Improving Specialist Cancer and Cardiovascular Services in North and East London and West Essex

Appendix A - H

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Improving Specialist Cancer and Cardiovascular Services in North and East London and West Essex

Appendices A- H

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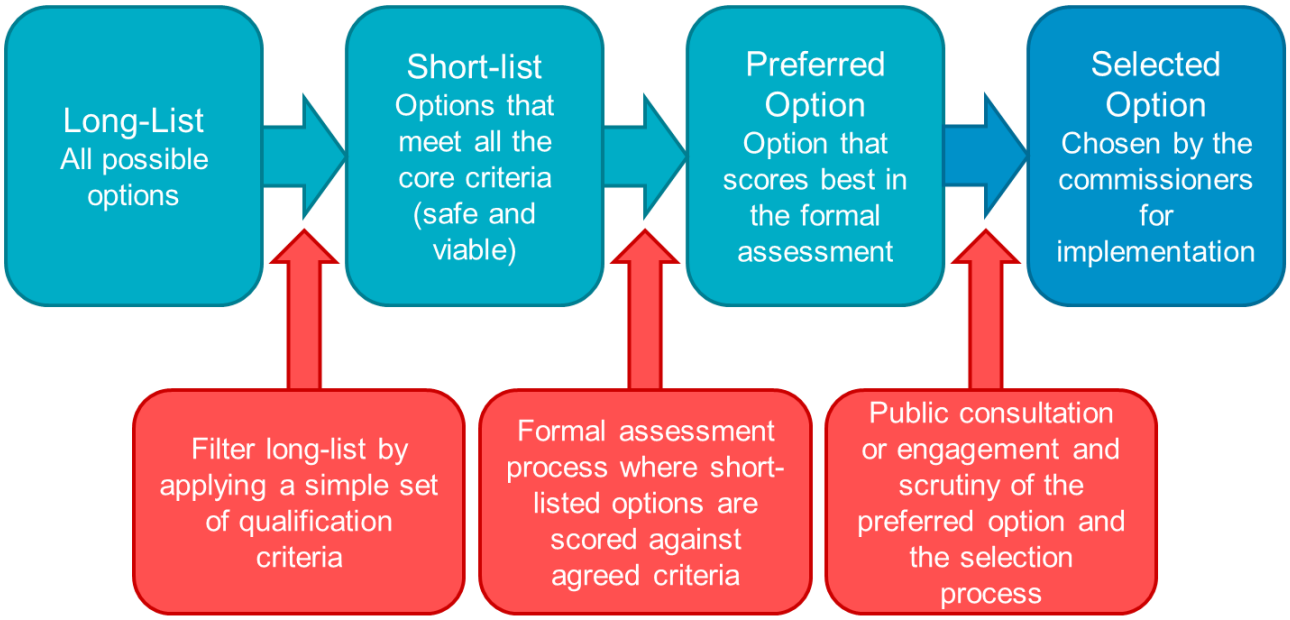
A Appendix – Cancer options appraisal process

A.1 Introduction

The diagram describes the process whereby a long-list of hypothetical service configurations has been distilled down to a single preferred option that stakeholders are now being asked to consider for approval and implementation.

Figure A-1 – Cancer options appraisal process



Each stage of the process is intended to be objective, transparent and robust.

The process involved a number of workshops facilitated by members of the programme team. At each workshop there was representation from:

- The programme team
- NHS England (commissioning team)
- The CSU contracting team
- UCL Partners
- Clinical Commissioning Groups

There was also representation from patients and the public at the shortlisting event, the patient experience scoring workshop, the final clinical scoring workshop and the concluding workshop where all the scores were brought together.

The process has been separate from the work undertaken by London Cancer earlier in 2013. That exercise was led by the clinicians in the sector and the criteria used to arrive at recommendations were mostly clinical. This process has been led by commissioners, involved a wider range of stakeholders and assessed options on non-clinical as well as clinical criteria. Where clinical advice was sought this was independent of the providers affected. The providers

of services were not involved in the process of selecting and scoring options except to confirm that information used was correct.

A.2 Duties and responsibilities

Throughout the process NHS England was mindful of its duties and responsibilities in respect of:

- Reducing inequalities in health and health provision as contained in S13 of the NHS Act 2006, the Equality Act 2006 and the NHS constitution and mandate
- The NHS (Procurement, Patient Choice and Competition) (2) Regulations 2013.

In respect of these duties commissioners must act with a view to:

- Securing the needs of the people who use the services
- Improving the quality of the services and
- Improving efficiency in the provision of these services.

Furthermore commissioners must not engage in anti-competitive behaviour (which can include reducing the number of providers), unless to do so is in the interest of people who use the services which may include:

- By the services being provided in an integrated way or
- By co-operation between the persons who provide the services in order to improve the quality of the services. The process was considered and approved by the Programme Board at is meeting 11 November 2013.

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A.3 Long listing

For each service pathway several options on a long-list were drawn up by the project management team based on experience of previous reconfigurations and having taken account of:

- Duties contained in S13 of the NHS Act 2006
- The NHS constitution and mandate

This long-list was then reviewed and amended following discussion with UCLP, London Cancer, NHS England, the wider project team and the projects legal advisers.

The providers on the long list and the locations of services were limited to the existing service providers in the sector.

A.4 Shortlisting

A draft shortlist of options selected for scoring was developed out of a workshop held on 15 October 2013.

The general principle applied in drawing up the shortlist was that all options that appeared to be safe and viable should be considered in the appraisal stage. Four criteria were applied to arrive at the shortlist outlined in the table below.

Table A-1 – Cancer services shortlisting criteria

Criteria		Reasoning
1	Forecast volume of work, or population served, should be greater than an agreed threshold.	Sets the appropriate maximum number of providers for the area
2	Trust must demonstrate that it has the appropriate infrastructure/co-adjacencies	Takes out options that are unlikely to meet minimum standards
3	The current service must be able to demonstrate that it will meet acceptable standards of safety and clinical quality	
4	Option goes further than necessary to improve clinical quality in reducing the number sites	Takes out one site options where two site is indicated as being optimal

Wherever possible the thresholds or standards for these criteria were based upon National or London-wide guidelines. In some cases London Cancer had proposed standards that were different. With the exception of Renal Cancer (where no national or London-wide standard has been issued), the London Cancer standard was not used to reject options from the shortlist but was used to influence the clinical scoring.

The sections that follow describe the shortlisting debate for each pathway.

The conclusions of the shortlisting workshop were circulated for comment to a range of stakeholders before being adopted by the programme Board at its meeting on 11 November 2013.

A.5 Appraisal criteria

The workshop held on 15 October 2013 also discussed and agreed the criteria by which the shortlisted options would be appraised and scored, as well as the weighting to be applied to the scores.

Table A-2 – Cancer services appraisal criteria

Criteria	Description	Sub-Criteria	Weighting
1. Clinical Quality	The extent to which the option will improve clinical outcomes	• Survival rates and quality of life • Access to appropriate expertise to ensure patient safety • Ease / Extent of compliance with national specifications • Co-location with other key services or specialties / access to specialist equipment	45%
2. Patient Experience	The impact of the option for individual patients and the way that services are accessed	• Choice and competition • Impact on accessibility to the service • Impact on inequalities	25%
3.Deliverability	The relative difficulty associated with bringing the option to completion	• Complexity and time needed to deliver the changes • Co-dependencies with other strategies • Workforce changes required	20%
4. Research, education and training	The extent to which the quality of research is improved and the relative impact on education and training	• Improved research outcomes • Impact on education and training	10%

There was a minority view expressed in the workshop that greater weighting should be placed on the patient experience score. The effect of changing the weighting in this way has been tested in the sensitivity analysis.

A.5.1 Scoring: Clinical Quality, Training and Research

The scores for clinical quality were arrived at over a series of meetings. An initial workshop was held on 4 November 2013 at which the general principles for clinical scoring were agreed. Each of the members of the workshop were then interviewed by the project team and asked identify the key issues and to score each option. A final workshop was held on 29 November 2013 where the consolidated scores were shared and final clinical and research scores were agreed.

A score of zero to five has been awarded to each option. The scores took account of issued guidance and other published evidence that indicated that consolidation of services onto fewer sites can lead to better clinical outcomes and higher quality research. In general options that reduced the number of sites were scored more highly although there was recognition that a

point is reached where the clinical benefits to be gained from further consolidation become too small to justify further changes.

The appraisers looked for evidence of higher or lower clinical performance in the existing service based on:

- Current outcomes (peer review, waiting times, local service follow-ups)
- Co-dependencies with other specialties
- Technology
- Clinical trials
- Improvement plans in place to address known / current clinical weaknesses
- Retention / recruitment of expertise.

A.5.2 Scoring: Deliverability

The deliverability scores were reached at a workshop held on 13 November 2013.

In arriving at a single score of zero to five the workshop considered:

- **The complexity and scale of the implementation**. Factors that were taken into account included:
    - The need to build capacity
    - Any capital developments that may be required including new equipment
    - The financial standing of the trust involved and the impact that this might have on the investment decisions
    - The implications for the workforce
- **The strategic fit**: the extent to which the option fits with the strategic plans and strategies of the commissioners and the trusts.
    - The workshop took some account of the applications submitted to UCLP by trusts to be a provider of each service (although it was recognised that Trusts were asked to submit an application in response to a specific service configuration that was not necessarily the same as the option under consideration)
    - The trust's cancer strategy (or absence of one) was taken into account in considering how each trust aligned its strategy to NHS England's
    - How the option fitted against the national Clinical Reference Group specification was taken into account. Where an option currently did not comply, for example were a single Specialist Multi-Disciplinary Team covering more than one site was proposed, it was assumed that this configuration could be commissioned but that this would add to the time for implementation.
- **The current performance**: the current performance of the service was taken into account to the extent that a provider that is performing less well will have further to travel to reach the world-class standard that is expected.

A.5.3 Scoring: Patient Experience

The scores for patient experience were set at a workshop held on 2 December 2013.

Scores of zero to five were awarded in three separate areas:

- **Choice**: where the workshop concluded that the number of sites/providers in the sector was important to patients. In general options with fewer sites were scored lower.
- **Patient access**: the workshop concluded that the distance that patients and their family will have to travel for treatment was the most important factor associated with access. Options that significantly increased the distance that patients will need to travel were scored lower. Access to parking was also taken into account.
- **Equality**: the options were scored according to the relative impact on reducing inequalities in health and healthcare. In practice the workshop found that there was no material difference between the options when it came to their impact on inequalities and all options were scored the same.

The workshop also considered whether factors such as reduced waiting times and better outcomes should also be reflected in the overall patient experience score. The conclusion reached was that these factors were already reflected in the clinical scores, and that incorporating them into the patient experience score would be a double count.

A.6 Do Nothing Option

For comparison purposes a “do nothing” option has been scored. After some debate in the final workshop the score for each of the do nothing options was agreed as:

- Clinical Outcome 1
- Deliverability 2
- Patient Experience 3
- Research & Training 1

The same score was used for every pathway.

A.7 Sensitivity analysis

The sensitivity analysis is used to identify how robust the ranking of options is and whether a changes to the core assumptions or scores would change the ranking.

A number of sensitivity tests were applied to the consolidated scores. These included:

- The effect of removing the equality score from the overall patient experience score. As all options were given the same score for equality impact this was having the effect of diluting the overall patient experience score.
- Increasing the weighting for patient experience to identify if this changes the ranking of options
- Changing some scores where the workshop had indicated that there was not total consensus over the final score to see whether this affects the ranking.

B Appendix – Cardiovascular options appraisal process

B.1 Introduction

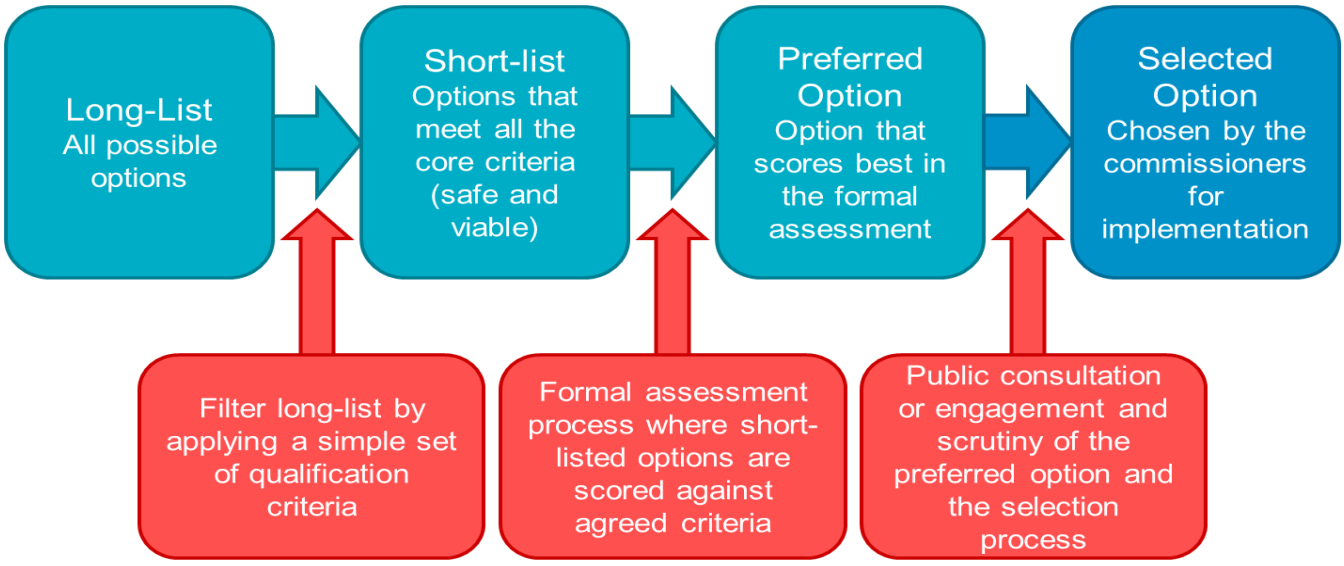
The process was led by NHS England as the commissioner of the majority of services that fall under the scope of this review. However there was recognition throughout that the local CCGs are the commissioner of a significant element of the services that come under the broad umbrella of cardiovascular services.

NHS England have undertaken an assessment of cardiovascular services and concluded that although the trusts offering these services provide good outcomes, neither is large enough to meet all the current and future commissioning expectations for a high quality service. This conclusion was supported by UCLPartners in their assessment of services[1]. UCLPartners have recommended that services at the Heart Hospital should be consolidated onto the Barts Hospital site.

B.2 Options Appraisal Process

The diagram describes the process whereby a long-list of hypothetical service configurations has been distilled down to a single preferred option that stakeholders are now being asked to consider for approval and implementation.

Figure B-1 – Cardiovascular options appraisal process



Each stage of the process is intended to be objective, transparent and robust.

The process was undertaken in a workshop facilitated by members of the programme team. At the workshop there was representation from:

- The programme team
- NHS England (specialist commissioning team)

[1] UCL Partners – World Class Outcomes for a unique population: A proposal for clinical change in specialist cardiovascular services across North and East London (Oct 13)

- UCL Partners
- CCGs
- Representatives from the patients and public

The process has been separate from the work undertaken by UCLPartners earlier in 2013. That exercise was led by the clinicians in the sector and the criteria used to arrive at recommendations were clinical. This process has been led by commissioners, involved a wider range of stakeholders and assessed options on non-clinical as well as clinical criteria. The current providers of the service were not directly involved in either the selection or scoring of options.

B.3 Duties & Responsibilities

Throughout the process NHS England was mindful of its duties and responsibilities in respect of:

- Reducing inequalities in health and health provision as contained in S13 of the NHS Act 2006, the Equality Act 2006 and the NHS constitution and mandate
- The NHS (Procurement, Patient Choice and Competition) (2) Regulations 2013,

In respect of these duties commissioners must act with a view to:

- Securing the needs of the people who use the services
- Improving the quality of the services and
- Improving efficiency in the provision of these services

Furthermore commissioners must not engage in anti-competitive behaviour (which can include reducing the number of providers), unless to do so is in the interest of people who use the services which may include:

- By the services being provided in an integrated way or
- By co-operation between the persons who provide the services in order to improve the quality of the services. The process was considered and approved by the Programme Board at is meeting 11 November 2013.

C Appendix – Cancer options appraisal un-weighted scoring

C.1 Cancer appraisal process

The tables below contain the un-weighted scoring from each cancer pathway options appraisal.

C.1.1 Brain cancer

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
B)	UCLH + BHRUT	4.0	3.0	3.0	4.5	14.5

C.1.2 Head and neck cancer

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
B)	UCLH + BHRUT	2.3	3.2	3.5	3.0	11.9
E)	UCLH	4.0	2.7	4.0	4.2	14.9
F)	BH	3.0	2.7	3.5	4.0	13.2

C.1.3 Bladder / prostate cancer

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
D)	UCLH + BHRUT	2.0	3.2	1.0	3.0	9.2
E)	UCLH & BHRUT (Prostate)	3.3	3.2	3.0	4.0	13.4
F)	UCLH	4.0	2.3	3.5	4.0	13.8

C.1.4 Renal cancer

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
E)	RFH + BH	3.1	3.3	2.5	3.0	11.9
F)	BH	4.2	2.3	3.0	4.0	13.5
G)	RFH	4.2	2.3	4.0	4.0	14.5

C.1.5 HSCT

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.8	3.0	1.6	0.4	6.8
B)	BH + UCLH	8.1	3.0	2.4	1.8	15.3

C.1.6 Acute myeloid leukemia Level 2b

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
B)	BH + UCLH + BCF + BHRUT	2.8	3.3	2.0	3.5	11.6
C)	BH + UCLH + BCF	3.0	3.0	2.0	4.0	12.0
D)	BH + UCLH + BHRUT	3.8	3.0	4.0	4.0	14.8

C.1.7 Oesophago-gastric cancer

Option		Clinical	Patient experience	Deliverability	Research education and training	Total
	Do nothing	1.0	3.0	2.0	1.0	7.0
C)	BH + BHRUT	3.0	3.3	1.0	3.0	10.3
D)	UCLH + BHRUT	3.4	3.3	3.0	3.0	12.7
E)	BH	4.2	2.3	3.5	4.0	14.0
F)	BHRUT	4.0	2.2	1.0	4.0	11.2
G)	UCLH	4.4	2.3	4.0	4.0	14.7

D Appendix – Cancer displacement assumptions

D.1 Cancer displacement activity

The tables below set out a number of assumptions relating to how activity will be displaced when a cancer service is decommissioned. Each table shows the percentage of patients expected to transfer from decommissioned services to retained services based on the assumptions below and the data available (Feb 2012 – Jan 2013).

In general the following assumptions have applied:

- Activity commissioned by the CCGs in north central or north east London will be retained by the new preferred provider(s)
- A proportion of activity commissioned from outside of this area (usually 10% or 20%) will be lost to other providers
- Current activity patterns to a provider that continues as a preferred provider have not been changed.

The reconfiguration of cancer activity is based on the Case for Change. An analysis of the geographical source of the transferring activity was carried out to identify which patients were likely to remain in the north east London region, and which were likely to choose another trust outside the region which might be closer.

This analysis was used to model the movement of specialist cancer activity between the trusts following the reconfiguration.

Table D-1 – Brain activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	76%	100%	0%	0%	0%	0%	0%	0%	0%	0%
RF	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
BHRUT	24%	0%	0%	100%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

Table D-2 – Bladder activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	99%	100%	0%	99%	0%	0%	0%	0%	0%	0%
RF	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
BHRUT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	1%	0%	0%	1%	0%	0%	0%	0%	0%	100%

Table D-3 – Prostate activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	97%	100%	0%	99%	0%	0%	0%	0%	0%	0%
RF	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
BHRUT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	3%	0%	0%	1%	0%	0%	0%	0%	0%	100%

Table D-4 – Renal activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RF	98%	98%	100%	98%	98%	98%	98%	0%	0%	0%
BHRUT	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	2%	2%	0%	2%	2%	2%	2%	0%	0%	100%

Table D-5 – Head and neck activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	96%	100%	0%	0%	99%	0%	0%	0%	0%	0%
RF	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
BHRUT	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	4%	0%	0%	0%	1%	0%	0%	0%	0%	100%

Table D-6 – HSCT activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	100%	0%	22%	0%	0%	0%	0%	0%	0%	0%
UCLH	0%	100%	67%	0%	0%	0%	0%	0%	0%	0%
RF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BHRUT	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	0%	0%	11%	0%	0%	0%	0%	0%	0%	100%

Table D-7 – AML activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	100%	0%	7%	0%	7%	0%	7%	0%	0%	0%
UCLH	0%	100%	92%	0%	92%	0%	92%	0%	0%	0%
RF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BHRUT	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	0%	0%	1%	0%	1%	0%	1%	0%	0%	100%

Table D-8 – Oesophago-gastric activity transfers

From ->	Barts Health	UCLH	RF	BHRUT	BCF	HUH	NMUH	PAH	BTUH	Other Providers
To:										
Barts Health	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UCLH	88%	100%	0%	0%	0%	0%	0%	0%	0%	0%
RF	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
BHRUT	11%	0%	0%	100%	0%	0%	0%	0%	0%	0%
BCF	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
HUH	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
NMUH	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
PAH	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
BTUH	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Other providers	1%	0%	0%	0%	0%	0%	0%	0%	0%	100%

E Appendix – Financial technical appendix

E.1 Joint financial impact assessment on the specialist cancer services and cardiovascular reconfiguration

E.1.1 Introduction

The preferred options will help develop world class centres of excellence giving patients the best chance of survival and highest quality of care. Further consolidation will also help to drive through efficiency improvements which have been financially modelled by PwC to understand combined the impact of both the cancer and cardiovascular proposed options. This section sets out the combined impact on the following parties:

1. The NHS as a whole, the 'system' – the net present value (system NPV) of the preferred option to the NHS.

2. The Providers – the incremental operating cashflow and the assessment of affordability[2] of the preferred option to providers

3. The Commissioners - the incremental operating cashflow and the assessment of affordability of the preferred option to commissioners.

E.1.2 Combined project system NPV

The combined project system NPV is the combination of the system NPV for implementing the preferred cancer and cardiovascular options. The cancer and cardiovascular system NPV's are based upon a financial model and the key working assumptions include:

- Reconfiguration date:
  - Cancer reconfiguration: 1 October 2015
  - Cardiovascular reconfiguration: 1 December 2014

- Cashflows are modelled over 34 years to align with the remaining life of the Barts PFI building on the West Smithfield site

- The scope of costs include:
  - Cancer reconfiguration: clinical inpatient and critical care activity including excess bed days
  - Cardiovascular reconfiguration: all cardiovascular activity.

- Providers who lose activity, are likely to no longer incur a proportion of their current cost base, as these are either reabsorbed by another service line or no longer incurred. This will most likely be the case for fixed costs such as utilities, rent and rates, insurance and other costs that do not vary with activity. Such costs are classified as "fixed costs". Variable costs, which vary with activity, transfer to the new provider with the activity.

[2] Affordability analysis seeks to estimate the impact on provider income and expenditure over the period from 2012/13 to five years after the service transition date.

- Each year in the model, assumptions are applied to the recurrent operational cashflows in both the cancer and cardiovascular models. These include, for example, growth assumptions relating to both demographic and non-demographic factors. Appendix E outlines these assumptions in more detail.

The combined project NPV demonstrates that there is an overall positive return of £94.2m to NHS over the 34 years assessment period as a result of the cancer and cardiovascular reconfigurations. This indicates that there is a positive financial benefit as a result of the reconfiguration.

The cashflows presented in the table below and the NPV bridge are grouped into the following categories:

1. Recurrent operational cashflows (see section E.1.2.1)

2. Other recurrent cashflows (see section E.1.2.2)

3. Non-recurrent transitional cashflows (see section E.1.2.3)
    a. Implementation costs
    b. Capital expenditure

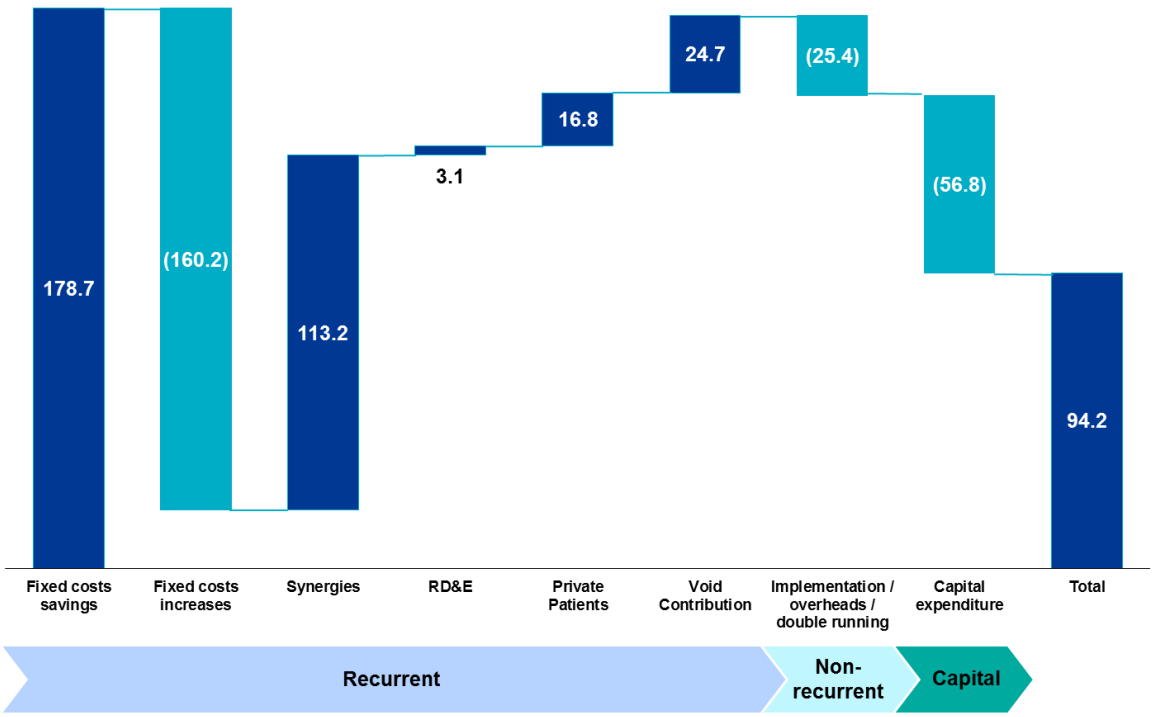
This section considers each of these categories in turn with further detail included in section E.2 and E.3 for the cancer and cardiovascular reconfiguration respectively.

The table and figure below outline the system NPV of the preferred options for both cancer and cardiovascular services.

Table E-1 - 34 year System NPV of the preferred option for cancer and cardiovascular activity (£000)

	Cancer	Cardiovascular	Total
Recurrent operational cashflows			
Fixed costs savings (costs no longer incurred)	51,522	127,187	178,709
Fixed costs increases (incremental fixed costs)	0	(160,211)	(160,211)
Post-reconfiguration synergies	13,088	100,122	113,210
Other recurrent cashflows			
RD&E contribution	894	2,163	3,057
Private patient contribution (additional private patient income generated by reconfiguration)	9,642	7,205	16,847
Void contribution (net contribution from reused vacated space)	10,623	14,101	24,724
Non recurrent transitional cashflows			
Implementation costs	(10,228)	(15,180)	(25,408)
Capital expenditure	(11,478)	(45,278)	(56,756)
Total	**64,063**	**30,108**	**94,171**

Figure E-1 – System NPV bridge (£m)



E.1.2.1 Recurrent operational cashflows

Recurrent operational cashflows are defined as those that are received or incurred in respect of the delivery of specialist cancer services or cardiovascular services to NHS patients. The combined project NPV analysis above recognises the incremental impact of these recurrent operation cashflows as a result of implementing the preferred cancer and cardiovascular options.

