

Critical care strategy: Managing the H1N1 flu pandemic

Executive summary

1. The NHS is one of the best-prepared health systems in the world for an influenza pandemic. This document describes the approach to managing critical care in a H1N1 flu pandemic.
2. One of the key priorities for the NHS during an influenza pandemic is saving the lives of those who become seriously ill as a result of infection with the virus. H1N1 flu is mild for the majority of people, but some people will need treatment in hospital, with a small proportion of these being so ill as to require critical care, to help them recover. This strategy sets out how we will maximise the number of people who can benefit from this care during a pandemic.
3. Existing guidance for pandemic influenza suggested that the NHS ought to have plans in place to double critical care capacity. The ten Strategic Health Authorities have now confirmed for the first time that robust plans have been developed to enable this to be delivered, should it be needed in response to a surge in cases of H1N1 flu. These plans are a significant achievement, and reflect the hard work and dedication of many doctors, nurses and managers in hospitals, ambulance trusts and PCTs and staff in Local Authority and social care organisations across England.
4. Alongside increasing capacity, we need to try to prevent people becoming seriously ill with H1N1 flu in the first place. Good hygiene practices, vaccination, access to antiviral medication and primary care and community services all have a key part to play in keeping people well, thereby minimising pressure on NHS hospital services, particularly critical care.
5. Doubling critical care capacity will allow many more people to benefit from critical care than would otherwise be the case. In order to achieve this very significant increase, hospitals will need to deploy their trained workforce differently and may need to postpone non-urgent, planned operations, so that they can concentrate their staff and resources on the most seriously ill patients.

6. The NHS has also developed plans to increase substantially the number of critical care beds for children. In some cases, doctors may also determine that older children should be appropriately cared for in an adult critical care unit.
7. The NHS is planning effectively to increase critical care to manage the potential demands of H1N1 flu. However, there is more work to be done to ensure that we are as fully prepared as possible, for a potential surge of cases later this year. An H1N1 Critical Care Clinical Group, comprised of the foremost clinical and logistical experts, has been convened to provide advice to frontline staff on how to operate critical care services during the pandemic.
8. We need to ensure that we maximise the use of the available critical care services, with areas that are less affected by H1N1 flu helping out those areas that are more affected. Regional and national coordination of critical care beds, including ambulance services' patient transport arrangements will be part of ensuring that the right patient is in the right bed at the right time.
9. We will be continuing to work with Strategic Health Authorities and the local NHS to develop a framework for handling decisions that might need to be made by local organisations to increase critical care capacity, given the associated consequences on staffing and activity elsewhere in the hospital.
10. As well as protecting themselves from infection by being vaccinated, staff will need to be fully supported by their employer to enable them to contribute maximally during a pandemic scenario.

Introduction

1. Experience from previous influenza pandemics has indicated that they can result in a rise in demand for hospital treatment.
2. This strategy sets out our approach to managing critical care during the H1N1 flu pandemic. Part of this approach involves increasing the number of available critical care beds. However, we also need to try to prevent people becoming seriously ill as a result of H1N1 flu.
3. Critical care services operate as part a whole system approach, so all NHS and social care organisations have a role to play in ensuring critical care services can handle the demands that might be placed on them as a result of a surge.

What we know about the pandemic H1N1 influenza virus

4. The pandemic H1N1 influenza virus is currently resulting in mild clinical illness for the majority of those who become infected. At present, it appears to be milder and spread less rapidly than our plans for a pandemic of avian influenza H5N1 assumed.
5. However, in contrast to most seasonal influenza strains, in some people H1N1 flu can produce severe lung disease. It seems to invade preferentially the lower, rather than upper, airway. This can manifest in acute lung injury, resulting in hypoxemia (low oxygen concentration in the blood) and stress on the heart.
6. To date, a small minority of people have required hospital care to help them recover from H1N1 flu. This is particularly the case for people who have underlying health conditions¹ that make them more susceptible to serious illness caused by H1N1 flu. Pregnant women also seem to be more vulnerable.

What do we mean by critical care

¹ Relevant underlying health conditions include chronic (long-term) lung disease, including people who have had drug treatment for their asthma within the past three years, chronic heart disease, chronic kidney disease, chronic liver disease, chronic neurological disease (neurological disorders include motor neurone disease, Parkinson's disease and multiple sclerosis), suppressed immune systems (whether caused by disease or treatment) and diabetes.

7. Critical care services support people who are seriously ill, whether because of a major illness, accident or following major surgery. Most patients admitted to critical care have one or more organs that require sophisticated technological support because they are not functioning properly.
8. There are two levels of adult critical care:
 - Level 3: Frequently called intensive care, this is the most complex care, including multi-organ support and ventilation.
 - Level 2: Sometimes called high-dependency care, this is less complex than level 3, but more so than that provided in hospital wards. It is sometimes used for patients following operations, or who are being 'stepped-down' from Level 3 care before they are transferred to general wards.
9. Critical care units would normally comprise a number of Level 2 and Level 3 designated beds, staffed by several specialist consultants and enough nurses to provide one-to-one care to the sickest patients, 24 hours a day.
10. It is reasonable to assume that most patients who require critical care as a result of H1N1 will need some degree of advanced respiratory support. Therefore, for the specific purpose of this strategy, the terms critical care refers specifically to Level 3 services.
11. The definitions of critical care are slightly different for children, with Level 2 care denoting a need for continuous nursing supervision and some organ support. Level 3 care involves advanced respiratory support, intensive nursing supervision and complex monitoring. It is a specialised service, requiring sophisticated equipment and highly trained staff. Neonatal intensive care units are designated differently again.
12. There are currently 3,647 adult critical care beds (composed of 1,982 Level 3 (ITU) and 1,665 Level 2 (HDU beds) and 363 paediatric critical care beds in England. This equates to a total of 4,010 critical care beds for adults and children across the NHS in England. Data on critical care beds were first collected in 1999/2000 and since July 2000 there has been a 56% increase in open and staffed NHS beds.²
13. A full definition of levels of care is at Appendix One.

