**Levels of Care**

**Level 1:** Primary care networks. First point of contact: GP, dentist, Pharmacist, OOH, WAST, NHS Direct, crisis intervention.

**Level 2:** Local Services: 24/7 Minor injuries, local emergency assessment, emergency assessment teams, some emergency admissions, diagnostics and tele-links. Patient level 0 care (ward).

**Level 2+:** Local Acute Services: Wales: Local injury service. Medical & surgical services, elective treatment with less than 48 hr stay. High quality diagnostics, links to centres of excellence.

**Level 2+:** Rural General Hospital: Scottish model: acute medical and surgical admissions, Complex illness transferred. Essential diagnostic services. Patient levels 0, 1, 2 (high dependency care), Low risk obstetrics only. Paediatrics provided by GPwSIs.

**Level 3 a:** Major acute hospital: Scotland: Core admitting Services for life threatening unselected emergencies: 24/7 General Medicine, General Surgery, Orthopaedics, Anaesthetics, Radiology, Pathology services. Patient levels 0, 1, 2 and 3 (critical care).

**Level 3 b:** Major acute hospital. (Level 3 Wales) As for 3a, Specialised, less common, complex cases, concentration of skills and equipment – some patients will bypass 3a facilities. Patient levels 0, 1, 2 and 3 (critical care)

**Level 4:** Tertiary and highly specialised care eg burns, Neurosurgery, cardiac surgery, specialised children’s services. Patient levels 0, 1, 2, 3 and 3T Tertiary CRITICAL CARE
Introduction

In this paper I have tried to bring together papers relating to Welsh Assembly, UK Government and Scottish Executive policies with papers and recommendations from professional learned bodies, with the common themes of what levels of modern hospital care look like and what is needed ‘behind the scenes’ to support safe patient care at those various levels.

I have referred to only a few actual research papers, and only those mentioned in the original policy documents or professional papers, where there is a need to look behind a statement to improve clarity. I also looked specifically at two papers from the Journal of the Army Medical Corps following a recommendation from a member of the Expert Group at the Phase One meeting April and a conversation on trauma care with Prof Tim Hodgetts of the Defence Medical Services.

There are also references to personal opinions of two expert group members which again clarified points.

Overview

The overwhelming majority of people’s care should be delivered at home, and the Community hospital could provide a focus to support patients at home, prevent avoidable hospital admission, identify opportunities for local diagnosis and treatment and enable discharge and rehabilitation.\(^\text{10}\)

For some conditions, people get better by being taken straight to a hospital with the right specialist facilities provided across local or regional networks,\(^\text{3}\) for example people with a heart attack should go to a hospital with cardiac catheterisation facilities to get primary angioplasty, and not to their nearest ED.\(^\text{16,32}\) There is also a strong case for regionalisation of services for serious trauma,\(^\text{17}\) as care in a specialist centre improves the outcome for patients with multiple trauma.\(^\text{23,32}\) For some serious surgical conditions such as ruptured abdominal aortic aneurysm, there is no link between time taken to hospital and mortality.\(^\text{22}\) Childbirth is another potentially high-risk situation where again there is evidence that the ready availability of specialist obstetric and anaesthetic care improves outcomes in labour wards.\(^\text{32}\)

Some studies show that Emergency Departments (EDs) in small hospitals are as clinically equally effective as those in larger hospitals for a range of conditions,\(^\text{13}\) as there are many life-threatening conditions that may benefit
from the earliest possible attention in EDs of any size or complexity. Some
groups of patients need urgent care, but not necessarily specialist care.
Examples of these would be patients suffering from anaphylaxis, asthma,
choking or drowning. The care needed is the same wherever it is provided.

There is no strong evidence of better or worse outcome for specialties
treating high numbers of patients with common conditions that make up 95%
of acute care episodes (eg emergency medicine, acute medicine and some
surgery). Studies in the USA and the UK have not found a correlation
between high volume and better outcomes for most patients, although some
benefits for patients with severe injuries have been found. Waiting times in
very large A&E departments have been shown to be longer than in smaller
departments, but larger units are more likely to be able to provide senior
staff 24 hours per day.

The arguments for larger, more distant units cannot also be interpreted as
arguments for the closure of smaller EDs.

The key conditions which are most likely to present in an Emergency
Department (ED) are:

<table>
<thead>
<tr>
<th>Injuries</th>
<th>Deliberate self harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poisoning</td>
<td>Acute Myocardial Infarction (AMI)</td>
</tr>
<tr>
<td>Violence</td>
<td>Asthma</td>
</tr>
<tr>
<td>Wrist trauma</td>
<td>Psychiatric conditions</td>
</tr>
<tr>
<td>Fractured neck of Femur</td>
<td>Substance misuse</td>
</tr>
</tbody>
</table>

Other than AMI, none of these illnesses or injuries requires treatment in a
specialist centre.

Closure of locally accessible EDs however, enforces bypass of hospitals for
those patients who will benefit, at the expense of patients who would not
benefit, and it may not be acceptable, for conditions with a high risk of
mortality, to trade a reduced risk for some patients for an increased risk in
others. Patients who have urgent need of airway control or who have
complex cardio-respiratory problems have urgent need of skilled and
experienced usually medical personnel to deliver the care they need.

There is, for example, a 10% increased relative risk of death from asthma for
each 10km increase in distance travelled.

For other conditions, such as ruptured abdominal aortic aneurysm distance
a study in West Sussex appears to confirm other studies suggesting that the
in ruptured abdominal aortic aneurysm, the time travelled to hospital has no bearing on mortality. However the times travelled were small (13.8 minutes for those who survived more than two days, against 14.4 minutes for those who died within two days). Previous studies into this are potentially confounded by ignoring community deaths\textsuperscript{22}

Extending the range of conditions which should be taken to specialist centres rather than closing locally accessible EDs may provide a better solution.\textsuperscript{12}

In rural areas with sparse populations, and ED attendances of 30-50 000 pa, there may be little alternative to preserving existing EDs with progressive development of alternative MIUs,\textsuperscript{13} although departments with less than 60 000 attenders pa are less well able to sustain 24/7 staffing levels.\textsuperscript{13}

It is unlikely that a hospital could cope with greater than 90 000 -100 000 new attenders pa without causing patients to travel long distances for other forms of secondary care which a hospital provides and unacceptably long transfer times for ambulances.\textsuperscript{13} Access to services may be reduced for older and poorer people\textsuperscript{18}

In urban areas where there are major units with relatively small caseloads\textsuperscript{19}, or where EDs are less than 10km apart\textsuperscript{17}, there may be advantages to amalgamation. Reducing the scale of a hospital leads to more frequent errors and avoidable deaths\textsuperscript{19}

With distances above 10-20 km, there is a need to sustain emergency services.\textsuperscript{17} This affects the ED, and in-patient services. Cross cover between acute services may be required. This would result in significant extra training implications for acute specialty staff.

When ED services are centralised, additional costs fall on the ambulance service and the patients\textsuperscript{13}

The number of critically ill patients transferred in the UK in 2007 was more than 10,000 pa, but most hospitals transferred less than 20 patients per year. Reconfiguring services may mean that the number of ambulance journeys and the distances that patients travel will increase. There will be a need to increase training and capacity in the ambulance services and to improve the transfer service especially for the critically ill patient. The time and resources to achieve this are not to be underestimated.\textsuperscript{32}

If major EDs are amalgamated, a predictable demand falls on the remaining facilities – major illness and injury continues to be taken somewhere.
North London, the proximity of the next nearest ED predicted the extent of the decrease in ambulant patients. One third of patients ‘disappeared’ in a two mile move. Some eventually reappeared. The marginal costs therefore of major EDs may be less than those incurred by purchasers of establishing new facilities. Cases may simply be transferred, not lost.  

Levels of Unscheduled Care (USC)

Unscheduled Care (USC) is provided at different levels across the UK. These are influenced by and depend on, the distance a patient has to travel for care, the urgency and severity of the condition, patient factors such as age (children) and co-existing medical condition, and the complexity of care and level of expertise necessary to provide treatment and support.

These levels of care roughly fall into the following categories, although the margins between can be blurred by local circumstances:

- Level 0: care self care
- Level 1: care primary care networks
- Level 2: care local services
- Level 2+: care local hospitals or rural general hospitals
- Level 3a: care acute hospitals with core admitting services
- Level 3b: care acute hospitals with core admitting and sub specialist services
- Level 4: care acute hospitals providing tertiary services

Level 1 Care: Primary Care Networks

These include Primary Care, minor injuries, GP and dental out-of-hours care, crisis intervention. Assessment, diagnosis and treatment is delivered by GPs, pharmacy, the Ambulance Service, district and community nurses and NHS 24.
The aim is for these services to provide unscheduled care for the majority of contacts, especially for minor illness in the community. They will normally act as the first point of contact to the NHS Scotland Unscheduled Care system and should be readily accessible locally to all.  

