Annex D

H1N1 Critical Care Clinical Group

To: Ian Dalton,
National Director
NHS Flu Resilience
Department of Health

26 November 2009

Dear Ian,

SUPPLIES TO SUPPORT SURGING OF CRITICAL CARE CAPACITY

Background

1. During the current pandemic of H1N1 flu a Critical Care Clinical Group has been convened to offer advice and support to NHS colleagues on the practical implications of surging critical care capacity, if required. The membership of the group is drawn from medical and nursing colleagues working in neonatal, paediatric and adult intensive care services as well as representatives of the British Association of Critical Care Nurses, the British Association of Perinatal Medicine, the Paediatric Intensive Care Society and the Intensive Care Society. The following information has been prepared for colleagues leading and managing critical care services.

2. It is not formal guidance nor is it a performance management document but has been developed as a reference to assist local planning. It should be read alongside the existing Department of Health guidance on Demand and Capacity (Surge) published in May 2009[1] and the Critical Care Strategy published in September 2009[2].

3. It is acknowledged that individual units and critical care networks will have already carried out work to assure themselves of the supplies issues that they need to address. However given the likely impact of the pandemic on critical care services, especially for children, and the challenge that would be involved in achieving a doubling of capacity the members of the group wished to offer advice that can be used to double check existing preparedness. We would be grateful if this note could be circulated to NHS organisations through the Strategic Health Authorities.

The day's supply approach

[1] Pandemic flu: managing demand and capacity in health care organisations (surge)
http://www.dh.gov.uk/prod_consum_dh/idcplg?IdcService=SS_GET_PAGE&ssDocName=DH_087733

[2] Critical care strategy
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_104977

4. The Group encourages units and networks to adopt the approach known as “the day’s supply”. This is process by which units identify their daily consumption per patient per bed, compare with store levels held normally, identify what would be needed in a surge situation, look at where they obtain stock from assess the speed and vulnerability of their supply chain and prepare their stock levels accordingly.

5. The important principle is that all units that may face the potentially challenging implications of a flu pandemic peak have considered all the essential equipment supplies and disposables that are routinely required, and factored into their planning process a method for accessing sufficient additional resources to at least double the normal maximum number of Level 3 beds.

Preparing for children being admitted to adult ICUs

6. One potentially challenging aspect of local surge plans may be the necessity to provide care for significant numbers of children in general ICUs, with appropriate support from colleagues with paediatric expertise. As general ICUs may not routinely stock the range of different items required for the care of children then, without appropriate advanced planning, supplies’ availability could add to staffing and clinical issues in such circumstances. Accordingly, this document addresses the implications for supplies that must be considered to prepare for the care of ventilated children in general ICUs during the peak of a pandemic.

Reference lists

7. This document has three appendices:

   Appendix A provides a list of general consumables and drugs used in critical care on a daily basis.

   Appendix B provides a list of additional items identified as essential requirements for managing ventilated children in general ICUs

   Appendix C provides a list of resuscitation equipment requirements

Supply chain resilience

8. A priority for individual and network critical care services should be close liaison with the local SHA to explore the reliability of essential supply chains. This will need to address the robustness of these arrangements in extreme circumstances, for example, where significant numbers of staff may be compromised by flu-related problems or increased international demands. It will be important to reduce uncertainty or relevant concerns about aspects of supply chains. In order to maximise efficiency and minimise the potential financial implications these issues should ideally be addresses on a network basis in accordance with agreed regional policies for providing core intensive care requirements,

9. Responsibility for the provision of resources or supplies to meet a requirement to surge critical care capacity, if needed, rests with local organizations working through critical care networks and with leadership from Strategic Health Authorities. To ensure resilience of supplies it is important that local plans are discussed with NHS Supply Chain or local supplier networks to identify whether or not they are sustainable in terms of pharmaceuticals, consumables and other products required to deliver the totality of critical care. It is important that suppliers have information on which to base an increase in their stock holdings to meet the anticipated surge and that these estimates reflect local needs for the supplies that would be consumed when critical care capacity is doubled. A need exists to identify regional and local supplier networks and to share your plans with them so that suppliers can work with you in delivering the escalated level of support you require. By the same token, you will need to work with the same supplier network to manage the process of de-escalating effort and thus maintain positive working relationships.

