1. Introduction

Southampton University Hospitals NHS Trust supports the five key principles of the review and the general aim to:

- Adopt national quality standards
- Develop congenital heart networks
- Pool surgical expertise
- Implement new systems for analysing mortality and morbidity

1.1 The relationship between volume and outcomes

While the Trust supports the need to pool surgical expertise and ensure there is 24/7 care in the specialist surgical centres we would ask the review to consider our opinion and provide further clarification of the statement in the consultation document that “research evidence identifies a relationship between higher-volume surgical centres and better clinical outcomes”

A review of the relationship between volume and outcome was carried out by H Ewert\(^1\) at the request of the review team in 2009.

The two best studies cited in this review are those from Welke\(^2\) et al in 2008 and 2009. Most of the other studies are small, old, or have significantly incomplete data.

The most recent of the papers by Welke\(^3\) et al (2009) indicates a statistically significant inflection point in the relationship between unit volume and mortality at around 250 cases per annum - see below.

\(^1\) Ewert, H. *The Relation Between Volume and Outcome in Paediatric Cardiac Surgery; Public Health Resource Unit – A Literature Review for the National Specialised Commissioning Group* (2009)

There is no evidence anywhere in the published literature for a significant association between unit case volume and mortality above 300 cases per year, and there is some evidence in the earlier paper by Welke et al (2008) that this threshold may be as low as 100 cases per annum. However, the confidence intervals narrow substantially at around the 250 case per annum mark in both of the papers by Welke et al. It should be noted that these studies on patient volumes included all children under 18 years of age in contrast to the review’s cut off which excludes children between the ages of 16-18 years from being counted in the surgical numbers. This is a significant omission as the legal age for adulthood in England is 18 years and children aged 16-18 years are cared for under the paediatric cardiac services.

Ewart makes the unqualified statement on page five of the report that "Overall, the studies confirmed the association of volume with hospital mortality". This might lead one to suppose that the association is linear, which it is not, therefore implying that mortality reduces continuously as volume increase, which it does not. However, this report does confirm the remarks made in other publications that volume is only a surrogate marker, and that patient factors such as age and surgical complexity have a much bigger impact on mortality than unit volume.

In summary, there is no data supporting a need for units bigger than 300 paediatric (age <18 yr) cases per annum, and only professional recommendations that viable

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units (with 3-4 surgeons) need volumes of total (adult and paediatric) congenital caseload of 375-500 per annum. The Department of Health view in 2003 in response to the Monro Report was that a minimum figure of 300 procedures should be used as a guide for service reconfiguration.

The NCAT\(^4\) review commissioned by Safe and Sustainable stated that ”..the papers reviewed did not provide sufficient evidence to make firm recommendations regarding the cut-off point for minimum volume of activity for paediatric cardiac procedures overall.” and this concurs with our view.

We also strongly support NCAT's view in stating “Whilst it should be remembered that although the emphasis has been on numbers of procedures per surgeon, as indicated by Dr Ewart there are many other factors and crucially it is how the team is put together in a sustainable safe way that will secure the best possible results for children with heart disease. Time and again effective team working has been shown to be the key component of ensuring patient safety.” Multi-disciplinary team working has been the mainstay of the service provided at Southampton for more than 30 years.

**Why quality centres may do less operations.**

Much emphasis has been placed by Safe and Sustainable on the volume of cases being a surrogate for quality.

What has not been acknowledged is that poor quality leads to an increase in the volume of surgery done at a centre.

A high quality fetal diagnostic service results in the majority of complex cardiac problems being detected antenatally which is of benefit in the management of these children after birth. However a significant proportion of parents of a fetus with major complex congenital heart disease will opt for termination. The fetuses who are terminated are likely to have major complex problems which would normally be treated with three operations at different times and their loss results in a disproportionate reduction in the total number of operations performed at that centre. Thus centres with a high quality fetal service will perform fewer operations in contrast to centres with a lower quality fetal service.

Congenital heart surgery is a complex field and it is inevitable that the desired result may not be achieved by every operation. If the residual problem is significant a re-operation will be required at a later time. As the quality of surgical expertise improves the need for re-operations becomes less. In contrast centres with a lower level of surgical expertise and a high incidence of residual problems will perform more operations.

\(^4\) National Clinical Advisory Team report on SAFE AND SUSTAINABLE 2010
It is clear that centres with a lower quality fetal service and a lower quality surgical expertise are unfairly advantaged when the primary focus is on demonstrating a high number of cardiac operations.

If it is suggested that volume is a marker of quality it must be acknowledged that there are confounding factors which enable a poor quality centre to achieve a high volume in the first place.

2. Designation of surgical centres

2.1 Why choose quality?

The Trust strongly asserts that in deciding which centres to designate, it is vital that the NHS follows Professor Sir Ian Kennedy’s original recommendation in his report on excess deaths at the Bristol Royal Infirmary and chooses centres on the basis of quality rather than access.

The reasons for choosing only the highest quality centres are:

- They have the high calibre individuals, teamwork and culture required to manage expansion without a fall in quality
- It is easier to persuade staff from a lower quality centre to work under the leadership of a higher quality centre
- It is easier and more credible to ask patients to move to a higher quality centre even if their travel time increases

These principles have been demonstrated in Southampton where:

- An additional 100 cases flowed into the centre from Oxford with no prior planning
- The surgical results have remained outstanding throughout the rapid expansion
- Clinicians from Oxford have embraced working in the Southampton centre with the team to provide cardiology services for their patients
- The patients and their charity support group have responded to the change positively and are supporting the retention of the network in option B

Clinical leadership in particular has not been given full enough consideration in the options appraisal. Even if a clinician from a high quality centre transfers to a lower

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5 Learning from Bristol: The Report of the Public Inquiry into children’s heart surgery at the Bristol Royal Infirmary 1984-1995
quality unit, their ability to play a role in transforming the quality of care in that unit will be limited if they are not given a leadership role within it. This principle has been demonstrated in Bristol where the quality improvements delivered were a result of a fundamental change in key leadership roles.

We would urge the review to take note of the experience in Sweden where the two highest quality centres were designated (closing five) despite those centres being located near to each other at one end of the country. Those involved describe the decision as popular with patients and well supported and understood by clinicians (see Appendix 1).

2.2 Features of the quality of care in Southampton

Governance and a child-centred culture of care

Cardiac surgery in infants and children carried a very high risk in the past and although the risks are now considerably less, the potential for adverse events to occur will always remain high. Robust governance arrangements are of paramount importance and Southampton has demonstrated this from the inception of congenital heart surgery 40 years ago.

We monitored our survival outcomes long before the creation of the CCAD database and the mortality graph below demonstrates the consistently excellent results during a period when the national mortality rates were much higher. This is the result of excellent team working and a culture of strong governance.

Mortality rates at Southampton over 30 years

The introduction of new procedures has always been carefully planned and implemented with minimal risk. The hypoplastic left heart programme was started after a visit to an expert unit in Ann Arbor, Michigan by a team of medical, nursing and associated professionals. Complex Ebsteins valve repair and Fontan conversion operations are examples of complex operations carried out at Southampton which currently attract referrals from all over the UK and Ireland. These high risk procedures were introduced in collaboration with leading international centres and
with the involvement of the entire multi-professional team. These demonstrate our emphasis on strong governance safeguards while striving to improve and undertake high risk innovative surgery.

The management of children with congenital heart disease is a high risk speciality and one that has attracted a number of investigations over the past 30 years. The Bristol Inquiry is the best known one but there have been many other external investigations of institutions and referrals to the GMC of medical professionals in many of the institutions providing paediatric cardiac surgery in this country. Southampton has not had a single external investigation into its paediatric cardiac services and we would attribute this to the existence of strong governance, peer scrutiny, transparency and consistently excellent outcomes.