The NPV of the impact on recurrent operational cashflows is a net positive return of £131.7m over the 34 year assessment period which comprises:

- positive return of £178.7m generated through provider fixed cost savings (from providers who are losing activity)
- negative return of £160.2m due to an increase in provider fixed costs (from providers who are the recipient of activity)
- positive return of £113.2m generated through reconfiguration synergies.

This indicates that there is a significant positive benefit to recurring operational cashflows as a result of the reconfiguration with the majority of the positive benefit arising from the reconfiguration synergies once fixed cost savings are offset against additional fixed costs.

Consolidated incremental operating cashflows

This section outlines the consolidated incremental impact on operating provider cashflows for each provider as a result of implementing the preferred cancer and cardiovascular option. Section following this will focus on the individual providers in more detail.

The flow of patients is greater in the cardiovascular reconfiguration compared to the cancer reconfiguration:

- 2,333 spells arose at providers in the north and east London and west Essex cancer system between February 2012 and January 2013, with 732 expected to transfer to new providers as part of the reconfiguration
- 5,159 spells arose at The Heart Hospital in respect of activity in scope of this reconfiguration in 2012/13, 95% of this will transfer to Barts Health.

An overview of the projected operational cashflows impact on the NHS system is presented over a 10 year period from 2014/15 in the table below. The incremental income and cost cashflows for all providers is:

- Positive in year 2013/14 (the year prior to reconfiguration)
- Negative from the year of reconfiguration (2014/15) to 2017/18
- Positive from 2018/19 onwards.

When the incremental total cashflow is considered on a cumulative basis, providers break-even in 2021/22, which indicates a benefit of the reconfiguration to providers overall.

Table E-2 – Summary of consolidated operating cashflows for all providers (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	(1,224)	(3,531)	(3,419)	(3,517)	(3,616)	(3,715)	(3,816)	(3,917)	(4,019)	(4,121)
Non-clinical	0	(0)	0	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Reduction / (increase) in provider cost											
Fixed	228	(1,279)	(6,550)	(3,963)	(1,520)	379	1,341	1,386	1,434	1,482	1,533
Variable	0	788	2,574	4,197	4,352	4,510	6,196	6,415	6,638	6,866	7,098
Total	**228**	**(1,716)**	**(7,506)**	**(3,184)**	**(685)**	**1,274**	**3,821**	**3,985**	**4,155**	**4,329**	**4,509**

There is a decreased cost of services to commissioners from the reconfiguration, resulting in an incremental decrease in provider income each year post reconfiguration. In year 6, this results in an incremental provider income decrease of £3.7m. There is only an impact on income from activity commissioned under National Standard Contracts. This is driven by decrease in commissioner costs from the cardiovascular reconfiguration due to the transfer of activity of cardiovascular activity from UCLH to Barts Health and other providers, which more than offsets the increase in commissioner costs from the cancer reconfiguration which is caused by the transfer of specialist cancer activity to UCLH. In year 6, there is an increase of £0.5m from the

cancer reconfiguration (see Table E-32) and a decrease of £4.2m (see Table E-49) of income from the cardiovascular reconfiguration.

Due to its central London location, it is assumed that UCLH has a higher cost base compared to other providers (including Barts Health) and therefore to achieve the same level of care, commissioners are required to provide UCLH with an increase in income per spell in comparison to the level paid to other providers with a different and lower cost geographic location.

The relative payments to providers are determined with reference to each provider's market forces factors (MFF). The MFFs are used to determine the premium applied to the National Standard Contract prices. The number of spells transferring under the cardiovascular reconfiguration being greater than under the cancer reconfiguration drives the net decrease in cost to commissioners.

Whilst the overall impact on the combined system NPV as a result of fixed cost savings is only £18.5m, this is driven by significant level of fixed cost savings (a positive impact of £178.7m on the NPV) and fixed costs increases (a negative impact of £160.2m on the NPV). The fixed cost savings are driven by both the cancer (£51.5m) and the cardiovascular reconfiguration (£127.2m). The fixed cost increase is only driven by the cardiovascular reconfiguration. When the cardiovascular reconfiguration is considered in isolation, there is a negative impact of £33.0m on the NPV, however, when considered in conjunction with the cancer reconfiguration, there is a net positive position due to fixed cost changes.

In terms of operational cashflows, with the exception of 2013/14, until the end of 2017/18, there is an increase in cost to the providers as a result of changes to fixed costs whilst from 2018/19 there are fixed cost savings. This is driven by the balance in each year between i) fixed cost savings as part of the cancer reconfiguration due to a reduction in the number of providers for each tumour type and ii) the net increase in fixed costs as part of the cardiovascular reconfiguration. In year 6, there is a fixed cost saving of £1.3m (see table above).

A key driver of the positive NPV for the combined reconfiguration is the post reconfiguration synergies which have a positive impact of £113.2m on the NPV. £13.1m of this is as a result of the cancer reconfiguration (see Table E-16) and £100.1m due to the cardiovascular reconfiguration (see Table E-41).

The positive financial impact as a result of the post-reconfiguration synergies is due to the reduction in variable costs from of the consolidation of activity to fewer sites. If no post-reconfiguration synergies were to arise, as there is no change to the baseline level of activity as a result of the cancer and cardiovascular reconfiguration, the level of variable costs in the system would remain the same. Therefore the growth in variable costs with the change in activity is assumed to be offset by synergy savings. From the table below, in year 6, £0.7m of the £6.2m is as a result of the cancer reconfiguration with the remaining £5.5m as a result of the cardiovascular reconfiguration.

The benefit from synergy savings is 7.7 times larger as a result of the cardiovascular reconfiguration than the cancer reconfiguration. This is because there are significantly more spells being transferred under this reconfiguration and the majority of this activity is transferred to one site which enables a great degree of consolidation.

Table E-3 Post reconfiguration synergy savings (nominal) (£'000s)

	1	2	3	4	5	6	7	8	9	10
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Reduction in variable cost due to post-reconfiguration synergy saving										
Cancer										
Head and Neck (UCLH)	0	24	76	79	82	113	117	121	126	131
HSCT (UCLH)	0	77	236	246	256	352	366	380	394	409
AML (UCLH)	0	32	99	103	107	148	153	159	165	171
Renal (RF)	0	20	61	63	65	90	94	97	101	105
Cardiovascular										
Total (BH)	788	2,422	3,726	3,862	4,000	5,493	5,685	5,880	6,079	6,282
Total	**788**	**2,574**	**4,197**	**4,352**	**4,510**	**6,196**	**6,415**	**6,638**	**6,866**	**7,098**

For further information on the rationale for the anticipated synergy savings, see Table E-23 for cancer synergies and Table E-45 for cardiovascular synergies.

Incremental operating cashflows by provider

This section outlines the following for each provider (Barts Health, UCLH, RFH, BHRUT and "other"):

- A summary of the cancer and cardiovascular activity that is proposed each provider will gain or lose[3]
- The incremental impact on operating cashflows for each provider as a result of implementing the preferred cancer or cardiovascular option.

Barts Health

Barts Health is the largest trust in the UK with an annual turnover of approximately £1.25 billion, a workforce of approximately 15000 and serves a population of over 2.5 million in East London and beyond. Barts Health, which was established on 1 April 2012, consists of six local hospital sites including a very large PFI development on the Royal London site.

Since the creation of Barts Health formed by the merger of St Bartholomew's Hospital, Whipps Cross University Hospital and Newham University Hospital, Barts Health has been financially challenged and is currently in self-imposed financial turnaround, focusing on the financial and efficiency challenges that lie ahead for the Trust. Barts Health have prepared a turnaround plan to deliver financial balance by 2015/16.

For 2013/14 financial year the trust has a deficit plan target of approximately £50m with a forecast outturn position of £39m. This is £11m better than plan and indicates the turnaround programme is starting to take effect. This nonetheless indicates a significant underlying financial

[3] The impact on RFH and BHRUT is only measured for the purposes of the cancer reconfiguration as under the cardiovascular reconfiguration the only activity that transfers is from UCLH and this activity is transferred 95% to Barts Health with the remaining 5% to unspecified other providers.

challenge for the trust. The increase in income and contribution to Barts Health presented in this section will help to address the financial turnaround.

Under the preferred option, Barts Health is subject to the following changes in activity so there is a net transfer in of activity:

- Net transfer out of specialist cancer activity - losing 421 spells and gaining less than 22

- Transfer in of cardiovascular activity from The Heart Hospital – gaining 4,901 spells

Due to the transfer of cardiovascular activity to Barts Health, there is an increase in provider income from commissioner from 2014/15 (the year of the cardiovascular reconfiguration) from both the commissioners through National Standard Contract income and through non-clinical income.

The increase in National Standard Contract income is driven by the increase in provider income from commissioners from the cardiovascular reconfiguration being significantly greater than the decrease in provider income from commissioners from the cancer reconfiguration. It is anticipated that Barts Health will have an increase in annual income of £49.0m. This is as a result of an increase of £50.3m due to the cardiovascular reconfiguration and a decrease of £1.2m due to the cancer reconfiguration.

The increase in non-clinical provider income is as a result of the cardiovascular reconfiguration only. By year 6, non-clinical provider income will be £25.5m.

The net transfer in of activity as a result of the cancer and cardiovascular reconfigurations results in an increase to both fixed and variable costs. In year 6, the quantum of fixed and variable cost increases are £7.5m and £47.3m respectively.

The increase fixed costs are driven by an increase in the fixed costs as a result of the cardiovascular reconfiguration, £8.5m in year 6 (see Table E-43), which totally negates the fixed cost saving as a result of the cancer reconfiguration, £1.1m in year 6 (see Table E-20).

The increase in variable costs are driven by the transfer in of cardiovascular activity, £49.0m in year 6 (see Table E-43), which totally negates the variable cost saving from the cancer reconfiguration, £1.8m in year 6 (seeTable E-20).

However, the incremental increase in variable costs at Barts Health due to the cardiovascular reconfiguration does not equate to the total variable cost for the equivalent cardiovascular activity at UCLH, due to synergy assumptions being applied to the variable cost base at Barts Health on reconfiguration. As a result the variable cost per spell reduces. As outlined above, the synergy assumption reduces the variable costs in respect of cardiovascular activity by £5.5m in year 6, therefore, if the synergy benefit were to be excluded the incremental increase to variable cost would be £52.8m. This synergy assumptions were developed with the input of clinicians, and agreed at the Financial Steering Group.

As the increase in cost is less than the increase in provider income, Barts Health experiences a financial benefit through an increase in net operating cashflow. In year 6, this benefit equates to £19.8m overall (£1.5m of the benefit relates to the cancer reconfiguration (Table E-20) and £18.3m to the cardiovascular reconfiguration (Table E-43)).

Table E-4 – Barts Health – incremental operating cashflows from the preferred option (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	14,780	44,423	45,004	46,337	47,685	49,048	50,424	51,812	53,210	54,620
Non-clinical	0	6,126	19,465	20,762	22,241	23,814	25,485	27,261	29,146	31,146	33,268
Reduction / (increase) in provider cost											
Fixed	228	(1,279)	(7,425)	(7,349)	(7,339)	(7,336)	(7,455)	(7,708)	(7,970)	(8,241)	(8,522)
Variable	0	(14,650)	(44,306)	(43,736)	(45,325)	(46,949)	(47,256)	(48,900)	(50,575)	(52,281)	(54,018)
Total	**228**	**4,977**	**12,157**	**14,682**	**15,914**	**17,214**	**19,822**	**21,077**	**22,413**	**23,834**	**25,348**

UCLH

UCLH has a history of being a relatively financially strong trust with a healthy balance sheet, although the trust faces significant future challenges in light of demands relating to restrictions in future growth in health funding in the context of increasing demand and an ageing population, together with increasing expectations from advances in technology. These challenges, together with the trust's plans to expand the hospital's currently constrained capacity, increase the importance to UCLH to work on system changes in the provision of healthcare.

The trust continues to build on their expertise and capability in the field of specialist cancer care. In August 2013, HM Treasury approved an outlined business case for the development of the world's most advanced form of radiotherapy, proton beam therapy (PBT). This, along with the drive towards centralisation of specialist cancer services, will require careful long-term capacity and capital planning. The positive financial impact on the proposals outlined in this business case will support the future direction for cancer services.

Under the preferred options, UCLH is subject to the following changes in activity so there is a net transfer out of activity overall as a result of the cancer and cardiac reconfigurations:

- Net transfer in of specialist cancer activity - gaining 528 spells and losing 37 spells
- Transfer out of cardiovascular activity from The Heart Hospital – losing 5,159 spells.

Due to the transfer of cardiovascular activity from UCLH, there is a decrease in provider income from commissioner from 2014/15 (the year of the cardiovascular reconfiguration) from both the commissioners through National Standard Contract income and through non-clinical income.

The decrease in National Standard Contract income is driven by the decrease in provider income from commissioners from the cardiovascular reconfiguration being significantly greater than the increase in provider income from commissioners from the cancer reconfiguration. It is anticipated that UCLH will have a decrease in income of £48.6m, this is as a result of a decrease of £56.6m (see Table E-47) due to the cardiovascular reconfiguration which offsets the increase of £8.0m due to the cancer reconfiguration.

The decrease in non-clinical provider income is as a result of the cardiovascular reconfiguration only. By year 6, non-clinical provider income is £26.8m.

The net transfer of activity as a result of the cancer and cardiovascular reconfigurations results in a saving in both fixed and variable costs. In year 6, the quantum of fixed and variable cost increases are £7.0m and £51.1m respectively.

The decrease fixed costs are driven by a decrease in the fixed costs as a result of the cardiovascular reconfiguration, £6.9m in year 6 (see Table E-47) with a small saving arising from the cancer reconfiguration, £44k in year 6 (see Table E-22).

The decrease in variable costs are driven by the transfer out of cardiovascular activity, £57.3m in year 6 (see Table E-47), which totally negates the variable cost increase from the cancer reconfiguration, £6.5m in year 6 (see Table E-22). However, the incremental increase in variable costs at UCLH due to the cancer reconfiguration does not equate to the total variable cost for the equivalent cancer activity at current providers, due to synergy assumptions being applied to the variable cost base of specific tumour types at UCLH on reconfiguration. As a result the variable cost per spell reduces. As outlined in Table E-3, the synergy assumption reduces the variable costs at UCLH in respect of cancer activity by £0.6m in year 6, therefore, if the synergy benefit were to be excluded the incremental increase to variable cost would be £51.7m. This synergy assumptions were developed with the input of clinicians and agreed at the Financial Steering Group.

As the increase in cost is more than the increase in provider income, UCLH experiences a financial detriment through a decrease in net operating cashflow. In year 6, this detriment equates to £17.3m overall.

Table E-5 – UCLH – incremental operating cashflows from the preferred option (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	(16,646)	(47,175)	(44,770)	(46,033)	(47,308)	**(48,592)**	(49,884)	(51,185)	(52,490)	(53,802)
Non-clinical	0	(6,448)	(20,489)	(21,855)	(23,412)	(25,067)	**(26,827)**	(28,696)	(30,680)	(32,785)	(35,019)
Reduction / (increase) in provider cost											
Fixed	0	0	673	2,761	4,740	6,155	**6,952**	7,188	7,433	7,685	7,947
Variable	0	16,250	47,165	45,906	47,559	49,247	**51,120**	52,882	54,678	56,504	58,363
Total	**0**	**(6,844)**	**(19,827)**	**(17,959)**	**(17,146)**	**(16,973)**	**(17,346)**	**(18,510)**	**(19,755)**	**(21,086)**	**(22,510)**

Royal Free Hospital

Under the preferred options, the RFH has a net transfer in of specialist cancer activity, gaining 142 spells (renal) and losing 64 spells. There is no transfer in or out of cardiovascular activity.

Despite the net transfer in of activity (renal cancer activity), there is a decrease in provider income from commissioners from 2015/16 (the year of the cancer reconfiguration) from the activity commissioned through National Standard Contract. By year 6 there is a decrease in provider income of £6.0m. There is no non-clinical income considered as part of the cancer reconfiguration.

The decrease in National Standard Contract income is due to the decrease in provider income due to the loss of activity (HSCT and AML) which outweighs the increase in income from the

transfer in of renal spells despite there being 78 more renal spells transferring into the RFH than activity transferring out.

The net transfer in of activity results in a saving in both fixed and variable costs. In year 6, the quantum of fixed and variable cost savings are £1.3m and £4.2m respectively. There are savings in the cost base despite there being a net transfer in of activity, due to the costs relating to AML and HSCT being higher than the costs transferring to RFH in respect of renal activity.

However, the incremental increase in variable costs at RFH due to the transfer of renal activity does not equate to the total variable costs for renal at the current providers, due to synergy assumptions being applied to the renal variable cost base on reconfiguration. As a result the variable cost per spell reduces. As outlined in Table E-3, the synergy assumption reduces the variable costs in respect of renal activity by £90k in year 6. This synergy assumptions were developed with the input of clinicians and agreed at the Financial Steering Group.

As the decrease in provider income is more than the cost saving, the RFH experiences a financial detriment through a decrease in net operating cashflow. In year 6, this detriment equates to £0.5m.

Table E-6 – Royal Free Hospital – incremental operating cashflows from the preferred option (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	0	(2,573)	(5,329)	(5,543)	(5,763)	(5,989)	(6,221)	(6,458)	(6,701)	(6,949)
Non-clinical	0	0	0	0	0	0	0	0	0	0	0
Reduction / (increase) in provider cost											
Fixed	0	0	147	454	782	1,133	1,338	1,384	1,431	1,480	1,530
Variable	0	0	1,771	3,689	3,837	3,989	4,168	4,329	4,494	4,663	4,836
Total	**0**	**0**	**(655)**	**(1,186)**	**(924)**	**(641)**	**(483)**	**(508)**	**(533)**	**(558)**	**(583)**

BHRUT

Under the preferred options, BHRUT has a net transfer out of specialist cancer activity, losing 116 spells and gaining less than 32 spells. There is no transfer in or out of cardiovascular activity.

Due to the net transfer out of more than 84 spells of activity, there is a decrease in provider income from commissioners from 2015/16 (the year of the cancer reconfiguration) from the activity commissioned through National Standard Contract. By year 6 there is a decrease in provider income of £0.7m. There is no non-clinical income considered as part of the cancer reconfiguration.

The net transfer out of activity results in a saving in both fixed and variable costs. In year 6, the quantum of fixed and variable cost savings are £0.3m and £1.1m respectively. There are savings in the cost base despite there being a net transfer in of activity, due to the costs relating to AML and HSCT being higher than the costs transferring to RFH in respect of renal activity.

As the cost saving is greater than the decrease in provider income, BHRUT experiences a financial benefit through an increase in net operating cashflow. In year 6, this detriment equates to £0.7m.

Table E-7 – BHRUT – incremental operating cashflows from the preferred option (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	0	(308)	(638)	(664)	(691)	**(718)**	(745)	(774)	(803)	(833)
Non-clinical	0	0	0	0	0	0	**0**	0	0	0	0
Reduction / (increase) in provider cost											
Fixed	0	0	34	104	179	259	**307**	317	328	339	351
Variable	0	0	460	953	991	1,030	**1,071**	1,112	1,154	1,198	1,242
Total	**0**	**0**	**185**	**418**	**506**	**599**	**660**	**684**	**708**	**734**	**760**

Other providers

For the cancer reconfiguration, other providers relates to providers in the north and east London system, excluding Barts Health, UCLH, RFH and BHRUT from which activity transfer from/to[4] as a result of reconfiguration. Some activity from Barts Health, UCLH, RFH and BHRUT where there are low levels of activity for a particular cancer type are also included as other provider activity.

For the cardiovascular reconfiguration, other providers relates to providers in the north and east London system other than UCLH and Barts Health. It is estimated that 5% of activity may transfer to these providers.

Other providers experience a financial benefit from the reconfiguration of cancer and cardiovascular services through an increase in net operating cashflow as shown in the table below. In year 6, this equates to £1.2m, of which £0.5m relates to the cancer reconfiguration and £0.7m to the cardiovascular reconfiguration.

Due to the transfer in of activity, there is a net increase in the income from 2014/15, both from commissioners through National Standard Contract income (cancer and cardiovascular income) and also through non-clinical income (cardiovascular income only). By year 6, the National Standard Contract income is £2.5m, of which £0.4m relates to the cancer reconfiguration, and £2.2m relates to the cardiovascular reconfiguration.

There is a year on year saving in fixed costs, which is £0.2m in year 6. This is due to cancer activity moving out of the 'other' providers.

There is a year on year increase in variable costs which is £2,9m in year 6, this is driven by an increase in fixed costs as a result of the cardiovascular reconfiguration, £2.9m in year 6, as a result of the transfer in of 5% of the current activity at UCLH. There is a negligible saving in

[4] Activity will transfers to other non-specified providers due to not all activity transferring to the applicable centre of excellence as patients exercise their right to choice of provider

variable costs, £41k in year 6, at other providers as a result of the cancer reconfiguration. For further detail, see Table E-31 for the cancer reconfiguration and Table E-48 for the cardiovascular reconfiguration.

Table E-8 – Other providers – incremental operating cashflows from the preferred option (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Increase / (reduction) in provider income											
National Standard Contract	0	641	2,103	2,315	2,387	2,461	2,535	2,611	2,687	2,764	2,842
Non-clinical	0	322	1,024	1,093	1,171	1,253	1,341	1,435	1,534	1,639	1,751
Reduction / (increase) in provider cost											
Fixed	0	0	22	67	116	168	199	206	213	220	227
Variable	0	(812)	(2,516)	(2,614)	(2,710)	(2,807)	(2,907)	(3,009)	(3,112)	(3,218)	(3,326)
Total	0	151	633	861	964	1,075	1,168	1,242	1,321	1,405	1,495

Incremental costs for commissioners

The combined impact of the preferred cancer and cardiovascular options, are a decrease in the cost to commissioners as shown below. By year 6, the incremental annual net increase in cost to commissioners would be £3.7m.

This is driven by the decrease in the cost to the commissioners as a result of the cardiovascular activity shifting from UCLH to Barts Health, £4.2m in year 6, which outweighs the increase in cost to commissioners as a result of a significant proportion of cancer activity transferring to UCLH from other providers, £0.4m in year 6 (see Table E-32).

Table E-9 – Commissioners - incremental costs from the preferred option (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Decrease / (increase) in cost											
CCG	0	366	1,100	1,126	1,160	1,194	1,228	1,263	1,298	1,334	1,369
NHS England	0	858	2,430	2,292	2,357	2,421	2,487	2,553	2,619	2,685	2,752
Total	0	1,224	3,531	3,419	3,517	3,616	3,715	3,816	3,917	4,019	4,121

Although commissioners will incur a decrease in their cost base as shown in the table below, this decrease is likely to be non-recurrent and only represent a cost to the commissioners for a period of two financial years post reconfiguration. After this period the commissioners would expect an offsetting decrease in funding, through the commissioner allocation being rebased.

Therefore, the incremental benefit to commissioners of implementing the preferred cardiovascular option, will only be relevant to the end of 2016/17, whilst the incremental cost to commissioners of implementing the preferred cancer option will only be relevant to the end of 2017/18. As a result of the timing differences, there is a net benefit to commissioners until the end of 2016/17 and then a cost to commissioners in 2017/18.

Table E-10 – Commissioners - incremental operating cashflows from the preferred option (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Decrease / (increase) in cost											
CCG	0	366	1,100	1,126	(4)	0	0	0	0	0	0
NHS England	0	858	2,430	2,292	(412)	0	0	0	0	0	0
Total	0	1,224	3,531	3,419	(416)	0	0	0	0	0	0

E.1.2.2 Other recurrent cashflows

Other recurrent net cashflows are defined as those that are received (e.g. income received) or incurred (e.g. operating costs including but not limited to staff costs and overheads) in respect of:

- The delivery of services to non-NHS (e.g. private) patients
- Other recurrent cashflows that relate to the reconfiguration.

The NPV analysis recognises the incremental impact of these recurrent cashflows as a result of implementing the preferred cardiovascular and cancer options.

The NPV of the impact of the preferred cancer and the cardiovascular option on other recurrent cashflows is a benefit of £44.6m. Of this £44.6m, £21.1m is from the preferred cancer option and £23.5m from the preferred cardiovascular option. The NPV comprises:

The NPV on other recurrent cashflows comprises of:

- A PV of £3.1m generated through incremental research, development and education (RD&E) contribution (income net of the associated costs of delivering the research, development and education)). This £3.1m represents the present value of £9.2m of research, development and education contribution generated over the 34 year assessment period
    - £0.9m of the NPV is from the incremental research, development and education contribution generated at UCLH as part of the implementation of the preferred cancer option, this represents the present value of £2.6m
    - £2.2m of the NPV is from the incremental research, development and education contribution generated at Bart Health as part of the implementation of the preferred cardiovascular option, this represents the present value of £6.6m.

- A PV of £16.8m generated through providing specialist cancer and cardiovascular services to private patient. This £16.8m represents the present value of private patient contribution totalling £46.7m over the 34 year assessment period
    - £9.6m of the NPV is from providing specialist cancer services to private patients, this represents the present value of £29.5m
    - £7.2m of the NPV is from providing specialist cardiovascular services to private patients, this represents the present value of £17.2m.

- A PV of £24.7m generated by providers through their ability to utilise (for other profitable services) surplus bed capacity arising from the reconfiguration of specialist cancer and cardiovascular beds
    - £10.6m of the NPV is generated by providers in the north and east London and west Essex cancer systems through their ability to utilise surplus bed capacity arising as a result of the preferred cancer option
    - £14.1m of the NPV is generated by UCLH through their ability to utilise surplus bed capacity arising from cardiovascular activity moving out of The Heart Hospital (after considering proposed specialist cancer reconfiguration).[5]

Table E-11 Incremental contribution from Private Patient, RD&E and void contribution (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Barts Health											
Private Patients	0	0	0	538	538	538	538	538	538	538	538
RD&E	0	0	0	0	0	112	116	121	126	131	136
UCLH											
Private Patients	0	0	0	0	0	283	353	428	508	593	683
RD&E	0	0	0	0	0	49	51	53	55	57	59
Void contribution (UCLH)	0	322	1,311	1,657	1,686	1,716	1,747	1,747	1,747	1,747	1,747
Total	**0**	**322**	**1,311**	**2,195**	**2,225**	**2,699**	**2,805**	**2,887**	**2,974**	**3,066**	**3,163**

Research, development and education (RD&E)

Through the creation of a specialist cancer centre at UCLH and a cardiovascular centre at Barts Health, there will be better access to RD&E opportunities. From a clinical perspective as highlighted in the Case for Change, such opportunities will help improve the pathway of care to give more patients access to the latest technology and clinical trials and from a financial perspective, such opportunities will generate additional income for the NHS.

There is only expected to be a financial benefit from 2018/19, with a total increase of £0.2m in year 6. The present value of the financial impact of the incremental RD&E (£3.1m) is considered small relative to the overall NPV of £94.2m.

Private patient

Through the creation of a specialist cancer centre at UCLH and a cardiovascular centre at Barts Health, it is anticipated that there will be an increase in the number of private patient referrals. The income from such patients will be additional to the current NHS activity as the majority of patients are considered international and therefore will have a direct financial benefit to the system.

The benefit is driven by the following:

- 10 planned private patient beds at UCLH in respect of the preferred cancer option which are incremental to the system

[5] This is not reflected in full in the cancer surplus in the affordability analysis

- 8 private patient beds at Barts Health in respect of the preferred cardiovascular option which are incremental to the system.

