Critical Care Strategy for Wales: Managing the swine flu pandemic

Executive summary

The current pandemic A(H1N1) influenza virus is mild for the majority of those who become infected. It appears to be milder and spread less rapidly, than our plans for a pandemic of avian influenza H5N1 assumed. To date, a small minority of people have required hospital care to help them recover from swine flu. Some have been cared for in critical care. These have mainly been people who have underlying health conditions that make them more susceptible to serious illness caused by swine flu.

As well as increasing capacity, preventing serious illness in the first place from swine flu is a vital element in reducing demand for critical care beds. Our policy of offering antiviral treatment to all patients in high risk groups showing flu like symptoms and prioritising these groups for vaccination will mean that fewer people will suffer severe symptoms and need critical care treatment in hospital.

Vaccination is the most important way by which we can prevent people catching swine flu and developing serious illness as a result. Subject to the licensing process, vaccinations against both swine and seasonal influenza will be offered to high-priority groups from mid-October. 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.

Although good hygiene measures and vaccination should prevent significant numbers of infections, many people may nevertheless become infected with swine flu. The support of primary, community, mental health and social care services will be critical to ensure that patients can be effectively looked after out of hospital.

LHBs, working with the 3 adult critical care networks in Wales, have set out plans to double adult critical care capacity, in line with the rest of the UK. Cardiff and Vale University LHB has also plans to double paediatric critical care capacity. We are continuing to monitor the situation very closely to assess whether actual demand will mirror the planning assumptions, which are based on the worst case scenario. Information systems are being put in place to provide early warning of likely demand and to assist decision making.

Given the much smaller number of level 3 paediatric beds, arrangements will need to be developed where, if necessary, children of a suitable age or size could be cared for on adult units with suitable supervision from paediatric trained staff.

Neo-natal Intensive Care (NICU) capacity will also be developed to cope with potential demand. LHBs are working to ensure they identify and have the appropriate numbers of skilled staff to care for the expected increased number of
ill, low-birth-weight and preterm infants. Integral to this is up-skilling/training of nurses and midwives who can provide the right care under an agreed governance framework. The vaccination of pregnant women is a key issue in reducing the adverse impact on pregnancy and a rise in preterm births.

In a flu pandemic, critical care facilities will be coordinated across Wales and the UK. 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.

A UK Swine Flu 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. This will build on the current ethical framework and is likely to include, for example, advice on admission and discharge thresholds to critical care, staffing ratios, and what age or weight of child can be treated in an adult critical care bed, should no paediatric bed be available.

This strategy is designed to minimise the demand on critical care services as much as possible during a flu pandemic through the introduction of strong preventative measures in primary and community care. As part of our contingency planning for a flu pandemic, we have robust plans in place that will enable us to double critical care capacity in Wales at the peak of the pandemic. We will be testing the resilience of these plans over the next few weeks.

We will work with NHS organisations to co-ordinate access to critical care services so that patients can be sent to the nearest hospital with available critical care beds. This will include liaising with hospitals in England. Local NHS organisations will increase access to critical care beds as and when required.

In addition to ensuring we have critical care beds, we also need the specialists in place to staff them. We have asked the new LHBs to make sure they have identified all of their suitably qualified staff who can be called on to work with critically ill patients. Further training will be offered where needed.
Introduction

1. Experience from previous influenza pandemics and the story so far with this one has indicated a rise in demand for critical care services.

2. This strategy sets out our approach to critical care during the swine flu pandemic. Alongside increasing the number of critical care beds, we also need to prevent people becoming seriously ill as a result of swine flu.

What we know about the current pandemic A(H1N1) influenza virus?

3. The current pandemic A(H1N1) influenza virus is mild for the majority of those who become infected. It appears to be milder, and spread less rapidly, than our plans for a pandemic of avian influenza H5N1 assumed.

4. In contrast to most seasonal influenza strains, in some people swine flu 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).

5. To date, a small minority of people have required hospital care to help them recover from swine flu, including oxygen or ventilation. This is particularly the case for people who have underlying health conditions\(^1\) that make them more susceptible to serious illness caused by swine flu.

What do we mean by critical care?

6. 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.

7. In Wales, critical care is defined as:
   - Level 3T (Tertiary): Frequently called intensive care, patients at all levels of severity would be appropriately treated at this level. Organ support and monitoring for most body systems should be available at level 3T and these facilities would normally be available to multiple patients simultaneously.

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\(^1\) 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.
• Level 3: As for level 2 but these facilities might be available for only a small number of patients simultaneously because of staffing or equipment constraints as they may not have the equipment or expertise to manage these patients.