The importance of mortality meetings is well recognised within the speciality. Mortality is now at a satisfactory level with most institutions falling within the 99.8% confidence intervals as shown in the graph on page 11. Now that mortality rates are comparatively low, the challenge for the speciality is to focus on morbidity, re-operation rates and near-misses. With this in mind we have instigated a regular review of all patients who undergo paediatric cardiac surgery within the previous fortnight and this is attended by all professionals involved.

In summary, strong governance is the key to maintaining standards and ensuring the safety of children undergoing cardiac surgery. This has to be a major factor in the designation of surgical centres. We would argue that this is one of the strengths of Southampton and deserves due consideration in the designation process.

**Fetal cardiac services**

The new standards for fetal cardiac screening (FASP) produced by the Department of Health in 2010 and the new BCCA standards for fetal cardiac services (2010) have raised the requirements for quality and detail of fetal cardiac scans to a new high level. This underlines the increasing recognition placed on the value of fetal cardiac services.

Although the fetal cardiac facilities available in the cardiac centres were assessed by Sir Ian Kennedy’s team, there was no assessment of outcome measures of fetal cardiac diagnosis. However the review has acknowledged the importance of this by publishing the figure on page 24 in the pre-consultation business case which demonstrates the relative performance of all regions in the country using CCAD data. The South Central region has the best fetal diagnosis rate in the country outside London.
The strengths of the fetal cardiac services at Southampton are:

- It is the second best performing region in the country and the best outside London
- It is fully compliant with the new 2010 BCCA standards for fetal cardiology
- It has a strong fetal medicine network as does its partner unit at Oxford

Performance measures are of great importance and those for fetal cardiac services must be included in the final decision making process of designation of centres.

**Paediatric intensive care unit (PICU)**

The PICU in Southampton is recognised as being of the highest quality. This is reflected in its consistently impressive PICAnet data, including the lowest standardised mortality rates of all the hospitals in the review, as well as the highest productivity measured by length of stay. Data also shows the unit has the lowest refusal rate for admissions with one cardiac patient turned away during 2010/11. The success of the unit we believe can be largely attributed to:

- Strong leadership
- An ability to recruit high calibre staff to key roles
- The culture of team-working
- The organisation and management of the service
- A strong, thriving PIC network

The Kennedy review specifically commended the PICU on its exemplary management. The consequences of the closure of this unit are profound and are described in section 3.3.
Peer recognition

Southampton has a long history of excellence and is widely regarded as one of the very best centres in the world for congenital heart surgery. The centre is recognised by peers around the world for its leadership role in the specialty globally. Letters of support from our colleagues in some of the most prestigious international surgical centres have been sent to the review team during the course of the consultation and can be shared with interested parties by request.

South of England congenital cardiac network

For more than a year this network has seen two leading university hospitals form a network for the care of babies and children with congenital heart disease in the south.

Following the suspension of surgery at the John Radcliffe Hospital, there has been joint working between the teams at both centres to provide as much cardiology as possible in Oxford with surgeries and interventional catheters being performed in Southampton. This has resulted in an increased volume of surgery in Southampton (making it the fifth biggest centre in England currently) as shown in the table below.

**Surgical volumes in Southampton and Oxford 2009/10 – 2010/11**

<table>
<thead>
<tr>
<th>Centre</th>
<th>2009/10</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td>231</td>
<td>335</td>
</tr>
<tr>
<td>Oxford</td>
<td>108</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>339</td>
<td>348</td>
</tr>
</tbody>
</table>

This network is an example of the relationship between centres that the review is aspiring to achieve. It would make no sense to de-designate a surgical centre after such a thriving partnership has been achieved.

2.3 Issues we believe deserved fuller consideration in the designation of the centres

Mortality data when centres are compared

Option B has the best survival outcome among the four options under consideration.
The independent investigation into surgical outcomes at Oxford in 2010\(^6\) showed Oxford to be on the 95% control limit on the 2000-2008 all procedure mortality funnel plot (reproduced below). There were two other centres between the 95% and the 99.8% control limits and one centre above the 99.8% control limit. The 95% control limit is not a standard that is commonly used in CCAD and other analyses. An “average” centre has a 1 in 40 chance of lying above the 95% control limit and therefore this is not a reliable discriminator. On the other hand, the more commonly used 99.8% control limit is more informative as an “average” centre has only a one in 1000 chance of lying above it.

We fully agree with NHS Specialised Services that “the analysis did not suggest that there are immediate safety concerns about any centres currently performing surgery”. The centre lying above the 99.8% control limit also had the highest SMR of 1.65. An “average” centre would have a SMR of one with the observed and expected deaths being equal. By way of comparison Bristol had a SMR of 2.7 at the time of the investigation into excessive deaths.

Whilst accepting that there were no immediate safety concerns, we would assert that falling above the 99.8% control limit on cumulative nine year data is a significant finding. It suggests that the centre’s mortality is highly likely to be different from the “notional average centre”, with only a one in 1000 possibility of this being due to chance.

The data was re-analysed after dividing it into three cohorts of three year periods. The outlier was now within the 99.8% control limits for each of these three funnel plots. Scrutiny of the three graphs will reveal that the SMR remains similar to the original nine year graph but the 99.8% funnel plots have simply moved out because the sample size is smaller and the confidence limits are wider. The 2000-2008 graph remains the most reliable funnel plot as the numbers are larger and conclusions more robust.

For similar reasons it is not necessarily correct to infer, as the review does, that any centre with a slightly higher mortality in the 2000-2002 time period compared to the 2006-2008 period has improved. This is no more accurate than claiming that a centre with a slightly worse mortality for the last segment showed had deteriorated. The most reliable inferences are made from the largest sample and the three year cohorts do not provide added reassurance.

We would also disagree with the review panel’s suggestion that the period 2000-2005, where the centre in question had the highest SMR (approximately 1.8), was

“almost historical”. It is not. There was a watershed at the time of the Bristol Inquiry in 1995 but the period since 2000 cannot be disregarded as being historical.

The principal reason that the review did not take into account mortality statistics is because the data is not risk stratified for complexity of cases. Hypoplastic Left Heart (HLH) is generally regarded as the most complex heart defect and has the highest mortality. Results for HLH are documented in CCAD and mortality is around 15-20%. This is approximately ten times higher than the mortality for the bulk of other congenital heart defects and could have a significant effect on the total mortality. CCAD data for the period 2000-2008 show no submissions for HLH from the centre with the mortality outside the 99.8% control limits. It is entirely appropriate that centres may choose not to undertake surgery for HLH and other high risk conditions. The data simply demonstrates the statistical outlier’s high SMR cannot be accounted for by undertaking high risk surgery such as HLH.

All centres in option B had a good survival outcome in the period 2000-2009 as shown in the funnel plot below. They all fall below the upper 99.8% limit (upper dotted line in the figure) for the observed/expected death ratio. The same cannot be said about option A. Mortality data cannot be totally disregarded as has been the case so far. The JCPCT must make best use of the data that is available. Option B is the best choice based on mortality data.

