Liverpool University Hospitals
NHS Foundation Trust

Integration & Reconfiguration Programme

Clinical Services Reconfiguration Business Case

Liverpool University Hospitals NHS Foundation Trust

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1. Executive Summary

1.1 Introduction

1.1.1 Purpose of Document

The merger of Aintree University Hospital NHS FT (AUHFT) and the Royal Liverpool and Broadgreen Hospitals NHS Trust (RLBUHT) to form Liverpool University Hospitals Foundation Trust (LUHFT) in 2019, has created an opportunity for the Trust to reconfigure services in a way that provides the best healthcare, improving the quality of care and health outcomes that patients experience.

The merger also formed part of the "One Liverpool" integrated, place based strategic plan for the city, with the aim of providing sustainable and standardised acute and specialist services to improve health outcomes. This aligns with the wider Cheshire and Merseyside Sustainability and Transformation Plan for the wider system footprint, as we provide coordinated specialist tertiary care for Cheshire and Merseyside, and beyond.

Our next phase of proposed clinical service changes is aligned to the opening of the new Royal Liverpool Hospital and endeavours to avoid multiple moves to minimise disruption to patients and staff. These schemes relate to our General Surgery, Vascular, Urology, Nephrology, and Breast services.

This document provides a description of these services currently delivered by the Trust. It explains the challenges experienced by the services, rationale for change, and the proposed options for how these can be addressed and improvements made through the reconfiguration of services, including the significant benefits that can be achieved through the new models of care.

1.1.2 Strategic Context

The clinically-driven decision to merge was made in the context of work ongoing at the local and national level reviewing the provision of healthcare services – both nationally and in Liverpool in particular. Locally in Liverpool, the Mayoral Health Commission reviewed health outcomes and healthcare services in the city in 2013. This Commission published a report in 2013, highlighting, as one of its key recommendations an integrated health and social care system in Liverpool.

In November 2014, more than 200 clinicians from both AUHFT and RLBUHT gathered and reviewed the current provision of services across both organisations. The overwhelming consensus was that reconfiguration was necessary to:

- achieve the best possible clinical outcomes for patients; and
- to improve health outcomes for the challenging patient population that the Trusts serve.

It was agreed that no change was not an option given the overall clinical challenges the Trusts faced. A merger was identified as the only option that would fully enable the best possible outcomes for the population served by both trusts, providing the best means of improving poor patient outcomes overall, and in particular local city wards, by creating equity of services and access to acute care across the city.

The merger represented a unique, once in a generation opportunity to reconfigure services to address the fundamental challenges to delivering healthcare services in the city, and best serve the needs of the people of Liverpool and beyond.

