None	ED MIU	EMed staff Orthopaedics ENPs	Radiology Fracture clinic Medical supplies	Community (after radiology)	GP Orthopaedics ENPs	Radiology Supplies of splints
Dislocation – complicated	Emergency	Rapid	Severe	None	ED	EMed staff Orthopaedics ENPs	Radiology Operating departments Orthopaedic wards Vascular surgery Occ Medical supplies pharmacy	Hospital Could aim for earlier hospital discharge with home physio etc	ED medical staff Orthopaedics Vascular surgery	As before

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Burns – minor	Semi- elective	Slow	Mild	None unless self treated	Home GP MIU ED	Self GP Paramedic ENP EMed staff	Pharmacy Medical supplies	Home GP MIU	Self Paramedic GP Nurse MIU	Pharmacy Medical supplies
Burns – major	ILT	Rapid	Death	None	ED	EMed staff +/- Anaesthetic staff	Paramedics Critical care Plastic surgery Pharmacy Medical supplies Operating department	ED or Direct to local burns unit	EMed staff Paramedic Plastic surgery staff	Paramedic Critical care Plastic surgery Pharmacy Medical supplies Operating department
Severe Alcohol intoxication	Can be ILT	Rapid	Death	None	ED	EMed staff +/- Anaesthetic staff Acute Med	Paramedics Critical care EMed/med bed Pharmacy D&A team	ED Any medical/ ED bed	EMed staff	Paramedics Pharmacy
Syncope cause	Emergency	Not predicted	Mild	None	GP surgery ED	GP EMed staff Acute med staff	Paramedics Physicians OPD START team	GP OP follow up unless ALTE	GP Physicians Physio OT	ECG machine

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Anaphylaxis	ILT	Rapid	Death	None	GP surgery Community ED Wards	Self GP Nurses Paramedics Physicians	Observation beds Pharmacy Allergy clinic Pathology	Community Observe in GP surgery Hospital at home	GP Nurses Paramedics Allergy clinics	Allergy clinics Pharmacy Ambulance service
GI haemorrhage	Emergency	Rapid-mild	Death – moderate	None- 24hrs	Community OPD ED SAU	GP Ambulance service EMed staff Surgical staff	Operating theatres Pharmacy Endoscopy Blood transfusion service Pathology	OPD if relatively well ED if haemo- dynamically unwell	Surgical staff OPD staff EMed staff Ambulance service	Operating theatres Pharmacy Endoscopy Blood transfusion service Pathology
Ruptured abdominal aneurysm	ILT	Rapid	Death	None – Unless previously diagnosed and decision not to treat made	ED SAU	Ambulance service EMed staff Vascular surgeons	Radiology Operating theatre staff Pathology Blood transfusion service Surgical wards	None unless decision made not to treat when care could be given in community	None unless decision made not to treat then community nurses, GP	As before

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Perforation and Peritonitis	Emergency	Rapid	Death	None	ED SAU	Ambulance service EMed staff Surgeons Surgical nurses	Radiology Operating department Pathology Blood transfusion Surgical wards	None unless decision made not to treat when care could be given in community	None unless decision made not to treat then community nurses, GP	As before
Ophthalmologic	Emergency – semi- elective	Moderate – slow	Moderate – none	Variable – 6hrs-days	Community ED Eye clinic MIU	Opticians EMed staff GP Opht- halmology	Radiology Pharmacy Operating department Eye clinics	Treatment by opticians or eye departments directly Direct access needs to be agreed MIU	Pharmacy Eye clinics Operating departments for some Eye wards	As before
Oral and maxillofacial	Emergency – semi- elective	Moderate to slow	Moderate to mild	Up to 24hrs	Community ED Max fax clinic	Dentists EMed staff Max fax staff	Radiology Pharmacy Max fax clinic	More access to dental surgeries for Rx of emergencies Pharmacists – self Rx with antibiotics Max fax trauma to speciality MIU	Dentists Pharmacists	Radiology Procurement

Service/ intervention/ workstream/ treatment	Category	Rate of deterioration (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
ENT	Emergency – semi-elective	Moderate to slow	Moderate to mild	None to 24hrs	Community ED ENT clinic	GP EMed staff ENT surgeons	Radiology Medical supplies OPD OD ENT wards	Direct access to ENT clinic for emergencies MIU	ENPs ENT staff	Radiology Procurement for equipment Medical supplies
Review clinics	Elective	Not predicted	Mild – None, depending on condition	Days to weeks	ED	EMed physicians and nurses	OP clinics GP Plaster rooms Radiology	Varies according to condition Direct FU in specialist clinics e.g. orthopaedics Review in community	GPs Practice nurses Staff in OP clinics	GP Radiology OP
Psychiatric Emergencies incl section 136	Emergency	Not predicted	Usually moderate	Variable None to 24hrs	ED Acute Psychiatric assessment units Community	EMed Psychiatry Police Ambulance PSW GPs Crisis teams	Psychiatric Hospitals CDU/acute beds Families OPD Pharmacy Police	Psychiatric hospital or units Community	GP Crisis teams	Ambulance Police Families

Service/ intervention/ workstream/ treatment	Category	Rate of deterior- ation (typically)	Impact of doing nothing	Maximum deferral period	Current delivery setting(s)	Current delivery personnel	Impact on other services (upstream and downstream)	Alternative delivery setting(s)	Alternative delivery personnel	Impact on other services (upstream and downstream)
<b>Single morbidity assessment: Emergency medicine Department</b>										
Stroke	Usually emergency ILT	Not predicted	Death – though variable	None, though decision could depend on pre-morbid state	GP Ambulance ED MAU	EMed Stroke team Physicians Neurologists Radiologists	Medical beds Stroke beds Radiology Physio OT Social services Families Pharmacy	To some extent depend on co-morbidity Either direct to – stroke ward or – treat at home	Community nurses Families GP	Social services Private care providers
Acute severe/ILT asthma	ILT	Rapid	Death	None	GP Community Ambulance ED MAU	EMed Acute physicians	Respiratory teams OPD Radiology Crit Care Medical beds Pharmacy	Community ED Some will need ITU	Paramedics GP surgery EMed staff	Medicine respiratory staff Radiology etc Critical care teams in community
Sudden Headache SAH	ILT	Not predicted	Death – though variable	0-12hrs	ED MAU	EMed Acute med	Ambulance GP Critical care Neurosurgery Radiology	Could consider community LP without CT when no CT Others would require CT/LP	GPs Nurses EMed	As before



# Appendix5: Surge checklists for adaptation by local facilities

PRE-SURGE					
Category	Action	Plan in place	Actioned	Tested	Outcome and evidence
Decision-making	Command and control procedures are in place.				
	Structures are in place to enable decisions to be disseminated from health authority/health board (HA/HB) level down to the service prioritisation group of each facility and thereafter to frontline services.				
	Each facility (hospital, care home etc) has a service prioritisation group to implement strategic prioritisation decisions at an operational level.				
	The specific roles required for the service prioritisation group to function have been agreed, with 'role cards' available if appropriate.				
	Members are aware of their roles and responsibilities, and deputies identified.				
	An audit trail is in place to record all decisions taken by the group.				

	The operating procedures of the group have been agreed (location, frequency etc).				
	Post-surge plans are in place to return working practices to normal.				
	The point at which the service prioritisation group should be stood down has been identified.				

<b>PRE-SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Information</b>	Clear lines of communication within the organisation are in place.				
	Clear lines of communication to partner organisations, the media and the public are in place.				
	Information requirements for maintaining services within the organisation have been identified. This should include the frequency with which information is required.				
	Information requirements to enable other organisations to maintain their services have been identified. This should include the frequency with which information is required.				
	Mechanisms are in place to collect the required information.				
<b>Capacity</b>	Use of space within the facility has been assessed and additional temporary capacity identified.				
	An assessment has been carried out of the resources that will be required to make this capacity usable.				
	Contingency plans detail the process for bringing additional space into operation, i.e. in stages/at the same time, and how long this will take.				