² Department of Health KH03a return. There were 2,343 available (open and staffed) critical care beds in the count taken in July 2000. The comparable figure in the count taken in July 2009 was 3,647.

Planning for an increase in demand for critical care

14. The NHS has been preparing for an influenza pandemic for around five years and is acknowledged to be one of the best prepared health systems in the world³. Since April 2009, there has been a sharpened focus on preparing specifically for the demands of H1N1 flu.
15. Guidance published on 30th April 2009⁴ reinforced to the NHS the recommended planning requirement of a 100% increase (a doubling) in the availability of critical care beds from normal levels. A summary of existing guidance on emergency planning and pandemic influenza preparedness is at Appendix Two. It is expected that such an increase might need to be sustained for around 8-10 weeks as the demand rises, peaks and then falls away.
16. The National Director for NHS Flu Resilience, Ian Dalton, wrote on 2 July to all NHS Chief Executives to make clear the expectation that preparedness plans need to be reviewed and subjected to further testing. Alongside this, each NHS Board has been asked to make a statement regarding the readiness of their organisation in September.
17. The Department of Health has also collaborated with professional bodies to help local organisations test the resilience of their critical care services. Strategic Health Authorities (SHAs) are currently working with local Chief Executives, and critical care network colleagues, to ensure critical care resilience informs the formal updates that all NHS Boards will make in September.
18. SHAs have been leading regional planning, working with Primary Care Trusts (PCTs) and individual hospitals to ensure there are plans in place to deal with an increase in demand for critical care as a result of H1N1 flu.
19. The Department of Health has also been working collaboratively with Wales, Scotland and Northern Ireland, in order that a consistent approach is adopted across the U.K.
20. Each of the ten SHAs in England have now confirmed to the Department that they have robust plans in place to be able to double the capacity of Level 3 critical care, in response to H1N1 flu.
21. The following sections provide more detail on how this can be achieved, and sets these plans in the wider context, emphasising the importance of trying to prevent people contracting H1N1 flu and becoming seriously ill as a result as a key part of managing the overall demand for critical care.

³ World Health Organisation, November 2007

⁴ Pandemic flu: Managing Demand and Capacity in Health Care Organisations. (Surge)

Preventing people becoming seriously ill as a result of H1N1 flu

22. Critical care services operate as part of the whole health and social care system, and so cannot be viewed in isolation. Our approach recognises these inter-dependencies and seeks to maximise the contributions that all parts of the system can make. This means trying to prevent as many patients as possible becoming infected with H1N1 flu, providing appropriate treatment with antivirals and in primary care to try to prevent serious illness developing, as well as ensuring that patients who need it are rapidly admitted to hospital, with those most likely to benefit from critical care accessing it when needed.
23. The diagram below summarises the strategy for ensuring that critical care services are able to cope with the anticipated demand.

Taking a whole-systems approach to critical care in a swine flu pandemic

Public	Primary, community & mental health care	Social care services	Ambulance services	Acute trusts: general services	Acute trusts: Critical care services
Good hand and respiratory hygiene					
Swine and seasonal flu vaccination of frontline healthcare and social care workers					
Vaccination of high-risk groups	Deliver vaccination programme		Rapidly transport people to hospital	Manage hospital capacity to ensure sufficient availability of level 3 critical care services	
Rapid access to primary care for high-risk groups	Manage high-risk groups				
Rapid access to antivirals through NPFS	Prescribe antivirals				
	Continue to support people at home and in the community				
	Minimise delayed discharges				

24. Different parts of the strategy can only be implemented at certain times. Since the beginning of the H1N1 flu pandemic, the NHS has been working hard to preventing infections occurring, and, if they do occur, trying to prevent them causing serious illness. This work, which includes vital contributions from General Practice and the National Pandemic Flu Service, will continue until the end of the pandemic.
25. Using resources most effectively is relevant during the peak weeks when significant numbers of people are likely to require hospitalisation. Clearly, any steps taken to focus resources more towards patients with H1N1 should only be taken as, and when, the situation requires them, although detailed planning will need to have taken place in advance.

Preventing infection

26. Everyone, from members of the public through to frontline health and social care staff, can reduce the spread of infection by following hand washing and respiratory hygiene advice. Taking extra precautions to protect others from infection (particularly those who are most vulnerable to H1N1 flu) could have a significant impact on the number of people who become seriously ill. A public campaign to raise awareness is ongoing.
27. Vaccination is the most important way by which we can prevent people catching H1N1 flu and developing serious illness as a result. Subject to the licensing process, vaccinations against both H1N1 and seasonal influenza will be offered to high-priority groups from the autumn. People who are known to be vulnerable to infection are urged to ensure they are vaccinated to protect themselves and help support the NHS and social care services.
28. Frontline health and social care staff have also been prioritised for both H1N1 and seasonal flu vaccinations, because their job places them at greater risk of infection. NHS staff have a responsibility to themselves, their families and their patients to ensure they are protected from flu this Winter. NHS Boards and their Chief Executives, Medical and Nursing Directors are accountable for ensuring that the benefits of vaccination are fully explained to their frontline staff, and that vaccine take-up is consequently good.

