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# Health Overview and Scrutiny Panel

Thursday, 15th September,  
2011

at 5.00 pm

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## MEMBERS' ROOM DOCUMENT

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### 7 **SAFE AND SUSTAINABLE - REVIEW OF CHILDREN'S CONGENITAL HEART SERVICES IN ENGLAND, REPORT OF THE PUBLIC CONSULTATION**

- Health Impact Assessment: Interim Report

Wednesday, 7 September 2011

HEAD OF LEGAL AND DEMOCRATIC  
SERVICES



# Safe and Sustainable: Review of Children's Congenital Heart Services in England

Health Impact Assessment: Interim Report

August 2011  
NHS Specialised Commissioning Team



# Safe and Sustainable: Review of Children's Congenital Heart Services in England

Health Impact Assessment: Interim Report

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1.11	02/08/2011	JD	KS	BN	Draft 1.11 Final Interim Report
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# 1. Introduction

## 1.1 Overview of the Safe and Sustainable Review

In April 2010 the NHS published *Safe and Sustainable: The Need for Change* which set out proposals for a new model of provision for children's heart surgery<sup>1</sup> in England. It envisaged fewer, larger specialist surgical centres working within regional paediatric cardiology networks delivering care as close as possible to the child's home.

*Safe and Sustainable* aims to develop a national service with better clinical outcomes and a trained clinical workforce which is expert in the care and treatment of children and young people with congenital heart disease. This review is being managed by National Specialised Commissioning Team (NSCT) on behalf of the ten Specialised Commissioning Groups (SCGs) in England<sup>2</sup> and their constituent Primary Care Trusts (PCTs). Its scope includes England and Wales.<sup>3</sup>

The *Safe and Sustainable* Review was instigated in response to concerns among clinicians, professional organisations and parents regarding the future resilience of the existing 11 surgical centres which currently provide paediatric cardiac surgery. There have been long-standing doubts about whether some of these centres are performing a sufficient number of complex procedures to maintain and develop specialist skills.<sup>4</sup> In 2006, a national workshop of surgical experts, together with other NHS staff and parent groups, endorsed the view that the current configuration of services in England was unsustainable.<sup>5</sup> This view was then echoed by an independent report by the Royal College of Surgeons in 2007.

Responding to these concerns, the *Safe and Sustainable* Review proposed reducing the number of centres providing children's heart surgery from 11 to either six or seven. On the 1<sup>st</sup> March 2011, a formal public consultation was launched on four areas<sup>6</sup>:

- **Proposed standards of care** - the standards proposed to deliver higher and more consistent levels of care around the country.
- **Congenital heart networks** – surgical centres being supported by strengthened and more co-ordinated networks of local providers and outreach services to deliver secondary and follow-up care closer to home.
- **Measuring quality** – implementing analysis of mortality and morbidity data to ensure outcomes are monitored.

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<sup>1</sup> Children heart surgery and paediatric cardiac surgery are used interchangeably throughout this report. Both terms refer to the same service.

<sup>2</sup> In England, there are ten Specialised Commissioning Groups (SCGs) that commission specialised services for their regional populations, which range in size from 2.8 million people to 7.5 million people. Examples of such services include haemophilia and blood and marrow transplantation.

<sup>3</sup> As there are no paediatric cardiac surgical services in Wales, Welsh children use services in England and therefore have been included in the review.

<sup>4</sup> Safe and Sustainable Review: Pre-Consultation Business Case (PCBC), February 2011.

<sup>5</sup> This review dates back to 2001 when, following a public inquiry into children's heart surgery in the NHS, the Kennedy Report made a number of recommendations designed to improve national standards by moving to larger specialist centres where higher volumes of patients could be treated. Further details on the history behind the *Safe and Sustainable* review are included within in Chapter 2.

<sup>6</sup> NHS Specialised Services (2011): 'Safe and Sustainable: A new vision for children's congenital heart services in England. Consultation Document – 1<sup>st</sup> 2011 to July 2011'

- **Larger surgical centres** – reduction of eleven centres to six or seven in order to ensure surgeons undertake a critical mass of procedures per annum to achieve true quality and excellence and deliver improved outcomes for children.

These Options are explained further in Chapter 2.

The proposed new service delivery model is predicated on the need to ensure the following core standards are upheld in the future provision of heart surgery services for children in England and Wales:

- A minimum of four full-time congenital cardiac surgeons in each surgical centre;
- A minimum volume of 400, but ideally 500 paediatric surgical procedures per year in each surgical centre; and
- 24 hour / seven days a week cover in each surgical centre.
- It is proposed that in future, services for children with congenital heart disease will be provided within congenital heart networks. All congenital heart networks would include Specialist Surgical Centres, which would provide all interventional procedures, working with more locally based Children's Cardiology Centres and District Children's Cardiology Service.

## 1.2 About the Health Impact Assessment

### 1.2.1 Overview of Health Impact Assessments

Impact assessments are a key component of policy and act to guide and evaluate government investment. The assessment process helps policy makers to think through the consequences of proposals, improving the quality of advice to Ministers and encouraging informed public debate.<sup>7</sup>

Health Impact Assessments (HIAs) have long been identified as a mechanism by which potential effects on health outcomes and health inequalities can be identified and redressed prior to implementation<sup>8</sup>. They can be defined as:

*“A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population”.*<sup>9</sup>

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<sup>7</sup> <http://www.bis.gov.uk/impact-assessments>

<sup>8</sup> Acheson, D. (1998) Independent Inquiry into Inequalities in Health, Stationery Office, London, [www.archive.official-documents.co.uk/documents/doh/ih/contents.htm](http://www.archive.official-documents.co.uk/documents/doh/ih/contents.htm)

<sup>9</sup> European Centre for Health Policy (1999), Health Impact Assessment: main concepts and suggested approach (Gothenburg Consensus Paper), Brussels, [www.who.dk/document/PAEGothenburgpaper.pdf](http://www.who.dk/document/PAEGothenburgpaper.pdf).

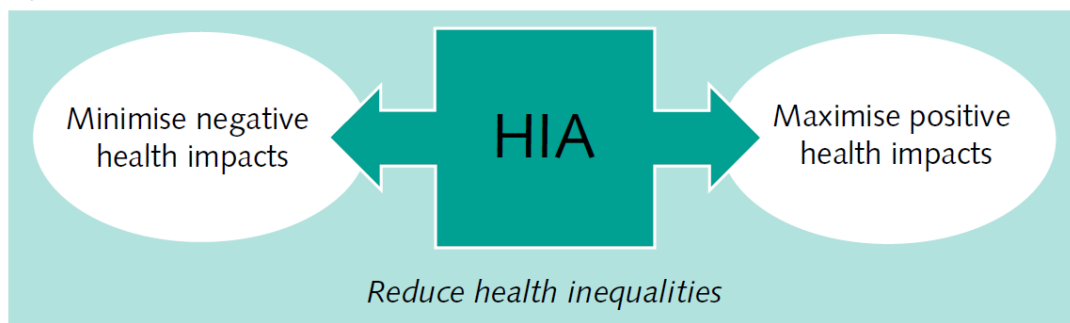
The aim is to explore the positive and negative consequences of different Options and produce a set of **evidence-based, practical recommendations**, which can then be used to maximise the positive impacts and minimise any negative impacts of proposed policies or projects.<sup>10</sup> Analysis is undertaken for all of the population but also highlights if and where certain sections of the population will be affected, either geographical communities or, in particular, certain socio-economic or equalities groups.<sup>11</sup>

Assessment of impacts and recommendations on opportunities and mitigations are based on the participation of a wide range of stakeholders, thereby giving the HIA independence and democratic legitimacy.<sup>12</sup>

The Department for Health (DH) has produced clear guidance on HIAs and clearly sets out the requirements for a robust assessment:

*“A good HIA will guide policy makers to consider the positive and negative impacts of their proposed policy on health. It will identify any unintended health consequences that may either lend support to the policy or suggest improvements to it. It will also contain a clear analysis of whether the health of the whole population or just certain sections within the population will be affected.”<sup>13</sup>*

#### Objectives of a HIA



Source: DH (2010): 'Health Impact Assessment of Government Policy'

HIAs do not determine the decision about which Option should be selected; rather they act to *assist* decision makers by giving them better information on how best they can promote and protect the health and well-being of the local communities they serve.<sup>14 15</sup>

<sup>10</sup> Taylor, L. and Quigley, R. (2002), Health Impact Assessment: A review of reviews, Health Development Agency, [www.nice.org.uk/page.aspx?o=502189](http://www.nice.org.uk/page.aspx?o=502189)

<sup>11</sup> Department for Health (2010): 'Health Impact Assessment of Government Policy: A guide to carrying out a Health Impact Assessment of new policy as part of the Impact Assessment process'

<sup>12</sup> NHS Executive London (2006): 'A short guide to Health Impact Assessment: Informing health decisions' [www.londonhealth.gov.uk](http://www.londonhealth.gov.uk)

<sup>13</sup> Department for Health (2010): Op. cit.

<sup>14</sup> Kemm, J. (2007), More than a statement of the crushingly obvious: A critical guide to HIA, West Midlands Public Health

### 1.2.2 Scope of this HIA

In October 2010 the NSCT commissioned Mott MacDonald to carry out a HIA of the reconfiguration Options for children's heart surgery, to consider the positive and negative impacts that each proposed Option could have on:

- health outcomes and existing health inequalities;
- equality groups and deprived populations;
- travel and access to the services; and
- the resulting carbon dioxide emissions.

The HIA is also required to consider mitigation measures for any adverse consequences identified; highlight ways in which to enhance positive impacts; and make any suggestions for ways in which Options could be improved to maximise the quality of treatment and equality of outcomes.

The findings of the HIA will be used, along with other evidence, to help inform the final decision about the future configuration by the Joint Committee of Primary Care Trusts (JCPCT); the decision-making body for the Review.

### 1.2.3 What does the HIA not do?

- **The HIA does not seek to critique the modelling underpinning Option development.** A key feature of this HIA is its independence from those proposing any changes and those who are making decisions on the shape of future children's heart surgery provision. In undertaking this assessment the HIA team has developed an understanding of how the Options for future services were arrived at to inform the research tasks. However, the HIA does not seek to offer a comprehensive analysis or critique of the models underpinning change proposals.
- **The rationale and principles behind the proposals are not challenged.** This HIA is not designed to justify, defend or challenge the rationale or principles behind proposed reforms put forward in *Safe and Sustainable*. It has also been undertaken based on the assumption that any emerging proposals will be designed to realise benefits for all patients requiring paediatric cardiac treatment, thereby helping improving outcomes for patients.
- **The purpose of the HIA is to inform rather than decide.** As indicated above, the objective of this HIA is not to determine the decision, but to assist decision makers by giving them better information.<sup>16</sup>

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Observatory.

<sup>15</sup> Taylor, L et. al. (2002): Op. cit.

<sup>16</sup> J Kemm (2007), *More than a statement of the crushingly obvious: A critical guide to HIA*, West Midlands Public Health Observatory.

### 1.3 Purpose of this interim report

The purpose of this interim report is to provide a comprehensive overview of emerging findings based on the assessment tasks undertaken to date. It is based on the evidence gathered during all of the research tasks undertaken for phases one (scoping) and two (data capture and engagement). All of project phases are fully described In Chapter 3.

All identified impacts have been appraised on the basis of who they will affect; how many people will experience them; whether they will have disproportionate effects for any vulnerable groups; the likelihood of them being realised; and the degree to which they are short, medium or long term. Whether each impact will be experienced under all Options or will be more pronounced for certain Options above others has also been examined.

***This interim report does not represent the final HIA.*** It will be refreshed following the publication of the national consultation findings and the completion of the final HIA engagement events. The final HIA report will reflect and incorporate any additional relevant findings before being received by the HIA Steering Group.

## 2. Safe and Sustainable: The current situation and Options for change

### 2.1 The current situation

Congenital heart disease is relatively rare; around eight out of every 1,000 babies born will have some form of congenital heart disease.<sup>17</sup> Services for children with congenital heart disease are increasingly complex, with surgical and cardiology interventions demanding greater technical skill and expertise from all of the professionals in the cardiac teams.

The numbers of children who require cardiac surgery are relatively small. At the time that the Safe and Sustainable Review began there were 31 consultant paediatric cardiac surgeons in England performing around 3,600 cardiac procedures for children each year. On average a PCT is likely to have 20 children each year requiring heart surgery.

There are currently 11 centres across England which provide children's heart surgery:

- Freeman Hospital, Newcastle;
- Leeds Teaching Hospital;
- Alder Hey Children's Hospital, Liverpool;
- Birmingham Children's Hospital;
- Glenfield Hospital, Leicester;
- John Radcliffe Hospital, Oxford;
- Bristol Royal Hospital for Children;
- Royal Brompton Hospital, London;
- Great Ormond Street Hospital for Children, London;
- Evelina Children's Hospital, London; and
- Southampton General Hospital.

There are no children's heart surgical centres in Wales, so Welsh children are referred to surgical centres in England.

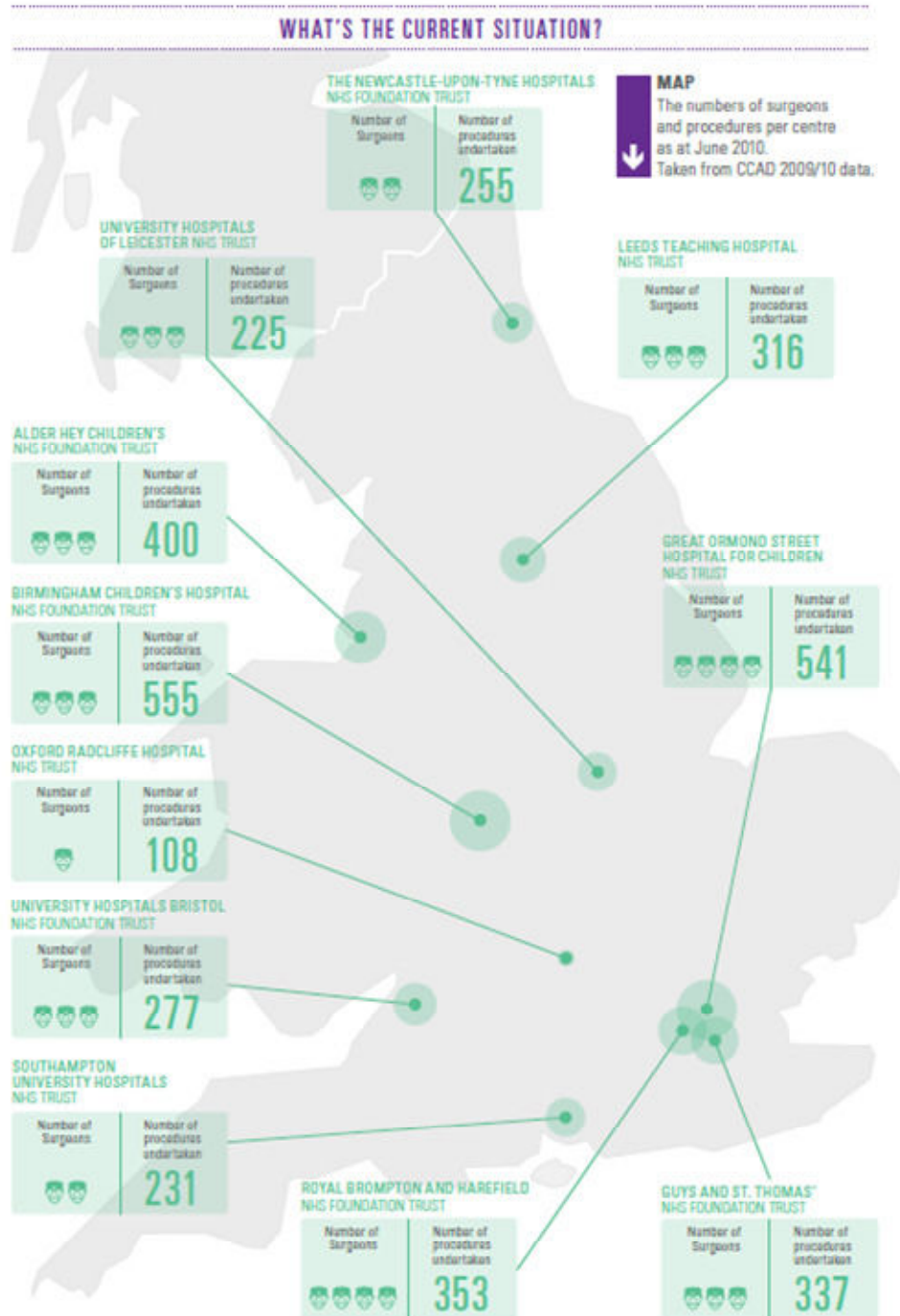
Figure 2.1 sets out the number of procedures and number of surgeons at each of the centres providing children's congenital heart surgery as of June 2010. The proposed standards presently being consulted upon recommend a minimum of four full-time congenital cardiac surgeons in each surgical centre and a minimum volume of 400, but ideally 500 paediatric heart surgical procedures per year in each surgical centre. These volumes are not being achieved at all centres within the current configuration of children's heart surgery services.

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<sup>17</sup> Safe and Sustainable Pre-Consultation Business Case: Review of Children's Congenital Cardiac Services in England, February 2011



Figure 2.1: The current situation



Source: NHS Specialised Services (2011): Op. cit

## 2.2 The need for change

The Safe and Sustainable review was instigated at the request of national parent groups, NHS clinicians and their professional associations and there is strong support for the need for change. Organisations that support the review include the Children's Heart Federation (the UK's leading association for parents of children with heart conditions), the Royal College of Surgeons of England, Society for Cardiothoracic Surgery of Great Britain, Paediatric Intensive Care Society, Royal College of Nursing, Royal College of Paediatrics and Child Health, and the British Congenital Cardiac Association.

The clinicians and other experts have advised that children's heart surgery should be provided in fewer NHS hospitals than at present. Increasing the number of surgeons is not considered to be the answer, as this would result in surgeons performing fewer surgical procedures and occasional surgical practice will not lead to better clinical outcomes for children.

In 2009, the Children's Heart Federation commissioned an independent expert (Ipsos Mori) to assess the level of support for the review amongst parents of children with congenital heart disease. 5,000 parents were sent questionnaires, and 1,000 responses were received. The outcome of this analysis concluded that around 73% of parents who responded either 'strongly agree' or 'agree' on the benefits of reducing the number of units in the NHS that provide cardiac surgery for children.

Without change there is a risk that in the future some children's congenital cardiac surgery services may be neither safe nor sustainable in future. The present system is characterised by the following challenges which the Safe and Sustainable Review is designed to overcome:<sup>18</sup>

- The different NHS services that care for children with congenital heart disease could work together better;
- Clinical expertise is spread too thinly over 11 surgical centres;
- Some centres are reliant on small teams and cannot deliver a safe 24 hour emergency service;
- Smaller centres are vulnerable to sudden and unplanned closure;
- Current arrangements are inequitable to children and their families as there is too much variation in the expertise available from centres;
- Available research evidence identifies a relationship between higher-volume surgical centres and better clinical outcomes;
- Fewer surgical centres are needed to ensure that surgical and medical teams are treating enough children to maintain and develop their specialist skills;
- Having a larger and varied caseload means larger centres are best placed to recruit, mentor and retain new surgeons and plan for the future; and
- The delivery of non-surgical cardiology care for children in local hospitals is inconsistent.

Further detail on the case for change can be found in the *New Vision for Children's Congenital Heart Services in England* at:

[http://www.specialisedservices.nhs.uk/safe\\_sustainable/public-consultation-2011](http://www.specialisedservices.nhs.uk/safe_sustainable/public-consultation-2011).

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<sup>18</sup> NHS Specialised Services (2011): Op. cit.

### 2.3 The new model of care

Congenital heart networks will be central to the new model of care to ensure that in future care for children and young people with congenital heart disease are better coordinated. Within the new model of care, each network would include a Specialist Surgical Centre, a Children's Cardiology Centre and District Children's Cardiology Services. The services that each of the centres would provide are set out in Table 2.1 below. The Specialist Surgical Centre would provide leadership. Specific arrangements would also be developed for each network to ensure the appropriate transition to adult congenital heart services.

Table 2.1: Components of the new model of care<sup>19</sup>

Service	District Children's Cardiology Service	Children's Cardiology Centre	Specialist Surgical Centre
Interventional Cardiology			✓
Surgery			✓
Cardiology		✓	✓
Ongoing Care	✓	✓	✓
Assessment and Diagnosis	✓	✓	✓

Further detail on the model of care is set out in the consultation document.<sup>20</sup>

The proposed reconfiguration aims to achieve:

- Better results in the surgical centres with fewer deaths and complications following cardiac surgery;
- Better, more accessible diagnostic services and follow up treatment delivered within regional and local networks;
- Reduced waiting times and cancelled operations;
- Improved communication between parents and all of the services in the network that see their child;
- Better training for surgeons and their teams to ensure the sustainability of the service;
- A trained workforce expert in the care and treatment of children and young people with congenital heart disease;
- Centres at the forefront of modern working practices and innovative technologies that are leaders in research and development; and
- A network of specialist centres collaborating in research and clinical development, encouraging the sharing of knowledge across the network.<sup>21</sup>

<sup>19</sup> NHS Specialised Services (2011): Op. cit.

<sup>20</sup> NHS Specialised Services (2011): Op. cit.

<sup>21</sup> NHS Specialised Services (2011): Op. cit.

## 2.4 The Options being consulted upon

The *Safe and Sustainable* consultation document '*New Vision for Children's Congenital Heart Services in England*<sup>22</sup> asks the views on the following:

- **Standards of care** – the proposed national quality standards that have been developed for the NHS to provide higher standards of care consistently across the country.
- **Congenital heart networks** – surgical centres leading regionally based congenital heart networks which would co-ordinate services closer to home by, for example, developing more outreach support in areas that have been neglected in the past.
- **Measuring quality** – that the principle of implementing new systems to analyse and report on mortality and morbidity data relating to children with congenital heart disease.
- **Larger surgical centres** – that larger surgical services can deliver quality and excellence and, therefore, the number of centres that provide heart surgery for children should be reduced to either six or seven so that higher caseloads can be achieved at each centre.

Table 2.2 below summarises each of the four proposed Options. The impacts associated with each Option are discussed and analysed in Chapters 5 – 8.

Table 2.2: The proposed options

Option	Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
Option A	Seven surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> <li>• Glenfield Hospital, Leicester</li> </ul>	Four cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Southampton General Hospital</li> <li>• Leeds General Infirmary</li> <li>• John Radcliffe Hospital, Oxford</li> </ul>
Option B	Seven surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> <li>• Southampton General Hospital</li> </ul>	Four cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Leeds General Infirmary</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> </ul>
Option C	Six surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> </ul>	Five cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Leeds General Infirmary</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> <li>• Southampton General Hospital</li> </ul>

<sup>22</sup> NHS Specialised Services (2011): Op. cit.

Option	Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
Option D	Six surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Leeds General Infirmary</li> <li>• Alder Hey Children's Hospital, Liverpool</li> </ul>	Five cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Freeman Hospital, Newcastle</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> <li>• Southampton General Hospital</li> </ul>

## 3. Our approach to the Health Impact Assessment

This section provides an overview of our approach to the HIA, describing the main components of the approach followed and the key assumptions and limitations.

### 3.1 Phases of this HIA

This is a prospective HIA - it is being undertaken before any proposals have been implemented in accordance with best practice guidance.

*“The HIA should be started at the beginning of the policy development process ... The consequences for health of all the Options can then be fully considered and the HIA can have a genuine influence on the chosen Option.”<sup>23</sup>*

The Phases of the approach are summarised in the table below.

Table 3.1: HIA methodology

Phase	Overview	Application to the proposals for children’s heart surgery and cardiology services
1	Scoping (October 2010 – February 2011)	<p>This phase was completed in early 2011 prior confirmation of the final Options put forward for the national public consultation. The purpose of this phase was to develop an initial view on the potential effects of the reconfiguration of children’s heart surgery services and to understand whether there were any groups who could be disproportionately affected. This scoping phase was undertaken before the Options for the consultation were finalised, to give the HIA Steering Group, the JCPCT, patients and the public a view of the areas that would require particular consideration during the main stage of the HIA. Tasks included:</p> <ul style="list-style-type: none"> <li>• <b>Literature review:</b> reviewing clinical and other published evidence to identify those groups within society most likely to experience congenital heart disease and, therefore, most likely to be vulnerable to service changes.</li> <li>• <b>Socio-demographic analysis:</b> to understand where there are high numbers of those populations most vulnerable to services changes.</li> <li>• <b>Strategic stakeholder interviews:</b> consultations with Regional Directors of Public Health to understand potential localised impacts and ways in which these might be addressed in the Options.</li> <li>• <b>Production of a scoping report:</b> this was published in February 2011 and set out the scope for the next steps in the HIA.</li> </ul>
2	Data capture and engagement (March 2011 – July 2011)	<p>During this stage, more detailed evidence was gathered and analysed through a variety of means:</p> <ul style="list-style-type: none"> <li>• <b>Stakeholder engagement forums:</b> seven forums<sup>24</sup> were held with the stakeholders from around the country to understand their views on the impacts of the reconfiguration Options, maximisation of the positive impacts, and mitigation of negative effects. Individuals from the health sector (particularly staff currently involved in delivery of cardiac surgery services); parents and representatives from groups identified as ‘vulnerable’ to service changes were invited to these forums. A full list of all of those invited to the series of forums is included in Appendix A. Findings from the forums are contained within Appendix B.</li> <li>• <b>One-to-one stakeholder interviews:</b> undertaken with stakeholders who were unable to attend the forums.</li> </ul>

<sup>23</sup> Department for Health (2010): Op. cit.

<sup>24</sup> Forums were held in all cities which currently have a surgical centre, with the exception of Birmingham and Liverpool. An event was arranged in both of these cities but there was not sufficient interest from local stakeholders to attend so one-to-one consultations were held instead where appropriate. Welsh stakeholders were invited to a forum in Bristol, while the stakeholders from East of England were invited to London.