There is only expected to be a financial benefit from 2016/17 at Barts Health in respect of the cardiovascular reconfiguration and 2018/19 at UCLH in respect of the cancer reconfiguration, with a total increase of £0.9m in year 6. The present value of the financial impact of the incremental private patients income (£16.8m) is considered small relative to the overall NPV of £94.2m.

Void contribution

The activity transferring into specialist cancer centres under the preferred cancer option and from UCLH to Barts Health under the preferred cardiovascular option will result in there being surplus bed capacity across a number of providers. Additional contribution can be generated from this surplus bed capacity, through utilisation of the beds for other revenue and profit generating services.

- Under the preferred cancer options it is anticipated that there will be approximately 20 surplus beds available in 2019/20 (stepping up from 17 beds in 2015/16)

- Under the preferred cardiovascular option it is anticipated that there will be approximately 33 surplus beds available in The Heart Hospital.

E.1.2.3 Non-recurrent transitional cashflows

Implementation costs

The costs associated with implementing the preferred cancer and cardiovascular options, including double running cost, are £28.9m, which have a net present cost of £25.4m. At this stage cost estimates have been provided by Barts Health, UCLH and RFHA summary of the projected costs by provider is set out in the table below and summarised as follows:

- **External implementation team** £6.4m (£1.6m is for the implementation of the preferred cancer option and £4.8m for the implementation of the preferred cardiovascular option)

- **Internal implementation team** £5.7m (£2.9m is for the implementation of the preferred cancer option and £2.8m for the implementation of the preferred cardiovascular option)

- **Double running costs** £13.8m (£7.2m is for the implementation of the preferred cancer option and £6.7m for the implementation of the preferred cardiovascular option)

- **Temporary refurbishment works** £3.0m (£3.0m is for the implementation of the preferred cardiac option)

Table E-12 – Implementation costs of implementing the preferred option (£000)

	Total
External implementation team	6,430
BH	4,751
UCLH	1,680
RFH	0
Internal implementation team	5,669
BH	2,416
UCLH	3,054
RFH	200
Double running costs	13,836
BH	10,475
UCLH	3,362
RFH	0
Temporary refurbishment works	3,000
BH	3,000
UCLH	0
RFH	0
Total	**28,936**

Capital costs

The total projected nominal capital expenditure in relation to implementing the preferred cancer and cardiovascular options is £61.9m (see table below), which have a net present cost of £56.8m. These relate to the following:

- 79% of £61.9m (£49.0m)[6] relates to the implementation of the preferred cardiovascular option as Barts Health will incur additional cost at the Barts Health PFI hospital in order to create capacity required to service the additional activity. This estimate has been developed by a combination of Barts Health and external cost consultants (See **Error! Reference source not found.**)

- 21% of £61.9m (£12.9m) relates to the implementation of the preferred cancer option as UCLH will incur £12.6m to refurbishment The Heart Hospital to accommodate the additional cancer activity, whilst £0.3m is required by RFH. The UCLH estimate has been developed by external cost consultants (See Table E-38).

[6] The total nominal capital expenditure that has been modelled is £49.0m. The latest figure provided by Barts Health is £49.8m following more detailed information being made available following the completion of the modelling exercise.

Table E-13 – One-off capital expenditure of implementing the preferred options (£000)

	Total
Barts Health	49,000
UCLH	12,557
RFH	300
Total	61,857

E.1.3 Commissioner affordability impact

An assessment has been undertaken to quantify the incremental impact on commissioners cost base from the implementation of the preferred option for both cancer and cardiovascular. The assessment period is for the analysis is 1 April 2013 through to 30 September 2020[7].

There is an overall gain to commissioners of £7.8m. This gain arises as a result of significant levels of cardiovascular activity moving to Barts Health from UCLH, offset by a much lower level of cancer activity transferring to UCLH from other providers. The move from UCLH to Barts Health triggers a reduction in the MFF and consequently lower National Standard Contract payments paid by the commissioners.

Table E-14 - Affordability of implementing the preferred option for commissioners (£000)

	Cardiovascular		Cancer		Total	
	CCG	NHS England	CCG	NHS England	CCG	NHS England
Cost – (increase) / decrease						
Operational cost – National Standard Contract	2,599	6,168	(9)	(999)	**2,589**	**5,169**

E.1.4 Provider affordability impact

An assessment has been undertaken to quantify the incremental impact on the income and expenditure of Barts Health and UCLH from the implementation of the preferred option for both cancer and cardiovascular. The assessment is limited to these providers on the basis that these providers experience material transfers of activity through implementation of the preferred cancer option. The period for the income and expenditure analysis is 1 April 2013 through to 30 September 2020[8].

Barts Health

Through the net transfer out and receipt of cancer and cardiovascular activity respectively, Barts Health expect an improved operating contribution of approximately £79.7m.

The costs that Barts Health is projecting in relation to implementation and double running (£17.6m) associated with the reconfiguration of services are greater than the improvement in contribution (£2.2m) associated with increased cardiovascular RD&E and private patient activity.

[7] 30 September 2020 is the date 5 years after the date of transition of services.
[8] 30 September 2020 is the date 5 years after the date of transition of services.

Therefore the net impact on Barts Health income and expenditure is a gain of £64.2m over the assessment period.

UCLH

Under the preferred option, UCLH would lose significant levels of cardiovascular activity which currently operates at a high margin. In addition the trust will gain loss making cancer activity reducingthe UCLH operating contribution by £88.7m over the assessment period.

The costs that UCLH is projecting in relation to implementation and double running (£8.1m) associated with the reconfiguration of services are greater than the improvement in contribution (£2.2m) associated with increased cancer RD&E, private patient activity and void space.

The net UCLH loss over the assessment period is £94.6m.

Table E-15 - Affordability of implementing the preferred option for providers (£000)

	Cardiovascular		Cancer		Total	
	Barts Health	UCLH	Barts Health	UCLH	Barts Health	UCLH
Operating Contribution – gain / (loss)						
Income	345,066	(380,574)	(5,785)	37,935	339,282	(342,639)
Costs	271,221	(283,645)	(11,629)	29,729	259,593	(253,917)
Operating Contribution	73,845	(96,929)	5,844	8,207	79,689	(88,722)
Transitional Costs[9]						
Implementation / OHs / double running costs	(10,201)	(4,050)	(7,440)	(4,045)	(17,641)	(8,095)
Other						
RD&E contribution	189	0	0	127	189	127
PP contribution	1,973	0	0	850	1,973	850
HH void contribution	0	1,272	0	0	0	1,272
Provider – gain / (loss)	**65,806**	**(99,707)**	**(1,596)**	**5,139**	**64,210**	**(94,568)**

It is not the intention that the provider gain or loss stated in the commissioner and provider affordability tables above represents the final position. Rather, the analysis is intended to support a discussion between Barts Health, UCLH and NHS England with the view to determining any transitional support that will be paid or received by each of these parties. The gain or loss that is contributed or received in the transitional support agreement may therefore be subject to change through negotiation and a compromise will be sought that allows all three organisations to confirm that the impact of the preferred option is, following transitional payments made or received, considered to be affordable.

[9] Temporary refurbishment costs incurred by Barts Health have been excluded for the purposes of affordability

E.2 Financial impact assessment on the specialist cancer services reconfiguration

E.2.1 Introduction

The financial appraisal seeks to examine and quantify the financial impact of implementing the preferred option to reconfigure specialist cancer services. The appraisal is structured on the outputs of a financial model which was built to measure the incremental financial impact of implementing the joint reconfiguration.

The key input to the financial model is income and costs for each provider and these income and cost figures are driven by the level of cancer activity per tumour type at each provider. As activity is transferred, the model reflects the flow of income and costs movements depending upon whether they are directly impacted by the transfer. The incremental income and cost lines are discussed in detail throughout this section.

The financial impact analysis is presented in respect of the following parties:

1. The NHS as a whole, the 'system' – the net present value (system NPV) of the preferred option to the NHS

2. The Commissioners - the incremental operating cashflow and the assessment of affordability of the preferred option to commissioners

3. The Providers – the incremental operating cashflow and the assessment of affordability[10] of the preferred option to providers.

E.2.2 System NPV of preferred cancer option

The system NPV is based upon a financial model and the key working assumptions include:

- A reconfiguration date across all types of cancer of 1 October 2015

- Cashflows modelled over 34 years to align with the remaining life of the Barts PFI building on the West Smithfield site

- Costs include clinical inpatient and critical care activity including excess bed days and excluding outpatients[11]

- At providers who lose activity, costs allocated as fixed are reallocated to other services outside of cancer and cardiovascular as a result of the reconfiguration if they are not lost entirely[12]

[10] Affordability analysis seeks to estimate the impact on provider income and expenditure over the period from 2013/14 to five years after the service transition date.
[11] For scope of costs per provider see Appendix F.
[12] Fixed costs may remain stranded at the existing provider for a few years after the reconfiguration date before being reallocated or being lost entirely.

- Cost synergies are anticipated to arise in respect of some service lines where activity is sufficiently consolidated. Each year in the model, assumptions are applied to the recurrent operational cashflows. These include, for example, growth assumptions relating to both demographic and non-demographic factors. Appendix E outlines these assumptions in more detail.

Further detail in relation to the modelling inputs and assumptions is set out in Appendix F.

The NPV[13] analysis demonstrates that there is a net benefit of £64.1m to the NHS system of the proposed reconfiguration of specialist services, as shown in the table below. The benefit of £64.1m represents the positive cashflow return net of the investment cost associated with the reconfiguration over the 34 year assessment period. Through the application of discount factors[14] the £64.1m is expressed in present values.

The cashflows presented in both Table E-16 and the NPV bridge in

Figure E-2 are grouped into the following categories:

1. Recurrent operational cashflows (section E.2.2.1)
2. Other recurrent cashflows (section E.2.2.2)
3. Non-recurrent transitional cashflows (section E.2.2.3)
    a. Implementation costs
    b. Capital expenditure

The system NPV of the preferred cancer options is provided in the table and figure below.

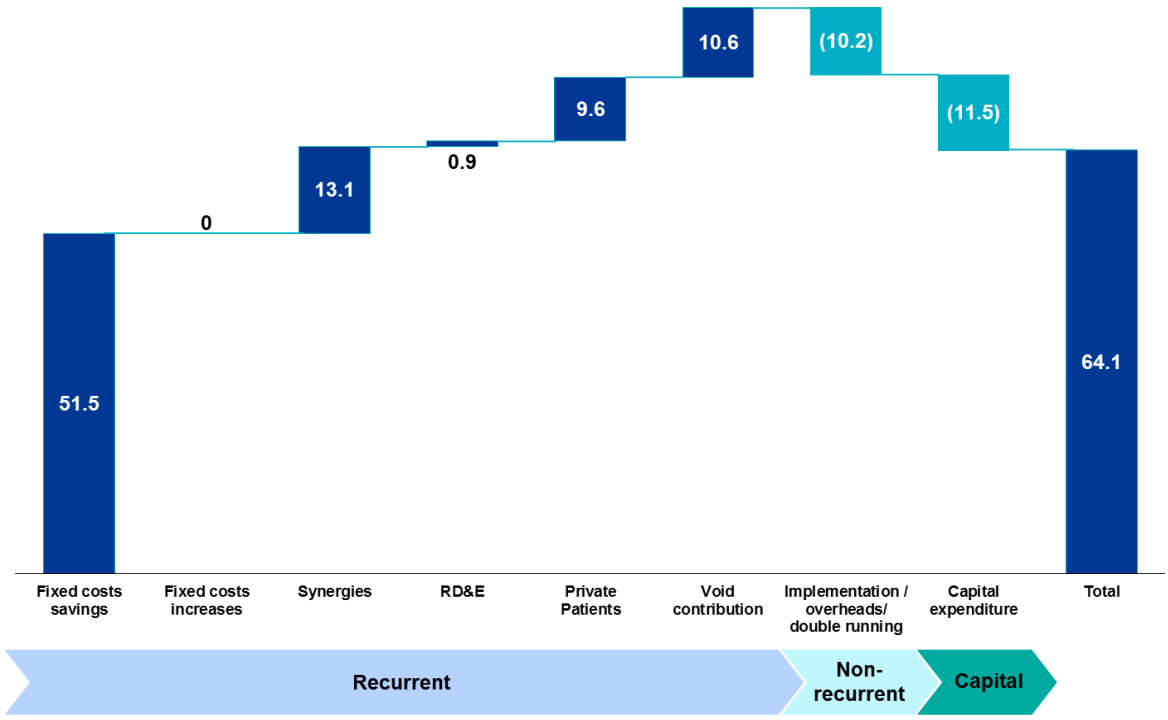
Table E-16 - 34 year system NPV of the preferred cancer option (£000)

	34 year NPV
Recurrent operational cashflows	
Fixed costs savings (costs no longer incurred)	51,522
Fixed costs increases (incremental fixed costs)	0
Post-reconfiguration synergies	13,088
Other recurrent cashflows	
RD&E contribution	894
PP contribution	9,642
Void contribution	10,623
Non-current transitional cashflows	
Implementation costs	(10,228)
Capital expenditure	(11,478)
Total	**64,063**

[13] The system NPV recognises the incremental cost to the NHS. Whilst there is an impact on both providers and commissioners of implementing the preferred option, to avoid double counting at a system level, the system NPV only considers the impact on provider operational cashflows. The cost to commissioners (payment of the National Standard Contract income to the providers) of implementing the preferred option is considered later in this section from a commissioner affordability perspective.

[14] Discounting is the process of estimating the present value of an income stream by reducing expected cash flow to reflect the time value of money.

Figure E-2 – NPV bridge of preferred cancer option (£m)



E.2.2.1 Recurrent operational cashflows

Recurrent operational cashflows are defined as those that are received (e.g. income received from commissioners) or incurred (e.g. operating costs including but not limited to staff costs and overheads) in respect of the delivery of specialist cancer services to NHS patients. The NPV analysis above recognises the incremental impact of these recurrent operational cashflows as a result of implementing the preferred cancer options.

The NPV of the impact of the preferred cancer option on recurrent operational cashflows is a benefit of £64.6m, which comprises:

- A PV of £51.5m generated through provider fixed cost savings. This £51.5m represents the present value of £146.6m of fixed cost savings generated over the 34 year assessment period.

- A PV of £13.1m generated by providers through reconfiguration synergies. This £13.1m represents the present value of £37.3m reductions in variable costs due to the realisation of reconfiguration synergies over the 34 year assessment period.

Consolidated recurrent operating cashflows

This section outlines the consolidated incremental impact on operating provider cashflows[15] for each provider as a result of implementing the preferred cancer option.

While total flow of patients is relatively small, both UCLH and RFH are net receivers of activity and the remaining providers are net donators of activity.

An overview of the projected operational cashflow impact on the north and east London and west Essex cancer system is presented over a 10 year period from 2014/15 in the table below. The table shows the increase or reduction in provider income and cost in addition to the increase or reduction in net provider operating cashflow.

The incremental income and cost cashflows for all providers is positive from the year of reconfiguration (2015/16) despite there being no change to the assumed baseline level of activity in the north and east London and west Essex cancer system overall. This benefit to the providers' net operating cashflows increases in every financial year. For example; in year 7 (2020/21), there is an incremental benefit to net operating cashflow of £4.2m arising from the implementation of the preferred option.

Table E-17 – Summary of consolidated operating cashflows for all London cancer providers (£'000s)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income										
National Standard Contract	0	193	400	416	432	449	**467**	484	503	521
Reduction / (increase) in provider cost										
Fixed	0	322	994	1,714	2,481	2,931	**3,031**	3,134	3,241	3,351
Variable	0	153	472	491	510	703	**730**	758	786	815
Increase / (reduction) in net provider operating cashflow	0	667	1,866	2,620	3,423	4,083	**4,227**	4,376	4,529	4,687

There is an increased cost of services to commissioners from the reconfiguration, resulting in an incremental increase in provider income each year post reconfiguration. In year 7, this results in an incremental provider income increase of £0.5m. This increase is generated by the transfer of specialist cancer activity to UCLH.

Due to its central London location, it is assumed that UCLH has a higher cost base compared to other providers and therefore to achieve the same level of care, commissioners are required to provide UCLH with an increase in income per spell in comparison to the level paid to other providers with a different and lower cost geographic location.

The relative payments to providers are determined with reference to each provider's market forces factors (MFF). The MFFs are used to determine the premium applied to the National

[15] In modelling the impact of the preferred option only clinical income on National Standard Contract is included for each provider. Non-clinical income is excluded. For the remaining providers (with the exception of Barts Health), income is estimated by applying National Standard Contract tariffs to HES data, therefore only clinical income can be obtained. Income from outpatient activity is also excluded from modelling.

Standard Contract prices. The relevant MFFs are outlined below, which demonstrates that UCLH has the highest MFF premium of the providers participating in the reconfiguration.

Table E-18 – MFF premium used for income adjustment on income transfer

Provider	MFF Factor (2013/14)
Barts Health	1.2128
UCLH	1.2976
RF	1.2465
BHRUT	1.1744
Other	
BCF	1.1973
HUH	1.2052
NMUH	1.2012
PAH	1.1534
BTUH	1.1228
Other[16]	1.2976

The key driver of the positive system NPV highlighted in

Figure E-2 is the saving generated through reductions to provider fixed cost base. For example; in year 7 there is a £3.0m reduction of fixed costs. Fixed costs may include utilities, rent and rates, insurance, and other contracted services such as maintenance or transportation costs and other costs that do not vary according to the level of activity. These costs would not transfer to a new provider on reconfiguration. As activity transfers out, the requirement for some or all of these services may decrease and therefore there is an opportunity for the provider to scale down their services, and associated costs, to reflect their new activity levels and requirements.

In the majority of cases, the providers are not able to eliminate fixed costs immediately on transition. For example, services may be under contract or assets being leased, which would result in the provider having to renegotiate or cancel the contract or lease, leading to time delay and potential contract breakage costs. For this reason fixed costs are assumed to be phased out over a number of years, and as the phasing out of fixed costs increases the associated savings increase.

One of the key drivers for the NPV of fixed costs savings is the proportion of total costs that are categorised as fixed (rather than variable) by the providers. On this basis, analysis has been undertaken to assess the sensitivity of the NPV to changes in the fixed and variable cost split. As mentioned above, on reconfiguration fixed costs are not transferred to the new provider and over time are removed from the system, whilst variable costs transfer to the new provider.

- Where 10% of the provider fixed costs are re-classified as variable costs, there is a reduction to the system NPV of £4.8m resulting in the system NPV of the reconfiguration falling to £59.3m

[16] The MFF of other providers in the model has been assumed to be equivalent to the MFF of UCLH.

- Where 10% of the provider variable costs are re-classified as fixed costs, there is an increase to the system NPV of £16.5m resulting in the system NPV of the reconfiguration increasing to £80.6m.

Unlike fixed costs, variable costs transfer from the old to the new provider on reconfiguration. As there is no change to the assumed baseline level of activity, the total level of variable costs remain the same. However, there is a reduction in variable cost due to the post reconfiguration synergies which will arise as a result of consolidation of activity at providers who are receiving activity. These post reconfiguration synergies are discussed in further detail later in this section. Variable cost savings are not as material as the fixed costs savings generated from the preferred option, however, the savings continue to increase each year post reconfiguration, with a £0.7m saving in year 7.

As the recipients of most transferring activity, UCLH and the RFH have undertaken a high level assessment to estimate the extent of variable cost savings (for each cancer type) that could be achieved through post-reconfiguration synergies. The process by which the synergy assumptions were formed included running workshops for each cancer type where clinicians were given the opportunity to share their experience and views to identify and where appropriate discount areas where synergies may arise. The Finance Working Group converted the outputs of the clinical workshops into synergy assumptions and the providers have agreed these assumptions through discussion at the Finance Steering Group. The level and rationale for the level of synergies for each cancer type is discussed later in this section in the relevant provider sections.

As stated above, as the recipients of material levels of activity, UCLH and the RFH have undertaken a high level assessment to estimate the extent of variable cost savings (for each cancer type) that could be achieved through post-reconfiguration synergies. In order to understand how sensitive the level and timing of synergies are to the system NPV the following analysis has been undertaken:

- Where the synergy percentage is increased by 1% there is an increase to the system NPV of £3.4m, resulting in the system NPV of the reconfiguration increasing to £67.4m

- Where the synergy percentage is decreased by 1% there is a decrease to the system NPV of £3.4m, resulting in the system NPV of the reconfiguration decreasing to £60.7m

- Where the synergy percentages are delayed by 1 financial year, there is decrease to the system NPV of £0.4m, resulting in the system NPV of the reconfiguration decreasing to £63.7m.

Provider operating cashflows

This section outlines the following for each provider (Barts Health, UCLH, RFH, BHRUT and “other”):

- A summary of the cancer activity (split by cancer type) that it is proposed each provider will gain or lose (for each provider with the exception of “other”)

- The incremental impact on operating cashflows for each provider as a result of implementing the preferred cancer option.

The impact on activity and operating cashflow is displayed separately for Barts Health, UCLH, RFH and BHRUT. In addition, there is an "other" category[17]."“Other” includes other providers not individually detailed in this analysis, alongside some cases from Barts Health, UCLH, RFH and BHRUT where there are low levels of activity for a particular cancer type.

Barts Health

Under the preferred option, Barts Health has a net transfer out of specialist cancer activity, losing 421 spells of activity and gaining less than 22.

Table E-19– Barts Health - summary of cancer activity - gain/loss[18]

Cancer type	Gain	Loss	Volume gaining	Volume losing	Volume after reconfig.
Brain	-	100%	-	97	0
Head and neck	-	100%	-	185	0
Bladder	-	100%	-	19	0
Prostate	-	100%	-	15	0
Renal	-	100%	-	52	0
HSCT	22% from RFH	-	12	-	101
AML	7% from RF, BCF and NMUH	--	Under 10	-	58
OG	-	100%	-	53	0
Total	**-**	**-**	**Max. 22**	**421**	**159**

Due to the net transfer out of activity, as shown in the table above, there is a net decrease in provider income from commissioners from the date of transition. By year 7, it is anticipated that Barts Health will suffer a loss of £1.3m of income for that year. The loss of income is due to the transfer out of NHS England commissioned activity albeit there is an immaterial offsetting increase in CCG commissioned activity due to the gain of AML activity.

The net transfer out of activity also results in a decrease in both the fixed and variable cost base in each year from the date of reconfiguration. In year 7, the quantum of fixed costs saved and variable costs no longer incurred are £1.1m and £1.8m respectively.

As the reduction in total cost is greater than the reduction in provider income, Barts Health experience a financial benefit through an increase in net operating cashflow. In year 7, this benefit equates to £1.6m.

[17] “Other” includes other providers not individually detailed in this analysis due to materiality, alongside some cases from Barts Health, UCLH, RF and BHRUT where there are low levels of activity for a particular cancer type. This grouping is carried out to guard against identification of individual patient data, and is considered to be immaterial versus the specific providers included. The individual provider data received has been grouped prior to publication to prevent identification, but the activity totals remain the same as in the original data, ensuring that activity is not lost or gained in the de-identification process.

[18] Indicative volume of spells based on Feb 2012 – Jan 2013 activity from CSU HES data extract

Table E-20 - Barts Health - incremental operating cashflows from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Increase / (reduction) in provider income										
National Standard Contract	0	(526)	(1,089)	(1,133)	(1,178)	(1,224)	**(1,271)**	(1,320)	(1,369)	(1,420)
Reduction / (increase) in provider cost										
Fixed	0	114	354	610	883	1,043	**1,078**	1,115	1,153	1,192
Variable	0	735	1,522	1,583	1,646	1,711	**1,777**	1,845	1,914	1,985
Increase / (reduction) in provider net operating cashflow	0	324	787	1,060	1,351	1,530	**1,584**	1,640	1,698	1,757

UCLH

Under the preferred option, UCLH has a net transfer in of specialist cancer activity, gaining 528 spells of activity and losing only 37 spells of activity.

Table E-21– UCLH - summary of cancer activity - gain/loss[19]

Cancer type	Gain	Loss	Volume gaining	Volume losing	Volume after reconfig.
Brain	76% from BH	-	75	-	597
Head and Neck	96% from BH 99% from BCF	-	233	-	386
Bladder	99% from BH 99% from BHRUT	-	31	-	53
Prostate	97% from BH 99% from BHRUT	-	92	-	231
Renal	-	100%	-	37	0
HSCT	67% from RFH	-	36	-	168
AML	92% from RF 92% from BCF 92% from NMUH	--	16	-	51
OG	88% from BH	-	45	-	82
Total	**-**	**-**	**528**	**37**	**1,568**

This activity transfer is beneficial to UCLH as the income it generates more than offsets the associated costs. In year 7, there is an incremental increase in provider income of £8.3m against the National Standard Contract whilst the total provider cost increases by only £6.4m. These movements generate a benefit of £1.9m through an increase in the UCLH net operating cashflow (See the table below).

[19] Indicative volume of spells based on Feb 2012 – Jan 2013 activity from CSU HES data extract

Table E-22 – UCLH - incremental operating cashflows from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income										
National Standard Contract	0	3,447	7,142	7,429	7,723	8,026	**8,336**	8,654	8,979	9,313
Reduction / (increase) in provider cost										
Fixed	0	5	15	26	38	44	**46**	48	49	51
Variable	0	(2,796)	(5,656)	(5,883)	(6,117)	(6,206)	**(6,446)**	(6,691)	(6,943)	(7,200)
Increase / (reduction) in provider net operating cashflow	0	657	1,501	1,571	1,644	1,865	**1,937**	2,010	2,086	2,163

A key driver of the positive cashflow is a minimal increase in fixed costs despite the transfer in of activity. There is an assumption that there are no incremental fixed costs in relation to activity transferring in as UCLH anticipate being able to absorb the activity into the existing fixed cost base. Further to this, UCLH will generate a small saving in fixed costs following the loss of renal activity to RFH.

In addition to fixed costs being relatively low, the increase in variable costs has also been adjusted downwards. The adjustment has been made recognising there are savings to be achieved for particular tumour types through reconfiguration synergies agreed by the Financial Steering Group. The table below sets out the potential rationale for the synergy savings applied to variable costs.

Table E-23 – UCLH – Rationale for Financial Synergy

Activity Type	Potential Rationale for Financial Synergy	Synergy applied to variable cost base
AML	- Supports best practice mix of laparoscopies; implementation of robotic surgery - More standardisation and better pathways (both design and choice of pathway) due to consolidation; - Procurement scale leading to savings - Extra scale helps attract clinical trials, providing free drugs to participating patients.	Year 1: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%
HSCT	- More effective coordination of support activities - More integrated pathway, reducing costs such as number of chemotherapy treatments required.	
Head and Neck	- Extra scale helps to support staff skills and enhanced recovery programmes. Expected considerable payoff from any reduction in complications and associated follow-up activity - More effective investigation pathway.	

Despite brain, bladder and prostate cancer activity transferring into UCLH, the volume of activity is not considered to be of a sufficient level to allow synergy savings to be achieved. There are benefits which will arise as a result of the OG reconfiguration, but some are limited by consolidation onto two sites, and others require further investment to implement (e.g. enhanced recovery programmes) and so do not have clear financial benefits.

The financial impact of the synergy savings outlined is demonstrated in the table below which sets out the variable cost savings by cancer type. For example, the total variable cost saving due to synergies in year 7 (in respect of head and neck, HSCT and AML) is £0.7m, with the largest benefit of £0.4m anticipated in respect of HSCT.

Table E-24 – Variable cost saving due to post-reconfiguration synergies (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Reduction in variable cost due to post-reconfiguration synergy saving										
Head and Neck	0	24	76	79	82	113	117	121	126	131
HSCT	0	77	236	246	256	352	366	380	394	409
AML	0	32	99	103	107	148	153	159	165	171
Total	**0**	**133**	**411**	**428**	**445**	**613**	**636**	**660**	**685**	**711**

Royal Free Hospital

Under the preferred option, RFH has a net transfer in of specialist cancer activity, gaining 142 spells of renal activity, whilst only losing 64 spells.

