The Faculty of
Intensive Care Medicine

Position paper of the Workforce Advisory Group January 2015

1.0 Introduction & aims of this paper

1.1 Hospitals are in need of consultants with general, acute clinical skills. The needs of patients and desire of central government for a 7 day, consultant-delivered hospital service has been made clear. Whilst funding is shifting towards supporting outpatient and community-based activity, increased longevity, the rising incidence of diseases such as diabetes and cognitive impairment, and the expectations of the public mean that demand for intensive care is likely to rise.

1.2 The recognition by the General Medical Council (GMC) of intensive care medicine (ICM) as a specialty, some inevitable decoupling from its traditional base in anaesthesia and the (recent) evolution of training systems through joint, dual and (now) single specialty programmes, means workforce planning for ICM is especially challenging.

1.3 The aims of this position paper are to:

1.3.1 Describe briefly the current supply of ICM/critical care facilities in England and Wales.
1.3.2 Attempt to predict future demand for the clinical service.
1.3.3 Record the best estimates that can be made of the current medical workforce in ICM.
1.3.4 Summarise the work performed by the Centre for Workforce Intelligence on the future workforce in ICM.
1.3.5 Make recommendations as to how these data should be employed by (a) the Faculty and (b) networks or local ICM delivery systems.

2.0 Beds, clinical performance and costs of critical care in England & Wales

2.1 In December 2013, there were 3829 adult critical care beds of all types in England, of which 77.1% were occupied. This figure is variable; thus in February of the same year there were 3770 beds with an occupancy rate of 87.7.

2.2 In Wales in 2014 there was an average of 3.2 (intensive care) beds per 100,000 people, lower than the number provided for the population in the rest of the UK. Patients requiring critical care were relatively few (around 9000 per annum). The Welsh government has indicated that units should run at an average occupancy of around 65-70%, but all units in Wales report occupancy rates of greater than 80%, with many often operating at over 100% occupancy at times.

2.3 Data concerning the absolute healthcare expenditure on critical care is variable; more useful is perhaps the perspective that in England annual expenditure increased in real terms from £700m to £1bn over from the financial year 1999-2000 to that of 2005-6. This was associated with a 35% increase in the number of staffed beds in general intensive care units

(ICUs), with more of the increase in Level 2 (106%) than in Level 3 (23%) dependency. Over the period 1999-2006, the mean cost of an intensive care bed day rose slightly from £1551 to £1647 (2006-7 prices). According to Consolidated Welsh Costing Return (WRCN1) 2011/12 a ward bed in Wales cost £413 per night, a Level 2 bed an average £857 per night, and a Level 3 bed £1932 per night.

2.4 In England, early discharges resulting from a shortage of critical care beds declined from 7.1% in 1998 to 3.3% in 2006 as the number of level 2 beds increased. Although there was no consistent change either in the proportion of patients with at least one chronic condition, nor in the average severity of illness score, the mean predicted risk of mortality rose from 30.5% in 1998 to 32.1% in 2000, but subsequently fell to 31.4% in 2006, suggesting that less severely ill cases were being admitted. Analysis by 10ths of predicted risk of mortality in England showed no widening in the distribution of cases.

2.5 After 2000, unit mortality adjusted for case mix in England fell dramatically by 2.0% a year and hospital mortality by 2.4% a year (compared with no change between 1998 and 2000). This was accompanied by a decrease of 11.0% a year in transfers out (for the same level of care) to other ICUs and a fall of 8.7% a year in transfers in, whereas previously both proportions had been rising. In addition, the proportion of unplanned night discharges declined by 7.7% a year.

2.6 Despite small increases in average unit costs, the cost effectiveness of critical care improved after 2000, partly as a result of the improvements in outcome.

3.0 Demand for intensive care beds: Intensive Care National Audit and Research Centre (ICNARC) data

3.1 ICNARC made an estimate of actual available bed-days in England using the DoH KH03A adult critical care bed census made each January for 2007-11, split into adult general ICU and combined ICU/HDU beds. Available bed-days in England for 2012/13 (as KH03A stopped in 2011) were estimated by extrapolating the trend seen in 2007-11. Occupied bed-days in CMP units in England were calculated for the two unit types based on date/time of admission and date/time fully ready for discharge (for survivors) or date/time of death for non-survivors.