	All plans for using additional space incorporate infection control requirements as recommended in Government guidance.				
	Arrangements are in place, which ensure that flu patients are separated from those without flu.				
	Areas have been identified for cohorting patients.				

<b>PRE-SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Provisions</b>	Key clinical supplies have been identified.				
	Key non-clinical supplies have been identified.				
	Space for storing supplies has been identified.				
	Key supplies have been stockpiled (where possible/appropriate).				
	Contingency plans detail the process for ordering more supplies and the points when this should be carried out.				
	Contingency plans detail alternative routes for obtaining supplies when normal channels have been exhausted.				
	Arrangements are in place to inform the service prioritisation group about the levels of supplies.				
	A mechanism is in place to prioritise supplies as directed by the service prioritisation group.				
<b>People</b>	Arrangements are in place for managing staff shortages.				
	Minimum staffing levels required to maintain services have been identified.				
	Key skills that will be required to run services have been identified.				

	Key staff for crossover roles and specific pandemic support have been identified.				
	Contingency plans detail arrangements for the redeployment of staff where necessary.				
	Staff have undergone training in infection control.				
	Where appropriate, staff have undergone training to up skill as previously identified.				

<b>PRE-SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>People (continued)</b>	Plans for staffing have been discussed with partner organisations.				
	Any staff insurance/liability issues have been identified and procedures put in place to address them.				
<b>Prioritising services</b>	A review of all services offered by the facility has taken place and core services have been identified.				
	The service prioritisation group has agreed how services will be prioritised in order to maintain core services as far as possible. This has been carried out in accordance with direction from HA/HB and national guidance.				
	The service prioritisation group is aware of the triggers for deferral of services.				
	The service prioritisation group has decided how essential medical services will be maintained for people with chronic illness.				
	Where a decision has been taken to defer services, plans are in place to mitigate the impact of deferral on both patients and partner services.				
	Where a decision has been taken to maintain services, consideration has been given to alternative methods/locations of delivery.				
<b>Deferring treatment</b>	The service prioritisation group has agreed which treatments will be deferred.				
	The service prioritisation group is aware of the triggers for deferral of treatment.				

	Where a decision has been taken to defer treatment, plans are in place to mitigate the impact of deferral on patients, eg by offering telephone support services.				
	A mechanism is in place to keep track of patients whose treatment has been deferred.				

<b>PRE-SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Restriction of treatment</b>	Where a decision has been taken to maintain services, 'model of care' plans or 'patient pathways' identify alternative methods of treatment which can be offered when the range of treatments is restricted, eg using oral rather than IV antibiotics.				
	The service prioritisation group has considered whether treatments can be offered in advance of the surge and patients fast tracked.				
<b>Admission criteria</b>	The service prioritisation group is responsible for the process of evaluation and admission to the service and has recorded all decisions.				
	The current admission criteria for services have been reviewed and consideration has been given as to how these should be modified. This should be carried out on the basis of capacity.				
	Alternative support has been identified for those who may not be admitted to the facility.				
	Criteria and protocols are in place for closing the facility to new admissions.				
<b>Discharge criteria</b>	The current discharge process has been reviewed and potential problem areas have been identified.				
	Criteria and protocols have been put in place for initiating rapid early discharge.				

	Patient groups where rapid early discharge could occur, if needed, have been identified.				
	Any additional support that will be required for rapid early discharge has been identified.				

<b>SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Decision-making</b>	Command and control procedures are in operation.				
	Information management strategies are in operation.				
	The service prioritisation group is managing the surge.				
<b>Information</b>	There is ongoing monitoring of surge related triggers for action.				
<b>Capacity</b>	Additional capacity is being operated as directed by the service prioritisation group.				
<b>Provisions</b>	Key clinical and non-clinical supplies are being monitored and that information is being passed on to the service prioritisation group.				
	Supply needs are being anticipated and ordering is being carried out appropriately.				
	Supplies are being managed in accordance with contingency plans.				
<b>People</b>	Arrangements for managing staff shortages are in operation.				
	Redeployment of staff is in operation as set out in contingency plans.				
	There is ongoing retraining/upskilling of staff.				
	There is ongoing communication with partner organisations about staffing levels.				
<b>Prioritising</b>	Core services are continuing to be offered.				

<b>services</b>	The service prioritisation group is using information from HA/HB and the front line to assess when trigger points for service restriction have been reached. All decisions are being recorded.				
	Prioritisation of services is being carried out as directed.				
	Mitigation strategies for deferred services are in operation.				

<b>SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Deferring treatment</b>	Criteria and protocols for treatment deferrals have been activated by the service prioritisation group.				
	Treatments are being deferred as directed.				
	Records are being kept of patients whose treatments have been deferred.				
	Mitigation strategies for deferred treatments are in operation.				
<b>Restriction of treatment</b>	The service prioritisation group has disseminated decisions on which treatments are being restricted.				
	Individual patient prioritisation is in operation if the service is overwhelmed.				
<b>Admission criteria</b>	Criteria and protocols for modifying admission on the basis of capacity have been activated.				
	The service prioritisation group is monitoring the evaluation and admission of patients and recording decisions.				
	Alternative support is being offered to people who have not been admitted to the facility.				

	Criteria and protocols for closing the facility to new admissions have been activated when capacity is reached.				
<b>Discharge criteria</b>	Criteria and protocols for initiating rapid early discharge have been activated.				
	Additional support is in place for rapid early discharge.				

<b>POST SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Decision-making</b>	Command and control procedures are in operation.				
	Information management strategies are in operation.				
	The service prioritisation group is managing the surge: looking at resuming normal operations through a return to normal capacity, bringing back on line deferred services and treatments, and factoring in the availability of staff and other resources. All decisions are being recorded.				
	The service prioritisation group is reviewing resources and capacity to enable catch-up of deferred treatments.				
	Arrangements are being put in place to manage a possible second wave. Arrangements take account of the effectiveness of the surge capacity response and any modifications that are required.				
<b>Information</b>	There is ongoing monitoring of surge -related triggers for action.				
<b>Capacity</b>	Temporary additional capacity is being reduced as directed by the service prioritisation group.				
<b>Provisions</b>	Key clinical and non-clinical supplies are being monitored and that information is being passed on to the service prioritisation group.				
	Supply needs are being anticipated and ordering is being carried out appropriately for catch-up of deferred treatments.				



	Restocking is being carried out in anticipation of a second wave.				
<b>People</b>	Arrangements for managing staff shortages are in operation.				
	Normal working practices are being reinstated as appropriate/possible.				
<b>Prioritising services</b>	Core services are continuing to be offered.				
	Services are being resumed where appropriate/possible.				

<b>POST -SURGE</b>					
<b>Category</b>	<b>Action</b>	<b>Plan in place</b>	<b>Actioned</b>	<b>Tested</b>	<b>Outcome and evidence</b>
<b>Deferring treatment</b>	Deferred treatments are being resumed where appropriate/possible.				
	Patients whose treatments have been deferred are being identified.				
	Work is ongoing to catch up on treating patients whose treatments had been deferred.				
<b>Restriction of treatment</b>	Treatment restrictions are being lifted where appropriate/possible.				
	The service prioritisation group has considered the likelihood of a second wave and whether treatments can be offered in advance of the surge and patients fast-tracked.				
<b>Admission criteria</b>	Normal admission criteria have been resumed.				
<b>Discharge criteria</b>	Normal discharge criteria have been resumed.				