Managing admissions and discharges

29. Although good hygiene measures and vaccination might prevent significant numbers of infections, many people may nevertheless become infected with H1N1 flu. Those who do contract H1N1 flu should follow the advice relating to rapid access to antivirals, using the National Pandemic Flu Service (NPFS)⁵, to reduce the severity and duration of illness.
30. The NPFS was launched in July 2009 to take the pressure off frontline primary care services⁶. By diverting otherwise healthy people away from primary care, we can ensure that patients in high-risk groups and those with complications are still able to access their GPs. It is particularly important that pregnant women and infants see their GP urgently. Clinical support provided by primary care should help to reduce the number of patients who need hospitalisation, with GPs helping to manage their illness at home or in the community wherever possible.
31. The support of community, mental health and social care services will be critical to ensure that patients can be effectively looked after out of hospital. All relevant organisations are expected to have robust and tested plans in

⁵National Pandemic Flu Service: <https://www.pandemicflu.direct.gov.uk/> or 0800 1 513 513

⁶ The NPFS is currently not operational in Scotland, Wales and Northern Ireland, but it can be switched on if needed

place to alleviate pressure on their services due to H1N1 flu and to avoid people requiring hospital admission where possible.

32. Mental health services, for example, should have considered how they can best meet the needs of their service users to reduce the need for them to be admitted to acute hospitals because of H1N1 flu. Equally, primary and community services should have arrangements in place to enable more people to be cared for in community settings.
33. Local authorities have also taken steps to ensure the business continuity of their services, and it is essential that children and adult social care services are able to continue to care for people during a H1N1 flu pandemic. It will be particularly important to ensure that the providers of nursing, residential and domiciliary care continue to operate effectively, and that carers are supported to continue to look after vulnerable people. Vaccination of frontline social care staff should help ensure the resilience of these organisations.

Increasing critical care capacity

34. Each of the ten SHAs in England have provided assurance to the Department of Health that they have developed robust plans for doubling critical care capacity, in line with the recommended target from DH pandemic influenza guidance.
35. The NHS is planning a phased approach, aimed at matching the level of response to the pressure being felt by local services. The priority is to enable as many people as possible to benefit from critical care, and in doing so save lives.
36. During the winter months of every year, more people become seriously ill and require hospital care than at other times of the year. Services in all NHS hospitals are used to dealing with this increase in demand, and there are tried-and-tested strategies in place to respond.
37. Often during winter, services enter a phase one response, which involves increasing the capacity of critical care by opening additional critical care beds and expanding the numbers of nurses, for example by using bank staff. To help reduce demand from non-emergencies there may be some corresponding reduction in elective activity.
38. Should a surge in H1N1 flu cases occur, it is expected that critical care services will experience a significantly greater increase in demand this winter. All SHAs have confirmed that, in response, their services will be able to enter phase two, doubling the available bed capacity.
39. The following table sets out a summary of the actions that could be taken by local organisations in these different phases. There are differences between hospitals with regard to critical care capacity and the way that services are provided by them. The measures described in the table are available to local organisations and their implementation will be dependent on the scale of demand facing hospitals due to patients hospitalised with H1N1. Not all of these actions will be taken by all hospitals but they are appropriate responses to large increases in demand and would be implemented after consideration of the options open to each hospital.

Phase	Actions	Implications	Effect on critical care capacity
Current Position	Test and refine plans to increase capacity	None.	No increase
One	<ul style="list-style-type: none"> • Postponement of elective surgical procedures that require post-operative critical care admission • Opening of 'closed' critical care beds • Expansion of nursing capacity by increasing agency or bank staff support • Where necessary, secondment of additional medical staff from elective duties (e.g. anaesthesia) • 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 • Consider withdrawing or reducing critical care follow-up and rehabilitation services 	<ul style="list-style-type: none"> • Paediatric critical care referrals still to tertiary centres • Reduced occupancy of level 2 critical care areas to assist patient flow 	Roughly 20% increase in Level 3 beds (with potential reduction in Level 2 beds)
Two	<p>As for Phase 1 plus:</p> <ul style="list-style-type: none"> • 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 leave for medical and nursing staff • Cancellation of all non-urgent surgery • Deployment of reserve-trained critical care nursing/medical staff • Change in the ratios of critical care trained nurse:patient may be necessary 	<ul style="list-style-type: none"> • All elective surgery postponed • Outpatient appointments postponed • Paediatric patients may be managed in adult beds 	Doubled

40. SHAs and hospitals are likely to take actions within the phases in a flexible manner in response to need in a stepped transition through different phases rather than a single large step.
41. We will be working with SHAs to develop the arrangements for agreeing movement between the phases as part of the work described in paragraphs 69 to 78 below. This work will include linking the phases in any escalation plan with the phases set out in existing pandemic flu guidance.