3.2 Occupied bed-days in ICUs in England registered with the ICNARC Case Mix Program (CMP) were categorised into Level 3 and Level 2 days according to the proportion of calendar days in the unit at each Level and extrapolated to estimate totals for England in terms of bed numbers (reported to CMP by participating units extrapolated to total bed numbers reported in KH03A).

3.3 Bed utilisation for 2014 to 2033 was estimated by applying projected age- and sex-specific rates to ONS population projections for England (2012-based) and translated to numbers of beds by assuming the need to maintain average occupancy, and making a comparison against reported numbers in KH03A.

3.4 Sensitivity analyses were applied concerning the potential impact of the assumptions on results.

3.5 Extrapolating from observed data in the Case Mix Programme Database, the bed-days of critical care delivered in adult general ICUs (including Level 3, Level 2 and combined Level 3/2 dependency) were estimated to have increased from 650,000 bed-days in 2007 to 740,000 bed days in 2013.

3.6 Level 2 bed-days delivered increased from 260,000 in 2007 to 390,000 in 2013, whereas the Level 3 bed-days delivered decreased from 380,000 in 2007 to 350,000 in 2013.

3.7 In terms of age- and sex-specific bed utilisation rates and then projecting forward to 2033, if the observed trends continue, an increase in overall bed days is estimated of approximately 4% per annum – comprising an approximate increase of 7% per annum for Level 2 bed-days and an approximate decrease of 2% per annum for Level 3 bed-days.

3.8 It is important to note that critical care utilisation is predominantly supply-led and the observed rise in utilisation is likely to be driven by increased bed provision. Secondly, the results represent a projection forward of twenty years based on trends in observed bed utilisation from the previous seven years and do not take any account of current or future unmet need. Thirdly, the decrease in Level 3 bed-days over the past seven years has occurred despite increasing bed provision suggesting that current unmet need is likely to be for additional Level 2 beds-days. Finally, the assumptions made (for data, for data handling, for calculations, etc.) require further detailed exploration.

4.0 The medical workforce: General issues

4.1 The current [2014] cost of providing a Level 3 bed is about £350k pa, most of which is attributable to staffing. However, planning a medical workforce effectively is an almost impossible task. It takes 12-15 years to train a first year medical student to become a consultant or GP. Moreover, the perceived skill mix required changes frequently; training moved towards increased specialisation following the 'Modernising Medical Careers' report (2005), yet only a few years later a more generalist approach was being advocated in the 'Shape of Training Review' (2013).

4.2 Whilst central government policy can set out to determine how many doctors are needed, the final number that can be employed in a particular geographical location is determined by the money available to employ them. In times of relative plenty (e.g. 1998-2008) expansion in consultant opportunities is rapid; more recently this has slowed significantly. Such swings are particularly apparent in specialist areas where significant capital investment is needed for optimal clinical practice, of which ICM may be the exemplar.

4.3 Training is based traditionally around teaching hospitals and in conurbations. Some 86% of trainees now end up as consultants working in the same area in which they trained. Arguably, areas that struggle to recruit trainees or have few allocated to them will not be able to fill additional consultant posts even if funding is available to create them.

5.0 The current [2014] state of ICUs and the medical workforce: Faculty and affiliated professional bodies

The Faculty Survey

5.1 Historically there has been little or no workforce data published for ICM in the UK. However, in 2011-12 the Faculty of ICM (FICM) conducted a two phase census of all Fellows. Phase 1

[response rate 80%] was sent to hospitals [England n=136, Scotland n=15, Wales n=10, N Ireland n=6]. Those that responded have between 6 and 10 beds [31.1%], 24.2% between 11 and 20, 14.9% between 16 and 20 and the remainder 21+ beds. Only 6 hospitals returned fewer than 5 funded beds. There is an expectation amongst ICUs over the next 12 months that some will increase their numbers of funded beds (by a total of 178) and some will see a decrease (by a total of 26).

5.2 Phase 2 of the survey [response rate 50%] related to individual consultants [n=921, 16.9% female; England n=794, Scotland n=80, Wales n=39, N Ireland n=8]. Some 35.6% cover ICU a week at a time, 36.2% undertake blocks of days and the remainder single days. The average number of direct clinical care [DCC] sessions [programmed activities, PAs] devoted to ICM is 4.24; mean DCC PA devoted to non ICM practice is 3.82.The average number of supporting professional activity [SPA] is 2.89 sessions per consultant. Where there is a differential allocation of these, the average number for ICM is 1.19 and non-ICM is 1.69.

