



Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

**Report on behalf of the clinical group by
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Executive summary

1. Following the discovery of a novel version of the H1N1 virus in April 2009 the first cases started appearing in the United Kingdom shortly after. During June and July 2009 there were peaks of activity during what was considered to be the first wave of the pandemic of H1N1 (2009). During this time critical care services came under particular pressure.
2. The clinical pattern of H1N1 (2009) indicated that it was attacking the lower respiratory system leading to severe respiratory failure for some patients. Also it was attacking all age groups, including people with no previously known health condition. Critical care services were preparing to face considerable demands on their services.
3. Building on work done by the NHS in the four UK countries to prepare for an influenza pandemic over a number of years, NHS organisations developed plans to surge critical care capacity. During July and August, the Strategic Health Authorities (SHAs) in England finalised their plans to double critical care capacity and reported on these to the Department of Health. Similar approaches were developed in Northern Ireland, Scotland and Wales as part of a coordinated UK response to the pandemic.
4. In September 2009, the Department of Health set out a national H1N1 critical care strategy that confirmed that SHAs had plans in place to surge capacity. This followed agreement by the four UK health ministers that NHS bodies should plan on this basis.
5. At the same time, the DH established a Swine Flu Critical Care Clinical Group to provide advice to the DH and the NHS on the practical issues around surging and sustaining critical care capacity during the anticipated second wave of the pandemic during October, November and December.
6. The membership of the clinical group was drawn from medical, nursing, pharmacy and managerial colleagues and included representatives of the professional bodies involved with critical care. It had members from all four countries of the UK.
7. The Clinical Group developed advice on some of the central areas involved with surge: support to staff to enable them to work in extended roles, the “Day’s Supply” needed to sustain surge, principles to support triage of patients and the role that Extracorporeal membrane oxygenation (ECMO) could play during the second wave.
8. The Clinical Group was impressed with the planning done at regional and local level to enable surge to happen. It continued to play the role of “a critical friend” to encourage these plans to be strengthened further. In addition, it was essential that the principles around command and control, stopping elective activity, providing mutual aid were agreed and shared between clinicians and managers in all organisations.
9. The group has identified seven key learning points that it hopes will now be taken forward by the UK health departments, professional societies, regulators, regional bodies in England and most importantly by critical care networks and their component organisations.

10. The key learning points are:

SHA's should revisit and re-energise their critical care networks, learning the lessons from the H1N1 (2009) pandemic

the UK health departments should incorporate the learning from the pandemic into national policy and guidance to the NHS in their countries;

engagement is needed by the professional bodies, working together, to develop further clinical advice

the health departments, regulators and employers need to build on the work to put in place support to staff during the pandemic

SHA's should take forward the approaches to bed management developed during the pandemic

work should be supported to assess the long-term capacity needed for extracorporeal membrane oxygenation (ECMO) as part of the range of treatments available for patients in severe respiratory failure

local organisations should ensure that they have multi-speciality arrangements in place to support triage in surge situations and that these processes are well documented and rehearsed

Section One: Background

1. As part of the Department of Health (DH) response to the challenges faced by the National Health Service (NHS) due to the pandemic of H1N1 (2009) influenza, the DH established the Swine Flu Critical Care Clinical Group (SFCCCG) in September 2009. The specific context was that Strategic Health Authorities in England had submitted plans to the DH setting out how the critical care services delivered by general Intensive Care Units (ICUs) and Paediatric Intensive Care Units (PICUs) could be surged, and this additional capacity sustained, during the expected second wave of the H1N1 pandemic. Building on these local plans, the Department of Health published an H1N1 Critical Care Strategy on 10 September 2009¹ that described the approach to surging critical care during the pandemic. Similar approaches were taken in Northern Ireland, Scotland and Wales as part of a co-ordinated UK wide response to the pandemic.
2. The role of the group was to provide senior clinical support at a national level to Strategic Health Authority (SHA) and local plans to surge capacity. This advice was also shared with all four UK health departments. A significant task was to ensure that general and paediatric intensive care services were as prepared as possible for the expected surge in demand and its implications before the NHS headed into the second wave and the traditional flu season.
3. Dr Judith Hulf CBE, the former President of the Royal College of Anaesthetists was invited to chair the group, and its membership was drawn from the medical, nursing and pharmacy professions as well as the professional societies involved in critical care. To ensure co-ordination across all parts of the United Kingdom, representatives from the other three UK health departments were invited to join the group. A full list of the group's membership is at annex A.
4. From the outset, the members of the group emphasised the importance of building on the extensive work already carried out by the Department of Health, professional bodies and local clinicians over a period of years that had looked at both the ethical issues and detailed service patterns needed to respond to an influenza pandemic.
5. Where the group saw its particular focus was on advising on the practical issues involved in surging capacity and sustaining it during a second wave. This would include the consideration of the information supplied to the DH by SHAs in England, assist the DH in evaluating it and to help SHAs to identify and manage risks associated with their plans individually and collectively.
6. The terms of reference agreed for the group (in full at Annex B) were to:
 - offer advice to the Department of Health on how the NHS should best increase general 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;

¹ Critical care strategy: managing the H1N1 flu pandemic, Department of Health
http://www.dh.gov.uk/en/Publichealth/Flu/Swineflu/DH_104989

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- 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.
7. To ensure continuity with the overall approach to pandemic planning, the group was accountable to the Department of Health's Pandemic Influenza Clinical and Operational (PICO) Group, and through this body to the Swine Flu Delivery Board co-chaired by the Chief Medical Officer and the Chief Executive of the NHS.

Section Two: Key Learning Points

8. The work carried out by the Critical Care Clinical Group is described in the third section of this report. From this activity, that group has drawn out seven key learning points, with a sub-set of specific issues that it believes should be addressed by the national professional and regulatory bodies, Strategic Health Authorities as well as local critical care networks and NHS organizations.
9. H1N1 (2009) presented a 'slow burn' scenario of an incident potentially lasting several weeks. The NHS is well used to planning for a major incident lasting for 48 or 72 hours. It is vital that the NHS is also able to respond to a longer-term demand to surge capacity should another pandemic or similar incident occur. The 2009/10 pandemic experience has served as a valuable learning exercise for the NHS. The clinical group feels strongly that this learning needs to be built, upon, to ensure that the NHS is as resilient as it can be to handle a future event of this kind.
10. Of the learning points identified by the clinical group the first one, dealing with critical care networks, is the key one. Essentially, all other actions depend on robust and well-prepared critical care networks. This issue needs to be, addressed, by the SHAs. The learning points are:

Learning Point One: Revisit and re-energise critical care networks

Work should include:

- SHAs ensuring that there are fully functioning critical care networks covering all parts of regions
- SHA's should review plans by networks to double capacity should be reviewed and ,as there was variability noted between networks, as a first step to turning the H1N1 surge plans into critical care surge plans and revised on an annual basis. SHA plans should then be based on these local network plans;
- SHAs ensuring that the command and control arrangements developed during the pandemic should remain capable of deployment and have clinical support;
- data on the numbers of neonatal, paediatric and general critical care beds within each region should be available and held by each SHA and shared with networks on a regular basis to ensure its accuracy;
- addressing the steps needed to ensure that plans to deliver mutual aid are robust, rehearsed and owned by all organisations within the networks;
- further developing the communication arrangements set up during the pandemic between SHAs and networks to promote an open and transparent discussion about intensive care unit (ICU) capacity and the robustness of surge planning;
- arrangements developed and maintained within each network to provide clinical advice and support to those working in general and paediatric ICUs, especially those outside of tertiary and other regional centres;
- promoting discussion between general and paediatric critical care services on the implications of caring for children on general units during a surge;
- the involvement of ambulance services in order to maintain a focus on the transfer and other transport implications of a surge;
- identifying the pharmacy and other supplies necessary to sustain a surge – and we encourage the use of the “day’s supply” concept in this – as well as ensuring the resilience of supply chains at local, regional and national level;

- maintaining a focus on logistic and supplies issues, in particular drugs, medical gases and blood supplies in addition to staffing and bed capacity;

Learning Point Two: Incorporate the learning from the pandemic into national policy and guidance to the NHS:

The Department of Health is encouraged to ensure that the work done by the NHS during the pandemic is, built upon, and maintained through national policy for critical care. Key areas for action are:

- the H1N1 Critical Care Strategy of September 2009 should be turned into a generic policy for critical care surge that is subject to regular rehearsal and future pandemic influenza planning frameworks should have relevant cross references to this policy;
- the development of further guidance around the handling of the postponement of elective activity, ensuring that managers and clinicians at all levels of the NHS are aware of this guidance and how it would assist local decision making about switching from elective to emergency capacity in a pandemic or other similar major incident;
- the promotion of consistent approaches to NHS command and control across all 10 SHAs, supported by a peer review process;
- maintaining a national focus on the supply chain for critical care and involve the relevant supplies agencies in national command and control arrangements;
- identifying the lessons from the healthcare worker vaccination programme including how to improve uptake across all staff groups;
- work by the four health departments to include UK wide mutual aid for critical care into their national planning frameworks and include these in any future rehearsal of their planning arrangements.
- ensuring that a consistent approach to audit is taken during a pandemic and that NHS organisations give early ethical approval to enable them to begin.