Regional planning

42. To support the development of this strategy, SHAs have submitted information to the Department on their ability to increase critical care capacity. SHAs have drawn on the plans prepared by individual hospitals and within critical care networks. SHAs will continue to work with the local NHS to refine further and update regional arrangements as these local plans develop.
43. If required, SHAs have confirmed that it would take three days on average to double the number of beds, and hospitals have plans in place to sustain this increase for the maximum expected duration of the peak in demand (between 8-10 weeks). Some organizations and critical networks have indicated that they could sustain this surge longer and the Department of Health will be working with SHAs to follow up the issues involved in sustaining a doubling of capacity.
44. SHAs have identified a number of steps that they are taking to enable the increase to capacity to be supported. This includes the purchasing of additional ventilators, the preparation of plans to ensure that consumables are available and contingency plans prepared to ensure their supply. Work is also being done to develop arrangements for step down facilities for patients following a stay in critical care and the scope for additional inter-hospital transfers if required.
45. In addition they have been working with local organizations to undertake skills audits to identify additional staff who can be available to work in critical care. The preparation and implementation of training plans and the production of associated training materials have supported this work.

Ensuring continued access to services

46. This doubling of capacity will enable those patients who might benefit from critical care to be cared for, in these extraordinary circumstances during peak of the pandemic, in numbers much greater than would normally be possible.
47. The extra numbers of beds can be created by the upgrading of level 2 critical care and post-operative surgical beds to level 3 critical care beds. In

some cases, however, this means that level 2 care will need to be provided on general acute wards to patients who are recovering and are able to be stepped-down out of level 3 beds. This is necessary to maintain the flow of patients through the hospital, and free-up level 3 facilities for other, sicker, patients.

48. In order to create additional level 3 capacity, hospitals may need to redeploy ventilators and other essential equipment that is normally used elsewhere. Similar decisions will need to be taken in relation to medicines and consumables.
49. Such a significant increase in critical care capacity will necessarily have an impact on the level of specialist critical care support that can be provided to each patient. Some of the therapeutic strategies used in critical care are very labour intensive or require highly specialised equipment, and not all of these are likely to be available during the peak level of demand. NHS staff are used to flexing adjusting bed capacity and treatments during seasonal winter pressures but a doubling of capacity for period of eight to 10 weeks would require changes to the ways that treatments could be provided.
50. In this case, critical care services will be seeking to strike a clinically appropriate balance between providing high-quality care available at normal levels of activity and enabling as many patients as possible to benefit from this potentially life-saving treatment.
51. Depending on how many extra beds are required, it may be necessary to change the normal staffing ratios, with fewer highly specialist staff, supported by non-specialist nurses, looking after more patients. Existing critical care staff may be asked to work longer hours, with reserve staff deployed to critical care facilities.
52. Staff with previous critical care experience are currently being identified, and training programmes are currently being implemented on a regional basis. In addition, some staff, such as anaesthetists, those who normally work in recovery areas or on specialist respiratory wards, have skills which can be used to manage patients in critical care. These staff will need to be deployed to critical care to boost the numbers of staff who are able to manage critically ill patients under supervision, supplementing the cohort of staff who usually work in critical care.
53. Elsewhere in the hospital, changes will be needed to keep as many critical care beds as possible free for H1N1 flu and emergency patients, and allow staff to be redeployed to support expanded critical care units.
54. For example, the majority of inpatient elective surgery could be postponed and outpatient activity would need to be reduced during peak weeks of demand. The postponement of elective operations will be on clinical grounds, linked to the likelihood of the patient requiring critical care following their operation.

55. We recognise the impact that this will have on people who are waiting for operations or other treatment. Whilst we are confident that people will understand the need to prioritise critically ill H1N1 flu and other emergency patients during a peak, we need to make sure that other patients who are waiting for treatment are not unduly disadvantaged, and that their care continues to be managed appropriately.
56. People who have their operations postponed because of H1N1 will be prioritised for treatment as the NHS recovers from the peak phase, in line with clinical need and the length of time they have been waiting.

Paediatric critical care

57. Although some children are occasionally admitted to adult critical care facilities, very sick children, under the age of 16, would normally be transferred to and cared for in a specialist paediatric critical care facility⁷.
58. Paediatric critical care facilities tend to be smaller than adult units, reflecting the smaller proportion of children in the community to adults and the fact that children require critical care more rarely.
59. Every winter there is an increase in demand for paediatric critical care due to respiratory conditions requiring ventilatory support. These pressures are partly mitigated by a reduction in cardiovascular admissions, many of which are elective.
60. Furthermore, H1N1 flu infections have been highest in those under 16. We therefore need to recognise that it is a particular challenge for the NHS to expand paediatric critical care capacity to respond to H1N1 flu.
61. Despite this, SHAs have indicated that they can substantially increase the numbers of available beds to cope with possible additional demand. This will require beds to be provided at district general hospitals as well as tertiary centres.
62. Clinicians caring for children will always act in the best interests of the child. As with adult services, the most common constraint on increasing capacity is numbers of appropriately trained and specialised staff. In some cases, staff may be asked to work in paediatric intensive care that do not have extensive experience caring for children. Trusts will endeavour that they are always properly supported and supervised.
63. In other cases, they may decide that it is necessary for a child of an appropriate age or weight to be treated in adult critical care facilities, with input from appropriately trained paediatric staff as agreed at local level.

⁷ There are some regional differences in the age up to which children are admitted to specialist paediatric intensive care units.