5.3 Out of hours work is undertaken in a variety of ways. For on call, the majority (74%) of consultants work a 1 in 10 or more onerous rota. Some 29.4% cover simultaneously other clinical areas of practice as well as ICM when on call and 36.5% of hospitals have their out of hours cover for ICM provided by non-intensivists. Some out of hours work is classified as 'scheduled' with an average allocation of 1.37 PA's for this type of work.

5.4 Data for national recruitment to training posts leading to a CCT in ICM are shown in Appendix 1. These are evolving, as the first such posts were only filled in 2012.

Survey of ICM in Wales

5.5 A survey conducted in Wales in 2014 has shown that 50% of Welsh ICUs do not currently meet the Intensive Care Society Core Standards (2013) and the Welsh Critical Care standards (2013) for consultant staffing.]. The largest cause of failure to meet standards is Tier 3 units [**units providing long term level 3 care**] being staffed out of hours and weekends by non ICM trained consultants

5.6 The Welsh study also revealed that 50% of ICUs share their out of hours resident (junior) cover with operating theatres or obstetrics. Some 80% of units do not meet all the standards for junior staffing - either shared cover 6/14 or covering too many patients out of hours 3/14.

6.0 The future critical care workforce: Confederation for Workforce Intelligence report

Background and methods

6.1 The CfWI contributes to the planning of future workforce requirements for health, public health and social care in England, being commissioned by the Department of Health, as well as Health Education England and Public Health England, to look at specific clinical workforce groups and pathways, and to provide materials, tools and resources to inform workforce planning policy decisions at a national and local level.

6.2 The CfWI programme of work is designed to assist decision makers in planning to meet the futures needs for medical workforce(s) in England for specialist groups. These include

currently general practitioners, psychiatrists, medical ophthalmologists, obstetricians and gynaecologists, dentists and dental care professionals, and workforces providing acute and other medical services, including anaesthetists and those practising ICM.

6.3 This last (joint) review conducted during 2013-14 aims to identify key drivers of demand and supply for consultants in anaesthetics and ICM, focusing on high-impact, high-uncertainty factors that may have an impact in the next 20 years. The exercise involves a review of workforce capacity and workload issues, considers different service delivery models/patient pathways and their workforce implications, and makes recommendations for workforce planning, including training numbers.

6.4 Horizon scanning was employed to identify the key drivers that might impact on workforce supply and demand over the 20 year period. Following this, a one-day scenario generation workshop was conducted involving a broad group of stakeholders who used the drivers from the horizon scanning, including a few extra generated on the day, to create four scenarios that were thought relevant to anaesthetics and ICM. A Delphi panel then quantified the impact of these on future demand and supply. The scenarios [Figure 1] were:

- Scenario 1: Laissez faire [little central government interference in healthcare provision], financially unconstrained environment.
- Scenario 2: Fragmentation [of healthcare provision], financially constrained.
- Scenario 3: Non laissez faire [central government control], financially unconstrained.
- Scenario 4: Fragmentation, financially unconstrained.

Figure 1: Different scenarios designed to bound the key future uncertainties (such as average need and workforce behaviours).

		Cluster A	
		Less political involvement	More political involvement
Cluster D	Increase in GDP spent on healthcare	**Scenario 1**	**Scenario 2**
	Decrease in GPD spent on healthcare	**Scenario 3**	**Scenario 4**

6.5 A model specification provides the blueprints for the supply and demand model built using system dynamics software. A baseline projection is modelled alongside the four scenarios which are designed to explore the inherent uncertainty of the future.

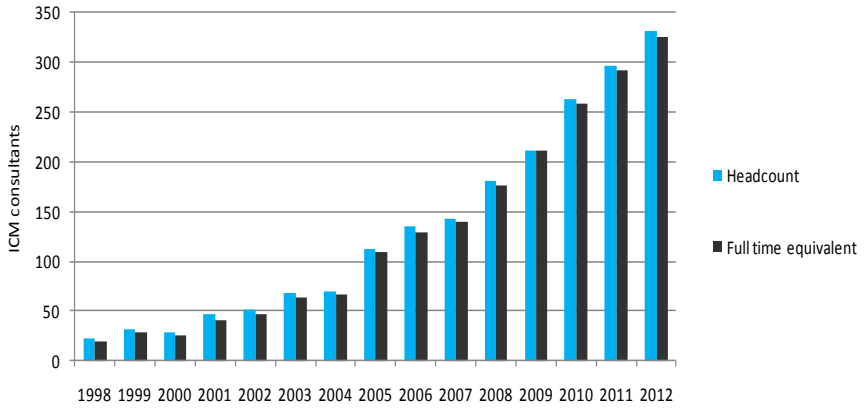
CfWI projections: Current estimations of supply