Table E-25– Royal Free Hospital - summary of cancer activity – gain/loss[20]

Cancer type	Gain	Loss	Volume gaining	Volume losing	Volume after reconfig.
Brain	-	-	-	-	0
Head and Neck	-	-	-	-	0
Bladder	-	-	-	-	0
Prostate	-	-	-	-	0
Renal	98% from BH 98% from UCLH 98% from BHRUT 98% from BCF 98% from HUH	-	142	-	186
HSCT	-	100%	-	53	0
AML	-	100%	-	11	0
OG	-	-	-	-	0
Total	**-**	**-**	**142**	**64**	**186**

[20] Indicative volume of spells based on Feb 2012 – Jan 2013 activity from CSU HES data extract

There is a net financial loss to the RFH despite a net transfer in of cancer activity by volume. By way of example, in year 7, total provider income shows an incremental decrease of £6.2m whilst the total provider costs shows a decrease of £5.7m. This results in a net loss of £0.5m.

In year 7, the £6.2m decrease in income is due to the RFH gaining £0.9m of income due to the transfer of renal activity and losing £7.1m of income due to the transfer out of HSCT and AML. The decrease in cost of £5.7m is caused by the increase in total cost of £1.0m due to the transfer of renal to the RFH and a decrease of £6.8m of costs from the transfer of HSCT and AML to other providers. Therefore, RFH are losing a positive contribution from HSCT and AML combined of £0.3m and gaining a negative contribution of £0.1m from renal activity.

Currently AML at RFH has been estimated by the application of the average margin of Barts Health and UCLH on operational income with renal estimated in line with the margin of Barts Health (See Table F-7).

Table E-26 – Royal Free Hospital - incremental operating cashflows from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income										
National Standard Contract	0	(2,573)	(5,329)	(5,543)	(5,763)	(5,989)	**(6,221)**	(6,458)	(6,701)	(6,949)
Reduction / (increase) in provider cost										
Fixed	0	147	454	782	1,133	1,338	**1,384**	1,431	1,480	1,530
Variable	0	1,771	3,689	3,837	3,989	4,168	**4,329**	4,494	4,663	4,836
Increase / (reduction) in provider net operating cashflow	0	(655)	(1,186)	(924)	(641)	(483)	**(508)**	(533)	(558)	(583)

The synergy assumptions were developed with the input of clinicians (through a series of workshops) and from a governance perspective were agreed through discussion at the Finance Working Group and Finance Steering Group meetings. The table below sets out the potential rationale for the synergy savings applied to variable costs.

Table E-27 – Royal Free – Rationale for Financial Synergy

Activity Type	Potential Rationale for Financial Synergy	Synergy applied to variable cost base
Renal	- Ability to deliver appropriate pathway across north east (NE) London and best practice mix of laparoscopic vs open (shorter length of stay and better recovery times). Facilitated by access to robotic surgery - Procurement scale leading to savings - Extra scale helps attract clinical trials, providing free drugs to participating patients.	Year 1: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%

The financial impact of the synergy savings outlined in the table above is demonstrated in the table below which sets out the variable cost savings for renal cancer. For example; the total variable cost saving due to synergies in year 7 is £0.1m.

Table E-28 – Variable cost saving post-reconfiguration due to synergies (£000) – Royal Free

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Reduction in variable cost due to post-reconfiguration synergy saving										
Renal	0	20	61	63	65	90	**94**	97	101	105

BHRUT

Under the preferred option, BHRUT has a net transfer out of specialist cancer activity, losing 116 spells and gaining less than 32 spells. BHRUT would transfer out all of bladder, prostate and renal activity, and transfer in 24% and 11% of brain and OG activity respectively from Barts Health.

Table E-29– BHRUT - summary of cancer activity - gain/loss[21]

Cancer type	Gain	Loss	Volume gaining	Volume losing	Volume after reconfig.
Brain	24% from BH	-	22	-	234
Head and Neck	-	-	-	-	0
Bladder	-	100%	-	13	0
Prostate	-	100%	-	78	0
Renal	-	100%	-	25	0
HSCT	-	-	-	-	0
AML	-	-	-	-	0
OG	11% from BH	-	Under 10	-	48
Total	**-**	**-**	**Max. 32**	**116**	**282**

The activity transfers result in a financial gain to BHRUT, demonstrated by an increase in net operating cashflow. For example, in year 7, BHRUT's income and costs decreases by £0.7m and £1.4m respectively, increasing net operating cashflow by £0.7m.

In year 7, the decrease in income is due to the reduction in income from bladder, prostate and renal cancer of £0.9m offsetting the increase in brain cancer activity and OG cancer activity income of £0.2m. This results in a net reduction in income of £0.7m.

There is a decrease in fixed costs due to the fixed costs attributable to bladder, prostate and renal being reabsorbed or removed entirely from year 6. In year 7, this equates to a decrease in fixed costs of £0.3m. Due to the transfer out of these cancer types, there is a reduction in

[21] Indicative volume of spells based on Feb 2012 – Jan 2013 activity from CSU HES data extract

variable costs of £1.3m. As brain and OG cancer transfer into BHRUT from Barts Health, this increases variable costs by £0.2m. This results in a net decrease in costs of £1.4m.

The financial benefit to BHRUT is driven by BHRUT's loss of bladder, prostate and renal activity which currently operates at a negative margin. This results in the £0.7m of benefit to net operational cashflows. The gain of brain and OG activity only marginally decreases the net operational cashflow as the contributions of £(7)k and £5k offset each other.

Table E-30 – BHRUT - incremental operating cashflows from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income										
National Standard Contract	0	(308)	(638)	(664)	(691)	(718)	**(745)**	(774)	(803)	(833)
Reduction / (increase) in provider cost										
Fixed	0	34	104	179	259	307	**317**	328	339	351
Variable	0	460	953	991	1,030	1,071	**1,112**	1,154	1,198	1,242
Increase / (reduction) in provider net operating cashflow	0	185	418	506	599	660	**684**	708	734	760

Other providers

"Other" includes other providers not individually detailed in this analysis, alongside some cases from Barts Health, UCLH, RF and BHRUT where there are low levels of activity for a particular cancer type. Refer to Appendix D for the detailed cancer displacement assumptions.

Under the preferred option, the activity transferring to and from other providers results in an increase in net operating cashflow. In year 7, this financial gain equates to a contribution of £0.5m.

In year 7, there is an increase in operational income of £0.4m. This increase is the net of a decrease in income of £0.5m relating to cancer transferring out of BCF and NMUH versus an increase in income of £0.9m at other unspecified providers due to activity transferring in as patients exercise their right to choice of provider (see Appendix D).

Where changes in activity occur, there is a decrease in fixed costs at BCF/HUH/PAH/NMUH providing specialist renal/AML/head and neck services being reabsorbed or removed entirely from year 6. In year 7, this equates to a decrease in fixed costs of £0.2m. Due to the transfer out of these cancer types, there is a reduction in variable costs of £0.6m. This decrease in variable costs is offset by an increase in variable costs at other unspecified providers of £0.6m leading to a negligible net increase in variable costs of £42k. This results in a net decrease in costs of £0.2m.

The financial benefit to other providers in year 7 of £0.5m is comprised of two elements. The loss of activity at BCF and NMUH is assumed to operate at a loss therefore there is an incremental benefit to net operating cashflow of £0.3m when this activity transfers out of these providers. The transfer in of activity to other unspecified providers leads to a benefit of £0.2m.

This is predominantly attributable to the gain of HSCT which operates at a positive margin, which counteracts the receipt of other cancers operating at a negative margin.

Table E-31 – Other providers - incremental operating cashflows from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income										
National Standard Contract	0	152	315	327	340	354	**367**	381	396	410
Reduction / (increase) in provider cost										
Fixed	0	22	67	116	168	199	**206**	213	220	227
Variable	0	(18)	(36)	(38)	(39)	(41)	**(42)**	(44)	(46)	(47)
Increase / (reduction) in provider net operating cashflow	0	156	346	406	469	512	**531**	550	570	590

Incremental costs for commissioners

Under the preferred cancer option there is an increase in the cost to commissioners, as shown in the table below. By year 7, the incremental annual net increase in cost to commissioners would be £0.5m.

Table E-32 – Commissioners - incremental costs from the preferred cancer option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Decrease / (increase) in cost to commissioner										
CCG	0	(2)	(4)	(4)	(4)	(4)	**(4)**	(5)	(5)	(5)
NHS England	0	(191)	(396)	(412)	(428)	(445)	**(462)**	(480)	(498)	(516)
Total	0	(193)	(400)	(416)	(432)	(449)	**(467)**	(484)	(503)	(521)

This increase in commissioner cost is driven by the significant proportion of specialist cancer activity transferring (in the north and east London and west Essex cancer system) from various providers to UCLH which has a higher MFF due to its geographical location (see Table E-18).

Although commissioners will incur an increase in their cost base as shown in the table above, this increase is likely to be non-recurrent and only represent a cost to the commissioners for a period of two financial years post reconfiguration. After this period, the commissioners would expect to receive an offsetting increase in funding, which is not a mandated level increase in funding, but instead through the commissioner allocation being rebased using the allocation formula to reflect the MFF's of those providers commissioned.

Should this be the case, the incremental costs to commissioners of implementing the preferred option will only be relevant to the end of the financial year 2017/18 (as shown in the table below).

Table E-33 – Commissioners - incremental costs from the preferred option (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Decrease / (increase) in cost										
CCG	0	(2)	(4)	**(4)**	0	0	0	0	0	0
NHS England	0	(191)	(396)	**(412)**	0	0	0	0	0	0
Total	0	(193)	(400)	**(416)**	0	0	0	0	0	0

Notwithstanding the negative financial impact on commissioners arising from the preferred cancer option, this impact is more than offset by a positive impact on commissioners as a result of the cardiovascular reconfiguration.

E.2.2.2 Other recurrent cashflows

Other recurrent net cashflows are defined as those that are received (e.g. income received) or incurred (e.g. operating costs including but not limited to staff costs and overheads) in respect of:

- The delivery of specialist cancer services to non-NHS (e.g. private) patients
- Other recurrent cashflows that relate to the reconfiguration of specialist cancer services.

The NPV analysis recognises the incremental impact of these recurrent cashflows as a result of implementing the preferred cancer option.

The NPV of the impact of the preferred cancer option on other recurrent cashflows is a benefit of £21.1m, which comprises:

- A PV of £0.9m generated through incremental research, development and education (RD&E) contribution (income net of the associated costs of delivering the research, development and education) earned by UCLH. This £0.9m represents the present value of £2.6m of research, development and education contribution generated over the 34 year assessment period.
- A PV of £9.6m generated by UCLH through incremental contribution from providing specialist cancer services to private patients. This £9.6m represents the present value of private patient contribution totalling £29.5m over the 34 year assessment period.
- A PV of £10.6m generated by providers in the north and east London and west Essex cancer system through their ability to utilise (for other profitable services) surplus bed capacity arising from the reconfiguration of specialist cancer beds.

The table below sets out the projected annual 'other' recurrent cashflows over a ten year period from financial year 2014/15. For example: in year 7 the total 'other' recurrent cashflows are projected to be £1.3m. The sections below explore each of the cashflows in more detail.

Table E-34 Other recurrent cashflows (£000)

Year	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Incremental contribution										
RD&E (UCLH)	0	0	0	0	49	51	53	55	57	59
Private Patient (UCLH)	0	0	0	0	283	353	428	508	593	683
Void	0	346	692	721	751	781	781	781	781	781
Total	0	346	692	721	1,083	1,186	1,262	1,344	1,431	1,524

Research, development and education (RD&E)

Through the creation of specific specialist cancer centres, there will be better access to RD&E opportunities. From a clinical perspective, as highlighted in the Case for Change, such opportunities will help improve the pathway of care to give more patients access to the latest technology and clinical trials, and from a financial perspective, such opportunities will generate additional income for the NHS.

The clinical benefit is however expected to outweigh the financial benefit as there is only expected to be a financial benefit from financial year 2018/19, with a £0.1m benefit in contribution for year by 2020/21.

This benefit in contribution is driven solely by the specialist cancer centre at UCLH and UCLH estimate:

- Incremental income from RD&E equal to a maximum of 1% of their total income
- Incremental costs from RD&E equal to 80% of the RD&E income, therefore generating a contribution of 20% to the UCLH margin.

For example; in year 7 (2018/19) the total income generated by UCLH in respect of specialist cancer services is £26.6m. On that basis, forecast incremental income from RD&E is equal to 1%, being £0.3m. To calculate the incremental contribution that UCLH will generate from the RD&E activity in that year, 20% is applied to the incremental RD&E income, which is equal to £0.1m.

Whilst an important aspect of the clinical case for the reconfiguration, the present value of the financial impact of the incremental RD&E (£0.9m) is considered to be small relative to the overall NPV of £64.1m.

Private patients

Through creation of specific specialist cancer centres at UCLH, it is anticipated that there will be an increase in the number of private patient referrals. The income from such patients will be additional to the current NHS activity as the majority of patients are assumed to be international and will therefore have a direct financial benefit to the system.

This benefit is driven solely by the specialist cancer centre at UCLH where it is anticipated there will be 10 planned private patient beds. These 10 private patient beds are incremental and arise from the reconfiguration required to deliver the preferred cancer option.

UCLH estimate the financial benefit associated with the incremental private patient beds to be:

- Incremental income equal to 5% - 10%[22] of total cancer income

- Incremental costs equal to 77% of the private patient income, therefore generating a contribution of 23% to the UCLH margin.

For example; in year 10 (2023/24) the total income generated by UCLH in respect of specialist cancer services is £29.7m. On that basis, forecast incremental income from private patients is equal to 10%, being £3.0m. To calculate the incremental contribution that UCLH will generate from the private patient activity in that year, 23% is applied to the incremental private patient income, which is equal to £0.7m.

As private patients is one of the key drivers contributing to the overall NPV benefit of 'other' recurrent cashflows (PV of £9.6m), analysis has been undertaken to assess the sensitivity of the NPV to changes in the level of private patient income:

- Where private patient income is increased by 10% per annum, there is an increase to the system NPV of £1.0m resulting in the system NPV of the reconfiguration increasing to £65.0m.

- Where private patient income is decreased by 10% per annum, there is a decrease to the system NPV of £1.0m resulting in the system NPV of the reconfiguration decreasing to £63.1m.

Void contribution

The activity transferring into specialist cancer centres under the preferred option will result in there being surplus bed capacity across a number of providers in the north and east London and west Essex cancer system. It is currently anticipated that there will be approximately 20 surplus beds available in 2019/20 (stepping up from 17 beds in 2015/16) from which additional contribution can be generated, through utilisation of the beds for other revenue and profit generating services.

It is assumed that the surplus beds can be utilised for other services from 2015/16. The income per bed is assumed to be £0.5m per annum and a contribution margin (based on utilising the beds for specialist services) of 8%. For example, in year 7, the total income generated in

[22] This percentage is 5% in 2018/19 and then steps up to the maximum 10% in 2023/24 in 1% increases per year.

respect of the 20 beds would be £9.9m. On applying the 8% contribution margin to the income, an incremental contribution of £0.8m is achieved.

As the void contribution is the most significant category of 'other' recurrent cashflows contributing to the system NPV (PV of the void is £10.6m), analysis has been undertaken to assess the sensitivity of the NPV to changes in the level of the void contribution:

- When the number of surplus beds reduces by 5, from 20 to 15 beds, there is a decrease to the system NPV of £2.8m resulting in the system NPV of the reconfiguration decreasing to £61.3m.

- When income per bed is increased by 10% to £547k per annum, there is an increase in the system NPV of £1.1m resulting in the system NPV of the reconfiguration increasing to £65.1m.

- When the contribution margin is increased from 8% to 9%, there is an increase in the system NPV of £1.3m resulting in the system NPV of the reconfiguration increasing to £65.4m.

E.2.2.3 Non-recurrent transitional cashflows

Implementation costs

The costs associated with implementing the preferred cancer option, including double running costs, have a net present cost of £10.2m. Cost estimates have been provided by Barts Health, UCLH and RFH. A summary of the projected costs by provider is set out below.

Barts Health[23]

- £1.1m on an external implementation team that includes legal, human resources and project management fees

- £0.3m on an internal implementation team that includes programme office costs and transitional lead support

- £6.1m on double running costs (including double-running and redundancy) over the transfer period.

UCLH

- Approximately £0.6m on an external implementation team that includes legal and project management fees

[23] Barts Health have assumed the following phasing of cancer services to calculate their one-off costs:
2014/15 from 1 November 2014 – 33% of cancer services (as a percentage of total 13/14 income) transfer
2015/16 from 1 April 2015 – further 33% of cancer services transfer
2016/17 from 1 April 2016 – remaining 34% of cancer services transfer

- Approximately £2.4m on an internal implementation team that includes the following for a maximum of 4 years (until the end of 2017/18):
  - Cancer Implementation Director
  - UCLH Programme Implementation Managers
  - PMO Function
  - Tumour Group Clinical Lead
  - Financial Lead
  - HR Lead
  - Communications Lead

- Approximately £1.1m on double running costs over the transfer period which UCLH anticipate to be one month.

Royal Free Hospital

- Approx. £0.2m on an internal implementation team.

Table E-35 – Implementation costs of implementing the preferred option (£000) (nominal)

	0	1	2	3	4	Total
	2013/14	2014/15	2015/16	2016/17	2017/18	
External implementation team	**0**	**358**	**752**	**344**	**189**	**1,643**
BH	0	358	574	161	0	1,094
UCLH	0	0	178	183	189	550
RF	0	0	0	0	0	0
Internal implementation team	**200**	**739**	**738**	**619**	**584**	**2,880**
BH	0	102	104	54	0	260
UCLH	0	637	634	565	584	2,420
RF	200	0	0	0	0	200
Double running costs	**0**	**1,959**	**2,350**	**2,483**	**370**	**7,162**
BH	0	1,959	2,002	2,125	0	6,086
UCLH	0	0	348	358	370	1,076
RF	0	0	0	0	0	0
Total	**200**	**3,056**	**3,840**	**3,446**	**1,143**	**11,685**

The following scenarios have been tested in order to provide an understanding of how sensitive the system NPV is to a change in the implementation costs assumptions:

- Where implementation costs, for all providers, are increased by 20%, there is a decrease to the system NPV of £2.0m resulting in the system NPV of the reconfiguration decreasing to £62.0m

- Where implementation costs, for all providers, are decreased by 20%, there is an increase to the system NPV of £2.0m resulting in the system NPV of the reconfiguration increasing to £66.1m

- In order to reach the break-even point (where an increase in transition costs is at a level that reduces the system NPV to zero) implementation costs need to increase to 726% of their current value.

Capital expenditure

The total projected capital expenditure in relation to implementing the preferred cancer option is £12.9m (see table below), which has a present cost of £11.5m (see

Figure E-2). Of the total capital expenditure:

- 98% of £12.9m (£12.6m) relates to the refurbishment of The Heart Hospital to accommodate the incoming cancer activity
- The remaining 2% of the £12.9m relates to £0.3m capital expenditure required by RFH.

Table E-36 - One off capital costs of implementing the preferred option (£000)

Year	0	1	2	Total
Fin. Yr	2013/14	2014/15	2015/16	
UCLH	0	3,679	8,878	12,557
RF	300	0	0	300
Total	300	3,679	8,878	12,857

The cost estimates for UCLH capital expenditure have been provided by Sweett Group based on measured floor area requirements assessed by Medical Architecture (MA)[24]. In the report, three short term variants and one long term variant are presented. UCLH confirmed that the preferred option for the cardiovascular financial model is "Variant 3".

Under Variant 3:

- There is a 9-12 month programme of works
- The cost of the works equates to approximately £12.6m
- The scope of work is for the refurbishment and re-equipping of the four existing operating theatres and two recovery wards[25] on the first floor. The catheterisation laboratory on the second floor is to be converted to three new operating theatres together with the refurbishment of the two second floor recovery wards.

[24] The cost estimates are an extract of the draft "UCLH The Heart Hospital Reprovision" report from Medical Architecture, commissioned by UCLH (June 2013)
[25] The cost estimates include refurbishing the two recovery wards to first and second stage recovery standard.

The total cost estimate of £12.6m includes £4.8m of pure construction costs and £1.7m of equipment costs. A cost breakdown is presented below. The following benchmarks have been calculated to assess the high level reasonableness of the UCLH capital expenditure:

Table E-37 – Benchmarks to assess the high level reasonableness of UCLH capital expenditure (£000)

	Cost per meter squared	Cost per bed
Based on construction costs only	3	59
Based on construction costs including construction costs, non works costs, professional fees, contingencies and VAT but excluding equipment	7	134
Based on construction costs including construction costs, non works costs, professional fees, contingencies, VAT and equipment	8	155

A high level review of reasonableness of capital expenditure against a comparable project has been completed, and based on this review capital expenditure assumptions would appear to be broadly reasonable at this stage. Details of review of capital expenditure are provided in Appendix H.

Table E-38 – UCLH capital costs for implementing the preferred option (£000)

Department	New build (NB)/ Full refurbishment (FR)/ Medium refurbishment (MR)	Area (m^2)	Rate (£ per m^2) (real at 201314)	Construction costs (£000) (real at 2013/14)	Cost per m^2 (£) (real at 2013/14)	Construction Costs (£000) (Nominal)	Construction Costs (£000) (Nominal)
First floor							
Refurbish existing four Nr Theatres (1)[26]	MR	487	3,360	1,637		1,699	
Refurbish two Nr recovery wards (2)	MR	469	1,512	709			
Second floor							
Convert cath lab to three Nr Theatres (3)	FR	341	5,040	1,717		1,782	
Refurbish two Nr recovery wards (4)	MR	357	1,512	539		559	
Subtotal		**1,654**		**4,602**	**2,781**	**4,776**	**2,888**
Sundry on costs (sustainability, phasing etc)				250	151	259	157
Professional design fees	15%			728	440	756	457
New works costs	15%			837	506	869	525
Equipment (5)				1,650,	998	1,712	1,035
Planning contingency	10%			807	488	838	506
Optimism bias	15%			1,331	805	1,381	835
VAT (not on fees)	20%			1,895	1,146	1,967	1,189
Total		**1,654**		**12,100**	**7,317**	**12,557**	**7,592**

[26] Further details provided by Sweett Group on each individual aspect of the construction cost are as follows:
(1) MA area of 339m2 +25% for plant and 15% for circulation. Rate is the full refurbishment rate abated by one third for medium refurbishment allowance. Scope to be defined.
(2) MA area of 408m2 and 15% for circulation. Rate is the full refurbishment rate abated by one third for medium refurbishment allowance. Scope to be defined.
(3) MA area of 237m2 +25% for plant and 15% for circulation. Rate is the full refurbishment rate.
(4) MA area of 310m2 and 15% for circulation. Rate is the full refurbishment rate abated by one third for medium refurbishment allowance. Scope to be defined.
(5) Allow £150k per theatre for medium refurbishment, £250k for full refurbished theatres and £75k each for the 4 Nr Recovery Wards.

The following scenarios have been tested in order to provide an understanding of how sensitive the system NPV is to a change in the capital expenditure assumptions:

- Where UCLH capital expenditure is increased by 10%, there is a decrease to the system NPV of £1.1m resulting in the system NPV of the reconfiguration decreasing to £62.9m

- Where the planning contingency and optimism bias are reduced to zero in respect of the UCLH capital expenditure, there is an increase to the system NPV of £2.0m resulting in the system NPV of the reconfiguration increasing to £66.1m

- In order to reach the break-even point (where an increase in total capital expenditure is at a level that reduces the system NPV to zero) total capital expenditure needs to increase to 658% of its current value.

E.2.3 Commissioner affordability impact

An assessment has been undertaken to quantify the incremental impact on commissioners cost base from the implementation of the preferred option. The assessment period is for the analysis is 1 April 2013 through to 30 September 2020[27].

There is a £1m increase in cost to commissioners. This cost arises as a result of cancer activity moving to UCLH which has a higher MFF and consequently higher National Standard Contract payments.

Table E-39 - Affordability of implementing the preferred option for commissioners (£000)

For the period from 1 April 2013 to 30 September 2020 Cost – (increase) / decrease	CCG	NHS England	Total
Operational cost – National Standard Contract	(9)	(999)	(1,008)

E.2.4 Provider affordability impact

An assessment has been undertaken to quantify the incremental impact on the income and expenditure of Barts Health and UCLH from the implementation of the preferred option. The assessment is limited to these providers on the basis that these providers experience material transfers of activity through implementation of the preferred cancer option. The period for the income and expenditure analysis is 1 April 2013 through to 30 September 2020[28].

Barts Health

Through the net transfer out of activity, Barts Health suffers a loss of income of £5.8m over the assessment period. This is offset by a £11.6m reduction of costs, resulting in an improved operating contribution of approximately £5.8m.

[27] 30 September 2020 is the date 5 years after the date of transition of services.
[28] 30 September 2020 is the date 5 years after the date of transition of services.

The costs that Barts Health is projecting in relation to implementation and double running (£7.4m) are greater than the improvement in operating contribution and therefore the net impact on Barts Health income and expenditure is a loss of £1.6m over the assessment period.

UCLH

Under the preferred option, UCLH gain activity and therefore the associated income (£38.0m) and cost (£29.7m). This has a beneficial impact on the UCLH operating contribution, increasing it by £8.2m over the assessment period.

The gain to UCLH from operating contribution is adjusted by the following:

- A reduction of £4.0m to account for the UCLH estimate of the costs they will incur in respect of implementation and double running
- An increase of £1.0m to reflect the additional contribution (income net of the relevant cost) gained through increased RD&E and private patient activity.

The net UCLH gain over the assessment period is £5.1m.

Table E-40 – Impact on income and expenditure of preferred option for providers (£000)

For the period from 1 April 2013 to 30 September 2020	Barts Health	UCLH
Operating cashflow – gain / (loss)		
Income	(5,785)	37,935
Costs	(11,629)	29,729
Operating contribution	5,844	8,207
Transitional Costs		
Implementation / OHs / double running costs	(7,440)	(4,045)
Other		
RD&E contribution	0	127
PP contribution	0	850
Provider – gain / (loss)	**(1,596)**	**5,139**

It is not the intention that the provider gain or loss stated in the commissioner and provider affordability tables above represents the final position. Rather, the analysis is intended to support a discussion between Barts Health, UCLH and NHS England with the view to determining any transitional support that will be paid or received by each of these parties. The gain or loss that is contributed or received in the transitional support agreement may therefore be subject to change through negotiation and a compromise will be sought that allows all three organisations to confirm that the impact of the preferred option is, following transitional payments made or received, considered to be affordable.

E.3 Financial assessment of the specialist cardiovascular services reconfiguration

E.3.1 Introduction

Barts Health proposes to move cardiovascular activity from the London Chest Hospital into the Barts PFI building tower on the West Smithfield site. In conjunction with this move, the impact of the preferred cardiovascular option of this reconfiguration project is the receipt of cardiovascular activity from The Heart Hospital at UCLH, which increases synergies available, by increasing the scale of service provision in modern PFI facilities at Barts Health.

The financial appraisal seeks to examine and quantify the financial impact of implementing the preferred option to reconfigure cardiovascular services. The appraisal is structured on the outputs of a financial model which was built to measure the incremental financial impact of implementing the joint reconfiguration.

The key inputs to the financial model are income and costs for UCLH and Barts Health are driven by the level of cardiovascular activity at each provider. As activity is transferred the model reflects the flow of income and costs movements depending upon whether they are directly impacted by the transfer. The incremental income and cost lines are discussed in detail throughout this section.