# Appendix 6: Modified Standard Assessment Evaluation Protocol

For further details, see the full version of the Appropriateness Evaluation Protocol Criteria as adapted for the Manchester Utilisation Review Project (2002/03).<sup>62</sup>

## **I Admission Criteria IA Intensity of service**

IA1 Surgery or other procedure in 24 hours, requiring:

- (a) general/regional anaesthesia; and/or
- (b) equipment or other facilities available only for in-patients

IA2 Vital signs monitoring at least every two hours

IA3 Intravenous medication and/or fluid replacement (does not include tube feeds)

IA4 Observation for toxic reaction to medication

IA5 Continuous or intermittent (at least every 8 hours) respiratory assistance

## **IB Severity of illness**

IB1 Severe electrolyte/acid base abnormality – any one of the following 4 sets:

- (i) Na < 123mEq/L or > 156mEq/L
- (ii) (ii) K < 2.5mEq/L or > 6.0mEq/L
- (iii) (iii) CO<sub>2</sub> combining power < 20mEq/L or > 36mEq/L
- (iv) (iv) arterial pH < 7.3 or > 7.45

IB2 Acute loss of sight or hearing (within 48 hours of admission)

IB3 Acute loss of ability to move any body part (within 48 hours of admission)

IB4 Persistent fever  $\geq 38^{\circ}\text{C}$  for more than 5 days

IB5 Active bleeding

IB6 Wound dehiscence or evisceration

IB7 Pulse rate < 50 per minute or > 140 per minute

IB8 Blood pressure: systolic < 90mmHg or > 120mmHg and/or Diastolic < 60mmHg or > 120mmHg

IB9 Sudden onset of unconsciousness (coma or unresponsiveness)

IB10 ECG evidence of acute ischaemia, must be suspicion of new MI

IB11 Suspicion of MI, admitted for Troponin T analysis 12 hours post pain onset.

## **II Adult Day of Care Criteria**

### **IIA Medical services**

IIA1 Procedure in operating room (theatre) that day (i.e. the day reviewed)

IIA2 Scheduled for procedure in operating room the next day requiring extraordinary pre-operative consultation or evaluation

IIA3 Cardiac catheterisation that day

IIA4 Angiography that day

IIA5 Biopsy of internal organ that day

IIA6 Invasive CNS diagnostic procedure that day

IIA7 Any test requiring strict dietary control

IIA8 Treatment requiring frequent dose adjustments under direct medical supervision

IIA9 Close medical monitoring by a doctor at least three times per day

IIA10 Post operative day (after operating room or procedures 3–6 above)

**II B Nursing/life support services**

IIB1 Continuous or intermittent (at least every 8 hours) respiratory assistance

IIB2 Parenteral therapy: intermittent or continuous IV fluid with any supplementation

IIB3 Continuous monitoring of vital signs, at least every 30 minutes, for at least 4 hours

IIB4 Fluid balance

IIB5 Major surgical wound and drainage care

IIB6 Close nurse monitoring under physician's orders at least three times per day

**IIC Patient condition**

IIC1 Inability to void or absence of intestinal movements in last 24 hours

IIC2 Transfusion due to blood loss in last 48 hours

IIC3 Ventricular fibrillation or ECG evidence of acute ischaemia in last 48 hours

IIC4 Fever > 39°C rectally (or at least 38°C orally) in last 48 hours if the patient was admitted for reason other than fever (or > 100°F (R) or 101°F (OR))

IIC5 Coma: unresponsive for at least one hour in last 48 hours

IIC6 Acute confusional state in last 48 hours, not due to alcohol withdrawal

IIC7 Signs or symptoms due to acute haematologic disorders (significant neutropenia, anaemia, thrombocytopenia, leucocytosis, or thrombocytosis yielding signs or symptoms) in last 48 hours

IIC8 Progressive acute neurological difficulties in last 48 hours

An example of how the assessment evaluation protocol might be modified for use as a checklist:

<b>ACUTE HOSPITAL ADMISSION CRITERIA One or more criteria met – agreement for the admission day</b>		
		<b>Please tick if criteria present</b>
	<b>(CLINICAL SERVICES)</b>	
1.	Procedure in theatre within 18 hours.	
2.	Monitoring of cardiac rhythm, blood pressure, pulse, temperature or respiration every 2 hours for at least 2 observations.	
3.	Any form of artificial ventilation or respiratory support (new or changing).	
	<b>(PATIENT CONDITION)</b>	
4.	Severe electrolyte/acid-base abnormality.	
5.	Acute loss of ability to move a limb or acute loss of mobility within 48 hours prior to admission. (Exclude global weakness.)	
6.	Acute impairment or reduction of sight, hearing or swallowing within 48 hours prior to admission.	
7.	Recent acute internal bleeding (except haematuria unless requiring catheterisation).	
8.	Acute rupture of recent surgical wound.	
9.	Pulse rate < 50 or > 140 per min.	
10.	Systolic blood pressure < 90mmHg or > 200mmHg, diastolic < 60mmHg or > 120mmHg.	
11.	Acute confusional state/coma/unresponsiveness.	
12.	ECG evidence of acute ischaemia (including unstable angina with suspicion of acute MI).	
13.	Overdose/ingestion/ waiting for psychiatric opinion.	
14.	Severe pain requiring urgent diagnostic assessment or parenteral analgesia.	

# Appendix 7: Community hospital day of care criteria

Further information on the community hospital day of care criteria is available.<sup>63</sup>

## **Components of the community hospital day of care criteria**

One or more criteria may be met for agreement.

1. Any invasive procedure that day which could not have been done as a day case.
2. New/change in treatment under medical supervision, requiring 24-hour nursing observation.\*
3. Parenteral therapy – intermittent or continuous IV fluids.\*
4. Vital sign monitoring at least four times a day.
5. IM or SC injections more than twice a day.\*
6. Fluid balance or daily weighing.\*
7. Major surgical wound care three times a day.\*
8. Close nurse monitoring more than three times a day.\*
9. Wound management requiring 24-hour nursing supervision.\*
10. General supervision required at least four times a night.
11. Bowel management plan with nursing input more than three times a day.
12. Bladder management plan with nursing input more than three times a day.
13. Blood transfusion.
14. Fever of at least 38°C within past 48 hours.\*
15. Coma/unresponsiveness in past 24 hours.\*
16. Acute confusional state for less than 48 hours with provisional diagnosis and treatment plan.\*
17. End of Life care.
18. Recent recovery from major surgery.
19. New acute illness – onset within 24 hours, not requiring DGH care but requiring non-resident medical care and nursing assessment.

20. Rehabilitation plan.

21. Medical respite care.

\*Criterion also appears in the Assessment Evaluation Protocol tool.

### **Departure from the criteria**

No community hospital day-of-care criteria met – reason assigned for departure:

1. Patient needs 24-hour care but at a lower level of care than a community hospital.
2. Problem in scheduling procedure.
3. Scheduled procedure was delayed.
4. Down days at the hospital (eg certain procedures not performed at weekend).
5. Waiting for results of tests/procedures.
6. Diagnostic procedure could be done as an outpatient.
7. Waiting for medical agreement for discharge.
8. Family/regular carers causing delay in discharge.
9. Organisation of services outside hospital delaying discharge.
10. Other.

# Appendix 8: Patient classification system for emergency/disaster management

Further details and examples are available in Sienkiewicz et al.<sup>64</sup><sub>66</sub>

## Level 1: Highest priority

The patient in this priority level needs uninterrupted services. The patient's condition is highly unstable, and deterioration or inpatient admission is highly probable if the patient is not seen. In case of a disaster or emergency, every possible effort must be made for the patient to receive care.

Patient examples include but are not limited to:

- a patient who is bedbound, paralysed, ventilator-dependent or unable to meet physiologic and safety needs
- a patient who needs extensive wound care
- an patient on infusion therapy who requires daily visits
- a patient with a mental health disorder unable to self-administer medications
- a patient who is cognitively impaired with urgent safety issues
- a patient who is functionally impaired requiring daily assistance to meet physical and nutritional health needs.

## Level 2: Moderate priority

The patient in this priority level may have a recent exacerbation of a disease process. The patient requires a moderate level of skilled care, meaning that care should be provided but may be able to be delayed until the emergency is contained. The patient may have essential untrained family/caregivers not prepared to provide needed care. Patient examples include but are not limited to:

- a patient who uses equipment as needed (PRN), ie oxygen, suctioning, nebulisation, patient-controlled analgesia pump
- a patient with diabetes who self-administers insulin and requires skilled monitoring of blood glucose less than every 24 hours

- a patient who has extensive wound care needs with support/back-up assistance
- a patient with multiple medication changes in the past 1-2 weeks
- a patient who requires medication refills
- a patient who requires custodial care who could not otherwise be managed.