**The ability to undertake complex surgery with minimal risk**

The outcome data is particularly significant as six of these centres (Birmingham, Evelina, Alder Hey, Freeman, Southampton and Great Ormond Street) undertook high risk surgery for HLH during this period as documented in the CCAD database. Option B has the highest number of centres offering complex surgery compared to other options. The undertaking of complex surgery requires a range of high-level skills from different members of the team. The risks are high and the multi-professional expertise required is of a much higher scale than for the more simple types of cardiac surgery. Every effort must be made to preserve the team-based expertise of centres already undertaking this highly skilled work which may not be universally reproducible. Option B has the highest number of centres undertaking complex work with good results and this is a strong reason for making it the preferred choice.
Co-location of critically interdependent services

Children undergoing cardiac surgery often experience problems with the function of other organs in the early post operative period and this often requires urgent specialist attention. Immediate access to the expertise of other paediatric subspecialists is crucial to the welfare of the critically ill child. The clinical need for ensuring the provision of subspeciality expertise without delay forms the basis for the concept of co-location.
The extent to which critically interdependent services can be physically dislocated from one another and yet qualify to be deemed co-located, remains a contentious issue. There is however, unanimous agreement on the need for co-location and that it would be in the child’s best interest to provide specialist input in a timely fashion when needed.

The review regarded cardiac centres situated at a different site from the rest of the paediatric subspecialities, but in the same city, as being co-located. In other words the threshold for being considered to be co-located was set at a relatively low level both in the quality assessment process and in being considered eligible for designation as a surgical centre.

The reality of clinical practice is such that it is far easier to have a critically ill child assessed by a specialist present at the same location than one on-duty at another site in the same city. This may be aggravated during out-of-hours, which accounts for more than 50% of the working day. Multiple visits are often required to assess an evolving problem and there is much more flexibility for the specialist to do this, if they are present at the same site.

The aim of the review is to provide the best care for children in the future. The input of expertise from the critically interdependent specialities and from the other specialties is an integral part of post-operative cardiac care. There can be no doubt that a physically co-located centre is the ideal and the further away the facilities are, the more compromised the care is likely to be. This is a matter of considerable clinical importance such that it is imperative to seek independent expert opinions from the Paediatric Intensive Care Society and the Royal College of Paediatrics and Child Health. We believe that review has incorrectly interpreted Professor Edward Baker’s recommendations in his report on critical specialised paediatric services.  

Southampton has the full range of paediatric speciality expertise on site. Option B designates the highest number of centres with co-located expertise and this clinically relevant criterion, supported by widespread professional opinion, has to be a major factor in the selection of options.

**Co-located maternity and neonatal services**

The majority of complex cardiac defects are diagnosed antenatally. It is advantageous to deliver babies with some of the most complex defects at a maternity unit co-located with the cardiac centre. For example, transposition of the great arteries is a relatively common defect and when it coexists with an intact atrial septum, the standard immediate treatment of keeping the duct open does not provide adequate oxygenation and the neonate can die if an urgent atrial septostomy

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7 Department of Health, ‘Commissioning safe and sustainable specialised paediatric services: a framework of critical interdependencies’, September 2008
is not carried out\textsuperscript{8}. In addition to having an excellent antenatal service Southampton also has co-located maternity and regional neonatal intensive care services, all of which add to the strength of option B in providing the best possible national service.

A co-located neonatal intensive care service provides the ideal setting for duct ligation surgery for extreme premature babies. These babies are often very sick because of associated co-morbidities and may not tolerate being transported to a cardiac centre. As the CCAD data shows, duct ligation has one of the highest mortalities amongst all the cardiac operations carried out. The purpose of the review is to aim for the best possible care for all children. There is reason to believe that the presence of a co-located neonatal intensive care unit can improve the welfare of critically ill newborn and possibly reduce mortality of this very vulnerable group. This facility is available in very few cardiac centres, one of which is Southampton. Option B designates the highest number of co-located regional neonatal intensive care units and is the ideal choice.

**Adult congenital heart disease (ACHD)**

The review is tasked with the provision of cardiac surgical services for children under 16 years of age. The issue of whether or not any consideration should be given to the care of children with congenital heart disease over 16 years of age and of adults with congenital heart disease (ACHD) remains a highly contentious issue. The patient support group GUCHPA, the ACHD cardiologists and the vast majority of practising paediatric cardiologists and congenital heart surgeons have been of the view that it ought to be. Incidentally the legal age of adulthood in England is 18 years and not 16.

There is unanimous agreement that the results of designation of centres for paediatric cardiac surgery will have huge implications in any future consideration of designation for adults with congenital heart disease. The surgical skills and specialist knowledge required is such that it is beneficial to children and adults with congenital heart disease if the same group of surgeons operate on the whole age range.

Leaving aside the justification for disregarding the provision of services to children over 16 years and to adults with congenital heart disease so far, it is imperative that this should be given some consideration at this final stage.

- Southampton has one of the largest adult congenital cardiac services in the whole country. This is largely related to the excellent survival outcome for those operated here in the 70s and 80s.

\textsuperscript{8} Blyth M, Howe D, Gnanapragasam J, Wellesley D. The hidden mortality of transposition of the great arteries and survival advantage provided by prenatal diagnosis. BJOG 2008;115:1096-100
The unit at Southampton has a strong network with the regional cardiology units who do not engage in occasional practice, which is unfortunately common in other regions.

The ACHD unit at Southampton has an international reputation being well represented on the speakers panel at international meetings.

ACHD services are co-located with paediatric cardiology providing a seamless integration of congenital cardiac services. Congenital surgeons do not have to be away working at two sites.

ACHD services are co-located with medical and surgical subspecialty adult services, which are an integral part of managing the multi-organ malfunction commonly experienced by this group.

Southampton has an excellent reputation for its ACHD Electrophysiology services.

Southampton has a well co-ordinated service with the co-located maternal services, providing an expert regional service for pregnant women with cardiac disease – the commonest cause of maternal death in the UK.

The unit attracts national and international referrals for high risk Fontan conversion surgery.

The unit undertakes highly skilled surgery such as Ebsteins valve repair.

The unit believes in working closely with its patients and greatly values the acknowledgement of the ACHD service at Southampton by the GUCH Patients Association.

As the majority of patients will spend more of their life under the care of adult services rather than paediatric, option B, the only option with Southampton, has the best range of centres capable of providing quality long term care for children as they grow into adulthood.

**Interventional catheters**

The review is primarily concerned with the designation of surgical centres. However, it is important that interventional catheterisation is taken into account in the decision-making process as the provision of this service will be limited to the centres continuing to undertake surgery.

Southampton’s partner centre at Oxford is renowned for its pioneering work with trans catheter closure of ducts in extremely premature babies and is one of very few centres in the world with experience in fetal aortic valve intervention.

The CCAD returns for 2010-2011 demonstrate that the combined number of interventional catheters done at Southampton & Oxford for congenital heart disease exceeds the number done at any other centre.
Mortality outcomes and funnel plots for interventional catheters can be viewed on the CCAD portal. Southampton has the lowest mortality for interventional catheters among all the cardiac centres in the UK. There has been only one death within 30 days of an interventional procedure at Southampton over the past ten years and even this was not directly attributable to the procedure.

Survival outcome is of paramount importance to families and the results of interventional catheters are no less important than those of surgery. This vital information must be taken into account in making the final choice of surgical centres. Option B, the only option to feature Southampton, has the best survival outcome for interventions and is the best choice.

### Surgical innovation and mentorship

Southampton congenital cardiac service has always recognised the need to translate the latest knowledge and technology into improvements in clinical care. This process began almost from inception of the current service with the introduction of successful infant and neonatal surgery in 1973 using deep hypothermia and circulatory arrest. This technique is now eclipsed by new technologies, but at the time this was one of two or three units in the world pioneering this work.