Phase	Overview	Application to the proposals for children's heart surgery and cardiology services
		<ul style="list-style-type: none"> <li>• <b>One-to-one interviews with families:</b> Over 40 interviews were undertaken with parents of children who are currently undergoing surgery. Families were selected on the basis that they lived in 'vulnerable postcode districts.'; this means that live in areas which would experience significant travel impacts under one or more of the Options AND which contains high densities of vulnerable groups.<sup>25</sup> A summary of issues raised by families consulted can be found in Appendix C.</li> <li>• <b>Focus groups with vulnerable populations:</b> in some areas there was demand for specific focus groups with people from the groups identified as disproportionately vulnerable to service changes. As such five local focus groups were held to target areas with large Asian communities and/or high levels of deprivation.<sup>26</sup></li> <li>• <b>Detailed travel and access analysis:</b> journey time data for all postcode districts was analysed and mapped for private car, public transport, blue-light ambulance and helicopter to understand the impacts on journey times of each Option. With regard to the travel and analysis the following two points should be noted: <ul style="list-style-type: none"> <li>– Only travel impacts of journeys to surgical centres have been analysed. It has not been possible to look at the impact of reduced journey times for secondary care (that will be delivered closer to home in the new network models) because at present there is no data which projects the change in flows for secondary and follow-up care. As such, the travel impacts of these follow-up services being provided closer to home is not represented in this assessment.</li> <li>– <i>It is the responsibility of the HIA to identify where travel impacts are particularly 'significant.'</i> The HIA uses the following definitions to describe a 'significant' increase in journey times.<sup>27</sup> <ul style="list-style-type: none"> <li>○ An increase in journey time of over one hour</li> <li>○ A total journey time to the designated surgical centre of over three hours by private transport</li> <li>○ A total journey time to the designated surgical centre of over four hours by public transport</li> </ul> </li> </ul> </li> <li>• <b>Carbon emission analysis:</b> the carbon analysis presented in this report is a high level assessment this analysis undertaken by looking at the changes in travel patterns and using these to calculate future carbon emissions of each Option. As it is based on the travel impacts it also only considers the carbon impacts associated with trips to surgical centres. It does not include any impacts on carbon emissions that would result in care being delivered closer to home, involving shorter journeys.</li> <li>• <b>Impact analysis:</b> this involved identifying the extent of the impact (who and how many people are likely to be affected); the likelihood of the impact (how likely it is to be realised); the duration of the impact (whether it will be permanent or temporary); and extent (whether the impacts will be experienced under all Options or one more than others). For each impact, whether it will have a disproportionate effect on those groups identified as vulnerable to service change was also assessed.</li> <li>• <b>Production of an interim report:</b> The key preliminary findings based on the first two Phases of the HIA are contained within this report; these findings been shared with the Overview and Scrutiny Committees, LINKs and patients and the public on 21 June 2011. It is planned that the interim report will be published in August.</li> </ul>

<sup>25</sup> See section 3.2.2 for more details on how vulnerable postcode districts are classified

<sup>26</sup> Demand was expressed from communities and health bodies in the current Leeds and Leicester networks. Focus groups have been (or are due to be) organised in Leeds, Bradford and Kirklees (Leeds); and Belgrave (Leicester).

<sup>27</sup> Postcode districts can fall into one, two or three of these categories. Some postcode districts already fall within one or both of the latter definitions prior to the adoption of any new model.

Phase	Overview	Application to the proposals for children's heart surgery and cardiology services
3	Review of HIA in light of consultation outcomes (September 2011)	The interim report will be refreshed to reflect the findings from the public consultation and the findings from the two remaining HIA engagement events. The report will then be received by the HIA Steering Group.
4	Incorporation of HIA into JCPCT decision-making (October 2011)	This final phase will be to ensure that the report is well presented and understood to decision-makers so that it can inform the JCPCT as it takes its decisions on the reconfiguration of services in the winter of 2011. Regular presentations on emerging findings are being made to the JCPCT to ensure they remained informed of developments.

## 3.2 Overview of assessment process

### 3.2.1 Identifying vulnerable groups within the population

#### 3.2.1.1 How is a 'vulnerable group' defined?

As well as looking at health impacts for the whole population, one of the central aims of an HIA is to identify and focus on **disproportionate impacts** and understand which populations, groups or communities are most likely to be sensitive or 'vulnerable' to change. To do this during the scoping phase clinical evidence and data on incidence of conditions that generate the demand for cardiac surgery was analysed.<sup>28</sup> This exercise identified current activity trends and highlighted which socio-demographic groups are most susceptible to experiencing congenital heart disease and, therefore, are likely to be more **'vulnerable'** to service changes.

It is essential to realise that identifying a societal group as 'vulnerable' to service changes does not mean all or most families from within this group will have experience of congenital heart disease. **The numbers of people from these groups who will actually be affected by service change will, in fact, be very small;** this is because the annual caseload of children requiring heart surgery itself remains small (under 3,600 cases per annum).

Finally, essential to understanding the impacts on vulnerable groups is ensuring that there is a clear distinction between the terms 'disproportionate impacts' and 'different impacts'.

- **'Disproportionate impact'** means that a particular societal group is more likely to experience an impact than the general population.
- **'Different impact'** means that the type of effect that a group experiences will be different in nature to that experienced by the general population.

It is possible for neither, both or just one of the above definitions to be relevant. For example, a vulnerable group may be more susceptible to experiencing an impact by virtue of their socio-demographic characteristics, **but** the actual type of impacts they experience may well mirror those of other patients.

<sup>28</sup> The full review of clinical evidence and activity data was undertaken during the scoping phase and is included in Appendix D.



### 3.2.1.2 Why it is important to identify vulnerable groups?

It is important to identify which groups are likely to have a disproportionately high need for services for the following reasons:

- To ensure that mitigation measures are targeted appropriately at those communities who are in most need of support with transition to a new service structure;
- To comply with the requirements of the Public Sector Equality Duty as set out in the Equality Act 2010, which imposes a statutory duty on public sector bodies to undertake equality analysis and consider the impacts of proposals on people with the following 'protected' characteristics<sup>29</sup>:
  - Gender: considering whether there are particular and possibly different impacts on men or women;
  - Age: taking account of all age groups to understand whether any of them will experience disproportionate impacts;
  - Race: including ethnic or national origins, colour or nationality, particularly differential impacts on Black, Asian and minority ethnic (BAME) groups;
  - Disability: including both physical, sensory and mental impairments;
  - Religion or belief: assessing whether the proposals may impact disproportionately on individuals and families because of their religion or faith, including lack of belief;
  - Gender reassignment: understanding any differential impacts for trans-gender people;
  - Sexual orientation: considering impacts on lesbians, gay men, and bi-sexual people;
  - Marriage and civil partnership: understanding differential treatment of people who are married or within a civil partnership (only applicable in terms of discrimination); and
  - Pregnancy and maternity: understanding any differential impacts for women who are pregnant, new mothers (with babies under six months old), or breastfeeding.

The review of clinical evidence during the scoping stage, however, did not concentrate solely on the statutory equality groups; the objective was also to understand whether there are any other population groups in which there is a higher prevalence of congenital heart disease. For example, research considered people living in deprived areas due to the well-documented links between socio-economic disadvantage and poorer health outcomes. As highlighted in the 2010 Marmot Review<sup>30</sup> 'there is a social gradient in health – the lower a person's social position, the worse his or her health.'

The findings of this evidence review (which are provided in full in Appendix D) revealed that there is a higher propensity to experience congenital heart disease, and therefore need for children's heart surgery services, amongst the following population groups:

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<sup>29</sup> Government Equalities Office (GEO) (2010): Equality Act. These protected characteristics are covered by the new Equality Duty which replaces the existing three separate duties which relate to gender; race and disability.

<sup>30</sup> Marmot, M. (2010) 'Fair Society, Healthy Lives. Strategic Review of Health Inequalities in England post 2010'

### Children's heart surgery - vulnerable groups

- Children (under 16s)\* who are the primary recipient of the services under review and, therefore, most sensitive to service changes;
- People who experience socio-economic deprivation;
- People from Asian ethnic groups, particularly those with an Indian, Pakistani, Bangladeshi and other Indian subcontinent heritage;
- Mothers who smoke during pregnancy; and
- Mothers who are obese during pregnancy;

These groups are defined as **vulnerable groups** because they are more likely to need the services under review and, are most likely to experience **disproportionate impacts**.

\* It is recognised that within this group there are subsets of children who are particularly 'vulnerable' and more likely to experience disproportionate effects. The following subsets are important to consider:

- Children with multiple morbidity, necessitating successive interventions.
- Children with Down's Syndrome as evidence shows that between 40% and 50% of children with Down's Syndrome have a congenital heart disease and around 60% of those require treatment in hospital.<sup>31</sup>

These subsets cannot be mapped as sufficiently robust datasets are not collected at national level; however representatives of Downs' Syndrome charitable organisations included within the stakeholder forum events and families of children with multiple complications were consulted during the series of one-to-one discussions with families.

## 3.2.2 Identifying vulnerable postcode districts

### 3.2.2.1 Step one: analysing density data for vulnerable groups

Having identified those population groups most vulnerable to service change it was essential to identify which places in England and Wales have high densities of these population groups. ***This is the first step in the process of understanding where disproportionate effects will be felt and to what extent (i.e. the number of people that will be affected).*** In order to do this, data for each of the vulnerable groups<sup>32</sup> was analysed by postcode district.<sup>33</sup> The postcode districts were then ranked according to density; all of those postcode districts above the median were classified as having a 'disproportionately high' representation of the vulnerable group. Any postcode districts which 'ranked' above the median for two or more of the identified vulnerable groups were then highlighted as requiring specific attention and consideration.<sup>34</sup>

<sup>31</sup> [www.nhs.uk](http://www.nhs.uk) – 'Complications of Down's Syndrome'

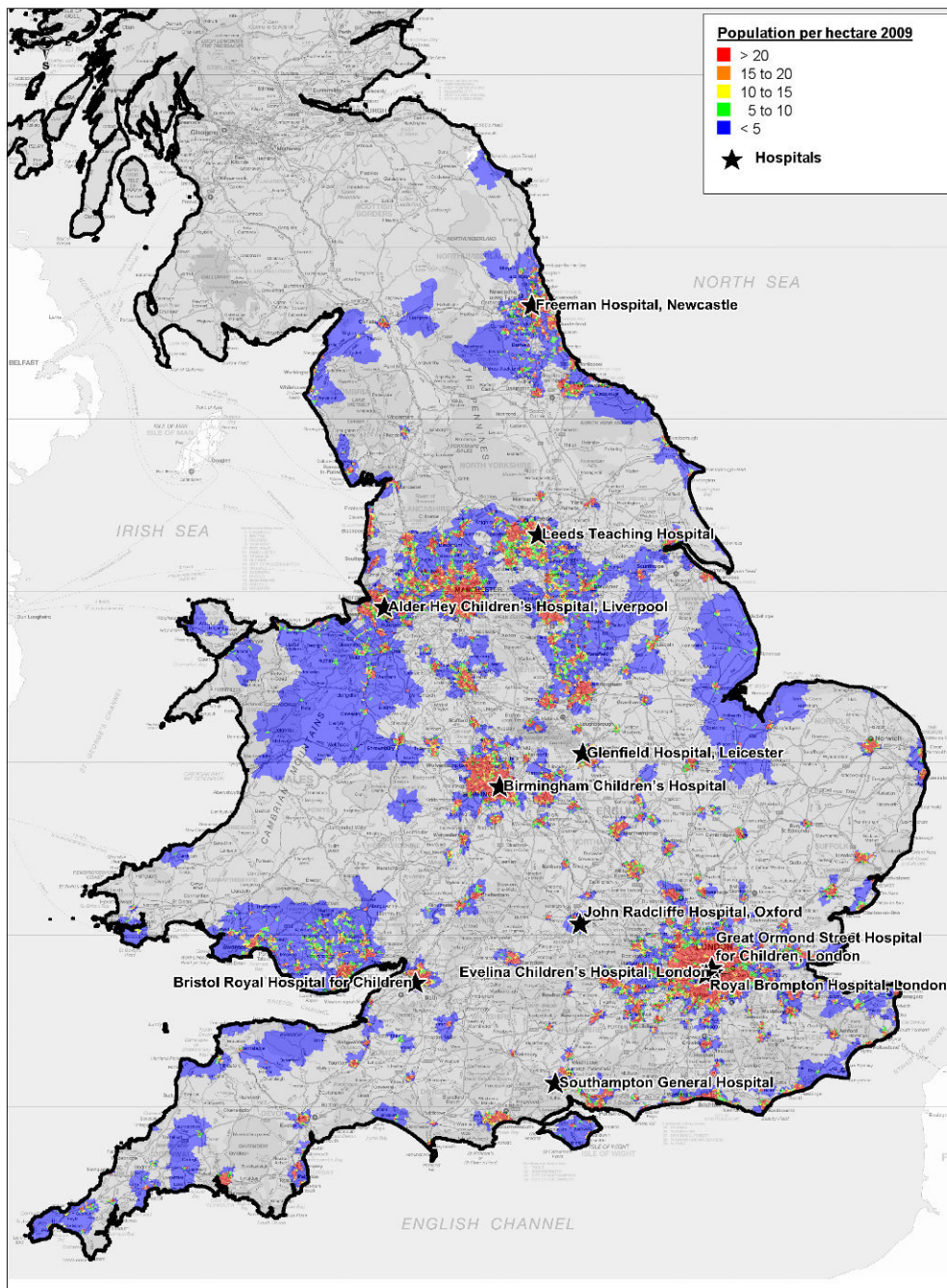
<sup>32</sup> For mothers who are obese or who smoke during pregnancy there is no data at a sufficiently fine spatial scale for this type of analysis. As such, as a proxy for poor health, Department for Communities and Local Government 'health deprivation' figures have been used for these two vulnerable groups.

<sup>33</sup> Postcode districts have been used as the 'geographical unit' for analysis because this is consistent with all of the modelling undertaken by KPMG to inform option development.

<sup>34</sup> A full list of the postcode districts and whether they rank above the median for each of the vulnerable groups can be found in Appendix E.

All of the postcode districts are illustrated on the map below; this shows where demand for services is *potentially* higher due to the demographic composition.

Figure 3.1: Postcode districts with high densities of two or more vulnerable groups



Contains Ordnance Survey data (c) Crown copyright and database right 2011

### 3.2.2.2 Step two: cross referencing density data with travel impacts

**However, it is not necessary for the HIA to focus on all of the postcode districts** in Figure 3.1 above because some of them (811 out of 1,453; 56%) are not directly affected by any of the Options as surgical services will continue to be provided from six to seven centres..

**The HIA needs to concentrate on where impacts will be most pronounced.** As such it needs to focus on those areas which not only have higher densities of vulnerable groups but **at the same time** will experience significant future travel impacts. Significant travel impacts are defined as an increase in journey time of over an hour (compared to the current journey time) AND/OR a total journey time of over three hours (or four hours by public transport).<sup>35</sup> As journey times are dependent on which surgical centres are removed, there is a different set of vulnerable postcode districts for each Option – these are set out in Chapters 5 -8, which discuss each of the Options in detail.

#### **Travel and access analysis – rationale behind the HIA approach**

The Safe and Sustainable consultation document shows the proportions of people (out of the total population) who would experience an increase in travel time of more than 1.5 hours: (Option A – 3.6%; Option B – 6.2%; Option C – 6.2%; and Option D – 3.6%). The modelling undertaken for HIA supports and is consistent with these population proportions.

It is important to note, however, that the HIA also looks at where travel impacts are particularly **'significant'** in terms of travel times; this is because it is the remit of the HIA to take a very detailed look at who experiences impacts. The HIA uses the following definitions to describe a 'significant' increase in journey times:

- An increase in journey time of over one hour
- A total journey time to the designated surgical centre of over three hours by private transport
- A total journey time to the designated surgical centre of over four hours by public transport

Postcode districts can fall into one, two or three of these categories. Some postcode districts already fall within one or both of the latter definitions prior to the adoption of any new model.

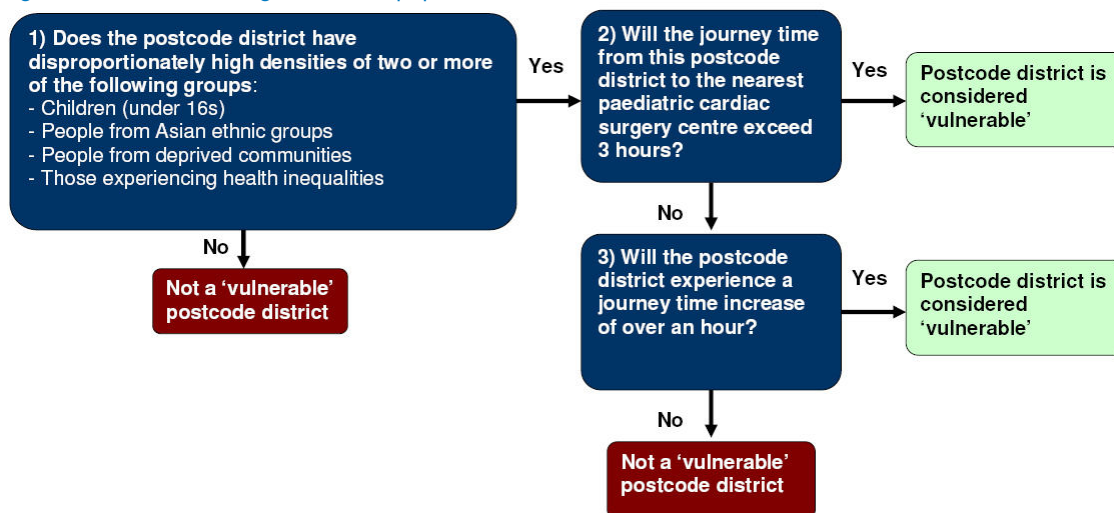
#### **It should be further noted that:**

- Travel impacts are not based on the whole population as this would provide a misleading picture of the number of people affected by each Option. Instead all travel and access impacts are assessed on the basis of the number of patients who would actually experience impacts. Using the present activity figures provides a good proxy in terms of the future scale of impact.
- Travel times have been modelled to surgical centres only. There has been no analysis of travel times to access secondary and post-interventional care because flow data is not available for these patients.
- The transport and access analysis has been undertaken on the basis of fair weather. I.e. modelling has not accounted for disruption caused due to bad weather conditions.

The process for carefully considering vulnerable postcode districts is depicted in the diagram below.

<sup>35</sup> The travel thresholds to support the determination of vulnerable postcode districts has been based on private car travel times only; this provides a good indication as to where journey times are significant. Public transport figures would show a similar picture.

Figure 3.2: Determining vulnerable population districts



### 3.2.3 Identifying impacts

Having determined the locations across England and Wales that are most likely to experience disproportionate impacts, the next step was to identify **what those impacts could be** and whether they are positive or negative. At the same time it was important to understand any measures already being implemented by the NSCT to mitigate any potentially adverse effects as well as suggesting further mitigation and improvement measures.

Critical to any impact assessment is the involvement of stakeholders who can contribute informed views on potential impacts, opportunities and mitigations. As well as health and clinical stakeholders it is very important to consult people from groups and postcode districts identified as vulnerable. Engaging with those who could experience disproportionate effects is important in order to ensure full representation of potential effects.

#### 3.2.3.1 Engaging with vulnerable groups and those from vulnerable postcode districts

Extensive effort throughout the HIA process was made to engage with groups identified as vulnerable to service change and those in vulnerable postcode districts. The following steps were undertaken:

- Stakeholders representing people from vulnerable socio-demographic groups were invited to the engagement forums that were staged in seven cities across England to gain their views on how the proposed changes may affect the vulnerable populations.<sup>36</sup>
- Each of the regional Specialised Commissioning Groups (SCGs) were asked to provide local contacts for the vulnerable groups identified so that these could be added to our stakeholder lists. Local assistance was regarded as important to maximise involvement from vulnerable groups.

<sup>36</sup> See Appendix A for more details

- Consultations were undertaken with over 40 families who have a child undergoing heart surgery and who live within one of the vulnerable postcode districts. The numbers of families engaged from each area was determined by examining where journey time impacts would be most experienced in future; and
- Four focus groups with members of the Asian community and/or those living in areas of high social deprivation have been or are due to be undertaken<sup>37</sup>.
- In addition, for the next Phase of the assessment, IPSOS MORI have been asked to provide findings from the consultation for the specific vulnerable groups so that responses from these populations can be reviewed and incorporated into the assessment where appropriate.

It should be recognised that this is an assessment of a national service reconfiguration. In addition the surgical services under review represent very few children per annum. Therefore, it was appropriate to seek involvement from every community or area throughout the England and Wales where high numbers of vulnerable groups are located. **Engagement activity needed to specifically target those areas where impacts would be most pronounced – i.e. where there are expected to be significant travel and access impacts under one or more of the proposed Options** (as fully explained in Figure 3.2 above).

### 3.2.4 Appraising impacts

In order to fully understand and assess each impact identified, it is important to consider a number of factors so that a balanced assessment can be reached. These factors are summarised below:

- **Scale of the impact:** this considers who and how many will experience impacts. As indicated in section 3.2.2.2 above when considering 'scale' of impact it is critical to ensure that there is **an accurate estimate of the number of people that will be affected**<sup>38</sup> under any of the proposed reconfiguration Options. As such, impacts are presented in terms of the number of patients rather than expressed in terms of total population figures; the latter provides a misleadingly large figure as to how many people will actually experience impacts as a result of implementing one of the proposed new models of care.
- **Likelihood:** defined as how likely it is that the impact will be realised. Considered here is the existing mitigation work that is being undertaken by Safe and Sustainable and the extent to which this will prevent any negative impacts from being realised.
- **Duration:** looking at whether the impact will be permanent (long term) or temporary (short term).
- **Extent of the impact:** whether the impact will be experienced to the same extent across all Options or whether it is more relevant for one or some Options.

Finally, for each impact, it is specified whether or not there will be disproportionate or different effects for any of the vulnerable groups as compared to the overall patient caseload.

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<sup>37</sup> Focus groups locations are: Leeds, Bradford and Kirklees (currently using Leeds Teaching Hospital) and Belgrave in Leicester (currently using the Glenfield Hospital). These groups were convened after there was evidence demand in these locations for further direct involvement.

<sup>38</sup> There may be slight differences between the modelled hospital case load figures and those in the consultation document as the model assigns all patients from each postcode district to a single hospital while the consultation document includes hospital figures which reflect the variations within these postcode districts. The model is also unable to reflect patient choice both for the current and proposed scenarios and therefore will not pick up patients using a different hospital than the one nearest to them.

## 4. Identifying the impacts of service reconfiguration

### 4.1 Objectives and content of this Chapter

This Chapter presents the type of positive and negative impacts likely to be experienced should one of the new service model Options proposed by the Safe and Sustainable Review be adopted.

According with the methodology described above, this Chapter identifies:

- Who and how people are likely to experience the positive and negative impacts (scale of impact), with particular consideration of where there could be disproportionate or different impacts for vulnerable groups;
- How likely it is for the impact to be experienced (likelihood);
- Whether the impact will be short or long term (duration); and
- Whether the impact is relevant for all Options or is more pronounced for some Options above others (extent of impact).

This Chapter also identifies where the Safe and Sustainable Review has already identified impacts and is taking action to address them, as well as suggesting further mitigation measures and improvement opportunities.

#### 4.1.1 Evidence base

This Chapter is based predominantly on qualitative evidence which has been derived from the following sources:

- Information gathered during the contextual literature review;
- Interviews with Regional Directors of Public Health (RDPHs);
- Findings from the stakeholder engagement forums around the country<sup>39</sup>;
- One-to-one stakeholder consultations; and
- Interviews with patient families from vulnerable postcode districts.<sup>40 41</sup>

It is important to note that ***the impacts presented in this Chapter are NOT specific to any particular Option***; the majority of impacts are associated with the general principle of reconfiguring service delivery and are relevant regardless of the Option selected by the JCPCT. However it is acknowledged that some effects are more pronounced for some Options than others. Where there is any degree of differentiation this is highlighted and, wherever possible and relevant, a quantification of the scale of the impact is provided.

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<sup>39</sup> Stakeholder engagement forums were held in Bristol; Leeds; Leicester, London; Newcastle; Oxford; and Southampton. Events were also scheduled for Birmingham and Liverpool but due to lack of demand for the forum event, stakeholder engagement has also been carried out through one-to-one consultations to ensure all the networks are involved.

<sup>40</sup> Further information regarding the methodology that has been employed for each of these tasks can be found in Chapter 3, and details of the stakeholder groups that have been invited to participate in the assessment process can be found in Appendix A.

<sup>41</sup> Vulnerable areas are defined according to the methodology set out in Chapter 3. Each option has different vulnerable postcode district which are illustrated in Chapters 5 to 8. However, all postcode districts considered vulnerable in any of the options were included when selecting areas for interviews with patient families.

#### 4.1.2 Structure of this Chapter

The findings are organised into three main categories:

- Firstly, those impacts which will be **experienced by all patients (present and future)**;
- Secondly, those impacts which will be **experienced by a proportion of patients and families (present and future)**; and
- Thirdly, those impacts only likely to be **realised for those patients who are already undergoing surgical treatment** i.e. they are already in the system and are likely to require on-going surgical treatment, **or those patients that enter the system within the first few years of the new model being operationalised**.

#### 4.2 Impacts that will be experienced by all patients – present and future

This section considers impacts that will not only be experienced by all patients, but which will also be expected to be long term in nature. In general these long-lasting and universal impacts are positive in nature, relating to an improved standard of care and better clinical outcomes.

##### 4.2.1 Improved outcomes

The evidence gathered during this assessment reveals a considerable consensus amongst professional bodies, clinicians and within published literature of the principles underpinning the case for change. There is agreement around the drivers behind the review i.e. that a critical mass of workload at each surgical site (a minimum of 400 cases per year, based on between 100 and 125 procedures annually per surgeon<sup>42</sup>) is likely to result in improved levels of expertise and, therefore, better health outcomes for patients. For example, an independent review of literature concluded that there is an inverse relationship between volume and inpatient hospital mortality which increased with the complexity of the operation<sup>43</sup> and ensuring that each designated surgical centre has a minimum of four surgeons is considered to improve the continuity, safety and quality of care for children, families and staff and allow surgeons to provide consistent 24 hours a day, seven days a week cover. Parents at some of the stakeholder forum events also agreed with the rationale of service reconfiguration, in that it is premised on improving outcomes for children receiving treatment which is their priority.