Neonatal intensive care

64. The great majority of pregnant women who contract influenza H1N1 have a mild and self-limiting illness. A small proportion of women, however, experience more serious illness, and current clinical experience from the UK and world-wide suggests that they may have increased risks - principally related to secondary complications and an increased risk of preterm labour.
65. Care of ill pregnant women should be timely and aim to reduce maternal complications and preterm birth. Pregnant women suffering from influenza H1N1 should be ideally cared for in a maternity unit with on-site access to adult critical care and Neonatal Intensive Care Unit (NICU) facilities.
66. The possible impact of a second wave in the pandemic on neonatal intensive care will come from induced or spontaneous pre-term delivery arising from flu during pregnancy, and staff sickness. Standards of infection control necessary in these units means that NICUs have a policy of not admitting neonates and infants directly from the community and will limit visitors to first-degree relatives showing no symptoms of flu.
67. Locally there may need to be discussions around the possible release of NICU nurses to support younger children in need of intensive care, however, this needs to be balanced by the need to maintain NICU staffing levels. Infants who are patients in NICU facilities must not be exposed to staff who are treating flu cases as they are particularly vulnerable.
68. Neonatal units and their networks will be reviewing their admission and discharge policies to ensure that babies who need intensive care most can receive it. Care for many babies can be provided in other settings such as transitional care and special care units (SCUs), thus freeing up NICU cots and staff to care for those most needing critical care.

Ongoing preparations

69. Work is continuing locally, regionally and nationally to help prepare the NHS to meet the challenge posed by the H1N1 virus. This will include further refinement of preparedness plans, engage with staff and take reasonable steps to ensure that the additional capacity that can be provided is maximised.
70. Nationally, the NHS Medical Director and NHS Flu Resilience Director have convened a group of the foremost clinical and logistical experts to provide advice to frontline staff on how to maximise the benefits for patients that can be achieved through a doubling of critical care capacity. Dr Judith Hulf, President of the Royal College of Anaesthetists, will chair the group, which will meet throughout the period of the H1N1 flu pandemic. The group will include representation from the relevant professional bodies.
71. This H1N1 Critical Care Clinical Group will consider and advise upon management, staffing and logistics issues (such as equipment, medicines and consumables) associated with an increase in demand for critical care services. It will also work with a wide range of clinicians and existing clinical groups to develop credible clinical advice and strategies to support staff to deliver critical care services through the pandemic.
72. This is likely to include, for example, advice on admission and discharge thresholds to critical care, staffing ratios, and how best to care for paediatric patients in adult critical care facilities. For example, what age or weight of child can be treated in an adult critical care bed, should no paediatric bed be available.
73. The group will work with the relevant authorities in Scotland, Wales and Northern Ireland to coordinate and support the provision of comprehensive critical care services across the UK. Details of the membership of the group and its terms of reference are attached.
74. SHAs will continue to work with Trusts to explore the potential for critical care services to go even further, should this be necessary in response to a local peak in demand.
75. Hospitals operating for many weeks with double their usual critical care capacity will also require additional supplies of consumables such as oxygen, disposable equipment and medicines. SHAs are currently working with hospitals to ensure that sufficient supplies for the duration of a peak in demand are available.
76. In addition to this, work is under way within the Department of Health to ensure that the supply chains that exist for these products are robust enough to provide the necessary increase in manufacture and delivery of consumables and equipment. Further advice will be provided to SHAs to help inform local decisions on procurement.

Decisions around escalating capacity

77. As part of their preparedness planning, local NHS organisations and their SHAs will develop an understanding of what level of service pressure will trigger an escalation in their phase of response. These decisions can only be taken locally, in response to local numbers of cases and the numbers of people requiring hospital admission and critical care. However, they do need to be taken within a consistent national framework.
78. The Department will therefore be working with SHAs over the next few weeks to establish a clear national framework within which these local decisions will operate. This is necessary to ensure consistency of approach across the service and across the country.
79. This will build on the work that NHS organisations have done to put local operational systems in place in conjunction with neighbouring hospitals in their critical care networks.
80. The first stage of the framework will be the identification by a local hospital of the need to take steps to increase capacity. This would be in discussion with their local network and the relevant Strategic Health Authority.
81. Secondly, SHAs would need to assure themselves that hospitals continue to act reasonably in terms of service provision.
82. Thirdly, SHAs would obtain confirmation from the Department of Health that the action proposed by the local NHS organisation can proceed.
83. These arrangements will be designed to enable quick confirmation to be provided and to enable the decisions made by local NHS organisations to be implemented quickly.
84. As part of their preparedness planning, hospitals and SHAs are agreeing what level of service pressure would need to be experienced in order for an escalation to a higher phase to be warranted.
85. Indicators might include the available number of beds within the region dropping below a threshold level, transfers of patients out of region rising above a threshold level, paediatric patients being treated in adult beds and sustained levels of surgical cancellations above the norm.
86. During the peak weeks, clear command and control arrangements will need to operate. A central strategic leadership team has been formed within the Department of Health's NHS Flu Resilience Directorate to provide national leadership, NHS operational management and ensure the supply of stock continues during the pandemic, linked to incident control rooms in every SHA region.