Learning Point Three: Engagement by the professional bodies to develop further clinical advice

The professional medical, nursing, pharmacy bodies within the critical care community developed advice during the pandemic. They should be encouraged to continue this work, including:

- the development of the database of contacts within each general and paediatric ICU that was prepared by the clinical group. This should be hosted by one of the ICU bodies;
- addressing how the guidance documents on support to staff prepared by the bodies and the clinical group can be adopted on an ongoing basis;
- turning the training documents prepared by the bodies into standing guidance for staff working in ICUs;
- developing formal treatment guidelines to support the work of medical, nursing and pharmacy staff with this work co-ordinated across the British Association of Critical Care Nurses (BACCN), the British Association of Perinatal Medicine (BAPM), the Intensive Care Society (ICS), the Paediatric Intensive Care Society (PICS) and the United Kingdom Clinical Pharmacy Association (UKCPA). Critical

care networks should be involved in the development and communication of these guidelines;

Learning Point Four: Build on the work to put in place support to staff during the pandemic

Critical care surge will place considerable demands on staff in and outside of general and paediatric ICUs. Staff need, to continue to have the confidence that employers and regulatory bodies will support them. We encourage further action at all three of these levels including:

- maintaining the skills audits developed by employers and the arrangements that were put in place to provide refresher training for staff who may need to be redeployed into critical care during a surge;
- incorporating the advice on indemnities and liabilities developed by the Department of Health into mainstream policy guidance;
- taking the document prepared by the clinical group on support to staff and developing it into a fuller national policy document on staff working in extended roles that can be revised with clinical and staff side groups on a regular basis;
- continued work by the regulatory bodies to develop their advice to staff working in extended roles;
- that the scope is considered by all the staff regulatory bodies for the identification of a core set of common principles for surge situations that they could then use as the basis for developing their individual guidance;

Learning Point Five: Take forward the approaches to bed management developed during the pandemic

The pandemic showed that it was possible to have a UK wide data base of paediatric ICU bed availability through existing regional bed bureaux that could, be accessed directly by all units. This excellent work, should be built upon, with consideration given to:

- developing the bed bureaux's data base into a standing system of support to PICUs;
- extending this approach to general ICU beds;
- scoping, by SHAs of the specification and cost of IT systems, on a national basis, that would enable real time data on general and paediatric ICU bed availability to be accessed. This recognises that the existing IT systems supporting bed management activity are now either quite old or not consistent between SHAs.

Learning Point Six: Work, should be done, to assess the long-term capacity needed for extracorporeal membrane oxygenation (ECMO) as part of the range of treatments available for patients in severe respiratory failure

ECMO played a significant role in the UK's response to the pandemic. In the light of this, we support:

- the work by the relevant planning and commissioning bodies in England and Scotland to identify the scope for additional baseline capacity;
- the development of national standards for ECMO provision, shared across the UK;

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- work to develop transfer and retrieval arrangements for patients requiring ECMO, including consideration by commissioners of the provision of mobile ECMO for transfers when appropriate and necessary.

Learning Point Seven: Triage

The issue of triage remained one that was actively discussed within the NHS during the pandemic. Considerable work had been done by the UK health departments on the ethical issues involved in surging capacity. The group acknowledges the concerns that this issue raises for clinicians and managers. It is important that the distinction between day-to-day clinical decision-making and the triage that might be needed during major incidents or pandemics is understood. Going forward, the group suggests that:

- NHS organisations further develop their local approaches to triage including the maintenance of decision-making groups with membership drawn from across clinical specialties and services provided by the organisation;
- these groups should continue to meet and rehearse their approach to decision making in advance of any surge in activity.

Taking the work forward to address the key learning points

11. Following on from the key learning points the following forward agenda is suggested to enable this work to progress.
12. The clinical group found it invaluable to be able to consider all aspects of critical care including neo-natal, paediatric and general services. Opportunities should be created to maintain planning links across all three strands of critical care at national and regional levels.
13. The initial focus of the group was on medical and nursing staffing issues as well as logistic and supply issues. To enable a fuller dialogue, the group was, expanded to include pharmacy representatives, this underscored the importance of involving pharmacy colleagues from the start of planning work on resilience, and in particular that in preparing for the impact of an influenza pandemic on critical care services.
14. Having an ability to discuss issues with colleagues from all four countries in the United Kingdom was invaluable during the group's work. The ability to maintain a dialogue across the UK on planning for surging critical care should be preserved during the years ahead.
15. The specific suggestions for taking forward the key learning points are:
 - there should now be a discussion involving the professional bodies and the Royal Colleges to support the development of clinical guidelines and the approach for communicating these to critical care networks;
 - SHAs should take forward the work on policy and the development of critical care networks should be taken forward involving and in so doing involve the professional bodies as sources of reference and advice;

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consideration should be given to appropriate vehicles for ensuring an overview of the planning for critical care surge that take into account the issues facing neonatal, paediatric and general critical care services and clinicians;

the excellent work done between the four UK health departments on planning for critical care surge should not be lost and the sharing of policy developments should be encouraged and where relevant, UK wide approaches agreed;

Section Three: Issues addressed by the group

16. In the light of the first wave of H1N1(2009) in June and July it was clear that patients, including adults, children and neonates would require hospitalisation and intensive care. This necessitated further rapid development of operational plans to cope, as far as would be possible, with the potential demand. Strategic Health Authorities (SHAs) had provided and confirmed plans to double critical care capacity and to sustain that doubling for eight weeks or more. These plans drew on the detailed guidance covering operational issues relating to a rise in demand for services that had been issued on 1 May 2009².
17. To reinforce these regional plans the Department of Health published an H1N1 Critical Care strategy on 10 September 2009³. This document both confirmed that the NHS had plans to double general capacity and substantially increase paediatric capacity and set out the issues that would need to be addressed to make this happen.

Data on activity during the pandemic

18. Fortunately, the second wave of the pandemic was more moderate than had been forecast in July in the light of the significant first wave that was experienced. However, sadly for a number of individuals H1N1 proved to be a fatal disease. There were 309 confirmed deaths due to H1N1 as of 3 March 2010. The position with hospital activity due to H1N1 is set out in the following table:

| Treatment : Secondary Care in England from 17 July 2009 to 3 March 2010 | | | |
|--|---------------|---------------|-----------------|
| Source: Department of Health daily situation reports | | | |
| | All | Adults | Children |
| Admissions to hospital | 25,785 people | 16,284 | 9,501 |
| Received critical care treatment | 2,326 people | 1,863 | 463 |
| Total hospital bed days | 101,940 days | 73,073 | 28,867 |
| Critical care bed days | 18,247 days | 15,413 | 2,834 |
| Critical care average length of stay | 7.8 days | 8.3 days | 6.1 days |
| ECMO bed days (from 26 October 2009) ⁴ | 496 days | 496 | 0 |

19. The group welcomed the valuable study done by the Intensive Care National Audit and Research Centre (ICNARC) under the heading of the Swine Flu Triage (SwiFT) study that provides further detail on critical care activity during the pandemic. The details of this study can be found at <http://www.icnarc.org>⁵. The group was disappointed to hear that as late as December, four months after the first wave that some trusts had not provided ethics

² Pandemic flu: managing demand and capacity in health care organisations (surge), Department of Health, http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_098769

³ Critical care strategy: managing the H1N1 flu pandemic, Department of Health http://www.dh.gov.uk/en/PublicHealth/Flu/Swineflu/DH_104989

⁴ Collected separately from 26 October 2009

⁵ <https://www.icnarc.org/CMS/ArticleDisplay.aspx?ID=d406b81c-dd7d-de11-9a46-002264a1a658&root=RESEARCH&categoryID=70422f67-6983-de11-9a46-002264a1a658>

committee approval to enable the study to begin. The DH should seek in a future situation to ensure that studies of this nature are fast tracked for approval.