### **Level 3: Low priority**

The patient in this priority level can safely forgo care or a scheduled visit without a high probability of harm or deleterious effects. The patient is able to manage alone for several days or longer, or may have significant others or available support systems in place. Patient examples include but are not limited to:

- a patient who is mobile and independent in functioning
- a patient needing uncomplicated routine wound care
- a patient who self-manages medications/diet
- a patient who is a low safety risk.

### **Note**

In the patient classification system guide, the examples in the priority levels are not listed in any rank order. The examples are suggestions for how agencies may wish to classify their patients. It is also suggested that a patient may be classified as Level 1 owing to specific circumstances and care needs at one point in time, and may be changed to a different classification at another time as circumstances and care needs change. Time frames for patient visits within the priority levels are purposely not recommended, recognising that numerous factors may affect each agency's ability to respond, including the time, type and location of the disaster, the available personnel and the care requirements of the patients.



# Appendix 9: CURB-65 and the Pandemic Medical Early Warning Score

By estimating the likelihood of death from community-acquired pneumonia, the CURB-65 scoring system can assist clinical decision-making when considering admission from this condition. The Department of Health, the British Thoracic Society, the British Infection Society and the Health Protection Agency currently recommend CURB-65 for use when assessing patients with influenza-like illness during a pandemic<sup>65</sup>.<sup>67</sup>

One point is allocated for each of:

- **C**onfusion mental test score <8 or new disorientation in person, place and time
- **U**rea >7mmol/l
- **R**espiratory rate  $\geq$ 30/min
- **B**lood pressure, systolic (<90mmHg) or diastolic ( $\leq$ 60mmHg)
- **A**ge  $\geq$ 65 years.

The score for each parameter is added together, and the higher the score, the greater the likelihood of death, therefore the greater the need for intervention. Under normal situations, people with a score of 0 or 1 would be managed at home and those with higher scores would be considered for admission to hospital. The Pandemic Medical Early Warning Score (PMEWS)<sup>66</sup> has been developed to identify those patients with community-acquired pneumonia who have the greatest mortality risk and thus the greatest need for hospital care. Some of the parameters are common to CURB-65, but PMEWS includes additional factors that are more social in nature.

**The drawback of both these systems is that they are limited to community-acquired pneumonia, and in the pandemic situation, those with the greatest risk of dying may not be the patients prioritised for treatment.**

# Appendix 10: Admission and discharge guidance for an influenza-like illness

Further details on the clinical management of patients with an influenza-like illness during an influenza pandemic are available in: *Clinical guidelines for patients with an influenza like illness during an influenza pandemic*.<sup>67</sup> The use of any severity assessment tool does not replace clinical judgment. A patient's social circumstances should also always be taken in to account.

## a) Admission guidance – adults

Patients with new or worsening symptoms – particularly shortness of breath or recrudescence of fever not responding to treatment – should be examined to assess the presence and severity of influenza-related pneumonia.

- Patients with worsening of pre-existing co-morbid medical conditions should be managed according to best practice for that condition with reference to published disease-specific guidelines, if available.
- In patients with influenza-related pneumonia clinically, hospital referral and assessment should be considered for patients with a CRB-65 score of 1 or 2 (particularly score 2) and urgent admission for those with CRB-65 score of 3 or more.
- Patients with bilateral chest signs of pneumonia should be referred to hospital for further assessment regardless of CRB-65 score.
- The CRB-65 score does not replace clinical judgment.

## b) Admission guidance – children

Children who are severely ill should be referred for assessment for admission. Indicators of severe disease are:

- oxygen saturation in air < 92% (absence of cyanosis is a poor discriminator for severe illness)
- severe dehydration
- altered conscious level
- complicated or prolonged seizures

- signs of sepsis such as extreme pallor, hypotension, a floppy infant
- signs of respiratory distress such as markedly raised respiratory rate, grunting, intercostal recession or breathlessness with chest signs.

### **c) Discharge guidance – adults**

Patients should be reviewed within 24 hours of discharge home. Those with two or more of the following unstable clinical factors should be considered for continued hospital management:

- temperature >37.8C
- heart rate >100/min
- respiratory rate > 24/min
- systolic blood pressure <90mmHg  
oxygen saturation <90%  
inability to maintain oral intake
- abnormal mental status.

**d) Discharge guidance – children** All children should be assessed for discharge at least twice daily. Children should not remain in hospital if they are receiving therapy that could be given in the community. In previously healthy children, suitable discharge criteria would be if the child:

- is clearly improving
- is physiologically stable
- can tolerate oral feeds
- has a respiratory rate of <40/min (<50/min in infants)
- has awake oxygen saturation of >92% on air.

# Appendix 11: Inclusion and exclusion criteria

<b>Inclusion and exclusion criteria from primary to secondary care</b>			
<b>Adult – inclusion criteria</b>	<b>Adult – exclusion criteria</b>	<b>Paediatric – inclusion criteria</b>	<b>Paediatric – exclusion criteria</b>
<p>Any acute trauma not amenable to treatment in primary care, eg suspected fractures, major lacerations</p> <p>Any acute surgical emergency where the cause or a co-morbidity is not within the exclusion criteria and where acute surgical intervention is required, eg suspected appendicitis, bowel obstruction</p> <p>Any acute medical emergency where the cause or a co-morbidity is not within the exclusion criteria, eg acute myocardial infarction, sepsis, gastrointestinal bleeds</p>	<p>Any acute trauma amenable to treatment in primary and community care eg minor lacerations, grazes, sprains, strains</p> <p>Admission for ‘social’ issues</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest</p> <p>Known, severe, progressive baseline cognitive impairment requiring respiratory support</p> <p>Known, advanced, untreatable neuromuscular disease requiring respiratory support</p> <p>Known, advanced metastatic malignant disease</p> <p>Known, advanced and irreversible immunocompromise requiring respiratory support</p> <p>Severe and irreversible neurological event or condition</p> <p>Elective palliative surgery</p>	<p>Any acute trauma not amenable to treatment in primary care, eg suspected fractures, major lacerations</p> <p>Any acute surgical emergency where the cause or a co-morbidity is not within the exclusion criteria and where acute surgical intervention is required, eg suspected appendicitis</p> <p>Any acute medical emergency where the cause or a co-morbidity is not within the exclusion criteria, eg sepsis</p>	<p>Any acute trauma amenable to treatment in primary and community care eg minor lacerations, grazes, sprains, strains Admission for ‘social’ issues, ensure child protection issues addressed</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest Known, severe, progressive baseline cognitive impairment requiring respiratory support Known, advanced, untreatable neuromuscular disease requiring respiratory support</p> <p>Known, advanced metastatic malignant disease Known, advanced and irreversible immunocompromise requiring respiratory support Severe and irreversible neurological event or condition Elective palliative surgery</p>