• 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.

8. 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.

9. It is reasonable to assume that most patients who require critical care as a result of swine flu will need some degree of advanced respiratory support. Therefore, for the specific purpose of this strategy, critical care refers to Level 3 services.

10. 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.

11. Neo-natal Intensive Care (NICU) capacity is more constrained. LHBs are working to ensure they identify and have the appropriate numbers of skilled staff to care for the expected increased number of ill, low-birth-weight and preterm infants. Integral to this is up-skilling/training of nurses and midwives who can provide the right care under an agreed governance framework.

12. A full definition of levels of care is at Appendix One.
Planning for an increase in demand for critical care

12. There has been a concerted programme of preparedness planning for some time in anticipation of a possible influenza pandemic. Since April 2009, preparations have been specifically focused on meeting the demands of swine flu.

13. We have planned on doubling the availability of level 3 critical care beds from normal levels as has the rest of the UK. We are continuing to monitor the situation very closely to assess whether actual demand will mirror the planning assumptions, which are based on the worst case scenario.

14. The Director General of the Department of Health and Social Services (HSSDG) and Chief Executive of the NHS, Paul Williams, wrote on 31 July to all NHS Chief Executives to make clear the expectation that preparedness plans would be reviewed and subjected to further testing.

15. The HSSDG is currently working with LHB Chief Executives and adult critical care network colleagues to ensure critical care resilience is an essential part of these plans. In particular, plans must demonstrate that there are arrangements in place to deal with an increase in demand for critical care as a result of swine flu.

16. The HSSDG has also been working collaboratively with England, Scotland and Northern Ireland, in order that a consistent approach is adopted across the U.K.

17. LHBs, working with the 3 critical care networks in Wales have set out how they could double the level 3 capacity of critical care, in response to swine flu.

18. The following sections provide more detail on how this can be achieved, and sets these plans in the wider context, emphasising the importance of preventing people contracting swine flu and becoming seriously ill as a result. This is a key part of our approach to reducing the demand for critical care.
Preventing people becoming seriously ill as a result of swine flu

19. 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 interdependencies and seeks to maximise the contributions that other parts of the system can make, in particular in primary and community care. This means preventing patients developing serious illness as a result of swine flu, as well as ensuring that patients most likely to benefit from this specialist care can access it when needed.

20. Using resources most effectively is relevant during any peak weeks when additional numbers of people may require hospitalisation. Clearly, any steps taken to focus resources more towards patients with swine flu should only be taken as and when the situation requires them, although detailed planning has been undertaken in advance.

Preventing infection

21. 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 swine flu) could have a significant impact on reducing the number of people who become seriously ill. A public campaign to raise awareness is ongoing.

22. Vaccination is the most important way by which we can prevent people catching swine flu and developing serious illness as a result. Subject to the licensing process, vaccinations against both swine and seasonal influenza will be offered to high-priority groups from mid-October. 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.

23. Frontline health and social care staff have also been prioritised for both swine and seasonal flu vaccinations, because their job places them at greater risk of infection. Staff have a responsibility to themselves, their families and their patients to ensure they are protected from flu this Winter.

Preventing complications

24. Although good hygiene measures and vaccination should prevent significant numbers of infections, many people may nevertheless become infected with swine flu. Those who do contract swine flu should take the same precautions as for seasonal flu. Stay at home, drink plenty of fluids, and take paracetamol to reduce any increase in temperature. If people feel really unwell they should contact their GP for a clinical assessment, and if necessary for rapid access to antivirals to reduce the severity and duration of illness.
Preventing unnecessary hospital admissions

25. Ensuring rapid access to antivirals and vaccinations in primary care and by targeting high risk groups should help to minimise unnecessary hospital admissions. The support of primary, 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 should have robust and tested plans in place to alleviate pressure on their services due to swine flu and to avoid people requiring hospital admission wherever possible.

26. Mental health services, for example, will 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 swine flu. Equally, primary and community services have arrangements in place to enable more people to be cared for in community settings.

27. 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 swine 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.
Doubling critical care capacity

Adult critical care

28. LHBs have set out how they could double level 3 critical care capacity, in line with the recommended target from NHS pandemic influenza guidance.

29. The NHS is planning a phased approach, aimed at matching the level of response to the pressure being felt by local services.

30. During the winter months of every year, more people become seriously ill and require hospital care. 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.