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<sup>42</sup> Whilst there is not a universal consensus about the *number* of operations a surgeon should undertake to sustain top levels of expertise it is accepted that undertaking a critical mass of procedures in terms of clinical competence and outcomes. Using a figure of a minimum of four surgeons per unit was supported by the National Clinical Advisory Team (NCAT) following its review of the clinical case for change. The NCAT has also recommended that 'it is no longer acceptable to have units with low activity.' (National Clinical Advisory Team, Safe and Sustainable Paediatric Cardiac Surgery Services: Desktop Review, 2010, p.3)

<sup>43</sup> Public Health Resource Unit (2009): 'The relation between volume and outcome in paediatric cardiac surgery: A literature review for the national specialised commissioning group'



#### 4.2.1.1 Impact appraisal

- **Scale:** This positive impact will benefit all patients, both present and future. Based on present patient numbers this would equate to approximately 3,600 patients per year.
- **Likelihood:** These impacts are considered highly likely to be realised following implementation and consolidation of the new model.
- **Duration:** Improvement in outcomes is likely to be long term and permanent and benefits are likely to be maximised over time as the new service model becomes established.
- **Extent:** Benefits will be experienced under all of the proposed Options. However, it is worth noting that Safe and Sustainable is undertaking more work on Option B to assess whether it is possible for all two centres to reach the optimum '400 cases per year.' Should this not be the case it is not considered that the clinical benefits will be fully realised under this option because 400 is seen as the minimum number of patients per year to achieve excellence.<sup>44</sup>
- **Impacts for vulnerable groups:** This benefit is likely to disproportionately affect vulnerable groups as they tend to have a higher need for surgical services and therefore will be amongst the primary beneficiaries.

#### 4.2.2 Delivering care closer to home

While surgical intervention is a key component in the care for children with congenital heart defects it is only one facet of the overall paediatric cardiac service care pathway; the majority of children require only one interventional cardiology procedure (over 88%).<sup>45</sup> The model proposed by the Safe and Sustainable review envisages that most care (i.e. non-surgical or post-operative) will continue and more uniformly be provided as close as possible to families' homes. This is viewed as positive by clinicians, patients, parents and carers, saving travel time and minimising family disruption.

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<sup>44</sup> NHS Specialised Services (2011): Op. cit. See pages 109 – 110.

<sup>45</sup> See NHS Specialised Services (2011): Op. cit. See page 21.

#### 4.2.2.1 Impact appraisal

- **Scale:** As with improvement to clinical outcomes this positive impact will benefit all patients, both present and future (approximately 3,600 patients per year).
- **Likelihood:** One of the main planks of the Safe and Sustainable Review is the development of congenital heart network to support the surgical centres so these benefits are highly likely to be realised.
- **Duration:** Improved and more consistent secondary care is likely to be a long term and permanent positive impact; benefits will be maximised over time as the new service model becomes established.
- **Extent:** Benefits will be experienced under all of the proposed Options.
- **Impacts for vulnerable groups:** This benefit is likely to disproportionately affect vulnerable groups as they tend to have a higher need for surgical services and therefore will be amongst the primary beneficiaries. In addition some of the vulnerable groups (women and those on low incomes) have lower access to private transport and need to rely more on public modes. As such, more local access to secondary care will, therefore, help to support reducing inequities in access to services.

#### 4.2.3 Additional opportunities to maximise the positive impacts

Detailed below are some potential opportunities which should be considered to support the positive impacts identified above. These will help to ensure that the benefits for patients and their families are fully maximised.

##### 4.2.3.1 Supporting clinical networks

To ensure that health outcome benefits are realised and maximised it is essential that the centralised surgical system is accompanied by the development of high quality clinical networks. These networks need to be characterised by sufficient capacity and appropriately skilled cardiology teams at District Children's Cardiology Services and Children's Cardiology Centres, have clear communication and protocols between the surgical centres, local sites and ambulance services, and operate appropriate and robust governance arrangements to secure continuity of care.

There are mixed views on the efficiency with which the current networks are presently operating. Evidence suggests that, at present, networks are organised and operate in an ad hoc and inconsistent way and, in some cases, outreach services and clinics do not correspond with present network geography. However, during the some of the forums events around the country, stakeholders did highlight strengths of their existing networks; they are underpinned by established working relationships and shared professional cultures and have developed over time. Where it can be demonstrated that they are working well it is important that fragmentation of existing networks is avoided and good practice recognised and taken forward.

Strong supporting clinical networks are already a key feature of the Safe and Sustainable Standards and will be an integral component of the proposed new model of care. Development of these new and improved networks should commence as soon as possible to provide reassurance to children and families during the transition phase, especially given that there will be a lead time required to establish these into functioning, and efficient networks. Through the creation of formal clinical networks and the revised pathway of care there is a real opportunity to reduce national inconsistencies in services. Network opportunities could be particularly pronounced in London and the South East. The exact configuration remains subject to consultation but the proximity of the three centres could help to establish a strong collaborative model of service delivery across London and the South East that should be developed in partnership with local stakeholders.

Network development should also look to target resources at providing support for those groups who are identified as vulnerable i.e. women who have not had access to pre-natal support and whose child's cardiac problems are identified only at or after birth. This is particularly relevant in areas where levels of immigration are high, remote areas and socio-economically deprived areas.

#### 4.2.3.2 Training requirements within the wider network

Whilst recognising that Safe and Sustainable standards have identified training for units, the creation of new networks also presents the opportunity to boost health outcomes by incorporating further training requirements to the wider network of clinical providers, particularly for GPs, public health and midwives, in order to change behaviours during pregnancy which may increase the risk of having a child with a congenital heart defect. This will contribute to improved pre-natal diagnosis, which is important and effective in preventing serious complications from developing; it will also enable more informed decisions to be taken about where births should take place ensuring that the best quality of support and care is available for vulnerable babies and their mothers.

#### 4.2.3.3 Monitoring of outcomes

Improved data collection is already part of the Safe and Sustainable proposals. The extent to which outcomes will be improved should be scrutinised and monitored to ensure that reconfiguration delivers the expected improvements. Evaluation of changes or new services is good practice in public policy delivery across all sectors and is often an effective way of capturing successes and communicating those to stakeholders.

#### 4.2.3.4 Opportunities to engage with vulnerable groups

Once a decision has been made by the JCPCT, efforts should be made to engage with the vulnerable groups (as identified within this HIA report) to involve them in the implementation process as far as is possible. Their input would be particularly beneficial in terms of delivery of the component parts of the model e.g. pre-surgical, after care and support, to ensure that benefits for these groups can be maximised and that care delivered closer to home matches with the needs of vulnerable groups. Benefits could also be achieved through education and awareness raising amongst more vulnerable communities, for example, with primary care and social care staff providing better patient information on the links between congenital heart defects and lifestyle during pregnancy.

### 4.3 Impacts that will be experienced by a proportion of children and their families – present and future

This section details long and medium term impacts that are likely to be experienced by *some* children and their families as a result of service reconfiguration.

#### 4.3.1 Long and complex journeys for surgery

All of the Options proposed in the Safe and Sustainable consultation document will give rise to additional journey times to surgical centres for some children and their families.<sup>46</sup> As such, there will be some adverse impacts experienced by a proportion of children and their families, both presently and in the future.

The proportion of children and families who will experience very long journeys in future (a total journey time to a surgical centre of over three hours by private transport or four hours by public transport) is set in the table below.

Table 4.1: Numbers and percentage of patients who will experience journey times of over 3 hours by private transport, or over 4 hours by public transport

Option	Private car (> 3 hours journey time)		Public transport (> 4 hours journey time)	
	Number of patients (% of total patients)	Number of patients minus baseline figure (% of total patients)	Number of patients (% of total patients)	Number of patients minus baseline figure (% of total patients)
A	65 (2%)	-2 (-0.01%)	168 (5%)	36 (1.01%)
B	85 (2%)	18 (0.49%)	178 (5%)	46 (1.56%)
C	90 (3%)	23 (0.65%)	172 (5%)	40 (1.10%)
D	69 (2%)	2 (0.06%)	149 (4%)	17 (0.46%)

The table highlights that only a very small percentage of patients will experience journey times classified as 'significantly' high; no more than 5% of patients for either private or public transport across all of the Options. Whilst numbers impacted are low, compared to the other Options, Option C would result in most numbers of patients having long journey times by private car (90 patients), whilst Option B sees the highest number of patients having long journey times by public transport (178 patients).

It is also important to note that, based on present caseload data, some patients due to have very long journey times in future actually already have journey times of over three hours by private car (67) and four hours by public transport (132) respectively. Deducting these 'baseline' totals from the forecasts for each of the Options provides a good picture of the actual change that the proposed Options would give rise to. This is shown in columns 3 and 5 in the above tables. This shows that the difference as compared to the present configuration is very small.

<sup>46</sup> See chapters 5 – 8 for more detail on travel impacts

In addition, even for those few patients who will have journey times of over three hours by car or four hours by public transport, this impacts will not be experienced over a long period of time. This is because, based on activity figures between April 2000 and March 2010,<sup>47</sup> less than 12% of patients require more than one surgical intervention; so the majority of appointments would actually take place in their local district general hospital or a Children's Cardiology Centre which will involve shorter rather than longer journey times.

A few other issues relating to the impact of longer and more complex journeys were also raised by stakeholders around the potential for geographical disparity in terms of travel and access. Although these issues will apply to very few patients, if patients are from following communities they could experience pronounced impacts:

- People living in the most rural parts of the country, where access is already poorer than in urban locations.
- Communities in northern parts of the country where weather conditions tend to be poorer, particularly in winter months, causing disruption which could result in longer journey times than those projected.
- Families needing to use London hospitals in future as there are some limitations with the London public transport system such as overcrowding during peak periods and on commuter routes. In addition, for those not familiar with the London transport network, it can seem complex, daunting and expensive, adding to anxiety already being experienced.

#### 4.3.1.1 Impact appraisal

- **Scale:** This impact will affect existing and future patients in areas with long journey times. Based on present patient numbers this would affect up to 23 patients by car and up to 46 patients by public transport.
- **Likelihood:** Long journey times to a surgical centre will definitely be experienced by a small minority of patients.
- **Duration:** The impact of long journey times to a surgical centre will be permanent and long term.
- **Extent:** This impact will be felt within all Options, but particularly Options B and C which see longest travelling times as compared to other proposed Options for public transport and car respectively.
- **Impacts for vulnerable groups:** There is likely to be a disproportionate impact on some of the vulnerable groups as set out below:
  - People with low incomes and who experience socio-economic deprivation because they are less likely to have access to private transport, especially those in rural areas where public transport links are particularly poor.<sup>48</sup>
  - Women (particularly those who are more socio-economically deprived) as they have a proportionally higher reliance on public transport; fewer women than men own a private car or have a driving licence.<sup>49</sup>

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<sup>47</sup> NHS Specialised Services (2011): Op. cit – page 21.

<sup>48</sup> Department for Transport (2007): 'Personal Travel Factsheet: Travel in rural and urban areas'. Department for Transport (2003): 'Personal Travel Factsheet 4: Bus use in GB'

<sup>49</sup> Department for Transport (2003): 'Personal Travel Factsheet 7: Car use in GB'. In 1999-2000 82% of men held a full licence, compared with 60% of women. This is likely to be a particular issue for single-mothers who do not have access to a private vehicle as part of their family unit.

#### 4.3.1.2 Mitigations and opportunities

To ease the challenges posed by longer and more complex journeys to surgical centres, families should be provided with clear guidance and advice about the different access Options so that travel for surgery is made as easy as possible; this will especially be the case for (those families who do have long journey times for surgery) using public transport.

Information will need to be provided in a range of languages and formats to ensure it can be understood by all families requiring transport assistance. Online advice should not be relied upon as IT access and literacy, especially for some key vulnerable groups (those from Asian backgrounds and socio-economically deprived families) cannot be assumed. Working with local community groups and organisations to ensure that this information is disseminated to those who require it through the appropriate media would be an effective way to take this forward.

Whilst the increase in patient volumes to newly designated centres may be modest (based upon present patient numbers, this is a maximum of 1,274, 35% of the annual patient caseload who would access a different centre<sup>50</sup>), it will be important to ensure that parents travelling long distances for surgery have access to long and short stay accommodation to help ease expense of travelling long distances for surgery. The Safe and Sustainable Standards set out clear requirements for the provision of accommodation at surgical centres.<sup>51</sup> It will be important that there are future reviews of the capacity of accommodation at designated surgical centres to check their ability to cope with increased caseloads and the requirement to accommodate more parents, as with the issues around transplantations. This could include Trusts working alongside the voluntary sector to help with the provision of more accommodation. Accommodation should also be available for siblings and other family members as appropriate.

In addition to accommodation, financial assistance with travel costs, particularly where patients live a long way from the hospital should be considered. Currently, families on income support can claim back travel expenses through a reimbursement scheme. Widening this to a universal travel reimbursement scheme (so that not only those on income support can benefit from assistance) is one possibility. Whilst this is outside the scope of the Safe and Sustainable Review, the NSCT have raised the concerns of parents with the Department for Health.

Another fairly simple solution to implement is for centres to bear geography in mind when scheduling planned-procedure appointments; those that have furthest to travel should be given later appointments, which will ease the stress of travelling long distances and may help prevent the need for accommodation the night before.

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<sup>50</sup> This applies to Option C

<sup>51</sup> NHS Specialised Services (2011): Op. cit. page 189

Finally, in order to ensure that the challenges of longer and more complex journeys do not disproportionately affect vulnerable groups, community support networks need to focus efforts on looking at access solutions for the population groups identified as most likely to experience difficulties when the new service model is implemented. These should be specifically targeted at geographical areas which experience very long journey times in future (these are illustrated for each Option in Chapters 5 to 8).

### 4.3.2 Effects on families

Engagement with stakeholders and, particularly families from vulnerable postcode districts across the country has identified a range of long term impacts that would be experienced by a small proportion of parents and siblings (see figures in table 4.3 above for indicative figures on the number of people affected) as a consequence of the proposed reconfiguration of specialist surgical centres. These impacts, summarised below, particularly affect those who would need to travel farthest to access a surgical centre.

- There is the potential for parents to feel isolated if attending to a child without any support from other family members or friends, especially if a stay over a period of months is required and there is no provision for more than one parent. Parents consider this type of informal support network to be very valuable. This will particularly affect those with very long journey times (see table 4.3 above) which is more the case for Options B and C.
- Regularly having to spend time away from home with an ill child is likely to have an impact on the care parents could provide to their other children, putting greater stress on family life.
- The financial costs incurred by families through visiting and/or staying with their child when they are undergoing surgery. These impacts are most likely to affect those families on low incomes or parents who are self-employed.
- A few parents, who have children who are currently being treated at hospitals which may not be designated as surgical centres in the future, have stated that they would consider relocating their family in order to be close to a surgical centre. The impact of this on family life (including housing; parental employment, schooling and childcare for other siblings; and family support) would be considerable.

#### 4.3.2.1 Impact appraisal

- **Scale:** All existing and future patients in areas with particularly long journey times will be affected by this impact (as indicated above, this is only likely to affect between 65 and 90 patients by car and between 17 and 46 patients by public transport).<sup>52</sup>
- **Likelihood:** Although the Safe and Sustainable Standards do address some of these issues, it is still likely that these emotional effects on families will be realised where long journey times are involved.
- **Duration:** A small proportion of families whose children require more than one intervention (likely to be under 12% based on present patient activity) will experience medium to long-term effects; however, for the vast majority of patients who require only one surgical spell these effects will be short-term.

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<sup>52</sup> This is based on present patient numbers; those with particularly 'long' journey times are those with trips of over three hours by car and over four hours by public transport.

- **Extent:** This impact will be felt under all Options, but particularly Options B and C which see longer travelling times than the other Options for public transport and car respectively.
- **Impacts for vulnerable groups:** There is likely to be a disproportionate impact on vulnerable groups, particularly those on low incomes or who rely on cultural or religious support close to home.

#### 4.3.2.2 Mitigations and opportunities

The Safe and Sustainable Standards include provisions to help mitigate effects on family life; these include:

- Provision of accommodation, maternity and children's play facilities.
- Standardising the provision of psychological support to parents and carers.
- Provision of Children's Specialist Nurses and a Clinical Psychologist during decision-making processes and explaining of diagnosis/treatment to help ease stress.<sup>53</sup>

Other mitigation measures which were suggested throughout the HIA activities included further engagement with social workers to boost emotional support to families and exploring, through the involvement of voluntary organisations, support mechanisms to ease logistical pressures of managing family life.

It is also suggested that special consideration should be given to those from more deprived backgrounds, where psychological support is often a larger priority<sup>54</sup>; also BAME groups or those particular faith backgrounds may be more reliant on specific cultural or religious support usually provided by their local community and not available in the new location. Engaging voluntary organisations can be an effective way in which to deliver to appropriate social, psychological and emotional support.

#### 4.4 Impacts that will affect only present patients and those that enter the system within the first couple of years of the model being operational

This section highlights covers those impacts which will be experienced by patients and some health services in the short-medium term; they are largely transitional effects involved in the switch from the existing configuration to the proposed new model of care.

##### 4.4.1 The period of transition

The transition stage of the reconfiguration will be a period of upheaval which could lead to service impacts before the changes have actually been implemented with the potential for this to affect quality of care (and outcomes) at centres where surgical services will no longer be provided and cause capacity issues at designated surgical centres.

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<sup>53</sup> NHS Specialised Services (2011): Op. cit – pages 184 – 190; presence of Cardiac Specialist Nurses and Clinical Psychologists has been classified as a 'mandatory amber' standard.

<sup>54</sup> NHS (July 2010): Children's Heart Services: Patient and Staff Engagement Event, Bristol– June 2010



During the engagement events some stakeholders, including parents, commented that there is the potential for temporary disruption as new networks are established, such as immediate difficulties in terms of discharge arrangements and onward care and handover procedures. There is the potential for some of these factors to lead to patients being required to stay in the surgical centre for longer, resulting in increased costs and emotional stress.

#### 4.4.1.1 Impact appraisal

- **Scale:** Patients currently within the system and who may require future surgical interventions which may need to take place at a different hospital will experience these impacts. This is likely to affect very few patients because more than 88% of children require only one intervention<sup>55</sup> and, based on the current actual patient caseload, a maximum of 1,233<sup>56</sup> (34%) of current patients would be required to travel to a centre that is different to the one that they are presently using under any of the proposed Options.
- **Likelihood:** The impact is unlikely to be realised in full, as Safe and Sustainable has already developed plans to reduce the possibility of the adverse transitional impacts being realised.
- **Duration:** Impacts associated with the period of transition will be short term.
- **Extent:** This impact is relevant to all Options. However, these transitional effects might be slightly more pronounced in Option C under which most patients would be required to use a different centre<sup>57</sup> in future (as compared to the other Options).
- **Impacts for vulnerable groups:** There is the potential for this issue to be more acute for people from vulnerable groups, particularly for those who, through economic circumstances, language barriers or lack of understanding of care pathways, would find it difficult to exert influence over the process of transferral to onwards care.

#### 4.4.1.2 Mitigations and opportunities

- Effective transitional arrangements will be particularly important. The Safe and Sustainable Review has already developed plans for the transitional period to minimise any adverse effects including new clinical protocols within each network and the development of a health records summary. Careful monitoring and consultation of families during the changeover to the new system will be required to ensure that these measures are mitigating interim effects and that quality of care and outcomes are not being jeopardised.
- The need to reassure children and parents about the transition process will be important. A clear communication and engagement plan would help to keep them informed and ensure that their needs are being considered and addressed. For identified vulnerable groups this is likely to be particularly beneficial and it will be important that this plan is communicated in ways which are understandable to them. For example, communication in different languages will be essential. Other options include:
  - Working with community and charitable organisations to identify the most appropriate way in which to issue information to the local community and particular population groups within it.

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<sup>55</sup> NHS Specialised Services (2011): Op. cit. – page 21.

<sup>56</sup> This figure is based on CCAD data 2009/10 on procedures per centre as presented in the Safe and Sustainable consultation document (NHS Specialised Services (2011): Op. cit.)

<sup>57</sup> Option C – 1233 patients. This is based on CCAD data 2009/10 on procedures per centre as presented in the Safe and Sustainable consultation document (NHS Specialised Services (2011): Op. cit.)

- Ensuring that information is as easy to reach in formats other than through a website to enable those without computer access / literacy to find out about new arrangements will be important to make sure the needs of all of the community are met.

#### 4.4.2 Resources and capacity

There were some concerns raised by stakeholders around resources and capacity; these were focused around those centres forecast to see significantly increased volumes of paediatric cardiac procedures; centres likely to accept a large volume of patients under three or more Options include Birmingham, Bristol, the London centres and Newcastle as shown in Table 4.2 below.

Table 4.2: Increased volumes of paediatric cardiac procedures by hospital network

Option	Birmingham	Bristol	Leeds	Leicester	Liverpool	London	Newcastle	Oxford	Southampton
A	-91	160	-316	189	55	187	149	-108	-224
B	162	81	-316	-225	55	-71	270	-108	153
C	162	160	-316	-225	55	227	270	-108	-224
D	97	160	320	-225	9	227	-255	-108	-224

Availability of clinical infrastructure (paediatric beds, paediatric intensive care unit (PICU) beds, planned theatre sessions, etc.) at the newly designated specialist centres was questioned. In the short term insufficient infrastructure or staff capacity could, in the worst case scenarios, result in some planned procedures being cancelled, possibly at short notice. For patients and their families who have travelled some distance, and potentially, having taken time off work, this will exacerbate the emotional stress incurred. This issue has, however, already been identified and action taken by the NSCT; see below.

Patient choice is another factor which needs to be considered in terms of capacity planning as it has the potential to disrupt planned flows; people may choose to travel to centres which are outside of their network which could induce capacity pressures. The following issues were raised during the HIA engagement process:

- Stakeholders did suggest that capacity pressures could be particularly pronounced in London because London is considered to be an international centre of good practice and, therefore, treats a significant proportion of international patients as well as undertaking domestic procedures. Great Ormond Street in particular (which is already undertaking well over 500 cases per annum) delivers a high number of other nationally commissioned specialist services. The capacity self-assessment undertaken by the hospital suggests that it is planning how best to meet additional demand. The Safe and Sustainable team is currently reviewing this.
- Families may also opt for treatment at one of the centres in the London network due to the good transport connections; stakeholders at the events in Newcastle, Leeds and Southampton suggested that London would be an easier and preferable Option if their present local services cease. This has the potential to affect projected flows.

- Another key factor impacting on patient choice for families is transport, access and private car parking facilities. Some families have stated that taking their child home via public transport following an operation is far from ideal and that those sites with better access and private car parking facilities would strongly influence their choice of centre for their child. Birmingham and London were highlighted as centres without adequate and/or affordable parking Options.

As such, the exercise of patient choice may mean that some centres may find it difficult to reach the 400 optimum caseload whilst others, in locations which are easily accessible or which have a high profile or quality reputation, may witness more than the forecast demand and face future capacity constraints. Given that patient numbers experiencing a change in network in future, though, it is unlikely that patient choice would affect flows to the extent of jeopardising the proposed new model of care.

The potential for population growth is another factor suggested by stakeholders as having the potential to affect demand for services. However, analysis of population growth data does not indicate that this will have a significant impact on patient flows. Of the 50 districts around the country with the highest population growth factors over the next ten years<sup>58</sup>, the London network currently supports the majority (26). Growth projections for these districts are estimated to result in an additional 46 patients for the London network. This is followed by the Leicester network (covering 9 of the top 50 areas for projected growth each), with the remaining 15 districts with highest population growth projections spread across the other networks.<sup>59</sup> Overall, this is unlikely to translate in a significant uplift of patients numbers for any other network.

#### 4.4.2.1 Impact appraisal

- **Scale:** This impact is likely to be felt by patients and staff in any centres where demand exceeds that which has been assumed.
- **Likelihood:** This could be an issue for patients to be treated in London and Birmingham in future, where patient numbers are already high. However, as part of the Safe and Sustainable Review, all sites have been requested to assess additional capacity requirements so there should be limited potential of services having insufficient capacity. Present evidence suggests that patient choice and population growth are unlikely to induce significant enough changes to assumed patient flows to raise significant capacity challenges.
- **Duration:** Impacts on resources and capacity are short to medium term as they will be addressed as the proposed new model becomes established.
- **Extent:** This impact is applicable to all Options.
- **Impacts for vulnerable groups:** There are not considered to be any disproportionate impact on vulnerable groups.

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<sup>58</sup> Areas in the top 50 districts nationally for population growth up to 2020. TEMPPO 6.2 data

<sup>59</sup> Less than 10 additional patients per annum for networks other than London.

#### 4.4.2.2 Mitigations and opportunities

Understanding that there could be concerns around future capacity, the Safe and Sustainable Review required sites to complete a 'facilities and capacity' assessment as part of the Option evaluation process. They were asked to demonstrate that they would have:

- Sufficient staff at the tertiary centre to meet the demand for in-patient beds, critical care beds, theatre capacity and service provision as generated by the network.
- Sufficient capacity at the tertiary centre to ensure that the demands of emergency and elective cardiac surgery can be flexibly managed in daytime lists.
- Facilities in place to ensure easy and convenient access for parents and carers. Therefore, there should be limited probability of services having insufficient capacity unless, through patient choice, patterns of demand are significantly different from what has been assumed and modelled.