The financial impact analysis is presented in respect of the following parties:

1. The NHS as a whole, the 'system' – the net present value (system NPV) of the preferred option to the NHS

2. Providers – analysis includes the impact on provider operating cashflows and income and expenditure

3. Commissioners – the impact on commissioner operating costs (National Standard Contract)

E.3.2 System NPV of preferred cardiovascular option

The system NPV is an output from the financial model and the key working assumptions include:

- A reconfiguration date of 1 December 2014

- Cashflows are modelled over 34 years to align with the remaining life of the Barts PFI building on the West Smithfield site

- All activity currently undertaken at The Heart Hospital, with the exception of thoracic activity, is assumed to transfer out of UCLH

- 95% of the activity from UCLH transfers to Barts Health and the remaining 5% is assumed to transfer to other non-specified providers

- 87% of the activity is cardiovascular, with some non-cardiovascular activity for patients with congenital conditions requiring specialist supervision

- Each year in the model, assumptions are applied to the recurrent operational cashflows. These include, for example, growth assumptions relating to both demographic and non-demographic factors.

Further detail in relation to the modelling assumptions is set out in Appendix E.

The NPV[29] analysis demonstrates that there is a net benefit of £30.1m to the NHS system due to the proposed reconfiguration of cardiovascular services, as shown below. The benefit of £30.1m represents the positive cashflow return net of the investment cost associated with the reconfiguration over the 34 year assessment period. Through the application of discounting the £30.1m[30] is expressed in present values.

The cashflows presented in both the table and the NPV bridge below are grouped into the following categories:

1. Recurrent operational cashflows (see section E.3.2.1)

2. Other recurrent cashflows (see section E.3.2.2)

3. Non-recurrent transitional cashflows (see section E.3.2.3)
    a. Implementation costs
    b. Capital expenditure

This section considers each of these categories in turn.

The NPV of the preferred cardiovascular option is presented in the table and the figure below.

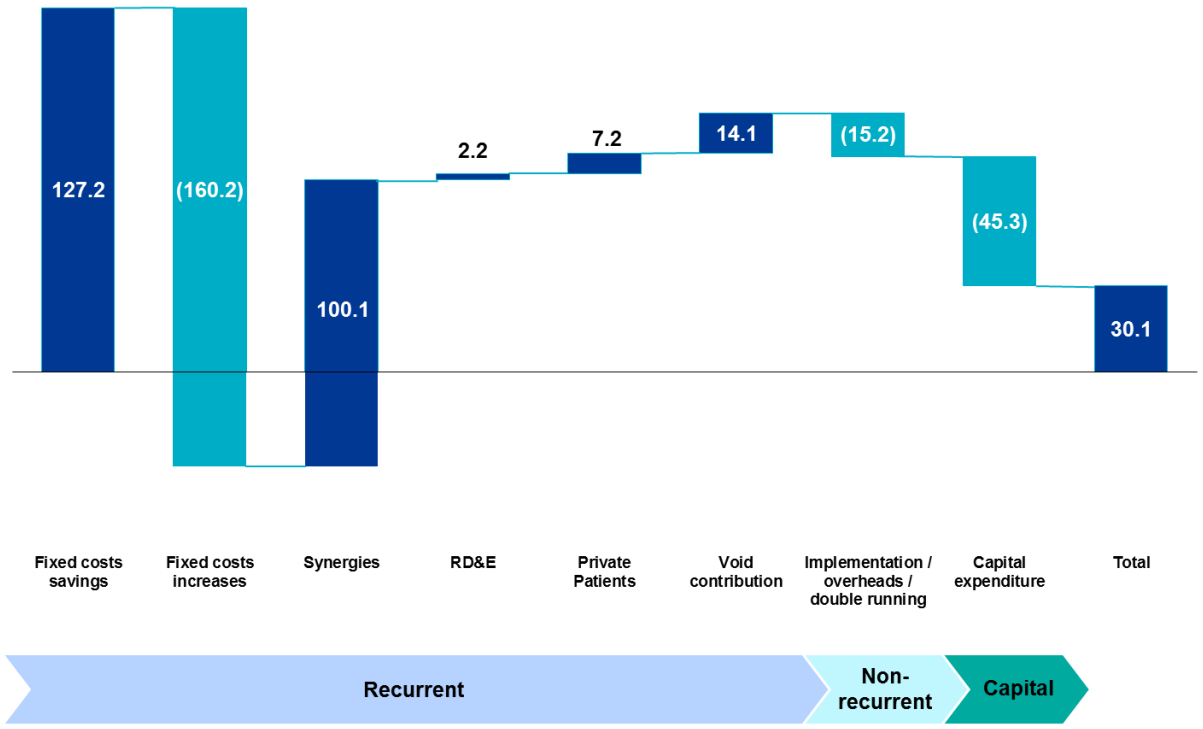
Table E-41 34 year NPV of the preferred cardiovascular option (£000)

	34 year NPV
Recurrent operational cash flows	
Fixed costs savings (costs no longer incurred)	127,187
Fixed costs increases (incremental fixed costs)	(160,211)
Post-reconfiguration synergies	100,122
Other recurrent cashflows	
RD&E contribution	2,163
Private patient contribution	7,205
Heart Hospital void contribution	14,101
Non-recurrent transitional cashflows	

[29] The system NPV recognises the incremental cost to the NHS. Whilst there is an impact on both providers and commissioners of implementing the preferred option, to avoid double counting at a system level, the system NPV only considers the impact on provider operational cashflows. The cost to commissioners (payment of the National Standard Contract income to the providers) of implementing the preferred option is considered later in this section from a commissioner affordability perspective.
[30] Discounting is the process of estimating the present value of an income stream by reducing expected cash flow to reflect the time value of money.

Implementation costs	(15,180)
Capital expenditure	(45,278)
Total	**30,108**

Figure E-3 – NPV bridge of preferred cardiovascular option (£m)



E.3.2.1 Recurrent operational cashflows

Recurrent operational cashflows are defined as those that are received (e.g. income received from commissioners) or incurred (e.g. operating costs including but not limited to staff costs and overheads) in respect of the delivery of cardiovascular services to NHS patients. The NPV analysis above recognises the incremental impact on these recurrent operational cashflows as a result of implementing the preferred cardiovascular option.

The NPV of the impact of the preferred cardiovascular option on recurrent operational cashflows is a benefit of £67.1m, which comprises:

- A PV of £127.2m generated through provider fixed cost savings. This £127.2m represents the present value of £359.0m of fixed cost savings generated over the 34 year assessment period.

- A PV of £160.2m, which represents a loss to the system through provider fixed cost increases. This £160.2m represents the present cost of £441.1m fixed cost increases over the 34 year assessment period.

- A PV of £100.1m generated by providers through reconfiguration synergies. This £101.1m represents the present value of a £277.4m reduction in variable costs due to the realisation of reconfiguration synergies over the 34 year assessment period.

Consolidated recurrent operating cashflows

This section outlines the consolidated incremental impact on operating provider cashflows for each provider as a result of implementing the preferred cardiovascular option.

An overview of the projected operational cashflow impact on the NHS system is presented over a 10 year period from 2014/15 in the table below. The table shows the increase or reduction in provider income and cost in addition to the increase or reduction in provider net operating cashflow.

The incremental projected operational cashflow impact for all providers is negative from the year of reconfiguration (2015/16) despite there being no change to the assumed baseline level of activity in the NHS cardiovascular system overall. For example; in year 6 (2019/20), there is an incremental loss to net operating cashflow of £0.3m arising from the implementation of the preferred option.

Table E-42 – Summary of consolidated operating cashflows for cardiovascular providers (£'000s)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Increase / (reduction) in provider income											
National Standard Contract	0	(1,224)	(3,724)	(3,818)	(3,932)	(4,048)	**(4,164)**	(4,282)	(4,401)	(4,521)	(4,642)
Non-clinical	0	(0)	0	(0)	(0)	(0)	**(0)**	(0)	(0)	(0)	(0)
Reduction / (increase) in provider cost											
Fixed	228	(1,279)	(6,872)	(4,957)	(3,234)	(2,101)	**(1,590)**	(1,644)	(1,700)	(1,758)	(1,818)
Variable	0	788	2,422	3,726	3,862	4,000	**5,493**	5,685	5,880	6,079	6,282
Increase / (reduction) in provider net operating cashflow	228	(1,716)	(8,174)	(5,050)	(3,305)	(2,149)	**(262)**	(242)	(221)	(200)	(178)

There is a decreased cost of services to commissioners from the reconfiguration, resulting in an incremental decrease in provider income each year post reconfiguration. In year 6, this results in an incremental provider decrease in income of £4.2m (see Table E-49).

The relative payments to providers are determined with reference to each provider's MFF. Based on 2013/14 values, the UCLH MFF is 1.2976 and the Barts Health MFF is 1.2128. This results in Barts Health receiving (and therefore the commissioners paying) an amount that is 7.0% lower than that received to UCLH.

There is no change in non-clinical income as this is not based on a National Standard Contract.

As a result of activity transferring out of The Heart Hospital, UCLH is able to generate savings through reductions to their fixed cost base. As UCLH are not able to eliminate fixed costs immediately as at the date of reconfiguration, fixed costs are phased out over a number of years, and as the phasing out of fixed costs increases the associated savings increase. Fixed costs include overheads, estates, financing costs and other costs that do not vary according to the level of activity. It is anticipated that these fixed costs will be reallocated to other services outside of cancer and cardiovascular as a result of the reconfiguration if they are not lost entirely. It is recognised these fixed costs will not be completely reabsorbed at the date of reconfiguration, resulting in stranded costs.

Barts Health incurs incremental fixed cost (e.g. facilities management costs, utilities and other corporate overheads) increases relating to reconfiguration of the estate to support the new cardiovascular activity they receive from UCLH. By way of example, in year 6, the net effect on fixed costs is an increase of £1.6m, due to the incremental fixed costs at Bart's Health being greater than the savings generated in the fixed cost base at UCLH. By year 6, all UCLH fixed costs that were not eliminated immediately have been phased out and are no longer incurred.

One of the key drivers for the PV of fixed costs savings is the proportion of total costs that are categorised as fixed (rather than variable) by the providers. On this basis, analysis has been undertaken to assess the sensitivity of the NPV to changes in the fixed and variable cost split. As mentioned above, on reconfiguration fixed costs are not transferred to the new provider and over time are lost from the system, whilst variable costs transfer to the new provider.

- Where 10% of UCLH fixed costs are re-classified as variable costs, there is a reduction to the system NPV of £6.2m resulting in the system NPV of the reconfiguration falling to £23.9m

- Where 10% of UCLH variable costs are re-classified as fixed costs, there is an increase to the system NPV of £91.1m resulting in the system NPV of the reconfiguration increasing to £121.2m.

Unlike fixed costs, variable costs transfer from the old to the new provider on reconfiguration. There is no change to the assumed baseline level of activity in overall as part of the reconfiguration, and therefore the total level of variable costs remain the same. However there is a reduction in variable costs cost due to the post reconfiguration synergies which will arise as a result of consolidation of activity at Barts Health who are receiving activity In year 6, the total variable cost saving is £5.5m.

Barts Health has undertaken a high level assessment to estimate the extent of variable cost savings that could be achieved through post-reconfiguration synergies. The process by which the synergy assumption was formed included running a workshop where clinicians were given the opportunity to share their experience and views to identify areas where synergies may arise. The Finance Working Group converted the outputs of the clinical workshop into a synergy assumption that was agreed by the Finance Steering Group.

Provider operating cashflows

This section outlines the following for each provider (Barts Health, UCLH and "other"):

- A summary of the cardiovascular activity that it is proposed each provider will gain or lose

- The incremental impact on operating cashflows for each provider as a result of implementing the preferred cardiovascular option.

The impact on activity and operating cashflow is displayed separately for Barts Health and UCLH. In addition, there is an "other" category, which represents the 5% of activity at The Heart Hospital which is transferring to other non-specified providers. This small proportion of patient activity is expected to flow elsewhere as patients exercise their right to choice of provider. This has been estimated to be 5% for the purposes of modelling patient flows from both a financial and competition perspective.

Barts Health

Under the preferred option, specialist cardiovascular activity will flow from The Heart Hospital to the new site at West Smithfield. The activity analysis for cardiovascular services at The Heart Hospital outlined in chapter 4 of the business case shows that the total number of spells is 5,159. As indicated above, 95% of the activity at The Heart Hospital has been assumed to transfer to Barts Health. This corresponds to 4,901 spells transferring to Barts Health.

Barts Health experience a financial benefit from the reconfiguration of cardiovascular services through an increase in net operating cashflow following the move of activity from The Heart Hospital to Barts Health. This is due to the positive contribution margin of The Heart Hospital at UCLH. For example, in year 6, the net financial impact is an increase in net operational cashflow of £18.3m.

Table E-43 – Barts Health - incremental operating cashflows from the preferred option (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	14,780	44,948	46,093	47,470	48,863	**50,271**	51,695	53,132	54,579	56,040
Non-clinical	0	6,126	19,465	20,762	22,241	23,814	**25,485**	27,261	29,146	31,146	33,268
Reduction / (increase) in provider cost											
Fixed	228	(1,279)	(7,539)	(7,703)	(7,948)	(8,218)	**(8,498)**	(8,787)	(9,086)	(9,394)	(9,714)
Variable	0	(14,650)	(45,041)	(45,258)	(46,909)	(48,595)	**(48,967)**	(50,677)	(52,420)	(54,195)	(56,003)
Increase / (reduction) in provider net operating cashflow	228	4,977	11,833	13,895	14,854	15,863	**18,292**	19,493	20,772	22,136	23,591

Due to the transfer in of activity to Barts Health, there is a net increase in income from the date of transition, both in National Standard Contract and non-clinical income. By year 6, it is anticipated that Barts Health will gain income of £75.8m of income for that year, £50.3m of which is National Standard Contract received from commissioners. Barts Health incurs additional fixed costs to support the new cardiovascular activity they receive from UCLH. These incremental fixed costs reduce the NPV by £160.2m. The table below provides a breakdown of the fixed costs, in real terms, prior to inflation being added.

Table E-44 - Additional fixed cost breakdown for Barts Health (£000) (excluding inflation – as at 2013/14)

	Incremental cost (2016/17)
Fixed costs	
Buildings maintenance charge	2,389
Public dividend capital	1,154
Corporate overheads	586
Facilities cost allocation	87
Premises, fixed plant and leasing	1,303
Other fixed costs	1,692
Total	**7,212**

In order to understand the sensitivity of the system NPV to the amount of additional fixed costs incurred at Barts Health, the following analysis has been undertaken:

- When the additional fixed costs increase by 10% there is a reduction in the system NPV of £16.0m, resulting in the system NPV of the reconfiguration decreasing to £14.1m
- When the additional fixed costs decrease by 10% there is an increase in the system NPV of £16.0m, resulting in the system NPV of the reconfiguration increasing to £46.1m
- To reach the break-even point, the additional fixed costs would need to increase by 18.79%.

Variable costs are transferred from UCLH in relation to the transferred activity, leading to an increase in variable costs in year 6 of £49.0m. Variable costs at Barts Health do benefit from a downward adjustment on transfer from UCLH to reflect that there are savings to be achieved through post reconfiguration synergies.

The potential rationale for the synergy savings applied to variable costs relating to cardiovascular activity is as follows:

- increased scale will provide development opportunities for staff and resilience in rotas, which should help staff retention and reduce the need for agency staff
- volumes will also support both 7 day working and the availability of specialists to authorise discharge which should provide small length of stay reductions
- some potential benefits from specialisation in support services and staff.

These potential areas for achieving synergies have been converted into synergy assumptions. A post reconfiguration synergy of 4% (phased from 2% to 4% over five years) was applied for services transferring to Barts Health.

Table E-45 – Synergy saving applied to cardiovascular services

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20 Onwards
Post reconfiguration synergy %	2%	2%	3%	3%	3%	4%

The financial impact on net operation cashflows of the synergy savings outlined is demonstrated below which sets out the variable cost savings at Barts Health. In year 6, the impact of the synergy results in a reduction in variable cost of £5.5m.

Table E-46 – Variable cost saving post-reconfiguration due to synergies (£000)

	1	2	3	4	5	6	7	8	9	10
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Reduction in variable cost due to post-reconfiguration synergy saving										
Barts Health	788	2,422	3,726	3,862	4,000	5,493	5,685	5,880	6,079	6,282
Total	788	2,422	3,726	3,862	4,000	5,493	5,685	5,880	6,079	6,282

As stated above, Barts Health has undertaken a high level assessment to estimate the extent of variable cost savings that could be achieved through post-reconfiguration synergies. In order to understand how sensitive the level and timing of synergies are to the system NPV the following analysis has been undertaken:

- Where the synergy percentage is increased by 1% there is an increase to the system NPV of £26.3m, resulting in the system NPV of the reconfiguration increasing to £56.5m.
- Where the synergy percentage is decreased by 1% there is a decrease to the system NPV of £26.3m, resulting in the system NPV of the reconfiguration decreasing to £3.8m.
- Where the current synergy percentage is delayed by one year there is a decrease to the system NPV of £2.7m, resulting in the system NPV of the reconfiguration reducing to £27.4m.
- To reach the break-even point, the current synergy percentages would need to decrease by 0.41% in 2013/14, 2016/17 and 2018/19, leading to a cumulative synergy from year 6 onwards of 2.76%.

UCLH

Under the preferred cardiovascular option UCLH lose all 5,159 spells of cardiovascular activity.

Table E-47 – UCLH – Incremental operating cashflows from the preferred option (£000)

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Increase / (reduction) in provider income											
National Standard Contract	0	(16,646)	(50,623)	(51,912)	(53,462)	(55,031)	**(56,618)**	(58,221)	(59,839)	(61,469)	(63,114)
Non-clinical	0	(6,448)	(20,489)	(21,855)	(23,412)	(25,067)	**(26,827)**	(28,696)	(30,680)	(32,785)	(35,019)
Reduction / (increase) in provider cost											
Fixed	0	0	668	2,746	4,714	6,117	**6,907**	7,142	7,385	7,636	7,896
Variable	0	16,250	49,960	51,562	53,442	55,364	**57,326**	59,328	61,369	63,446	65,564
Increase / (reduction) in provider net operating cashflow	0	(6,844)	(20,484)	(19,460)	(18,717)	(18,617)	**(19,211)**	(20,446)	(21,765)	(23,172)	(24,673)

UCLH suffer a loss to their financial position, which can be seen through a decrease in projected net operating cashflow, following the move of activity from The Heart Hospital to Barts Health. This is due to the positive contribution margin of The Heart Hospital at UCLH. Using year 6 as an example, the net financial impact is a decrease in net operational cashflow of £19.2m.

Due to the transfer out of activity, there is a net decrease in provider income from both National Standard Contract and non-clinical income. By year 6, it is anticipated that UCLH will suffer a loss of £83.4m of income for that year, £56.6m of which is expected to be received from commissioners.

The loss of cardiovascular activity also results in a decrease in both the fixed and variable cost base from the date of reconfiguration. The fixed cost savings are recognised from year 2, as no fixed costs are able to be reabsorbed in the remainder of year 1. The stranded element of the fixed cost base is no longer incurred from year 6, resulting in a saving of £6.9m in this year. The variable costs no longer incurred in year 6 are £57.3m, bringing the total cost saving for UCLH in year 6 to £64.2m.

Other providers

As part of the reconfiguration, other providers in the system will gain approximately 258 spells of activity to account for the 5% of activity at The Heart Hospital which is transferring to other non-specified providers. This small proportion of patient activity is expected to flow elsewhere as patients exercise their right to choice of provider.

Other providers in the system will experience a marginal financial benefit from the reconfiguration of cardiovascular services through an increase in net operating cashflow due to the move of activity from The Heart Hospital which is not absorbed at Barts Health. Using year 6 as an example, other providers will gain an increase of £0.7m in net operational cashflow.

Due to the transfer in of activity, there is a net increase in provider income from both National Standard Contract and non-clinical income. By year 6, it is anticipated that other providers will receive a gain of £3.5m on income for that year, £2.2m of which is received from commissioners.

A key driver of the positive cashflow is the fact that there are no additional fixed costs despite the transfer in activity. There is an assumption that there are no incremental fixed costs in relation to activity transferring in as other providers are anticipated to be able to absorb the activity into the existing fixed cost base.

Variable costs are assumed to transfer from the current provider to the receiving provider. As no synergies are assumed for other providers as the exact flow of activity is not determined and the volumes are lower than for the transfer to Barts Health, the increase in variable costs represents the full value of the transfer of variable costs from UCLH. At year 6, the increase in variable costs is £2.9m.

Table E-48 – Other providers - incremental operating cashflows from the preferred option (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Increase / (reduction) in provider income											

National Standard Contract	0	641	1,951	2,000	2,060	2,120	**2,182**	2,243	2,306	2,369	2,432
Non-clinical	0	322	1,024	1,093	1,171	1,253	**1,341**	1,435	1,534	1,639	1,751
Reduction / (increase) in provider cost											
Fixed	0	0	0	0	0	0	**0**	0	0	0	0
Variable	0	(812)	(2,498)	(2,578)	(2,672)	(2,768)	**(2,866)**	(2,966)	(3,068)	(3,172)	(3,278)
Total	0	151	477	515	559	606	**657**	712	771	835	905

Incremental costs for Commissioners

Under the preferred cardiovascular option there is a decrease in the cost to commissioners, as shown in below. By year 6, the incremental annual net decrease in cost to commissioners would be £4.2m.

Table E-49 – Incremental costs for Commissioners

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Reduction / (increase) in cost											
CCG	0	366	1,102	1,130	1,164	1,198	**1,233**	1,268	1,303	1,338	1,374
NHS England	0	858	2,621	2,688	2,768	2,850	**2,932**	3,015	3,099	3,183	3,268
Total	0	1,224	3,724	3,818	3,932	4,048	**4,164**	4,282	4,401	4,521	4,642

The decrease in cost to the commissioners is due to the shift of cardiovascular activity from UCLH to Barts Health which has a lower MFF (outlined in the table below).

Table E-50 – MFF factors used for income adjustment on income transfer

Provider	MFF Factor (2013/14)
Barts Health	1.2128
UCLH	1.2976
Other[31]	1.0000

Although commissioners will incur a decrease in their cost base as shown above, this is likely to be non-recurrent and only represent a cost to the commissioners for a period of two financial years post reconfiguration. After this period the commissioners would expect an offsetting decrease in funding, through the commissioner allocation being rebased using the allocation formula to reflect the MFF's of those providers commissioning too.

Should this be the case, the incremental costs to commissioners of implementing the preferred option will only be relevant to the end of the financial year 2016/17 (as shown below).

[31] When services are reconfigured, 5% of UCLH activity is lost to other providers in the system. As the provider is unknown, the MFF has been rebased to 1.00.

Table E-51 – Commissioners - incremental operating cashflows from the preferred option (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Decrease / (increase) in cost											
CCG	0	366	1,102	1,130	0	0	0	0	0	0	0
NHS England	0	858	2,621	2,688	0	0	0	0	0	0	0
Total	**0**	**1,224**	**3,724**	**3,818**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

There is an incremental reduction in commissioner cost due to the reconfiguration for the period 2013/14 to 2016/17 of £8.8m, broken down into a £6.2m saving for NHS England and a saving of £2.6m for CCGs in aggregate. The table below breaks down the reduction in commissioner costs for cardiovascular services further by individual CCG. Due to the wide catchment area of The Heart Hospital, not all of the CCGs have been identified.

Table E-52 – Allocation of decrease in commissioner costs by commissioner (£000)

Commissioner	Cardiac	
NHS England Total		**6,168**
CCG		
Barnet	135	
Enfield	365	
Haringey	414	
Islington	299	
Camden	138	
West Essex	65	
City & Hackney	235	
Tower Hamlets	13	
Newham	7	
Waltham Forest	22	
Barking and Dagenham	8	
Other CCG/not allocated	898	
CCG Total		**2,599**
Total		**8,766**

E.3.2.2 Other recurrent cashflows

Other recurrent net cashflows are defined as those that are received (e.g. income received) or incurred (e.g. operating costs including but not limited to staff costs and overheads) in respect of:

- the delivery of cardiovascular services to non-NHS (e.g. private) patients
- other recurrent cashflows that relate to the reconfiguration of cardiovascular services.

The NPV analysis recognises the incremental impact of these recurrent cashflows as a result of implementing the preferred cardiovascular option.

The NPV of the impact of the preferred cardiovascular option on other recurrent cashflows is a benefit of £23.5m, which comprises:

- A PV of £2.2m generated through incremental research, development and education (RD&E) contribution (income net of the associated costs of delivering the research, development and education) earned by UCLH. This £2.2m represents the present value of £6.6m of research, development and education contribution generated over the 34 year assessment period.

- A PV of £7.2m generated by UCLH through incremental contribution from providing specialist cancer services to private patients. This £9.6m represents the present value of private patient contribution totalling £17.2m over the 34 year assessment period.

- A PV of £14.1m generated by UCLH through their ability to utilise (for other profitable services) surplus bed capacity arising from cardiovascular activity moving out of The Heart Hospital after taking into account the usage due to the proposed specialist cancer reconfiguration. This £14.1m represents the present value of the void contribution totalling £32.2m.

The table below sets out the projected annual 'other' recurrent cashflows over a ten year period from financial year 2014/15. For example: in year 6 the total 'other' recurrent cashflows are projected to be £1.6m. The sections below explore each of the cashflows in more detail.

Table E-53 Other recurrent cashflows (£000)

Year	0	1	2	3	4	5	6	7	8	9	10
Fin. Yr	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Incremental contribution											
RD&E (Barts Health)	0	0	0	0	0	112	**116**	121	126	131	136
Private Patient (Barts Health)	0	0	0	538	538	538	**538**	538	538	538	538
Void contribution (UCLH)	0	322	965	965	965	965	**965**	965	965	965	965
Total	0	322	965	1,504	1,504	1,615	**1,620**	1,625	1,630	1,635	1,640

Research, development and education (RD&E)

Through the creation of a specific specialist cardiovascular centre at Barts Health, there will be better access to RD&E opportunities. From a clinical perspective, as highlighted in the Case for Change, such opportunities will help improve the pathway of care to give more patients access to the latest technology and clinical trials, and from a financial perspective, such opportunities will generate additional income for the NHS.

There is only expected to be a financial benefit from financial year 2018/19, with a £0.1m benefit in contribution in year 2019/20.

This benefit in contribution is driven solely by the specialist cardiovascular centre at Barts Health who estimate:

- Incremental income from RD&E equal to 0.31% of their total income

- Incremental costs from RD&E equal to 75% of the RD&E income, therefore generating a contribution of 25% to the Barts Health margin.

For example; in year 6 (2019/20) the total income generated by Barts Health in respect of cardiovascular services is £151.4m. On that basis, forecast incremental income from RD&E is equal to 0.31%, being £0.47m. To calculate the incremental contribution that Barts Health will generate from the RD&E activity in that year, 25% is applied to the incremental RD&E income, which is equal to £0.12m (as shown in the table above).

Whilst an important aspect of the clinical case for the reconfiguration, the present value of the financial impact of the incremental RD&E (£2.2m) is considered to be small relative to the overall NPV of £30.1m.

Analysis has been undertaken to assess the sensitivity of the NPV to changes in the level of RD&E income:

- Where RD&E income is increased by 10% per annum, there is an increase to the system NPV of £0.2m resulting in the system NPV of the reconfiguration increasing to £30.3m.

- Where RD&E income is decreased by 10% per annum, there is a decrease to the system NPV of £0.2m resulting in the system NPV of the reconfiguration decreasing to £29.9m.

Private patients

Through creation of a specific specialist cardiovascular centre at Barts Health, it is anticipated that there will be an increase in the number of private patient referrals. The income from such patients will be additional to the current NHS activity as the majority of patients are assumed to be international and will therefore have a direct financial benefit to the system.