<b>Inclusion and exclusion criteria from A&amp;E to secondary care</b>			
<b>Adult – inclusion criteria</b>	<b>Adult – exclusion criteria</b>	<b>Paediatric – inclusion criteria</b>	<b>Paediatric – exclusion criteria</b>
<p>Any acute trauma not amenable to treatment in A&amp;E or where conservative management would compromise the outcome, eg compound fracture, fractured neck of femur, ruptured spleen</p> <p>Any acute surgical emergency where the cause or a co-morbidity is not within the exclusion criteria and where acute surgical intervention is required, eg suspected appendicitis, 'acute abdomen', gynaecological emergencies</p> <p>Any acute medical emergency where the cause or a co-morbidity is not within the exclusion criteria, eg acute myocardial infarction, sepsis, gastro-intestinal bleeds</p>	<p>Acute trauma amenable to conservative treatment in the A&amp;E department, eg manipulation of Colles' fracture and splintage in A&amp;E rather than pinning</p> <p>Admission for 'social' issues</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest</p> <p>Known, severe, progressive baseline cognitive impairment requiring respiratory support</p> <p>Known, advanced, untreatable neuromuscular disease requiring respiratory support</p> <p>Known, advanced metastatic malignant disease</p> <p>Known, advanced and irreversible immunocompromise requiring respiratory support</p> <p>Severe and irreversible neurological event or condition</p> <p>Elective palliative surgery</p>	<p>Any acute trauma not amenable to treatment in A&amp;E or where conservative management would compromise the outcome, eg compound fracture, ruptured spleen</p> <p>Any acute surgical emergency where the cause or a co-morbidity is not within the exclusion criteria and where acute surgical intervention is required, eg suspected appendicitis</p> <p>Any acute medical emergency where the cause or a co-morbidity is not within the exclusion criteria, eg sepsis</p>	<p>Acute trauma amenable to conservative treatment in the A&amp;E department, eg manipulation of fracture and splintage in A&amp;E rather than pinning</p> <p>Admission for 'social' issues – ensure child protection issues addressed</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest</p> <p>Known, severe, progressive baseline cognitive impairment requiring respiratory support</p> <p>Known, advanced, untreatable neuromuscular disease requiring respiratory support</p> <p>Known, advanced metastatic malignant disease</p> <p>Known, advanced and irreversible immunocompromise requiring respiratory support</p> <p>Severe and irreversible neurological event or condition</p> <p>Elective palliative surgery</p>

<b>Inclusion and exclusion criteria from secondary care to intensive care</b>			
<b>Adult – inclusion criteria</b>	<b>Adult – exclusion criteria</b>	<b>Paediatric – inclusion criteria</b>	<b>Paediatric – exclusion criteria</b>
<p>Requirement for invasive ventilatory support: refractory hypoxaemia SaO<sub>2</sub> &lt;90% on non-rebreathe mask or FiO<sub>2</sub> &gt;0.85: respiratory acidosis (pH &lt;7.2): clinical evidence of impending respiratory failure: inability to protect or maintain airway</p> <p>Hypotension (systolic blood pressure: &lt;90mmHg or relative hypotension) with clinical evidence of shock (altered level of consciousness, decreased urine output, or other evidence of end-stage organ failure)</p> <p>SOFA score = 7 or single organ failure</p>	<p>Severe trauma</p> <p>Severe burns with any two of the following: age &gt;60, &gt;40% of total surface area affected, inhalational injury</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest</p> <p>Known, severe, progressive baseline cognitive impairment</p> <p>Known, advanced, untreatable neuromuscular disease</p> <p>Known, advanced, metastatic malignant disease</p>	<p>Requirement for invasive ventilatory support</p> <p>Severe burns</p> <p>Hypotension with evidence of shock</p>	<p>Severe trauma</p> <p>Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest</p> <p>Known, severe, progressive baseline cognitive impairment</p> <p>Known, advanced, untreatable neuromuscular disease</p> <p>Known, advanced, metastatic malignant disease</p>

<b>Inclusion and exclusion criteria from secondary care to intensive care</b>			
<b>Adult – inclusion criteria</b>	<b>Adult – exclusion criteria</b>	<b>Paediatric – inclusion criteria</b>	<b>Paediatric – exclusion criteria</b>
	<p>Known, advanced and irreversible immunocompromise</p> <p>Severe and irreversible neurological event or condition</p> <p>SOFA score &gt;11</p> <p>End-stage organ failure meeting the following criteria:</p> <ul style="list-style-type: none"> <li>• Heart: New York Heart Association (NYHA) class III or IV</li> <li>• Chronic obstructive pulmonary disease with FEV1 &lt;25% predicted, baseline PaO2 &lt;7.33k Pascal, or secondary pulmonary hypertension</li> <li>• Cystic fibrosis with post-bronchodilator FEV1 &lt;30% or baseline PaO2 &lt;7.33k Pascal</li> <li>• Pulmonary fibrosis with VC or TLC &lt;60% predicted, baseline PaO2 &lt;7.33k Pascal</li> <li>• Primary pulmonary hypertension with NYHA class III or IV heart failure, right atrial pressure &gt;10mmHg, or mean pulmonary arterial pressure &gt;50mmHg</li> <li>• Liver – Child – Pugh score &gt;7</li> </ul>	<p>Head injury.</p> <p>Severe Burns</p>	<p>Known, advanced and irreversible immunocompromise</p> <p>Severe and irreversible neurological event or condition</p> <p>End-stage heart, lung or liver failure.</p>

# Appendix 12: Discharge and risk of consequential medical event

Consensus disposition classification and tolerance for rate of consequential medical events-from Kelen et Al <sup>68</sup>

Risk of consequential medical event	Basis	Mean upper limit of tolerance for consequential medical events (interquartile range)
Minimum	Minimum to no anticipated medical events during next 72 hours	3.8% (2–5)
Low	Calculated risk of non-fatal medical event. Transfer to low acuity facility appropriate. Consider early discharge when effects of disaster exceed risks of remaining in hospital	11.7% (8–15)
Moderate	Consequential medical event quite likely without clinical intervention Discharge to home not advisable Transfer to facility of moderate capabilities	33.1% (25–50)
High	Patient care cannot be interrupted without virtually assured morbidity or mortality. Highly skilled care required Transfer to major acute-care facility only	61% (45–80)
Very high	Patient cannot be moved or readily transferred Unstable for transport Consider ICU-capable transport only	92.3% (95–100)



# Appendix 13: Phased responses and staged triage for critical care

Further details on phased responses and staged triage for critical care are available.<sup>69</sup>

## Phased responses

### Phase 0

Normal activity

### Phase 1

- Cancellation of all elective surgical procedures requiring post-operative critical care admission
- opening of 'closed' critical beds
- expansion of nursing capacity by increasing agency or 'bank' shift support.
- secondment of additional medical staff from 'elective' duties (eg anaesthesia) where necessary
- discharge of suitable patients to other ward areas (with appropriate upgrade in medical/nursing support for these areas)
- non-clinical transfer (if appropriate and capacity exists) to other critical care units
- maintenance of existing nurse:patient staffing ratios.
- consider withdrawing or reducing critical care outreach services where these are provided and withdraw critical care follow-up and rehabilitation services.

Admissions to Level 3 critical care beds according to Stage 1 triage response

### Phase 2

As for Phase 1 plus:

- Upgrading of existing Level 2 beds to Level 3
- conversion of reserve critical care areas into Level 3 facilities (eg theatre recovery, HDU, SHCU, CCU)

- creation of Level 2 facilities in other clinical areas (if required)
- cancellation of annual leave for medical and nursing staff
- cancellation of all non-urgent surgery
- cohorting of index disease patients into specific clinical areas
- deployment of reserve-trained critical care nursing/medical staff.

Change in the ratios of critical care trained nurse:patient may be necessary; 1:1 ratio of nurse:patient target for all Level 3 patients, 1:2 for Level 2 patients

Admissions to Level 3 critical care beds according to Stage 2 triage response.

Critical care interventions according to Stage 2 triage response.

### **Phase 3**

As for Phase 2 plus:

- Maximum use of all available Level 3 capacity
- nurse:patient ratios according to local Clinical Leads' discretion
- full recruitment of reserve-trained critical care nursing/medical staff.

Admission to Level 3 beds according to Stage 3 triage response

Critical Care interventions according to Stage 3 triage response

### **Phase 4**

- An event of catastrophic severity could result in complete or partial collapse of some or all hospital infrastructures
- specific planning is not feasible given the extent of possible scenarios
- medical responses in such circumstances will be limited by the sustainability of personnel, equipment and environment
- it must be hoped that the process of planning for lesser phases will provide a basis for locally produced responses.

## **Staged triaging**

### **Stage 0**

Normal practice.

### **Stage 1**

Stringent admission review for all patients referred. Level 3 care may be restricted on the basis of SOFA scale assessment or other identified clinically significant co-morbidities. Full medical and nursing supportive Level 2 care will be provided as appropriate, but cardiopulmonary resuscitation will not be attempted if this proves ineffective.