Ambulance service will in future offer ‘hospital on the move’ with more paramedics trained to look after people at home and stabilise their condition for longer journeys if these need to be made. Ambulance services can become mobile providers and co-ordinators of out-of-hospital patient care and diagnosis, working as part of the primary care team, not just for emergencies, but undertaking regular assessments, monitoring for potential acute episodes, advising on improving self care skills and referring to GPs and specialists as necessary.

However, in terms of Ambulance Care, in 2007 the Scottish model was fragmented with little co-ordinated planning and an enhanced Emergency Medical Retrieval system is now proposed to retrieve patients with life threatening injury or illness where advanced medical intervention is appropriate to optimise safe transfer.

Traditionally, influence on survival in trauma cases has been the most scrutinised quality marker for air ambulances. Major trauma is still a relatively rare condition, and a 2009 study shows that doctor-led air ambulance crews improve the level of delivery of care to these patients without prolonging on-scene times. There are clearly other benefits of carrying an appropriately trained doctor on air ambulances such as advanced analgesia techniques, sedation and the ability to discharge a greater number of patients at the scene.

Patient travel distances are also an issue in Cumbria. There has been an aim there to provide fast expert at scene treatment followed by fast transport to definitive care. 160 paramedics are trained to give ‘clot-busting’ drugs to rural heart attack sufferers.

Remote households have cards with their farm name, grid reference and important telephone numbers. The North West Air Ambulance has been operational since 1999 for major trauma incidents. Some doctors are members of BASICS (British Association of Immediate Care) and work with the emergency services. 26 Community groups have been trained as Community First Responders and offer basic life support and defibrillation. (Self funded charities)

In some rural areas lay people are trained as Voluntary First Responders and save lives by undertaking defibrillation and pre-hospital thrombolysis.
as for every hour of delay, mortality increases by 20%. Defibrillation was previously only undertaken when the ambulance arrived. Survival from out-of-hospital cardiac arrest depends on the time of call to time of treatment, rather than the distance from hospital.\textsuperscript{20}

Level 2 Care: Local Services

![Level 2: Local Services: 24/7 Minor injuries, local emergency assessment, emergency assessment teams, some emergency admissions, diagnostics and tele-links. Patient level 0 care.]

Services provided include provision for minor injuries, rapid access clinics, local emergency assessment and some emergency admissions.\textsuperscript{2} Some of these may be provided in Community Hospitals.

Facilities may act as a base for emergency response community teams, routine emergency medicine eg chest infections, cardiac failure \textsuperscript{2}

**Minor Injury Unit (MIU)**

These are often local centres which provide treatment for what 70\% of what members of the public would recognise as current Accident and Emergency (A&E) services, such as less serious injuries like sprains, cuts and grazes. They can be run by nurses who have experience and expertise in treating minor injuries. Serious trauma or illnesses cannot be treated in a Minor Injuries Unit.\textsuperscript{5} MIUs do not admit emergency cases but rather stabilise and transfer where necessary.\textsuperscript{7}

The College of Emergency Medicine does not favour the terms minor injuries or minor illnesses, as its members believe that all patients need adequate assessment as minor conditions may be associated with unexpectedly complex injuries or illnesses.\textsuperscript{17}

MIUs can and should be capable of delivering care 24 hours per day, 7 days per week, staffed by a mix of Nurse Practitioners, General Practitioners (GPs) and Paramedics. They can be seen as ideal locations for GP out of hours centres.\textsuperscript{7}

They would have appropriate facilities for diagnostic testing and linked by tele-medicine to a ‘hub’ with Emergency consultants able to give advice.\textsuperscript{7} or to multidisciplinary specialist outreach support teams\textsuperscript{3}
For MIUs to be successful, a close relationship with the nearest ED is desirable for clinical supervision, rotation of staff and continuing education. Nurse Practitioners (NPs) must have explicit agreed working guidelines.

The cost effectiveness of the MIU or its contribution to health, rather than its role in managing demand are unknown.\(^{13}\)

MIUs in Scotland these are referred to as Community Casualty Units. In Scotland, if Community Casualty Units offer A&E services they should also be able to sustain services for urgent care at level 2 at least.\(^{7}\)

Facilities called Urgent Care Centres (UCCs) provide GP led multidisciplinary care involving nurses, emergency care practitioners, mental health crisis teams or social services. They may provide 24/7 care and are often co-located with EDs or in the community.

There is a risk of care fragmenting with a corresponding increase in costs unless urgent care centres and the services they provide are integrated within a network of providers and work synergistically with general practice.\(^{32}\)

**The hospital element of Unscheduled Care**

**Overview:**

The primary task of the hospital Emergency Department is to:

1. Resuscitate and provide immediate treatment for the critically ill and injured, and refer as appropriate,
2. Provide a diagnosis and treatment service for the less severely ill or injured needing urgent hospital attention, and refer as appropriate, and,
3. Provide a diagnosis and treatment service for those subsequently discharged.\(^{19}\) (The workload at this level may be influenced by primary care emergency centres in urban areas.\(^{19}\))

Specific groups of people require special attention: Children need suitable facilities; the aggressive should not be allowed to inconvenience others; the bereaved need a place to express grief and receive comfort; and there are those patients whose first language is not English. The homeless have an above average prevalence of psychiatric conditions and a high ED utilisation. Social conditions which increase homelessness increase ED usage\(^{19}\).
Emergency Departments may be categorised by their opening times and staffing:\(^{13}\)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Hours Open per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Medical staff on site</td>
<td>168 hrs pw</td>
</tr>
<tr>
<td>II</td>
<td>Medical staff on site</td>
<td>less than 168 hrs pw</td>
</tr>
<tr>
<td>III</td>
<td>No medical staff on site</td>
<td>168 hrs pw</td>
</tr>
<tr>
<td>IV</td>
<td>No medical staff on site</td>
<td>less than 168 hrs pw</td>
</tr>
</tbody>
</table>

Initial assessment of patients admitted as an emergency should be from a doctor of sufficient experience and authority to initiate a management plan. Job plans must allow consultants to deal with emergency admissions without delay \(^{26}\) and specialists should be free of other clinical commitments when on take.\(^{29}\) Following admission the patient should be transferred to a ward appropriate for their clinical condition in terms of specialty and presenting complaint and excessive transfers should be avoided as these are detrimental to patient care.\(^{26}\)

**Supporting the Emergency Department - Staffing**

**Key Specialties**

The London Implementation Group (A&E reference group) say that as a minimum \(^{19}\), all major EDs should have on site specialists in:

- Emergency medicine,
- General medicine,
- General surgery including vascular surgery,
- Anaesthesia and Intensive Care
- Paediatrics
- Acute psychiatry
- Trauma and orthopaedics,
- Obstetrics and gynaecology
- Radiology including CT scanning, and pathology services including laboratory services and blood bank \(^{19,17,27}\)

Provision of these specialties together with appropriate nursing staff providing rapid assessment and resuscitation improves outcome.\(^{19}\)

Specialists from medicine, surgery, critical care, anaesthetics and primary care come together with emergency medicine to form the hospital based emergency service.\(^{25}\)
Acute general physicians do not do away with the need for emergency physicians who have expertise in managing children and trauma (75% of the ED workload). There are however clear links between emergency medicine and critical care medicine and Acute Care Common Stem (ACCS) training allows smaller hospitals to have doctors with broad training and competencies and thus the ability to provide cross-cover arrangements.

The seven key specialties which support the ED are

- critical care,
- acute medicine,
- diagnostic imaging,
- laboratory services,
- paediatrics,
- orthopaedics and
- general surgery.

**Acute General Surgical Services**

Acute surgical services are interlinked to acute medical services. Surgical units need ready access to acute medical services for patients with co-morbidities or who develop acute medical conditions. Acute medicine needs prompt access to senior, competent surgical review of the acutely ill patient. There are also ‘watershed’ conditions which present as emergencies for which the distinction between medical and surgical responsibility is less clear; for example the acute abdomen, acute pancreatitis, gastrointestinal bleeding and fractures in the elderly with complex medical co-morbidities.

If the emergency general surgical service was to be removed from any site it would be inevitable that the whole of the major elective surgical service will also have to be moved and re-provided for. Major elective surgery requires 24/7 emergency cover and critical care support. Anaesthetic support would follow the major elective service. Consultants would probably choose to live closer to the site where they do most of their elective work and therefore live further away from the second site for which they would have to provide emergency cover. Two site working in surgery is fraught with hazards and dangers and elsewhere has not been shown to work well, even over quite short distances. (For example Neath and Swansea)

Some small amount of “very selective” day case work may be possible without 24/7 cover but these patients sometimes need admitting or occasionally have serious life threatening complications, particularly bleeding, such as a day case laparoscopic cholecystectomy done in the
hospital without close by surgical cover which bleeds from a port and requires emergency laparotomy. 47

If full services on current sites cannot be maintained then there must be a balance between large numbers of patients travelling longer distances with increased risk and increased environmental issues, and the small but finite risk of small numbers of patients for example having catastrophic haemorrhage with no on-site surgical services.17

There are real problems facing specialties such as paediatrics and surgical specialties. They may not have enough doctors to provide safe levels of care in all hospitals.