This benefit is driven solely by the specialist cardiovascular centre at Barts Health where it is anticipated there will be 8 planned private patient beds. These 8 private patient beds are incremental and arise from the reconfiguration required to deliver the preferred cardiovascular option.

Barts Health estimate the financial benefit associated with the incremental private patient beds to be £0.54m per annum (as shown in Table E-53). The Barts Health estimate is based on:

- average income per bed at £0.35m per annum with an average contribution of 30% to the Barts Health margin

- An additional contribution of £0.20m from MRI / other imaging diagnostics.

This results in a total contribution of £1.04m, from which the UCLH private patient contribution transferring across from The Heart Hospital is deducted, resulting in an incremental net benefit of £0.54m per annum.

As private patients is one of the key drivers contributing to the overall NPV benefit of 'other' recurrent cashflows (PV of £7.2m), analysis has been undertaken to assess the sensitivity of the NPV to changes in the level of private patient income:

- Where private patient income is increased by 10% per annum, there is an increase to the system NPV of £0.7m resulting in the system NPV of the reconfiguration increasing to £30.8m

- Where private patient income is decreased by 10% per annum, there is a decrease to the system NPV of £0.7m resulting in the system NPV of the reconfiguration decreasing to £29.4m.

Void contribution

The cardiovascular activity transferring from UCLH to Barts Health in the preferred option will result in there being surplus bed capacity in The Heart Hospital after taking into account the usage due to the proposed specialist cancer reconfiguration. It is currently anticipated that there will be approximately 33 surplus beds available from which additional contribution can be generated, through utilisation of the beds for other revenue and profit generating services.

It is assumed that the surplus beds can be utilised for other services from 2014/15, following the transfer of cardiovascular activity in December 2014. The utilisation of these beds is split between additional specialist cancer activity and additional non-specialist activity. 15 of these beds are allocated to additional general activity and the remaining 18 to additional cancer activity.

The income per bed for additional specialist cancer activity is assumed to be £497k per annum with a contribution margin (based on utilising the beds for specialist services) of 8%. For example, in year 6, the total income generated in respect of the c.18 beds would be £8.9m. On applying the 8% contribution margin to the income, an incremental contribution of £711k is achieved.

The income per bed for additional non-specialist activity is assumed to be £497k per annum with a contribution margin (based on utilising the beds for non-specialist services) of 3.4%. For example, in year 6, the total income generated in respect of the c.15 beds would be £7.5m. On applying the 3.4% contribution margin to the income, an incremental contribution of £254k is achieved.

As shown in Table E-53, the sum of the contributions from additional specialist cancer and additional non-specialist activity equals £965k in year 6.

As the void contribution is the most significant category of 'other' recurrent cashflows contributing to the system NPV (PV of the void is £14.1m), analysis has been undertaken to assess the sensitivity of the NPV to changes in the level of the void contribution. The sensitivity analysis has been conducted on both the specialist cancer and non-specialist activity portions of the void contributions respectively.

Specialist cancer activity:

- When the number of surplus beds reduces by 5, from 18 to 13 beds, there is a decrease to the system NPV of £2.9m resulting in the system NPV of the reconfiguration decreasing to £27.2m

- When income per bed is increased by 10% to £547k per annum, there is an increase in the system NPV of £1.0m resulting in the system NPV of the reconfiguration increasing to £31.1m

- When the contribution margin is increased from 8% to 9%, there is an increase in the system NPV of £1.3m resulting in the system NPV of the reconfiguration increasing to £31.4m.

Non-specialist activity:

- When the number of surplus beds reduces by 5, from 15 to 10 beds, there is a decrease to the system NPV of £1.2m resulting in the system NPV of the reconfiguration decreasing to £28.9m

- When income per bed is increased by 10% to £547k per annum, there is an increase in the system NPV of £0.4m resulting in the system NPV of the reconfiguration increasing to £30.5m

- When the contribution margin is increased from 3.4% to 4.4%, there is an increase in the system NPV of £1.1m resulting in the system NPV of the reconfiguration increasing to £31.2m.

E.3.2.3 Non-recurrent transitional cashflows

Implementation costs

The costs associated with implementing the preferred cardiovascular option, including double running costs, have a net present cost of £15.2m. Cost estimates have been provided by both Barts Health and UCLH at this stage. A summary of the projected costs by provider is set out below.

Barts Health

- £3.7m on an external implementation team that includes legal fees, fees for OBC/ FBC production and design fees to FBC

- £2.2m on an internal implementation team that includes Programme Office costs and Transitional Lead support

- £4.4m on double running costs over the transfer period relating to the running of the Queen Elizabeth II Hospital and the move of The Heart Hospital to the Barts Health site

£3.0m on temporary refurbishment works relating to the conversion of the East wing ground floor for displaced outpatients and the ground floor KGV conversion for additional outpatients to support the arrival of The Heart Hospital.

UCLH

- £1.1m on an external implementation team that includes legal fees, external PMO support and fees relating to the Competition Commission Submission

- £0.6m on an internal implementation team that includes the following for a maximum of 18 months (until the end of 2015/16):
  - Cardiovascular Implementation Programme Director
  - PMO function
  - Financial lead
  - HR lead
  - HR manager
  - Further HR support
  - Communications lead

- £2.3m on double running costs over the transfer period which UCLH anticipate to be one month.

Table E-54 – Implementation costs of implementing the preferred option (£000)

	0	1	2	Total
	2013/14	2014/15	2015/16	
External implementation team	**1,000**	**3,751**	**37**	**4,787**
BH	1,000	2,657	0	3,657
UCLH	0	1,094	37	1,130
Internal implementation team	**100**	**2,054**	**635**	**2,789**
BH	100	1,533	522	2,155
UCLH	0	521	113	634
Double running costs	**0**	**4,585**	**2,089**	**6,674**
BH	0	2,300	2,089	4,388
UCLH	0	2,286	0	2,286
Temporary refurbishment works	**0**	**3,000**	**0**	**3,000**
BH	0	3,000	0	3,000
UCLH	0	0	0	0
Total	**1,100**	**13,390**	**2,761**	**17,251**

The following scenarios have been tested in order to provide an understanding of how sensitive the system NPV is to a change in the implementation costs assumptions:

- Where implementation costs, for all providers, are increased by 20%, there is a decrease to the system NPV of £3.0m resulting in the system NPV of the reconfiguration decreasing to £27.1m

- Where implementation costs, for all providers, are decreased by 20%, there is an increase to the system NPV of £3.0m resulting in the system NPV of the reconfiguration increasing to £33.1m

- In order to reach the break-even point (where an increase in transition costs is at a level that reduces the system NPV to zero) implementation costs need to increase to 298% of their current value.

Capital costs

The total projected nominal capital expenditure in relation to the preferred cardiovascular option is £49.0m, which has a present cost of £45.3m. Capital costs in the cardiovascular model are only incurred by Barts Health. Of the capital expenditure, £24.5m is incurred in 2014/15 with the remaining £24.5m in 2015/16.

Table E-55 - One off capital expenditure of implementing the preferred option (£000)

	0	1	2	Total
	2013/14	2014/15	2015/16	
Barts Health	0	24,500	24,500	49,000

The capital expenditure costs for Barts Health have been developed by a combination of Barts Health and their external cost consultants. These cost estimates reflect the capital expenditure that Barts Health estimate will be incurred in relation to refurbishing the Barts Health PFI hospital to create the capacity required to service the additional activity they receive through the proposed reconfiguration. The total nominal cost estimate of £49.0m[32] includes construction costs (including provision for risk and inflation), equipment costs, fees and contingency costs. These costs are outlined in Table E-57.

The below benchmarks have been calculated to assess the high level reasonableness of the Barts Health capital expenditure. A bed base of 181 has been assumed for the purpose of calculating the cost per bed, which has been obtained from the Barts Health SOC.

[32] The total nominal capital expenditure that has been modelled is £49.0m. The latest figure provided by Barts Health is £49.8m (see **Error! Reference source not found.**) following more detailed information being made available following the completion of the modelling exercise.

Table E-56 – Benchmarks to assess the high level reasonableness of Barts capital expenditure (£000)) [33]

	Cost per meter squared	Cost per bed
Based on construction costs only	3	169
Based on construction costs including construction costs, non works costs, professional fees, contingencies and VAT but excluding equipment	4	199
Based on construction costs including construction costs, non works costs, professional fees, contingencies, VAT and equipment	5	275

A high level review of reasonableness of capital expenditure against a comparable project has been completed, and based on this review capital expenditure assumptions would appear to be broadly reasonable at this stage.

Table E-57 – Affordability Barts Health capital expenditure requirement for implementing the preferred option34

Cost Breakdown	Cost (£000)	Rate (£ per m^2)	Additional detail
Works	30,512	3,252	
Fees	2,379	254	
Equipment (including VAT)	13,851	1,476	
Contingency	3,038	324	
Total	**49,780**[35]	**5,306**	**Total floor area: 9,382 m^2**

The following scenarios have been tested in order to provide an understanding of how sensitive the system NPV is to a change in the capital expenditure assumptions:

- Where Barts Health capital expenditure is increased by 10%, there is a decrease to the system NPV of £4.5m resulting in the system NPV of the reconfiguration decreasing to £25.6m

- Where the planning contingency is reduced to zero in respect of the Barts Health capital expenditure, there is an increase to the system NPV of £2.8m resulting in the system NPV of the reconfiguration increasing to £32.9m

- In order to reach the break-even point (where an increase in total capital expenditure is at a level that reduces the system NPV to zero) capital expenditure needs to increase to 166% of their current value.

E.3.3 Commissioner affordability impact

An assessment has been undertaken to quantify the incremental impact on commissioners cost base from the implementation of the preferred option. The assessment period is for the analysis is 1 April 2013 through to 30 September 2020[36].

[33] Benchmarks based on total nominal costs of £49.8m rather that £49.0m as included in the financial model.
[34] The cost per metre squared. has been calculated based on floor area of 9382m^2 provided in the cost submission from Barts Health

There is a £8.8m decreased cost to commissioners. The decrease in cost arises as a result of the cardiovascular activity moving to Barts Health from UCLH. Barts Health has a lower MFF and therefore commissioners pay a lower National Standard Contract payment to Barts Health than they would if the activity was still with UCLH.

Table E-58 - Affordability of implementing the preferred option for commissioners (£000)

For the period from 1 April 2013 to 30 November 2019 Operating cashflow – gain / (loss)	CCG	NHS England
Operational cost – National Standard Contract	2,599	6,168

E.3.4 Provider affordability impact

An assessment has been undertaken to quantify the incremental impact on the income and expenditure of Barts Health and UCLH from the implementation of the preferred option. The assessment is limited to these providers on the basis that these providers experience material transfers of activity through implementation of the preferred cardiovascular option. The period for the income and expenditure analysis is 1 April 2013 through to 30 September 2020[37].

Barts Health

In receiving 95% of the UCLH cardiovascular activity Barts Health generates an increase of £345.1m over the assessment period. This is offset by a £271.2m reduction of costs, resulting in an improved operating contribution of approximately £73.8m.

The costs that Barts Health is projecting in relation to implementation and double running (£10.2m) are marginally offset by an increase in private patient and RD&E contribution (income net of the relevant cost) such that the net impact on Barts Health income and expenditure is a gain of £65.8m over the assessment period.

UCLH

Under the preferred option, UCLH lose 100% of their activity and therefore the associated income (£380.6m) and cost (£283.6m). This has a detrimental impact on the UCLH operating contribution, decreasing it by £97.0m over the assessment period.

The loss that UCLH suffer through a reduction in operating contribution is increased by £4.1m to account for the UCLH estimate of the costs they will incur in respect of implementation and double running. This loss is in part offset by an increased margin (£1.3m over the five years) in the recognition of void space arising through the reconfiguration.

The net UCLH loss over the assessment period is £99.7m.

[36] 30 September 2020 is the date 5 years after the date of transition of services.
[37] 30 September 2020 is the date 5 years after the date of transition of services.

Table E-59 - Affordability of implementing the preferred option for Providers (£000)

For the period from 1 April 2013 to 30 November 2019	Barts Health	UCLH
Operating cashflow – gain / (loss)		
Income	345,066	(380,574)
Costs	271,221	(283,645)
Operating contribution	73,845	(96,929)
Transitional costs[38]		
Implementation / OHs / double running costs	(10,201)	(4,050)
Other		
RD&E contribution	189	0
PP contribution	1,973	0
HH void contribution	0	1,272
Provider – gain / (loss)	**65,806**	**(99,707)**

[38] Temporary refurbishment costs incurred by Barts Health have been excluded for the purposes of affordability

F Appendix – Financial modelling methodology

F.1 Introduction

This section sets out to explain the basis on which the financial models have been prepared as well as the key data inputs, assumptions and model outputs.

F.2 General principles

F.2.1 Basis of model preparation

Two financial models have been prepared:

- cancer financial model
- cardiovascular financial model

Whilst the cancer and cardiovascular financial models produce discrete model outputs, these can be overlaid to demonstrate the impact of the full reconfiguration.

Both financial models calculate and compare the following annual cashflows:

- the “do nothing” option
- the “preferred” option

F.2.2 Model outputs

The model outputs quantify the impact on the following parties:

- The NHS as a whole, the ‘system’ – the net present value (system NPV) of the preferred option to the NHS.

- The Providers – the incremental operating cashflow and the assessment of affordability[39] of the preferred option to providers

- The Commissioners - the incremental operating cashflow and the assessment of affordability of the preferred option to commissioners.

F.2.3 Provision of model inputs and assumptions

All inputs and assumptions for the financial model have been provided by the relevant provider (Barts Health, UCLH or RFH) or where appropriate NHS England[40]. Where inputs and assumptions have not been supplied, or were not available, assumptions have been developed in conjunction and agreed with Barts Health, UCLH and NHS England. From a governance perspective, all inputs and assumptions have been signed off by the Finance Working Group.

The inpatient activity included in the scope of the reconfiguration was specified using a combination of clinical diagnoses (ICD-10 codes), procedures (OPCS) and Health Resource Groups ("HRGs") through consultation with specialist commissioners. The scope was signed off by the providers and NHS England at the Finance Steering Group. Based on these definitions,

[39] Affordability analysis seeks to estimate the impact on provider income and expenditure over the period from 2012/13 to five years after the service transition date.
[40] These inputs have not been subject to an audit or due diligence

specialist activity was identified in the providers' (for activity, income and costs) and NHS Hospital Episode Statistic ("HES") data (for activity and income).

F.2.4 General modelling assumptions

Table F-1 outlines the general modelling assumptions used in the cancer and cardiovascular models.

Table F-1 - General modelling assumptions

Assumption	Description
Baseline inputs	Stated for the Financial Year 1 April 2013 to 31 March 2014 (FY 2013/14) - Year 0
Model length	Annual cashflows are modelled for 34 years after FY 2013/14 to FY 2047/48. Model length aligns to the remaining life of the Barts Health PFI contract which is 32 years from 2016[41]
Transfer date[42]	Cancer: 1 October 2015 Cardiovascular: 1 December 2014
Activity transfer	Cancer: Activity transfers in conjunction with the Transfer Tables (refer to Appendix C) Cardiovascular: All activity currently undertaken at the Heart Hospital, with the exception of thoracic activity, is assumed to transfer out of UCLH. 10 % of current activity at the Heart Hospital is thoracic activity. 95% of the activity transfers to Barts Health and the remaining 5% to other non-specified providers. 87% of the activity transferring out of the Heart Hospital is cardiovascular, with the remaining activity being non-cardiovascular activity for patients with congenital conditions requiring specialist supervision.
Discount rate (real)	Years 1- 30: 3.5% Years 31-34: 3.0% This is as specified in the Treasury Green Book Guidance
General Inflation Rate (%)	To deflate nominal cashflows to real in the NPV calculation. Year 1 (FY 2014/15): 1.9% Year 2 (FY 2015/16):1.8% Year 3 (FY 2016/17):1.7% Year 4 (FY 2017/18): 1.7% Year 5 onwards: 2.0% "The NHS belongs to the people: A Call to Action – The Technical Annex" Page 20 - GDP deflator assumption as per OBR forecasts.
Valuation date of NPV	1 April 2014. One-off costs incurred in FY2013/14 are considered to be "sunk" and are not included in the NPV calculation. e.g. the one-off costs incurred in 2013/14 at the RFH are excluded from the NPV.
Affordability modelling period	Cancer: 1 April 2013–30 September 2020 (5 years from transfer date) Cardiovascular: 1 April 2013–30 November 2019 (5 years from transfer date)

[41] As stated in Section 5 of the Green Book, costs and benefits considered should normally be extended to cover the period of the useful lifetime of the assets encompassed by the options under consideration. As the appraisal concerns the Barts Health PFI, the appraisal period has been set to reflect the life of this contract.

[42] On completion of the detailed implementation planning, further work is required to ensure that 1 December 2014 is an appropriate transfer date for the cardiovascular reconfiguration and develop a reconfiguration date for each cancer type.

F.3 Cancer model - inputs & assumptions

This section outlines the key inputs and assumptions in the cancer model. The key input to the financial model is income and costs for each provider and these income and cost figures are driven by the cancer activity per tumour type at each provider. The key baseline data is detailed in this section, along with the assumptions applied to the cashflows in the model.

F.3.1 Recurrent operational cashflow assumptions

Table F-2 sets out the detailed assumptions applied to recurrent operational income and costs in the cancer model.

Table F-2 - Recurrent operational cashflow assumptions

Recurrent operational income/cost assumptions	Purpose	Year	1	2	3	4	5	6	7	8	9	10 onwards
		Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Growth assumptions												
Demographic growth	To reflect changes in population based on a blended average of the ONS 2011 data for the local authorities associated with the 2012/13 cancer/cardiac activity.		1.56%	1.49%	1.41%	1.35%	1.30%	1.25%	1.20%	1.15%	1.10%	1.05%
Non demographic growth	To reflect the level of projected growth attributable to non-demographic factors based on a 50:50 blended rate of London Region Planning assumptions for specialist commissioning and non-specialist commissioning. [43]		3.15%	3.15%	3.15%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%
Tariff deflator	Comprising of two components which drives operational income.											
i) efficiency requirement	To reflect the year on year cost savings required from providers.		(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%
ii) cost inflation	To reflect secondary health cost inflation.		2.20%	2.20%	3.00%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%

[43] Appendix G includes a sensitivity to quantify the impact of using the specialist commissioning or non-specialist non-demographic assumption instead of the blended rate.

		Year	1	2	3	4	5	6	7	8	9	10 onwards
		Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Cost assumptions	Comprising of same two components as the tariff deflator.											
iii) efficiency requirement	To reflect the year on year cost savings required from providers. Applied to variable costs.		(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%
iv) Cost inflation	To reflect secondary health cost inflation. Applied to both fixed and variable costs.		2.20%	2.20%	3.00%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%
Funding for Integration Transformation Fund (ITF)												
Impact on commissioner income	To account for a reduction in commissioner budgets due to integrated care pathways. This reduction is applied to commissioner income based on the London Region Planning assumptions (FY2014/15: (0.3)%; FY2015/16: (3.0)%). It is assumed that 50% of the ITF impact is passed onto the providers through a reduction in income paid to providers (which represents a reduction in the commissioner cost base) – see below. The net impact of the ITF assumption on commissioner is therefore a reduction in contribution margin. (FY2014/15: (0.15)%; FY2015/16: (1.5)%).		(0.30)%	(3.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Impact on commissioner cost			(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Net commissioner position			(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Impact on provider income	An element (50%) of the reduction in commissioner budgets due to the change in ITF funding is shared with the providers through a reduction in the income they receive from commissioners. This reduction is equal to 50% of the London region planning assumptions (assumption: FY2014/15: (0.15)%; FY2015/16: (1.5)%). It is assumed that the ITF does not result in a reduction in the provider cost base.		(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%

F.3.2 Recurrent operational income inputs

The recurrent operational income inputs used in the cancer model are outlined in Table F-3, with the sources and scope being explained in Table F-4.

In the financial modelling of the impact of the preferred cancer option, only clinical income on national standard contract is included for each provider. Non-clinical income is excluded on the basis that UCLH data was unavailable at this stage of work. For the remaining providers (with the exception of Barts Health), clinical income is estimated by applying national standard contract tariffs to HES data, therefore only clinical income can be obtained. Income from outpatient activity is also excluded from the financial modelling.

The table below summarises all of the cancer income inputs used in the financial model. Barts Health and UCLH conduct activity in respect of all cancer types whilst all other providers only conduct activity in respect of some of the cancer types. Where no number is included, this is because there is no[44] activity in respect of this cancer type for this provider.

Table F-3 - Forecast 2013/14 clinical income by cancer type per provider[45] (£000)

	Brain	Head and Neck	Bladder	Prostate	Renal	AML	HSCT	OG	Total
Commissioned by:	*NHSE*	*NHSE*	*NHSE*	*NHSE*	*NHSE*	*CCG[46]*	*NHSE*	*NHSE*	
BH	482	978	43	9	363	782	864	302	3,823
UCLH	7,070	810	602	2,341	91	1,920	7,783	964	21,582
RFH	-	-	-	-	785	96	5,500	-	6,381
BHRUT	2,021	44	220	378	128	65	-	329	3,186
BCF	-	268	-	-	109	-	-	-	377
HUH	-	19	-	-	-	-	-	-	19
NMUH	-	-	-	-	38	-	-	-	38
PAH	-	26	-	-	-	-	-	-	26
BTUH	-	29	-	-	139	-	-	-	168
Other[47]	23	29	-	63	29	19	-	-	163
Total	**9,596**	**2,203**	**865**	**2,792**	**1,682**	**2,882**	**14,147**	**1,596**	**35,763**

[44]Where there are low levels of activity for a particular cancer type and provider these levels of activity have not been included and instead marked at 0. Such spells are instead included in an "Other" category. This grouping is carried out to guard against identification of individual patient data, and is considered to be immaterial versus the specific providers included

[45] BH: Barts Health NHS Trust, UCLH: University College London Hospitals NHS Foundation Trust, RFH: Royal Free London NHS Foundation Trust, BHRUT: Barking, Havering and Redbridge University Hospitals NHS Trust, BCF: Barnet and Chase Farm Hospitals NHS Trust, HUH: Homerton University Hospital NHS Foundation Trust, NMUH: North Middlesex University Hospital NHS Trust, PAH: Princess Alexandra Hospital NHS Trust, BTUH: Basildon and Thurrock University Hospitals

[46] Some AML activity is commissioned by NHSE, but as it is predominantly commissioned by CCGs. The model assumes AML is 100% CCG-commissioned in the absence of clarity on the AML commissioning split assumption.

[47] "Other" income relates to activity at sites where there were only a small number of relevant spells of activity. These sites have not been identified to avoid the risk of including patient identifiable information.

The table below summarises the source and scope of the income inputs which are included in the table above so to identify where the income is based on actual data or an estimate based on HES data.

Table F-4 - Source and scope of income inputs

Provider	Cancer type	Description
BH	All except brain	Based on clinical inpatient and critical care activity including excess bed days and excluding outpatients provided by BH. Actual income data was available for the first six months of the 2013/14 financial year, with the remaining year pro-rated accordingly. This pro-rating was applied to both income and costs therefore any seasonality would have had a minimal impact.
	Brain	The product of average income per spell (based on 2012/13 HES[48] data and 2013/14 national standard contract tariffs) and full year estimate of 2013/14 HES activity for the agreed service scope.
UCLH	All except renal	Based on clinical inpatient and critical care activity including excess bed days and excluding outpatients provided by UCLH. Actual income data was available for part of the 2013/14 financial year, with the remaining year based on forecast.
	Renal	The product of average income per spell (based on 2012/13 HES[48] data and 2013/14 national standard contract tariffs) and full year estimate of 2013/14 HES activity for the agreed service scope.
RFH	HSCT	Based on cost and contribution data provided by RFH.
	Renal and AML	The product of average income per spell (based on 2012/13 HES[48] data and 2013/14 national standard contract tariffs) and full year estimate of 2013/14 HES activity for the agreed service scope.
BHRUT, BCF, HUH, NMUH, PAH, BTUH & Other[49]	All applicable	The product of average income per spell (based on 2012/13 HES[48] data and 2013/14 national standard contract tariffs) and full year estimate of 2013/14 HES activity for the agreed service scope.

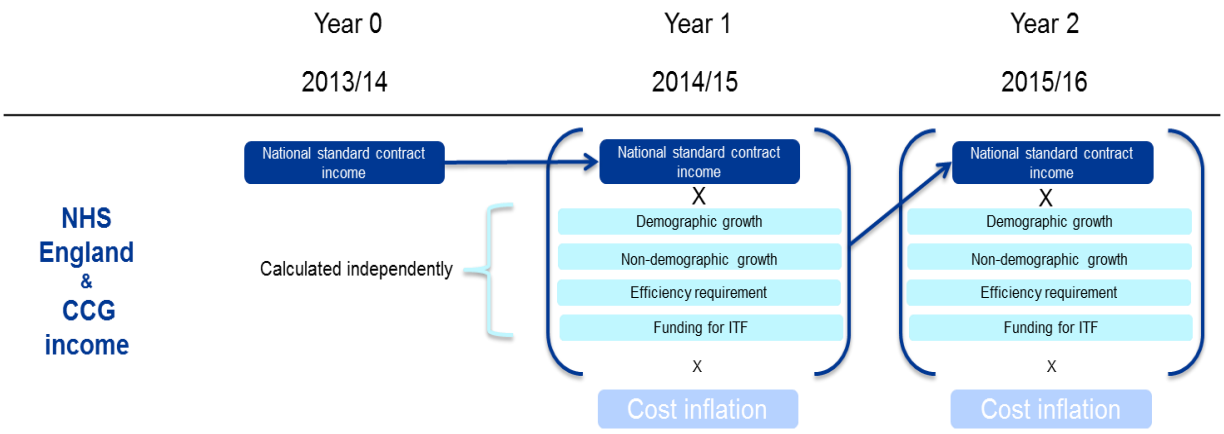
F.3.3 Application of recurrent operational income assumptions

The figure below explains how the assumptions Table F-2 are applied to recurrent operational income inputs (Table F-3) in the financial model. The impact of each

[48] HES data includes the same clinical activity as provided by Trusts with the exception that HES data does not include activity from HES critical care.
[49] The "Other" Provider category is used to account for activity at sites where there were only a small number of relevant spells of activity. These sites have not been identified to avoid the risk of including patient identifiable information.

assumption is calculated in isolation by applying the assumption to the previous year's real income cashflow. For instance, in year 1, to calculate each effect independently, the demographic growth, non-demographic growth, efficiency requirement and funding for ITF assumptions are each individually multiplied by base year national standard contract income. These impacts are then summed together and added to the base year real national standard contract income to obtain the cumulative real impact before multiplying by the applicable inflation factor to obtain nominal income. In the subsequent year (year 2), the real national standard contract income from the previous (year 1) is used as the base on which the assumptions are applied.

Figure F-1 – Application of recurrent operational income assumptions in the cancer model



When services are reconfigured, the income which is transferred from an existing to a new provider needs to be adjusted to reflect the differences in Market Forces Forces[50] (MFF) between providers. The MFFs for each provider are outlined below.

Table F-5 – Market Forces Factors used for income adjustment on income transfer

Provider	Market Forces Factor (2013/14)
Barts Health	1.2128
UCLH	1.2976
RF	1.2465
BHRUT	1.1744
Other	
BCF	1.1973
HUH	1.2052
NMUH	1.2012
PAH	1.1534
BTUH	1.1228
Other[51]	1.2976

[50] The MFFs are used to determine the premium applied to the national standard contract prices to reflect different cost bases at different providers due to different geographical locations.
[51] The MFF of other providers in the model has been assumed to be equivalent to the MFF of UCLH.