Management of beds to maintain access to services

87. Quite rightly, planning to date has followed existing guidance on pandemic flu which was drafted with an H5N1 influenza strain in mind. This guidance assumed that the virus would spread so quickly that all services would experience peaks in demand at the same time, and so they would not be able to offer assistance to other organisations.
88. However, we have learnt from the first wave of H1N1 flu cases earlier this year, and through sharing experience with other countries, that the current H1N1 pandemic is likely to be different, provided the virus remains the same. It is most likely that local areas will experience peaks of H1N1 flu at different times.
89. It is therefore likely to be possible for those areas that are less affected by H1N1 flu at any one time to help those areas who are more affected. This 'mutual aid', follows the approach taken frequently in the NHS where patients can be transferred to another part of the country where they need specialist care for their condition that is not available locally.
90. All regions have a well-developed system of critical care networks in place to make sure that adult patients have access to critical care facilities. Working across a group of hospitals within the same geographical area, clinicians can ensure that the use of the available critical care resource is maximised.
91. There are well established arrangements for hospitals seeking to arrange transfers for critically ill patients, assisted where necessary by access to the National Intensive Care Bed Register (NICBR) which has been running for the past 15 years. It is provided from four centres around the country which cover all 10 SHA areas in England: London, Oldham, Wakefield and Newcastle.
92. Information on bed availability is obtained daily telephone by each centre. The centres share information with their local area and all four share data between them and have access to bed availability in each other's area. They also have the capability to support or replace for a limited time other centres should communications to a centre be interrupted.
93. In routine circumstances, critical care units seek to avoid transfers of patients as far as possible, unless there are clinical reasons for doing so. However, if demand exceeds supply in one hospital and a transfer is therefore necessary, critical care units use the bed registers to identify available capacity. There are routine arrangements for making transfers between units. During a pandemic, hospitals would use transfers to match patients to available capacity, identified through the registers.
94. Children are already, although not routinely, admitted to adult facilities where this is the most appropriate clinical choice. This could be because the age and development of the child means they are bordering on those of

an adult, or because the long-distance transfer to a dedicated paediatric unit is unlikely to offer a significantly improved outcome.

95. During a pandemic, regional paediatric critical care units may come under particular pressure. We would expect this to be managed at regional level and paediatric critical care facilities are currently managed within well-established networks. There are existing arrangements for sharing information on a daily basis on bed availability and these support the management of admissions between the community, district general hospitals and regional critical care facilities. We will also be testing the resilience of these arrangements to ensure that the supply of information on a national basis can continue through the pandemic.
96. Part of this testing will be to work with SHAs and paediatric networks to identify scope for a further national coordination function on to these arrangements, which would provide for the more effective allocation of beds across regions should this be needed during a period of peak demand. Decisions would be based on the clinical need of the patient, the operational availability of paediatric intensive care beds across the country and the logistical constraints of transferring the patient to the bed. We will be scoping the potential for this function to also link with hospitals and networks in Scotland, Wales and Northern Ireland, as well as England. We have worked with the Paediatric Intensive Care Society (PICS) to identify a national clinical adviser to assist us in taking forward this preparatory work and to advise on its operation during a pandemic.
97. In a flu pandemic situation, SHAs will take on a leadership role strengthening these existing bed management systems. SHAs will oversee the operation of all of their critical care networks, taking strategic decisions to ensure that adult and paediatric critical care resources are managed consistently across their region. This will ensure capacity is increased in a timely manner and available resources are deployed in a fair and effective way for maximum patient benefit.
98. A comprehensive programme of testing these local arrangements is taking place in every SHA throughout September. These exercises will ensure that the command and control structures are robust and will specifically test the resilience plans for NHS staffing levels and critical care capacity.
99. The system will need to be underpinned by clear arrangements for transporting critically ill children to the hospital with the nearest available bed. In some cases, it may be necessary to transport children over long distances in order to provide them with the best possible care.
100. This recognises that ambulances are valuable assets, of which there are a limited number, and which are expected to be in great demand responding to 999 calls during a peak. They will prioritise providing transport for critically ill patients, with competent medical teams providing care for these patients en-route. However, it is possible that ambulance trusts will not

have the capacity to provide routine transfers during a pandemic and local hospitals will have to make other arrangements for these where possible.

101. The resilience of ambulance services is currently undergoing rigorous testing. In preparation for their September readiness statement, Ambulance Trusts are self-assessing against a flu resilience checklist. This particularly covers staffing resilience, including of control rooms as well as frontline services.
102. We will be working with SHAs to further test the resilience of bed management and transport arrangements, informed by the lessons from the September exercises.

Supporting NHS staff

103. The following paragraphs are particularly relevant for NHS staff, who will be caring for patients during the H1N1 flu pandemic.

Preventing illness as a result of the pandemic

104. Frontline health and social care workers have been prioritised for both H1N1 and seasonal flu vaccination. These groups are at increased risk of infection due to the nature of their work. The vaccine will be voluntary, but is strongly recommended. As well as protecting themselves and their families (particularly if they have underlying medical conditions that put them at higher risk), vaccination will also reduce the risk of staff transmitting the virus to vulnerable patients. Staff vaccination will reduce sickness absence, helping the NHS remain resilient and continue caring for sick patients.
105. In order to maximise take-up of the vaccine, staff need to be fully informed about the benefits of vaccination, and able to access vaccination at a convenient time and place. NHS Boards and their Chief Executives, Medical and Nursing Directors are accountable for the success of their vaccination programmes.
106. Staff should also follow good hand hygiene practices and make use of available personal protective equipment to help reduce their risk of infection.
107. NHS employers are expected, by working with staff-side representatives, to fully support staff who are put under extra pressure as a result of the pandemic. These extra demands might have an impact on staff morale and well-being, as well as their psychological health. The Department has published guidance for employers on supporting staff during a pandemic, which includes helping staff prepare to cope with long-sustained demand and providing care for staff that is sensitive and responsive to their needs.

Enabling staff to contribute further

108. The most straightforward way for critical care units to increase their available staffing resource to support a doubling of capacity is for employers and staff representatives to agree flexibility over working hours.
109. For example, there is provision within the Working Time legislation for staff to make an additional contribution beyond the 48 hour week for a short intensive period, recouping the time over the following months to suit individual needs and to allow an orderly recovery back to normal services⁸.