Emergency medicine with clinical decision unit (CDU) facilities or combined medical/surgical assessment units would have to provide the initial investigation, diagnosis, stabilisation and treatment of patients with for example abdominal pain. This would involve triage to a unit with appropriate surgical support which may be on another site. This may allow sustainable out of hours surgical rotas in most hospitals.32

Most district hospitals should continue to provide a full emergency service but with better integration with out-of-hours services, walk-in centre services and minor injury care. 32

Some local hospitals may not have 24-hour specialist paediatric services and specialist surgery. Some, though perhaps not all, local hospitals would continue to have 24-hour general surgery on-site. Local hospitals that have an accident and emergency department and accept medical cases must be supported by a continuous intensive care service as well as 24-hour imaging and laboratory services. Where on-site surgery is not provided, the hospital should not accept unselected medical patients.32

Acute medicine can be provided in the absence of acute general surgery, provided that patients likely to require surgery are not admitted to such units and that a surgical opinion is available promptly when needed 31

Although it is potentially possible to separate emergency medicine from emergency surgery, a hospital taking only selected medical emergencies would become less clinical or financially viable, and the long term aim should be to align all emergency services. 32
Critical Care Services

Critical care receives desperately ill patients from the ED, wards or theatres. 25% of admissions to critical care are planned. The majority are unexpected emergencies. Critical Care networks raise standards by adopting common policies and protocols and optimise resources by integrating their capacity. It is undesirable to transfer critically ill patients between hospitals.

Critical care is provided predominantly by anaesthetic doctors. The number of anaesthetists needed to staff a critical care unit would be seriously affected if acute surgery or obstetrics was withdrawn as anaesthetists with critical care experience would be likely to move with the acute surgery and obstetric services. This would greatly restrict the type of medical emergencies which could be admitted as both local and district hospitals need enough doctors trained to the appropriate standard to support 24/7 critical care (level 3) provision.

If hospitals are to maintain safe acute medical services, anaesthetics and critical care must be available.

The defining characteristic of any emergency hospital is 24-hour presence of intensive care which may be difficult to maintain without on-site operative surgery.

Networking and Transferring patients

A hospital without operative surgery would depend heavily on being part of a network with rotation of staff between this and other larger hospitals. As training develops [over decades], it is possible that doctors providing support for intensive care will increasingly have an emergency medicine or acute medicine background. It may be that the most appropriate response from a clinical perspective would be to close one emergency department rather than convert it to one which accepts only selected medical emergencies.

Hospitals admitting general surgical patients need 24/7 cover by surgeons trained to be able to perform general surgery, usually upper or lower gastrointestinal surgeons with back up from specialist colleagues.

A basic local hospital might be able to care for the 80-90% of the ED and the medical workload of an existing district general hospital without Orthopaedics, Paediatrics or General Surgery on site, but there is a greater need for senior emergency physicians to assess, stabilise and treat patients prior to transfer or discharge. It might be possible to cope without paediatric services by having peak time Clinical decision Units, but these
would have to be staffed by people trained and experienced in paediatric care. 32

Transferring patients between hospitals requires not only a suitably equipped ambulance vehicle, but accompanying staff of enough experience to be able to deal with any anticipated emergencies en route. The more complex or ill the patient, the more senior the accompanying medical and nursing staff required.

80% of inter-hospital transfers involve anaesthetists and their team. The resource implications for even experienced anaesthesia / critical care staff to simultaneously assess, stabilise and prepare a patient for transfer should not be underestimated. 32 Unless a full rota of transfer anaesthetists is created, transfers may remove the only senior anaesthesia and/or critical care cover from the hospital. 32

There are good data showing that transfer of seriously ill patients from one hospital to another is associated with a worse clinical outcome. 32

If major specialties are not on site, there must be robust and safe pathways in place for the management of severe illness or injury. This might mean bypassing the nearest ED, or clear procedures for rapid stabilisation or summoning retrieval teams if there is a long journey to the nearest appropriate facility. There should especially be clear procedures for the patient with abdominal pain and the pyrexial child. 17

Maternity Services

Midwifery Care

Maternity care providers and commissioners should ensure that maternity services develop the capacity for every woman to have a designated midwife to provide care for them when in established labour for 100% of the time. 55 and the assessment and planning of services should take into account the availability of information technology equipment and networks, local transport services, access to facilities for wheelchairs or baby buggies and for women with physical, sensory or learning disabilities, 55

Most routine antenatal care can be delivered in the community by midwives, but access to consultant-led obstetric services is required for many obstetric and medical conditions and procedures such as detailed scanning, as well as the management of high-risk pregnancy. 32
The drivers for change in obstetric services are

1. Safety and quality with sound financial investment
2. Patient choice, although safety is not a choice, but a necessity, so in choosing a delivery location, the mother may accept a greater health risks for improved psychological benefits but must be informed to make that choice. 54
3. Reorganisation of acute medical services: If anaesthetic, haematological and critical care support (including high dependency care) are centralised, maternity care of high risk women will inevitably follow the acute service support. 54 This is a concern for maternity units of less than 2500 deliveries per year which may have less well developed support services.
4. Workforce in midwifery: This has been exacerbated by the expansion in choices of delivery location for women. Lack of midwifery expansion would lead to increased risk to the women.54
5. Changes in legislation: ie EWTD, Training structure and changes to consultant working practice.54

Links to other specialties and facilities

Maternity services have unique requirements, namely 24/7/52 availability of a multidisciplinary team of midwifery, obstetric, anaesthetic, intensive care and neonatal specialists, and therefore need specific strategies to ensure the services are sustainable. The care is for two individuals and problems usually develop suddenly and unexpectedly.53 Obstetric care is closely linked to anaesthetic services, - all pregnant women require a high standard of anaesthetic care 55 and can also have complex medical needs such as diabetes, asthma, congenital or acquired heart disease, blood disorders or obesity, for which they may be under specialist medical review and require multidisciplinary care throughout their pregnancy. 55 They may also have social or mental health needs, requiring professional input.55

Birth is a time of relatively high risk for both mother and child. Over 95% of births are managed with immediate access to a consultant-led obstetric unit with supporting anaesthetic and paediatric services. Even a pregnancy judged as low risk might develop sudden and unexpected complications that need immediate specialised management. A minority of births take place at home (2–3%) or in stand-alone midwife-led units (3%). 32

All maternity care providers should ensure that consultant-led services
have adequate facilities, expertise, capacity and back-up for timely and comprehensive obstetric emergency care, including transfer to intensive care.\textsuperscript{55}

Consultant obstetric units require a 24-hour anaesthesia and analgesia service with consultant supervision, adult high-dependency and access to intensive care, haematology blood transfusion and other district general hospital support services and an integrated obstetric and neonatal care service.\textsuperscript{55}

Reorganisation of acute services requiring anaesthetic, haematological and intensive care support will drive centralisation into larger units with patients having to travel to receive these services. As maternity services require high dependency/intensive care type support, there would mean that the maternity care of such higher-risk women will need to follow the acute service support. Such a shift in the provision of support services would have a major impact on the safe delivery of acute obstetric services as they currently exist. This is of specific concern for those smaller maternity units, delivering fewer than 2500 women per annum, or split site services, which may have a less well-developed spectrum of support services\textsuperscript{54}

In Russia, obstetrics is provided in specialist clinics.\textsuperscript{48} but Williams B et al regard obstetrics as a specialty which should be on site, or close to a major ED.\textsuperscript{13} The Royal College of Surgeons saw it in 2000 as a core service supporting the provision of emergency care.\textsuperscript{50}

The Royal College of Obstetricians see as a standard that every pregnant woman attending an accident and emergency department for problems other than obvious minor injuries should be seen by a midwife or obstetrician, but if this is not possible a midwife or an obstetrician should be consulted by phone.\textsuperscript{55}

In the Brent Emergency Care and Diagnostic centre (BeCAD) a level 2+ hospital, consultant led obstetrics is not available\textsuperscript{51}

Obstetrics is seen by the Department of Health to be on a par with critical care in requiring 24/7 specialist expertise and not relying on a ‘hospital at night’ team cover.\textsuperscript{18} and is seen as a specialty whose patients may on occasions require critical care.\textsuperscript{52}
Obstetric, anaesthetic and paediatric staff availability

A consultant obstetrician should be available within 30 minutes outside the hours of consultant presence. A duty anaesthetist of appropriate competency and dedicated only to the labour ward must be immediately available. There must be 24-hour availability in obstetric units within 30 minutes of a consultant paediatrician (or equivalent staff and associate specialist grade) trained and assessed as competent in neonatal advanced life support.

Networks

Multidisciplinary care, provided through well-understood clinical and local social services networks, should be available for all women with pre-existing medical, psychological or social problems that may require specialist advice in pregnancy.