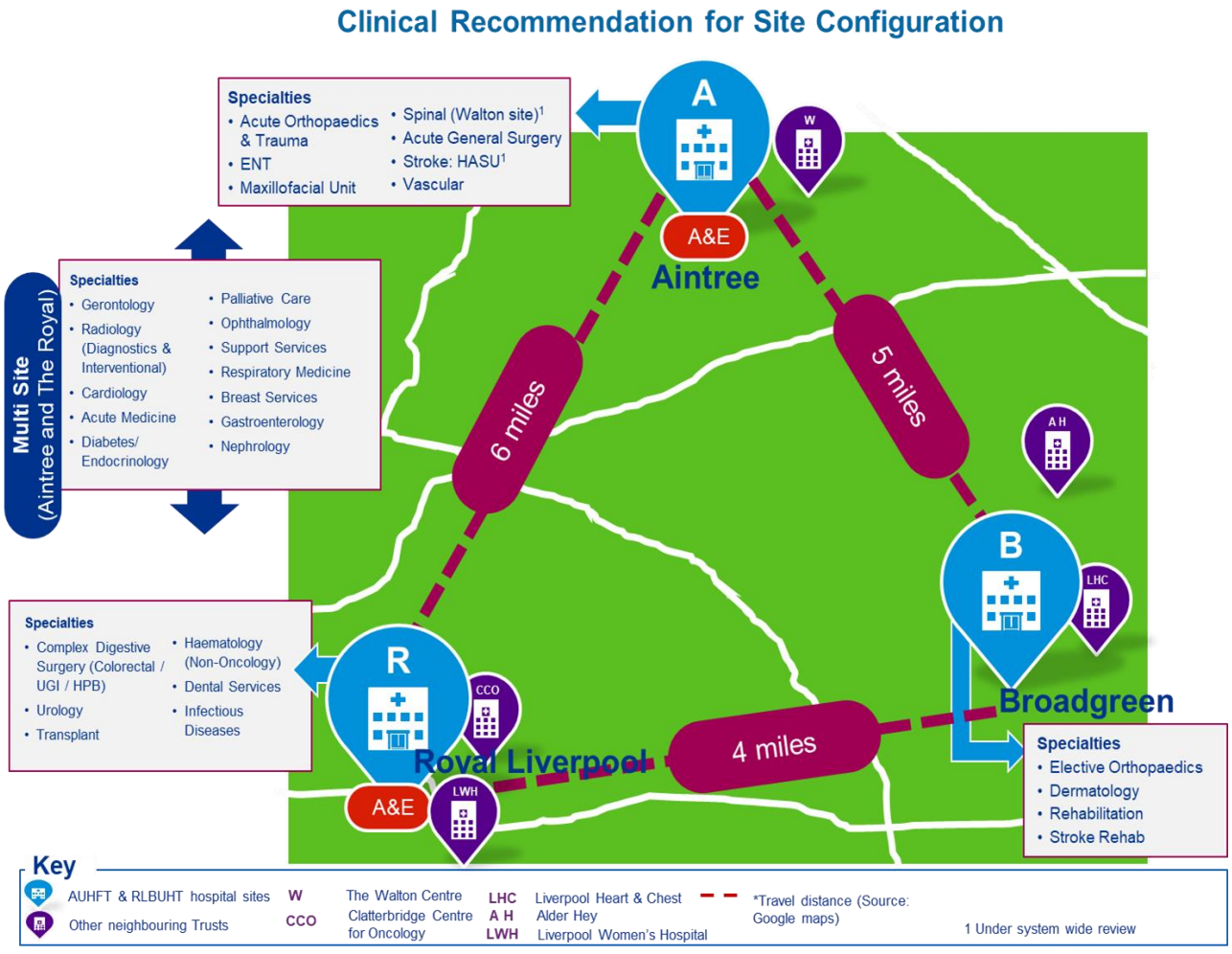
1.1.3 Future Vision for LUHFT

The key aims of the merger were to reconfigure services in a way that:

- Provides the best healthcare services for the city
- Improves safety and quality of care, health outcomes and patient experience
- Reduces variation in service outcomes and inequalities
- Provides the best place to train and work for healthcare professionals in Liverpool and the North West

These aims underpin the vision for LUHFT. The vision for clinical services, as reflected in the One Liverpool Plan, is one of 'single service, system-wide delivery, delivered through centres of clinical and academic excellence'.[1]

The vision of '*single service, city wide delivery*' could only be achieved through the merged organisation and the integration and reconfiguration of services. Our vision for the site reconfiguration for LUHFT recommended by our clinical teams as described in this document is illustrated below.



[1] Liverpool CCG (2018), 'One Liverpool: 2018-2021', p. 29.

1.1.4 Overview - Proposed Service Changes

Each of the clinical service chapters in this document discusses in turn, the five clinical services, setting out the clinical rationale for change; the proposed clinical models; associated benefits of the proposed change and implications; and how they would be implemented.

These are summarised as follows:

Rationale and impact of proposed change

Specialty	Rationale and impact of proposed change		
	Rationale for Change	**Outline Clinical Model**	**Patient Benefits**
General Surgery	**Emergency General Surgery** • **Clinical / Quality outcomes** – low consultant presence in theatre when high risk of death, consultant review within 14 hours of admissions • **Different workforce models across sites**. RL not aligned to best practice for EGS (AUGIS) **Elective subspecialties** • **Fragmentation of services** – minimum surgeon volumes not met • **Separation of HPB services** – currently liver based at AUH, Pancreas at RL site	• Acute/non acute split of General surgery subspecialties • RL (Elective inpatients /complex site - Upper GI, colorectal, HPB) • AUH (non-elective/benign – enhanced ambulatory care, ERAS, day case)	• **Improved mortality rates** through dedicated emergency surgery service, specialist consultants operating through an EGSU model • **Reduce clinical variation**, timely reviews and reduced complications • **Optimised theatre capacity** through planned / unplanned split • **Reduced LoS** and release of inpatient beds • **Reduction in day case patients treated as inpatients**, bed days saved
Vascular	• **Theatre & Bed Capacity Constraints:** - **Impact on activity levels** - Currently not meeting national targets for AAA, Carotid Endarterectomy (CEA) and Critical Limb Ischaemia (CLI). - Potential to expand the bed base to meet demand. • **Interventional Radiology –** Shortage of interventional theatre capacity currently at RLH in addition to inadequate staffing levels. • **Key strategic enabler wider service reconfiguration** • **Improves patient safety** through co location with Trauma Unit	• Transfer of Vascular Services from RL to AUH site (to align to Stroke/IR and elective/ non-elective model) • Expand capacity to improve access to service • No change to outpatients	• **Enhance emergency delivery** of vascular care through co-location with the Trauma unit • **Improve timely access to care** by reducing delay in investigations • **Reduce length of stay** by reducing delays in treatment and interventions • **Reduce need for patient transfers** across sites • **Reduce rehabilitation costs** by having a lower limb prosthetic centre on site

Specialty	Rationale and impact of proposed change		
	Rationale for Change	**Outline Clinical Model**	**Patient Benefits**
Urology	• **Provision of timely and equitable access to care** • **Clinical workforce sustainability** – ability to meet procedure volumes with sub specialties and clinical sustainability challenges of on call rotas • **Duplication of resources** – high rental and maintenance costs	• Urology main inpatient services delivered at RL • Day surgery and Outpatient Services maintained at AUH & RL sites • Enhanced recovery programme	• **Improved access** to specialist cancer and continence services • **Improved ambulatory assessment** of urgent problems, reducing admission • **Financial efficiencies** from reduced intensity of on call rotas and reduced duplication of equipment/maintenance costs • **Increased day case procedures** through streamlined pathways
Breast	• **Variation in practice across sites –** Different surgical pathways, different pre-op assessment • **Timely access to care –** Misalignment of capacity and demand across sites • **Inequitable access to facilities –** Radio-pharmacy service provision for breast cancer surgery patients at RL site only • **Duplication –** 2 referral points for each service leading to operational inefficiencies • **Workforce constraints** - Variations in workforce between the two sites. AUH seeing a higher volume of referrals however have a smaller consultant team	• Surgery (both cancer and benign) consolidated at the new RL site (mainly day case) • Outpatients and diagnostics unchanged at AUH and RL sites • Breast screening will remain unchanged at BGH	• **Co-location** with Clatterbridge Cancer Centre • **Improved outcomes**, patients will have a dedicated bed base at RL • **Financial efficiencies** through single on call rota • **Better utilised theatre lists** and planning • **Single site procurement efficiencies** and reduced duplication of equipment
Nephrology	• **Dialysis service provision including estate** not meeting national guidelines • **Acute Kidney Injury (AKI)** – diagnosis and treatment of AKI at RL does not meet best practice for specialist skills required and equipment • **Workforce constraints** – clinical workforce shortages impacting on quality and equity of services available to patients. This also limits the take up of home therapy	• Regional Tertiary Service with equitable access to Specialist Renal Care and Transplant for the C & M region • Nephrology main hub at RL – 56 bed tertiary unit including Transplant and Renal HDU • Medical cover provided at AUH (non-elective) • Unified Home Dialysis team and seamless flow of patients to satellite dialysis units • Alignment of specialist	• **Reduced mortality and improved quality of life** from more timely / equitable access • **Reduced morbidity** from early identification of AKI and access to standardised pathways • **Reduced readmissions** and length of stay • **Financial savings** from combined on call • **Procurement efficiencies** from combined Dialysis Units

Specialty	Rationale and impact of proposed change		
	Rationale for Change	**Outline Clinical Model**	**Patient Benefits**
		clinics	

As described, the proposed changes associated with these clinical services are limited to transferring an aspect of a service to another LUHFT site; expansion of service capacity; and/or alignment of clinical services to deliver a single service model of care as illustrated below.