Safe and Sustainable recognises that the accuracy of predictions around patient flows is important to get right in order to support the operation of the future model of care. Therefore, it has already commissioned an independent consultancy to undertake direct discussions with families about their future intentions; canvassing parents of children currently in the system is seen as a sensible proxy for future behavioural patterns. Alongside this, Safe and Sustainable is also validating the initial transport and travel analysis to test out the validity of the assumptions. These activities will help to forecast which hospitals are, in reality, likely to receive patients that are currently being treated elsewhere, thereby assisting with capacity planning.

In order to ensure that any future capacity pressures are minimised, the capacity and resilience issues should be addressed and resolved well in advance of implementation; the action already being put in place to help further test predicted flows will help this. It is suggested that during implementation, particular work is undertaken with those families and networks currently served by Leeds, Leicester and Southampton where stakeholders raised the issue about the likelihood of families using a centre other than that to which they have been assigned if their services cease at their local hospital.

In addition, it will be extremely important that future flows are monitored to ensure the sustainability of services and that no capacity problems manifest themselves following reconfiguration.

### 4.4.3 Retention of expertise

There is a risk that expertise may be lost when the reconfiguration changes are implemented as it may not be viable or desirable for some staff to relocate. Through the impacts forums and one-to-one consultation, some surgeons have indicated that they may choose to focus on specialist adult services only, retire or move abroad to work and, therefore, this impact does present a risk in terms of retention of expertise. Given the small number of surgeons providing paediatric cardiac surgery nationally and the small number of doctors who are trained each year, being unable to retain one or two surgeons could have significant consequences for some designated centres. For each of the Options, between 10 (Option A) and 13 (Option C) of the 31<sup>60</sup> surgeons may be required to relocate to new centres; it is likely that not all will do so.

In addition, surgeons do not operate in isolation; they are supported by a wider medical, nursing and care team. Some staff, such as perfusionists, will be encouraged to move as their skills are closely linked to provision of this care. However, it is considered that some nursing staff may not transfer to another city so that surgeons who decide to relocate will be required to work within newly established teams.

Many stakeholders have also commented that cardiology centres (non-surgical centres) may have difficulties in attracting and retaining the required medical and nursing expertise. Training for middle and junior medical staffing could also be impacted if sufficient senior clinicians are not retained to provide supervision at these cardiology centres. This impact could be aggravated if staff start to look for other positions as soon as the JCPCT decision is announced but prior to formal implementation of service reforms.

#### 4.4.3.1 Impact appraisal

- **Scale:** This impact could potentially be felt by all patients until staff and expertise levels under the new model stabilise.
- **Likelihood:** It is likely that impacts associated with the retention of expertise will be realised and it is dependent on the ability to recruit the right skills mix in future.
- **Duration:** The retention of expertise will be a medium to long term impact.
- **Extent:** This impact will be felt within all Options, but particularly within Option C where most surgeons would be required to relocate.
- **Impacts for vulnerable groups:** There will be no disproportionate impacts on vulnerable groups.

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<sup>60</sup> These surgeon figures have been taken directly from a new vision for Children's Congenital Heart Services in England, 2011, Safe and Sustainable, p.17

#### 4.4.3.2 Mitigations and opportunities

The ability to recruit and retain appropriately trained clinical and nursing staff was considered as part of both the deliverability and sustainability criteria of the Options evaluation<sup>61</sup>, however there will be a lead time involved in establishing new teams and cultures. To support future workforce planning and to try to mitigate expertise being lost, discussions with clinicians to assess their future career intentions is in the process of being undertaken; staff are being consulted and asked what their plans might be. Effective workforce planning is vital for the transitional and implementation phases and should be built into the capacity modelling; it needs to be considered as an integral part of the decision about reconfiguration rather than addressed after the decision has been made.

A dedicated redeployment team could be established to support affected staff with vacancies protected for at risk staff. Redeployment should, where possible, keep teams intact. New teams will also require support to develop close and effective working relationships as quickly as possible. Business critical staff development and retention schemes should be considered for staff expected to re-locate to a new centre and good training and career progression opportunities need to be developed to retain experienced staff within the system.

#### 4.4.4 Patient – clinician relationships

A negative impact of the proposed new model of care is that continuity of care will be lost for a small number of patients; this is particularly with regard to the disruption of the relationship between children, their families, their surgeon and the wider cardiac team. Those patients who do require numerous surgical procedures and/or require frequent attendance for cardiac care establish strong bonds of trust with the clinical team treating them and these may be jeopardised through reconfiguration plans. Those children who are currently receiving treatment and who require more than one procedure (this is typically under 12% of patients)<sup>62</sup> may have to attend new centres and develop relationships with new clinical staff for their care in future. This disruption of care could affect a child's and their parents' confidence and add to emotional stress.

This impact will be more pronounced where services are ceased at centres where high volumes of patients are treated. All five of the hospitals which feature in all of the Options<sup>63</sup> presented in the consultation document have patient caseloads of over 300 per year. However, of the hospitals which do not feature in either all or some of the Options, the Royal Brompton (353) and Leeds (316) also treat over 300 patients annually. It is likely that impacts to patient – clinician relationships would be more pronounced in these geographical areas.<sup>64</sup>

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<sup>61</sup> Safe and Sustainable (17<sup>th</sup> December 2010) Review of children's congenital cardiac services in England and Wales: Draft Pre-consultation business case

<sup>62</sup> NHS Specialised Services (2011): Op. cit – page 21.

<sup>63</sup> Alder Hey Children's Hospital; Birmingham Children's Hospital; University Hospitals Bristol; Great Ormond Street Hospital; and Guys and St. Thomas'.

<sup>64</sup> These figures is based on CCAD data 2009/10 on procedures per centre as presented in the Safe and Sustainable consultation document (NHS Specialised Services (2011): Op. cit.)

Although the issues mentioned above are likely to have a considerable effect on those who do experience them, very few patients are likely to be affected. At present, less than 12% of patients require more than one surgical intervention. In addition, patients who will actually be required to use a different surgical centre in future does not exceed 34%<sup>65</sup> of the total patient caseload in any of the proposed Options. As such, for most patients, maintenance of established relationships will be achieved through effective cardiology networks rather than through the actual surgical centre, which they will only need to visit once.

Another continuity of care issue raised by some Regional Directors of Public Health as well as other stakeholders was the transitioning from paediatric to adult treatment. As part of the current configuration of cardiac heart surgery services, patients receive care from separate paediatric and adult cardiologists, but the same surgeon and perfusionist can provide treatment to both children and adults. Many patients take comfort in being treated at the same centre as that which they had received treatment during their childhood; seeing a practitioner that they know and who understands their condition without the requirement for explanation was highly valued.

#### 4.4.4.1 Impact appraisal

- **Scale:** These issues will only affect children already in the system because all future patients will be allocated to a centre to be retained, therefore, relationships with surgical staff will not be put at risk. This is likely to affect very few current patients because:
  - More than 88% of children require only one intervention.<sup>66</sup>
  - A maximum of 34%<sup>67</sup> of current patients would be required to travel to a new centre under any of the Options. For all other children requiring more than one intervention there will be no disruption to their continuity of care.
  - There are very few patients who receive treatment as a child and who need surgical treatment as an adult.
- **Likelihood:** For those few children and families who need more than one intervention, and who would use a new hospital in future, it is very likely that this impact will be realised and will lead to some of the wider emotional and psychological impacts. In terms of transition into GUCH services, the probability of disruption being encountered cannot fully be assessed as GUCH services themselves are being reviewed under a separate process.
- **Duration:** The impact will be short term, as this issue will only affect current patients; new patients will be automatically referred to centres retaining cardiac surgery so that future service provision is not interrupted.
- **Extent:** This impact will be realised within all Options, but particularly Option C as this is likely to involve more patients using a different hospital than at present, compared to the other Options.
- **Impacts for vulnerable groups:** There are no disproportionate impacts on vulnerable groups.

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<sup>65</sup> This figure applies to Option C.

<sup>66</sup> This is based on present patient numbers. See NHS Specialised Services (2011): Op. cit. – page 21.

<sup>67</sup> This figure is based on CCAD data 2009/10 on procedures per centre as presented in the Safe and Sustainable consultation document (NHS Specialised Services (2011): Op. cit.)

#### 4.4.4.2 Mitigations and opportunities

- For the minority of patients who require more than one intervention and will be treated in different surgical centre, protocols (either national or network-based) need to be established that reflect and safeguard relationships where possible; these will need to include detailed transitional arrangements; closer links between different centres across the network; link paediatricians; and cardiac liaison nurses.
- Fully involving parents with the development of their child's clinical care pathway will also help to allay concerns about their future treatment. Direct communication with specialist staff will improve trust and help to instil confidence in the way in which their child will receive care in the future. The Safe and Sustainable standards address involvement of parents in decision-making by provision of better information and access to appropriate support and guidance.<sup>68</sup>
- Finally, it is suggested that all new diagnosis of cases should be referred to new designated centres as soon as practicable after a decision is taken by the JCPCT to minimise future severance of patient/clinician relationships. This will help to ease transitional effects considerably.

While adult congenital heart services are outside of the scope of the Safe and Sustainable consultation, the review and the paediatric clinical standards give prominence to the transition to adult services to ensure an integrated approach to the entire patient pathway. There is a separate review of GUCH service being undertaken by the NHS.

#### 4.4.5 Longer travel times to surgical centres

All of the proposed Options will give rise to longer journey times for patients and families who need to use a new surgical centre in future. The table below captures the patient numbers that this is likely to affect – between 8% and 12% of patients if travelling by private car and between 9% and 12% if using public transport will experience an increase of more than one hour. Option C results in most patients being affected by both private car and public transport.

Table 4.3: Proportion of current children experiencing additional journey times of 1 hour or more

Option	Private car	Public Transport
A	8% (295)	11% (413)
B	8% (293)	11% (395)
C	12% (425)	12% (432)
D	9% (339)	9% (364)

As data is not currently available on the projected flows for accessing secondary care at non-surgical centres, analysis cannot be undertaken on the changes in these journey times, which would be likely to see reductions due to this care being provided closer to home.

<sup>68</sup> NHS Specialised Services (2011): Op. cit. – pages 184 – 187.



#### 4.4.5.1 Impact appraisal

- **Scale:** Only present patients will be affected by an increase in journey times; future patients will be assigned to a retained centre so the journey times will not see any alterations. This will affect very few patients. Out of all of the Options the maximum number of patients that will experience an increase of over one hour is 425 (12%) by car and 432 (12%) by public transport (both of these relate to Option C).
- **Likelihood:** The impact of longer travel times will be experienced by a small minority of patients.
- **Duration:** The impact will be short term as the relative increase in journey times only affects a proportion of existing patients.
- **Extent:** This impact will be felt within all Options, but particularly Option C as this will involve the most number of people experiencing an increase of over one hour.
- **Impacts for vulnerable groups:** This impact does have the potential to affect people from vulnerable groups mainly due to the economic implications of having to travel further.

#### 4.4.5.2 Mitigations and opportunities

To ease the challenges posed by longer, unfamiliar and more complex journeys for surgery, it would be useful if families could be provided with clear guidance and advice about the different access Options so that travel is made as easy as possible. This will especially be the case for public transport where families need to use new and unfamiliar services. Safe and Sustainable does suggest the need for enhanced provision of information on travelling, parking and public transport in Standards;<sup>69</sup> this should be a priority.

Information will need to be provided in a range of languages and formats to ensure it can be understood by all families requiring transport assistance. Online advice should not be relied upon as computer access and literacy, especially for some of key vulnerable groups (those from Asian backgrounds and socio-economically deprived families) cannot be assumed. Working with local community groups and organisations to ensure that this information is disseminated to those who require it would be an effective way to take this forward.

#### 4.4.6 Sustainability of interdependent services

There were certain specific services that stakeholders did raise concerns about in terms of the impact on them of moving paediatric cardiac surgery, including their future sustainability post-reconfiguration, which are described below. It is possible that there will be some effects in terms of provision of these services in the short-medium term following implementation of one of the proposed new service models and the time taken for the system to stabilise.

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<sup>69</sup> NHS Specialised Services (2011): Op. cit. – page 190.

- **Nationally commissioned services:** Nationally commissioned services are, by their nature, very specialist and performed at very few centres nationwide. Extracorporeal Membrane Oxygenation (ECMO) is one specialist service which is commissioned on a national basis. There are currently three centres in England which provide paediatric ECMO services; Great Ormond Street for Children (London), Freeman Hospital (Newcastle) and Glenfield Hospital (Leicester). These centres have a national and international reputation for providing high quality ECMO services, with the support of cardiac surgeons, intensivists and perfusionists.

If either the Newcastle or Leicester sites were no longer designated as cardiac surgical centres (Option D; and Options B, C and D respectively), then the related reduction in intensive care beds and changes in staffing impacts on paediatric ECMO services which could be under threat and would probably have to be relocated. Setting up new ECMO centres, for example in Birmingham's Children's Hospital, is likely to cause some short term capacity issues as the service becomes established. As Option D proposes the cessation of surgical services at both Newcastle and Leicester this could pose most risk to future ECMO provision in the short-medium term.

It should be noted that Leicester also provides the main national adult ECMO service and whilst paediatric and adult ECMO services will be separate in the future, the current links between adult and paediatric ECMO services in terms of the provision of training, research and development in the delivery of ECMO services, flexibility of provision and case selection could, if Leicester was no longer designated as a cardiac surgical centre (Options B, C and D), result in an indirect impact on adult ECMO services. There may be separate opportunities for Leicester to develop further as a national training hub.

Although ECMO is part of critical care networks, the Scottish Expert ECMO group agreed that "the majority of experts recommended that ECMO should be provided in a hospital with cardiothoracic services onsite, to ensure access to the skills and support of cardiothoracic surgeons and perfusionists."<sup>70</sup>

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<sup>70</sup> Scottish Expert ECMO Group report July 2011: <http://www.scotland.gov.uk/Publications/2010/04/16151905/5>

Short-medium term risks could also be encountered if other nationally commissioned services need to be relocated as part of the review. For example, in addition to ECMO, Great Ormond Street is the only designated provider of complex tracheal surgery for children and is the largest provider for paediatric cardiothoracic transplantation surgery. As such, if Great Ormond Street is not in the eventual new service model decided upon by the JCPCT there could potentially be adverse consequences due to the need to relocate services and the possible loss of expertise.<sup>71</sup> Similarly paediatric transplantation services disruption could be encountered if the Freeman Hospital is not included in the Option selected by the JCPCT because it is presently a transplantation provider.

- **PICU:** The caseload of PICUs at many sites comprises a high proportion of cardiac related cases; for example over 70% of the patients treated at the Royal Brompton, the Freeman Hospital in Newcastle and Glenfield Hospital, Leicester are cardiac patients. If surgical services are relocated from these hospitals it is considered likely that the remaining PICU will need to be downsized with significant impacts on beds, services and staff, possibly leading to the units becoming unviable. Therefore, the PICU at Royal Brompton would be impacted under all four Options; the PICU at Glenfield Hospital, Leicester would be impacted in Options B, C and D; and the PICU at the Freeman Hospital in Newcastle would be impacted in Option D. Under Option D, the sustainability of all three PICUs (whose caseload comprises a high proportion of cardiac related problems) may be adversely impacted.

Safe and Sustainable has already identified concerns about PICU sustainability. It considers that as the PICUs at the Royal Brompton, Newcastle and Leicester “exist predominantly to support cardiac surgery (and because all three cities have existing alternative paediatric intensive care provision for non-cardiac admissions) this presents limited risk to local and national paediatric intensive care provision” should paediatric cardiac surgery be removed from these sites.<sup>72</sup> Conversely, larger centres should be able to increase the capacity and sustainability of PICUs and such centres may be more likely to be able to attract good quality staff. There is a further impact which could be felt by the Royal Brompton should PICU services be lost as a result of reconfiguration; the Royal Brompton has some concerns that paediatric respiratory services could become unviable. The JCPCT has agreed to convene an independent panel of experts to report specifically on the issue of the extent to which the services could be safely delivered at the Royal Brompton Hospital in the absence of a paediatric cardiac surgical service / viable PICU before it makes its final decision.<sup>73</sup> This interim report has not made an assessment of the likely impact, as it is important to consider all the available evidence and the findings from the independent panel of national and international experts will need to be considered before any assessment is made.

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<sup>71</sup> The sustainability of this service would be not considered at risk if the proposed Option including GOSH is implemented.

<sup>72</sup> NHS Specialised Services (2011): Op. cit. See page 105.

<sup>73</sup> The results of this review will be incorporated into the final HIA report.

- **Interventional cardiology:** Stakeholders engaged throughout the HIA did have some varying views about whether some interventional procedures could continue to be undertaken at non-surgical centres or whether all the interventional cardiology work would need to transfer to the designated surgical centres; this would also entail the transfer of some cardiology medical training places. This, therefore, could have an impact on patients requiring interventional cardiology services, at sites in Newcastle, Leicester, Southampton, Leeds and Oxford as they would then need to travel further for these services as well as for surgical services. All of the proposed Options involved the removal of surgical services at two or more of these sites.

#### 4.4.6.1 Opportunities and mitigations

It will be important to highlight how clinical interdependencies have been protected when the decision on Options is taken by the JCPCT; this will ensure transparency and allay any concerns about where and whether the future viability of other services is at risk both for patients and staff. It is also essential that impacts on associated services, particularly PICUs, are closely monitored following the implementation of any services reforms.

In terms of PICU impacts in particular, there will be a range of evidence relevant for the JCPCT to consider to ensure that any potential negative impacts are minimised or mitigated. There is a separate review of specialised paediatric services in London being undertaken which is considering the centralisation of specialised paediatric services delivered through a collaborative network-based model of care;<sup>74</sup> and the Royal Brompton Hospital and Great Ormond Street have previously put forward a proposal for facilitated centralisation of specialist paediatric cardiac and respiratory services in London.<sup>75</sup> It would be worthwhile considering relevant findings from such reviews.

#### 4.4.6.2 Impact appraisal

- **Scale:** These impacts are likely to be felt by a small number of patients receiving these services in centres where surgery will be removed.
- **Likelihood:** Safe and Sustainable has already undertaken considerable further work with regard to future capacity, sustainability and resilience of ECMO and PICU services to minimise effects during transition. However, there are likely to be some impacts until the proposed new model is firmly established.
- **Duration:** The sustainability of interdependent services will be a short to medium term impact.
- **Extent:** ECMO impacts will be particularly relevant if they are removed from Leicester (B, C and D). PICU and interventional cardiology impacts would have the same extent of impact across all Options.
- **Impacts for vulnerable groups:** There are no disproportionate impacts on vulnerable groups.

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<sup>74</sup> Commissioning Support for London (2010): 'The London Specialised Children's Services Review'

<sup>75</sup> Royal Brompton and Harefield NHS Trust and Great Ormond Street Children's Hospital Children's Heart and Lung Service (2009): 'A proposal to establish a national and international service for children with heart and lung disease'

## **4.4.7 Capacity of ambulance services**

### 4.4.7.1 Impacts

There may be possible consequences for ambulance provision in the short-medium term until any new service model is implemented and established. Longer trips to a specialist centre may result in ambulances being out of circulation for more time.

### 4.4.7.2 Mitigations and opportunities

Ambulance services, including those in Wales, should to be fully integrated within the clinical networks<sup>76</sup> and fully consulted about the implications for future services. This should happen during implementation.

## 5. Analysis of Option A

This Chapter presents which populations are likely to be impacted by Option A. It identifies:

- The number and location of those people who would be designated to a new hospital under Option A;
- Access impacts for population and patient numbers, for both private car and public transport;
- Impacts on vulnerable postcode districts (those areas where there are high densities of socio-demographic groups with a higher propensity to experience congenital heart disease); and
- The impact on carbon emissions.

### 5.1 Option A

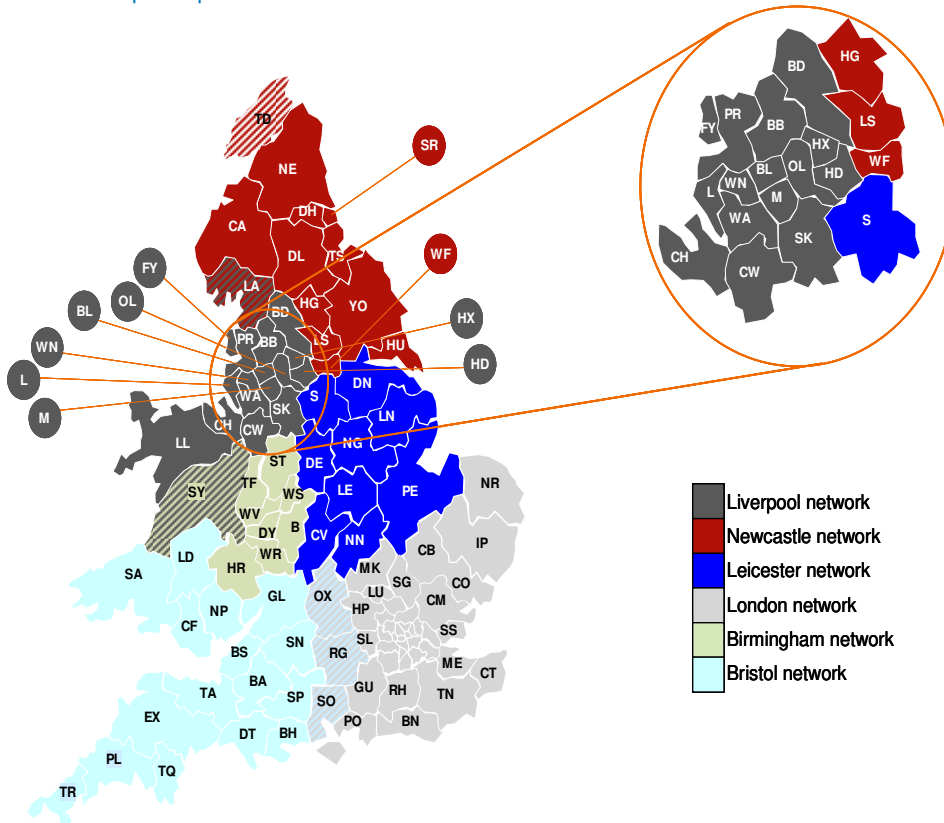
Option A includes seven Specialist Surgical Centres and four potential Children's Cardiology Centres, the locations of which are shown in Table 5.1.

Table 5.1: Services provision in Option A

Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
Seven surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> <li>• Glenfield Hospital, Leicester</li> </ul>	Four cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Southampton General Hospital</li> <li>• Leeds General Infirmary</li> <li>• John Radcliffe Hospital, Oxford</li> </ul>

The networks associated with this configuration of services are illustrated in Figure 5.1.

Figure 5.1: Map of Option A



Source: Safe and Sustainable, Pre-Consultation Business Case: Review of Children's Congenital Cardiac Services in England

## 5.2 Who and where would be impacted by Option A?

The Safe and Sustainable consultation document provides figures for the numbers of procedures undertaken at each of the present sites.<sup>77</sup> Should Option A be implemented a maximum of 1008 patients would be required to use a new surgical centre to one they are presently using (if they require a future surgical intervention).

It is also relevant to consider numbers of patients who would be required to use a new network in future as this indicates where change is likely to have pronounced effects. Based on patient data, it is anticipated that 772 children would be affected by being assigned to a new network. This represents 21% of the total current number of patients.<sup>78</sup> Of these 772 patients the majority are patients currently using Leeds (316; 41%) and Southampton patients (224; 29%).

<sup>77</sup> NHS Specialised Services (2011): Op. cit. page 17. These figures are taken from CCAD data for 2009/10.

Each of the hospitals included within Option A is likely to receive more patients in future. It is likely that Leicester would see the largest increase; based on current flow data it would provide 189 more interventions per annum (27% of the 772 total) which is almost double the current volume of cases at this centre<sup>79</sup>. The London centres would absorb the next highest number of new patients (187, which represents 24%).

### 5.3 Access impacts

The access analysis presented below provides data on journey times to a surgical centre from each postcode district within its network. As patient activity data provides the most accurate way of looking at the actual numbers of people likely to be affected; all analysis is based on existing patient flows.

The access assessment provides information for both private car and public transport journeys:<sup>80</sup>

- Numbers and proportions of patients experiencing a potential increase in journey time under Option A;
- Numbers and proportions likely to experience a 'significant' access impact. This is defined as:
  - An increase in journey time of over one hour; and/or
  - A total journey time of over three hours by private transport or four hours by public transport.

Two further important issues should be noted with regard to the travel methodology:

- Travel times have been modelled to surgical centres. There has been no analysis of travel times to access secondary and post-interventional care because flow data is not available for these patients. As such, the positive travel effects that will be experienced by all patients who in future will receive follow-up care closer to home are not reflected in this analysis. Only journey times changes for those requiring surgery are included.
- Travel times have been modelled based on 'fair weather' assumptions. During the assessment some stakeholders and members of the HIA Steering Group commented that bad weather could affect travel times in certain parts in the country. This concern is recognised but it is not possible to predict or quantify weather patterns and therefore, they cannot be robustly factored into the analysis.

#### 5.3.1 Access impacts for patients of Option A

Table 5.2 below shows that in terms of the total number of patients 29% (1,044) would experience a journey time increase by private car and 23% (813) by public transport. Numbers experiencing *significant* travel impacts, however, are far smaller than this: 338 (10%) by private car and 525 (15%) by public transport.

It is also worth noting for this Option that over 50% of the patient caseload would be able to access a surgical centre within one hour by car; although this is significantly less by public transport (19%).

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<sup>79</sup> Based on 2009/10 CCAD validated data

<sup>80</sup> The HIA has also considered journey times by blue-light ambulance and by helicopter. Findings are included in Appendix F.