31. The number of beds can be doubled quickly if necessary and hospitals should have plans in place to sustain this increase for as long as possible. The factors that would impact on these plans are:
   - The numbers of staff affected by flu in certain skill mix groups
   - The case mix on the Unit

32. This doubling of capacity would enable those patients who might benefit from critical care to be cared for in the peak of the pandemic in numbers much greater than would normally be possible. This expansion would have an impact on the level of intensivist support that can be provided to each patient, as well as an impact on services elsewhere in the hospital.

33. 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 this means that level 2 care would 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.

34. To staff the additional beds, existing critical care staff may be asked to work longer hours, and reserve staff deployed to critical care facilities. It may be necessary to change the normal ratios of nursing staff to patients, with fewer highly specialist staff looking after more patients.

35. Staff with previous critical care experience are currently being identified, and training programmes are being implemented on a regional basis. In addition, some staff, such as those who normally work in operating theatres, have skills which can be used to manage patients in critical care. These staff would 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.

36. In taking the step to change how units are staffed, critical care services would be seeking to strike a clinically appropriate balance between providing high-quality
care and enabling as many patients as possible to benefit from this potentially life-saving treatment.

37. If it is necessary to substantially increase critical care capacity the majority of elective surgery would be postponed and outpatient activity would need to be reduced. The redeployment of key staff into critical care might have knock-on effects on many other services.

38. We recognise the impact that this would 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 swine flu patients during a peak, we need to make sure that other patients who are waiting for treatment would not be unduly disadvantaged, and that their care continued to be managed appropriately. People who have their operations postponed as a result of swine flu will be prioritised for treatment as the NHS recovers from the peak phase.

**Paediatric critical care**

39. 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 facility.

40. 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. It is a particular challenge for the NHS to expand paediatric critical care capacity to respond to swine flu.

41. Some of our normal capacity is provided by Units in England and we will be coordinating surge capacity across the UK. This would require beds to be provided at district general hospitals as well as tertiary centres.

42. 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 who do not have extensive experience caring for children, but Units will endeavour to ensure that they are always properly supervised.

43. It may also be necessary for some children of an appropriate age or weight to be treated in adult critical care facilities, with input from appropriately trained paediatric staff.

**Neonatal critical care**

44. Care of ill pregnant women should be timely and aim to reduce maternal complications and preterm birth. Pregnant women suffering from Influenza A(H1N1)v should be cared for in a maternity unit with on-site access to Adult ICU and Level 3 NICU facilities.
45. LHBs are working to ensure they identify and have the appropriate numbers of skilled staff to care for the expected increased number of ill, low-birth-weight and preterm infants. Integral to this is up-skilling/training of nurses and midwives who can provide the right care under an agreed governance framework.

46. We expect all LHBs to review their admission and discharge policies to ensure that babies who need this care most can receive it. Care for many infants can be provided in other settings such as transitional care and special care units (SCBUs), thus freeing up NICU cots and staff to care for those most needing critical care.

47. As is currently the case, we expect all LHBs and regions to work within a network of care and provide the necessary support and advice to colleagues elsewhere in Wales and where appropriate across the four nations. Where necessary, and when appropriate facilities are available, the transport of neonates, or of the mother with baby in utero will occur using established mechanisms e.g. dedicated national/regional neonatal transport services.

48. The great majority of pregnant women who contract swine flu 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.

**Ongoing preparations**

49. There is always more that can be done to refine preparedness plans, engage with staff and take reasonable steps to ensure that the additional capacity that can be provided is maximised.

50. The NHS Medical Directors within the UK 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.

51. This Swine Flu 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.

52. This is likely to include, for example, advice on admission and discharge thresholds to critical care, staffing ratios, and what age or weight of child can be treated in an adult critical care bed, should no paediatric bed be available.

53. The group will work across the UK to coordinate and support the provision of comprehensive critical care services.
54. LHBs will consider the options for purchasing or hiring additional equipment. They will be balancing the extra capacity they might need, with the risk that they are expensive purchases that may never be needed because the demand doesn’t materialise. Information systems are being put in place to provide early warning of likely demand and to assist decision making in this respect as far as possible.

55. Hospitals operating with double their usual critical care capacity would also require additional supplies of consumables such as oxygen and medicines. LHBs are currently working to ensure that sufficient supplies for the duration of a peak in demand are available.
Providing a national framework for local decisions

56. As part of their preparedness planning, LHBs and local organisations will develop an understanding of what level of service pressure would 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.

57. The HSSDG will be working with LHBs to establish a clear national framework within which these local decisions will operate. This will ensure consistency of approach across the service.

58. During the peak weeks, clear command and control arrangements would need to operate. A central NHS flu pandemic team has been formed to assist with planning and test resilience and ensure the supply of stock continues during the pandemic.

Management of beds to maintain access to services

59. 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.