Equipment issues

10. Where plans include the following issues then it is important that they have been tested and local actions identified:

    Using reserve ventilators Where ICUs are planning to use ventilators that have been kept in storage after being replaced then there should be attention to ensuring that mothballed equipment has been recently serviced and that any specific equipment required for their re-use is available in sufficient numbers to enable repeated usage. As current staff may not be familiar with this equipment there should be arrangements made to update training, and also provision of appropriate paperwork instructions.

    Using equipment from outside ICUs If introducing equipment and devices that are not normally used by existing critical care staff there should be systems created to provide appropriate update training sessions. This could include instructions in the use of anaesthetic machine ventilators, theatre monitoring equipment, differing infusion devices and renal replacement therapy machines.

    Acquiring age related supplies For units that do not normally provide care for ventilated children, or those who may have existing paediatric services but who may have to provide care for much younger children, it is advised that there should be direct communications with the local PICU service to ensure that equipment and supplies are acquired in accordance with agreed local policies.

    Age compliance for ventilators In order to ensure reasonable preparation for managing ventilated children, general ICUs should ensure that the appropriate age-compliance of their existing (and reserve) ventilators are identified. In circumstances where alterations or additional equipment may be required to enable ventilation of smaller children these should be considered or purchased where appropriate.

Use of neuromuscular agents For general ICUs caring for children, the principles on the usage of neuromuscular paralysing agents (with appropriate sedation levels) would need to be considered, for example in situations of extreme demand. Although it should be clarified that this concept is not being particularly advocated, it is probably pragmatic that sufficient supplies of muscle relaxants are prepared on this basis.

Blood sample containers In ICUs it is important to raise awareness of the necessity to use appropriate paediatric blood sample containers. These should be included in the supplies process, with appropriate paperwork to enable staff to select the correct ones for any blood samples taken.

Fluid delivery If the total number of patients ventilated (including children) results in there being insufficient infusion pumps available to deliver essential medications it may be necessary to revert to burette fluid delivery for children. These should therefore be included in the equipment work. As intensive care staff may be relatively unfamiliar with burette administration then training – with appropriate printed guidance – should be provided by experienced paediatric nursing colleagues.

Connection to regional PICU services

11. Addressing supplies issues for children on adult ICUs needs to be supported by close links with regional PICU services to ensure that as far as reasonably possible locally agreed treatment policies are adhered to. Regional protocols for drug infusion concentrations (e.g. inotropes, vasopressors) and preferred treatment strategies (e.g. fluid therapy, insulin infusions etc.) should be distributed electronically and in printed format, with spare copies being readily available to ensure that staff can access this information whenever required.

Dr Judith Hulf CBE
Chair
H1N1 Critical Care Clinical Group

Appendix A

CRITICAL CARE CONSUMABLES*

*** Text in *italics* indicates that a full range of appropriate sizes will be required**

Ventilator-related

- Airway tubes
  - *tracheal tubes*
  - *tracheostomy tubes, fenestrated/non fenestrated*

- Circuits
  - catheter mounts
  - ventilator circuits; various types for use on all types of ventilators
  - filters for different types of ventilation
  - PEEP valves

- Suction
  - *suction catheters*
  - *closed suction*
  - Yankauer suckers
  - suction tubing
  - suction liners

- Other
  - Magill forceps (if single patient use)
  - laryngoscopes (if single patient use)
  - stylet (if single patient use)
  - bougie (if single patient use)
  - *oxygen masks: facial, bucket, tracheostomy masks & nasal cannula*
  - oxygen tubing
  - *NIV and CPAP masks, facial and nasal*
  - nebulisers, face mask & T-piece
  - nebuliser adapters
  - sputum traps
  - *non-rebreathable masks*
  - *hand-ventilation sets*
  - tracheostomy tapes
  - tracheostomy dressings
  - sterile preparation packs for all invasive procedures
  - *percutaneous tracheostomy kits*
  - *chest tubes and drainage system/bottle*
  - *airways*
  - oxygen diluters and tubing if used for humidified masked oxygen
  - *face masks for Ambu bags*

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Medical Gases

In existing Level 3 and Level 2 facilities as well as theatre or general ward areas that may be used for critical care during a surge:

- Oxygen
- Air
- Nitric oxide

Vascular access and monitoring related

- Intravenous
    - *cannulae*
    - *central venous catheters*
    - *hypodermic needles*
    - IV administration sets (blood, fluids, drugs)
- Arterial
    - *cannulae*
    - insertion line packs
    - pulmonary artery catheters/cardiac output probes and sets (if used)
    - pressure bags
    - transducers sets
    - *Luer lock syringes*
    - arterial blood sampling syringes
    - closed blood sampling system