Nature of proposed service changes

Specialty	Main impact of proposed change		
	Transfer service to another site	Expansion/ Increase capacity	Align clinical standards to deliver single service model
Breast Services	✓		✓
Nephrology	✓		✓
Vascular	✓	✓	
Urology	✓		✓
General Surgery (Acute/ Non- Acute split)	✓	✓	✓

The following sets out a summary of each clinical service reconfiguration proposal. These are further detailed in the individual chapters included in the main body of the document (Chapters 2 to 8).

1.2 General Surgery

Strategic/Clinical Case

Overview of services

General surgery is a specialty that focuses on surgery in the abdominal area and intestines including the gastrointestinal tract, liver, colon, pancreas and other major parts of the endocrine system of the human body. General surgery is one of the two largest surgical specialties across the UK, employing over 30% of the country's consultant surgeons.

General surgery is delivered between the LUHFT's legacy Trust sites, Aintree University Hospital (AUH) site and Royal Liverpool and Broadgreen University Hospitals (RLBUHT) sites and includes three sizeable sub-specialties:

- **Colorectal** surgery, which focuses on the lower gastrointestinal tract such as the colon and rectum, including operations for colon and rectal cancer, inflammatory bowel disease, anal cancer, prolapses, haemorrhoids and intestinal polyps, as well as bowel screening services.
- Upper gastrointestinal ('**upper GI'**) surgery, which is performed on the oesophagus and stomach and includes addressing issues such as oesophago-gastric (gullet and stomach) cancers, reflux, hiatus hernia, Barrett's oesophagus and ulcer disease;
- Hepato-pancreato-biliary ('**HPB'**) surgery, which focuses on the liver, pancreas, bile duct and gallbladder.[2]

In addition to these sub-specialties, AUH has developed services with dedicated consultants with special interests covering **emergency general surgery** and visceral trauma.[3] In this way, emergency general surgery is considered to be a sub-specialty in its own right, alongside the other sub-specialties of upper GI, colorectal and HPB.

Currently, the general surgery service is provided on a spilt site basis. Both Royal Liverpool Hospital and Aintree University Hospital provide emergency surgical care where Broadgreen Hospital provides elective activity only. Each site provides different models of service. Both sites provide a 7-day Consultant led service for emergency surgery.

Case for Change – Current Challenges

General surgical emergency admissions are the largest group of all surgical admissions to UK hospitals and account for a large percentage of all surgical deaths. Complications occur in as many as 50% of patients undergoing some common procedures, and these result in dramatic increases in length of stay.

The current clinical models across sites experience constrains and limitations to service provision and are unaligned; having two different service models also increases inequity amongst the population of Liverpool.

Key challenges for the emergency and elective subspecialty across sites include:

Emergency General Surgery

- **Clinical Outcomes** - Trust performance on clinical /patient outcomes and quality of care are mixed across sites, prompting concerns around the success of operations. These areas include -

[2] Currently, AUH site only provides hepato-biliary surgery (HB), whilst RLH site only provides pancreato-biliary (PB) surgery.
[3] Trauma relating to internal organs in contrast to orthopaedic trauma.

Consultant present in theatre for high risk patients (when risk of death ≥ 5%); Length of Stay following Emergency Laparotomy Procedures;, and Patient to be reviewed by Consultant within 14 hours of admission.

- **Clinical Sustainability** - at the RLH site, emergency surgery is provided by sub-specialist surgeons who deliver both emergency and elective care. This model is not consistent with recommendations or clinical evidence on best practice. Care should be provided by consultants trained in emergency surgery and that support for complex patients should be provided by surgeons fully trained and experienced within a sub-specialty.
- **Recruitment** - There have been difficulties in recruitment of consultants without them already having subspecialty interests.
- **Operational Challenges** - There is a lack of rapid access service (Ambulatory Care 'Hot Clinic') leading to multiple procedures and operations (like uncomplicated hernia, appendicitis, abscess) being performed as inpatient rather than day case. This increases burden on NCEPOD theatre and emergency surgical and anaesthetic teams.
- **Estates** - There is no ring fenced assessment space within New Royal dedicated specifically for Emergency General Surgery, so change is needed in order to locate services within an appropriate estate footprint. Furthermore, the current estate in AUH does not provide sufficient capacity to provide safe and quality rapid assessment and efficient patient flow.