6.6 The supply forecasts try to combine the contributions of a number of CCT holder categories ICM service delivery including intensivists (single CCT holders only, of which there are currently few), intensivists also qualified in anaesthesia (dual CCT holders), intensivists

holding dual CCTs with another specialty (most commonly acute medicine) and anaesthetists (single CCT holders) practicing ICM (without formal recognition of training).

6.7 The workforce coded as ICM consultants has grown on a FTE since 1998, from 20 to 325 (to 2012). However, ICM has only had a separate CCT since 2012 and most ICM supply was probably coded under anaesthetics historically [Figure 2]

Figure 2: ICM consultant workforce 1998-2012.



6.8 The proportion of women in the workforce has increased since 1998, and the participation rate for both male and female practitioners remains constant and high [about 0.98 for ICM].

6.9 The system is currently unclear regarding how many doctors work in anaesthetics and ICM [Figure 3].

Figure 3: Estimates of doctors in anaesthesia, ICM or both [various authorities]

Count of doctors working in anaesthetics / ICM	Anaesthetics	ICM	AICM	OICM	Total
GMC doctors on the specialist register with a postcode in England (data request April 2014)	7093	7	499	131	7730
HSCIC - HC of occupation codes (2012)	5711	332	-	-	6043 (2012) 6250 (2013)
FICM – HC of service provision (2011/12) (50% response rate)	-	42	723	29	794
RCoA (consultants, 2010 census)	5639	-	-	-	5639

- +1000 doctors on the specialty register but not working in the English NHS.

We use	5833	6	411	100	6350

CfWI projections: Future estimates of demand

6.10 In forecasting future demand CfWI estimates the workforce needed to maintain current levels of care per patient, recognising there is always some unmet need [estimated as 25% by the Delphi panel of 14 participants].

6.11 Factors impacting future base line demand include population growth [based on the ONS 2012 projections), the rising proportion of older people, specifically those over 80 who rely most on ICM services, and scenario-specific [Section 6.4] changes both to the average person's individual need for ICM and to the efficiency and productivity of the service.

6.12 Baseline demand for intensivists is expected to increase by 25% by 2033 due to demographic changes alone. The Delphi panel judged the change in average individual need and productivity/efficiency over the next 20 years to be as shown in Figure 4.

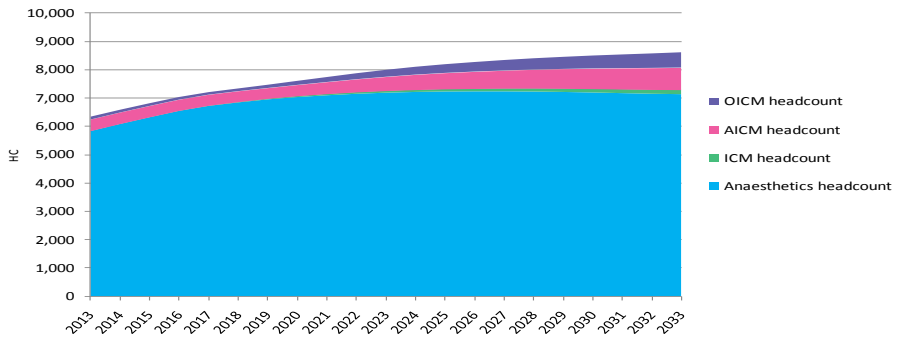
Figure 4: Demand for intensivists by 2033 according to Scenarios [Section 6.4] according to changes in patient need and clinician productivity/efficiency [views of Delphi panel, n=14].