Achieving a doubling of critical care capacity

20. The primary focus of the clinical group was to address issues necessary to enable clinical and managerial staff to achieve the planned doubling of critical care capacity across the UK and to provide the support to them necessary to maintain this level of activity for a period of eight weeks or more.
21. The initial work programme identified by the group covered communications and the command and control mechanisms needed, sustaining the supply chain of consumables within a critical care unit, the readiness of equipment, the support for and additional training to all staff required to work outside their normal working capacity and environment, indemnity for those staff, the concept of 'triage' and specific clinical issues including the potential for use of Extracorporeal membrane Oxygenation (ECMO).

Command and control

22. In order to support local work, the group asked SHAs to identify the clinical leads for critical care and the lines of communication to individual hospitals. Useful information was obtained from each of the SHAs about the structure of their command and control system. SHAs had asked the group to indicate what it considered a good approach to identifying the risks that needed to be managed within the command and control arrangements. This was shared and further updates were obtained. These were reviewed and feed back was given.
23. The group hoped that by so doing a common approach could be adopted between SHAs so that any necessary movement of patients and staff across boundaries could be facilitated. Given the statutory role of SHAs and the differences within their areas, imposing a standardised national approach was not an option. It was clear from the returns made by the SHAs that each had particular strengths, and some had weaknesses. This may be a reflection of the fact that the clinical group did not see all of the detailed planning documentation held within SHAs but there would appear to be scope for work, perhaps by peer review, to raise standards across all regional areas SHAs to a shared level of preparedness.

Database of critical care networks

24. In early September 2009 although data were available on the NHS Trusts or Health Boards providing critical care there was no complete database of all critical care facilities in the UK available in a single place. This reflected the devolved nature of health to the four UK countries and in England, that central monitoring is done at an aggregate NHS Trust level with each SHA holding its own database of critical care networks and facilities. The clinical group considered that communications would be of paramount importance to facilitate the work of critical care units in the event of a large second wave.
25. The SFCCCG was anxious to establish a database to include the bed numbers in each facility, the names and contact details of the lead clinician and lead nurse and the manager responsible for the unit. It was considered essential that direct communication was made possible with and between clinicians in individual facilities. The critical care network system across the UK provides support but while excellent in some areas, it was not perceived to be by members of the group to be as robust in others.

26. Partial databases were available from the four departments of Health, the Intensive Care Society (ICS), Paediatric Intensive Care Society (PICS) the Intensive Care National Audit and Research Centre (ICNARC), SHAs and individual critical care networks. The databases in Scotland, Wales and NI, being smaller and easier to manage, were more complete. The paediatric database across the UK was also robust. The DH support team to enable central communication, and control should that become necessary carried out considerable detailed work on this database.

Clinical advice

27. The substantial body of clinical experience and advice accrued during the first wave, and subsequently during the second wave was well co-ordinated by professional bodies on their web sites, specifically the Royal Colleges of Paediatrics, Anaesthetists, Physicians, ICS and PICS, with links to the DH web site. The decision was made that it was not the role of the clinical group to develop this clinical advice but rather to ensure that it was in place, easily available to clinicians and was being communicated widely.

28. The clinical group proposed a system be set up for a 24-hour clinical advice service within each SHA probably manned by the on-duty clinical lead in the tertiary referral critical care unit. Such units are likely to care for the sickest and most complex patients and could provide telephone advice for clinicians in smaller units. As the second wave moderated, this proposal was not implemented nationally although it does operate informally within some of the critical care networks.

Database of documents

29. In order to identify, and acknowledge, the very substantial body of work already completed on clinical, ethical and managerial issues relating to the critical care of H1N1 patients a resource document database, was set up by the Department of Health and made available to the members of the group.

Surging capacity and standing down elective activity

30. The process for standing down elective activity is vital to any escalation of critical care activity. Any arrangement also needs to be underpinned by robust management information. Considerable concern was expressed to members of the group by local clinicians that the precise mechanism in their area was unclear. Each hospital and SHA had its own process, and although general principles, had been identified, there was concern that it would be left in some cases to individual clinicians, on duty at the time, to bear the responsibility for stopping activity. It was the clear view of the group that this was a shared managerial and clinical responsibility and that the process should be defined and rehearsed in advance of being needed, NHS Trust Chief Executives must ensure that local systems are well understood by clinical colleagues and that the arrangements for initiating them are understood.

Mutual aid

31. Mutual aid is central to the response to the demands placed on critical care by a pandemic or similar long-term incident. The group was encouraged by the plans developed at SHA level to deliver mutual aid. However, the members of the group received feedback that there was not a universal understanding at senior managerial level in individual

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organisations and networks that centres unaffected by the pandemic might need to suspend their elective activity programmes to assist centres that were no longer able to receive admissions of patients with H1N1. Fortunately, the nature of the second wave meant that plans for mutual aid were not, put to the test. This means that it is important now that the principles and plans for mutual aid are, embedded within organisations and networks and a shared understanding achieved amongst senior clinical and managerial decision makers.

32. The four health departments would have a role to play to reduce the possibility that parts of the UK would be at more than full capacity while others would be relatively unaffected. Steps were taken, to address this in the pandemic but the group felt that any future rehearsals of pandemic scenarios should include a UK wide mutual aid element. The group had also received comments from clinicians that the process for a return to normal elective activity following de-escalation was not well defined. This also would need attention by national, regional and local managers.

Rehearsal

33. The importance of rehearsal was reiterated, throughout the meetings of the group in order to test all local plans to double critical care capacity, including redeployment of facilities, equipment and staff and standing down electives, transport systems and triage. In the group's view, this needs national guidance and regular testing at regional and local levels.

Bed management

34. The co-ordination of bed availability is a central element to effective mutual aid to enable patients to access services in those parts of the country less affected by a pandemic. H1N1 did affect parts of the country at different times and it was important that units were aware of the overall bed picture in order to ensure that patients who could be treated were not denied access to care.
35. In England, the four bed regional bureaux collaborated to produce a collated PICU bed state that was updated, three times a day and was able to be accessed by all units. With the agreement of the other three health departments, this was turned, into a UK wide bed state. This was especially important for PICU given the relatively lower number of beds compared to general services. However, the principles could apply equally for general beds. The PICU arrangement proved to be invaluable for short term planning in response to the pandemic, both within PICUs and across regions. The clinical group believes that considerations should be given to continuing this service after the end of this phase of the H1N1 pandemic and certainly reviving it during the next flu season.
36. The clinical group heard that the existing systems used to monitor general and paediatric bed availability are either now relatively old in IT terms or that there are different approaches taken within SHAs. Whilst recognising the need to be sensitive to local services, rather than having top down solutions imposed, the group believes that it would be helpful to and the SHAs in England should set out the scope and issues involved with replacing the current IT systems for general and paediatric bed availability with a new and consistent approach across the NHS in England.