Elective subspecialty services

- **Limited procedure volumes at each site due to fragmentation of services -** Volumes of elective colorectal and Upper GI patients are lower at both sites than the national average. The Royal Colleges, Improving Outcomes Guidance, Clinical Networks and NHS national guidelines increasingly relate patient outcomes to catchment population size and emphasise the importance of sufficient clinical volume. It follows that the current provision of services for the Trust's hospital sites will suffer when minimum surgeon volumes are not attained.
- **Clinical sustainability -** The fragmentation of services and different clinical models result in variation in patient outcomes and quality of care which also leads to operational challenges including length of stay and timely access to care.

Proposed Clinical Model

The key proposal underpinning the integrated model for general surgery is to consolidate similar services and patients onto the same site, establishing a 'hot' (non-elective) site at the AUH site where dedicated teams are in place to carry out emergency surgery, and a 'cold' (elective) site at RLH site specialising in carrying out planned surgery, with limited disruption to waiting lists caused by emergency cases.

The separation of elective and non-elective general surgical care will allow both aspects of the service to be managed efficiently, improve availability of staff for pre and post-operative reviews, allow for patients to be seen in a timely manner and treated by appropriate specialists, and ensure that trauma and other emergency demands do not impinge on the ability to deliver elective general surgical care. The model has the additional benefit of ensuring enough scale in each sub-specialty for effective service and for junior doctors to get relevant experience.

Economics Case

Options Appraisal

A number of service model options have been considered to address existing service challenges and improvement in services:

Option 1: Do Nothing (AUH and RLH services remain delivered in the same way as they are currently)

Option 2: Implement the current AUH Model for EGS across AUH and RLH sites

Option 3: Implement the current RLH Model for EGS across AUH and RLH sites

Option 4: Unified Acute Surgical Single Site Service on Aintree site

Each option was assessed against the Trust's Business Case evaluation criteria. Given the challenges faced under the current model (Option 1) and the subsequent challenges and limitations arising from option 2 and 3 including increased estates constraints, the preferred clinical model identified is option 4 to consolidate similar services on the same site. Planned cancer /complex subspecialty activity will be consolidated at the RLH site and a centralised emergency site will be established at Aintree, where dedicated teams are in place to carry out emergency surgery with enhanced access to diagnostics.

Key Benefits

The following summarises the key benefits to patients and associated improvements that would be gained from the proposed integrated clinical service model. These are described in more detail in the main document. Draft benefits realisation plans have also been developed which sets out the anticipated benefits from the proposed key service changes and the indicative timescales for when these will be realised.

Service change	Benefit
Aligned Emergency General Surgery service based at AUH site	• Early review by senior surgeon reducing number of patients not seen within first 14 hours • Access to sub-specialist staff • Seven day ambulatory care service leading to reduction in avoidable admissions • Enhanced Recovery After Surgery programme for emergency patients reducing length of stay for procedures such as emergency laparotomy
Elective Subspecialties centralised at RLH site (Cancer & Complex benign Procedures)	• Increased procedure volumes for subspecialties leading to compliance to with guidelines and specialist commissioning standards • Reduction in readmissions • Reduction in ward LoS for cancer/complex patients • Improvement in timely access to care and cancer performance standards • Improved access to minimally invasive surgery resulting in lower rates of post-operative complications • Co-location of Hepato-Biliary and Pancreato-biliary teams resulting in improved MDTs,

Service change	Benefit
	patient experience and junior doctor training.
Centralise routine benign UGI and Colorectal activity at AUH	• Increase day case activity and timely access to care • Reduction in day-case patients treated as inpatients and bed days saved • Improved patient experience • Reduction in benign (UGI and colorectal) patient morbidity • Improved RTT performance (based on national targets)
Enhanced Clinical Roles	• Support gap in junior doctors • Improve Continuous professional development for staff • Improve recruitment and retention

Additional benefits are described in more detail in the main document (section 2.2.4) which explains the key benefits covering Clinical /Patient Outcomes; Patient Access; Patient Experience; Workforce; and Operational / Financial Efficiencies.