In Stage 1 triage, it may be also necessary to introduce escalation limits on critical care interventions undertaken in patients. In patients where Level 3 care has been initiated but physiological deterioration has continued, despite full supportive care, it may be appropriate to consider limiting the degree or duration of circulatory support, or not to initiate renal replacement therapy if renal failure cannot be prevented.

### **Stage 2**

The principles of triaging are similar to those of Stage 1, but greater stringency will be required in deciding which patients should receive Level 3 care and the extent of the treatment interventions provided. These decisions should be shared by two or more consultants, both of whom ideally should be experienced in critical care medicine.

### **Stage 3**

Even with maximally expanded critical care capacity, it will only be possible to treat a limited proportion of the patients who may require Level 3 care as it is likely that all available Level 3 beds will be in use as a result of a progressively increasing referral rate. Consequently, many potentially preventable deaths may be inevitable. New referrals will only be able to receive Level 3 care if a bed becomes available because a patient has died or recovered sufficiently to be discharged.

Staffing and equipment limitations will be such that critical care interventions will have to be restricted. Mechanical ventilation, fluid therapy (+/- vasopressor

support), intravenous antibiotics and enteral nutritional support may be provided, but treatment will not be further escalated if deterioration occurs despite these interventions. In patients considered to be at risk of peptic ulceration, H2 receptor antagonist therapy may be considered appropriate.

The over-riding principle will be that only patients who are thought to have a good chance of survival with a reasonable life expectancy should receive Level 3 care. In patients who progress to multiple organ failure despite full supportive care, treatment interventions may have to be withdrawn, or non-escalation strategies agreed on the basis that other less sick patients are more likely to benefit from receiving Level 3 care. Use of the SOFA scale to assist in non-escalation/withdrawal decisions will ensure consistency for all patients.

The decision to withdraw or limit interventions earlier in the course of a patient's treatment than would be considered under normal circumstances is likely to cause distress to relatives and critical care staff, and the ability to continue functioning as a cohesive team will require careful attention to staff communication and morale.

As there is likely to be extreme distress, anger and even a risk of aggressive behaviour from family and friends of those in whom withdrawal of treatment interventions must be considered, it may be advisable to rely on non-escalation (eg not commencing vasopressor support or renal replacement) in many situations. Lack of availability of drugs, equipment or expertise may independently restrict such interventions.

Nursing and medical resources are likely to be under such pressure that the normal standards expected of critical care will inevitably be compromised and hence close teamwork and mutual staff support will be of crucial importance. Failure to preserve staff morale is likely to lead to increased absenteeism, and consequently increase staffing problems and reduce bed availability.

In the face of high demand there may be patients that the clinicians cannot differentiate between on the basis of benefit. At this stage, allocation of ICU treatment may required to be made by a clinically based selection process, taking into account the principles of the ethical framework (Appendix 2).

#### **Stage 4**

An event which causes the collapse of some or all hospital infrastructures may render attempts to maintain a cohesive critical care response difficult or even impossible. It is unrealistic to plan provision of life-support interventions in the absence of adequate equipment, supplies, staff and a suitable environment. Under such circumstances the provision of intensive care must be regarded as a lower priority than more sustainable responses to preserve lives and reduce the suffering of the wider public.

# Appendix 14: The Sequential Organ Failure Assessment scoring system

Organ system	0	1	2	3	4
<b>Respiratory</b>					
PaO <sub>2</sub> /FiO <sub>2</sub>	>400	≤400	≤300	≤200	≤100
<b>Renal</b>					
Creatinine (μmol/l)	<106	106–168	169–300	301–433 urine output <500ml/day	>433 urine output <200ml/day
<b>Hepatic</b>					
Bilirubin (μmol/l)	<20	20–32	33–100	101–203	>203
<b>Cardiovascular</b>					
Hypotension	No hypotension	Mean arterial BP <70mmHg	Dopamine ≤5	Dopamine >5 or Epinephrine ≤0.1 or Norepinephrine ≤0.1	Dopamine >15 or Epinephrine >0.1 or Norepinephrine >0.1
<b>Haematological</b>					
Platelet count (thousands/mm <sup>3</sup> )	>150	≤150	≤100	≤50	≤20
<b>Neurological</b>					
Glasgow Coma Scale score	15	13–14	10–12	6–9	<6

The Sequential Organ Failure Assessment (SOFA) score is based on a variety of easily measurable physiological parameters that have been validated in the critical care setting against a number of different population comparisons but not individual patient decision-making. While SOFA gives a degree of objectivity to support clinical decision-making,<sup>72</sup> there are currently no universally accepted systems available for scoring illness severity for the purposes of triage in this context. The SOFA scoring system for critically ill patients provides a simple and reproducible measure of illness severity, and may be used as assistance for decision-making. However, it has not been validated in this regard, and should not be used as a primary or exclusive triaging tool.<sup>70</sup>

# Appendix 15: Stakeholders who reviewed and provided feedback to the guidance process

Dr Louise Wilson, Pandemic Influenza Co-ordination Team, the Scottish Government (Lead Author)

Dr Bruce Taylor and Dr Carl Waldman, Intensive Care Society

Dr John Colvin, Chair, Scottish Critical Care Delivery group and SGHD Service and Patient Prioritisation Project Board member.

Service and Patient Prioritisation Project Board (Scotland) (chaired by Dr Lesley Wilkie)

Professor Vivienne Nathanson, British Medical Association

Dr Elaine Gadd, Deputy Director, Policy Research, Department of Health

Anita Simmonds, Sleep and Ventilation Unit, Royal Brompton Hospital

Keith Young, Critical Care Team, Urgent and Emergency Care, Department of Health

Oskan Edwardson, Executive Director of Operations, East of England Ambulance Trust (on secondment to Department of Health PIPP)

Janet Meacham, Deputy Director, PIPP team, DH

Dr Calum Semple, Senior Lecturer in Child Health and Consultant Respiratory Paediatrician, Institute of Child Health, University of Liverpool and Alder Hay Children's Hospital, (on secondment to Department of Health PIPP)

Dr Barbara Bannister, Consultant Adviser in Pandemic Influenza Planning, Department of Health

Dr Nick Clements, Head of Medical Services, MPS

Mary-Lou Nesbitt, Head of Governmental and External Relations, MDU

Jane O'Brien, Head of Standards & Ethics, General Medical Council

Simon Cole, Social Care Lead, Health and Social Care Implementation Team, PIPP

Alison Langridge, Communications Team, PIPP,

Simon Roger, Deputy Director, DH Legal Services, Department of Work and Pensions

**Emergency Planning Clinical Leadership Advisory Group (EPCLAG) (please see list of members below)**

Chair: Dr Penny Bevan, Director of Emergency Preparedness, DH  
Dr Anthony Bleetman-Honorary Senior Clinical Lecturer in Surgery, British Association for Accident and Emergency Medicine  
Dr David Zideman-Chairman, British Association for Immediate Care  
Mr Pete -Dziewulski-Consultant Burn & Plastic Surgeon, British Burn Association-  
Dr Vivienne Nathanson-Head of Science & Ethics, British Medical Association  
Dr Peter-Holden Deputy Head of GPs Committee, British Medical Association  
Dr David Snashall -Faculty of Occupational Medicine of the Royal College of Physicians  
Dr Bruce Taylor-Consultant in Critical Care Medicine & Anaesthesia, Intensive Care Society  
Dr Simon Stockley- Royal College of General Practitioners  
Mr Mike Hayward-Professional Nurse Advisor for Acute & Emergency Care and RCN UK lead for Emergency Planning, Royal College of Nursing  
Ms Celia Kendrick-Senior Nurse, Royal College of Nursing  
Dr Ian Maconochie-Consultant in Paediatric A&E, Royal College of Paediatrics & Child Health  
Professor Michael Murphy-National Blood Service Oxford, Royal College of Pathologists  
Professor Sebastian Lucas-Department of Histopathology, Royal College of Pathologists  
Professor Roy Pounder-Royal College of Physicians  
Professor Richard Williams , Royal College of Psychiatrists  
Mr-David Jones-Royal College of Surgeons  
Dr Fionna Moore-Medical Director, London Ambulance Service  
Professor Peter McCollum-Consultant Surgeon, Royal College of Surgeons of Edinburgh  
Dr Hamish Meldrum-GPC Chairman, British Medical Association  
Mr Darren Walter-Faculty of Pre-Hospital Care representative, Royal College of Surgeons of Edinburgh  
Group Capt. David Jenkins-, Ministry Of Defence  
Ms Kelly Jervis-Senior Sister/ Emergency Planning Support Officer, Heart of England NHS Foundation Trust.  
Professor Lindsey -Davies- National Director of Pandemic Influenza Preparedness, DH  
Mr James Latta- Strategic Asset Management, DH