Support for Staff

37. Inevitably, staff of all disciplines and all grades will be required to work in extended roles in the event of a pandemic. The group were concerned that the arrangements for supporting and providing additional training for those staff were in place. Excellent documentation is available from the ICS⁶ and PICS⁷ to support this and the group wished these to be made widely available as a future resource and they are both easily adaptable to meet local needs. Many individual units, paediatric and general have produced local plans and resource documents but there is no central depository for these. We would wish to see the ICS and PICS acting as supporters for the development of these plans and to urge those units who have not yet done work in this area to undertake it in a non-pandemic situation.
38. It had been recognised, ahead of the first wave, as evidence by a joint statement by the ICS, PICS and the Association of Paediatric Anaesthetists of Great Britain and Ireland in June 2009 that larger children might need to be admitted to adult ICUs during the pandemic⁸. There remained through the pandemic considerable local discussions between adult and paediatric intensivists about the practical implications that this would pose for medical and nursing staff. These issues have not, been fully bottomed out within all units and require further discussion locally.
39. The group welcomed the useful documentation produced by the DH that collated issues around supporting staff in extended roles.^{9 10} The stance taken by the regulatory bodies was crucial during the pandemic. The majority of regulators were explicit in their support for professionals in a pandemic situation working in extended roles. However, the group continued to receive comments throughout the pandemic about a lack of consistency between the regulators on the central issue of staff working outside of their normal role in a surge situation.
40. The group noted that the surge plans that had been shared, by SHAs had identified adjustments to nurse staffing ratios as a vehicle for enabling surged critical care facilities to operate. It was considered by the group that more detailed guidance, was needed on how nurses would actually work in a surge. For example where staff, were redeployed from other ward or theatre areas, they could work as part of a team supervised and supported by an ICU. The group developed guidance on this issue and it is attached at annex C.
41. As a vaccine was available against H1N1 it was considered essential that offering protection for staff through immunisation was carried out at an early stage. The group heard about variations in uptake between NHS trusts and between staff groups. Within the secondary care sector uptake by staff group as at February 2010 was Doctors (42%), Nurses and Midwives (35%), other health professionals (41%) and clinical support staff (43%). Lessons learned from organisations where the uptake amongst acute care staff was highest should be used in the future. There would also appear to be some particular issues

⁶ <http://www.ics.ac.uk/> Support for Staff working in exceptional circumstances

⁷ http://www.ukpics.org/index.php?option=com_content&task=blogsection&id=13&Itemid=41 Managing very sick children in a pandemic

⁸ <http://www.apagbi.org.uk/index.asp?PageID=322> Managing very sick children in a pandemic, June 2009, Association of Paediatric Anaesthetists of Great Britain and Ireland

⁹ Pandemic influenza: additional measures to meet workforce supply

http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_106388.pdf

¹⁰ Pandemic influenza: indemnity cover and associated issues in England

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_109559

needed to address around the relatively lower uptake by nursing colleagues. The group strongly urges the avoidance of any suggestion that immunisation is mandatory as it believed that this would be counterproductive.

Neonatal intensive care

42. There are well-organised perinatal networks within England and the clinical group felt that these should continue to be encouraged to co-ordinate their local arrangements. The clinical group supported the guidance developed by the Royal College of Paediatric and Child Health that admissions of infants from the community with H1N1 should not, be made to neonatal intensive care units (NICU). H1N1 did not pose as great a threat to NICU as to general and paediatric units as there was no evidence that H1N1 caused any increase in premature births. However H1N1 did have a differential affect pregnant women and there were issues around the care of babies born to mothers with the virus.
43. Local NICUs did develop plans around supporting infants who might need to be nursed in these situations. Business continuity was also an issue given the potential impact of the virus on staff and the extent to which NICU staff might, be needed to support a surge in paediatric or general capacity.
44. The clinical group noted that although the 10 September 2009 critical care strategy did address NICU issues, and that examples of local strategies existed, that there was still scope for more details national guidance for NICU and flu issues.

Triage and ethical issues

45. The group recognised and endorsed the extensive work done by the Department of Health together with the professional bodies on ethical issues during the planning for a pandemic over previous years. A great deal of work had, been done, as part of the work on pandemic influenza preparedness. It was acknowledged, that clinicians do not agree about relying on scoring systems for triage. Some regard the SOFA scoring system as a possible strategy but by no means foolproof. However, the group was urged by the SHA Flu Lead Directors to do further work on advice for the triage of patients into critical care beds.
46. We were concerned to hear that there was a risk of some NHS Trusts misunderstanding the application of triage, with a suggestion that it would be introduced, once a surge began. It was vitally important to emphasise that critical care clinicians carry out clinical decision making about treatments and patients day in and day out. This decision-making would continue in a surge. In fact the reason for surging was to ensure that as many patients as possible could still benefit from the respiratory support available from ICUs and PICUs. Triage would only be introduced once all surged facilities were exhausted, underscoring the importance of mutual aid.
47. The group developed a statement of principles on triage, annexed at D, which emphasised the need for multi-specialty team decision making arrangements to be set up and that there has to be a local decision making process that is clearly documented. The clinical group stressed that the rehearsal of strategies related to triage is imperative. The group encourages individual hospitals to take this forward considering the issues for neonatal, paediatric and general services.

Supplies, equipment and pharmaceuticals

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

48. Using the Military concept of a “Day’s supply” needed to maintain each critical care bed; the group produced a paper setting out the consumables and drugs needed in a surge situation. This included the paediatric items, needed on a general ward should larger children require admission to a general bed. Issues around neonatal supplies, were also considered. This document identified supplies essential to one day’s critical care of general and paediatric patients and is attached, at annex E. Individual units were urged to identify the supplies required to be available for paediatric and general patients and to make their central supply department aware of their needs to sustain a doubling of capacity.
49. Members of the group received comments from local clinicians expressing concerns about the need to stockpile supplies. The professional societies believed that there was a need for further dialogue on this with the DH. In the views of the members of the clinical group, the issues regarding production of consumables and medicines sufficient to sustain doubling were never satisfactorily addressed. In a pandemic of greater severity than encountered in 2009, sustained production including that from outside of the UK and haulage will be in jeopardy due to manufacturing and transport staff becoming ill with the virus.
50. The issue of stockpiling, was consequently raised with the group. Although the group accepted the thinking behind the Department of Health’s active discouragement to stockpile it was considered, that a sustained surge of critical care capacity would be very difficult to maintain without the building up of stocks in local units. There are also capacity issues relating to the available storage capacity to hold stocks for surge.
51. The group endorsed the Department of Health’s approach to SHAs to seek assurance that the resilience of supply chains was being actively tested, and local plans put in place to ensure supplies were available during a surge. There is a need for “peacetime” work with clinicians to reflect on the experience and consider implications for national and regional policies on supplies.
52. Although it would not be advisable in a normal state of affairs, the group recognised that the re-use of single use items within a CC unit might become necessary in a surge situation.
53. The value of conserving supplies, particularly oxygen and blood, should be emphasised. The Department of Health informed the group of steps that had been taken with the suppliers of medical gases to sustain a supply but within most hospitals there is much wastage of oxygen, for example there are supplies left turned on when masks and nasal speculae are disconnected from the patient or too high inspired oxygen concentration used in mechanical ventilation. There will be few savings on essential blood within critical care units, but if elective work ceases then blood should be conserved. The Department of Health was in discussions with the National Blood Transfusion Service and the group felt that it was essential that the Blood Service was a full partner in the national response alongside the SHAs.
54. In order to double critical care capacity ‘archived’ equipment and that normally used outside the ICU and PICU will need to be redeployed. This applies particularly to such items as ventilators and syringe drivers. It is likely that archived equipment will be that which is difficult to use, has been ‘cannibalised’, or no longer works. The task of making this equipment ready is a joint one for clinicians, nursing staff and technicians and must be done in advance of it being needed.

55. While many SHAs purchased additional equipment that would be of use in normal or pandemic situations, others did not and the group did not receive enough precise information attributed to individual units to judge whether sufficient usable equipment, general and paediatric, was available to double capacity. It must also be remembered, that operating theatre ventilators are in some instances static (i.e. attached to ceiling 'pods') thus reducing the capacity of operating theatre and recovery areas to be used as critical care facilities. Some complex paediatric equipment would be difficult to deploy in an adult area and hospitals would need to identify how to manage the implications of this. This remains an issue for networks to address in their surge planning.