### Mentorship

With the implementation of more complex operations we recognised the need for surgical mentorship beyond the normal limits of training, and also the need to plan for succession of senior surgeons as they retire. The phases of development we have implemented can be defined as follows;

1. Identification
2. Induction
3. Higher training
4. Employment
5. Mentorship

Over the last ten years we have actively identified those trainees we felt had the desire and also the necessary skills to be successful as a congenital cardiac surgeon. During this period we have identified five trainees as potential consultant congenital cardiac surgeons. Of these, one has now emigrated to America and is head of service in a university hospital after a period of time working with us as a consultant. Two have recently returned from higher training and are employed by us as substantive consultant surgeons. One is working with us as a senior surgical fellow having returned from higher training in Toronto, and the last is now a senior trainee at Toronto Children's Hospital. All five individuals are, or will be, employable as substantive consultant congenital surgeons in the NHS. During this time we have guided two other surgeons to other career pathways who had expressed desire and displayed motivation to become paediatric cardiac surgeons.

All newly employed surgeons follow a system of mentorship that is written into a consultant’s job plan. Initially experience and expertise is established by joint operating. Cases suitable for independent operating are agreed and objectives are set for exposure to more complex surgery for each six month period. At the end of each six month period, the outcomes are reviewed and the objectives set for the next six months. The objective for mentorship is that all surgeons will eventually have the skills to operate at the highest level on all cases.

This system needs constant real time information in order to inform objective setting. This is achieved by collating data from surgical performance meetings held bi-weekly. All cases are reviewed and assessed for variances in surgical performance and in depth morbidity data is collected. The progress of a new colleague is documented and new objectives based on solid evidence of capability. Using this system we can be as certain as possible that the introduction of a new surgeon will not lead to a dip in outcome measures, and the new surgeon can be confident that expertise will be shared in as safe an environment as possible.

Innovation

In the last 14 years we have established seven surgical programmes and published tens of reports using innovative strategies for complex or challenging scenarios. We have developed a principle for introducing new surgery that is based on evidence and multidisciplinary input. Firstly, we establish a need by identifying patients who would benefit from a new treatment and contact the leading centre performing this successfully to arrange a team visit to discuss all aspects of the treatment. This involves input from cardiology, cardiac surgery, anaesthesia, intensive care, nursing staff, perfusion and many others. A team is established to clarify a treatment protocol and, at this stage, they arrange to visit the centre that is reporting success in the treatment.
A treatment protocol is classified and the surgery is now commenced with a visiting surgical proctor. Successfully implemented treatments include a comprehensive programme for hypoplastic left heart syndrome, revision Fontan surgery, Ebstein’s anomaly, the Ross procedure, valve sparing aortic root surgery, and complex pulmonary atresia with VSD and MAPCA’s.

In addition to new surgical programmes we have developed increasingly complex operations to avoid a Fontan circulation which limits both life expectancy and function. This surgery is based on intensive pre-operative planning and requires close collaboration of cardiac radiology and the use of 3D echocardiography. As a diagnostic group these patients are extremely heterogeneous and as such are not captured in CCAD data, however over the past ten years we have performed over 25 such procedures.

In summary, we support the principle of the review that surgery should be concentrated in fewer larger centres; however it is essential that centres are chosen on the basis of quality and capability so that progress made over the last decade is not lost. We believe that designated centres should be able to demonstrate a clear methodology for innovation and improving practice. We have demonstrated that not only patient safety is at the heart of our practice, but also that innovation and new technology can be implemented safely. We have developed a system that introduces new surgeons, new procedures and new technologies into clinical practice in the safest and most sustainable environment.

3. Consideration of the options put forward for consultation

We would not support either of the six centre options that have been put forward for public consultation. This is because there are ample cases for seven sustainable centres and this reduction could be implemented more easily with less disruption to inter-dependent services.

In this section of our response we will largely confine our comments to a comparison of options A and B.

There are many points to make with respect to this part of the review and we would wish to provide further detail about elements of the options appraisal that are relevant to the Southampton centre.

The options were assessed against four criteria, each of which was allocated a certain weighting by a range of interested stakeholders. Each option was then allocated a score of between one and four for each of the criteria and this score was then multiplied by the weighting to reach a final score.

The high weighting of the quality criterion has been put forward as evidence that quality was given the highest priority in this option appraisal. However, as we can show, the weighting in itself was not powerful enough to overcome some of the flaws in the scoring and this can be demonstrated by reviewing each criterion in turn.
Our assessment of this process has clearly showed us that option B is the highest scoring of all the options put forward for public consultation.

The criteria used in the options appraisal and the associated scores for options A and B

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Weighting</th>
<th>Score for option A</th>
<th>Weighted score for option A</th>
<th>Score for option B</th>
<th>Weighted score for option B</th>
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<tr>
<td>Access and travel</td>
<td>14</td>
<td>4</td>
<td>56</td>
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<td>14</td>
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<td>Quality</td>
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<td>75</td>
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</table>

3.1 Criterion 1 – Access and travel times

Option B was allocated the lowest score of one for this criterion while option A was allocated the highest score of four. This generated a weighted 42 point difference in scores between the options.

Since every option was awarded a score of four for retrieval times the sub-criterion of journey times (the time it takes patients to get to their surgical centre) was the only discriminating factor in the scoring.

A simple assessment of the facts relating to both journey times and retrieval standards has revealed some issues with the work presented that materially disadvantaged the scoring of option B.

Journey times – the time it takes for families to reach their surgical centre

Option B was awarded the lowest possible score of one for this sub-criterion. This is because it had the highest number of patients whose journey time to their nearest surgical centre would increase by more than 90 minutes (6.2% of patients compared with 3.6% of patients in option A). A large proportion of the patients experiencing this increased journey time live within the postcode areas of Sheffield and Wakefield, who are assigned to the Newcastle centre in this option.

This can be seen in the network map below which is published on page 109 of the consultation document.
Looking at the map it is clear that the closest surgical centre for these families is Liverpool, with Birmingham their second closest centre. It is highly unlikely that patients would choose to travel to their third closest centre (a significantly longer distance away) and it is more realistic to assume that these patients will use Liverpool.

We would therefore suggest that these patients (113 in total) should be assigned to the Liverpool network which would still retain a sustainable centre in Newcastle.

We note that in the pre-consultation business case published on 16 February 2011 both the Sheffield and Doncaster postcodes were allocated to Birmingham and in Appendix S of the document, the number of patients whose journey time increases by more than 90 minutes in option B is 4.1%. However, when the consultation document was published on 1 March 2011, two weeks later, these postcodes were moved to Newcastle reducing the performance of option B in this regard. The rationale for this is at best unclear.

If the error is corrected and the Sheffield and Wakefield postcodes are assigned to Liverpool in option B then the number of patients whose journey time increases by more than 90 minutes would be 3.1% making this option the highest performing in this criterion.
Isle of Wight patients

In Appendix S of the pre-consultation business case, each option is shown as resulting in 13 families having a journey time above four hours to get to their nearest centre.

It is clear from closer inspection of the travel time data for the four options (which was generated by the computer software Geoplan and released to us during the course of the consultation) that these patients are from the Isle of Wight. The software only generates travel times of four hours for the Isle of Wight because it is not sensitive enough to accommodate ferry travel. This limitation has meant that the elective journey times of Isle of Wight patients have been given no meaningful consideration in this review.

This is easy to correct because work undertaken by SUHT to model the travel times from the Isle of Wight has shown that it takes more than four hours to reach either Bristol or the Evelina from the Island and therefore the only option where there are no patients travelling more than four hours is option B.

Further, we can show that in option B the Isle of Wight patients have no increase in their journey time, however in every other option their journey increases by more than 90 minutes. The impact of these considerations is shown in the table below.

Re-evaluation of journey time increases in options A and B

<table>
<thead>
<tr>
<th>% of patients whose journey time increases by more than 90 minutes</th>
<th>Option B with Sheffield and Wakefield assigned to Newcastle (from the consultation document)</th>
<th>Option B with Sheffield and Wakefield assigned to Liverpool (from the consultation document)</th>
<th>Option A without Isle of Wight patients factored in</th>
<th>Option A with the Isle of Wight patients factored in</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2%</td>
<td>3.1% (highest performing)</td>
<td>3.6%</td>
<td>3.9%</td>
<td></td>
</tr>
</tbody>
</table>
Was the scoring of the options for travel times reasonable?