Maternity services should agree arrangements for both in utero transfer and the transfer of a recently delivered mother and/or her newborn baby to a linked secondary or tertiary unit.

Units that do not have adult intensive care facilities, advanced imaging and cardiology on site must have protocols in place for the care of women with significant medical or obstetric illness to ensure that they are delivered in a unit that can provide these resources on site.

Currently 30% of primi-gravidae are transferred from home or from free-standing midwifery units to a consultant led service, for medical intervention.

There is increasing evidence that transfer to an obstetric unit as an emergency in labour is a poor experience for the mother and the management of risk is more difficult in these circumstances.
**Staffing and Training**

In Scotland, 53 maternity services are defined as being from level IIa to III:

<table>
<thead>
<tr>
<th>Level / example</th>
<th>Deliveries per annum</th>
<th>On site neonatal facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>III Queen Mother's Hospital, Glasgow</td>
<td>Regional Centre &lt; 5000</td>
<td>Yes</td>
</tr>
<tr>
<td>II c Ninewells Hospital, Dundee</td>
<td>&lt; 5000</td>
<td>Yes</td>
</tr>
<tr>
<td>II b Western Isles Hospital</td>
<td>&lt;1000</td>
<td>Yes</td>
</tr>
<tr>
<td>II a Caithness General Hospital, Wick</td>
<td>&lt;500</td>
<td>No</td>
</tr>
</tbody>
</table>

The Scottish medium units may not be able to sustain the present model of medical staffing of care during childbirth. 53 and medium- to large-sized obstetric units will increasingly require ‘increased hands-on involvement’ by consultants in providing direct clinical care and supervision of trainees, necessitating an incremental expansion in consultant numbers.53

The new specialist training programme in obstetrics and gynaecology is designed to meet the need for a consultant-based service as evidence indicates that senior involvement leads to improved safety, less intervention and better outcomes, and is recommended by clinical negligence scheme for trusts.32

The eventual target is to achieve 168-hour consultant presence in the biggest units and certainly by 2010 in those units delivering more than 5,000 babies. For units delivering 4,000–5,000 babies the aspiration is that 98-hour presence would be achieved by 2009, and for units delivering 2,500–4,000 babies by 2014.32

It is anticipated that units delivering less than 2,500 babies per year will be regarded to a great extent as low-risk units and will have to make arrangements according to an assessment of the level of risk (at present only one-third of those units even have daytime consultant presence).32

These aspirations to increase the trained presence in UK delivery suites would require an expansion in the number of trained specialists of the order of 60–70%, increasing the workforce in England from about 1,500 to approximately 2,500, which is probably unattainable. However, if there was to be a degree of reorganisation of the services, particularly smaller
consultant-led units — which seems inevitable with the additional pressures of the EWTD — an acceptable consultant presence throughout the delivery suites in the country could be delivered by 2,100 consultants; this figure could be achieved by a 5% expansion over five years.\textsuperscript{32}

Obstetric consultants, in an experiment in Rotherham have joined in on the middle-grade rota to make it EWTD compliant.\textsuperscript{49}

It should be emphasised that these calculations refer to reconfiguration of consultant led services delivering more than 2,500 patients (or thereabout) and do not refer to the very small consultant-led units or indeed to midwifery-led units, particularly those that are freestanding.\textsuperscript{32}

Thus fluctuations up or down in the number delivering in smaller and midwifery-led units do not affect these calculations and in no way undermine the need to reconfigure the other consultant-led units. Less than 6% of UK deliveries currently take place at home or in freestanding midwifery units. Similar issues occur in staffing neonatal and obstetric anaesthetic services.\textsuperscript{32}

The Royal College of Obstetricians and Gynaecologists (RCOG) believes that managed clinical peri-natal networks with care pathways, agreed between all professional members of the care team, is the model of choice.\textsuperscript{54} They recommend that - one size will not fit all; all planning decisions must concentrate on patient safety as the principal issue; the numbers and location of hospitals, units and staff will determine changes that are realistic and may be achievable; new working practices will impact on requirements; and flexibility, geographical, financial and political pressures need to be considered when reconfiguring maternity services

They see many experts as envisaging that within any defined area a prenatal hub and spoke network will incorporate home births, births in stand-alone midwifery-led units, births in co-located midwifery units and births in consultant obstetric units. Within any network there will be one supra-regional unit providing complex care to those at highest risk. Many such women will have significant risk factors identified either before or during pregnancy and will require delivery in such a unit. In this group of women their, or their baby’s, health will be dictating their care pathway. There is evidence that most women will travel for this type of very specialised care.\textsuperscript{5} These units will often be large units providing care to the very sickest women and will require 168 hours of consultant presence as well as a full complement of trainees.\textsuperscript{54}
Also within the perinatal network will be other hospital units providing routine obstetric care to the large majority of women, including most standard complications of pregnancy. These units will be consultant led and will provide good training to core trainees. The staffing of these units will depend on the numbers of deliveries and will provide training in addition to service. These units may encompass a co-located midwifery-led unit providing care to the low risk women who choose this option. 54

In some areas, due to geographical separation, there may be smaller consultant-led units or stand-alone midwifery-led units. These units will provide care for low risk women who understand that they may need to transfer to another unit during the antenatal period or in labour if they develop complications that define them as medium or high risk. 54

In service based hospitals, services will be provided mainly by consultants, supported by a hybrid rota of junior doctors and non-medical clinical staff such as advanced nurse practitioners and advanced midwifery practitioners. Maternity services will also be providing a home birth service to low risk women, based on informed choice. An increased number of suitably trained and supported midwives are necessary for the development of home births. 54

Within the perinatal network there will need to be clear care pathways and midwives and doctors working together in a mutually supportive framework to ensure the safety of all women and their babies. Sophisticated transport services will need to underpin any potential transport of mothers and babies.54

**Gynaecology services**

Ectopic pregnancy is a life-threatening condition. Women need prompt access to a dedicated Early Pregnancy Assessment Unit (EPAU) that provides efficient management, patient counselling and access to appropriate information and should have a policy in place for referring women from primary care or accident and emergency setting with suspected ectopic pregnancy directly to an EPAU for immediate assessment or to the nearest gynaecology emergency ward. Laparoscopic management of ectopic pregnancy in women who are haemodynamically stable, should be offered at least during normal working hours.56

All gynaecological teams operating on women with ovarian cancer should have access to both high-dependency and intensive therapy units.56

**Neonatal Services**
Key facts about Service use

- Between 8-13% of all newborn babies are admitted to a neonatal unit, and 2-3% will need intensive and/or high dependency care.
- 2:1000 deliveries are affected by hypoxic ischaemic encephalopathy (HIE).
- 3-4% of all births have a congenital anomaly.
- Around 5:10,000 births have Group B Beta-haemolytic streptococcal infection.
- About 10% of NICU admissions are 28 weeks gestation or below.
- Babies 28 weeks gestation or below account for 40-50% of total NICU occupancy, and 70-80% of intensive care days.

Special care baby unit facilities should be available on site in all level II and level III consultant-led units and there should be a defined rapid access route to neonatal intensive care in all level II and level III consultant-led units.

All maternity services must have systems in place for identifying high-risk women, informing plans of care for women admitted with threatened preterm delivery, and for transporting preterm babies in a warmed transport incubator.

All maternity units must be prepared for the birth of a baby with a life threatening condition. The increased numbers of babies born at extremely low birth weights or surviving with congenital abnormalities is increasing so it is inevitable that the proportion of babies going on to develop disabilities is also rising. The highest quality newborn intensive care is essential to ensure good outcomes for the sickest and most premature babies otherwise the long-term cost to society is likely to be substantial.

Maternity services should have agreed arrangements for the transfer of a recently delivered mother and her newborn baby to a linked secondary or tertiary unit should problems arise.

Newborn intensive care needs to be considered as integral to acute paediatric care services. Good outcomes from neonatal intensive care provide a foundation from which all subsequent development depends. Reconfiguration of neonatal services goes hand in hand with reconfiguration of maternity services. The reconfiguration and expansion in Level 3 capacity that started in 2003 should continue. This will help to ensure that the sickest infants within the network can benefit from the highest level of skill and expertise.
The critical issue for future delivery of neonatal services is the recruitment, training and retention of both medical and nursing staff. The future reduction of trainees’ working hours will have an immediate impact on the delivery of care. There should be less reliance on doctors in training and more reliance on trained doctors in delivering the service.\(^\text{32}\)

At a Level 2 hospital, all consultants taking part in the on-call rota for intensive care must be competent to manage a neonatal emergency until a retrieval team arrives.\(^\text{60}\)

In terms of Level 2 and Level 3 neonatal care, the investment required to achieve 24-hour consultant presence on Level 3 units was one factor that drove the decision as to whether the plan would be for greater centralisation of neonatal intensive care services than was envisaged in the DH review (2003).\(^\text{60}\) However the investment that followed did not enable sufficient Level 3 capacity to be developed in all networks. The result is either long distance transfers for high quality care, or the status quo whereby units designated as Level 1 and 2 continue to provide intensive care in cots that are not appropriately resourced.\(^\text{60}\)

Insufficient special-care capacity in some referring units makes it difficult for Level 3 units to return babies. This leads to cot blocking in Level 3 units, and new referrals being refused. This is a grossly inefficient use of a specialist service, reducing access to Level 3 intensive care.\(^\text{60}\)

Neonatal services are already working within neonatal networks with a group of units providing care across level I, II and III nurseries, with detailed care pathways and referral and retrieval protocols. There is an urgent need to ensure that any reconfiguration of maternity service goes hand in hand with neonatal networks to develop a truly integrated and appropriate perinatal network. All maternity staff need to be trained in neonatal resuscitation techniques and there are good examples where advanced neonatal nurses working alongside consultant colleagues provide the hands on acute neonatal service.