Transport

56. The group received updates from the DH on the work done with the ambulance services to ensure resilience during the pandemic. In addition, SHAs fed back to the group on the work that they had in hand with ambulance services, especially on the involvement of ambulance services in local planning exercises and rehearsals. This is essential given the key role that transport plays during a surge including the enabling the transfer of patients within the hub and spoke arrangements that need to operate between general hospitals and tertiary centres. Patients will also require transfer away from some units, into step down facilities in other centres within the context of mutual aid. The resilience of ambulance services needs to continue, to be addressed within network plans. A related factor is the resilience of the transport used to bring supplies to units and this needs to feature in regional and local resilience planning around supplies issues.

ECMO

57. The SFCCCG was asked by the DH to set up a sub-group to consider the place for the provision of extracorporeal membrane Oxygenation (ECMO) in the treatment of critically ill H1N1 patients. This was in response to demands from the NHS for guidance in the light of the experiences reported from the Southern Hemisphere of the role that ECMO played in the first wave there. ECMO is a highly specialised treatment, which was still subject to clinical trials in the UK at the start of the pandemic, and in July 2009 there were five beds at University Hospitals of Leicester NHS Trust available for adults, paediatric and neonatal cases and paediatric and neonatal beds available in Glasgow (four beds), London (three beds) and Newcastle (two beds).

58. The issues considered by the sub-group were the potential for ECMO to assist the NHS response to the pandemic, whether the NHS should be seeking to expand ECMO capacity and if expansion were considered appropriate would this be best being done in the existing centres or through wider dispersal of the treatment to other tertiary centres or hospitals. As ECMO was a UK wide resource the sub-group's advice was made available to all four health departments.

59. The membership of the sub-group is at annex F. The group met twice, in September and November. The statements produced at each of these meetings are appended at Annexes G and H. In summary, the sub-group supported the expansion of ECMO during the second wave of the pandemic but that given the nature of the treatment, and that years of training are required by its practitioners that any extra capacity needed to be provided to the Gold Standard set by Leicester.

60. Leicester confirmed that it could increase from five to eight beds and this, was implemented by mid-October. Additional capacity of two beds was created at each of the Royal Brompton and Papworth hospitals as these centres were currently providing ECMO as part

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

of their heart-lung transplantation programmes. Leicester, in a move endorsed by the sub-group, acted as the gatekeeper for all referrals into the surged capacity.

61. The group was clear that ECMO was only one of a portfolio of treatment strategies available to treat the severe respiratory complications of novel H1N1 influenza. It was also felt that the best available care for patients requiring ECMO would be in a unit with expertise in the technique and that ECMO should not become available as a minority treatment in multiple units. It was also aware of the effect an escalation in ECMO provision was likely to have on the provision of critical care patients who required other treatments. The impact on staffing levels and transport provision had to be borne in mind before an escalation of ECMO provision was made.
62. The clinical group received details of the establishment of an Expert Group by the Scottish Government to advise on long term provision of ECMO in that country. In addition, the specialised commissioning body in England was reported to be looking at ECMO provision from April 2010 onward. The clinical group supported the work by the authorities in both countries to look at the long-term needs for this service in the UK.
63. During the pandemic, the clinical group heard of the arrangements used in Sweden to provide a mobile ECMO unit, linked to the transfer and retrieval service in that country. The group considered that the scope to develop such a facility in the UK, should be considered as part of the planning work around long-term provision of ECMO.

Concluding the work of the group

64. The clinical group met five times in the period from September to December 2009 and met for the sixth and final time in March 2010. There were also two meetings of the ECMO sub-group in September and November 2009.
65. This report has been prepared as a contribution to the work being done by the four health departments on learning the lessons from the H1N1 (2009) pandemic. Now that the group has concluded its work the members hope that the health departments will now consider how best to ensure there is clinical input from neonatal, paediatric and general critical care clinicians – as well as from across the medical, nursing and pharmacy professions – in ongoing work to plan for a surge in critical care capacity.

Annex A – Membership

Chair: Dr Judith Hulf CBE

Former President of The Royal College of Anaesthetists;

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

| | |
|----------------------------------|--|
| | Consultant Anaesthetist, University College London Hospitals |
| Richard Barker | Executive Director of Operations and Performance NHS North East |
| Mark Borthwick | Consultant Pharmacist, Oxford Radcliffe Hospitals |
| Deputy: Meera Thacker | Consultant Pharmacist, Royal Free Hospital, London |
| Dr Sandra Calvert | Chair of the Thames Regional Perinatal Group; Consultant Neonatologist, St George's Hospital, London |
| Deputy: Dr John Chang | Consultant Paediatrician, Mayday Hospital, Croydon |
| Dr John Colvin | Consultant, Anaesthesia and Intensive Care Medicine, NHS Tayside; Chair of the Scottish Critical Care Delivery Group |
| Dr Jane Eddleston | Consultant in Intensive Care Medicine & Anaesthesia, Central Manchester University Hospitals; Department of Health Clinical Advisor for Critical Care |
| Dr George Findlay | Clinical Director for Critical Care at Cardiff and Vale University Local Health Board; Lead Clinician for the South East Wales Critical Care Network; Representative of the Welsh Assembly |
| Dr David Foster | Deputy Chief Nursing Officer Department of Health, London |
| Dr Gavin Lavery | Consultant in Intensive Care Medicine, Belfast Health and Social Care Trust; Representative of the DHSSPS Northern Ireland |
| Dr Paula Lister | Consultant Paediatric Intensivist, Great Ormond Street Hospital for Children, London; Chair of the Paediatric Intensive Care Society's Pandemic Preparedness Group. |
| Fiona Lynch | Paediatric Intensive Care Unit Nurse Consultant Evelina Children's Hospital, Guy's and St. Thomas' Hospitals, London |
| Colonel Peter Mahoney OBE | Defence Professor of Anaesthesia and Critical Care, Royal Centre of Defence Medicine, Selly Oak Hospital, Birmingham |
| Annette Richardson | Nurse Consultant in Critical Care, The Newcastle- upon- Tyne Hospitals; Strategy Advisor, National Patient Safety Association; |

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

National Board member, British Association of Critical Care Nurses

Professor Colin Robertson Consultant in Emergency Medicine, Royal Infirmary, Edinburgh
Professor of Emergency Medicine and Surgery, University of Edinburgh
Representative of the Scottish Government

Dr Bruce L Taylor Honorary Secretary, Intensive Care Society;
Consultant in Intensive Care Medicine and Anaesthesia,
Portsmouth Hospitals

Dr Gail Thomson Consultant in Infectious Diseases
Health Protection Agency
Porton, Salisbury

Dr Bob Winter President of the Intensive Care Society;
Consultant in Adult Intensive Care Medicine,
Nottingham University Hospitals

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

Secretariat

Colin McIlwain, Department of Health
Dr Kate Drysdale Department of Health
Alex Demetris, Department of Health
Carla Glanville, Department of Health

Annex B – Terms of Reference

Terms of Reference

The Swine Flu Critical Care Clinical Group (SFCCG) will:

1. 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.
2. Consider and advise upon management, staffing and logistic issues (eg equipment, medicines and consumables) associated with the increase in demand for critical care services.
3. 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.
4. 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 August 2009 and April 2010

Membership

The group will be chaired by Dr Judith Hulf, President of the Royal College of Anaesthetists. Working with the Department of Health the chair will identify up to 10 members of the group covering a broad range of clinical and logistical expertise. A wider 'virtual group' will also be needed.