F.3.4 Recurrent operational cost inputs

The recurrent operational cost inputs used in the cancer model are outlined in the table below. This table summarises all of the cancer cost inputs used in the financial model. Barts Health and UCLH perform activity in respect of all cancer types whilst all other providers only perform activity in respect of some of the cancer types. Where no number is included, this is because there is no[52] activity in respect of this cancer type for this provider.

[52]Where there are low levels of activity for a particular cancer type and provider these levels of activity have not been included and instead marked at 0. Such spells are instead included in an "Other" category. This grouping is carried out to guard against identification of individual patient data, and is considered to be immaterial versus the specific providers included.

Table F-6 - Forecast 2013/14 clinical costs by cancer type per provider (£000)

		AML	Brain	Bladder	HSCT	Head and Neck	OG	Prostate	Renal	Total
BH	V:	404	490	41	895	1,021	256	34	451	**3,592**
	F:	69	84	9	90	432	128	6	149	**967**
UCLH	V:	2,944	7,364	807	4,544	1,039	675	3,482	113	**20,968**
	F:	740	1,331	250	1,045	283	212	721	37	**4,619**
RF	V:	119	-	-	4,078	-	-	-	976	**5,173**
	F:	29	-	-	1,097	-	-	-	322	**1,448**
BHRUT	V:	81	2,169	289	-	51	242	566	159	**3,557**
	F:	19	390	88	-	18	89	117	53	**774**
BCF	V:	-	-	-	-	309	-	-	135	**444**
	F:	-	-	-	-	107	-	-	45	**152**
HUH	V:	-	-	-	-	22	-	-	-	**22**
	F:	-	-	-	-	8	-	-	-	**8**
NMUH	V:	-	-	-	-	-	-	-	47	**47**
	F:	-	-	-	-	-	-	-	15	**15**
PAH	V:	-	-	-	-	29	-	-	-	**29**
	F:	-	-	-	-	10	-	-	-	**10**
BTUH	V:	-	-	-	-	34	-	-	173	**207**
	F:	-	-	-	-	12	-	-	57	**69**
Other[2]	V:	23	25	-	-	34	-	95	35	**212**
	F:	6	4	-	-	12	-	20	12	**54**
Total		**4,433**	**11,857**	**1,484**	**11,749**	**3,421**	**1,603**	**5,041**	**2,780**	**42,368**

The table below summarises the source and scope of the cost inputs which are included in the table above so to identify where the cost is based on actual data or, where actual data is not available, an estimate based an average margin based on actual data from other providers.

Table F-7 – Source and scope of recurrent operational cost inputs

Provider	Cancer type	Description
BH	All	Based on clinical inpatient and critical care activity including excess bed days and excluding outpatients. First 6 months of FY 2013/14 were provided by BH which were then pro-rated for the full year. This pro-rating was applied to both income and costs therefore any seasonality would have had a minimal impact. Fixed costs include all overheads and PFI expenditure except those costs that are related to outpatient treatments and non PTI (patient treatment income). Variable costs are all other costs excluding outpatient and non PTI.
UCLH	All except renal	Based on clinical inpatient and critical care activity including excess bed days and excluding outpatients. Costs for first 6 months of 2013/14 were provided by UCLH which were pro-rated for whole year. Fixed costs calculated as 93% of all overhead costs. Variable costs include all direct costs plus 7% of overhead costs.
	Renal	For both fixed and variable, the cost figures are calculated by application of a margin to the operational income. The margin is same as the fixed/variable margin for Barts Health.
RFH	HSCT	Clinical costs provided by RFH.
	Renal	For both fixed and variable, the cost figures are calculated by application of a margin to the operational income. The margin is same as the fixed/variable margin for Barts Health.
	AML	For both fixed and variable, the cost figures are calculated by application of a margin to the operational income. The margin is same as the average fixed/variable margin for Barts Health and UCLH
Other providers Error! Bookmark not defined.	All applicable excluding Renal	For both fixed and variable, the cost figures are calculated by application of a margin to the operational income. The margin is same as the average fixed/variable margin for Barts Health and UCLH.
Other providers	Renal	For both fixed and variable, the cost figures are calculated by application of a margin to the operational income. The margin is same as the fixed/variable margin for Barts Health.

F.3.5 Recurrent operational cost assumptions

As outlined in Table F-8, for the purposes of carrying out the financial impact analysis recurrent operational costs were categorised as either fixed or variable.

Table F-8 - Cost categories

Cost category	Factors used in assessing	Treatment of cost in financial analysis
Fixed	Fixed costs include overheads, estates, financing costs and other costs that do not vary according to the level of activity.	Fixed costs are assumed to be lost from the system where activity is lost. Fixed costs reduce to nil according to a profile over 4 years.
Variable	Variable costs vary in the short or medium term when the level of activity changes.	In the model, variable costs are assumed to transfer with activity.

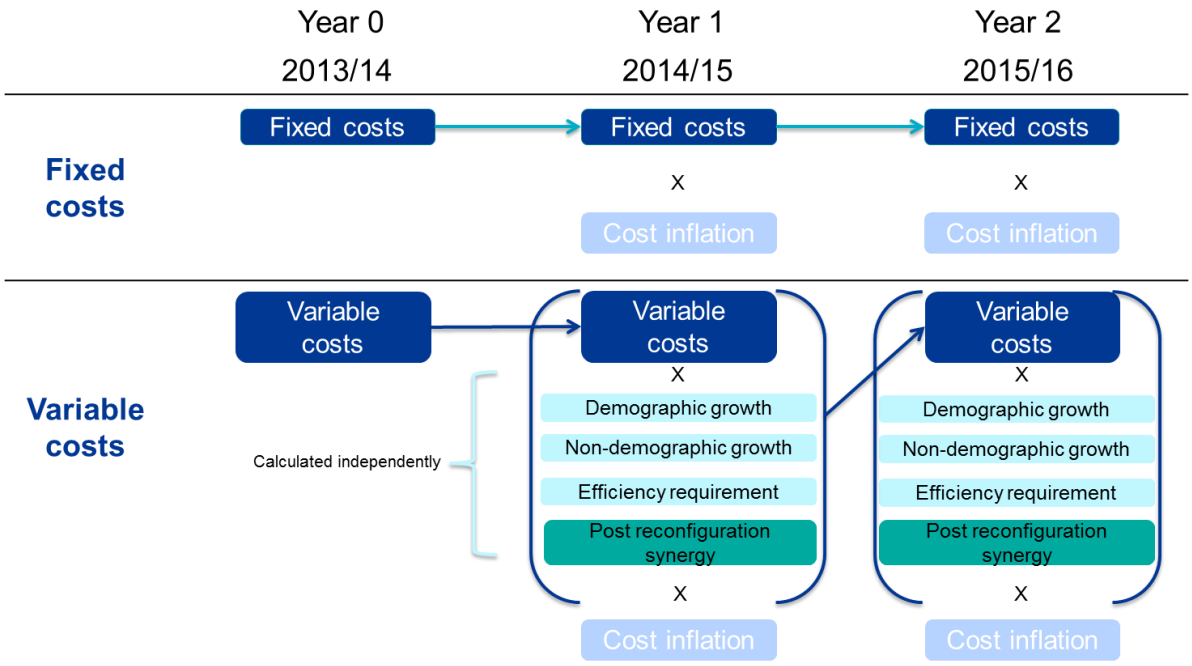
See Appendix G for a sensitivity of the NPV on the split between fixed and variable costs.

The figure below explains how the assumptions in Table F-2 are applied to recurrent operational costs in the model.

- Fixed costs in the model are assumed to increase by cost inflation in each year. In each period, the nominal fixed cost value is obtained by multiplying the real fixed cost base by the inflation factor.

- For variable costs, the impact of each assumption is calculated in isolation by applying the assumption to the previous year's real variable costs. For instance, in year 1, to calculate each effect independently, the demographic growth, non-demographic growth, efficiency requirement and synergy assumptions are each individually multiplied by base year variable costs. These impacts are then summed together and added to the base year real variable cost to obtain the cumulative real impact before multiplying by the applicable inflation factor to obtain nominal variable cost. In the subsequent year (year 2), the real variable cost from the previous (year 1) is used as the base on which the assumptions are applied.

Figure F-2 – Application of recurrent operational cost assumptions in the cancer model



Post-reconfiguration synergies

As the recipients of most transferring activity, UCLH and the RFH have undertaken a high level assessment to estimate the extent of variable cost savings (for each cancer type) that could be achieved through post-reconfiguration synergies.

The process by which the synergy assumptions were formed included running workshops for each cancer type where clinicians were given the opportunity to share their experience and views to identify appropriate discount areas where synergies may arise. The Finance Working Group converted the outputs of the clinical workshops into prudent synergy assumptions and the providers have agreed these assumptions through discussion at the Finance Steering Group. The level and rationale for the level of synergies for each cancer type is shown in the table below. No post reconfiguration synergies were modelled for the transfer of brain, bladder, prostate or OG activity.

Table F-9 - Synergy saving applied to specialist cancer services

Activity Type	Potential Rationale for Financial Synergy	Synergy applied to variable cost base
AML	• Supports best practice mix of laparoscopies; implementation of robotic surgery; • more standardisation and better pathways (both design and choice of pathway) due to consolidation; • procurement scale leading to savings; • extra scale helps attract clinical trials, providing free drugs to participating patients.	**UCLH** Year 1[53]: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%
Brain	• Potential benefits are limited by the volume being consolidated	N/A
Bladder	• Potential benefits are limited by the volume being consolidated	N/A
HSCT	• More effective coordination of support activities; • More integrated pathway, reducing costs such as number of chemotherapy treatments required.	**UCLH** Year 1: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%
Head and Neck	• Extra scale helps to support staff skills and enhanced recovery programmes. Expected considerable payoff from any reduction in complications and associated follow-up activity; • more effective investigation pathway.	**UCLH** Year 1: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%
OG	• Some benefits, but some are limited by consolidation onto two sites, and others require further investment to implement (e.g. enhanced recovery programmes) and so do not have clear financial benefits	N/A
Prostate	• Potential benefits, but limited by volume being consolidated	N/A
Renal	• Ability to deliver appropriate pathway across NE London and best practice mix of laparoscopic vs open (shorter length of stay and better recovery times). Facilitated by access to robotic surgery. • procurement scale leading to savings; • extra scale helps attract clinical trials, providing free drugs to participating patients.	**RFH** Year 1: 2014/15 – 0% Year 2: 2015/16 - 2% Year 3: 2016/17 – 3% Year 4: 2017/18 – 3% Year 5: 2018/19 – 3% Year 6 onwards: 2019/20 – 4%

[53] Pre-reconfiguration year

Where providers other than UCLH and RFH are the recipient of AML, HSCT, head and neck, and renal, a post reconfiguration synergy percentage is not applied due to low volumes transferring.

Stranded costs

The fixed costs for providers losing activity is stranded over the course of the first few years of the transfer based on a weighted average of the stranding for each of the individual fixed cost elements. Fixed costs may include utilities, rent and rates, insurance, and other contracted services such as maintenance or transportation costs and other costs that do not vary according to the level of activity. These costs would not transfer to a new provider on reconfiguration. As activity transfers out, the requirement for some or all of these services may decrease and therefore there is an opportunity for the provider to scale down their services, and associated costs, to reflect their new activity levels and requirements.

In the majority of cases, the providers are not able to eliminate fixed costs immediately on transition. For example; services may be under contract or assets being leased, which would result in the provider having to renegotiate or cancel the contract or lease, leading to time delay and potential contract breakage costs. For this reason fixed costs are assumed to be phased out over a number of years, as shown in the table below.

Table F-10 - Stranded costs for providers losing cancer activity

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20 onwards
Stranded cost (%)	100.00%[54]	75.00%	62.50%	37.50%	12.50%	0.00%

[54] Pre-reconfiguration year

F.3.6 Other recurrent cashflows inputs and assumptions

The tables below sets out the detailed assumptions used to calculate the additional contribution included in the cancer model which is entirely additional to the north and east London and west Essex cancer system (including inter-system transfers).

Table F-11 –– Other recurrent cashflows assumptions which impacts both the system NPV and the providers' affordability

Additional Contribution	Purpose	Year	1	2	3	4	5	6	7	8	9	10>
		Fin. Yr.	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Research, development & education	To reflect the increase in contribution to the north and east London and west Essex cancer system due to creation of a world class cancer system [55]	% of cancer income	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
		Contribution:	0.00%	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Private patient activity		% of cancer income	0.00%	0.00%	0.00%	0.00%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%
		Contribution:	0.00%	0.00%	0.00%	0.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%

Table F-12 – Other recurrent cashflows inputs which impact only the system NPV (£000) (nominal)

Additional Contribution/ Purpose	Year	1	2	3	4	5	6	7	8	9	10 >
	Fin. Yr.	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Void space/ The void contribution reflects the additional contribution from the space that is considered surplus in the north and east London and west Essex cancer system due to specialist activity transferring to UCLH after the reconfiguration. This space is available to generate an incremental contribution.[56]	Contribution	0	346	692	721	751	781	781	781	781	781

[55] The project team should continue to give consideration to the level of incremental research, development and education and private patient income from the reconfiguration as current assumptions are considered prudent.

[56] Further work is required to review the void contribution assumptions regarding generating contribution from surplus bed capacity as a result of the cancer reconfiguration as current assumptions are considered to be prudent.

F.4 Cardiovascular model - inputs & assumptions

This section outlines the key inputs and assumptions in the cardiovascular model. The key input to the financial model is income and costs for Barts Health and UCLH. The key baseline data is detailed in this section, along with the assumptions applied to the cashflows in the model.

F.4.1 Recurrent operational cashflow assumptions

The tables below sets out the detailed assumptions applied to recurrent operational income and costs in the cardiovascular model.

Table F-13 - Recurrent operational cashflow assumptions

Recurrent operational income and cost assumptions	Purpose	Year	1	2	3	4	5	6	7	8	9	10 onwards
		Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
GROWTH ASSUMPTIONS												
Demographic growth	To reflect changes in population based on a blended average of the ONS 2011 data for the local authorities associated with the 2012/13 cancer/cardiac activity.		1.56%	1.49%	1.41%	1.35%	1.30%	1.25%	1.20%	1.15%	1.10%	1.05%
Non demographic growth	To reflect the level of projected growth attributable to non-demographic factors based on a 50%:50% blended rate of London Region Planning assumptions for specialist commissioning and non-specialist commissioning. [57]		3.15%	3.15%	3.15%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%	3.25%
Demand management	A reduction in demand due to the ability to prevent: - referrals due to better prevention or alternative treatments; -multiple treatment spells by better clinical outcomes on the first treatment		(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%	(1.00)%

[57]Appendix G includes a sensitivity to quantify the impact of using the specialist commissioning or non-specialist non-demographic assumption instead of the blended rate.

Recurrent operational income and cost assumptions	Purpose	Year	1	2	3	4	5	6	7	8	9	10 onwards
		Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Tariff deflator (applied to income)	Comprising of two components which drive operational income.											
i) efficiency requirement[58]	To reflect the year on year cost savings required from providers. The efficiency requirement portion of the tariff deflator is only applied to clinical income.	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%	(4.00)%
ii) cost inflation	To reflect secondary health cost inflation. Applied to both clinical and non-clinical income.	2.20%	2.20%	3.00%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%
Cost assumptions	Comprising of same two components as the tariff deflator but the actual assumptions are slightly different.											
i) efficiency requirement[58]	To reflect the year on year cost savings required from providers. Applied to variable costs.	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%	(3.36)%
ii) cost inflation	To reflect secondary health cost inflation. Applied to both fixed and variable costs.	2.20%	2.20%	3.00%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%

[58]The full efficiency requirement is applied to clinical income but not non-clinical income (which includes drugs, devices and pass-throughs)

Recurrent operational income and cost assumptions	Purpose	Year	1	2	3	4	5	6	7	8	9	10 onwards
		Fin. Yr	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Funding for Integration Transformation Fund (ITF)												
Impact on commissioner income	To account for a reduction in commissioner budgets due to integrated care pathways. This reduction is applied to commissioner income based on the London Region Planning assumptions (FY2014/15: (0.3)%; FY2015/16: (3.0)%). It is assumed that 50% of the ITF impact is passed onto the providers through a reduction in income paid to providers (which represents a reduction in the commissioner cost base) – see below. The net impact of the ITF assumption on commissioner is therefore a reduction in contribution margin. (FY2014/15: (0.15)%; FY2015/16: (1.5)%).		(0.30)%	(3.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Impact on commissioner cost			(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Net commissioner position			(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%
Impact on provider income	An element (50%) of the reduction in commissioner budgets due to the change in ITF funding is shared with the providers through a reduction in the income they receive from commissioners. This reduction is equal to 50% of the London region planning assumptions (assumption: FY2014/15: (0.15)%; FY2015/16: (1.5)%). It is assumed that the ITF does not result in a reduction in the provider cost base.		(0.15)%	(1.50)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%	(0.00)%

F.4.2 Recurrent operational income inputs

The recurrent operational income inputs used in the cardiovascular model are outlined in Table F-14. Unlike for cancer, both clinical and non-clinical income and costs are included in the cardiovascular model. Given that all activity currently undertaken at the Heart Hospital, with the exception of thoracic activity, is assumed to transfer out of UCLH, non-clinical income is also assumed to transfer as part of the reconfiguration.

Table F-14 - Forecast 2013/14 clinical and non-clinical income per provider (£000)

	Clinical Income	Clinical Income	Non-clinical income	Total
Commissioned by:	CCG	NHSE	Other	
Barts Health	45,950	28,436	14,891	**89,277**
UCLH (Heart Hospital)	14,683	34,343	18,251	**67,277**
Total	**60,632**	**62,779**	**33,142**	**156,553**

The table below summarises the source and scope of the income inputs for both UCLH and Barts Health which are included in the table above.

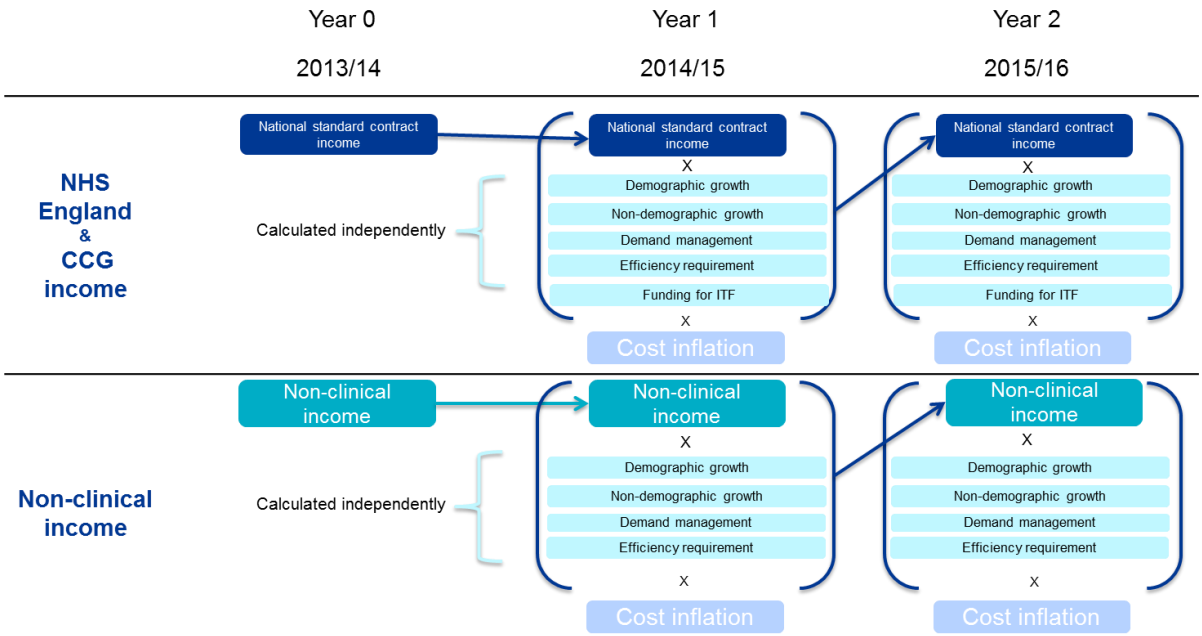
Table F-15 - Source and scope of income inputs

Provider	Description
BH	Barts Health provided the entire income for Barts Health Cardiovascular Services for the first six months of 2013/14. This was multiplied by two to estimate for a full year. This pro-rating was applied to both income and costs therefore any seasonality would have had a minimal impact. The cardiovascular income and cost data for Barts Health has been included in the analysis as the synergy benefit applied to the variable cost base needs to include the entirety of the new Barts Health cost base, including the variable costs gained from UCLH, and the existing Barts Health cost base.
UCLH	UCLH provided income data comprising of actual income data for the available part of the 2013/14 financial year and forecasts for the remaining part of the year. All activity currently undertaken at the Heart Hospital, with the exception of thoracic activity, is assumed to transfer out of UCLH. 87% of this activity is cardiovascular, with some non-cardiovascular activity included, for patients with congenital conditions requiring specialist supervision.

F.4.3 Application of recurrent operational income assumptions

The figure below explains how the assumptions in Table F-13 are applied to recurrent operational income inputs (Table F-14) in the financial model. The impact of each assumption is calculated in isolation by applying the assumption to the previous year's real income cashflow. For instance, in year 1, to calculate each effect independently, the demographic growth, non-demographic growth, efficiency requirement and funding for ITF assumptions are each individually multiplied by base year income. These impacts are then summed together and added to the base year real income to obtain the cumulative real impact before multiplying by the applicable inflation factor to obtain nominal income. In the subsequent year (year 2), the real income from the previous (year 1) is used as the base on which the assumptions are applied.

Figure F-3 – Application of recurrent operational income assumptions in the cardiovascular model



When services are reconfigured, the income which is transferred from UCLH to Barts Health needs to be adjusted to reflect the differences in MFF factors between the two providers. The MFFs for each provider are outlined below.

Table F-16 - MFF factors used for income adjustment on income transfer

Provider	MFF Factor (2013/14)
Barts Health	1.2128
UCLH	1.2976
Other[59]	1.0000

[59] When services are reconfigured, 5% of UCLH activity is lost to other providers in the system. As the provider is unknown, the MFF has been rebased to 1.00.

F.4.4 Recurrent operational cost inputs

The recurrent operational cost inputs used in the cardiovascular model are outlined in Table F-17.

Table F-17 - Forecast 2013/14 of the combination of clinical and non-clinical costs per provider (£000)

		Pay	Non-pay	Overheads	Total
BH	V:	45,503	20,794	4,144	**70,441**
	F:	0	0	30,663	**30,663**
UCLH	V:	26,837	19,465	1,231	**47,533**
	F:	0	0	5,808	**5,808**
Total		**72,340**	**40,259**	**41,846**	**154,445**

The table below summarises the source and scope of the cost inputs which are included in the table above.

Table F-18 - Source and scope of recurrent operational cost inputs

Provider	Description
BH	Figures for the first six months of FY2013/14 were provided by Barts Health for all inpatient costs including pay, non-pay and overheads. These were multiplied by two to give an annual estimate of cost. This pro-rating was applied to both income and costs therefore any seasonality would have had a minimal impact.
UCLH	Figures were provided by UCLH for all pay, non-pay and overhead costs relating to the Heart Hospital. These are based on forecast outturn for FY13/14 based on months 1 – 8.

Barts Health incurs additional fixed costs to support the new cardiovascular activity they receive from UCLH. These costs are incurred above the "do nothing" scenario where the Chest Hospital is incorporated into the Barts Health PFI site at West Smithfield and are due to the quantum of additional activity received from the Heart Hospital. Table F-19 shows the stepped increase in Barts Health fixed costs. The breakdown of these additional costs when fully incurred in 2016/17 is shown in Table F-20.

Table F-19 - Additional fixed costs for Barts Health (£000) (real at 2013/14)

	1	2	3	4
	2013/14	2014/15	2015/16	2016/17
Total additional fixed costs	(228)	1,259	7,248	7,212

Table F-20 - Additional fixed cost breakdown for Barts Health (£000) (real at 2013/14)

	Incremental cost (2016/17)
Fixed costs	
Buildings maintenance charge[60]	2,389
Public dividend capital	1,154
Corporate overheads	586
Facilities cost allocation	87
Premises, fixed plant and leasing	1,303
Other fixed costs	1,692
Total	**7,212**

[60] This figure is replaced by lifecycle charges in the NPV calculation (See Table F-22)

F.4.5 Treatment of depreciation and capital charges (fixed costs)

UCLH

- To reflect that depreciation is a charge incurred by UCLH in their Income and Expenditure account, the UCLH depreciation charge has been included in the affordability calculation. This is a cost to the provider for the eventual replacement of capital. As lifecycle costs are included in the system NPV as an expense to the cashflow, including depreciation in the system NPV in addition to this would be a duplication of this cost.
- To reflect the actual lifecycle and maintenance costs of the Heart Hospital in the "do nothing" scenario[61], UCLH has provided capital charge figures for the full 34 years modelled. It is assumed that no capital charge will be incurred in the "do nothing" scenario, due to no lifecycle maintenance relating to Heart Hospital activity being carried out, as the building will no longer be used for this purpose. The impact of the difference in the actual lifecycle and maintenance costs is considered to be a system benefit rather than specific to UCLH, therefore, it is only reflected in the system NPV.

Table F-21 - UCLH depreciation and lifecycle costs for the Heart Hospital (£000) (real at 2013/14)

ULCH charges	Purpose	Year	0	1	2	3	4	5	6	7	8	9	10
		Fin. Yr	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
UCLH Depreciation ("do nothing" option)	Base year depreciation on buildings and non-buildings to be included in affordability but not in the system NPV.		1,523	1,523	1,523	1,523	1,523	1,523	1,523	1,523	1,523	1,523	1,523
UCLH Depreciation ("preferred" option)	This is the stranded element of depreciation on buildings and non-buildings to be included in affordability but not in the system NPV.		1,523	1,523	1,396	1,015	634	254	-	-	-	-	-
UCLH Capital Charge for the Heart Hospital	To reflect maintenance and lifecycle costs of the Heart Hospital in the "do nothing" scenario. The profile of capex lifecycle / maintenance spend was provided by UCLH for the "do nothing" scenario based on the UCLH depreciation charge. This is to be included in the NPV.		-	1,112	278	1,112	6,117	834	834	1,390	1,112	5,005	1,112

[61] Only 10 years of the capital charge are shown

Barts Health

- Incremental depreciation charge on buildings and equipment has been included in the affordability calculation to reflect that depreciation is a charge incurred by Barts Health in their Income and Expenditure account. It is not included in the system NPV

- To reflect the actual lifecycle and maintenance in the "preferred" scenario, Barts Health has provided capital charge figures for the full 34 years modelled. The impact of the difference in the actual lifecycle and maintenance costs is considered to impact the system rather than specific to Barts, therefore, it is only reflected in the system NPV.