⁸ The Working Time legislation allows staff to work more intensively for short periods and average their hours over a 17 week period, which can be extended up to 26 weeks by local agreement. The Department is currently negotiating to extend this reference period to 52 weeks for all staff, except doctors in training.

110. There may also be scope for employers to increase available staff numbers to sustain services by deferring leave, including annual leave or a leave of absence for other reasons. There should not be a blanket ban, and requests for annual leave should continue to be considered on their merits, as it is important to allow staff to recuperate from a period of intense pressure.

Staff working outside normal areas of expertise

111. Staff have raised the question of whether they will be protected from legal action because of actions taken during a pandemic, particularly if they are working outside of their usual role.

112. The question arises because, in making the most effective use of their resources to expand critical care provision, hospitals may need to approach staff with previous experience of intensive care, but who no longer work there, and backfill these staff accordingly.

113. Where employers and staff are working in difficult circumstances to ensure the best possible care for patients the risks of being sued during a pandemic are no greater than at any other time, provided that healthcare professionals are supported by their employers and act reasonably.

114. Employers have a responsibility to ensure that staff are competent before any duties are delegated to them, and that staff are appropriately supported and supervised. Acute trusts, supported by SHAs working with critical care networks, are therefore taking steps now to refresh the training for staff who have worked in critical care in the past and provide appropriate training for other staff to enable them to work flexibly during the peak of the pandemic.

115. As at all other times, healthcare professionals should ensure they are acting reasonably, and that they are competent to carry out any practice requested of them. The bodies which regulate healthcare professionals have published guidance for those who are registered with them on their websites⁹. The guidance reminds healthcare professionals that they are accountable for their actions and so must assure themselves that they are operating safely, within the scope of their training.

⁹ **The General Medical Council:**

http://www.gmc-uk.org/guidance/news_consultation/medical_pandemic.asp

The Nursing and Midwifery Council:

<http://www.nmc-uk.org/aArticle.aspx?ArticleID=3691>

The Royal Pharmaceutical Society of Great Britain:

<http://www.rpsgb.org.uk/pdfs/flug&a.pdf>

The Health Professions Council:

<http://www.hpc-uk.org/mediaandevents/statements/swineflu/>

The General Dental Council:

<http://www.gdc->

[uk.org/Our+work/Standards/Influenza+Pandemic+Statement.htm](http://www.gdc-uk.org/Our+work/Standards/Influenza+Pandemic+Statement.htm)

116. The guidance also notes that, where healthcare professionals are asked to work outside of their scope of practice by employers, they should be mindful of their duty of care to patients and the public. This will also apply to staff who are asked to work within units under considerable pressures due to H1N1 flu.
117. Additionally, planning has taken place between the Department and the Regulatory Bodies to agree the arrangements for former staff returning temporarily to practice to boost resources during a peak. Local trusts will want to consider how these temporarily registered staff could best be used to augment their existing plans.

Conclusion

118. The current H1N1 flu pandemic may well put additional pressure on NHS critical care facilities over the Winter of 2009/10. In response, the Department, with the NHS and other key stakeholders, has developed a whole-systems strategy that emphasises the importance of prevention in reducing the demand for critical care beds.
119. We recognise the likely need for an increase in the capacity of critical care, and local NHS organisations have developed plans to at least double capacity. This is a significant achievement, and is testament to the hard work of doctors, nurses and managers across the NHS.
120. The implementation of these plans, whilst having a short-term impact on other NHS services, will mean that the NHS is in an excellent position to be able to care appropriately for much larger numbers of very sick people, and, ultimately, save more lives.

Appendix One

Definition of critical care services

1. In *Comprehensive critical care: a review of adult critical care services*, the Department of Health recommended a move away from the division of high dependency and intensive care based on beds to a classification focused on the level that an individual needs. The recommended classifications are:
 - Level 0 - Patients whose needs can be met through normal ward care in an acute hospital.
 - Level 1 - Patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team.
 - Level 2 - Patients requiring more detailed observation or intervention including support for a single failing organ system or post-operative care and those 'stepping down' from higher levels of care.
 - Level 3 - Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure

2. The definitions of critical care are slightly different for children and were cited in the *Paediatric Intensive Care Society Standards* document in 2001:
 - Level I: High dependency care requiring nurse:patient ratio of 0.5:1. Close monitoring and observation required but not requiring acute mechanical ventilation.
 - Level II: Intensive Care requiring nurse:patient ratio of 1:1. The child requiring continuous nursing supervision who is usually intubated and ventilated (including endotracheal CPAP). Also the unstable non-intubated child and the recently extubated child.
 - Level III: Intensive Care requiring nurse:patient ratio of 1.5:1. The child requiring intensive supervision at all times, who needs additional complex therapeutic procedures and nursing. For example unstable ventilated children on vasoactive drugs and inotropic support or with multiple organ failure.
 - Level IV: Intensive care requiring a nurse:patient ratio of 2:1. Children requiring the most intensive interventions such as unstable or level III

patients managed in a cubicle; those on ECMO, and children undergoing renal replacement therapy

3. The definition of neonatal intensive care is provided by the British Association of Perinatal Medicine (BAPM): *Standards for hospitals providing Neonatal Intensive and High Dependency Care* (2nd Edition) December 2001 designations for units:
 - Level 1 units provide Special Care. Babies receiving special care may need to have their breathing and heart rate monitored, be fed through a tube, supplied with extra oxygen or treated for jaundice; this category also includes babies who are convalescing from more specialist treatment before they can be discharged. This term includes units with or without resident medical staff.
 - Level 2 units provide High Dependency Care. high dependency care (HDC) takes place in a neonatal unit and involves care for babies who need continuous monitoring, for example those who weigh less than 1,000g (2lbs, 3oz), or are receiving help with their breathing via continuous positive airway pressure (CPAP) or intravenous feeding, but who do not fulfil any of the requirements for intensive care
 - Level 3 units provide care for babies with the most complex problems who require constant supervision and monitoring and, usually, mechanical ventilation. Due to the possibility of acute deterioration, a specialist doctor should always be available. Extremely immature infants all require intensive care and monitoring over the first weeks, but the range of intensive care work extends throughout the whole gestation period.