As with obstetricians, it is likely that, in future, consultant presence 24/7 on the largest units will be required. Routine newborn examinations should be an integral part of postnatal midwifery care, but with support from neonatologists where concerns are identified. Midwives in midwifery-led units must be competent to provide basic resuscitation, and their skills in caring for a sick infant until a retrieval team arrives need to be defined and assessed. It is not possible – nor an efficient use of resources – to provide ‘flying squads’ to provide emergency care to midwifery units. Women must be aware of what can and what cannot be provided in such units.\(^\text{32}\)
It is recommended that the provision of neonatal intensive care cots in
different parts of Scotland should be reviewed urgently in line with
rationalisation and reconfiguration of obstetric services. A central bureau of
neonatal intensive care cots should be established to facilitate planned *in utero* transfers.

**Paediatric Services**

**Key data** *(Royal College of Paediatrics and Child Health)*

**Primary care consultations**
0-4 year olds see a GP 6-12 times per year*.
5-15 year olds see a GP 3-7 times per year*.
* Not all are acute

**Emergency department consultations**
3.5 million children attend emergency departments annually in the UK.
25% of children attend ED per year.

**Admitted to hospital**
1 in 9 children will be admitted in a year.
1 in 3 children under 1 year old will be admitted.

**Numbers of units nationally** *(RCPCH, 2001)*
There are a total of 314 children’s units in the UK.
246 admit children acutely
There are 36 dedicated children’s emergency departments.

Acute services for children are distinct from adult acute care in several
important ways. Large numbers of children are seen in the acute setting.
The clinical course of acutely ill children is often much less predictable than
for adults, and the potential for poor outcomes from overlooking treatable
conditions is a constant and real concern. Communication with young
children and families requires different skills than in adult medicine.

The Accident and Emergency Services for children report recommended
that hospitals seeing more than 18 000 children (16 000, Services for
Children in emergency departments) should have a consultant in
paediatric emergency medicine by 2004 and in all emergency departments
by 2010, and should also have a paediatrician with subspecialty training in
paediatric emergency medicine.
All hospitals receiving acutely ill or injured children must have the facilities and staff required to establish high dependency care, and intensive level care for airway and respiratory support.59

If EDs in the UK lose on-site, 24-hour paediatric services, commissioners may plan to divert paediatric attendances to other centres. However, EDs will continue to receive very sick children even in centres where “bypass” arrangements have been made with the ambulance service, because parents with very sick children (particularly babies and infants) will attend the nearest facility.59

Acute paediatric services include a multiplicity of service types: medical, surgical and neonatal care, as well as child protection and child mental health.

Where a hospital with no on-site in-patient paediatric facilities provides unrestricted access to children via the accident and emergency department very careful consideration should be given as to how a critically ill child should be managed and to provision of 24 hour cover.57

The early stages of undifferentiated, often febrile, illness in children can be challenging to the most experienced paediatrician. Most children require a period of observation, possibly with some investigations, to decide whether they need further treatment. The development of observation or assessment units appears sensible, but initial experience suggests they may not reduce admissions but merely act as a substitute for primary care.

Serious bacterial disease is becoming rarer, management of long-term conditions such as asthma and diabetes is improving, and children are discharged from hospital faster. Injury is the commonest cause of death and disability in children over the age of one year.

The care of the critically ill child should begin as soon as the requirement has been recognised. “Stabilisation” of a child’s condition is required in two situations: following resuscitation and worsening of the condition of an acutely ill child, where urgent management is required to prevent further life-threatening deterioration stabilisation should be the responsibility of a multidisciplinary team led by a clinician of appropriate seniority.57

Stabilisation requires a team of competent individuals comprising as a minimum a paediatrician, an anaesthetist and a nurse working in concert with A&E staff or ward staff: the nurse-patient ratio should be at least 1:1.57
Services for the critically ill or injured child should be planned within a network. Services for the critically ill or injured child should be planned within a network comprising District General Hospitals and a tertiary centre with a Paediatric Intensive Care Unit. There should be action plan/contingency arrangements for those occasions when, because of extreme urgency, transfer must be undertaken by the referring hospitals.

The issues surrounding Paediatric Unscheduled care are:

> The need to provide a local service for the very large numbers of children with acute undifferentiated illness or injury.
> Maintenance of competence within a large workforce, where first-line presentation of serious illness is relatively rare.
> Too many hospitals with inpatient beds for the size of the paediatric workforce.

Critical issues for safe and effective care.

> Competence in the initial assessment and management of potentially sick children by those who first see the child.
> Easy access to a second opinion when these clinicians feel outside their competence.
> Access to child orientated investigative services such as radiology and laboratory services.
> Accessible and effective transport systems when children are critically ill.
> Access to anaesthetic and surgical skills.

The majority of acute services could be provided in community settings. The division between primary and secondary care is unhelpful. As more hospital care is provided in community settings and as hospitals are part of the community provision, there will be occasions when urgent care traditionally delivered by primary care is best delivered in close proximity to an A&E department on a hospital site.

**Essential elements of urgent Paediatric care**

Recognition of the sick child
Basic life-support skills
Ability to initiate treatment
Recognition of the rare but treatable conditions
Child protection recognition skills.
Admission, retrieval team call out, or transfer is triggered by:

- the unstable/collapsed child
- unstable/deteriorating after four hours
- needing hospital specific investigation or treatment
- unable to cope at home with support.

The common themes of providing a family-friendly environment, use of care pathways and a culture of constant improvement should run through all parts of the network. The ideal network will vary according to setting. Small rural areas will have different requirements from those of large urban service.

**In small places,** the challenge is maintaining competence of practitioners when numbers of children are small. There are two immediate solutions: firstly, that small places are networked into larger centres with the capacity to support clinicians through the development of management protocols, education and training, assurance and improvement programmes; secondly, rotation of staff between large and small places.

**Where small units are located in close proximity to larger units,** serious consideration needs to be given to amalgamation of management structures and reduction of inpatient accommodation. The need to maintain observation assessment capacity in the small units has to be balanced against the available numbers of appropriately skilled professionals. This will limit opening hours of such units. Transport/retrieval services need to be developed, reducing the need for overnight paediatric cover.

**In remote places,** options to combine urgent care and emergency care provision for children need to be considered, for example with co-location of urgent care and emergency care on the hospital site. Assessment and children's ward with retrieval or emergency transport system, access to specialists via telemedicine. Level 1 or 2 neonatal unit.

**In small settings near to large centres,** EDs with audiovisual separation for children, urgent care centre co-located within ED, children's observation area attached to ED, retrieval or emergency transport system, access to specialists on site or via telemedicine.

**In medium-sized places,** there needs to be sufficient consultant capacity to provide 24 hours a day cover and support to the acute team. The issue of the skill mix of the acute team, the balance of staff between the A&E department, assessment unit and acute wards needs to be resolved locally. ED with dedicated children's area, co-located urgent care centre, children's observation area attached to ED, children's ward, HDU, transport and
retrieval service, access to specialist opinion. Level 2 neonatal unit unless designated Level 3. In larger places (ie tertiary centres), there should be sufficient general paediatric capacity to be able to cover the emergency (and urgent care if co-located) without a conflict of interest with the other functions such as specialist care, education and training, and research. Children’s ED, wards, HDU, PICU, collocated specialist services. Neonatal Level 3 unit.

A possible paediatric acute care network.

**Mental Health Services**

Patients in the acute hospital should also have the same level of access to the opinion of a consultant psychiatrist as they would have to a consultant specialising in physical health problems. A 24/7 front line liaison psychiatric response should be available.  

**Services that may be provided by networks**

For an ED, there should be access to (though not necessarily on site):
Supporting the Emergency Department – Facilities

There should be dedicated 24/7 operating theatres with facilities for early long bone fracture fixation. Fully staffed dedicated emergency theatres should run during the peak times for arrival for surgical emergencies (0900 – 2100) with a dedicated emergency team and a consultant anaesthetist present. Outside that time a surgical team should be on call.

On site Computerised Tomography (CT) scanning improves management and outcome. 24/7 radiographic services improve outcomes. There should be 24/7 access to MRI which may be located in another unit.