Demand for intensivist care in 2033	Multiplier due to population growth and ageing population*	Multiplier due to change in patient need	Multiplier due to change in productivity and efficiency
Demand baseline	1.25 (tbc)	–	–
Scenario 1	–	1.50	1.20
Scenario 2	–	1.25	1.25
Scenario 3	–	1.40	1.15
Scenario 4	–	1.28	1.25
Principal projection	–	1.48	1.25

CfWI projections: Future estimates of supply

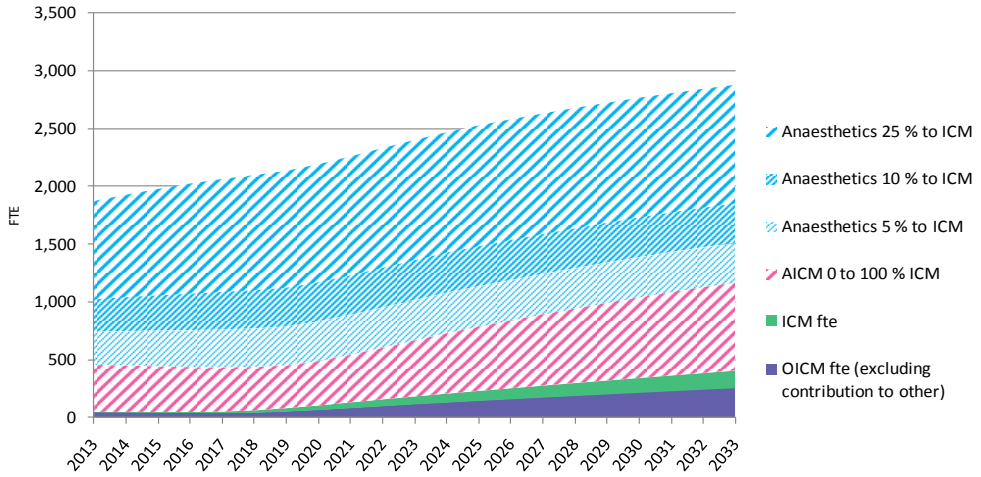
6.13 Supply projections were based around estimates/assumptions concerning training and departure from the specialty. These included numbers of new entries to the consultant grade via completion of training or the CESR route, and rates of attrition though early retirement or a shift to other work [e.g. management, academia] or changes to working patterns [e.g. part time][Figure 5].

Figure 5: Projected total CCT holder workforce by 2035.



6.14 Assumptions were made concerning the relative contribution of multiple specialities to the ICM workforce and the proportions of time they may spend in each clinical activity [e.g. anaesthetics vs. ICM services, Figure 7].

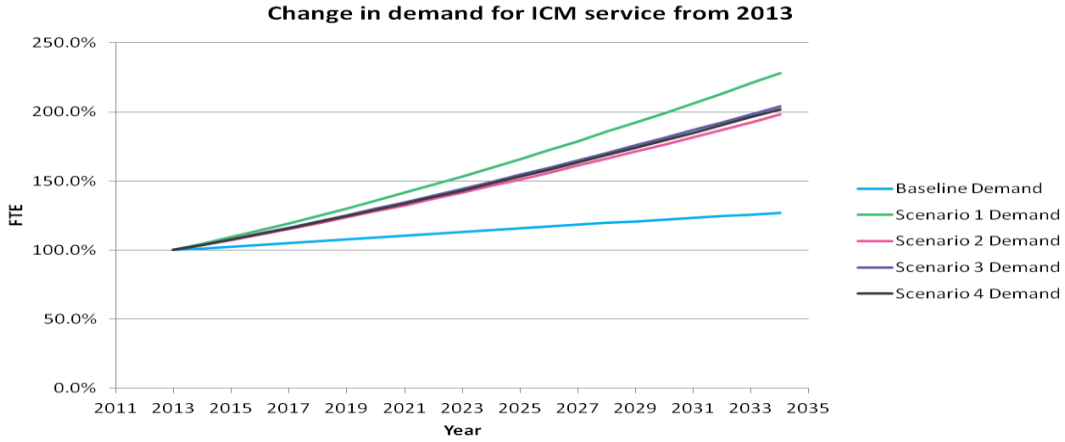
Figure 6: Projected ICM workforce supply with varying degrees of contribution to anaesthesia



CfWI projections: Future estimates of demand

6.15 For anaesthetics and ICM, all projections suggested an increase in demand from 2013 to 2035. Of the four scenarios, demand for ICM was projected to increase the most in Scenario 1 and the least in Scenario 2 [Section 6.4] [Figure 8]

Figure 8: Change in demand for ICM workforce by Scenario [Section 6.4]



7.0 Summary, conclusions & recommendations to the Faculty Board

7.1 There has been an increase in national funding of critical care services since the year 2000. Clinical performance appears to have improved according to those markers employed.

