

Phases of staged response to an increased demand for Paediatric Intensive Care in the event of pandemic or other disaster.
Working document

“The Critical Care Contingency Plan in the event of an emergency where the number of patients substantially exceed critical care capacity – Best Practice Guidance” was published for consultation by the Department of Health in 2006. The adult Intensive Care Society (ICS) have also published “Critical care contingency planning: phased responses and triaging framework”. That document suggests four stages of response to increase critical care capacity in the face of increased demand. There is a suggested triage mechanism described with each stage. The most recent guidance from the DOH “Pandemic Flu: Managing Demand and capacity in Health Care Organisations (Surge)” April 2009, refers to these documents.

Paula Lister (consultant paediatric intensivist , GOSH) wrote a document for the London paediatric services to complement the adult services document, addressing the paediatric critical care service. This document is modified for paediatric critical care in South Wales. It is written as a working document in order to allow continuing discussion and consultation within the Paediatric Intensive Care (PIC), the General Paediatric community, the General Intensive Care community and those bodies charged with the responsibility of discussing the ethics of resource limitation the event of a pandemic. This document maintains the 4 stage and phase format adopted by the adult service.

The staged responses are necessarily different, reflecting the centralised nature of paediatric critical care provision.

This document suggests trigger points for each stage.

Table 1 International Phases and their significance for the UK

International phases		Significance for UK
Inter-pandemic Period		
1	No new influenza virus subtypes detected in humans	UK not affected
2	Animal influenza virus subtype poses substantial risk	UK has strong travel/trade connections with affected country UK affected
Pandemic Alert Period		
3	Human infection(s) with a new subtype, but no new human to human spread to a close contact	UK not affected
4	Small cluster(s) with limited human-to human transmission but spread is highly localised, suggesting that the virus is not well adapted to humans	UK has strong travel/trade connections with affected country
5	Large cluster(s) but human-to-human spread still localised, suggesting that the virus is becoming increasingly better adapted to humans	UK affected
Pandemic Period		
6	Increased and sustained transmission in general population	UK Alert level 1 Virus/cases only outside the UK 2 Virus isolated in the UK 3 Outbreak(s) in the UK 4 Widespread activity across the UK
Post Pandemic Period		
End of pandemic Return to inter-pandemic period		

Phase 0

Inter-pandemic period & Pandemic alert period.

Normal PIC activity

- Ensure that contingency plans in preparation for a pandemic are complete both within the lead centre and the linked DGHs, including guidance on palliative care
- Neonatal services to confirm their operational plans during a pandemic
- Communication links need to be clearly identified.
- Potential means of providing outreach critical care support and training in the event of a pandemic need to be discussed and agreed. Outreach within hospitals, within the network and across hospitals needs to be discussed and planned.
- Ensure national ethical debate regarding triage decisions is complete.
- Ensure local paediatric services agree and understand triage tools.

Stage 0: Triage response and critical care interventions

Normal practice: Provision of intensive care to those patients who will, or possibly will, benefit.

Phase 1

Trigger point = International Pandemic Period, UK alert level 3

During this phase, preparations are made prior to escalation to UK alert level 4.

Creation of increased paediatric intensive care capacity at the lead centre

- Cancellation of non-urgent surgical procedures requiring post-operative PICU admission
- Commitment to expansion of nursing capacity by increasing agency or 'bank' shift support, and HDU nurses caring for level 2/3 patients thereby opening "closed" beds.
- Cohorting of index disease patients into specific clinical areas (this may initially mean caring for adults and children in the same area)
- Maintenance of existing nurse:patient staffing ratios
- Discharge of suitable patients from PICU and HDU to other ward areas, with appropriate upgrade in medical / nursing support for these areas.
- Secondment of additional medical staff from 'elective' duties (e.g. anaesthesia) where necessary, in particular to support discharge of patients to other ward areas.
- The aim during this phase will be to continue the retrieval service, however this will be dependent on staff availability and sickness which is not predictable.
- The reciprocal arrangement with Bristol PICU will be suspended with both regions responsible for their own patients (aside from those requiring cardiac surgery).

Stage 1 (or Triage Response 1): Triage Response and Limitation of Critical Care Interventions

Stringent admission review of all referred patients.

Intensive care provision may not be considered appropriate for patients with significant longstanding and / or multiple co-morbidities, in whom the risk of death is high (see BTS Clinical Guidelines and DOH criteria 2009).

In Stage 1 it may be necessary to introduce restrictions to the critical care interventions that are undertaken in patients, if there are difficulties in maintaining nurse:patient staff ratios.

Phase 2

Trigger point = Pandemic period, UK alert level 4

This phase initiates a need to admit children to ICUs, HDUs and NICUs outside the lead centre. It requires collaborative working between the lead centre, ICUs, HDUs, general paediatrics and the neonatal network.