Table 5.2: Travel and access impacts for patients

Option A	Private Car	Public Transport
Number of patients experiencing an increase in journey time	1,044 (29%)	813 (23%)
Number of patients experiencing a journey time increase of one hour or more	295 (8%)	413 (11%)
Total number and proportion of patients experiencing an overall journey time of over three hours by private car or four hours by public transport	65 (2%)	168 (5%)
Total number and proportion of 'new' patients who would experience an overall journey time of over three hours by private car or four hours by public transport (i.e. patients over and above those who currently experience these journey times).	-2 (0%)	36 (1%)
Total number and proportion of patients who would experience a journey time increase of one hour or more AND/OR an overall journey time of over three hours by private car and 4 hours by public transport	338 (10%)	525 (15%)
Number and proportion of patients within one hours journey time	1922 (53%)	693 (19%)

### 5.3.2 Where will access impacts be experienced?

#### 5.3.2.1 Access by private car

Private car travel time increases will be greatest around the locations currently served by Southampton (Hampshire, Southampton, Poole, the Isle of Wight, Portsmouth, Poole and Winchester), with journey times between 60 and 90 minutes longer; and by Leeds (Leeds, Dewsbury, Pontefract, Selby, Hull and North Humberside) where journey times will increase by an additional 90-120 minutes. York, Harrogate, Knaresborough, Malton, the Yorkshire Wolds and Bridlington, also served by Leeds, will also experience journey time increases of 60-90 minutes. Some parts of Oxfordshire will also be affected by increases of over one hour.

Under Option A the longest journey times by private car will be experienced by those living in the South West, Yorkshire (Kingston-upon-Hull and Driffield), Cumbria and the Isle of Wight (mainly due to crossing time). The West coast of Wales, Cornwall and the Norfolk / Suffolk coastline (including Norwich) also have travel times of over three hours, however these journey times are similar to those currently experienced, pre-reconfiguration.

Travel time increases and total journey times by private car are shown in Figure 5.2 and Figure 5.3 below.

Figure 5.2: Option change in total journey time

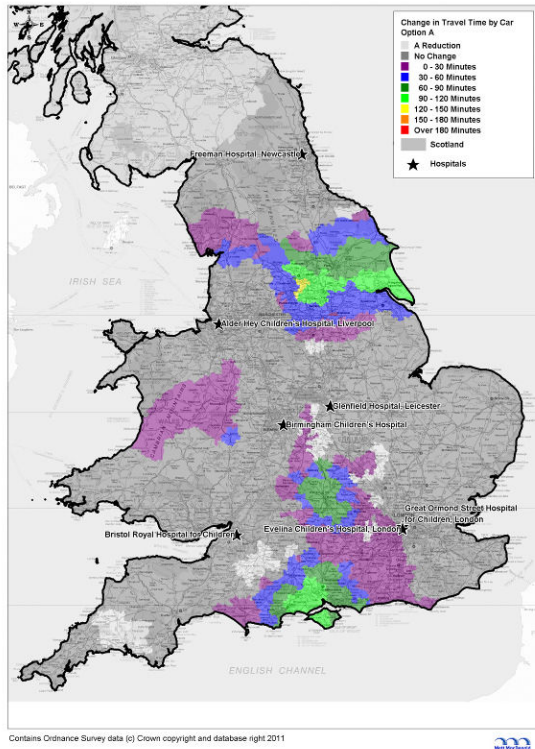
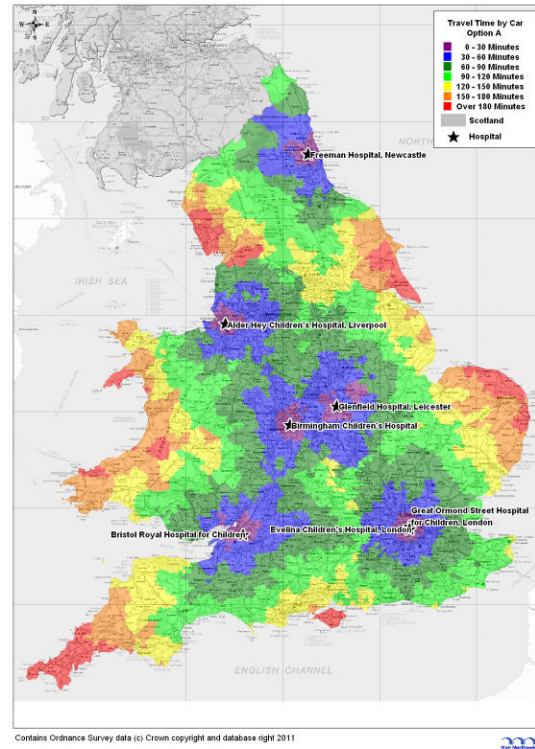


Figure 5.3: Option total journey time



### 5.3.2.2 Access for surgery by public transport

The majority of Yorkshire is affected by the changes in Option A. The Leeds-Bradford conurbation, Wakefield and Kingston upon Hull have increases in public transport travel times of 90-120 minutes and 120-150 minutes in some areas. Harrogate, Knaresborough, Driffield, Huddersfield, Barnsley and Doncaster have increases in travel of 60-90 minutes. For the populations currently served by Southampton, the areas affected by long increases to public transport journeys include along the coast from Southampton to Dorchester and the Isle of Wight, where journeys would take at least one hour more. Brackley in Oxfordshire would also see public transport to a surgical centre increase by over an hour. Some areas of Wales and the Midlands will experience increases in journey times as a result of the reallocation of current networks during the reconfiguration, rather than due to the loss of their current service provider.

Under Option A the longest overall journey times by public transport are seen in Dorset, the Isle of Wight, Lancashire, Yorkshire (Kingston-upon-Hull and Driffield) and Lincolnshire (Gainsborough and the east coast). Long journey times are also likely in small pockets in Oxfordshire. All of these areas will experience journey times of over four hours under Option A. The west coast of Wales, Cumbria, Cornwall and the Norfolk / Suffolk coastline (including Norwich) also have travel times of over four hours; however these journey times are similar to those currently experienced.

Travel time increases and total journey times by public transport are shown in Figure 5.4 and Figure 5.5 below.

Figure 5.4: Option change in total journey time

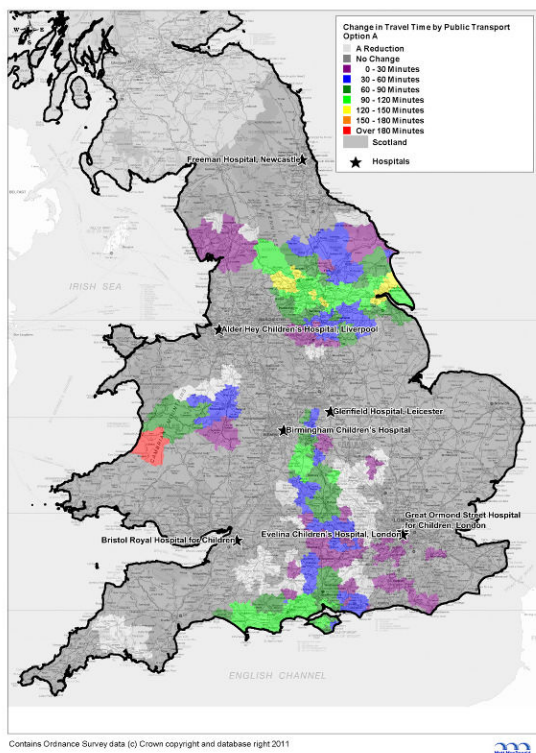
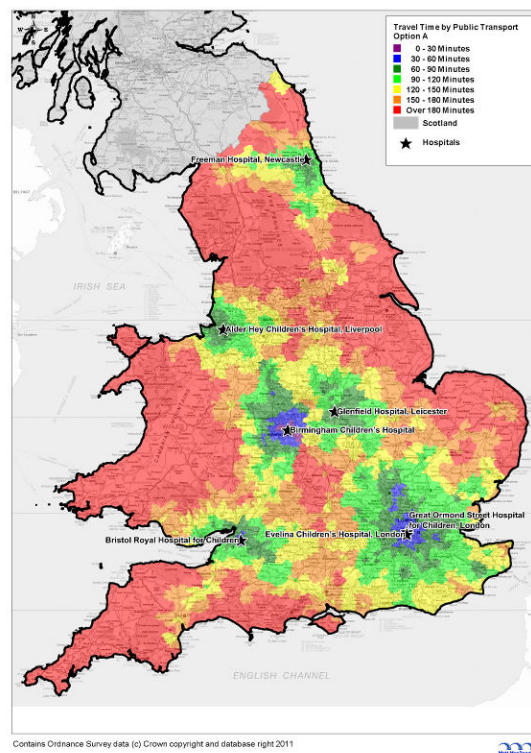


Figure 5.5: Option total journey time



## 5.4 Impacts on vulnerable areas

As set out in the methodology in Chapter 3, a key part of this HIA is to assess impacts on the population groups that are considered disproportionately vulnerable in terms of experiencing congenital heart disease. Certain postcode districts around the country have particular concentrations of these vulnerable people (as illustrated in Figure 3.1 in Chapter 3) so it can be expected that demand for services is *potentially* higher in these locations. **The analysis in this section specifically concentrates on the assessment of travel and access impacts on these vulnerable postcode districts.** Again, to accurately reflect the *numbers* of people that will actually be affected, analysis has been undertaken on the basis of current patient activity within these vulnerable postcode districts.

Under Option A there are presently 789 patients within the vulnerable postcode districts (29%<sup>81</sup>) and that would experience an increase in journey time by car and 597 (22%) by public transport. Those experiencing *significant* journey time effects, however, are far fewer: 226 (8%) by car and 307 (11%) by public transport.

<sup>81</sup> Expressed as a of total number of patients in vulnerable postcode districts. The total number of patients in vulnerable postcode districts is 2,745.

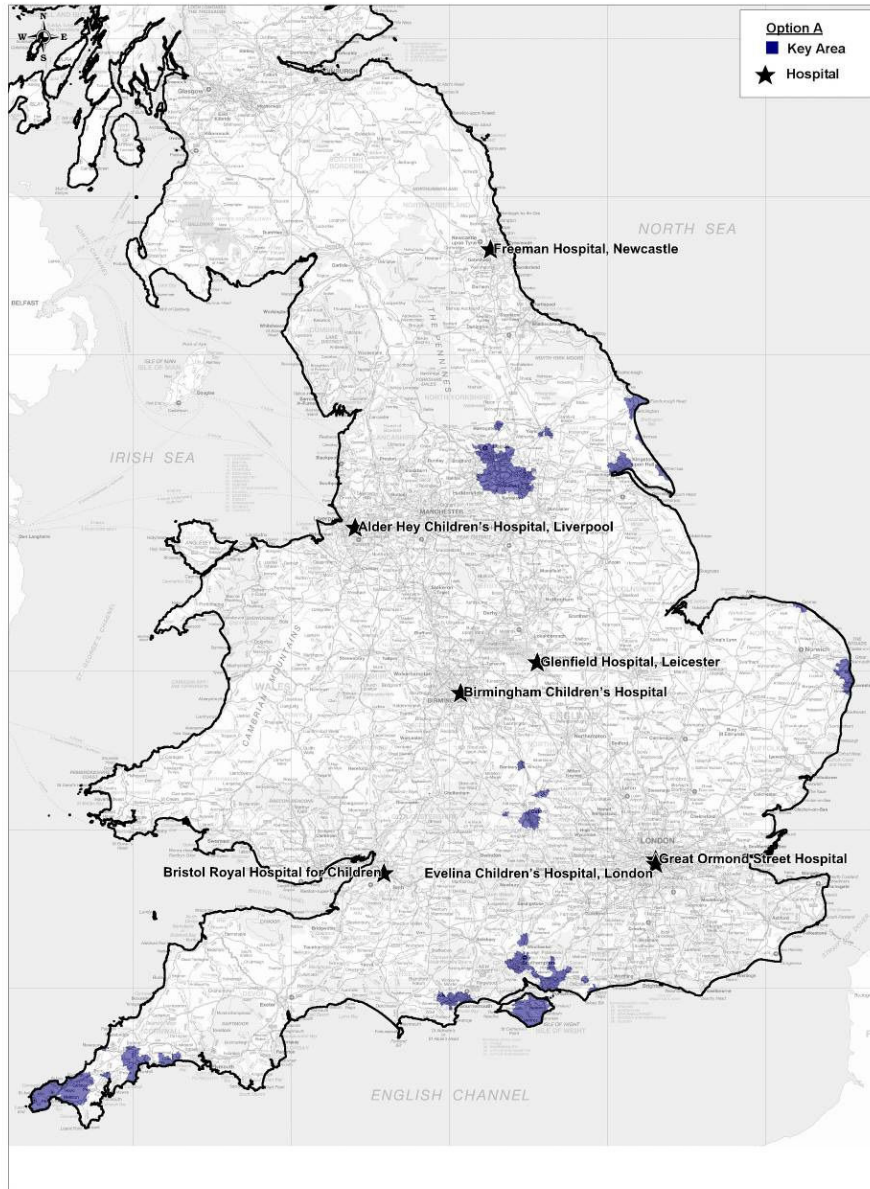
It is positive to note that over 60% of patients from vulnerable postcode districts would be able to access a surgical centre within one hour by car. The figure, however, is far less than public transport (25%).

Table 5.3: Travel impacts for patients in vulnerable postcode districts

Option A	Private Car	Public Transport
Number of patients from vulnerable postcode districts experiencing an increase in journey time	789 (29%)	597 (22%)
Number of patients in vulnerable postcode districts experiencing a journey time increase of one hour or more	202 (7%)	297 (11%)
Total number and proportion of patients from vulnerable postcode districts experiencing an overall journey time of over three hours by private car or four hours by public transport	40 (1%)	90 (3%)
Total number and proportion of 'new' patients from vulnerable postcode districts who would experience an overall journey time of over three hours by private car or four hours by public transport (i.e. over and above the number of patients already experiencing these journey times)	0 (0%)	20 (1%)
Total number and proportion of patients from vulnerable postcode districts who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	226 (8%)	307 (11%)
Number and proportion of patients from vulnerable postcode districts within one hours journey time	1698 (62%)	678 (25%)

Figure 5.6 below identifies the vulnerable postcode districts for Option A (i.e. where high there are concentrations of vulnerable groups.)

Figure 5.6: Option A: Vulnerable postcode districts experiencing significant travel time impacts



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## 5.5 Carbon emission impacts

As set out in the methodology, it should be noted that the carbon emission impacts presented in this Chapter are at a high level and are based only on the journey time projections for trips to surgical centres. They do not account for any potential reductions that could result from more secondary care being delivered closer to home (and, therefore, journey distances for follow-up appointments being reduced).

The net change in transport emissions from baseline for Option A is an annual increase of 58 tonnes CO<sub>2</sub>e. This represents a 17% increase from the baseline (341 tonnes CO<sub>2</sub>e per year).

This increase is a reflection of the change in journey times (section x.x), as patients and visitors would have to travel further for children's heart surgery under this Option. The estimated increase in emissions from baseline is the lowest of the reconfiguration Options.

Private transport accounts for the largest proportion of the estimated increase in transport emissions (51 tonnes CO<sub>2</sub>e, 89% of the total). Visitor travel for this mode in particular contributes to the majority of these emissions (76% of the total increase, 44 tonnes CO<sub>2</sub>e). However, the estimated change in transport emission for this mode is the lowest of the reconfiguration Options.

Public transport emissions are expected to increase by 6.1 tonnes CO<sub>2</sub>e (11% of the total increase). This represents the largest increase in emissions for this travel mode of the reconfiguration Options. This is primarily due to higher proportions of the population experiencing a decrease in journey time for other Options, offsetting a proportion of the projected increase in journey times for other populations.

Emissions from blue light ambulance under Option A are expected to increase by 0.2 tonnes CO<sub>2</sub>e (0.3% of the total increase). The estimated increase in emissions for this travel mode is the lowest of the reconfiguration Options.

The NHS Carbon Reduction Strategy for England aims to reduce the impact of travel movements from patients, staff and visitors.<sup>82 83</sup> Travel planning is a key carbon saving measure identified within this strategy,<sup>84</sup> aiming to reduce emissions by 81,524 tonnes CO<sub>2</sub> per year. The net increase in emissions from this Option represents 0.07% of the potential saving from travel planning projected in the Strategy.

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<sup>82</sup> NHS Sustainable Development Unit (August 2009) NHS England Carbon Emissions Carbon Footprinting Report [http://www.sdu.nhs.uk/documents/publications/1263313924\\_jgyW\\_nhs\\_england\\_carbon\\_emissions\\_carbon\\_footprintin\\_g\\_r.pdf](http://www.sdu.nhs.uk/documents/publications/1263313924_jgyW_nhs_england_carbon_emissions_carbon_footprintin_g_r.pdf)

<sup>83</sup> The NHS aims to reduce its emissions by 10% by 2015 (based on 2007 baseline data) from 21 MtCO<sub>2</sub>e to 19 MtCO<sub>2</sub>e; and 80% by 2050 (4 MtCO<sub>2</sub>e per year).

<sup>84</sup> NHS Sustainable Development Unit: NHS Carbon Reduction Strategy [http://www.sdu.nhs.uk/documents/publications/UPDATE\\_NHS\\_Carbon\\_Reduction\\_Strategy\\_\(web\).pdf](http://www.sdu.nhs.uk/documents/publications/UPDATE_NHS_Carbon_Reduction_Strategy_(web).pdf)

## 5.6 Summary of Option A impacts

The box below provides a summary of the key impacts associated with Option A.

### Summary of Option A impacts

#### Overall impacts

- Current patient data indicates that 1008 patients would be required to use a different centre from the one that they are currently using; 772 patients would be assigned to a new network.
- Under Option A, Leicester and London centres are likely to receive most new cases based on current patient data.

#### Access impacts

- Under Option A, 10% of patients would experience significant travel impacts by private car and 15% by public transport.
- Based on current patient numbers these impacts would be experienced by 338 children (if using private car) and 525 (if using public transport).
- *Note these figures relate only to trips to surgical centres because data is not available to for the journeys for secondary care.*

#### Impacts on vulnerable groups

- 29% of patients living within vulnerable postcode districts would experience an increase in journey time by car and 22% by public transport under the configuration proposed; significant travel impacts would, however, only be experienced by 8% by car and 11% by public transport.
- Under Option A 62% of patients from vulnerable postcode would be within one hour's car journey from a surgical centre; 25% are within an hour by public transport.

#### Carbon emission impacts

- The net change in transport emissions for Option A is an increase of 58 tonnes CO<sub>2</sub>e, a 17% increase from the baseline. *Note this modelling is based on trips to surgical centres only and does not account for the shorter journeys to local centres for follow-on care.*

## 6. Analysis of impacts of Option B<sup>85</sup>

This Chapter presents which populations are likely to be impacted by Option B. It identifies:

- The number and location of those people who would be designated to a new hospital under Option B;
- Access impacts for population and patient numbers, for both private car and public transport;
- Impacts on vulnerable postcode districts (those areas where there are high densities of socio-demographic groups with a higher propensity to experience congenital heart disease); and
- The impact on carbon emissions.

### 6.1 Option B

Option B also includes seven Specialist Surgical Centres and four potential Children's Cardiology Centres, the locations of which are shown in Table 6.1.

Table 6.1: Services provision in Option B

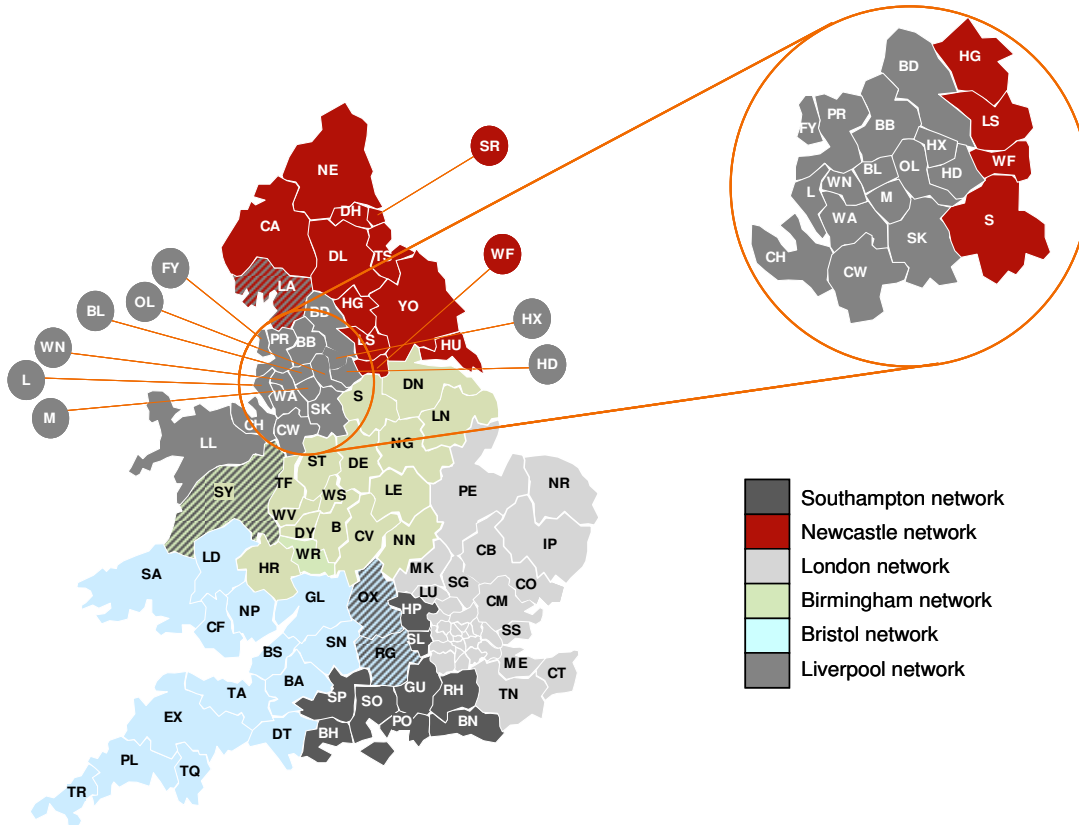
Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
<p>Seven surgical centres at:</p> <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> <li>• Southampton General Hospital</li> </ul>	<p>Four cardiology centres at:</p> <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Leeds General Infirmary</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> </ul>

The networks associated with this configuration of services are depicted in Figure 6.1.

<sup>85</sup> Some of the impacts that will be experienced by Option B will be the same as some of the other options because they involve the cessation of services at the same hospitals. Where an impact relates to the removal of services from a hospital this is repeated, and reported consistently, in each Option.



Figure 6.1: Map of Option B



Source: Safe and Sustainable, Pre-Consultation Business Case: Review of Children's Congenital Cardiac Services in England

## 6.2 Who and where would be impacted by Option B?

The Safe and Sustainable consultation document provides figures for the numbers of procedures undertaken at each of the present sites.<sup>86</sup> Should Option B be implemented a maximum of 1002 (28%) patients would be required to use a new surgical centre to one they are presently using (if they require a future surgical intervention).

It is also relevant to consider numbers of patients who would be required to use a new network in future as this indicates where change is likely to have pronounced effects. Based on patient data, it is anticipated that 858 children would be affected by being assigned to a new network. This represents 24% of the total number of patients.<sup>87</sup> Of the 858 patients likely to be affected (those assigned to a new network), the majority are patients currently using Leeds (316; 37%) and Leicester (225; 26%).

<sup>86</sup> NHS Specialised Services (2011): Op. cit. page 17. These figures are taken from CCAD data for 2009/10.

<sup>87</sup> The total number of patients is 3598

Each of the hospitals retained within Option B is likely to receive more patients in future. It is likely that Newcastle would see the largest increase; based on current flow data it would provide 270 more interventions per annum (31% of the 858 total) which is more than double the current volumes treated at this centre. The Southampton centre would absorb the next highest number of new patients (153, which represents 23%); again almost twice the current volumes<sup>88</sup>.

### 6.3 Access impacts

The access analysis presented below provides data on journey times to a surgical centre from each postcode district within its network. As patient activity data provides the most accurate way of looking at the numbers of people to be affected; all analysis is based on existing patient flows.

The access assessment provides information for both private car and public transport journeys:<sup>89</sup>

- Numbers and proportions of patients experiencing a potential increase in journey time under Option B;
- Numbers and proportions likely to experience a 'significant' access impact. This is defined as:
  - An increase in journey time of over one hour; and/or
  - A total journey time of over three hours by private transport or four hours by public transport.

Two further important issues should be noted with regard to the travel methodology:

- Travel times have been modelled to surgical centres. There has been no analysis of travel times to access secondary and post-interventional care because flow data is not available for these patients. As such, the positive travel effects that will be experienced by all patients who in future will receive follow-up care closer to home are not reflected in this analysis. Only journey times changes for those requiring surgery are included.
- Travel times have been modelled based on 'fair weather' assumptions. During the assessment some stakeholders and members of the HIA Steering Group commented that bad weather could affect travel times in certain parts in the country. This concern is recognised but it is not possible to predict or quantify weather patterns and therefore, they cannot be robustly factored into the analysis.

#### 6.3.1 Access impacts for patients of Option B

Table 6.2 below shows that in terms of the number of patients actually requiring surgical services, 29% (1,027) would experience a journey time increase by private car and 23% (830) by public transport. Numbers experiencing *significant* travel impacts, however, are considerably smaller: 337 (9%) by private car and 512 (14%) by public transport.

It is also worth noting for this Option that over 50% of the patient caseload would be able to access a surgical centre within one hour by car and a fifth of patients (20%) would be within an hour's journey by public transport.

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<sup>88</sup> 2009/10 CCAD validated data

<sup>89</sup> The HIA has also considered journey times by blue-light ambulance and by helicopter. Findings are included in Appendix F.

Table 6.2: Travel and access impacts for patients

Option B	Private Car	Public Transport
Number of patients experiencing an increase in journey time	1,027 (29%)	830 (23%)
Number of patients experiencing a journey time increase of one hour or more	293 (8%)	395 (11%)
Total number and proportion of patients experiencing an overall journey time of over three hours by private car or four hours by public transport	85 (2%)	178 (5%)
Total number and proportion of new patients who would experience an overall journey time of over three hours by private car or four hours by public transport	18 (0%)	46 (2%)
Total number and proportion of patients who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	337 (9%)	512 (14%)
Number and proportion of patients within one hours journey time	1939 (54%)	703 (20%)

## 6.3.2 Where will access impacts be experienced?

### 6.3.2.1 Access by private car

Private car travel time increases will be greatest around the locations currently served by Oxford (Oxfordshire), with journey times between 60 and 90 minutes longer; and by Leeds (Yorkshire and Lincolnshire) where journey times will increase by an additional 90-120 minutes. Areas of the East Midlands, served by Leicester, will also experience journey time increases of 60-90 minutes.