Governance

The group will be accountable to PICO and work closely with the PIPP 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

Annex C – Guidance on support to staff

H1N1 Critical Care Clinical Group

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

30 November 2009

Dear Ian,

PRINCIPLES FOR NURSE STAFFING IN A CRITICAL CARE SURGE

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.
2. This document has been produced to assist critical care staff in different and difficult circumstances. It is acknowledged that as experience with pandemic influenza develops the document will require change and updating. The current wave of the pandemic although putting pressure on services has not required the NHS to implement plans to surge critical care capacity. However, we still need to prepare for how the pandemic will develop in 2010 as well as the impact of winter on critical care services. Equally, the advice from the group will help with longer term planning for pandemic influenza preparedness.
3. During a surge of influenza patients there will be a requirement to change from the traditional methods of nurse staffing due to an increase in bed capacity, acuity of patients, change in patient groups (i.e. paediatrics in adult Intensive Care Units or vice versa) and staff absence. This document provides nursing staff with principles and ways to consider effectively deploying nursing staff to deal with a surge in critical care capacity. It should be read alongside the existing Department of Health guidance on Demand and Capacity (Surge) published in May 2009¹¹, the Critical Care Strategy published in September 2009¹² and Pandemic influenza: additional measures to meet workforce supply published in October 2009¹³ as well as the statements of the bodies listed in paragraph 16 below.

Aims

4. This document aims to:
 - assist with nursing staff deployment within adult and paediatric critical care during a surge in critical care capacity.

¹¹ 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

¹² Critical care strategy
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_104977

¹³ Pandemic influenza: additional measures to meet workforce supply
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_106388.pdf

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

- provide guidance for nursing staff on the professional issues that may effect them in this period of extraordinary circumstances

Potential groups of staff to provide critical care nursing

5. During peak periods it is envisaged that non-Intensive Care Unit (ICU) staff will be required to deliver nursing care under the supervision of ICU trained nurses. It is also envisaged that there will be an increased need for the paediatric patient to be cared for in adult ICUs, an area unfamiliar with caring for the critically ill child in the long- term.
6. The types of staff available to care for the critically ill may be categorised as follows:
 - ICU/Paediatric Intensive Care Unit (PICU) trained nurses. Experienced registered ICU/PICU nurses – staff currently employed in a critical care unit, with varying experiences in years and training.
 - Non-ICU trained nurses. Registered nurses with previous critical care experience or some transferable skills (e.g. anaesthetic/recovery/operating department practitioners/high dependency staff), provided with recent refresher critical care training.
 - Assistants/Helpers. Including trained critical care assistants, healthcare assistants, respiratory physiotherapists, other nurses & healthcare professionals with no critical care skills.

Nursing staff deployment

7. A flexible and pragmatic team approach, rather than a ratio approach, should be considered when deploying the team. Staff may be required to work outside their normal practices for an ad hoc short term basis. Any such changes will need to be supported by work to ensure that, as much as possible, nurses working in different ways than usual are competent to do what is expected of them and are appropriately supervised. Please see potential examples/scenarios below, please note that these examples are not exhaustive and that it is for individual units to determine an appropriate mix of cases:
 - scenario one: one ICU trained nurse, two non-ICU nurses (from e.g. recovery/anaesthetics) and one critical care assistant/healthcare assistant allocated to a group of 3-4 patients (three ICU adult patients and one HDU adult patient).
 - scenario two: two PICU trained nurses, one ICU adult nurse and one critical care assistant/Healthcare assistant allocated to a group of 3-4 patients.
 - scenario three: adult ICU nurse and a paediatric nurse (non-ICU) allocated to 2-3 paediatric patients in adult ICU.
8. A group of patients requiring ICU and/or HDU care may consist of a mix of adults and paediatrics.
9. Each critical care unit should provide a designated supernumerary nurse in charge on each shift for supervision, advice, support and coordination. A critical care matron/senior nurse should be identified to oversee the running of a new or established cohorted critical care area.

Training

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

10. Non-ICU nurses must receive critical care training and preparation to work in the critical care setting. The critical care training should be organised and delivered by adult and paediatric critical care clinical nurses/educators.
11. Adult ICU trained must receive training on specific paediatric critical care to care for PICU patients. Update PICU training should be organised and delivered by the PICU critical care team. The aspects of care specific to paediatric ICU should include:
 - Physiological and psychological differences between children and adults
 - Recognising the critically ill child.
 - Critical care skills such as airway management, ventilation strategies, fluid/nutritional management & administration of medications.
 - Psychological care of the child and family including consideration of ethics and care of the dying child & their family.
12. Additional educational resources such as clinical contact details, clinical guidelines & educational packages should be easily available for nurses and AHPs working in unfamiliar situations i.e. the adult ICU nurse/team caring for the paediatric patient.
13. The Intensive Care Society (ICS) is also sharing examples of good practice being developed for medical, nursing and OD practitioners within individual NHS Trusts. Copies of these could be requested from the ICS whose website address is www.ics.ac.uk.
14. There is an expectation from the General Medical Council (GMC 2009),¹⁴ the Nursing and Midwifery Council (NMC 2009), the Royal College of Nursing (RCN2009), the British Association of Critical Care Nurses (BACCN 2009), staff side organisations¹⁵ and NHS Employers (2009)¹⁶ that employees working outside of their normal role will need to continue to work within their scope of competence and receive adequate training and supervision. This reinforces the importance of employers planning ahead of a surge to assess the skills profiles of their staff, identify staff that can be redeployed to critical care and to provide training. In a surge situation, it will be important to support redeployed staff by having systems in place to direct and support clinical questions. These can take the form of identified local lead clinicians, agreed clinical guidelines, telephonic support from lead centres and educational resources.

Accountability and Responsibilities

15. It is acknowledged that a period of pandemic influenza will place extreme pressures and challenges to providing safe, effective, quality care to the critically ill patient. Registered nurses primary concerns will still be to act in the best interest of both patients and the public.
16. Guidance from the NMC, RCN and BACCN has outlined the responsibilities of nurses working in critical care environments. Therefore, nursing staff must adhere to the NMC position statement on the role of registered nurses and midwives during an influenza pandemic (15 October 2009)¹⁷. The RCN and BACCN have also released guidance on the care of the child in adult

¹⁴ GMC web links

http://www.gmc-uk.org/GMP_in_pandemic_draft_23Oct09.pdf_snapshot

¹⁵ UNISON web link

<http://www.unison.org.uk/healthcare/swineflu.asp>

¹⁶ NHS Employers web links

http://www.nhsemployers.org/Aboutus/Publications/Documents/Pandemic_Flu_HR_Guidance.pdf

¹⁷ NMC web links

<http://www.nmc-uk.org/aArticle.aspx?ArticleID=3897>

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

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

ITU during a flu pandemic (RCN/BACCN September 2009)¹⁸ and a joint position statement on standards for nurse staffing in critical care (BACCN/RCN October 2009).¹⁹

17. Operating Department Practitioners' will adhere to the position statement set out either by the HPC (2009)²⁰ or the NMC based on who is their regulatory body.
18. Trust Policies should reflect and support the requirement to work in the extra-ordinary circumstances created by a pandemic but must be adhered to.

Acknowledgements

19. I would like to thank the members of the group for their assistance in producing this note and in particular Annette Richardson, Nurse Consultant, Newcastle upon Tyne Hospitals NHS Foundation Trust and Fiona Lynch, PICU Nurse Consultant, Evelina Children's Hospital, Guy's and St. Thomas' NHS Foundation Trust, London.

Dr Judith Hulf CBE
Chair
H1N1 Critical Care Clinical Group

Annex D – Principles to support triage

H1N1 CRITICAL CARE CLINICAL GROUP

¹⁸ RCN web links

http://www.rcn.org.uk/newsevents/news/article/uk/rcn_issues_swine_flu_guidance_for_children_in_itu
<http://www.rcn.org.uk/pandemicflu>

¹⁹ BACCN standards for nurse staffing in critical care

www.baccn.org.uk/downloads/BACCN_staffing_document.pdf

²⁰ HPC web link

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

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

30 November 2009

Dear Ian,

PRINCIPLES TO SUPPORT PLANNING FOR TRIAGE

Background

1. NHS colleagues have expressed concern about the process for allocating scarce clinical resources in the face of increased demand during the current H1N1 pandemic.
2. The Critical Care Clinical Group (CCCG) has been tasked to provide practical advice for clinicians and organisations to prepare and test plans to achieve increased critical care capacity. We acknowledge that the aim of all providers is to maintain as high a standard of care as is achievable for the critically ill during periods of excess demand in a pandemic.
3. In preparation for a situation where demand exceeds the expanded critical care capacity, the CCCG suggests the following principles to support the application of existing ethical guidelines locally within organisations. This document should be seen as iterative and may need to be updated in light of further experience from the current pandemic.