Clear lines of communication, commitment and co-operation with predetermined admission standards and transparent decision-making are the keys.

Phase 2 moves to phase 3 once capacity becomes overwhelmed.

Creation of paediatric critical care capacity across South Wales

- Increase paediatric intensive care capacity with the conversion of HDU beds to ICU beds and reduction in nurse:patient staffing ratio.
- Bed management provided by the lead centre.
- Liaison with neonatal and adult critical care networks.
- Admission for intensive care according to agreed, common standards

Creating paediatric critical care capacity within local hospitals:

- Maximum use of all available bed capacity including the conversion of any additional areas if possible e.g. theatre recovery, HDU, ICU, NICU
- Creation of HDU facilities in other clinical areas if feasible
- Cancellation of annual leave for medical and nursing staff
- Deployment of staff with limited critical care training, under the supervision of trained staff.

Support of the general paediatric services linked to each PICU

- Support and advice to local paediatric services as per pre-pandemic planning
- Support via telephone website

Stage 2 Triage Response and Critical Care Limitations

A clear, transparent and equitable (across units) admissions policy is agreed. A national debate should guide the development of a triage algorithm. Any admissions policy should be based initially on the likely clinical benefit of critical care to the patient.

If the national debate is incomplete at the time of the pandemic, triage decisions will be jointly made by two consultants both of whom ideally should be experienced in paediatric intensive care. The over-riding principle will be that only those patients most likely to benefit from intensive care will be admitted.

Intensive care may not be considered in the group of known, high-risk patients (appendix 11, DOH "Pandemic Flu: Managing Demand and capacity in Health Care Organisations (Surge)" April 2009)

Staff, drug and equipment availability may restrict our provision of critical care. During this stage we would agree to support up to 2 failing organ systems; utilising mechanical ventilation, fluid therapy, vasopressors, intravenous antibiotics with enteral nutritional support.

We should agree that further interventions cannot be supported e.g. renal replacement therapy, ECMO, plasmapheresis.

Phase 3

Trigger point = Pandemic Period, UK alert level 4

As for Phase 2 plus;

- Nurse:patient ratios according to local Clinical Leads' (nursing & medical) discretion
- Continued assessment of risk; patient and staff safety
- Full recruitment of reserve-trained critical care nursing / medical staff
- Further limitation to critical care provision.

Stage 3 Triage Response and Critical Care Limitations

As for Phase 3;

It is likely during phase 3 that the demand for critical care beds will exceed capacity.

During the peak of the pandemic there may be an overwhelming number of children for whom respiratory support offers the only prospect of survival.

Pressure on nursing and medical resources may require compromise in the usual standards expected of critical care. Risks to patient and staff safety must be examined in the light of existing circumstances. Any such compromise decisions must be jointly taken (senior nursing, medical and hospital managerial staff), documented and fully supported by the management. Clear strategies for the withdrawal or non-escalation of intensive therapy will be needed for patients progressing to multiple organ failure or not responding to treatment. These decisions will need to be taken earlier in the course of a patient's treatment than would be considered under usual circumstances. The decision to withdraw or limit interventions earlier in the course of a patient's treatment than would be considered under normal circumstances is likely to cause distress to relatives and critical care staff, and the ability to continue functioning as a cohesive team will require careful attention to staff communication and morale.

Careful attention must be paid to the protection of staff from distressed relatives. Failure to preserve staff morale would lead to increased absenteeism and reduced bed availability. In the face of high demand there may be patients that the clinicians cannot differentiate between on the basis of benefit. At this stage, allocation of ICU treatment may be required to be made by a clinically based selection process, taking into account the principles of the ethical framework (appendix 2, DOH "Pandemic Flu:Managing Demand and capacity in Health Care Organisations (Surge)"April 2009)

Phase 4

An event of catastrophic severity could result in complete or partial collapse of some or all hospital infrastructures.

- Specific planning is not feasible given the extent of possible scenarios
- Medical responses in such circumstances will be limited by the sustainability of personnel, equipment and environment

It must be hoped that the process of planning for lesser phases will provide a basis for locally produced responses

Stage 4

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

The following are taken from Appendix 11 of the surge document

Inclusion and exclusion criteria from primary to secondary care

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

Inclusion and exclusion criteria from A&E to secondary care

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

Inclusion and exclusion criteria from secondary care to intensive care

Paediatric – inclusion criteria	Paediatric – exclusion criteria
Requirement for invasive ventilatory support	Severe trauma Cardiac arrest – unwitnessed, witnessed but not responsive to electrical therapy, recurrent cardiac arrest
Severe burns	Known, severe, progressive baseline cognitive impairment
Hypotension with evidence of shock	Known, advanced, untreatable neuromuscular disease
	Known, advanced, metastatic malignant disease
Head injury	Known advanced and irreversible immunocompromise
Severe Burns	Severe and irreversible neurological event or condition
	End stage heart, lung or liver failure