Under Option B the longest journey times by private car will be experienced by those living in the South West, Yorkshire, Lincolnshire and Cumbria. The West coast of Wales, Cornwall and the Norfolk / Suffolk coastline also have travel times of over three hours, however these journey times are similar to those experienced at present.

Figure 6.2: Option change in total journey time

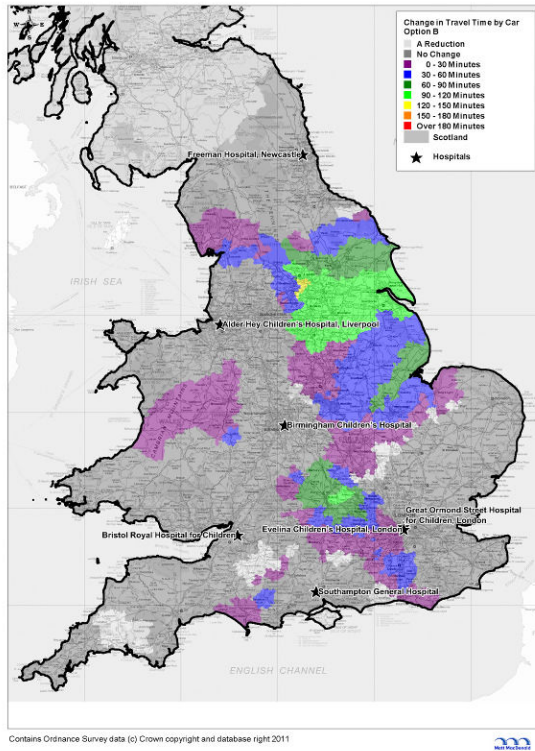
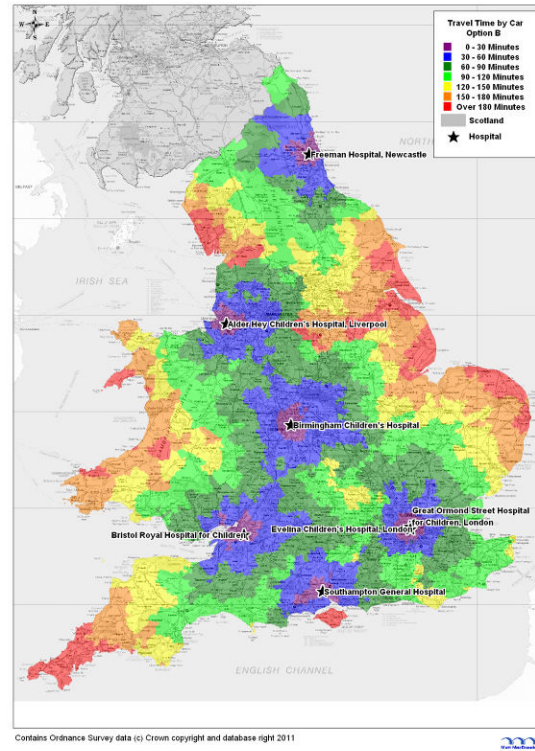


Figure 6.3: Option total journey time



### 6.3.2.2 Access by public transport

The majority of Yorkshire and Oxfordshire is affected by the changes in Option B with the region largely experiencing increases in public transport travel times of between 60 and 150 minutes. Areas of the East Midlands, presently served by Leicester, will also experience journey time increases of 60-90 minutes. Some areas of Wales, the South and the Midlands will experience increases in journey times as a result of the reallocation of areas networks during the reconfiguration, rather than due to the loss of their current service provider.

Under Option B the longest journey times by public transport are seen in Yorkshire, Dorset, Lincolnshire and Oxfordshire; these areas will experience journey times of over four hours. The West coast of Wales, Cumbria, Cornwall and the Norfolk / Suffolk coastline also have travel times of over four hours; however these journey times are similar to those currently experienced so populations will not witness a change.

Figure 6.4: Option change in total journey time

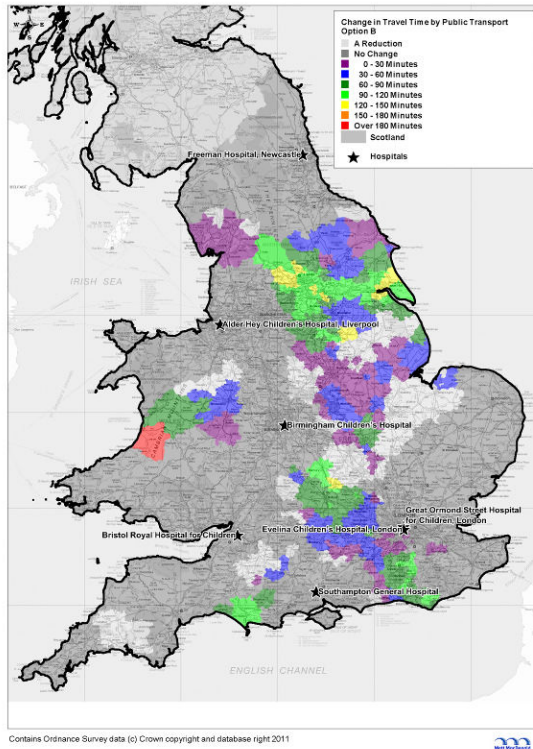
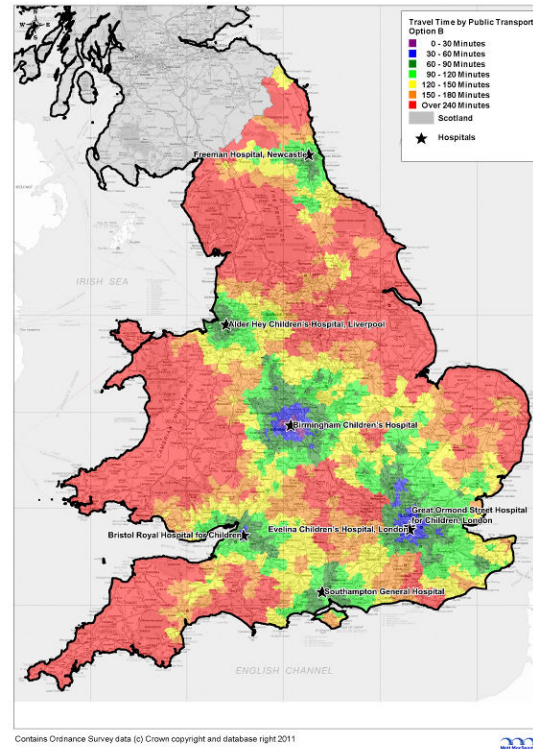


Figure 6.5: Option total journey time



## 6.4 Impacts on vulnerable groups

As set out in the methodology in Chapter 3, a key part of this HIA is to assess impacts on the population groups that are considered disproportionately vulnerable in terms of experiencing congenital heart disease. Certain postcode districts around the country have particular concentrations of these vulnerable people (as illustrated in Figure 3.1 in Chapter 3) so it can be expected that demand for services is *potentially* higher in these locations. **The analysis in this section specifically concentrates on the assessment of travel and access impacts on these vulnerable postcode districts.** Again, to accurately reflect the *numbers* of people that will actually be affected analysis has been undertaken on the basis of current patient activity.

Under Option B there are presently 795 patients within the vulnerable postcode districts (29%<sup>90</sup>) who would experience an increase in journey time by car and 620 (23%) by public transport. Those experiencing *significant* journey time effects, however, are far fewer: 247 (9%) by car and 308 (11%) by public transport.

<sup>90</sup> Expressed as a of total number of patients in vulnerable postcode districts. The total number of patients in vulnerable postcode districts is 2,745.

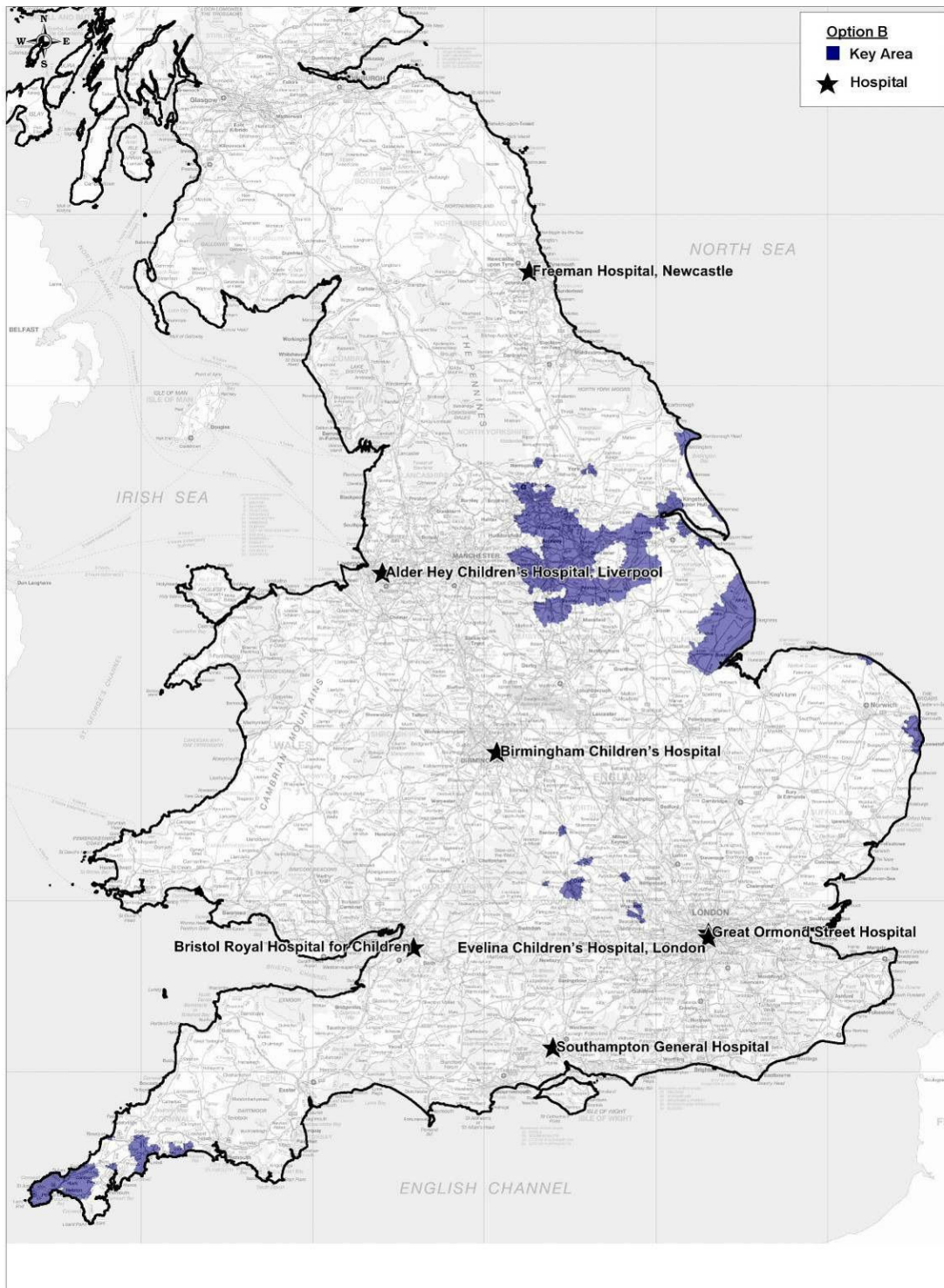
It is positive to note that over 60% of patients from vulnerable postcode districts would be able to access a surgical centre within one hour by car. The figure, however, is far less for public transport (25%).

Table 6.3: Travel impacts for patients in vulnerable postcode districts

Option B	Private Car	Public Transport
Number of patients from vulnerable postcode districts experiencing an increase in journey time	795 (29%)	620 (23%)
Number of patients in vulnerable postcode districts experiencing a journey time increase of one hour or more	221 (8%)	295 (11%)
Total number and proportion of patients from vulnerable postcode districts experiencing an overall journey time of over three hours by private car or four hours by public transport	54 (2%)	96 (4%)
Total number and proportion of 'new' patients from vulnerable postcode districts who would experience an overall journey time of over three hours by private car or four hours by public transport (i.e. over and above the number of patients already experiencing these journey times)	14 (0%)	26 (1%)
Total number and proportion of patients from vulnerable postcode districts who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	247 (9%)	308 (11%)
Number and proportion of patients from vulnerable postcode districts within one hours journey time	1681 (61%)	687 (25%)

Figure 6.6 below identifies the vulnerable postcode districts for Option B (i.e. where high concentrations of vulnerable groups).

Figure 6.6: Option B: Vulnerable postcode districts experiencing significant travel time impacts



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## 6.5 Carbon emission impacts

As set out in the methodology, it should be noted that the carbon emission impacts presented in this Chapter are at a high level and are based only on the journey time projections for trips to surgical centres. They do not account for any potential reductions that could result from more secondary care being delivered closer to home (and, therefore, journey distances for follow-up appointments being reduced).

The net change in transport emissions from baseline for Option B is an increase of 65 tonnes CO<sub>2</sub>e. This represents a 20% increase from the baseline (341 tonnes CO<sub>2</sub>e). This increase is a reflection of the change in journey times as patients and visitors would have to travel further for children's heart surgery under this Option.

Private transport accounts for the largest proportion of the estimated increase in transport emissions (62 tonnes CO<sub>2</sub>e, 91% of the total). Visitor travel for this mode in particular contributes to the majority of these emissions (78% of the total increase, 54 tonnes CO<sub>2</sub>e).

Public transport emissions are expected to increase by 6.1 tonnes CO<sub>2</sub>e (8% of the total increase).

Emissions from blue light ambulance under Option B are expected to increase by 0.2 tonnes CO<sub>2</sub>e (0.3% of the total increase).

The NHS Carbon Reduction Strategy for England aims to reduce the impact of travel movements from patient's staff and visitors.<sup>91 92</sup> Travel planning is a key carbon saving measure identified within this strategy,<sup>93</sup> aiming to reduce emissions by 81,524 tonnes CO<sub>2</sub> per year. The net increase in emissions from this Option represents 0.08% of the potential saving from travel planning projected in the Strategy.

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<sup>91</sup> NHS Sustainable Development Unit (August 2009) NHS England Carbon Emissions Carbon Footprinting Report [http://www.sdu.nhs.uk/documents/publications/1263313924\\_jgyW\\_nhs\\_england\\_carbon\\_emissions\\_carbon\\_footprintin\\_g\\_r.pdf](http://www.sdu.nhs.uk/documents/publications/1263313924_jgyW_nhs_england_carbon_emissions_carbon_footprintin_g_r.pdf)

<sup>92</sup> The NHS aims to reduce its emissions by 10% by 2015 (based on 2007 baseline data) from 21 MtCO<sub>2</sub>e to 19 MtCO<sub>2</sub>e; and 80% by 2050 (4 MtCO<sub>2</sub>e per year).

<sup>93</sup> NHS Sustainable Development Unit: NHS Carbon Reduction Strategy [http://www.sdu.nhs.uk/documents/publications/UPDATE\\_NHS\\_Carbon\\_Reduction\\_Strategy\\_\(web\).pdf](http://www.sdu.nhs.uk/documents/publications/UPDATE_NHS_Carbon_Reduction_Strategy_(web).pdf)



## 6.6 Summary of Option B impacts

The box below provides a summary of the key impacts associated with Option B.

### Summary of Option B impacts

#### Overall impacts

- Current patient data indicates that 1002 patients would be required to use a different centre from the one that they are currently using; 858 patients would be assigned to a new network.
- Under Option B, the Newcastle and Southampton centres are likely to receive most new cases, based on current patient data.

#### Access impacts

- Under Option B, 9% of patients would experience significant travel impacts by private car and 14% by public transport.
- Based on current patient numbers these impacts would be experienced by 337 children (if using private car) and 512 (if using public transport).
- *Note these figures relate only to trips to surgical centres because data is not available to for the journeys for secondary care.*

#### Impacts on vulnerable groups

- 29% of patients living within vulnerable postcode districts would experience an increase in journey time by car and 23% by public transport under the configuration proposed; significant travel impacts would, however, only be experienced by 9% by car and 11% by public transport.
- Under Option B 61% of patients from vulnerable postcode would be within one hour's car journey from a surgical centre; 25% are within an hour by public transport

#### Carbon emission impacts

- The net change in transport emissions for Option B is an increase of 65 tonnes CO<sub>2</sub>e, a 20% increase from the baseline. *Note this modelling is based on trips to surgical centres only and does not account for the shorter journeys to local centres for follow-on care.*

## 7. Analysis of impacts of Option C<sup>94</sup>

This Chapter presents which populations are likely to be impacted by Option C. It identifies:

- The number and location of those people who would be designated to a new hospital under Option C;
- Access impacts for population and patient numbers, for both private car and public transport;
- Impacts on vulnerable postcode districts (those areas where there are high densities of socio-demographic groups with a higher propensity to experience congenital heart disease); and
- The impact on carbon emissions.

### 7.1.1 Option C

Option C includes six Specialist Surgical Centres and five potential Children's Cardiology Centres, the locations of which are shown in Table 7.1.

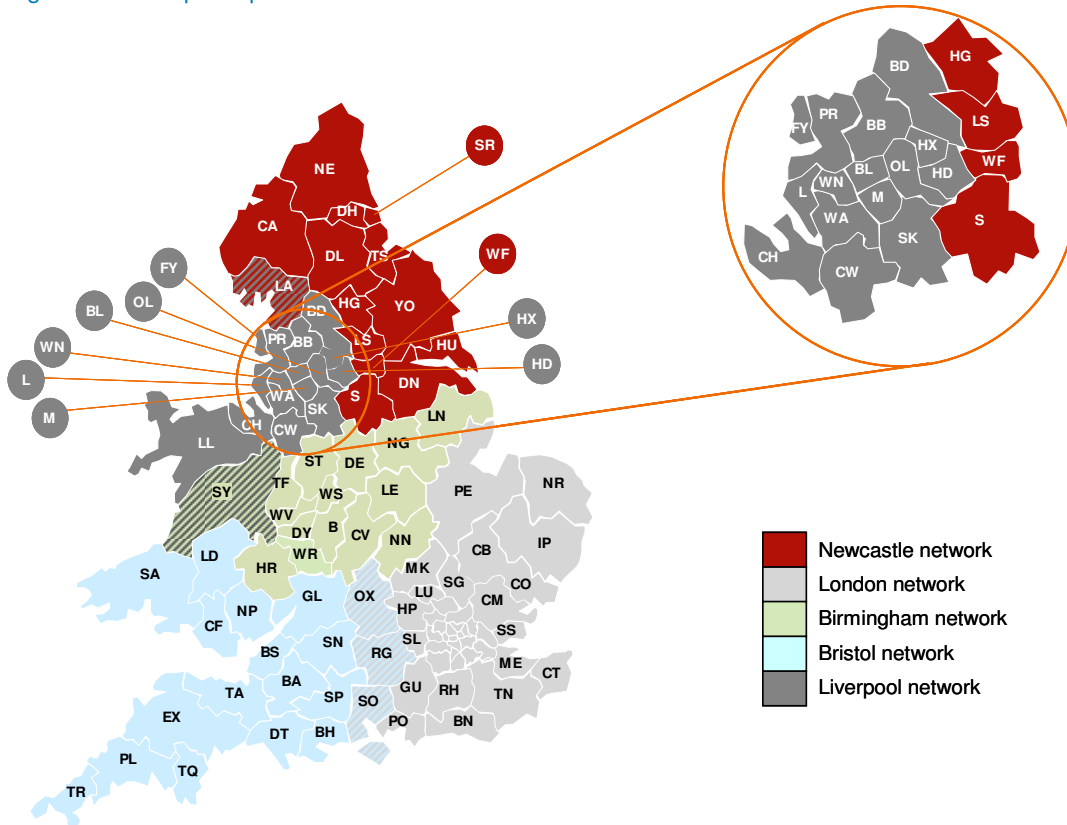
Table 7.1: Services provision in Option C

Option	Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
Option C	Six surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Freeman Hospital, Newcastle</li> <li>• Alder Hey Children's Hospital, Liverpool</li> </ul>	Five cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Leeds General Infirmary</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> <li>• Southampton General Hospital</li> </ul>

The networks associated with this configuration of services are depicted in Figure 7.1.

<sup>94</sup> Some of the impacts that will be experienced by Option C will be the same as some of the other options because they involve the cessation of services at the same hospitals. Where an impact relates to the removal of services from a hospital this is repeated, and reported consistently, in each Option.

Figure 7.1: Map of Option C



Source: Safe and Sustainable, Pre-Consultation Business Case: Review of Children's Congenital Cardiac Services in England

## 7.2 Who and where would be impacted by Option C?

The Safe and Sustainable consultation document provides figures for the numbers of procedures undertaken at each of the present sites.<sup>95</sup> Should Option C be implemented a maximum of 1,223 (34%) patients would be required to use a new surgical centre to one they are presently using (if they require a future intervention).

It is also relevant to consider numbers of patients who would be required to use a new network in future as this indicates where change is likely to have pronounced effects. Based on patient data, it is anticipated that 898 children would be affected by being assigned to a new network. This represents 25% of the total number of patients.<sup>96</sup> Of these 898 patients likely to be affected (those assigned to a new network), the majority are patients currently using Leeds (316; 35%), Leicester (225; 25%) and Southampton (224, 25%).

<sup>95</sup> NHS Specialised Services (2011): Op. cit. page 17. These figures are taken from CCAD data for 2009/10.

<sup>96</sup> The total number of patients is 3598

Each of the hospitals included within Option C is likely to receive more patients in future. It is likely that Newcastle would see the largest increase in cases; based on current flow data it would provide 270 more interventions per annum (30% of the 898 total) which is more than double the current volume of cases<sup>97</sup>. The London network would absorb the next highest number of new patients (227, which represents 25%).

### 7.3 Access impacts

The access analysis presented below provides data on journey times to a surgical centre from each postcode district within its network. As patient activity data provides the most accurate way of looking at the numbers of people to be affected; all analysis is based on existing patient flows.

The access assessment provides information for both private car and public transport journeys:<sup>98</sup>

- Numbers and proportions of patients experiencing a potential increase in journey time under Option C;
- Numbers and proportions likely to experience a 'significant' access impact. This is defined as:
  - An increase in journey time of over one hour; and/or
  - A total journey time of over three hours by private transport or four hours by public transport.

Two further important issues should be noted with regard to the travel methodology:

- Travel times have been modelled to surgical centres. There has been no analysis of travel times to access secondary and post-interventional care because flow data is not available for these patients. As such, the positive travel effects that will be experienced by all patients who in future will receive follow-up care closer to home are not reflected in this analysis. Only journey times changes for those requiring surgery are included.
- Travel times have been modelled based on 'fair weather' assumptions. During the assessment some stakeholders and members of the HIA Steering Group commented that bad weather could affect travel times in certain parts in the country. This concern is recognised but it is not possible to predict or quantify weather patterns and therefore, they cannot be robustly factored into the analysis.

#### 7.3.1 Access impacts on patients of Option C

Table 7.2 below shows that in terms of the number of patients, 33% (1,205) would experience a journey time increase by private car and 24% (863) by public transport. Numbers experiencing *significant* travel impacts, however, are smaller than this: 468 (13%) by private car and 543 (15%) by public transport.

It is also worth noting that over 50% of the patient caseload would be able to access a surgical centre within one hour by car and a fifth of patients (20%) would be within an hour's journey by public transport.

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<sup>97</sup> 2009/10 CCAD validated data

<sup>98</sup> The HIA has also considered journey times by blue-light ambulance and by helicopter. Findings are included in Appendix F.

Table 7.2: Travel and access impacts for patients

Option C	Private Car	Public Transport
Number of patients experiencing an increase in journey time	1,205 (33%)	863 (24%)
Number of patients experiencing a journey time increase of one hour or more	425 (12%)	432 (12%)
Total number and proportion of patients experiencing an overall journey time of over three hours by private car or four hours by public transport	90 (3%)	172 (5%)
Total number and proportion of new patients who would experience an overall journey time of over three hours by private car or four hours by public transport	23 (1%)	40 (1%)
Total number and proportion of patients who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	468 (13%)	543 (15%)
Number and proportion of patients within one hours journey time	1840 (51%)	705 (20%)

## 7.3.2 Where will access impacts be experienced?

### 7.3.2.1 Access by private car

Private car travel time increases will be greatest around the locations currently served by Leeds (Yorkshire and Lincolnshire) and Southampton (Hampshire and the Isle of Wight) with journey times between 60 and 120 minutes longer. The locations currently served by Oxford (Oxfordshire) and Leicester (East Midlands) will experience increases in journey times of between 60 and 90 minutes.

Under Option C, the longest journey times by private car will be experienced by those living in the South West, the Isle of Wight (mainly due to crossing time), Yorkshire, Lincolnshire and Cumbria. The west coast of Wales, Cornwall and the Norfolk / Suffolk coastline also have travel times of over three hours, however these journey times are similar to those experienced at present.