- General
    - blood culture bottles
    - blood lancets
    - bungs white & red
    - 3 way taps
    - extension sets (e.g. Octopus)
    - *IV dressings*

Haemofiltration (CVVH)

- Haemofiltration devices
- All disposable equipment and consumables dependent on local facilities, including
    - Line sets
    - Filters
    - Filtrate bags

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Nutrition

- Enteral
  - *nasogastric (large and fine bore)*
  - *naso-jejunal feeding tubes*
  - feeding bags and giving sets
  - feed
  - bile bags
  - *enteral syringes*

- Parenteral
  - TPN feeding lines
  - PIC lines
  - insertion kits in accordance with local policies

Patient Care

- General disposable
  - facial tissues
  - mouth care packs
  - hygiene solutions
  - slide sheets
  - patient wipes
  - incontinence pads
  - male urinal bowls
  - general bowls
  - wound drainage bags
  - bedpan liners

- Urinary / gastrointestinal
  - catheters (various sizes)
  - catheter bags
  - catheter insertion packs
  - bladder syringes
  - *incontinence drainage systems*

Infection control

- PPE as per RCoA website
- Hygiene solutions
  - gloves
  - plastic aprons selection
  - surgical gowns
  - surgical masks
- FPP3 respirator
- Eye protection
- Waste management containers

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Miscellaneous

- *Non-sterile gloves*
- *Sterile gloves*
- Clinical waste bags
- Bag ties (if used)
- Hand towels
- Gauze
- Cotton wool balls
- Temperature probes
- Infected and non infected laundry bags
- Detergent wipes
- Blood bottles (U&E, FBC etc)
- Universal containers
- Sterile scissors
- Sutures
- Sterile gowns
- Dressing packs
- Defibrillator pads
- ECG dots
- ECG dots (12 lead)
- Sterile bowls
- Stitch cutter
- *Blades*
- *Tapes*
- *Disposable BP cuffs*

Documentation

- Charts
    - observation and fluid balance
    - drug prescription
- Records
    - daily handover
    - nursing care, evaluation and management
    - medical management
    - discharge summary
- Request forms
    - laboratory
    - radiological
    - neurophysiology
    - psychiatry
- Labels
    - line
    - infusion
- Printer paper

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Drugs

Drug	Strength	Form
Actrapid insulin	100 units/10ml	Injection
Adrenaline	1:1000	Injection
Dobutamine	250mg/20ml	Injection
Fentanyl PCA	2.5mg/50ml	Syringe
Gelatin	4%	Infusion
Haemofiltration fluid	Accusol 35	Infusion
Heparin	25,000 units/5ml	Injection
Lansoprazole	30mg	Fastabs
Midazolam	50mg/50ml	Injection
Morphine PCA	50mg/50ml	Syringe
Noradrenaline	4mg/4ml	Injection
Omeprazole	40mg	Injection
Potassium Chloride	15%	Injection
Propofol	1%	Infusion
Salbutamol	2.5mg	Nebules
Salbutamol	5mg	Nebules
Sodium Chloride	0.9%	Infusion
Sodium Lactate (Hartmann's)	-	Infusion
Tinzaparin	3500 units/0.35ml	Injection
Vasopressin	20 units/1ml	Injection
Vecuronium	10mg	Injection
Water for Irrigation	-	Infusion
Ketamine		
Atracurium		
Enoxinone		
Antibiotics, e.g. Augmentin, clarithromycin		
Antivirals. e.g. Tamiflu		
Anticonvulsants		
Diuretics		
Anti-emetics		

Additional Pharmacy Items

- Aquagel
- Water for humidification
- Sterile water (litre bottles)
- Water for injection (10ml ampoules)
- Saline for injection (10ml ampoules)
- !0% Glucose (500ml/1L bags)
- 20% Glucose (500ml/1L bags)
- Emergency drug boxes
- Renal fluids including C.V.V.H. fluid
- Clinell wipes
- Saline 500ml bags

Appendix B

PICU consumables for General ICUs

Consumables needed to increase stock on PICUs, or for use in general ICUs.