We have outlined why we feel the scoring of option B for travel times was incorrect. This is important because option A scored 42 points more for access and travel than option B and there is no logical basis for this.

As an observation to illustrate the weaknesses in the rationale for the scoring of options in this sub-criterion, we have noted that there was no sound basis for scoring options A and D differently.

The review scored option A as a four, but option D just three because option A “has the highest number of patients whose journey time is increased by the smallest amount (0-30 minutes) … Therefore it is suggested that it scores higher than all other options”

Reviewing the data (contained in Appendix S of the pre-consultation business case) reveals that this is indeed true, however the scale of the difference is interesting. In option D 86% of patients have an increase of 0-30 minutes whereas in option A 87% do. The difference of one per cent out of 3,600 patients was deemed justification enough for adding another 14 points to the score of option A.

Overall, we wish to emphasise our concern that the scoring of options for this sub-criterion of access and travel was based on work which took place over a short period of time with changes being made to network boundaries at a late stage in the process. It must now be reconsidered by the JCPCT.

Option B emerges as the highest performing configuration of centres when patient journey times are taken into account. It is also the highest performing when retrieval is considered.

Retrieval times

The continued maintenance of a safe retrieval service to all mainland district general hospitals (DGH) was given due consideration in the selection of cardiac centres.

This is well documented in appendix T of the pre-consultation business case (page230-231) produced by Safe and Sustainable (reproduced for the West & South England & South Wales below). The method of calculating retrieval journey times was chosen with a view to demonstrating worst-case scenarios. "Blue light" ambulance journey times were considered but it was felt that car journey times should be used with a view to giving a "worst-case" timing.

It was determined that in order to ensure a retrieval time from Truro that would be compliant with the Paediatric Intensive Care Society (PICS) standards, namely

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standard number 123, Bristol would need to remain as a cardiac centre. As a consequence of this, configuration options which did not include Bristol (options 1, 7 and 11) were eliminated.

Unfortunately, the equally important need to provide a safe retrieval service for St Mary’s Hospital on the Isle of Wight was overlooked at the time of selection of centres. This was brought to the attention of the review team in March 2011. St Mary’s Hospital on the Isle of Wight serves a population of 145,000 people and it does not have a CAA approved airport suitable for landing of fixed-wing aircraft and PICS does not regard helicopter transport as a reliable means of retrieval because of the difficulties of flying at night or in bad weather. In other words the only reliable and safe way of retrieving critically ill children from the Isle of Wight is by means of road and ferry.

The retrieval times to St Mary’s, Isle of Wight would breach the PICS standards if Southampton were no longer a surgical centre. The review calculated retrieval times using the website www.direct.gov.uk and using the same website for calculation, a retrieval team leaving Evelina Children’s Hospital, London at 12 noon would require four hours and five minutes to reach St Mary’s Hospital on the IOW and one leaving the Bristol Children's hospital would require four hours four minutes. This would be in breach of the PIC retrieval standards and Safe and Sustainable have acknowledged this in their response to the Trust of 3 June.

The focus now appears to have shifted to exploring times of departure where the travel time to St Mary’s are the quickest and this is in direct contrast to the original methodology of calculating travel times for a 12 noon start in order to consider “worst-case” timings. The need to retrieve a critically ill child may occur at any time of the day or night. The PICS standard (no123) is a clinical safety recommendation based on the recognition that the critically ill child may deteriorate if specialist intensive care is not provided as soon as possible. It is because of this that the original methodology was chosen to highlight the worst case scenario and a 12 noon start (which gave a slightly longer travel time) was chosen and it was stipulated that blue light times would not be considered.

Unlike the mainland centres the most difficult time to reach the Isle of Wight is at night when the ferries are infrequent. Journey times can be significantly prolonged in winter and during periods of bad weather. In summary the 12 noon start time does not represent the worst case scenario for the Isle of Wight but even in this setting the PICS retrieval time standard is breached.

Having devised a methodology with a view to demonstrating the worst case times for mainland DGH’s there can be no justification for exploring the best case times for St Mary’s Hospital on the Isle of Wight. The methodology applied must be the same for all hospitals. Further, time is of the essence, and in practice retrieval teams will make every effort to reach their destination within the shortest possible time and this
applies both to the mainland and the Isle of Wight in equal measure. Our position is that the real clinical need to retrieve critically ill children from the Isle of Wight, which has inherent transport difficulties, and which had been overlooked in the initial appraisal, must be given equitable consideration.

As you can see in the charts reproduced below, taking the safety of children on the Isle of Wight into account leads to a very different picture of the comparison between Options A and B in Appendix T of the Pre-consultation Business Case.
Appendix T

West & South England & South Wales – 12:00 travel time (current travel time)

Option A

<table>
<thead>
<tr>
<th></th>
<th>Bristol</th>
<th>Southampton</th>
<th>Oxford</th>
<th>London</th>
<th>Birmingham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truro</td>
<td>03:04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barnstaple</td>
<td>02:12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plymouth</td>
<td>02:16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aberystwyth</td>
<td></td>
<td></td>
<td></td>
<td>02:55</td>
<td></td>
</tr>
<tr>
<td>Haverfordwest</td>
<td>02:33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carmarthen</td>
<td>01:43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swansea</td>
<td>01:24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bournemouth</td>
<td>02:17 (00:41)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorchester</td>
<td>01:52 (01:13)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeovil</td>
<td>01:20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portsmouth</td>
<td>(00:29)</td>
<td>02:02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brighton</td>
<td></td>
<td>01:48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margate</td>
<td></td>
<td>02:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isle of Wight</td>
<td></td>
<td></td>
<td>04:05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key to shading:

Blue = No change in travel time

Green = Change in travel time, with new time less than 3 hours

Red = Change in travel time, with new time over four hours

() = current travel time
### Option B

<table>
<thead>
<tr>
<th></th>
<th>Bristol</th>
<th>Southampton</th>
<th>Oxford</th>
<th>London</th>
<th>Birmingham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truro</td>
<td>03:04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barnstaple</td>
<td>02:12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plymouth</td>
<td>02:16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aberystwyth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>02:55</td>
</tr>
<tr>
<td>Haverfordwest</td>
<td>02:33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carmarthen</td>
<td>01:43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swansea</td>
<td>01:24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bournemouth</td>
<td>00:41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorchester</td>
<td>01:13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeovil</td>
<td>01:20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portsmouth</td>
<td>00:29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brighton</td>
<td>01:42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>02:00</td>
</tr>
<tr>
<td>Isle of Wight</td>
<td>02:19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yellow = A decrease in travel times
Comparison of travel times to St Mary's, Isle of Wight at different times of day showing 12noon is not the worst-case journey time.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>12noon</th>
<th>2310</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>04:05</td>
<td>04:53</td>
</tr>
<tr>
<td>Bristol</td>
<td>04:04</td>
<td>04:52</td>
</tr>
<tr>
<td>Southampton</td>
<td>02:19</td>
<td>03:22</td>
</tr>
</tbody>
</table>

Data taken from the HIA scoping document showing that the Isle of Wight has high incidence of congenital cardiac surgery
These factors lead us to conclude that the designation of Southampton as a surgical centre should be considered mandatory in the same way that Bristol is and that option B is the best solution for this given it would not necessarily be beneficial to consult further on new options. There can be no different tests applied to the Southampton centre compared to those used in the analysis of the situation in Truro. We reject any suggestion that the population of the Isle of Wight (145,000) might be less material than that of western Cornwall (175,000). Indeed, research carried out so far by the review (see map above) demonstrates the high rate of congenital cardiac surgery within this population. Changing the travel time calculation methodology in order to artificially improve the situation for this population would be unacceptable and would be to ignore the clinical relevance of the standard in question.