Figure 7.2: Option change in total journey time

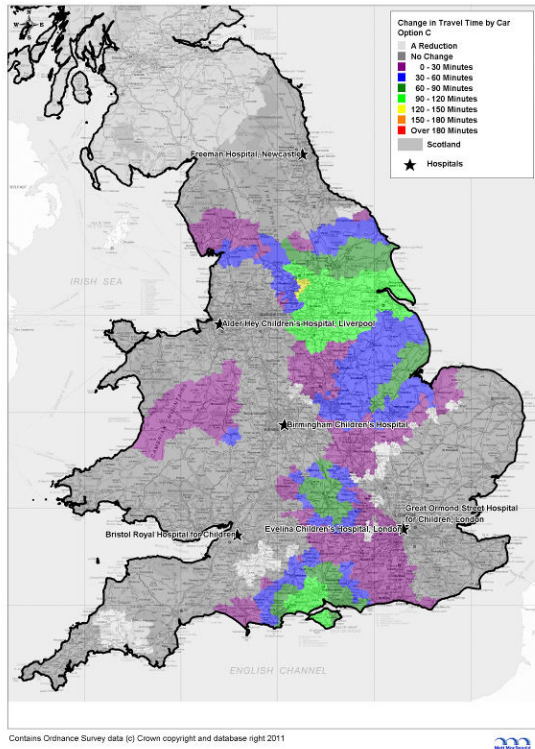
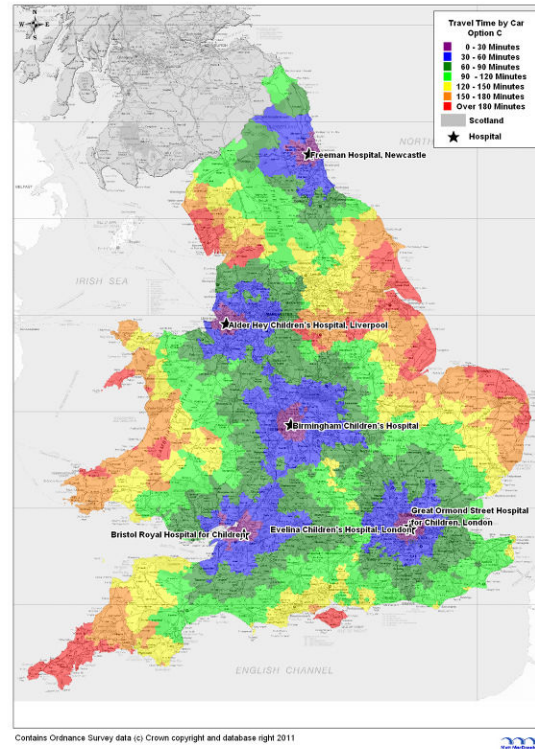


Figure 7.3: Option total journey time



### 7.3.2.2 Access by public transport

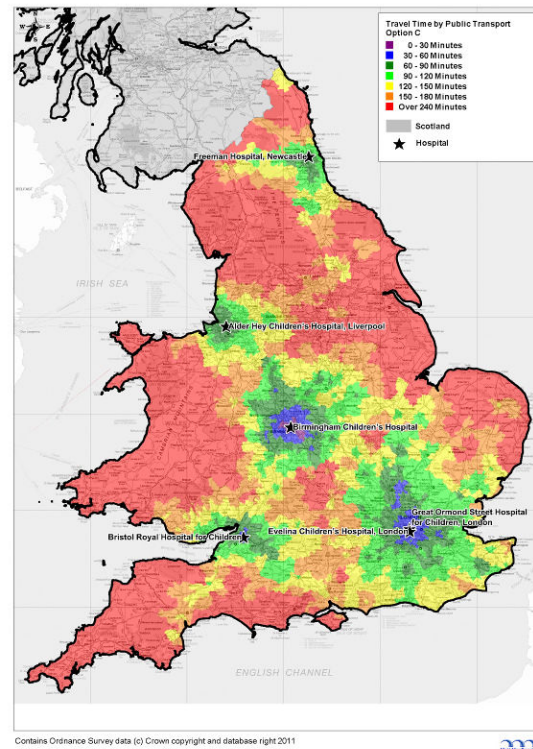
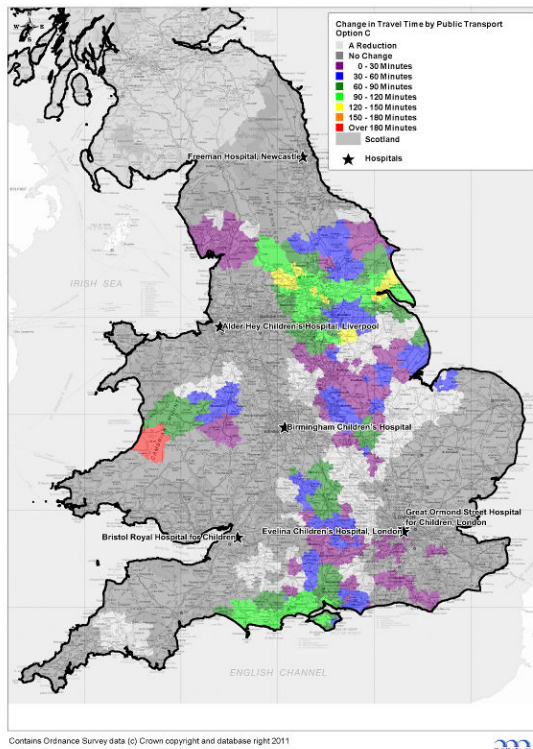
Under Option C, central Wales experiences the largest increase in journey time, with an increase in journey times from 60 to over 180 minutes. The county of Ceredigion experiences the largest change. Changes in journey time for Wales are a result of the reallocation of the areas network during the reconfiguration, rather than due to the loss of their current service provider.

Large areas of Yorkshire and are likely to experience increases in journey times of up to 180 minutes with Kingston upon Hull, Bradford and Pontefract the areas worst affected. In addition to this Retford, Nottinghamshire is also expected to experience an increase in journey times of up to 180 minutes. The south west is affected by the changes in Option C experiencing an increase in journey times of up to 120 minutes. Hampshire, Dorset and the Isle of Wight experience the largest increases in journey times in the south west. Oxfordshire (Oxford and Banbury), Lincolnshire (Grimsby), Northamptonshire (Kettering, Corby and Wellingborough), and Derbyshire (Chesterfield) are also affected by the changes, leading to increase in journey times of 60 to 90 minutes.

Under Option C, the large areas of England and Wales experience journey times of over four hours to access the hospital within their network. These areas include Cumbria, Yorkshire (North Yorkshire and Kingston upon Hull), Lincolnshire (Gainsborough and the east coast), Norfolk, Suffolk, central and west coast areas of Wales, the South West (Cornwall, Devon, Dorset and the Isle of Wight).

Figure 7.4: Option change in total journey time

Figure 7.5: Option total journey time



## 7.4 Impacts on vulnerable groups

As set out in the methodology in Chapter 3, a key part of this HIA is to assess impacts on the population groups that are considered disproportionately vulnerable in terms of experiencing congenital heart disease. Certain postcode districts around the country have particular concentrations of these vulnerable people (as illustrated in Figure 3.1 in Chapter 3) so it can be expected that demand for services is *potentially* higher in these locations. **The analysis in this section specifically concentrates on the assessment of travel and access impacts on these vulnerable postcode districts.** Again, to accurately reflect the *numbers* of people that will actually be affected analysis has been undertaken on the basis of current patient activity.

There are presently 901 patients within the vulnerable postcode districts (33%<sup>99</sup>) who would experience an increase in journey time by car and 628 (23%) by public transport. Those experiencing *significant* journey time effects, however, is less: 337 (12%) by car and 344 (13%) by public transport.

Nearly 60% of patients from vulnerable postcode districts would be able to access a surgical centre within one hour by car. The figure, however, is far less for public transport (25%).

Table 7.3: Travel impacts for patients in vulnerable postcode districts

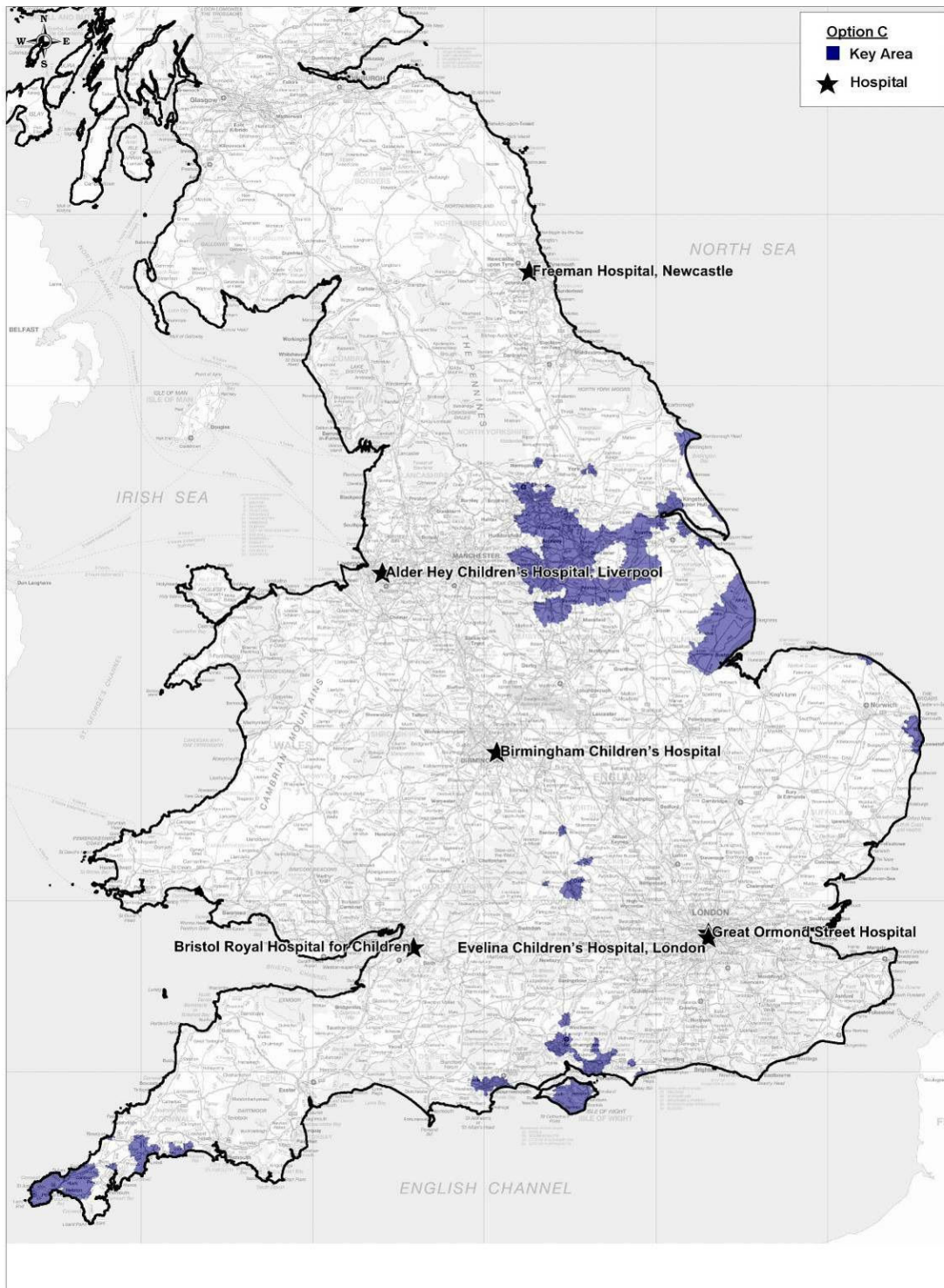
Option C	Private Car	Public Transport
Number of patients from vulnerable postcode districts experiencing an increase in journey time	901 (33%)	628 (23%)
Number of patients in vulnerable postcode districts experiencing a journey time increase of one hour or more	312 (11%)	325 (12%)
Total number and proportion of patients from vulnerable postcode districts experiencing an overall journey time of over three hours by private car or four hours by public transport	58 (2%)	86 (4%)
Total number and proportion of 'new' patients from vulnerable postcode districts who would experience an overall journey time of over three hours by private car or four hours by public transport (i.e. over and above the number of patients already experiencing these journey times)	18 (1%)	26 (1%)
Total number and proportion of patients from vulnerable postcode districts who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	337 (12%)	344 (13%)
Number and proportion of patients from vulnerable postcode districts within one hours journey time	1623 (59%)	687 (25%)

Figure 7.6 below identifies the vulnerable postcode districts for Option C (i.e. where there are high concentrations of vulnerable groups who would be significantly impacted).

<sup>99</sup> Expressed as a of total number of patients in vulnerable postcode districts The total number of patients in vulnerable postcode districts is 2,745.



Figure 7.6: Option C: Vulnerable postcode districts experiencing significant travel time impacts



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## 7.5 Carbon emission impacts

As set out in the methodology, it should be noted that the carbon emission impacts presented in this Chapter are at a high level and are based only on the journey time projections for trips to surgical centres. They do not account for any potential reductions that could result from more secondary care being delivered closer to home (and, therefore, journey distances for follow-up appointments being reduced).

The net change in transport emissions from baseline for Option C is an increase of 81 tonnes CO<sub>2</sub>e. This represents a 24% increase from the baseline (341 tonnes CO<sub>2</sub>e).

This increase is a reflection of the change in journey times as patients and visitors would have to travel further for children's heart surgery under this Option. The estimated increase in emissions from baseline is the highest of the reconfiguration Options.

Private transport accounts for the largest proportion of the estimated increase in transport emissions (74 tonnes CO<sub>2</sub>e, 92% of the total). Visitor travel for this mode in particular contributes to the majority of these emissions (79% of the total increase, 63 tonnes CO<sub>2</sub>e). This estimated change in transport emission for this mode is the highest of the reconfiguration Options.

Public transport emissions are expected to increase by 6 tonnes CO<sub>2</sub>e (8% of the total increase).

Emissions from blue light ambulance under Option C are expected to increase by 0.3 tonnes CO<sub>2</sub>e (0.3% of the total increase). The estimated increase in emissions for this travel mode is the highest of the reconfiguration Options.

The NHS Carbon Reduction Strategy for England aims to reduce the impact of travel movements from patient's staff and visitors.<sup>100 101</sup> Travel planning is a key carbon saving measure identified within this strategy,<sup>102</sup> aiming to reduce emissions by 81,524 tonnes CO<sub>2</sub> per year. The net increase in emissions from this Option represents 0.1% of the potential saving from travel planning projected in the Strategy.

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<sup>100</sup> NHS Sustainable Development Unit (August 2009) NHS England Carbon Emissions Carbon Footprinting Report [http://www.sdu.nhs.uk/documents/publications/1263313924\\_jgyW\\_nhs\\_england\\_carbon\\_emissions\\_carbon\\_footprintin\\_g\\_r.pdf](http://www.sdu.nhs.uk/documents/publications/1263313924_jgyW_nhs_england_carbon_emissions_carbon_footprintin_g_r.pdf)

<sup>101</sup> The NHS aims to reduce its emissions by 10% by 2015 (based on 2007 baseline data) from 21 MtCO<sub>2</sub>e to 19 MtCO<sub>2</sub>e; and 80% by 2050 (4 MtCO<sub>2</sub>e per year).

<sup>102</sup> NHS Sustainable Development Unit: NHS Carbon Reduction Strategy [http://www.sdu.nhs.uk/documents/publications/UPDATE\\_NHS\\_Carbon\\_Reduction\\_Strategy\\_\(web\).pdf](http://www.sdu.nhs.uk/documents/publications/UPDATE_NHS_Carbon_Reduction_Strategy_(web).pdf)

## 7.6 Summary of Option C impacts

The box below provides a summary of the key impacts associated with Option C.

### Summary of Option C impacts

#### Overall impacts

- Current patient data indicates that 1,223 patients would be required to use a different centre from the one that they are currently using; 898 patients would be assigned to a new network.
- Under Option C, the Newcastle and London centres are likely to receive most new cases, based on current patient data.

#### Access impacts

- Under Option C, 13% of patients would experience significant travel impacts by private car and 15% by public transport.
- Based on current patient numbers these impacts would be experienced by 468 children (if using private car) and 543 (if using public transport).
- *Note these figures relate only to trips to surgical centres because data is not available to for the journeys for secondary care.*

#### Impacts on vulnerable groups

- 33% of patients living within vulnerable postcode districts would experience an increase in journey time by car and 23% by public transport under the configuration proposed; significant travel impacts would, however, only be experienced by 12% by car and 13% by public transport.
- Under Option C 59% of patients from vulnerable postcode would be within one hour's car journey from a surgical centre; 25% are within an hour by public transport

#### Carbon emission impacts

- The net change in transport emissions for Option C is an increase of 81 tonnes CO<sub>2</sub>e, a 24% increase from the baseline (341 tonnes CO<sub>2</sub>e). *Note this modelling is based on trips to surgical centres only and does not account for the shorter journeys to local centres for follow-on care.*

## 8. Analysis of impacts of Option D<sup>103</sup>

This Chapter presents which populations are likely to be impacted by Option D. It identifies:

- The number and location of those people who would be designated to a new hospital under Option D;
- Access impacts for population and patient numbers, for both private car and public transport;
- Impacts on vulnerable postcode districts (those areas where there are high densities of socio-demographic groups with a higher propensity to experience congenital heart disease); and
- The impact on carbon emissions.

### 8.1.1 Option D

Option D includes six Specialist Surgical Centres and five potential Children's Cardiology Centres, the locations of which are shown in Table 8.1.

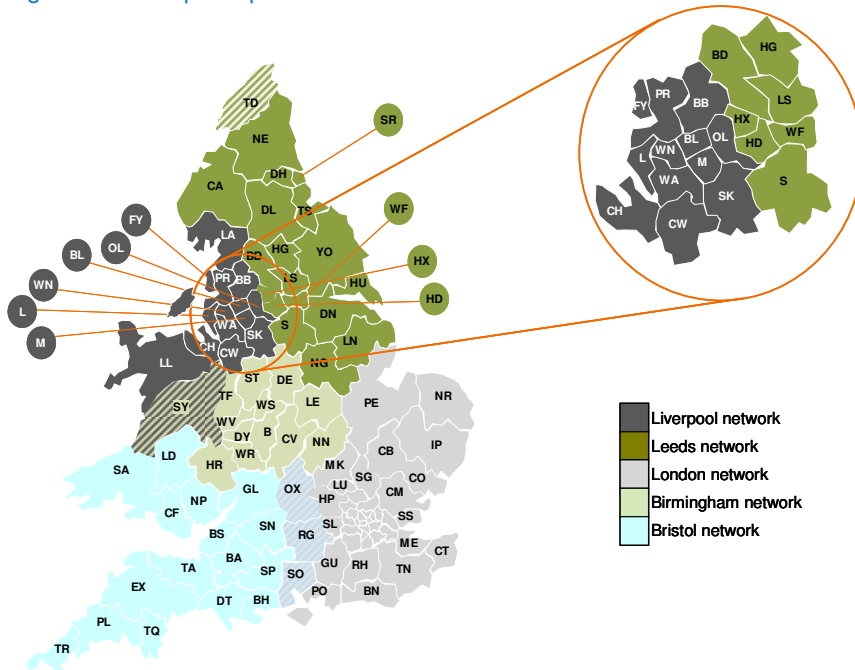
Table 8.1: Services provision in Option D

Proposed Specialist Surgical Centres	Potential Children 's Cardiology Centres
Six surgical centres at: <ul style="list-style-type: none"> <li>• Great Ormond Street Hospital, London</li> <li>• Evelina Children's Hospital, London</li> <li>• Birmingham Children's Hospital</li> <li>• Bristol Royal Hospital for Children</li> <li>• Leeds General Infirmary</li> <li>• Alder Hey Children's Hospital, Liverpool</li> </ul>	Five cardiology centres at: <ul style="list-style-type: none"> <li>• Royal Brompton Hospital, London</li> <li>• Freeman Hospital, Newcastle</li> <li>• Glenfield Hospital, Leicester</li> <li>• John Radcliffe Hospital, Oxford</li> <li>• Southampton General Hospital</li> </ul>

The networks associated with this configuration of services are depicted in Figure 8.1

<sup>103</sup> Some of the impacts that will be experienced by Option D will be the same as some of the other options because they involve the cessation of services at the same hospitals. Where an impact relates to the removal of services from a hospital this is repeated, and reported consistently, in each Option.

Figure 8.1: Map of Option D



Source: Safe and Sustainable, Pre-Consultation Business Case: Review of Children's Congenital Cardiac Services in England

## 8.2 Who and where would be impacted by Option D?

The Safe and Sustainable consultation document provides figures for the numbers of procedures undertaken at each of the present sites.<sup>104</sup> Should Option D be implemented a maximum of 1,172 (33%) patients would be required to use a new surgical centre to one they are presently using (if they require a future intervention).

It is also relevant to consider numbers of patients who would be required to use a new network in future as this indicates where change is likely to have pronounced effects. Based on patient data, it is anticipated that 828 children would be affected by being assigned to a new network. This represents 23% of the total number of patients.<sup>105</sup> Of these 828 patients likely to be affected (those assigned to a new network), the majority are patients currently using Newcastle (255; 35%), Leicester (225; 27%) and Southampton (224; 27%)

Each of the hospitals within Option D is likely to receive more patients in future. It is likely that Leeds would see the largest increase; based on current flow data it would provide 320 more interventions per annum (39% of the 828 total), which is double the current volume of cases<sup>106</sup>.

<sup>104</sup> NHS Specialised Services (2011): Op. cit. page 17. These figures are taken from CCAD data for 2009/10.

<sup>105</sup> The total number of patients is 3598

<sup>106</sup> 2009/10 CCAD validated data.

The London centres would absorb the next highest number of new patients (227, which represents 27%).

### 8.3 Access impacts

The access analysis presented below provides data on journey times to a surgical centre from each postcode district within its network. As patient activity data provides the most accurate way of looking at the numbers of people to be affected; all analysis is based on existing patient flows.

The access assessment provides information for both private car and public transport journeys:<sup>107</sup>

- Numbers and proportions of patients experiencing a potential increase in journey time under Option D;
- Numbers and proportions likely to experience a 'significant' access impact. This is defined as:
  - An increase in journey time of over one hour; and/or
  - A total journey time of over three hours by private transport or four hours by public transport.

Two further important issues should be noted with regard to the travel methodology:

- Travel times have been modelled to surgical centres. There has been no analysis of travel times to access secondary and post-interventional care because flow data is not available for these patients. As such, the positive travel effects that will be experienced by all patients who in future will receive follow-up care closer to home are not reflected in this analysis. Only journey times changes for those requiring surgery are included.
- Travel times have been modelled based on 'fair weather' assumptions. During the assessment some stakeholders and members of the HIA Steering Group commented that bad weather could affect travel times in certain parts in the country. This concern is recognised but it is not possible to predict or quantify weather patterns and therefore, they cannot be robustly factored into the analysis.

#### 8.3.1 Access impacts for patients of Option D

Table 8.2 below shows that in terms of the number of people actually requiring surgical services, 31% (1,121) would experience a journey time increase by private car and 22% (788) by public transport. Numbers experiencing *significant* travel impacts, however, are considerably smaller: 380 (11%) by private car and 470 (13%) by public transport.

It is also worth noting for this Option that over 50% of the patient caseload would be able to access a surgical centre within one hour by car and over a fifth of patients (21%) would be within an hour's journey by public transport.

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<sup>107</sup> The HIA has also considered journey times by blue-light ambulance and by helicopter. Findings are included in Appendix X.

Table 8.2: Travel and access impacts for patients

Option D	Private Car	Public Transport
Number of patients experiencing an increase in journey time	1,121 (31%)	788 (22%)
Number of patients experiencing a journey time increase of one hour or more	339 (9%)	364 (9%)
Total number and proportion of patients experiencing an overall journey time of over three hours by private car or four hours by public transport	69 (2%)	149 (4%)
Total number and proportion of new patients who would experience an overall journey time of over three hours by private car or four hours by public transport	2 (0%)	17 (0%)
Total number and proportion of patients who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	380 (11%)	470 (13%)
Number and proportion of patients within one hours journey time	1898 (53%)	742 (21%)

## 8.3.2 Where will access impacts be experienced?

### 8.3.2.1 Access by private car

Private car travel time increases are likely to be greatest around the locations currently served by Newcastle and Southampton with journey times between 60 and 150 minutes longer. Northumberland and Newcastle and Hampshire and the Isle of Wight respectively are expected to experience the largest changes. Areas currently served by Oxford (Oxfordshire) and Leicester (Nottinghamshire and Lincolnshire) are likely to experience increases in journey times of between 60 and 90 minutes longer.

Under Option D, the longest journey times by private car will be experienced by those living in the Isle of Wight (mainly due to crossing time), Lincolnshire, Cumbria and the North East. The West coast of Wales, Cornwall and the Norfolk / Suffolk coastline also have travel times of over three hours, however these journey times are similar to those experienced at present.

Figure 8.2: Option change in total journey time

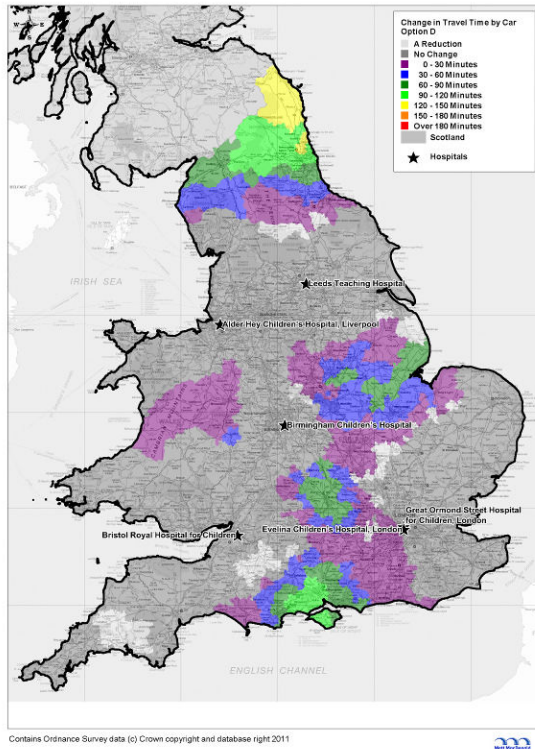
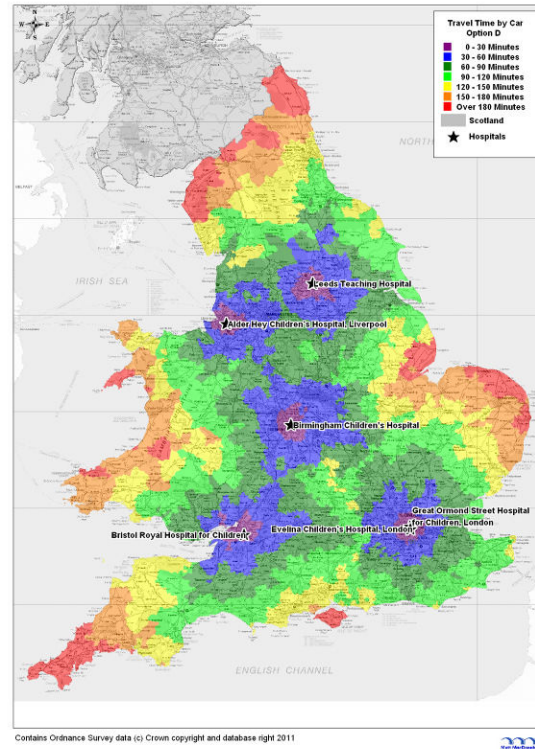


Figure 8.3: Option total journey time



### 8.3.2.2 Access by public transport

Under Option D, central Wales and the north experiences the largest increase in journey times, with an increase in journey times from 60 to over 180 minutes. The county of Cumbria and small areas of Northumberland experience the largest change.