[It is worth noting that in the NCEPOD report, 15% of Eds did not have 24/7 CT scanning and 6.7% did not have 24/7 conventional radiology]

Clinical Decision Units (CDUs) are required for particular patient groups: eg chest pain, thrombosis, abdominal pain, assessment of the collapsed patient, self harm, headache and minor head injuries.

Observation wards are associated with improved processes of care in the elderly. The British Association of emergency medicine believe that a short stay observation ward is an essential part of every ED.

In addition, there should be areas for resuscitation, trolley patients, ambulatory care, a reception, waiting areas, dedicated children’s facilities (if more than 16 000 children are seen annually), a rapid assessment and treatment area, point of care testing, and access to inpatient beds of 85% occupancy or sufficient to deliver a four hour target.

In contrast, a hospital which carries out only elective surgery needs surgery, anaesthesia, radiology, access to pathology, level 2 (HDU care), operating theatres, resident medical officer cover and access to level 3 (Intensive care).

If Services are removed from Emergency Departments

The following will be affected:
1 Expertise. Removal of a supporting service means that as expertise is not available from outside the A&E department there must be an increase in the expertise available within the department. This will need more, better trained doctors who are available for increased amounts of time. It is recommended that by 2012 any hospital with an A&E department should have doctors experienced in EM available in the department at all times. Hospitals should be working towards this over the next five years.

2 Transfers. There will be more non-critical transfers. Many documents concentrate on the critical care transfers, but the urgent, but non-critical transfers will be of much greater volume. This will mean more staff time taken in preparing patients for transfer and escorting patients, and very significant amounts of ambulance time.

3 Critical care transfers. Some issues have to be addressed where there are increased numbers of critically ill patients being transferred. Such patients need to be accompanied by skilled and experienced staff, at least one of whom must have level 3 critical care skills. The effects on staffing of units can be considerable if staff are involved in transfers; this can leave units vulnerable.

4 Ambulance service. The more services not provided in a local hospital, the greater the responsibility of the ambulance service. They will need to be more skilled in pre-hospital triage and will have longer journey times if they are ‘bypassing’ an A&E department. They will have increased risks in the care of seriously ill and injured patients.

At times, the ambulance may not ‘bypass’ a department if the patient is in extremis. This will place the staff in that department in a very difficult position and might result in poorer outcome for that patient.

Ambulance staff will have to undertake a larger number of emergency transfers and manage increased numbers of critical care transfers. Given the current pressures on the 999 system, it is essential that these increased demands are assessed and resource given to ensure a speedy response to a request for transfer.

5 Telemedicine facilities, especially for image transfer, will be essential to avoid unnecessary transfers and to allow urgent opinions, for example in orthopaedics.

At times key skilled staff may have to travel to a peripheral unit to deal with emergency cases. There can at times be reluctance by some specialised staff to travel to assess or treat patients. Experience seems to indicate that a
blanket ‘no travel’ approach is not in the best interests of patient care. It is felt that there are rare occasions when moving the doctor to the patient is essential.

6 Support for clinicians faced with clinical problems out with their normal expertise
In an ideal world this should not happen. Increasingly, doctors will be faced with an extremely ill or injured patient without immediate specialist back-up. They should be trained adequately and have the confidence to act even if they have to perform a procedure not part of their everyday practice. This is not an uncommon occurrence in EM and may become more common for other specialties.

The risk assessment should be agreed by all the major specialties involved.

**Level 2+ : the Rural General Hospital**

The ‘Kerr Report’ published by the Scottish Executive in May 2005 identified that the public wanted to maintain high quality services locally and to support the remote and rural communities whilst improving waiting times, empowering staff, using new technology, reducing the health gap between rich and poor and getting value for money.

The background to this is a Scottish population which is ageing faster and dying quicker; In 25 years, 1:4 will be over 65, 1:12 over 80. The number of over 80s will double from 200k to 400k. There will be more retired people than children. Long term conditions will increase with twice the likelihood of hospital admission.

The population need for proactive, preventative care for chronic conditions is not matched by a system whose funds are aimed at specialised episodic care for acute conditions.
One fifth of the population lives in a rural area with challenges of transport, access to services and sustainability of local communities.

Wide health inequalities mean that the deprived lose fifteen years of life compared to the affluent.

The Scottish health spend per head of population has doubled in the last eight years.

5% of the heaviest users of inpatient services accounted for 43% of the inpatient bed days. 1% used 16% of the inpatient bed days. 2.6% of the over 85s are admitted as an emergency three or more times in a single year.

There are fewer people of working age, the demand for flexible working and career breaks is increasing, and the EWTD, combined with skills shortages and recruitment and retention problems cause problems.

The Kerr Report set out a twenty year plan based on pathways spanning primary and secondary care, networks of rural hospitals linked to and supported by major teaching hospitals and a rational distribution of services between neighbouring hospitals.

The key messages of the Kerr report were to provide a service which was sustainable, safe and local; was delivered predominantly in local communities rather than in hospitals; was preventative, anticipatory care and became a modern, galvanised, skilled service developed with people and not for them.10

The report’s proposals to systematically care for people with long term conditions, target deprived areas, develop a national IC&T system, shorten waiting times and separate planned from unplanned surgery are familiar.10

In response to this, in “Delivering for remote and rural healthcare: NHS Scotland “the Scottish Executive describes the RGH as a facility which undertakes management of acute medical and surgical emergencies and is the emergency centre for the community, including the place of safety for mental health emergencies. It is characterised by more advanced levels of diagnostic services than a Community Hospital and will provide a range of outpatient, day-case, inpatient and rehabilitation services.” 9

It will provide local assessment, diagnosis and treatment and be the emergency centre for the community. While much of the activity undertaken could be described as treatment of minor injuries and minor illness, the RGH
will undertake first line management of all patients presenting with acute illness.  

Whilst a proportion of these patients may be transferred to a larger centre, the majority will be admitted to the RGH.

An RGH cannot, however, provide the broader range of services expected in a DGH. For example, an RGH will not provide Level 3 (Intensive Care) but will have the ability to provide Level 2 (high dependency care).

Specialist, complex care would be concentrated on fewer sites. The decisions about concentrating services on fewer sites should be informed by the balance of clinical benefit and risk of varying volumes of clinical activity, and limited (by workforce considerations) to services which are highly specialised, receive seriously ill patients 24 hours per day or care for medically unstable patients throughout the night and for which service redesign will not achieve a sustainable outcome.

The six Rural General Hospitals in Scotland are:

1. Lorne and Isles Hospital, Oban
2. Belford Hospital, Fort William
3. Western Isles General Hospital, Stornoway
4. Caithness General Hospital, Wick
5. Balfour General Hospital, Kirkwall, Orkney
6. Gilbert Bain Hospital, Lerwick.

In absolute terms of service provision, the RGH would provide:

- Emergency medical care: triage, diagnosis, resuscitation and stabilisation:
- Treat where possible, transfer when necessary
- Locally based routine elective care and care for chronic illnesses.
- A range of planned services to maintain consultant skill levels, extending the day surgery basket via a managed clinical network.
- An integrated care physician or a new type of general surgeon is needed as roles become more blurred.
- The medical team of surgeons, physicians and anaesthetists would be supported by a new type of doctor with skills in both general practice and acute medicine.
- The Remote and Rural Healthcare alliance will help people in remote areas access training.
RGHs will not provide intensive care. This limits the type of surgery and patients admitted.

Intra-partum care will be only be provided for low risk women with normal weight babies (Island RGHs will also be equipped to carry out Caesarian Sections)

RGHs will have a defined level of diagnostic capacity

If cancer care is delivered locally it should be with shared care, outreach clinics, and should deliver the same outcomes.

Flexible continuous medical education with maintenance of advanced procedural skills is fundamental to recruitment and retention.

In terms of USC a RGH will provide:
- Nurse led Urgent Care service managing minor injury and minor illness;
- Ability to resuscitate patients;
- Ability to manage acute surgical and medical admissions
- Initial fracture management and manipulation of joints;
- Midwifery led maternity service;
- Neonatal resuscitation;
- Capability to diagnose and initially manage acutely ill or injured child;
- Capability to manage patients requiring a higher dependency of care before transfer;
- Clear and appropriate retrieval and transfer arrangements

60% of admissions will be medical, but the key role of surgery will be elective out-patient, in-patient and day-case. Patients needing complex operations on the neck, chest, stomach or liver will be transferred to larger hospitals.

24 hour emergency surgical services will assess, treat if appropriate and transfer if necessary.

Surgical training would be broad and will have to include experience in some aspects of Emergency Medicine (formerly A&E), Orthopaedic Surgery, Urology, Obstetrics and Gynaecology, Neurosurgery, ENT, ophthalmology and plastic surgery.