Table F-22 - Barts Health incremental depreciation and lifecycle costs

(£000, real)	Purpose	Incremental depreciation / lifecycle cost	Frequency of charge
Additional Barts Health depreciation (Buildings)	Incremental depreciation on buildings. Added to additional Barts Health fixed costs in affordability but not in the system NPV.	335	Every year from 2015/16
Additional Barts Health depreciation (Equipment)	Incremental depreciation on equipment. Added to the additional Barts Health fixed costs in affordability but not in the system NPV.	2,054	Every year from 2015/16
Barts Health Buildings lifecycle	Incremental lifecycle costs on buildings to be added to the additional Barts Health fixed costs in the NPV.	2,000	Every 5 years from 2019/20
Barts Health equipment lifecycle (Items replaced every 7 years)	Incremental lifecycle costs on equipment to be added to the additional Barts Health fixed costs in the NPV.	14,992	Every 7 years from 2022/23
Barts Health equipment lifecycle (Items replaced every 10 years)	Incremental lifecycle costs on equipment to be added to the additional Barts Health fixed costs in the NPV.	683	Every 10 years from 2025/26

F.4.6 Recurrent operational cost assumptions

For the purposes of carrying out the financial impact analysis recurrent operational costs were categorised as either fixed or variable:

Table F-23 - Cost categories

Cost category	Factors used in assessing	Treatment of cost in financial analysis
Fixed	Fixed costs include overheads, estates, financing costs and other costs that do not vary according to the level of activity	Fixed costs are assumed to be lost from the system where activity is lost. Fixed costs reduce to nil according to a profile over 4 years.
Variable	Variable costs vary in the short or medium term when the level of activity changes	Variable costs are assumed by the model to transfer with activity

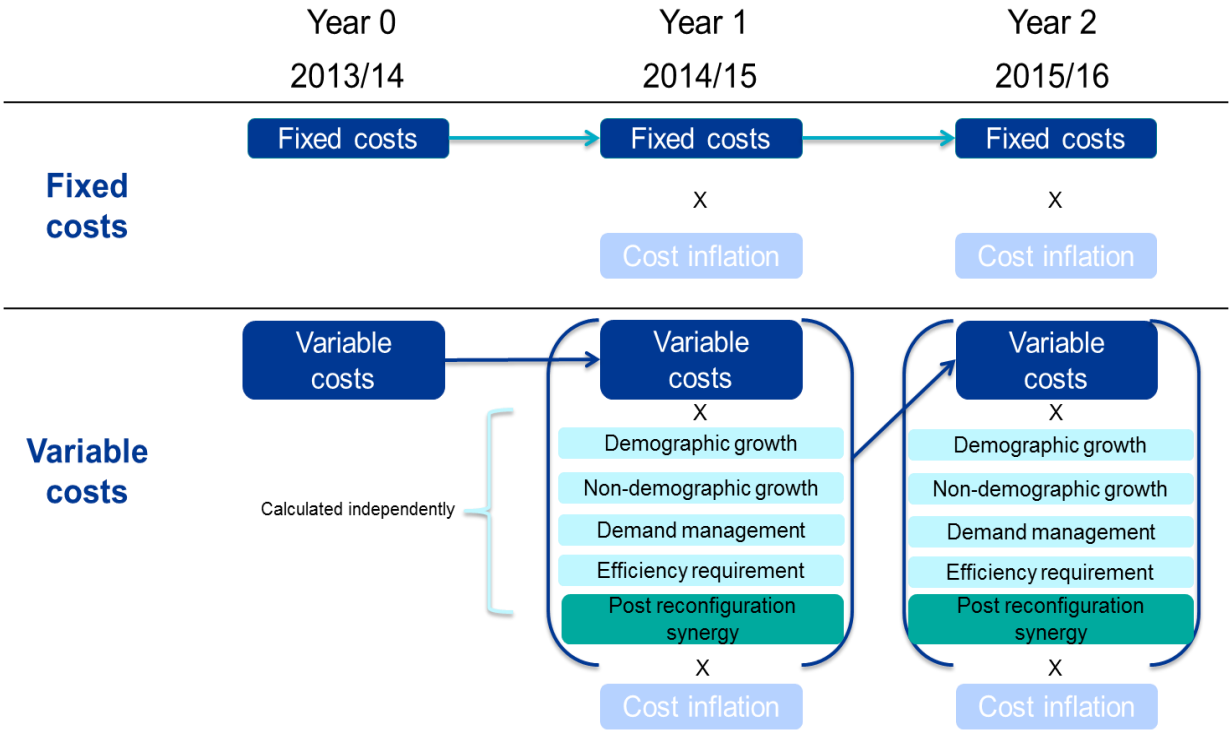
See Appendix F for a sensitivity of the NPV on the split between fixed and variable costs.

The figure below explains how the assumptions in Table F-13 are applied to recurrent operational costs in the model.

- Fixed costs in the model are assumed to increase by cost inflation in each year. In each period, the nominal fixed cost value is obtained by multiplying the real fixed cost base by the inflation factor.

- For variable costs, the impact of each assumption is calculated in isolation by applying the assumption to the previous year's real variable costs. For instance, in year 1, to calculate each effect independently, the demographic growth, non-demographic growth, efficiency requirement and synergy assumptions are each individually multiplied by base year variable costs. These impacts are then summed together and added to the base year real variable cost to obtain the cumulative real impact before multiplying by the applicable inflation factor to obtain nominal variable cost. In the subsequent year (year 2), the real variable cost from the previous (year 1) is used as the base on which the assumptions are applied.

Figure F-4 – Application of recurrent operational cost assumptions



Post-reconfiguration synergies

Variable costs at Barts Health benefit from a downward adjustment on transfer of variable costs from UCLH to reflect that there are savings to be achieved through consolidation of the cardiovascular activity, known as post reconfiguration synergies. The set of synergy assumptions has been developed with the input of clinicians (through a series of workshops) and from a governance perspective were agreed through discussion at the Finance Working Group and Finance Steering Group meetings.

The potential rationale for the synergy savings applied to variable costs relating to cardiovascular activity is as follows:

- Increased scale will provide development opportunities for staff and resilience in rotas, which should help staff retention and reduce the need for agency staff
- Volumes will also support both 7 day working and the availability of specialists to authorise discharge which should provide small length of stay reductions
- Some potential benefits from specialisation in support services and staff.

These potential areas for achieving synergies have been converted into prudent synergy assumptions. A post reconfiguration synergy of 4% (phased from 2% to 4% over five years) was applied for services transferring to Barts Health, as shown in the table below.

Table F-24 – Synergy saving applied to cardiovascular services

Post reconfiguration synergy %	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20 Onwards
Year on year %	2%	0%	1%	0%	0%	1% (in 2019/20)
Cumulative %	2%	2%	3%	3%	3%	4%

Stranded costs

The fixed costs for providers losing activity is stranded over the course of the first few years of the transfer based on a weighted average of the stranding for each of the individual fixed cost elements. As a result of activity transferring out of the Heart Hospital, UCLH is able to generate savings through reductions to their fixed cost base. As UCLH are not able to eliminate fixed costs immediately as at the date of reconfiguration, fixed costs are phased out over a number of years. Fixed costs include overheads, estates, financing costs and other costs that do not vary according to the level of activity. It is anticipated that these fixed costs will be reallocated to other services outside of cancer and cardiovascular as a result of the reconfiguration if they are not lost entirely. It is recognised these fixed costs will not be completely reabsorbed at the date of reconfiguration, resulting in stranded costs.

Table F-25 - Stranded costs for UCLH who are losing cardiovascular activity

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20 onwards
Stranded cost %	100.00%	88.04%	52.29%	21.83%	5.50%	0.00%

There is a small decrease in the existing Barts Health fixed cost base, despite being the recipient of cardiovascular activity, due a rental cost included in their 2013/14 baseline cost no longer being incurred following the reconfiguration. On transfer, additional fixed costs are incurred at Barts Health to incorporate the Heart Hospital which more than outweighs the removal of this element of rental expenditure.

Table F-26 - Stranded costs for Barts Health

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20 onwards
Stranded cost %	99.93%	99.90%	99.83%	99.78%	99.78%	99.78%

F.4.7 Other recurrent cashflows inputs and assumptions

The tables below sets out the detailed assumptions used to calculate the additional contribution included in the cardiovascular model which is entirely additional to the existing UCLH and Barts Health system.

Table F-27 – Other recurrent cashflows assumptions which impacts both the system NPV and the providers' affordability

Additional Contribution	Purpose		1	2	3	4	5	6	7	8	9	10 onwards
			2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Research, development & education	To reflect the increase in contribution to the north and east London and west Essex cancer system due to creation of a world class cancer system [62]	Income (% of cancer income[63]):	0.00%	0.00%	0.00%	0.00%	0.31%	0.31%	0.31%	0.31%	0.31%	0.31%
		Contribution:	0.00%	0.00%	0.00%	0.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Private patient activity		Contribution (£000) (nominal)	0	0	538	538	538	538	538	538	538	538
Void space	As activity is transferred out of the Heart Hospital the space can be utilised by UCLH for other revenue generating activities.	Additional general activity (£000) (nominal)	85	254	254	254	254	254	254	254	254	254

[62] The project team should continue to give consideration to the level of incremental research, development and education and private patient income from the reconfiguration as current assumptions are considered prudent

[63] This is applied to nominal clinical and non-clinical income within the scope of the model, net of the effect of demand management and the efficiency requirement

Table F-28 – Other recurrent cashflows inputs which impact only the system NPV (£000) (nominal)

Additional Contribution	Purpose		1	2	3	4	5	6	7	8	9	10 onwards
			2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Void contribution	As activity is transferred out of the Heart Hospital the space can be utilised by UCLH for other revenue generating activities. The void contribution reflects the additional contribution from the space that is considered surplus in the Heart Hospital after taking into account the usage of the proposed specialist cancer reconfiguration and other potential cancer uses[64].	Additional cancer activity (not included in the affordability calculations)	237	711	711	711	711	711	711	711	711	711

[64] Further work is required to review the void contribution assumptions regarding generating contribution from surplus bed capacity as a result of the cardiovascular reconfiguration as current assumptions are considered to be prudent.

G Appendix – Financial sensitivity analysis

The NPV benefit of £94.2m is based on the input data and assumptions set out in Appendix D. To demonstrate the sensitivity of a number of the key assumptions we have set out a number of scenarios to allow an understanding of the impact on the system NPV should these assumptions change.

Table G-1 – Sensitivity table (£000)

	Base assumption		Cancer		Cardiovascular		Total	
	Cancer	Cardiovascular	NPV	*Movement on base*	NPV	*Movement on base*	NPV	*Movement on base*
Base NPV			**64,063**	**-**	**30,108**	-	**94,171**	**-**
Post reconfiguration synergy %	**2015/16: 2% 2016/17: 3% 2019/20: 4%**	**2014/15: 2% 2016/17: 3% 2019/20: 4%**						
Delay to current synergies % by 1 year			63,672	*-391*	27,366	*-2,743*	**91,038**	***-3,134***
Increase in current synergy %'s by 1%			67,443	*3,381*	56,456	*26,348*	**123,899**	***29,729***
Decrease in current synergy %'s by 1%			60,682	*-3,381*	3,760	*-26,348*	**64,442**	***-29,729***
Additional fixed costs	-	**7,212 p.a. (£000 real)**						
Increase in additional fixed costs by 10%			-	-	14,087	*-16,021*	**14,087**	***-16,021***
Increase in additional fixed costs by 10%			-	-	46,129	*16,021*	**46,129**	***16,021***
Year on year efficiency requirement	**-4.00%**	**-3.36%**						
Increase in efficiency requirement by 1%			62,142	*-1,921*	15,874	*-14,234*	**78,016**	***-16,155***
Decrease in efficiency requirement by 1%			66,416	*2,353*	47,514	*17,406*	**113,930**	***19,759***

	Base assumption		Cancer		Cardiovascular		Total	
	Cancer	**Cardiovascular**	**NPV**	***Movement on base***	**NPV**	***Movement on base***	**NPV**	***Movement on base***
Private patient and research, development and education	**RD&E = 1% of income, 20% contribution from 2018/19** **PP: 2018/19 = 5% of income which increases 1% per annum until 2023/24 onwards when 10%, 23% contribution**	**RD&E = 0.31% of income, 25% contribution from 2018/19** **PP = £538.1k (real) contribution per annum from 2016/17**						
Increase in RD&E income by 10% per annum			64,152	*89*	30,325	*217*	**94,477**	***306***
Decrease in RD&E income by 10% per annum			63,973	*-90*	29,892	*-216*	**93,865**	***-306***
Increase in PP income by 10% per annum			65,027	*964*	30,829	*721*	**95,856**	***1,685***
Decrease in PP income by 10% per annum			63,099	*-964*	29,388	*-720*	**92,486**	***-1,685***
Non-demographic growth	**Years 1 - 3: 3.15%** **Year 4 onwards: 3.25%**	**Years 1 - 3: 3.15%** **Year 4 onwards: 3.25%**						
Increase in non-demographic growth to specialist rate	Y1: 3.90% Y2: 4.00% Y3: 4.10% Y4 onwards: 4.30%	Y1: 3.90% Y2: 4.00% Y3: 4.10% Y4 onwards: 4.30%	68,745	*4,682*	48,454	*18,346*	**117,198**	***23,027***
Decrease in non-demographic growth to non-specialist rate	Y1: 2.40% Y2: 2.30% Y3 onwards: 2.20%	Y1: 2.40% Y2: 2.30% Y3 onwards: 2.20%	60,289	*-3,774*	15,221	*-14,887*	**75,510**	***-18,661***

	Base assumption		Cancer		Cardiovascular		Total	
	Cancer	Cardiovascular	NPV	*Movement on base*	NPV	*Movement on base*	NPV	*Movement on base*
Fixed/variable cost split								
10% Fixed costs moved to Variable costs			59,268	*-4,795*	23,886	*-6,222*	**83,154**	***-11,017***
10% Variable costs moved to Fixed costs			80,551	*16,488*	121,189	*91,081*	**201,740**	***107,569***
Void contribution: London cancer activity	**Beds: 20 Income per bed: £497k Contribution margin: 8.0%**							
Reduction in number of beds by 5 from 20 to 15			61,310	*-2,753*	30,108	*0*	**91,418**	***-2,753***
Increase in income per bed by 10% to £547k p.a.			65,125	*1,062*	30,108	*0*	**95,233**	***1,062***
Increase in contribution per bed to 9%			65,391	*1,328*	30,108	*0*	**95,499**	***1,328***
Void contribution: Additional specialist cancer activity at the Heart Hospital		**Beds: 18 Income per bed: £497k Contribution margin: 8.0%**						
Reduction in number of beds by 5 from 18 to 13			64,063	*0*	27,204	*-2,904*	**91,267**	***-2,904***
Increase in income per bed by 10% to £547k p.a.			64,063	*0*	31,147	*1,039*	**95,210**	***1,039***
Increase in contribution per bed to 9%			64,063	*0*	31,406	*1,298*	**95,469**	***1,298***
Void contribution: Additional non specialist activity at the Heart Hospital		**Beds: 15 Income per bed: £497k Contribution margin: 3.4%**						
Reduction in number of beds by 5 from 15 to 10			64,063	*0*	28,876	*-1,232*	**92,939**	***-1,232***

	Base assumption		Cancer		Cardiovascular		Total	
	Cancer	**Cardiovascular**	**NPV**	***Movement on base***	**NPV**	***Movement on base***	**NPV**	***Movement on base***
Increase in income per bed by 10% to £547k p.a.			64,063	*0*	30,480	*372*	**94,543**	***372***
Increase in contribution per bed to 4.4%			64,063	*0*	31,203	*1,095*	**95,266**	***1,095***
Transition costs	**24,542 (£000 nominal)**	**66,251 (£000 nominal)**						
Increase in transition costs by 20%			59,721	*-4,341*	18,017	*-12,092*	**77,738**	***-16,433***
Decrease in transition costs by 20%			68,404	*4,341*	42,200	*12,092*	**110,604**	***16,433***
Implementation costs (excluding capital costs)	**11,685 (£000 nominal)**	**17,251 (£000 nominal)**						
Increase in transition costs by 20%			62,017	*-2,046*	27,072	*-3,036*	**89,089**	***-5,082***
Decrease in transition costs by 20%			66,108	*2,045*	33,144	*3,036*	**99,252**	***5,081***
Capital costs	**12,557[65] (£000 nominal)**	**49,000 (£000 nominal)**						
Increase in capital costs of 10%			62,915	*-1,148*	25,581	-4,528	**88,496**	***-5,676***
Removal of contingency and optimism bias			66,091	*2,028*	32,872	2,763	**98,963**	***4,791***
Combined downside scenario								
- Decrease in current post reconfiguration synergy by 1% - increase in additional fixed costs by 10% - increase in year on year efficiency requirement by 1% - increase in transition costs by 20% - decrease in RD&E and PP income by 10%	See above	See above	53,846	*-10,217*	-35,964	*-66,072*	**17,882**	**-76,289**

[65] UCLH capital expenditure only

Table G-2 – Breakeven analysis (£000)

	Cancer			Cardiovascular		
	Breakeven scenario	***NPV***	***Movement***	**Breakeven scenario**	***NPV***	***Movement***
Base NPV	64,063	-		30,108	-	
Post reconfiguration synergy %						
Delay to current synergies	Elimination of all synergy savings still results in a positive NPV, as follows:	*50,975*	*-13,088*	Synergy savings moved back to: 2% in 2022/23, 3% Cumulative in 2024/25 4% Cumulative from 2027/28 onwards.	*-68*	*-30,176*
Decrease in current synergy				Decrease in current synergy percentages by 0.41% in 2014/15, 2016/17 and 2019/20. Cumulative reduction from 2019/20 is 2.76%.	*0*	*-30,108*
Additional fixed costs						
Increase in additional fixed costs		-	-	Increase of 18.79% in recurring fixed costs is breakeven point, giving the following NPV:	*0*	*-30,108*
Year on year efficiency requirement						
Increase in efficiency requirement	Cost efficiency of 100%[66]	*50,982*	*-13,081*	Increase in current cost efficiency % by 2.43% to 5.79%.	*-198*	*-30,306*

[66] An increase in the cost efficiency of 100% removes the variable costs base entirely. The efficiency requirement only affects the variable cost base, therefore it is only the post-reconfiguration synergy element of the NPV which is affected. As the synergy benefit is only £13.1m of the NPV, this is the maximum reduction possible from an increase in the efficiency requirement.

	Cancer			Cardiovascular		
	Breakeven scenario	***NPV***	***Movement***	**Breakeven scenario**	***NPV***	***Movement***
Private patient and research, development and education						
Decrease in RD&E income	Elimination of all RD&E income still results in a positive NPV.	*63,169*	*-894*	Elimination of all RD&E income still results in a positive NPV.	*27,945*	*-2,163*
Decrease in PP income	Elimination of all PP income still results in a positive NPV.	*54,421*	*-9,642*	Elimination of all PP income still results in a positive NPV.	*22,904*	*-7,204*
Total transition costs						
Increase in total transition costs	Increase in transition costs of 295%	*0*	*-64,063*	Increase in transition costs of 50%.	*-121*	*-30,229*
Implementation costs (excluding capital costs)						
Increase in transition costs	Total implementation costs of 726%	*0*	*-64,063*	Total implementation costs of 298%	*0*	*-30,108*
Capital costs						
Increase in capital costs	Total capital costs of 658%	*0*	*-64,063*	Total capital costs of 166%	*0*	*-30,108*

The following describes the reasoning behind the movements in NPV in each scenario.

Post reconfiguration synergy saving

- A delay to the synergy saving will reduce the NPV as the total benefit from the post-reconfiguration synergy will reduce by the saving that would have been achieved in the period of delay. The time-weighted value will be close to the amount in real terms, due to the delay occurring in the early periods in the model. There will also be a small impact from the step up in synergies happening later, as the benefit from the difference between the original synergy and the step down will be lost for one period. The breakeven analysis indicates that even if all synergies are removed from the cancer reconfiguration, a positive NPV will still be anticipated whilst a 8 year delay to the synergy saving for the cardiovascular reconfiguration will reduce the cardiovascular NPV to almost zero.

- An increase/ decrease in the synergy percentage will increase / reduce the NPV. This is because in the preferred option, the variable cost base will decrease by more / less relative to the cost base in the “do nothing” scenario, and this will be realised every year that the synergy saving is realised. If all the cancer synergy savings are removed the cancer NPV reduces by £13.1m to £51.0m, however, a reduction of current synergy savings by 0.41% in Years 1,4 & 6, resulting in a cumulative reduction from 2019/20 onwards of 2.76%, reduces the cardiovascular NPV to zero.

- These sensitivities demonstrate that the cardiovascular model is much more sensitive to the post reconfiguration sensitivity compared to the cancer model. One driver of this is that the synergy is applied to all the activity at Barts Health post reconfiguration, rather than limited to particular services lines.

Additional fixed costs

- An increase / decrease in additional fixed costs will decrease / increase the NPV as this will increase / decrease the total amount of fixed costs in the preferred option. An increase in additional fixed costs of 18.79% reduced the cardiovascular NPV to zero.

Year on year efficiency requirement

- An increase / decrease in the efficiency requirement will decrease / increase the NPV as this will reduce / increase the variable cost base on which the synergy savings are calculated. In each year, the percentage efficiency requirement is applied to the previous year's variable cost, therefore equivalent increases / decreases to the percentage reduction do not lead to equal and opposite changes to the NPV. In the cardiovascular model, an increase of the efficiency assumption by 2.43% reduces the cardiovascular NPV to zero.

Private patient and research, development and education

- An increase / decrease in RD&E and private patient income will increase / decrease the NPV, however, the level of income expected from these activities is required to change significantly to have a large impact on the NPV. Even when 100% of the cancer private patient and RD&E income is removed, the cancer NPV only reduces by £10.5m, whilst, when 100% of the cardiovascular private patient and RD&E income is removed, the cardiovascular NPV only reduces by £9.4m.

Non-demographic growth

- An increase / decrease in the non-demographic growth assumption to the specialist / non-specialist rate in the London Region Planning assumptions will increase / decrease the NPV as this will affect the level of income and cost in all periods following the base year. The NPV will be affected via the synergy benefit as this depends on the variable cost base. With higher/ lower non-demographic growth, the variable cost base will increase/ decrease, affecting the base on which the synergy saving is applied.

Fixed / variable cost split

- A shift of 10% of the fixed costs to variable decreases the NPV, whereas a shift of 10% of the variable costs to fixed costs increases the NPV. The effects of this shift is not equal and opposite. When fixed costs move to variable, a proportion of costs are no longer phased out, however a synergy benefit will be realised on the new variable costs. When variable costs move to fixed, a small reduction in synergy benefit will be seen, however the fixed cost base being removed from the system will be greater. The impact of fixed costs phasing out has a relatively greater impact on the NPV than the synergy benefit.

Void contribution

- A reduction in the number of beds will reduce the NPV as this will reduce the total contribution from the void space. An increase in income per bed will increase the contribution on a per bed basis and consequently increase the NPV. With an unchanged bed base, an increase in contribution per bed will increase the NPV.

Total transition costs

- An increase / decrease in transition costs will decrease / increase the NPV. As the transition costs occur in the first few years of the model, the discount applied to them is low. In the cancer model, an increase in the transition costs of 295% reduced the cancer NPV to zero, and an increase of the cardiovascular transition costs by 50% reduces the cardiovascular NPV to zero. These sensitivities demonstrates that the cardiovascular model is much more sensitive to the same relative change in transition costs compared to the cancer model this is due to a higher level of capital costs in the cardiovascular model.

Implementation costs (internal and external transition teams and double running costs)

- An increase / decrease in implementation costs will decrease / increase the NPV. In the cancer model, total implementation costs of 726% of their current value reduce the cancer NPV to zero, and in the cardiovascular model total implementation costs of 298% of their current value reduces the cardiovascular NPV to zero. These sensitivities demonstrates that the cardiovascular model is much more sensitive to the same relative change in implementation costs compared to the cancer model this is due to a higher level of implementation costs in the cardiovascular model.

Capital costs

- An increase / decrease in capital costs will decrease / increase the NPV. In the cancer model, total capital costs of 658% of their current value reduce the cancer NPV to zero, and an increase of the cardiovascular capital costs to total capital costs of 166% of their current value reduces the cardiovascular NPV to zero. These sensitivities demonstrates that the cardiovascular model is much more sensitive to the same relative change in capital costs compared to the cancer model. This is due to a higher level of capital costs in the cardiovascular model.

Combined downside scenario

- The combined downside scenario sensitivity has a much more significant impact on the cardiovascular NPV compared to the cancer NPV. The cardiovascular model produces a negative NPV under this scenario whilst the cancer model still produces a positive NPV. This is due to the fact that the fixed cost savings in the cancer model is the predominant driver of the NPV, whilst, the cardiovascular NPV is impacted to a much greater extent by post reconfiguration synergy savings, capital expenditure and additional fixed costs.

H Appendix – Capital Expenditure

Capital expenditure will be incurred in relation to both the cancer and the cardiovascular reconfiguration. UCLH have provided details on capital expenditure in respect of the cancer reconfiguration and Barts Health have provided data in respect of the cardiovascular reconfiguration. Such data has been included in the financial evaluation.

In order to assess the reasonableness of capital expenditure figures provided by Barts Health and UCLH, a high level review has been completed by NHS England. This review focused upon the following two areas:

- That the floor area allocated to delivery if transferring services is sufficient, but not excessive, for the level of activity transferring

- That the construction cost per SqM is reasonable as an estimate at this stage.

Sufficiency of floor area

Barts Health and UCLH engaged external advisers (WT Partnership and Sweet Group respectively) to provide cost and floor area estimates. It is assumed these estimates are in compliance with the Health Premises Cost Guides (HPCGs) issued by Department for Health[67].

This initial assessment has been made available for UCLH in the draft report "UCLH the heart hospital reprovision" prepared by Medical Architecture on behalf of UCLH.

NHS England has reviewed the estates plan developed by WT Partnership for Barts Health and have assured the methodology applied.

Construction costs

Construction cost for works only for Barts Health and UCLH are set out in chapter five. These are based on the two independent external advisers engaged by each of the trusts.

Table H-1 – Comparison of construction cost for works (£000)

	Barts Health	UCLH[68]

[67]HPCGs provide both detailed capital expenditure breakdowns together with a number of design compliance requirements including energy standards (e.g. BREEAM). See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/144106/Healthcare_premises_cost_guides.pdf

[68] In order to compare the capital figures, UCLH benchmarks were converted into nominal figures using total nominal capital cost of £12.6m which is used in the model. This is for modelling and benchmarking purposes only.

	Cost per metre squared	Cost per bed[69]	Cost per metre squared	Cost per bed[70]
Based on construction costs only	3	169	3	59
Based on construction costs including construction costs, non works costs, professional fees, contingencies and VAT but excluding equipment	4	199	7	134
Based on construction costs including construction costs, non works costs, professional fees, contingencies, VAT and equipment	5	275	8	155

Both independent advisers have arrived at the same cost per square metre (£3k). In order to fully assess construction costs, NHS England compared the figures provided with a full business case made available in the public domain.

Case Study: Oxford Hospital

Oxford Hospital presented a full business case for the expansion of neonatal intensive care unit[71]. Whilst smaller in scale, it would appear reasonable to assume that these works are reflective of the complexity of the cardiac cancer construction proposed, involving a combination of lower specification ward areas, and higher specification, higher cost theatres. It should be noted the cost reconciliation was prepared by Sweet Group, as used by UCLH.

Construction Cost

On page 129 of the Business Case, a cost per square metre, based on design proposed in compliance with the HPCGs, is given as £2.7k per metre squared. Once indexation and location weighting has been applied and adjustment made for the land element of MFF applicable to the proposed building site, construction costs as stated would appear a reasonable estimate.

Contingency

The current business case includes a contingency figure of 20% on the Barts Health build, which is reasonable when compared to the performance of the Oxford Hospital Business Case (empirical optimism bias in line with the HMT Green Book), which slipped from £2.7k, to approximately £3.3k per metre squared, between project budget and project outturn slippage of 19.95%. UCLH makes a provision of 10% planning contingency and 15% optimism bias. Optimism bias may be expected to reduce as progress to Full Business Case in line with HPCGs.

[69] Based on 181 beds
[70] Based on 81 beds
[71] http://www.ouh.nhs.uk/about/trust-board/2012/may/documents/TB201235a_ExpansionofNeonatalFacilities2.pdf