Areas of the south west and the East Midlands are likely to experience increases in journey times of up to 120 minutes with Nottinghamshire, Hampshire, Dorset and the Isle of Wight experience the largest increases in journey times. Oxfordshire (Oxford and Banbury) and Northamptonshire (Kettering, Corby and Wellingborough) are also affected by the changes, leading to increase in journey times of 60 to 90 minutes.

Under Option D, the large areas of England and Wales experience journey times of over four hours to access the hospital within their network. These areas include Cumbria, Northumberland, County Durham, Yorkshire (North Yorkshire and the East coast), Lincolnshire (central areas and the east coast), Norfolk, Suffolk, central and west coast areas of Wales, the South West (Cornwall, Devon, Dorset and the Isle of Wight).



Figure 8.4: Option change in total journey time

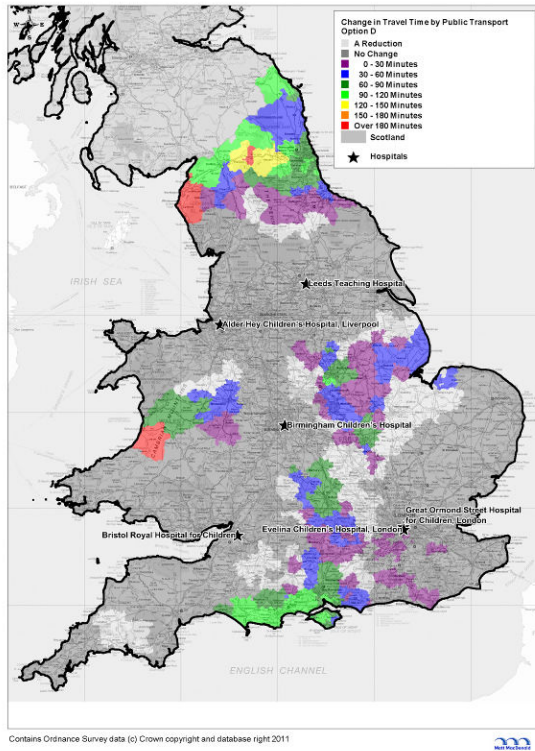
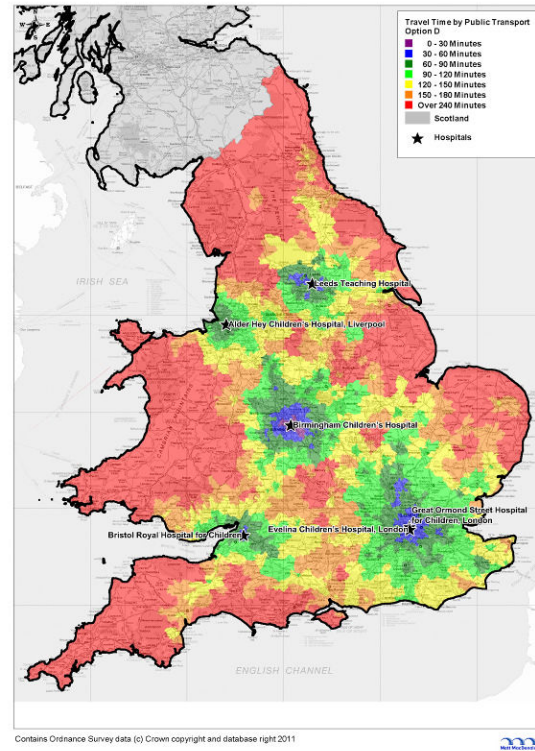


Figure 8.5: Option total journey time



## 8.4 Impacts on vulnerable groups

As set out in the methodology in Chapter 3, a key part of this HIA is to assess impacts on the population groups that are considered disproportionately vulnerable in terms of experiencing congenital heart disease. Certain postcode districts around the country have particular concentrations of these vulnerable people (as illustrated in Figure 3.1 in Chapter 3) so it can be expected that demand for services is *potentially* higher in these locations. **The analysis in this section specifically concentrates on the assessment of travel and access impacts on these vulnerable postcode districts.** Again, to accurately reflect the *numbers* of people that will actually be affected analysis has been undertaken on the basis of current patient activity.

There are presently 849 patients within the vulnerable postcode districts (31%<sup>108</sup>) and that would experience an increase in journey time by car and 585 (21%) by public transport. Those experiencing *significant* journey time effects, however, are far less: 284 (10%) by car and 288 (11%) by public transport.

Over 60% of patients from vulnerable postcode districts would be able to access a surgical centre within one hour by car and only 26% by public transport.

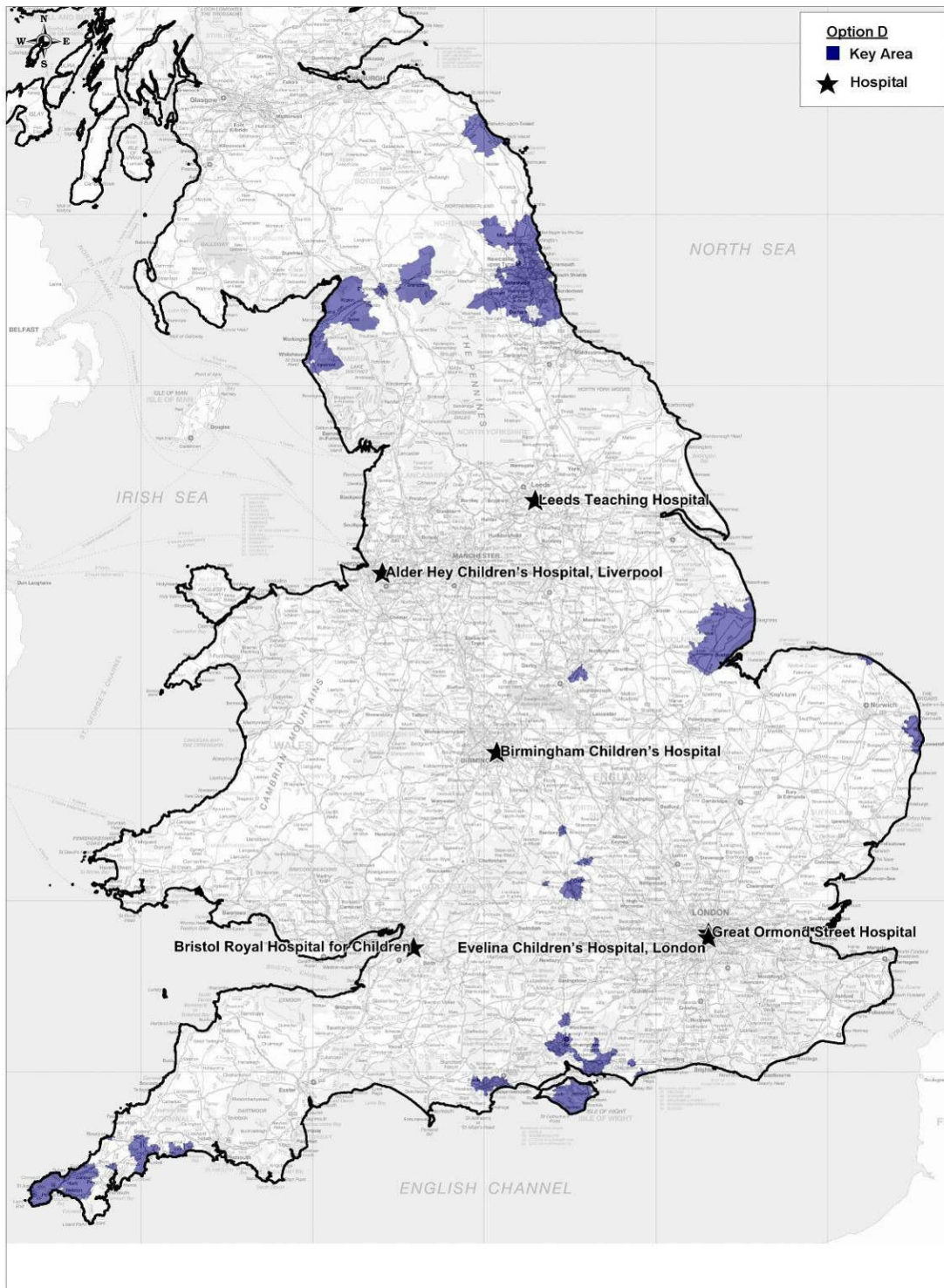
<sup>108</sup> Expressed as a of total number of patients in vulnerable postcode districts. The total number of patients in vulnerable postcode districts is 2,745.

Table 8.3: Travel impacts for patients in vulnerable postcode districts

Option D	Private Car	Public Transport
Number of patients from vulnerable postcode districts experiencing an increase in journey time	849 (31%)	585 (21%)
Number of patients in vulnerable postcode districts experiencing a journey time increase of one hour or more	253 (9%)	282 (10%)
Total number and proportion of patients from vulnerable postcode districts experiencing an overall journey time of over three hours by private car or four hours by public transport	43 (2%)	75 (3%)
Total number and proportion of 'new' patients from vulnerable postcode districts who would experience an overall journey time of over three hours by private car or four hours by public transport (i.e. over and above the number of patients already experiencing these journey times)	3 (0%)	5 (0%)
Total number and proportion of patients from vulnerable postcode districts who would experience a journey time increase of one hour or more AND/OR an overall journey time increase of over three hours by private car and 4 hours by public transport	284 (10%)	288 (11%)
Number and proportion of patients from vulnerable postcode districts within one hours journey time	1662 (61%)	724 (26%)

Figure 8.6 below identifies the vulnerable postcode districts for Option D (i.e. where high concentrations of vulnerable groups).

Figure 8.6: Option D: Vulnerable postcode districts experiencing significant travel time impacts



Contains Ordnance Survey data (c) Crown copyright and database right 2011

## 8.5 Carbon emission impacts

As set out in the methodology, it should be noted that the carbon emission impacts presented in this Chapter are at a high level and are based only on the journey time projections for trips to surgical centres. They do not account for any potential reductions that could result from more secondary care being delivered closer to home (and, therefore, journey distances for follow-up appointments being reduced).

The net change in transport emissions from baseline for Option D is an increase of 65 tonnes CO<sub>2</sub>e. This represents a 19% increase from the baseline (341 tonnes CO<sub>2</sub>e). This increase is a reflection of the change in journey times as patients and visitors would have to travel further for children's heart surgery under this Option.

Private transport accounts for the largest proportion of the estimated increase in transport emissions (59 tonnes CO<sub>2</sub>e, 91% of the total). Visitor travel for this mode in particular contributes to the majority of these emissions (78% of the total increase, 51 tonnes CO<sub>2</sub>e).

Public transport emissions are expected to increase by 5.5 tonnes CO<sub>2</sub>e (7% of the total increase). This represents the lowest increase in emissions for this travel mode of the reconfiguration Options. This trend is primary due to the combination of higher proportions of the population experiencing a decrease in journey time; and lower proportions of the population experiencing an increase in journey time in comparison to other Options.

Emissions from blue light ambulance under Option D are expected to increase by 0.2 tonnes CO<sub>2</sub>e (0.3% of the total increase).

The NHS Carbon Reduction Strategy for England aims to reduce the impact of travel movements from patient's staff and visitors.<sup>109 110</sup> Travel planning is a key carbon saving measure identified within this strategy,<sup>111</sup> aiming to reduce emissions by 81,524 tonnes CO<sub>2</sub> per year. The net increase in emissions from this Option represents 0.08% of the potential saving from travel planning projected in the Strategy.

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<sup>109</sup> NHS Sustainable Development Unit (August 2009) NHS England Carbon Emissions Carbon Footprinting Report [http://www.sdu.nhs.uk/documents/publications/1263313924\\_jgyW\\_nhs\\_england\\_carbon\\_emissions\\_carbon\\_footprintin\\_g\\_r.pdf](http://www.sdu.nhs.uk/documents/publications/1263313924_jgyW_nhs_england_carbon_emissions_carbon_footprintin_g_r.pdf)

<sup>110</sup> The NHS aims to reduce its emissions by 10% by 2015 (based on 2007 baseline data) from 21 MtCO<sub>2</sub>e to 19 MtCO<sub>2</sub>e; and 80% by 2050 (4 MtCO<sub>2</sub>e per year).

<sup>111</sup> NHS Sustainable Development Unit: NHS Carbon Reduction Strategy [http://www.sdu.nhs.uk/documents/publications/UPDATE\\_NHS\\_Carbon\\_Reduction\\_Strategy\\_\(web\).pdf](http://www.sdu.nhs.uk/documents/publications/UPDATE_NHS_Carbon_Reduction_Strategy_(web).pdf)

## 8.6 Summary of Option D impacts

The box below provides a summary of the key impacts associated with Option D.

### Summary of Option D impacts

#### Overall impacts

- Current patient data indicates that 1,172 patients would be required to use a different centre from the one that they are currently using; 828 patients would be assigned to a new network.
- Under Option D, the Leeds and London centres are likely to receive most new cases, based on current patient data.

#### Access impacts

- Under Option D, 11% of patients would experience significant travel impacts by private car and 13% by public transport.
- Based on current patient numbers these impacts would be experienced by 380 children (if using private car) and 470 (if using public transport).
- *Note these figures relate only to trips to surgical centres because data is not available to for the journeys for secondary care.*

#### Impacts on vulnerable groups

- 31% of patients living within vulnerable postcode districts would experience an increase in journey time by car and 21% by public transport under the configuration proposed; significant travel impacts would, however, only be experienced by 10% by car and 11% by public transport.
- Under Option D 61% of patients from vulnerable postcode would be within one hour's car journey from a surgical centre; 26% are within an hour by public transport

#### Carbon emission impacts

- The net change in transport emissions for Option C is an increase of 65 tonnes CO<sub>2</sub>e, a 19% increase from the baseline. *Note this modelling is based on trips to surgical centres only and does not account for the shorter journeys to local centres for follow-on care.*

## 9. Conclusions

This Chapter provides a high level, integrated summary of the assessment findings, combining all of the key impacts identified in Chapters 4 – 8. It begins with a summary of the specific evidence for each Option and then outlines the key impacts on: health outcomes and services; families; vulnerable groups; travel and access; and carbon emissions. This interim report then highlights some mitigation and opportunity measures that it suggested should be considered alongside the decision-making process.

### 9.1 Overview of the Option assessment

The table on the following page provides a summary of the main quantifiable impacts identified within the assessment.

Impact	Option A	Option B	Option C	Option D
<b>Overall impacts</b>				
Number of children affected by needing to use a different centre from the one that they are currently using*	1,008	1,002	1,233	1,172
Number of children assigned to a new network	772	858	898	828
Hospitals likely to receive most new cases*	Leicester London	Newcastle Southampton	Newcastle London	Leeds London
<b>Access impacts<sup>112</sup></b>				
Proportion of patients that would experience significant travel impacts	By private car	10%	9%	13%
	By public transport	15%	14%	15%
Number of children these impacts would be experienced by*	By private car	338	337	468
	By public transport	525	512	543
<b>Impacts on vulnerable groups</b>				
Proportion of patients living within vulnerable postcode districts who would experience an increase in journey time	By private car	29%	29%	33%
	By public transport	22%	23%	23%
Proportion of patients living within vulnerable postcode districts who would experience significant travel impacts	By private car	8%	9%	12%
	By public transport	11%	11%	13%
Proportion of patients from vulnerable postcode who would be within one hour's journey from a surgical centre	By private car	62%	61%	59%
	By public transport	25%	25%	25%
<b>Carbon emission impacts<sup>113</sup></b>				
Net increase in transport emissions from the baseline (341 tonnes CO2e).	Tonnes CO2e	58 tonnes CO2e	65 tonnes CO2e	81 tonnes CO2e
	% increase	17%	20%	24%

\* Based on current patient data

112 Note these figures relate only to trips to surgical centres because data is not available for the journeys for secondary care.

113 Note this modelling is based on trips to surgical centres only and does not account for the shorter journeys to local centres for follow-on care.

## 9.2 Impacts on health outcomes and health services

**This HIA has identified evidence to suggest that the concentration of surgical expertise onto fewer sites and the provision of more secondary services closer to home would be likely to create benefits in terms of better clinical outcomes for all children requiring paediatric cardiac services.**

All patients, present and future, should benefit as a result of reconfiguration because the new model will ensure:

- that there is a critical mass of procedures being undertaken by each surgeon each year to maintain the very best levels of expertise;
- that there is surgical cover 24 hours a day seven days a week;
- onwards care and support being provided closer to their home with strengthened and more coherently organised clinical networks.

There will be some short-medium impacts on services, which will be experienced during the transition from the current configuration to the new model of care. These impacts include capacity at retained centres; and the resilience of associated and/or linked services including ECMO, PICU, interventional cardiology and ambulance provision. Safe and Sustainable has already developed plans for the transitional phase which will help to minimise likelihood and the scale of these short term negative impacts whilst the proposed new system is implemented, becomes fully established and stabilises.

Particular work has been done, and is currently ongoing, around the capacity of centres proposed for retention; the Safe and Sustainable Review required centres to undertake a facilities and capacity assessment to ensure they could accommodate more patients in the future. It is recognised that population growth and, particularly, patient choice could impact on projected activity flows and therefore present the risk of capacity constraints. However, analysis undertaken for this HIA suggests that neither factor would exert a significant enough influence on demand assumptions to present sites with future challenges; any uplifts caused by either factor are likely to be very small. Future flows and their impact on capacity should, however, be carefully monitored as proposed by the Safe and Sustainable Standards.

A further impact which this HIA considers to have a significant short term and potentially long-medium term impact on service delivery is the potential loss of expertise from surgeons, specialist nurses and other team members who would be required to relocate under any of the proposed Options. Not all of these staff would want, or be able, to move cities, should services be withdrawn from the hospital in which they currently work; this does pose a risk to service sustainability and to the short term achievement of the expected improved outcomes. It is understood that as part of the Safe and Sustainable Review, consultation is being undertaken with staff to discuss the implications of proposed changes on staff once the result of the JCPCT decision is announced and Safe and Sustainable is considering the establishment of a human resources group to oversee staff transition and retention. This piece of work will better inform measures to mitigate the loss of expertise that is likely to occur as a result of adopting the new model.



### 9.3 Wider impacts on patients and families

**Whilst impacts may be felt by a few, they will be significant for some families and patients (children).**

This assessment has highlighted a range of impacts that will be experienced as a result of implementation of a new service model. Certain of these impacts will be felt only by children who are currently undergoing surgery and who will require further surgery in future. The key impact that will be experienced by this minority of patients who are currently in the system is the disruption to their continuity of care. Children develop strong bonds of trust and confidence with their surgeon and the supporting clinical team. For the very small proportion of existing patients, who require further surgical interventions and who will need to use a new hospital in future, there is a risk that these relationships will change, especially given the uncertainty over which staff members will choose to relocate.

There will also be some more long term impacts experienced by families, both present and future, as a result of long journey times to reach a surgical centre.<sup>114</sup> Where a child is being treated a long way from home, families will not have the same level of access to networks of psychological and emotional support from the wider family, or from their religious or cultural community. The costs of transport, subsistence, and possibly accommodation and childcare are likely to be heightened for those patients who need to travel long distances for surgical treatment in future. Whilst very long journey time impacts will be experienced by a small number patients and their families, the impacts are likely to have an effect on family well-being.

### 9.4 Impacts on vulnerable groups

**This HIA indicates that some population groups will be disproportionately affected by reconfiguration proposals due to their higher susceptibility of experiencing congenital heart disease and, therefore, needing children's heart surgery services.**

Vulnerable groups are, by definition, disproportionately likely to experience a congenital heart disease and are, therefore, more likely to require children's heart surgery services. As such vulnerable groups will benefit disproportionately from the positive impacts of improved health outcomes and care delivered closer to home. As with the general population, these impacts are likely to be long term.

In particular, the new network model of care is likely to improve the management of vulnerable groups in pregnancy to improve in utero diagnosis and hence outcomes for babies with cardiac problems and to be able to positively discriminate to ensure at risk communities and groups receive the best possible care, reducing health inequalities.

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<sup>114</sup> Particularly where journeys by car are over three hours or public transport trips are over four hours.

There are, however, some instances where patients from vulnerable groups will also experience some disproportionate negative impacts. This is particularly the case where journey times increase or overall travel times are very long (due to the more limited access to private vehicles amongst some groups and the economic implications of travelling further). However, the numbers of patients from vulnerable groups likely to experience impacts are very small under all of the Options. The psychological effects experienced by families from some vulnerable groups are likely to be more pronounced due not only to more limited financial resources but also a tendency amongst some Asian communities in particular to have a higher reliance on cultural and religious facilities and support close to their home.

In general, whilst vulnerable groups may be more likely to experience impacts outlined in this assessment (i.e. they will be disproportionately affected, they will not experience different impacts), the issues, both positive and negative, that they will encounter as a result of adoption of one of the proposed Options are consistent with those experienced by all patients.

## 9.5 Travel and access impacts

**All of the reconfiguration options will lead to some current patients needing to use a different surgical centre which will lead to longer journeys for these patients.**

Across all of the Options around a third of patients could potentially be affected by longer journey times by private car and between a fifth and a quarter of patients by public transport. Those experiencing very long journey time increases (increases of over one hour), however, are far fewer and do not exceed 450 patients (12% of total patients) for either public or private transport.

Where increases in journey times are experienced, the most significant effects will be induced as a result of cessation of paediatric cardiac surgical services at Leeds Teaching Hospital, followed by the removal of Southampton where highest number of patients will experience an increase of over an hour. Ceasing paediatric cardiac surgery services at any one of the London hospitals will have least effect on journey times due to the two other London hospitals in close proximity; no patients would experience a journey time increase of an hour or more as a result of removing paediatric cardiac surgery from one of the existing providers.

A small minority of patients will also experience very long travel times in future (over three hours by car and four hours by public transport in future) for paediatric cardiac surgery. However, based on current patient activity, this is expected only to affect a maximum of 90 patients by car and 178 by public transport. Also, it should be noted that the vast majority of these patients would have journey times of over these lengths of time under the present service configuration.

Impacts on journey times presented in this report only refer to travel time impacts to the surgical centres; the vast majority of children (nearly 90%) will only need to visit the surgical centre once and will then rely on follow-up care that is provided much closer to home. Journey time impacts of accessing this secondary care have not been modelled as flow data and projections are not available; hence the benefits of travelling shorter distances for post-interventional treatment cannot be quantified.

## 9.6 Carbon impacts

### **All of the reconfiguration options will lead to a net increase in transport emissions from baseline.**

Carbon increases are a reflection of the change in travel and increased journeys for some patients and visitors. Private transport accounts for the largest proportion of the estimated increase in transport emissions for all Options; emissions from blue light ambulance represent the lowest proportion of the estimated increase in transport emissions for all Options.

Impacts on emissions from transport presented in this report only refer to travel to surgical centres. Once again, it is worth stating that the vast majority of children (nearly 90%) will only need to visit the surgical centre once and will then rely on follow-up care than is provided much closer to home. Carbon impacts of accessing this secondary care have not been modelled as flow data and projections are not available hence the benefits of travelling shorter distances for post-interventional treatment cannot be quantified but it is expected that they could help to partially offset the impacts of increased travel emissions resulting from surgical trips.

## 9.7 Opportunities and mitigations

Safe and Sustainable is already undertaking work in many areas in which impacts have been identified. However, the work undertaken for this assessment has produced some additional suggestions around maximising the positive outcomes and minimising any of the short term negative effects which should be considered during the decision-making process and implementation of any of the proposed Options. These are summarised below:

- A clear programme of monitoring after implementation, especially to evaluate assumptions of patient flows; service infrastructure capacity at retained centres; resilience of ECMO, PICU and interventional cardiology services; recruitment and retention; and capacity of family accommodation at the surgical sites.
- An effective communication programme during transition to clearly describe to communities the phases of the changeover to further raise awareness of the clinical benefits of the new model and offer reassurance.
- Extension of training throughout the wider clinical network to include GPs, public health and midwives to help ensure effective implementation of the new service model.
- Provision of clear travel guidance and advice, which will need to be prepared in different languages as required.
- Consideration of the findings of other work currently being undertaken by Safe and Sustainable (for example around patient flows) and being commissioned by the JCPCT (for example the extent to which the services could be safely delivered at the Royal Brompton Hospital in the absence of a paediatric cardiac surgical service/viable PICU at the Royal Brompton) which will provide further evidence with respect to some of the impacts identified within this report.<sup>115</sup>

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<sup>115</sup> It is anticipated that some of these findings will be available for incorporation into the final HIA report.

There are also considerable opportunities to help address some of the disproportionate impacts and health inequalities experienced by some of the identified vulnerable groups. These measures include:

- Involving vulnerable groups in the implementation of proposed service changes as far as possible to ensure the provision of care closer to home matches with their specific service needs.
- Engaging with vulnerable groups through appropriate media to communicate service changes and the long term health benefits the proposed new model is expected to deliver.
- Looking to target resources at providing support to vulnerable groups during the development and strengthening of clinical networks.
- Developing standardised solutions to assist with issues which have a disproportionate impact on vulnerable families, including accommodation and travel costs and psychological, cultural and emotional support.