Triage

4. The topic of triage has been raised in a number of forums. Triage involves managing care where demand is outstripping resources. This is not the same as standard critical care clinical practice where decisions about whether or not an individual will benefit from intensive care are made every day.
5. Triage would involve making choices between patients who would all benefit from intensive care. This does imply however that all other measures (such as stopping elective work, expanding capacity, transfer within networks and transfer between networks), as set out in paragraph 5 above, have been exhausted. This situation has not been reached to date and it is not expected to be, based on the forward modelling of influenza H1N1.
6. The CCCG recommends that if triage has to be undertaken it is done by more than one experienced clinician, is fully documented and such processes are worked through in advance as set out in paragraph 14 below.
7. The intention is that, by robust action now within and between networks, triage will be avoided.

Principles

8. As a first step, Strategic Health Authorities, critical care networks and individual NHS Trust and NHS Foundation Trust should have rehearsed their plans to achieve an expansion of critical care capacity.

Report of the Swine Flu Critical Care Clinical Group and Key Learning Points for Future Surge Planning

9. There must be recognition within Trusts (clinical and managerial) of the requirement to cease elective activity when faced with increased demand in line with the guidance on responding to pressures developed by the Department of Health²¹. The following actions are likely:
 - Reducing or stopping elective surgical activity to reduce other calls on critical care;
 - Conversion of level 1 and 2 beds to level 3 beds;
 - Conversion of other areas - such as post operative recovery- to critical care.
10. This expansion will put demands on logistics which is why advice on supplies has been issued by the group through Strategic Health Authorities. This advice is now available on the Department of Health website²². It may require staff to work outside their normal area or supervise individuals less familiar with managing critical care patients. Guidance on principles to support this can also be found on the Department of Health web site along with workforce guidance from the Department .^{23 24}
11. A possibility is that paediatric patients may need to be cared for in adult units. Advice on training and process can be found on the Paediatric Intensive Care Society website including specific guidance on managing very sick children in a pandemic²⁵.
12. The decision to admit a patient into critical care, with or without H1N1 infection, is a clinical one. This takes into consideration many factors but especially the likely benefit (or otherwise) to that individual from critical care. This is not triage- but is standard critical care practice based on clinical prioritisation.
13. As all critical care clinicians may not be familiar with the likely clinical course of severe H1N1 in all patient groups it is strongly recommended that local networks offer support and advice on a 'hub and spoke' basis. Arrangements within networks should be in place to identify clinicians with expert knowledge on H1N1 and/or advanced respiratory support techniques, who can act as clinical advisors to their network colleagues. This clinical advisory service should be available at all times.
14. UK experience to date has been that H1N1 cases have been 'clustered' putting particular hospitals, units and services under pressure while adjacent services have been untouched. This is why the CCCG is emphasising the role of Networks and SHA Flu leads in managing and sharing this additional demand. Networks need to actively manage how patients are distributed between units and be aware of the impact on individual units. Arrangements must be confirmed for collaborative team working with regard to:

²¹Critical care strategy: Managing the H1N1 pandemic

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_104977

²²Critical Care Clinical Group: Supplies to support surging of critical care capacity
URL to be added and this document will then be updated on DH website.

²³ Critical Care Clinical Group: Principles for nurse staffing in a critical care surge
URL to be added and this document will then be updated on DH website.

²⁴ Pandemic Influenza: additional measures to meet workforce supply
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_106388.pdf

²⁵Paediatric Intensive Care Society: managing very sick children in a pandemic - triage
<http://www.ukpics.org/images/stories//pics%20briefing%20ver%203%204nov%2009.doc>

Paragraph 14 (continued)

- Sharing increased demand using robust mutual aid and transfer arrangements within networks and between neighbouring networks, including those in bordering Strategic Health Authorities.
 - The set up of decision making groups within and across organisations. The membership should be drawn from across clinical specialties and services provided by the organisation. This group should meet and rehearse its approach to decision making in advance of any surge in activity. These arrangements need to be not only confirmed, but to have been rehearsed.
15. Severely ill patients with H1N1 may present complex management challenges including ventilatory challenges. The CCCG is emphasising the role of tertiary units in providing advice and guidance on the management and transfer of these patients. This includes the role of IV antivirals and the role of oscillation and Extracorporeal Membrane oxygenation (ECMO). These must all be seen as part of a holistic approach and not as individual isolated therapies. The CCCG view is that management of such complex patients should be in conjunction with tertiary centres so that decisions on use of oscillation and ECMO can be made appropriately. Arrangements must be confirmed within individual Trusts and networks for the review of patients whose suitability for critical care is being assessed. A team approach is recommended.
16. Links to the existing Department of Health documents referencing triage are given at the end of this note.^{26 27}
17. The Group suggests that the relevant Royal Colleges and Associations, in conjunction with critical care networks, consider arranging Continuing Professional Development events on this issue to ensure that the key messages are discussed in all units, especially those currently with limited or no involvement in providing critical care or who might have to admit patients who currently would be treated in a regional adult or paediatric ICU.

Dr Judith Hulf, CBE
Chair
H1N1 Critical Care Clinical Group

Annex E – Guidance on supplies

²⁶Pandemic flu: managing demand and capacity in health care organisations (surge)
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_098769

²⁷Responding to pandemic influenza: The ethical framework for policy and planning
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080751

H1N1 Critical Care Clinical Group

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

30 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 2009²⁸ and the Critical Care Strategy published in September 2009²⁹.
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

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

²⁸ 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

²⁹ Critical care strategy
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_104977

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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 paralyzing 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*

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

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

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- 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 Royal College of Anaesthetist's website
- Hygiene solutions
 - gloves
 - plastic aprons selection
 - surgical gowns
 - surgical masks
- FFP3 respirator
- Eye protection
- Waste management containers

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

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 |
| Thromboprophylaxis | 3500 units/0.35ml | Injection |
| Vasopressin | 20 units/1ml | Injection |
| Vecuronium | 10mg | Injection |
| Water for Irrigation | - | Infusion |
| Ketamine | | |
| Atracurium | | |
| Enoximone | | |
| Antibiotics, e.g. Augmentin, clarithromycin | | |
| Antivirals. e.g. Tamiflu | | |
| Anticonvulsants | | |
| Diuretics | | |
| Anti-emetics | | |

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- Aquagel
- Water for humidification
- Sterile water (litre bottles)
- Water for injection (10ml ampoules)
- Sodium Chloride 0.9% for injection
- 10% Glucose (500ml/1L bags)
- 20% Glucose (500ml/1L bags)
- Emergency drug boxes
- Renal fluids including C.V.V.H. fluid
- Clinell wipes
- Sodium Chloride 0.9% bags 500ml

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) ` 2L 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 elastic 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 |
| 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 |
| | |
| RESUS DRUGS | |
| Adrenaline (1;10,000) | |
| Sodium bicarbonate 8.4% | |
| Atropine | |
| Calcium gluconate | |
| Normal saline ampoules | |
| | |
| VASCULAR ACCESS | |
| Intra-osseous (IO) gun & IO needles | |

Annex F - Membership of ECMO sub-group

Dr Judith Hulf CBE (Chair)

Former President of the Royal College of Anaesthetists and Consultant at University College London Hospitals

Dr Martin Ashton-Key

Medical Advisor, National Specialised Commissioning Group

Dr John Colvin

Consultant, Anaesthesia and Intensive Care Medicine, NHS Tayside and Chair of the Scottish Critical Care Delivery Group

Mr Richard Firmin

ECMO Programme Director and Consultant Cardiac Surgeon, Glenfield Hospital Leicester

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

Dr Bob Winter

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

Secretariat

Andrew Cooper, DH
Dr Kate Drysdale, DH
Martin Hensher, DH
Colin McIlwain, DH

Annex G - ECMO sub-group Statement, September 2009

Recommendations from the sub-group on ECMO Critical Care

As part of the Swine Flu Critical Care Clinical Group, a sub-group was set up to give advice to the Department of Health in the context of the H1N1 pandemic on the potential for ECMO to assist the response.