**Committee for Ethical Aspects of Pandemic Influenza (CEAPI). (please see list of members below)**

Chair: Very Reverend Graham Forbes, Provost of St Mary's Cathedral, Edinburgh

Mrs Julie Acred, Chief Executive, Derby Hospitals NHS Foundation Trust

Dr John Colvin, Consultant and Honorary Senior Lecturer in Anaesthesia and Intensive Care Medicine, Ninewells Hospital and Medical School, Dundee

Dr Jane Cowan, Medicolegal Adviser, MPS Risk Consulting

Dr Jean Jacques de Gorter, Director of Clinical Services, BUPA Hospitals Ltd

Professor Robert Dingwall, Director of the Institute for the Study of Genetics, Biorisks and Society, University of Nottingham

Mr Eugene Gallagher, Head of Primary Care & Family Practitioner Services in the Western Health and Social Services Board, Belfast

Professor Trisha Greenhalgh, Professor of Primary Health Care at University College London

Professor John Harris, Professor of Bioethics, School of Law, University of Manchester

Dr Victor Larcher, Consultant in General Paediatrics and Clinical Ethics, Great Ormond Street Hospital, London

Professor Jonathan Montgomery, Professor of Health Care Law, University of Southampton; Chair, Hampshire Primary Care Trust

Professor Vivienne Nathanson, Director of Professional Activities, British Medical Association

Ms Jane O'Brien, Head of Standards & Ethics, General Medical Council

Professor Michael Parker, Professor of Bioethics and Director of the Ethox Centre at the University of Oxford

Dr Clive Richards, Consultant in public health medicine, Nottinghamshire

Mr Hugh Robertson, Senior Policy Officer with responsibility for Prevention, Rehabilitation and Compensation, Trades Union Congress

Mrs Shahwar Sadeque, Educational & ICT Consultant and Chief Executive of TriEs Ltd

Professor John Saunders, Consultant Physician, Nevill Hall Hospital, Abergavenny; Chairman of the Committee for ethical issues in medicine, Royal College of Physicians

Mr Roy Taylor, Director of Community Services, Kingston upon Thames

Mr Geoff Watts, freelance journalist

Professor Richard Williams, Professor of Mental Health Strategy, University of Glamorgan; Consultant Child and Adolescent Psychiatrist, Gwent Healthcare NHS Trust

Dr Patricia Wilkie, Chair, Academy of Medical Royal Colleges patient/lay committee

**Feedback received from the following organisations as part of the formal consultation process.**

Alliance Boots Ltd

BMA

NHS Sheffield

Emergency Preparedness, NHS Yorkshire and the Humber

Gwion Rhys (LHB Board Member, GP partner)

Help the Aged

Dartford and Gravesham NHS Trust

North Trent Critical Care Network

John McCracken, Respiratory Therapist in Peterborough, Ontario

Sheffield PCT

National Pharmacy Association

Royal Manchester Children's Hospital

NHS South East Coast

Eastbourne DGH

Surrey Borders PCT

Norfolk and Norwich University Hospital

Royal College of General Practitioners

South Birmingham PCT

NHS East of England

Southampton General Hospital

Surrey Wide Critical Care Network

Wirral University Teaching Hospital NHS Foundation

Birmingham Children's Hospital

# Appendix 16: References

---

- 1 Or country-specific guidance – Pandemic Flu: A Scottish Framework for responding to an influenza pandemic.
- 2 On the state of public health: the annual report of the Chief Medical Officer of the Department of Health and Social Security for the year 1957. London: HMSO, 1958
- 3 On the state of public health: the annual report of the Chief Medical Officer of the Department of Health and Social Security for the year 1969. London: HMSO, 1970
- 4 Office for National Statistics, 2007, available at [www.statistics.gov.uk/cci/nugget.asp?id=949](http://www.statistics.gov.uk/cci/nugget.asp?id=949)
- 5 Average daily number of available and occupied beds by sector, England, 2009. Department of Health form KH03a, published 27th February 2009
- 6 Ibid
- 7 Menon DK, Taylor BL, Ridley SA. 'Modelling the impact of an influenza pandemic on critical care services in England', *Anaesthesia*, 2005, 60: 952–4.
- 8 Emergency response and recovery: Non-statutory guidance to complement emergency preparedness. London: HM Government, 2005.
- 9 NHS Emergency Planning Guidance 2005: Critical Care Contingency Planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity. London: Department of Health, 2006
- 11 Pandemic influenza: Guidance for primary care trusts and primary care professionals on the provision of healthcare in a community setting in England. London: Department of Health, 2007.
- 11 Pandemic Influenza The UK Blood Services Plan. UK Blood Services, 2006. [www.blood.co.uk/hospitals/library/pdf/MPD\\_PTI\\_DI\\_010\\_01.pdf](http://www.blood.co.uk/hospitals/library/pdf/MPD_PTI_DI_010_01.pdf)
- 12 Emergency planning: Development of an integrated plan for the management of blood shortages (NHS Gateway reference 3344). [www.dh.gov.uk/assetRoot/04/08/59/91/04085991.pdf](http://www.dh.gov.uk/assetRoot/04/08/59/91/04085991.pdf)
- 13 Pandemic influenza: human resources guidance for the NHS. London: Department of Health, 2008. [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080742](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080742)
14. Pandemic Flu: Scottish guidance on human resources. [www.scotland.gov.uk/pandemicflu](http://www.scotland.gov.uk/pandemicflu)
- 15 Pandemic influenza: human resources guidance for the NHS. London: DH, 2008. [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080742](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080742)
- 16 Pandemic Flu: Scottish guidance on human resources. [www.scotland.gov.uk/pandemicflu](http://www.scotland.gov.uk/pandemicflu)