The current supply and predicted future demand for critical care in England and Wales

7.2 The number of critical care beds has risen; although the geographical allocation of these is variable (lower in Wales) and bed occupancy is high. The size of units (30% 10 beds or less) is small by international standards.

7.3 The impacts upon the current organisation of critical care afforded by changing demand, principally though the reassignment of clinical services (e.g. centralisation of vascular surgery) and/or rationalisation of hospital beds is unclear at present. However, in terms of age- and sex-specific utilisation rates, if the observed trends continue as evidenced by ICNARC, survey material and CfWI an increase in the overall bed days required is estimated to be in the order of 4% per annum [comprised of a 7% rise per annum for Level 2 bed-days and an approximate fall of 2% per annum for Level 3 bed-days].

7.4 The CfWI process suggests that *currently* 15-25% of anaesthesia-ICM service demand is unmet, and their estimates support the contention that this will rise [if only due to a growing and ageing population].

The current medical workforce in ICM

7.5 Standards for workforce provision have been published for Wales and for the U.K. by the Intensive Care Society, but most Welsh units fail to meet these, largely through a lack of provision of separate ICM consultant rotas. Critically ill patients are therefore being cared for overnight, over weekends and bank holidays by non ICM trained consultants. Survey data suggest this situation pertains elsewhere in the UK (see Section 7.7).

7.6 The majority of units in Wales are also failing to meet standards for resident junior staff cover, mainly as they are required to share staff with other specialties/rotas. There remains a reliance on anaesthetic junior staffing in Wales, although these numbers are falling whilst the number of critical care units has remained largely the same. There are very few trainees in Wales allocated solely to critical care.

7.7 The UK-wide Faculty survey showed 29.4% of (consultant) respondents cover simultaneously other clinical areas of practice as well as ICM when on call and 36.5% of hospitals have their out of hours cover for ICM provided by non-intensivists. Some out of hours work is classified as 'scheduled' with an average allocation of 1.37 PA's for this type of work.

Projected workforce needs

7.8 For ICM, all projections suggested an increase in demand from 2013 to 2035. Of the four CfWI scenarios modelled, demand for ICM was projected to increase the most in Scenario 1 [by about 125%] and least in Scenario 2 [by about 25%]. This suggests a substantial increases in training appointments will be needed from the current number [n=112, 2014].

Recommendations to the Faculty Board

7.9 The WAG *recommends* to the faculty Board that:

7.9.1 It accepts this position paper as a statement of current provision and projected need for ICU services in England and Wales, accepting that local and regional variation will influence both demand and supply.

7.9.2 The policy concerning the standards for medical workforce provision published as part of the *General provision of intensive care services* (currently under development, 2014) is used to guide workforce planning.

7.9.3 The work of the CfWI is accepted as a broad indicator of workforce demand, using the limits provided by Scenarios 1 and 2 to guide modelling for the numbers of trainees needed.

7.9.4 That the abbreviated and adapted form of this document shown at Appendix 2 is used by Regional Advisors in to inform discussions concerning the appointment of trainees and consultants in ICM.

7.9.5 That the Faculty recognises the need for two pieces of work to be completed within the next 12 months:

7.9.5.1 That related to workforce demand for service provision. Networks will be asked to apply the 'standards' document [Section 7.9.2] to the critical care facilities within their region, to identify where gaps in the consultant workforce exist and to bring these to the attention of the Faculty to facilitate recruitment to the speciality, and to highlight the need to support critical care services via commissioners, central government and other relevant agencies.

7.9.5.2 That related to training. Two to three networks will be asked to reconcile the work they have carried out in 7.9.5.1 with their trainee numbers [Appendix 1] and to model how the latter need to be adjusted to meet current and projected service demand.

8.0 Relevant references

1. "Together for Health – A delivery Plan for the Critically Ill" http://wales.gov.uk/docs/dhss/publications/130611deliveryen.pdf
2. "Core standards for Intensive Care units. 2013". The Faculty of Intensive Care Medicine and the Intensive Care Society.
3. Royal College of Physicians of London 'Hospital Workforce, fit for the future? RCP March 2013
4. Academy of Medical Royal Colleges. The benefits of consultant delivered care. AoMRC 2012.
5. Royal College of Physicians of London 'Hospitals on the Edge'. RCP July 2012.
6. Royal College of Physicians of London 'Future Hospital: Caring for Medical Patients' Report of the Future Hospital Commission, RCP September 2013.