We would strongly assert that for the JCPCT not to correct the error would be to fatally flaw any decisions taken in this review.

**Concluding remarks on access and travel**

Option B is the highest scoring option for travel and access due to the following established facts:

- Only option B can provide a retrieval service that meets the standards set out by the PIC Society for the whole population of England and Wales
- Only option B provides a surgical service that can be reached within four hours for the whole population of England and Wales
- Option B (correctly drawn) has fewest patients experiencing an increase in their journey time of more than 90 minutes

The awarding of 56 points to option A and 14 points to option B for this criterion has no logical basis.

**3.2 Criterion 2 – Quality**

Option B scored 39 points more than option A for this criterion but a review of the scoring methodology shows that it should have scored at least 78 points higher.

Taking the sub-criterion “high quality service” (which is based purely on the Kennedy scores), option B scores four with all other options scoring three. Arguments have been made during the consultation that it is appropriate to consider the combined quality score for each option, by simply adding all the scores together. Thus option A has a total score of 3731 which is 97% of the score for option B which is 3842.

It must be highlighted that this device all but eliminates the single most important point of contrast between the options, namely the difference between the second
highest scoring centre in the Kennedy review with 513 points and the second lowest scoring centre with 402 points.

We would suggest that this is a highly misleading argument and that on the Kennedy scores alone there ought to have been at least a two point difference between options A and B.

Two other elements were reviewed as part of the quality score and these were research and innovation and clinical networks. It was appropriate to review research and innovation here, since this drives quality improvements and is a hallmark of centres of excellence like Southampton. In the last five years 100 research papers have been published by the unit covering a wide range of the different aspects of the care and treatment of children with congenital heart disease. A list of these papers can be supplied to interested parties on request.

However, it was not appropriate to include clinical networks here and mark option B down a point because of the mutual exclusivity of Bristol and Southampton. This element of the analysis is already a sub-criterion of sustainability, so now this supposition (which we have shown to be false in section 3.4) is given two points of influence in the scoring of the options.

Its influence on the scoring of the options for quality is as follows. In this criterion option B was awarded a four for research and innovation, with all other options awarded a three. This is appropriate since B is the only option to retain the leading centres for research. However, when clinical networks were then reviewed option B is scored as three while all other options are scored four, because of the mutual exclusivity issue. The scores across the options for these two sub-criteria effectively then cancel each other out. In other words, the benefits to research and innovation in option B (and its one point advantage) had no impact on the scoring of the options because the need to demonstrate volumes was wrongly included in two criteria.

To sense check the scoring of option A and B in this criteria it is possible to simply review the centres which are expanding in the two configurations. The table presented below illustrates the expansions that will occur at the centres involved in options A and B.
A comparison of centres expanding under options A and B (outside London)

<table>
<thead>
<tr>
<th>Centre</th>
<th>Current size (CCAD 2009/10)</th>
<th>Increase in volume Option A</th>
<th>Increase in volume Option B</th>
<th>Kennedy Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td>231</td>
<td>N/A</td>
<td>+169</td>
<td>84%</td>
</tr>
<tr>
<td>Birmingham</td>
<td>555</td>
<td>-83</td>
<td>+170</td>
<td>81%</td>
</tr>
<tr>
<td>Bristol</td>
<td>277</td>
<td>+143</td>
<td>+130</td>
<td>74%</td>
</tr>
<tr>
<td>Newcastle</td>
<td>255</td>
<td>+151</td>
<td>+271</td>
<td>70%</td>
</tr>
<tr>
<td>Liverpool</td>
<td>400</td>
<td>+45</td>
<td>+45</td>
<td>69%</td>
</tr>
<tr>
<td>Leicester</td>
<td>225</td>
<td>+189</td>
<td>N/A</td>
<td>66%</td>
</tr>
</tbody>
</table>

We would wish to emphasise that a centre with a lower Kennedy score will have a greater challenge to reach the new quality standard at the same time as experiencing a significant increase in their workload.

A simple consideration of the data quickly reveals that in option B, an additional 469 cases will be treated in the top scoring centres (above 70%) but in option A only 60 additional cases are treated in these centres.

Conversely in option B 45 more cases will be treated in the lowest quality centres (below 70%) whereas 234 more cases will be treated there in option A.

Serious consideration must be given to the impact of this before any committee could defend it as a reasonable commissioning decision. The JCPCT must give due consideration to the independent advice they have been given by Professor Sir Ian Kennedy’s assessment panel on the ability of each centre to meet the proposed quality standards in the future.

3.3 Criterion 3 – deliverability

Delivering an ECMO service
Currently there are four nationally commissioned respiratory ECMO centres in the UK

- Glasgow
- Newcastle
• Leicester
• GOSH
This equates to 10 –12 beds across the UK (season dependent)

In England in 2008/9, 60 respiratory ECMO cases were performed between the three centres.

There was no significant paediatric surge during H1N1 outbreak because the majority of cases were adults

Most cardiac centres now provide cardiac ECMO to support their surgical programme

• Birmingham (nurse led)
• Liverpool (nurse led)
• Evelina Childrens Hospital (nurse led)
• Royal Brompton (no information)
• Bristol (perfusion led)
• Southampton (perfusion led, with transition to nurse led service)

The majority of inter-hospital cardiac referrals for ECMO are to GOSH or Newcastle for consideration of Bridge to Transplantation.

Southampton has been performing ECMO for a number of years. It has a well established ECMO infrastructure with robust clinical governance and training systems in place and submits all its ECMO data to the ELSO Registry. In 2010 Southampton performed six cardiac ECMO runs with a survival rate of 67%.

The respiratory ECMO bid that has been submitted to NHS Specialised Services shows that Southampton has the capability to deliver the 20-30 respiratory cases per year predicted within the expanded footprint of 20 beds. It would be possible within this footprint to ensure ring fencing of beds for respiratory ECMO.

The Southampton respiratory ECMO bid anticipates an adult respiratory ECMO bid and the two services would collaborate for training. They would however operate independently.

An increase in demand for adult ECMO, as observed during the H1N1 pandemic, would not result in the deterioration of the service for children that was experienced in centres with a combined adult and paediatric ECMO service.

The review have stated that there must be three nationally designated centres in the final reconfiguration, and that they could be any of the following:

• Birmingham Children’s Hospital
• Newcastle
• GOSH
• Leicester
Even if Southampton were not successful with their ECMO bid, option B is still capable of meeting this criteria as Birmingham could deliver the service with Newcastle and GOSH.

Impact on the PICU service in the south

In 2010/11, the Southampton PICU admitted 940 patients, of which 358 (38%) were cardiac surgical patients who accounted for 44% of the total bed days during the same period.

PICU is co-located with all major paediatric and neonatal services on a single campus. There is an integrated retrieval service that performs approximately 200 retrievals per year.

PICU managed to absorb the increased workload from Oxford within its current footprint and there is capability within the current unit to increase the bed capacity to 20 beds, which would be capable of delivering the required service.

The PICU is recognised as being of high quality as described earlier in this response on page 7.

The closure of cardiac services at Southampton would have the following impact on the general PICU services:

- **Effect on resources and training**

  The reduction in admissions and bed days will result in a matching reduction in the resources of the unit. The anticipated reduction in beds is from 13 to seven or eight and from seven consultants to five. The middle grade rota will be affected, as training recognition will be lost, with the loss of two grid trainee posts. PICU posts will no longer appeal to senior regional anaesthetic trainees wishing to gain PICU experience, further diminishing the pool of skilled juniors available.