The RGH surgeon will visit larger centres to maintain skills and pursue interests. Anaesthesia (24/7) will be consultant led and delivered with GP support in a team of three.
The range of emergency surgical treatments in the RGH will be:

- Appendicectomy;
- Caesarean Section (in island RGHs);
- Endoscopy (including injection of varices);
- Evacuation of retained products of conception;
- Lacerations;
- Initial fracture management and joint dislocations;
- Repair of perforated ulcer;
- Control of haemorrhage (including splenectomy);
- Resection and anastomosis of bowel;
- Ruptured ectopic pregnancy surgery;
- Chest drain;
- Drainage of pericardium injury (for cardiac tamponade) plus suturing of penetrating injury.

Services must also be supported by Child Health, Mental Health, Endoscopy, Imaging, and Laboratories.

Care of the ill child would be managed by GpwSIs in Paediatrics and Child Health and GP Physicians with high level competence in Paediatrics and Child Health.

Kirkwall, Orkney
Balfour General Hospital
70 beds in six wards

Three consultant surgeons and three consultant anaesthetists provide planned and emergency care.

Visiting consultants provide specialist outpatient clinics every two to three months.

Fort William (70 miles from Raigmore Hospital Inverness)
Belford Hospital

2 general physicians, 3 general surgeons, 3 anaesthetists, and 5 junior doctors, including one SHO in EM.

[1200 medical admissions, 1900 operations including 300 emergencies, 1200 surgical OPD visits and 7,500 ED attenders per annum.]
Level 2+: Local Hospitals (England) and Level 2 Local Acute Services (Wales); 8, 46

The NHS National Leadership Network Local Hospitals Project in 2006 proposed the English model of the ‘Local Hospital’ which would have an Emergency Department (ED) supported by 24/7 access to acute medicine, level 2 patient care (High Dependency), a non-interventional Coronary Care Unit (CCU), essential services laboratory (haematology, biochemistry, pathology, blood transfusion, basic microbiology, infection control and mortuary services), diagnostic radiology (X ray, Ultrasound Scanning Service (USS) and Computerised Tomography (CT) scanning.

The Local Hospital would be supported by 24/7 local networked access to emergency surgery, trauma and orthopaedics, paediatrics, obstetrics and gynaecology, mental health, specialised surgery, interventional radiology 8

Designed for Wales 46 describes a Level 2 hospital as providing easy access to local acute services that people use most frequently, currently provided by district general and community hospitals. These include a local injury service and medical and surgical services with emergency and planned services managed separately, and those needing pre-planned treatment staying in hospital less than 48 hours. There will be high quality diagnostic facilities providing on-site support for treatment and diagnosis and well-developed high technology links with specialist hospitals to ensure that patients and clients are seen in centres of excellence quickly and as locally as possible.

In Wales 46: this would provide:

- **Emergency care**
  - Minor injuries
  - Rapid Access clinics
- Local emergency assessment
- Emergency admissions
- Base for emergency response community teams
- Routine emergency medicine eg chest infections, cardiac failure

➢ **Elective care**
- Out patients including children’s facilities, consultations, minor procedures and dental services
- Endoscopy suites for diagnosis and treatment
- Day care and short stay routine surgery
- Diagnostic facilities with radiology, ultrasound CT scanner, MRI, pathology and ECG and ECHO services

➢ **Integrated Care**
- rehabilitation beds
- sub-acute beds
- palliative care
- stroke unit
- therapies centre
- resource centre for carers, voluntary services, multi agency teams

➢ **Family Health care**
- midwifery led units
- paediatric / GP joint clinics
- local diagnostic services
- emotional health and well being services

➢ **Mental Health**
- extended day hospital
- in and out patient services
- liaison service

The report of a working party of the Academy of Royal Colleges defines a Local Hospital as providing 24-hour services including A&E, acute medicine, imaging including CT, laboratory services, level 3 critical care (intensive care), general surgery and orthopaedics where safe. In exceptional circumstances where on-site surgery is not provided, the hospital must not accept unselected medical patients.

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<table>
<thead>
<tr>
<th>Hospital</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bishop Auckland</td>
<td>New build (2002): 286 beds. Population 120,000 Emergency surgery phased out. Now developed as an elective treatment centre for County Durham and Darlington (12 miles away), delivering low risk hip and knee replacement surgery Midwife led delivery unit Urgent care centre staffed by GPs and Nurses</td>
</tr>
<tr>
<td>Brent Emergency Diagnostic and Care Centre</td>
<td>Local hospital: 243 beds. Population of 250,000 180 emergency admissions per week (10,000 per year) Provides acute medicine, surgery, gynaecology and trauma and orthopaedics. No consultant led obstetrics. Full range of day case, short stay surgery, elective in patient urology. Junior doctors don't work after midnight. Ward work covered by night time nurse teams.</td>
</tr>
<tr>
<td>Northumbria Healthcare NHS Trust</td>
<td>PFI new build: DGH 100 beds Population 70,000 24 hr Urgent Care Centre integrated with GP OOH service No major trauma Day cover: senior ED doctors, Nurse practitioners, no junior doctors Night cover: GPs and Emergency Dept doctors provide cover for entire hospital. Integration between EM and Medicine allows consultant physician to be on call to help with medical emergencies. Transfers to other hospitals by protocol</td>
</tr>
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Level 3 Care: Acute Services

A highly specialised facility supporting the intensive treatment of complex illness and acute emergency care\textsuperscript{2,3} and which must have access to level 3 Intensive Care. A back up facility for local services providing advice, assessment, diagnosis and treatment where it cannot be delivered safely at local level and transferring patients back when they no longer need specialist attention\textsuperscript{2} Services considered in this include: the Emergency Department, Critical Care, Trauma, Medicine, Surgery, Paediatrics, Neonatology, Obstetrics, Cancer Services, ‘High Tech’ diagnostics\textsuperscript{2}

Many level 3 services will be provided alongside level 2 with patients directed to the appropriate service at the point of entry. Hybrid models, working across the levels, may also be possible. For example, some (level 2) hospitals may deal with urgent medical admissions but not provide emergency surgery. All hospitals with level 3 facilities will be expected to adopt safe and sustainable ‘hospital at night’ teams.\textsuperscript{7}

Level 3 a: \textsuperscript{7}

Provides core admitting services\textsuperscript{7}

These are major acute hospitals\textsuperscript{7} which deal with life-threatening illnesses, presenting as undifferentiated acute illness or needing specific pathways for acute medical care eg AMI, stroke. Major acute hospitals would provide acute surgical services. Front doors would have an ED with emergency floor to deal with immediate resuscitation, acute medical problems, acute surgical problems, major trauma, minor injuries.\textsuperscript{2}

The Academy of Medical Royal Colleges defines this ‘District’ hospital as providing, in addition to the above, 24-hour specialist services such as paediatrics, some surgical specialties and possibly obstetrics\textsuperscript{32}
Assessment, diagnosis and treatment services for those patients likely to require medical and surgical admission, in what we might call “Emergency Units”.

The following services should normally be provided:

- General Surgical 24/7 receiving services;
- General Medical 24/7 receiving services (including provision for geriatric admissions);
- Orthopaedic surgery 24/7 receiving services;
- Anaesthetic services on a 24/7 basis, including general critical care services;
- Radiology services on a 24/7 basis.

**Level 3b:**

Major acute hospital providing sub-specialist services, or, in Wales, specialised, less common services for complex cases requiring a concentration of skills and equipment

This hospital will provide everything provided by a Level 2 or 3a hospital with the addition of highly specialised services, such as complex specialist medical, surgical, and rehabilitation services. These may include emergency services such as vascular surgery, urology, burns units and interventional cardiology. The key here will be to get patients who are likely to need these services to the appropriate site as quickly as possible. Those at the front end of urgent care (e.g. GPs and NHS 24) will have to route patients to these facilities.
In Wales\textsuperscript{46}, this would provide:

Major elective and emergency services requiring critical care together with specialist services for women and children, which cannot be decentralised to Local Acute Services. i.e.

- Accident and Emergency
- Trauma
- Emergency and Specialist medicine
- Neonatology
- Emergency Surgery
- Paediatrics
- Critical Care
- Cancer Services
- Obstetrics
- Complex surgery
- High Tech diagnostics

Plus further development of tertiary outreach services.