	PRODUCT
AIRWAY & BREATHING EQUIPMENT	
MASKS	facemask (silicone) size 0 & size 1
	facemask with air cushion : paediatric; small, med, large adult
	facemask non-rebreathing with tubing (high concentration)
	nasal cannula
	nebuliser kit
GUEDEL AIRWAYS	Guedel oropharyngeal airway (size 000,00, 0,1,2,3,)
BAGS	Marshall manual resuscitator (self-inflating bag) : child & adult
	0.5L anaesthetic circuit (Mapleson F infant T-piece)
	1L anaesthetic circuit (Ayers t-piece) `
	2lL anaesthetic circuit (Mapleson C with reservoir)
MANOMETER:	disposable manometer
	straight connector 15m -15F for manometer
LARYNGOSCOPE BLADES:	laryngoscope blades MAC 0-4
	laryngoscope blades SEW 1 & 2
MAGILL:	laryngoscope Magill child
	laryngoscope Magill paediatric
TRACHEAL TUBES :	uncuffed Portex tracheal tube 3.0mm-8.0mm id
	cuffed TT (low pressure, super safety clear) 2.5 mm-6.0mm
	cuffed TT standard PORTEX 4.0mm-8.5
LMA	laryngeal mask : size 1.0,1.5, 2.0,2.5,3.0,4.0
AIRWAY & INTUBATION ADJUNCTS:	gum eleastic bougie (5Ch & 15Ch)
	stylet intubation small, med & large
	cuffed tube pressure monitors
SUCTION CATHETERS:	Yankauer suction tube (short mini -paediatrics)
	catheter suction (oblique open-tip, two small relieving eyes) 5Fr-14Fr
STRAPPING : nasal tubes	Duoderm extra-thin hydrocolloid square (10x10cm)
	Elastoplast (bandage elastic adhesive)
oral tubes	zinc oxide tape 1-inch wide
	tracheal tube holders
	micromount elbow vent connection to ETT

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VENTILATORS:	paediatric circuits if appropriate with humidification
CHEST DRAINS	Seldinger chest drains 12F Seldinger chest drains 20F Rocket chest drains
IV & CARDIOVASCULAR EQUIPMENT:	cannulae 24G, 22G, 20G , 18G central lines (triple lumen) 5fr 15cm (>2yrs, femoral site) central lines (triple lumen) 5fr 8cm (6month -2 yrs) central lines multicath (triple lumen) 4.5fr 6cm (for children <6 months) hands-free defibrillator pads (child & adult)
MONITORING :	saturation probe neonate saturation probe paediatrics ecg electrodes baby 1.5mm non-invasive blood pressure cuffs & leads: neonatal size 2,3,4,5 transducer sets (as appropriate for use with local monitoring system) end-tidal CO_2 monitoring suitable for 4.5 or smaller TT
FEEDING:	feeding tube (6Fr -10Fr) infant formula (parents' preference)
CARES:	arm splints including elbow (freedom) snuggle wraps (newborn - large) and bed linen nappies urinary catheters (size 6,8,10, 12fr) eye care: gauze, sterile water, viscotears baby bath & wash mouth care: sponges, sterile water, vaseline, child toothbrush
SAMPLES:	blood sample mini-tube for collection (volume 1.3ml)

Appendix C

Resuscitation equipment [for both general and paediatric units]

AIRWAY EQUIPMENT	
Face masks	Size 00-4
Guedel oropharyngeal airways	Size 000-4
Laryngeal mask airways	Size 1-5
Laryngoscope blades	Miller 0
	Seward 1 &2
	Mackintosh 0-4
Laryngoscope handles	with batteries
Magill forceps	
Tracheal Tubes	uncuffed size 2.5-9.0
	cuffed 2.5-4.0 low pressure
	cuffed standard 4.0-9.0
Lubricating gel	
Gum elastic bougie	Fr 5 & Fr 15
Intubation stylet	small, med, large
Yankauer sucker	paediatric & adult
Tracheal tube connectors	15mm compatible connectors
	catheter mount with swivel
Nasogastric tubes	size 6-12 Fr
Duoderm, extra thin	
Elastoplast tape (1 inch)	
Zinc tape (1 inch)	
Scissors	
BREATHING CIRCUITS & BAGS	
High-flow oxygen masks with reservoir	paediatric & adult
Re-breathing circuits (Ayers T-piece)	500ml, 100ml, 2L
Self-inflating Ambu-bag	paediatric & adult
Nebuliser kit and adapters	
MoNITORING	
ECG electrodes	paediatric & adult
End-tidal CO_2 monitor	small & large connectors
Saturation probes	soft paediatric & adult

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RESUS DRUGS	
Adrenaline (1;10,000)	
Sodium bicarbonate 8.4%	
Atropine	
Calcium gluconate	
Normal saline ampoules	
VASCULAR ACCESS	
Intra-osseous (IO) gun & IO needles	