- 
- 17 Strategic Health Authorities in England, Local Health Boards in Wales, Health Boards in Scotland, and Health and Social Services Boards in Northern Ireland.
- 18 Pandemic Flu: A national framework for responding to an influenza pandemic. London: DH, 2007
- 19 Pandemic influenza: human resources guidance for the NHS. London: DH, 2008.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080742](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080742)
- 20 Pandemic Influenza – The UK Blood Services Plan. UK Blood Services, 2006.  
[www.blood.co.uk/hospitals/library/pdf/MPD\\_PTI\\_DI\\_010\\_01.pdf](http://www.blood.co.uk/hospitals/library/pdf/MPD_PTI_DI_010_01.pdf)
- 21 Emergency planning: Development of an integrated plan for the management of blood shortages (NHS Gateway reference 3344). 2004.  
[www.dh.gov.uk/assetRoot/04/08/59/91/04085991.pdf](http://www.dh.gov.uk/assetRoot/04/08/59/91/04085991.pdf)
- 22 An integrated plan for the National Blood Service and hospitals to address platelet shortages (NHS Gateway reference 6514). 2006.  
[www.dh.gov.uk/assetRoot/04/13/91/57/04139157.pdf](http://www.dh.gov.uk/assetRoot/04/13/91/57/04139157.pdf)
- 23 refer to [www.dh.gov.uk/en/publichealth/pandemicflu/index.htm](http://www.dh.gov.uk/en/publichealth/pandemicflu/index.htm) for the latest information on pandemic influenza alert levels.
- 24 Manchester Bed Study, 1988; GMSHA UM programme, 2002–06, North West UM programme, 2006
- 25 Care and resource utilisation: ensuring appropriateness of care. London: DH, 2006.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_063265](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_063265)
- 26 Smith HE, Pryce A, Carlisle L, et al. 'Appropriateness of acute medical admissions and length of stay'. *J R Coll Physicians, Lond*, 1997, 31(5): 527–32.
- 27 Donald IP, Jay T, Linsell J and Foy C. 'Defining the appropriate use of community hospital beds'. *Br J Gen Pract*, 2001, 51(463): 95–100.
- 28 MacFaul R, Glass EJ and Jones S. 'Appropriateness of paediatric admission', *Arch Dis Child*, 1994, 71(1): 50–8.
- 29 Werneke U and MacFaul R. 'Evaluation of appropriateness of paediatric admission', *Arch Dis Child*, 1996, 74(3): 268–73.
- 30 Christian MD, Hawryluck L, Wax RS et al. 'Development of a triage protocol for critical care during an influenza pandemic', *CMAJ*, 2006, 175(11): 1377–81
- 31 National Framework Decision Support Tools.  
[www.dh.gov.uk/en/SocialCare/Deliveringadultsocialcare/Continuingcare/DH\\_073912](http://www.dh.gov.uk/en/SocialCare/Deliveringadultsocialcare/Continuingcare/DH_073912)
- 32 . Sienkiewicz J, Wilkinson G, Cabbage B. 'A patient classification system for emergency events in home care', *Home Healthcare Nurse*, 2007, 25(6): 378–85.
- 33 CG50 'Recognition of and response to acute illness in adults in hospital', NICE guidance, 25 July 2007.
- 34 Challen K, Bright J, Bentley A and Walter D. 'Physiological-social score (PMEWS) vs. CURB-65 to triage pandemic influenza: a comparative validation study using community-acquired pneumonia as a proxy'. *BMC Health Serv Res*. 2007, 7: 33.

- 
- 35 Clinical guidelines for patients with an influenza like illness during an influenza pandemic. London: DH/British Thoracic Society/British Infection Society/Health Protection Agency, 2006.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4121753](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4121753)
- 36 Christian MD, Hawryluck L, Wax RS et al. 'Development of a triage protocol for critical care during an influenza pandemic', *CMAJ* 2006, 175(11): 1377–81.
- 37 Ardagh M "Criteria for prioritising access to healthcare resources in New Zealand during an influenza pandemic or at other times of overwhelming demand" *N.Z. Med J* 2006, 119(1243): U2356
- 38 Clinical guidelines for patients with an influenza like illness during an influenza pandemic. London: DH/British Thoracic Society/British Infection Society/Health Protection Agency, 2006.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4121753](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4121753)
- 39 Kelen GD, Kraus CK, McCarthy ML, et al. 'Inpatient disposition classification for the creation of hospital surge capacity: a multiphase study', *Lancet* 2006, 368(9551): 1984–90
- 40 Kraus CK, Levy F and Kelen GD. 'Lifeboat ethics: considerations in the discharge of inpatients for the creation of hospital surge capacity'. *Disaster Med Public Health Prep* 2007, 1(1): 51–6.
- 41 Forster AJ, Clark HD, Menard A et al. 'Adverse events among medical patients after discharge from hospital'. *CMAJ* 2004, 170(3): 345–9. Erratum in: *CMAJ* 2004 Mar 2, 170(5): 771.
- 42 Kelen GD, Kraus CK, McCarthy ML et al. 'Inpatient disposition classification for the creation of hospital surge capacity: a multiphase study', *Lancet* 2006, 368(9551): 1984–90
- 43 Responding to pandemic influenza: The ethical framework for policy and planning. London: DH, 2007.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080751](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080751)
- 44 NHS Emergency Planning Guidance 2005: underpinning materials – critical care contingency planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity. London: DH, 2007.  
[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_081282](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_081282)
- 45 Ibid.
- 46 Taylor B, Kemp V, Goldhill D and Waldmann C on behalf of the Intensive Care Society and the Division of Emergency Preparedness. 'Critical care contingency planning: phased responses and triaging framework'. *J Intensive Care Society* 2008, 9(1): 16–19. <http://journal.ics.ac.uk/pdf/0901016.pdf>
- 47 Pandemic flu: A national framework for responding to an influenza pandemic. London, DH, 2007.

---

[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080734](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080734)

48 Responding to pandemic influenza: The ethical framework for policy and planning. London: DH, 2007.

[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080751](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080751)

49 Hick JL, Daniel MD and O’Laughlin MD. ‘Concept of operations for triage of mechanical ventilation in an epidemic’, *Acad Emerg Med* 2006, 13: 223–9.

50 Christian MD, Hawryluck L, Wax RS et al. ‘Development of a triage protocol for critical care during an influenza pandemic’, *CMAJ* 2006, 175(11): 1377–81.

51 Ibid.

52 Confalonieri M, Potena A, Carbone G et al. ‘Acute respiratory failure in patients with severe community-acquired pneumonia. A prospective randomized evaluation of noninvasive ventilation’. *Am J Respir Crit Care Med* 1999, 160: 1585–91.

53 Levy M, Tanios MA, Nelson D et al. ‘Outcomes of patients with do-not intubate orders treated with noninvasive ventilation’. *Crit Care Med* 2004, 32: 2002–7.

54 Simonds AK. ‘Continuous positive airway pressure and non-invasive ventilation in acute hypoxaemic respiratory failure’. In: Simonds AK, (ed). *Non-invasive respiratory support: A practical handbook*. 3rd edition. PP. 57–71. London: Hodder Arnold, 2007.

55 *Pandemic influenza: Guidance for infection control in critical care*. London: DH, 2008.

[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_084178](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_084178)

56 Curtis JR, Cook DJ, Sinuff T et al. ‘Noninvasive positive pressure ventilation in critical and palliative care settings: understanding the goals of therapy’. *Crit Care Med* 2007, 35: 932–9

57 Ross CAC and Martin K. ‘Severity of influenza (1969–70)’. *General Practice and Hospital Health Bulletin* 1971, 29(3): 165–6.

58 *Clinical guidelines for patients with an influenza-like illness during an influenza pandemic*. London: DH, British Thoracic Society, British Infection Society, HPA, 2006.

59 *Pandemic influenza: Guidance for primary care trusts and primary care professionals on the provision of healthcare in a community setting in England*. London: DH, 2007.

[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080757](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080757)

60 Counter Fraud and Security Management Services, [www.cfsms.nhs.uk](http://www.cfsms.nhs.uk)

61 Responding to pandemic influenza: The ethical framework for policy and planning. London: DH, 2007.

[www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080751](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080751)

---

62 Manchester Bed Study, 1988; GMSHA UM programme, 2002-06, North West UM programme, 2006 Care and resources utilisation: ensuring appropriateness of care, DH, 2006 (Appendix 1

63 Donald IP, Jay T, Linsell J and Foy C. 'Defining the appropriate use of community hospital beds', Br J Gen Pract, 200151(463): 95–100

64 Sienkiewicz J, Wilkinson G and Cubbage B. 'A patient classification system for emergency events in home care', Home Healthc Nurse, 2007, 25(6): 378–85.

65 'Pandemic flu: Clinical guidelines for patients with an influenza-like illness during an influenza pandemic', Thorax, 2007, 62 (suppl. 1): i 1–46

66 Challen K, Bright J, Bentley A et al. 'Physiological–social score (PMEWS) vs. CURB-65 to triage pandemic influenza: A comparative validation study using community-acquired pneumonia as a proxy', BMC Health Services Research, 2007, 7: 33.

67 Clinical guidelines for patients with an influenza like illness during an influenza pandemic. London: DH, 2006

68

69 Taylor B, Kemp V, Goldhill D, Waldmann C on behalf of the Intensive Care Society and the Division of Emergency Preparedness. 'Critical care contingency planning: phased responses and triaging framework', J.Intensive Care Society, 2008, 9(1): 16–19.

70 Christian MD et al. 'Development of a triage protocol for critical care during an influenza pandemic' CMAJ, 2006, 175(11): 1377–81