May include a co-located urgent care centres: walk-in centres for 24/7 multidisciplinary GP led care which should have been given as a routine GP appointment, but which patient perceives as too urgent to wait\textsuperscript{3}

In Scotland, because the EWTD will bite at this level, some hospitals currently providing 24/7 emergency admissions will not do so in the future. These will generally be in Central Scotland where there is better access to alternative sites. In rural areas, the Rural General Hospital will provide these services. \textsuperscript{10}

\textbf{Emergency Care Networks:}

Coordinating major acute hospitals developing specialist diagnostic, therapeutic and clinical services\textsuperscript{3}
Level 4 Care: Tertiary and highly specialised care

The apex of the pyramid finds concentrated specialist expert services for less common conditions such as Burns, Neurosurgery, cardiac Surgery, Renal transplants, and specialised children’s services.²,¹⁵

Services which are highly specialised, providing services for rare or particularly complex conditions and will include the following:

- Cardiac surgery;
- Thoracic surgery;
- Neurosurgery; or
- Specialised critical care.⁷

Trauma Services

Severe trauma is not common and many hospitals see less than one case per week. This bears directly on their experience and ability to manage these challenging patients and it is unlikely that individual hospitals can deliver optimum care for this challenging group of patients.³⁹

Patients with head injury need early definitive airway control and rapid delivery to a centre with on site neurosurgical services, irrespective of the need for surgery, which implies regional planning of such services.³⁹

All agencies involved, including the Emergency Medical Services should be incorporated into the Clinical Governance arrangements of a regional trauma service.³⁹ A benchmarking exercise by the Defence Medical Services described an NHS culture which did not assign the same importance to the systematic management of major trauma as the Defence Medical Services. (DMS)⁴⁰
The DMS have audited their clinical effectiveness as a trauma system since 1999 by identifying unexpected outcomes and learning continuously why the system’s overall performance is above or below expectations via the Major Trauma Audit for Clinical Effectiveness (MACE.)

MACE, in a cycle of standard setting, performance management, identifying of performance gaps, education, and re-evaluation examines every casualty returned from the front line to the Royal Centre for Defence Medicine in Birmingham and all post mortem examinations and in weekly joint clinical case conferences conducted by telephone feeds back to all agencies involved from the front line through to Birmingham.41

Three methods13 of providing trauma care are described:

1: Regionalised trauma care
   Serving a 2.5 – 3.0M population
   Is supported by other Eds, fewer in number, and stand alone MIUs.
   Clear protocols for primary and secondary transfers.

The Royal College of Surgeons and the British Association of Orthopaedic Surgeons report of 2002 recommended that ambulances should be directed to units equipped with facilities to treat major trauma for severely injured patients.37

A Level One Trauma Centre has:

- 24/7 ATLS certified consultant led resuscitation and trauma team
- Consultant Director of trauma services
- 24/7 fully staffed ED
- ICU and trauma beds on same site as ED
- 24/7 on site CT and radiography
- 4-8 wte exclusive trauma orthopaedic surgeons with dedicated trauma theatre and daily trauma lists
- 24/7 helipad
- Anaesthetics, critical care and Paediatric Intensive Care
- General, vascular, urology surgery
- Orthopaedic surgery
- Plastic Surgery
- Cardiac or thoracic surgery
- Head and neck surgery
- Neurosurgery
- Paediatric surgery
- Interventional radiology
Alberti sees at the ‘apex of the pyramid’, specialist centres for uncommon conditions such as severe burns, supported by regional hospitals with 24 hour consultant cover in all necessary specialties with state of the art diagnostic equipment. 15

2: A series of fewer major Eds with a simultaneous increase in MIU facilities.  
Catchment population of 300,000 to 600,000  
70,000 – 100,000 new attenders per annum.  
But as attenders increase over 100,000, it becomes difficult to provide the necessary volume of inpatient supporting facilities.

Alberti calls these ‘Super Eds’ coping with virtually all emergencies including major trauma, vascular surgery, primary angioplasty and immediate CT scans for Head injury and stroke, and serving larger populations than current (English) Eds. 15

3: Preservation of existing Eds and development of alternatives for the minor injury caseload. This works best where population densities are low and levels of attendances at major Eds are low.

Alberti sees local Eds which assess and treat where appropriate, medical and surgical cases with a comprehensive staff of consultants and other experienced clinical staff. 15

Delays in surgical intervention led to poorer outcomes in cases of major trauma in the American Health system. 13 Larger hospitals had fewer procedural mistakes and fewer avoidable deaths in the nature and volume of trauma seen in the USA. The benefits depended also on effective pre-hospital care. The level of severe or urgent trauma cases dealt with per week for optimal care was put at around 15-20.13 A study outside the UK found that triaging patients with severe trauma to Eds with appropriate specialist expertise on site improved outcomes even with a small increase in travel time. 13

However, one UK study has not shown that a regional trauma system based on a regional trauma centre to be either more effective or more cost effective. 13 The Regional Trauma Unit had no method of triaging patients directly to the unit set up in Stoke on Trent and saw less than 20% of the volume recommended for a level I trauma centre. 13 The additional cost of a Regionalised Trauma System was £0.5M per annum, and the cost savings for the contiguous Eds was small, as only a small number of cases were transferred. 13 Additionally, introducing Regionalised Trauma centres has
consequences for the location of other clinical specialties and therefore for the range of professional experience and expertise in the remaining Eds.  

This is a problem because of the different times of the day when different illnesses or injuries present. 80% of asthma (medical) presents between 1600 and 0800, and 72% of major trauma (orthopaedic and surgical) presents between 1700 and 0900. Both need essential radiography, so that has to be dually provided if trauma is admitted elsewhere.

Secondary transfer of patients is associated with poorer outcomes. Some head injuries need decompressive surgery and a lack of neurosurgery facilities is a common reason for patient transfer. If neurosurgery facilities are not available, then there should be agreed rapid transfer guidelines as the time taken to craniotomy should be less than four hours (including the CT scan). Times longer than this are associated with a significantly poorer outcome. In East Anglia, it was rare to reach a neurosurgical unit within four hours, but the delay was usually at the receiving hospital, before contact was made with the neurosurgeons. In one study, 1:7 patients had neurosurgery within 4 hours if taken to a non-neurosurgical centre, compared with 2:3 who went directly to a neurosurgical centre.

The time taken to reach hospital following trauma was found to be longer for rural patients in Scotland, so attempts were made to bring specialists in integrated care to the patient in remote areas by air, when road times were in excess of one hour. Unfortunately the evaluation of this is scanty. All patients were stabilised and "a high proportion survived". Helicopter-Ambulance transfers are used in London (HEMS) and some rural areas to transport the seriously ill and injured from the scene. This may increase the workload of the ED as a proportion of these patients would previously have died.

The Emergency Medical Retrieval Service trial in Scotland will fly out specialist consultants to provide on site resuscitation and safe transfer for patients with life threatening injury or illness as well as providing 24/7 telephone advice.

Air ambulances help especially in transporting critical care personnel to assist in out of hospital airway management, if there is no-one on scene with the necessary expertise in rapid sequence induction and ventilation.

Air ambulances should be targeted at specific situations where calls are categorised as life threatening, such as serious road traffic accidents involving entrapment; burials or cave-ins; traumatic amputations; blasts and
explosions and gunshot wounds; and lower priority calls in remote areas. They should also be used to transfer clinical personnel to scene and for some inter-hospital transfers.  

Until the issue of trauma centres is resolved, the use of trauma teams, which should be 24/7 consultant led, provides a more efficient and organised approach to the care of the seriously injured in a DGH. A trauma team consists of senior anaesthetic, ED and surgical specialty doctors. ED medicine, anaesthetics, general surgery, orthopaedics and neurosurgery, available 24/7 is presumed to improve outcomes.

**Predictable trauma**

Trauma accounts for 50% of the orthopaedic workload and impacts on the ability to deliver elective work.

Managed clinical networks for spinal trauma, children’s orthopaedics and limb reconstruction following surgery (+/- plastic surgery), non-unions and infected non-unions could all be dealt with on a regional basis.

Older people have a much higher rate of fracture than younger people. Fractured neck of femur is a predictable, age related component of the ED trauma caseload. These patients, who have complex co-morbidities and have complex needs, always go to the ED, and are always admitted. Fractured neck of femur accounts for 80% of the trauma admitted.

The numbers of cases of nof will rise to at least 2020. The number of fractures and the costs are predicted to rise by 1% per year. The challenge will be to introduce safety measures to prevent injury in this age group.

**Paediatric trauma**

Children should not receive ED services if there are no paediatric specialists or paediatric in-patient facilities on site. However, there is no evidence of benefit if children are treated in dedicated paediatric units rather than general Eds, unless for specific diagnostic groups.

**Minor Trauma**

There is no evidence that Nurse Practitioners (in prospective randomised controlled trials) manage minor injuries as well as or more efficiently than junior doctors, or that MIUs are effective, in relation to major Eds at
managing minor trauma. However, GPs employed in EDs to minor conditions, save over one third of the cost per case compared with management by an SHO doctor.

[Definitions of Ward Care Levels]

**Ward Care levels**

*Patient Care Level 0*

Patients whose need to be in hospital, but whose needs can be met through normal ward care.

*Patient Care Level 1*

Patients at high risk of their condition deteriorating and needing staff with special expertise and/or additional facilities for at least one aspect of critical care, but whose care is delivered in a general ward environment.

*Patient care Level 2*

Patients requiring more detailed or extended observation or intervention including support for a single failed organ system or postoperative care and those ‘stepping down’ from higher levels of care (This level is High Dependency Care).

*Patient Care Level 3 / 3T*

Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems and including all complex patients requiring support for multi-organ failure (This level is Critical Care / Critical Care Tertiary).
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