- **Effect on efficiency and ability to admit patients**

  The loss of beds will also result in a reduction in flexibility of use. If one bed in 13 is closed, then the impact on the service is less than if one bed in seven is closed. In 2010 we expanded to 13 beds to cope with the greater cardiac workload. Despite this greater workload we sent no patients out of region for lack of a PICU bed. This was not the case in the past, when with fewer patients but fewer beds a larger number of patients were sent out of region.

- **Effect on skills**

  As well as reduction in the total number of patients, the acuity of the patients will also diminish. The majority of the cardiac surgical patients are ventilated and on drugs to support their hearts. The continual experience of looking after
these patients improves everyone’s skills in looking after non-cardiac patients. This is illustrated if we look at intensive care intervention. 39% of our patients are cardiac but over half of all the central lines placed in PICU are in cardiac patients. 50% of the renal support delivered (either peritoneal dialysis or haemofiltration) is delivered for cardiac patients and 60% of the days spent on renal support are for cardiac patients.

- **Effect on quality**

  The issue of quality cannot be underestimated. Paediatric intensive care at Southampton was specifically mentioned for its exemplary management in Professor Sir Ian Kennedy’s assessment. However, the report also explains “we found exemplary practice to be the exception rather than the rule. Mediocrity must not be our benchmark for the future.” We could not agree more and this is fully supported by the PICANet mortality data. Any child that is moved to any of the other hospitals in the options that don’t include Southampton will be managed in a paediatric intensive care with a higher mortality rate than Southampton General Hospital.

- **Effect on retrieval service**

  This will all impact on the ability of Southampton to maintain an independent retrieval service. Currently Southampton retrieval service performs around 200 retrievals each year from across the region. There is no separate regional retrieval service and not enough retrievals to necessitate one. The options are to fund and establish a regional retrieval service that doesn’t have a critical mass of work, rely on extra-regional transport services or compromise standards with the diminished resources from PICU. None of these will reproduce the excellence that currently exists.

- **Effect on trauma centre status**

  The impact of a reduction in flexibility and a reduced capacity to retrieve combines to impact Southampton’s designated status as a trauma centre. The two hospitals in the south that are likely to achieve designation are Oxford and Southampton. The Evelina cannot be considered because they do not have neurosurgery and GOSH will not be considered, as it does not have an emergency department. Options other than B would result in a downgrading of paediatric intensive care services to the south, while simultaneously directing major paediatric trauma towards these hospitals.

- **Effect on other paediatric services**

  The development of the PIC service in Southampton has allowed the expansion of tertiary services and made it possible for patients to receive
complex treatment closer to home. A decision to close cardiac surgical services would have a knock-on effect on all tertiary services, to the detriment of patients in the region.

These issues have been raised as concerns by the Wessex PIC network and the national PIC Society. South East SHA have also raised their concerns about the impact for their residents of restricted access to the excellent paediatric facilities in Southampton for children in Surrey, Sussex and Kent.

3.4 Criterion 4 – Sustainability

Achieving safe and sustainable centres in option B

The south of England is densely populated and by 2025, the south coast conurbation of Bournemouth, Southampton and Portsmouth will equal the population of Liverpool.

There is enough work in this region to develop Safe and Sustainable congenital surgical centres at both Bristol and Southampton with two centres remaining open in London.

At least 800 cases in under-16s are required between Southampton and Bristol for both of these centres to meet the standards of the review.

As part of the consultation, the review has sought to test the network between Southampton and Oxford which was developing prior to safe and sustainable beginning, but which was strengthened as a matter of urgency following the suspension of the surgical service at the John Radcliffe Hospital.

It is now clear that the network is firmly established and is resulting in an increased flow of surgical cases to Southampton as indicated below.

<table>
<thead>
<tr>
<th>Centre</th>
<th>2009/10</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td>231</td>
<td>335</td>
</tr>
<tr>
<td>Oxford</td>
<td>108</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>339</strong></td>
<td><strong>348</strong></td>
</tr>
</tbody>
</table>

(2010/11 numbers based on submissions to CCAD which have not yet been validated.)

The 2009/10 CCAD data shows a total 1847 cases in the south, which were shared by Oxford, Bristol and three centres in London.

With the suspension of surgery at Oxford and the preferred de-designation of the Royal Brompton Hospital as a surgical centre, there is enough work for the
remaining centres in London, Southampton and Bristol to achieve sustainable volumes of 400-500 cases. The following commitments must be made to deliver this:

- Hereford and Worcester patients flow to the Bristol network
- Parts of Southampton’s southwest network flows to Bristol
- Surrey and West Sussex patients flow to Southampton from referral centres in Chertsey, Guildford, Kingston, Redhill, Chichester, Frimley Park and Worthing
- Southampton and Evelina collaborate along the south coast to ensure that both centres are sustainable and there is enough volume for Bristol to provide 400 cases to meet the standard

There is a need to model these flows and the review team is undertaking this work with the Trusts to report back to the JCPCT in the autumn. We note that our commissioners in south west and south east coast SHAs have all shown their support for option B and we would strongly urge that they work with the surgical centres in Bristol, Southampton and the Evelina and with the review team itself to develop sustainable workload flows that ensure minimum volumes are secured for each centre. Both the Evelina and Bristol have confirmed that they will work with us to do this following the selection of option B. We would fully endorse the need for inter-network collaboration and we believe we can develop this in the south as a model of how this can benefit patients.

**Progress made to develop sustainable networks in the south**

During the consultation period, we have been working with our partners to discuss the development of an “inter-provider network” in the south. To date we have:

- Met with Birmingham Children’s Hospital
- Met with Evelina Children’s Hospital to discuss a network across the south coast that would see enough cases from Surrey and Sussex flowing to Southampton, while ensuring the Evelina is sustainable
- Received strong indications from St Peter’s Hospital in Chertsey that if the centre at the Royal Brompton Hospital is de-designated they feel it would be in their patients’ interests to work with Southampton as their preferred congenital cardiac surgical centre. This relationship will provide approximately 50 cases
- Met with Bristol to begin discussions around the patient flows from the south west that could move into the Bristol network as part of option B
- Had discussions with all CEOs in south central, south east coast and south
west SHAs who support the designation of Southampton in option B

- Had discussions with specialised commissioners in south west and south central SHAs to reach a broad consensus that we would be prepared to work together and with safe and sustainable to ensure Southampton, Bristol and Evelina are all sustainable.

**Achieving safe and sustainable centres in option A**

We wish to emphasise a number of concerns we have about the viability, desirability and clinical credibility of the networking arrangements proposed under option A. These are:

- That the sustainability of Newcastle’s network is dependent on cases from Hull, Wakefield and Leeds transferring to the north east. This would appear to be a subject of some concern among clinicians in the area and might be very difficult to implement in practice.

- That the sustainability of Leicester’s network is dependent on the movement of Coventry cases from Birmingham Children’s Hospital to Leicester. This requires patients to move from the country’s third highest quality centre to the country’s second lowest quality centre. Looking at outcomes, this requires commissioners to move patients from the only centre to have significantly better than expected outcomes, to the only one with significantly worse than expected outcomes on a more simple case mix. This lacks clinical credibility.

- That one of the country’s renowned leading centres (Birmingham), which has a strong track record in complex procedures and much to teach other centres in this regard, would actually lose staff and reduce in size by 80 cases, while one of the lowest quality centres (Leicester) with no such track record in complex cases grows by 190 cases.