In line with the current plans to double critical care capacity in the United Kingdom, the group's recommendation is that the existing respiratory ECMO capacity at Glenfield Hospital, Leicester should be doubled. Existing long-standing reciprocal arrangements outside the United Kingdom, which have recently worked well, will continue to support this service. The group does not support the expansion of respiratory ECMO at hospital units that are not currently providing it. The group believes that the current standard for a respiratory ECMO service for adults is that provided by Glenfield Hospital and any such services must be commissioned and provided to that standard.

Dr Judith Hulf CBE
Chair, Swine Flu Critical Care Clinical Group

Background

- Terms of Reference and membership (attached)
- ECMO is a highly specialised treatment best delivered by experts in this area with at least months, and usually years, of training
- Current capacity at the established ECMO centre at Glenfield Hospital, Leicester is 5 ECMO beds. Increase to capacity will be achieved through funding from the National Specialist Commissioning Group and redeployment of staff, if required, at the height of a pandemic
- The capacity at Glenfield Hospital would continue to be used flexibly between adult and paediatric ECMO beds with clinical decisions as to use remaining paramount
- Further discussions will need to take place within East Midlands SHA on the implications for transfer arrangements
- The group asked that the units currently commissioned to provide, and have expertise in, paediatric and neonatal ECMO (Great Ormond Street Hospital, London; Freeman Hospital, Newcastle and Yorkhill Hospital, Glasgow) ensure that their capacity is maximised for the duration of a pandemic flu wave
- The group agreed that the CESAR trial ventilatory protocol should be circulated in support of best practice guidelines issued by the Intensive Care Society

30 September 2009

CRITICAL CARE CLINICAL SUB GROUP ON ECMO

Terms of reference

In the context of the H1N1 pandemic and its likely second peak during the Autumn or Winter of 2009/10 to give advice to the Department of Health on:

- the potential for ECMO to assist the NHS response to the pandemic;
- whether the NHS should be seeking to expand ECMO capacity (with a need to be clear if this is for adults and/or children and neonates as well: all three groups can access ECMO now) or to keep within the existing commissioning plans for ECMO;
- if expansion were considered appropriate would this be best be done in the existing centres or through wider dispersal of the treatment to other tertiary centres or hospitals; and
- to consider the implications for the other three UK countries.

The sub-group will need to work closely with the National Specialist Commissioning Group (NSCG) as it currently commissions this service in England.

Annex H - ECMO sub-group Statement, November 2009

1. In September 2009, the Department of Health received advice from a sub-group of the Critical Care Clinical Group, chaired by Dr Judith Hulf, on the potential for extracorporeal membrane oxygenation (ECMO) to contribute to the NHS response to the current pandemic of influenza H1N1. This advice involved doubling of the capacity for adult respiratory ECMO available in the UK from the five beds then available at University Hospitals of Leicester (UHL) NHS Trust (Glenfield Hospital).
2. The context for this is the nature of the respiratory failure being seen during the current H1N1 pandemic and the scope for ECMO to be used for adults and children in respiratory failure during the current pandemic.
3. Severe respiratory failure requiring mechanical ventilation can be categorised by severity of the failure of either oxygenation or ventilation. Patients with refractory hypoxaemia carry the greatest risk of death and can prove the most challenging to treat. There are a number of different treatment options available for this latter group of patients, with differing levels of evidence base to support their use. These include prone ventilation, the ARDSnet strategy of low volume ventilation and permissive hypercapnia, high frequency oscillation ventilation (HFOV), ECMO and modalities to enhance matching of ventilation and perfusion such as inhaled nitric oxide or nebulised prostacyclin.
4. No single treatment confers guaranteed universal patient benefit and the construction of a treatment plan is the responsibility of experienced consultants trained in Intensive Care Medicine. Each intervention needs to be evaluated against the clinical needs of, and risk to, individual patients before the most appropriate treatment/s are selected. Some treatments are more efficacious in certain age groups. ICUs which do not routinely treat large numbers of patients with refractory hypoxia should seek advice and assistance if necessary from other units with more experience in this field. No one treatment is a panacea to survival.
5. Since September the incidence of H1N1 in the population has continued to grow and the numbers of people being hospitalised with H1N1 as well as those needing critical care has risen. Demand for ECMO has grown and the capacity at Glenfield Hospital has been increased as a result. ECMO is a very staff intensive activity requiring twice as many staff for each ECMO patient than for those cared for in a level 3 intensive care bed. Glenfield Hospital currently is able to staff eight ECMO beds.
6. In order to achieve the doubling of capacity that was recommended, the body responsible for funding ECMO – the National Commissioning Group (the NCG) – assessed whether hospitals in the national heart and lung transplant programme, who provide ECMO as part of that service, could develop a respiratory ECMO service during the current pandemic. The identified standard for respiratory ECMO is that delivered by Glenfield Hospital.

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7. The NCG has carried out a quality assurance process to review the potential of the Royal Brompton and Harefield NHS Foundation Trust and the Papworth Hospitals NHS Foundation Trust providing additional ECMO capacity during the current pandemic to the standards established by Glenfield Hospital. As a result, the NCG is now commissioning 2 beds from each hospital. Glenfield is acting as the gatekeeper for this additional capacity and is working closely with the other two hospitals. Consequently, there are now 12 adult respiratory ECMO beds available in the UK.
8. The Critical Care Clinical Group's sub-group was reconvened on 4 November 2009 to take stock of the position given the current stage of the pandemic and the steps taken at Glenfield, the Brompton and Papworth. Its recommendations are listed below.

General

- All ECMO must be provided to the Glenfield 'Gold Standard'
- The provision of ECMO beds should be a UK resource as are the other nationally commissioned services

Immediate

- Any increase in provision in the current wave needs to be rapid (2-3 weeks)
- This is too short a timescale to consider new respiratory ECMO centres
- Therefore only those units already providing adult ECMO (Glenfield, Brompton, Papworth) should be considered for expansion
- The NCG will consult with Brompton and Papworth about possible increase in beds
- Glenfield should be supported at the current 8 active ECMO bed level in order that they are able to maintain their central gate-keeping, advice and training role
- There is no demonstrated need in the current wave for increased paediatric provision
- The burden of supporting an ECMO service (transport, staff support, dispersing other clinical load) should be spread beyond East Midlands SHA

Medium Term

- Geographical spread should be considered in the commissioning of additional ECMO centres to minimise transport burden
- Only those centres already providing ECMO as part of the nationally commissioned heart and lung transplant service and bridge to transplant service should be considered.
- From a commissioning perspective – Birmingham, Manchester and Newcastle are currently commissioned by the NCG to provide heart and lung transplantation and bridge to transplant that includes the use of ECMO. These centres should be considered as potential additional centres of surge capacity for adult ECMO if it were to be required. It was agreed that the NCG should make contact with these centres to establish their willingness and ability to provide this if required to. They would need to be (a) prepared to offer surge capacity ECMO and (b) able to do it, which would include staffing capacity and impact on other resources, and (c) undergo the quality assurance process previously described using Glenfield gold standard to bring them to a state of preparedness. There might be training requirements that would need to be identified.
- For Scotland, a similar approach (using the framework and quality assurance) should be applied. Ministers and NSD Scotland to be consulted and agreement sought

Longer Term

- The sub-group noted that the National Commissioning Group has set up a process to determine the possible future designation of adult ECMO units in England beyond the current pandemic. This will be taken forward in the remainder of 2009 and into 2010, giving NHS Trusts the opportunity to express an interest in being designated as an ECMO unit as part of the longer term provision of this service.

Background

The group recognised that the current expanded ECMO capacity now available for adults was: Glenfield (8), Brompton (2) and Papworth (2).

This would leave a maximum capacity for adults currently at 12 beds.

In addition, there are beds available in

Sweden 2

There are Paediatric & Neonatal facilities available at:

GOSH 3 (3 paediatric and neonatal)

Glasgow 4 (2 paediatric and 2 neonatal)

Freeman 2 (2 paediatric and neonatal)

H1N1 Critical Care Clinical Group

11 November 2009 (with revisions 23 November 2009)