Appendix Two

Summary of and links to existing guidance that supports emergency planning and pandemic influenza preparedness

H1N1 flu clinical package (text that follows is from DH website)

The H1N1 flu clinical package is a set of tools for use in a pandemic situation by frontline healthcare professionals^{10,1}

The tools have been designed to be used during the phase of a pandemic when there is increased demand for clinical care.

Further information on when these tools should be deployed will be given nearer that time. The tools are designed to support and empower GPs, community nurses, midwives, health visitors, ambulance crews, emergency department doctors, nurses and those working outside their usual specialty area (e.g. junior doctors or surgeons working in influenza cohort wards).

The package will assist these health care professionals to assess patients, authorise antivirals, refer those with severe illness or complications, and guide treatment of patients in hospital.

These tools will help with the face-to-face application of the guidance Pandemic flu: managing demand and capacity in health care organisations (surge). It is therefore recommended that both documents are read in conjunction with each other.

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_100941

Pandemic Influenza: Guidance for infection control in critical care

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_084178

Planning and managing critical care capacities: detailed models can provide information for making good decisions

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4005318

NHS Emergency Planning Guidance: underpinning materials - critical care contingency planning in the event of an emergency where the numbers of patients substantially exceeds normal critical care capacity

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_081282

¹⁰ Information based on bird flu and where appropriate we will revise guidance to reflect our emerging knowledge of H1N1

In April 2009, the Department of Health published the following Surge guidance which assumed that a pandemic would be of an H5N1 virus. This guidance is still relevant but the critical care strategy document updates the relevant elements of the surge guidance to address the issues raised by H1N1.

Pandemic flu: managing demand and capacity in health care organisations (Surge) and in particular Appendix 13

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_098769

General Information on pandemic influenza

<http://www.dh.gov.uk/en/PublicHealth/Flu/PandemicFlu/index.htm>

Paediatric Intensive Care Society Website (due to contain more educational material):

<http://www.ukpics.org/>

Intensive Care Society Website:

<http://www.ics.ac.uk/>

Association of Paediatric Anaesthetists of Great Britain and Ireland Website:

www.apagbi.org.uk/

Appendix Three

Terms of reference and membership for the H1N1 critical care clinical group

The H1N1 Critical Care Clinical Group (CCCG) will:

offer advice to the Department of Health on how the NHS should best increase adult and paediatric critical care capacity in response to an increased demand for services caused by novel H1N1 Influenza in England;

consider and advise upon management, staffing and logistic issues (eg equipment, medicines and consumables) associated with the increase in demand for critical care services;

work with a wide range of clinicians and existing clinical groups to develop credible clinical advice and strategies to support staff to deliver Intensive Care Services;

work and communicate with the appropriate authorities in Scotland, Wales and Northern Ireland to co-ordinate and support the provision of comprehensive critical Care services across the UK

Timing

The group will initially operate between September 2009 and April 2010

Governance

The group will be accountable to Pandemic Influenza Clinical and Operational advisory group and work closely with the Department of Health's Pandemic Influenza Critical Care Working Group to ensure consistency in the clinical advice being provided to the Department.

The group's main links into the Department of Health will be via the National Director of NHS Flu Resilience and the NHS Medical Director

Membership

Dr Judith Hulf CBE (Chair)
President of The Royal College of Anaesthetists and Consultant at University College London Hospitals

Dr Bob Winter
President of the Intensive Care Society and Consultant in Adult Intensive Care Medicine and Anaesthesia at Nottingham University Hospitals NHS Trust

Dr Paula Lister
Consultant Paediatric Intensivist at Great Ormond Street Hospital for Children
NHS Trust and Chair of the Paediatric Intensive Care Society Pandemic
Preparedness

Ms Annette Richardson,
Nurse Consultant, Critical Care Services
The Newcastle upon Tyne Hospitals NHS Foundation Trust

Dr David Zideman
Consultant Anaesthetist, Hammersmith Hospital, Imperial College Healthcare
NHS Trust, London

Mr Richard Barker
Executive Director of Operations and Performance
North East Strategic Health Authority

Colonel Peter Mahoney
Defence Professor of Anaesthesia and Critical Care at the Royal Centre of
Defence Medicine

Liaison members with the other three UK nations:

Dr Gavin Lavery, DHSSPS and Consultant Intensive Care Physician, Belfast
Health and Social Care Trust

Professor Colin Robertson, Scottish Government and Consultant Accident
and Emergency Physician, Royal Infirmary of Edinburgh

Dr George Findlay, Welsh Assembly and Clinical Director for Critical Care at
Cardiff and Vale University Local Health Board

The group will also draw on a wider 'virtual group' within the Department of
Health, the NHS and the professions.