- That the networking arrangements proposed will drive an additional 211 referrals into London (from outside the city) at a time when the number of centres is being reduced from three to two. This would require the largest single expansion proposed for any centre at the Evelina Children’s Hospital (see below) where the number of procedures would increase by 384 cases – nearly the size of safe and sustainable centre in its own right. At the same time, Great Ormond Street Hospital would see an increased workload of more than 180 cases.
At the public consultation event held in Oxford on 4 May, we heard Mr Leslie Hamilton express a view that it would be preferable if the review did not result in more patients travelling into London for their care and his views were echoed at the London events by the national clinical director Professor Sir Roger Boyle. Under option B 71 fewer patients from outside London are expected to travel into the city for their care. In option A more than 200 patients will need to travel into the city for their care.

It is vital that this reconfiguration does not create mega-centres in London at the expense of the stability and viability of paediatric intensive care networks elsewhere in the South.

The table presented below illustrates the expansions that will occur at the centres involved in options A and B.

We would wish to emphasise that a centre with a lower Kennedy score will have a greater challenge to reach the new quality standards at the same time as experiencing a significant increase in their workload.

A simple consideration of the data quickly reveals that in option B, an additional 469 cases will be treated in the top scoring centres (above 70%) but in option A only 60 additional cases are treated in these centres.

Conversely in option B 45 more cases will be treated in the lowest quality centres (below 70%) whereas 234 more cases will be treated there in option A.

Serious consideration must be given to the impact on this before any committee could defend it as a reasonable commissioning decision. The JCPCT must give due consideration to the independent advice they have been given by Professor Sir Ian Kennedy's assessment panel on the ability of each centre to meet the proposed quality standards in the future.

<table>
<thead>
<tr>
<th>Centre</th>
<th>Current size</th>
<th>Increase in volume under option A</th>
<th>Increase in volume under option B</th>
<th>Kennedy score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evelina</td>
<td>337</td>
<td>+384</td>
<td>+243</td>
<td>88%</td>
</tr>
<tr>
<td>GOSH</td>
<td>541</td>
<td>+180</td>
<td>+39</td>
<td>76%</td>
</tr>
</tbody>
</table>
A comparison of centres expanding under options A and B (outside London)

<table>
<thead>
<tr>
<th>Centre</th>
<th>Current size (CCAD 2009/10)</th>
<th>Increase in volume Option A</th>
<th>Increase in volume Option B</th>
<th>Kennedy Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td>231</td>
<td>N/A</td>
<td>+169</td>
<td>84%</td>
</tr>
<tr>
<td>Birmingham</td>
<td>555</td>
<td>-83</td>
<td>+170</td>
<td>81%</td>
</tr>
<tr>
<td>Bristol</td>
<td>277</td>
<td>+143</td>
<td>+130</td>
<td>74%</td>
</tr>
<tr>
<td>Newcastle</td>
<td>255</td>
<td>+151</td>
<td>+271</td>
<td>70%</td>
</tr>
<tr>
<td>Liverpool</td>
<td>400</td>
<td>+45</td>
<td>+45</td>
<td>69%</td>
</tr>
<tr>
<td>Leicester</td>
<td>225</td>
<td>+189</td>
<td>N/A</td>
<td>66%</td>
</tr>
</tbody>
</table>

**Recruitment and mentoring**

In appendix 7 of the consultation document (page 216) the review recognises that the ability to recruit and retain newly qualified surgeons is a key factor in creating a sustainable surgical centre. We support this and refer the review to page 11 of this response where we describe our own established process for developing surgeons who can operate at the highest level on the most complex cases.

The review states that this area will be further developed post-designation but we would ask the JCPCT to consider the capability of the centres to develop such a training programme prior to designation.

**4. Affordability and value for money**

We note that paediatric congenital cardiac services comprise less than 0.2% of total commissioning spend in the NHS at £98 million.

Trusts which run the designated centres will need to prioritise the necessary investment in their capital programmes which are funded through the delivery of a surplus in the income and expenditure account. The capital spend for option B requires an investment that is just over £400K per year at discounted rates (for 25 years of capital investment) higher than that of option A.

Therefore the difference between options A and B is negligible and should be discounted in favour of improved quality for the nation.
5. Conclusion

Southampton is a high quality centre with an enviable reputation built up over the last forty years. It is pioneering in some procedures and provides the full range of complex cases. The PICU at Southampton General Hospital is the highest performing in the country.

To dismantle this excellent centre would risk materially disadvantaging children born in England with a severe congenital heart condition and other critically ill children in the south. There is no credible evidence to suggest the quality could be reproduced elsewhere and it is our opinion that options A, C and D are configurations in which the service as a whole will experience a drop in quality that could take a generation to recover.

Option B is also the best option for access and travel according to the methodology used to assess this criterion as we have demonstrated in this response. Although this is not a high priority for patients, it is certainly vital, as the PIC society informed the review, that the travel times for retrievals should meet the nationally agreed standard. PICS recommended that worst case scenarios should be explored, to demonstrate that technically it would always be possible to meet this standard for every single patient in the new configuration, as a result of this review. Option B is the only configuration in which this principle is honoured.

The mutual exclusivity of Bristol and Southampton

This assumption came to dominate the option development process, particularly in the south of the country.

It arose after a “nearest centre” access mapping exercise failed to find 400 cases for each centre and was further developed by commissioners following what we are told was a consideration of existing clinical networks and an unwillingness to consider any configuration that might make “potentially unreasonable changes to catchment areas for the London and Birmingham centres”.

We assert that a more credible approach to rationalising such a low volume but highly specialised service is to focus on designating the highest quality centres and then commissioning them to the desired volumes. This may sometimes require commissioners to think innovatively about the existing clinical networks and be bolder in drawing the catchment areas for the centres while taking into account clinician-supported patient choice. The well-documented evidence that patients will travel any distance to access the highest quality of care in this specialty has provided a clear mandate from the patients and the public to do this.

Since the consultation began we have been working with the review team to identify additional cases for our centre and Bristol. Thanks to the support of our partners we have been able to show that enough work exists in the south for both Bristol and Southampton to meet the new standards with reasonable network catchments and
reasonable travel times. This has shown that Bristol and Southampton are not mutually exclusive as was first thought to be the case.

The NHS must now show the necessary leadership to build an outstanding national service for children born with congenital heart disease. It should be a service based on quality of experience, safety and outcomes led by clinicians who have shown that they will strive for, and can achieve, excellence.

The development of tertiary paediatrics in England

The future of the congenital surgical services in England should be based on service excellence. This will require that the highest quality centres and those assessed as having the best capability to deliver the modern standards are supported. Hospitals in much of the developed world and most providers in England are striving to deliver the co-location of inter-dependent services on single sites; the modern leadership approach to team-working and sustainable networks. At Southampton our paediatric services have already achieved these goals as demonstrated by the clinical excellence we have achieved.

In the late 1990s the country developed lead PICUs of a size sufficient to enable them to thrive for the benefit of children in the wide regional catchment areas they serve. The current lead PICUs provide an exclusive focus on children with the ability to deliver a range of complex children’s services. Option B is the best option to continue with this strategy which has served the country effectively raising the standards of intensive care for all critically ill children. At Southampton we have one of the few paediatric services in the country which comprises key services such as trauma, respiratory, neurosurgery, cardiac, renal and other specialties. It makes no sense to dismantle this to the detriment of such a wide catchment area.

Finally, the Oxford and Southampton network is the only example in the last ten years of two surgical centres combining. We have proved that this has been effective and is well regarded by patients. It has resulted in surgical volumes which have increased significantly with no deterioration in quality. The support of commissioners will enable us now to deliver sustainable volumes in the south of England as we work with our colleagues in Bristol and the Evelina. We trust the JCPCT will understand these factors and will support option B as the only configuration of surgical centres that will deliver the aims of this review.