60. We have learnt from the first wave of swine flu cases earlier this year, and through sharing experience with other countries, that the current H1N1 pandemic is likely to be different. It is most likely that local areas will experience peaks of swine flu at different times.

61. It is likely that those areas which are less affected by swine flu at any one time will be able to help those areas who are more affected. This 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.

62. Wales has 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. There is only one paediatric critical care unit in Wales at Cardiff and Vale uLHB.

63. In a flu pandemic, critical care facilities will be coordinated across Wales and across the UK. 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.
A comprehensive programme of testing local arrangements is taking place in every LHB throughout September. This 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.

Areas can particularly help each other in the case of children, the paediatric intensive care unit in Cardiff and Vale uLHB may come under particular pressure. In this case, a UK approach does have clear advantages.

A national paediatric ‘bed management’ or coordination function would allow managers to consider 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. All decisions made will be underpinned by transparent audit and governance arrangements.

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.

We have published Welsh guidelines for the transfer of the critically ill adult in April 2009 to provide a more integrated critical care transfer model, including air ambulances, to ensure that patients can be transported to available beds within a clinically acceptable time.

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 unlikely that the Welsh Ambulance Trust would have the capacity to provide routine transfers during a pandemic and local hospitals will have to make other arrangements for these where possible.

The resilience of ambulance services is also currently undergoing rigorous testing.
Supporting services by supporting staff

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

Preventing illness as a result of the pandemic

72. Frontline health and social care workers have been prioritised for both swine and seasonal flu vaccination. These groups are at increased risk of infection due to the nature of their work. 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. All staff who are qualified to work on critical care beds will be prioritised for vaccination.

73. The extra demands that might be placed on staff by the swine flu pandemic may also have an impact on staff morale and well-being, as well as their psychological health. The HSSDG has published guidance for employers on supporting staff during a pandemic [Pandemic Influenza Human Resources Guidance for NHS Wales issued April 2009].

Enabling staff to contribute further

74. 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.

75. 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 services².

76. 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.

² 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.
Staff working outside normal areas of expertise

77. 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.

78. Employers must ensure that staff are competent before any duties are delegated to them. LHBs are 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 any peak of the pandemic.

79. Alongside providing necessary training, LHBs will also develop plans to ensure that all staff who are working outside of their normal areas of expertise are appropriately supported and supervised.

80. The NHS Litigation Authority has confirmed that there is not a substantially greater risk of NHS bodies or healthcare professionals being sued as a result of actions taken during a pandemic, providing they are able to demonstrate that the actions they took were reasonable.

81. Regulatory bodies have published guidance on their websites for registrants on practice during a pandemic. The guidance reminds registrants that they are accountable for their actions and need to assure themselves that they are operating safely, within their scope of practice.

82. The guidance also notes that, where staff 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 would also apply to staff who are asked to work within units under considerable pressures due to swine flu.

83. Additionally, the HSSDG has been examining the potential for former staff returning temporarily to practice to boost resources during a peak. Local LHBs will want to consider how temporary registrants could best be used to augment their existing plans.

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Pandemic Influenza Human Resources Guidance for NHS Wales issued April 2009
Conclusion

84. The current swine flu pandemic may well put additional pressure on NHS critical care facilities over the winter of 2009/10. In response, the HSSDG, 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.

85. We recognise the likely need for an increase in the capacity of critical care, and LHBs, working with the 3 regional critical care networks have set out how they could at least double level 3 capacity if necessary. The implementation of these arrangements, whilst having a short-term impact on other NHS services (like elective operations), would mean that the NHS is 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 *Designed for Life: Quality Requirements for Adult Critical Care in Wales*, five recognised levels of adult general critical care have been proposed:

- Level 0 – Patients needing care at level 0 are appropriately cared for in ordinary hospital wards such as are available in all acute hospitals and all general departments of surgery and medicine.

- 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 single organ support such as intropic support for the cardiovascular system, renal replacement treatment, or non invasive ventilatory support may be supported at this level but invasive ventilatory support would not be appropriate.

- Level 3 - Patients at all levels of severity might be appropriately treated at this level. Organ support and monitoring, as described in level 2, must be available for most body systems but these facilities might be available for only a small number of patients simultaneously because of staffing or equipment constraints. The duration of treatment for multiple organ failure for a given patient may also be limited, for the same reasons.

- Level 3T (Tertiary) – Patients at all levels of severity would be appropriately treated at this level. Organ support and monitoring for most body systems should be available at level 3T and these facilities would normally be available to multiple patients simultaneously.

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 Dependancy 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 (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.