Draft benefits realisation plans have also been developed for each clinical reconfiguration scheme and are set out in the Appendices (*Management Case – Appendix 1*). These detail the proposed benefits anticipated from the key service changes delivered and the indicative timescales for when these will be realised. These plans will be further developed alongside the detailed implementation planning for each scheme.

Estates Implications

Estate has been identified at the Aintree site that would not require any reconfiguration for the relocation of the Emergency Surgical Assessment Unit and would provide for the increase in activity from the Royal site.

The proposed model will result in 65 non-elective inpatient beds at the AUH site. In addition, 24 surgical assessment Unit trolleys will also be available at the AUH site. An additional 12 beds will also be available for elective benign surgery, providing capacity for the more routine benign Upper GI and Colorectal procedures at the Aintree site.

At the RLH site, this will comprise of 84 inpatient beds dedicated to all elective general surgery subspecialties, all of which are located on the same floor in the new RL hospital.

1.3 Vascular

Strategic/Clinical Case

Overview of services

Liverpool Vascular and Endovascular Service (LiVES) has been an established single service for several years and provide vascular services for the Merseyside region and a tertiary service for North England, Isle of Man and North Wales. It is based on a hub and spoke model, with the main hub based at the Royal Liverpool Hospital site, and 'spoke' sites based at Aintree, Whiston and St. Helens and Liverpool Heart and Chest Hospitals (LHCH) under Service Level Agreements and Southport under a joint venture.

Case for Change – Current Challenges

The greatest challenges within the LiVES service currently is that of capacity, both theatres and beds, in addition to challenges on inter-hospital transfers and Interventional Radiology services. These challenges significantly impact on the Trust's ability to providing timely access to care and subsequently on patient outcomes and experience. These challenges are described in further detail in this document.

Proposed Clinical Model

The proposed clinical model would see the relocation of LiVES services to the Aintree University hospital site. This would we based on expanding to two hybrid theatres, an open theatre, 33 vascular beds, 7 Intermediate Care Beds, 4 critical care beds, comprehensive outpatient, vascular lab and office facilities, potential for research facilities, and access to CT scanner together with co-location of dependent services.

Economics Case

Alignment to Trust Strategy

In developing the proposed model, consideration has been given to how the proposed clinical service model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

The benefits are manifold, and align to each of the Trust's strategic priorities of Great Care; Great People; Great Research and Innovation; and Great Ambition such as providing a better patient service by better access to care and patient experience, improved working environment and development for staff, increased support for interdependent services and facilitating the ability of LUHFT to strategically move elective cancer services into the New Royal Liverpool Hospital (RLH) and to have Aintree University Hospital (AUH) as the predominantly non-elective site.

Options Appraisal

A number of service model options have been considered to address existing service challenges and improvement in services with the preferred option being to move LiVES to the AUH site. This gives an opportunity to truly plan for a world class service with facilities to allow modern working.

Three options were considered and assessed as part of the options appraisal. These include:

Option 1: (Do Nothing) – Continue with current model including move to new Royal Liverpool Hospital

Option 2: Develop the Northern Aortic Centre at Liverpool Heart and Chest Hospital NHS FT (LHCH) – This would involve the development of the Liverpool Cardiovascular Service as a formal collaboration with LHCH, diverting activity from LUHFT to LHCH for aortic activity.

Option 3: Relocate LiVES to the Aintree site - Outpatients maintained on both RLH and AUH sites.

Each option was assessed against the Trust's Business Case evaluation criteria with option 3 (relocate LiVES services to Aintree site) identified as the preferred option.

This preferred option would generate increased improved outcomes, better access to care and generate efficiencies due to improved theatre capacity and better collaboration with dependent services which would also allow any expansion in numbers to be accommodated. For example, co-location with Diabetes, Orthopaedics and Stroke allows vascular interventions on inpatients from their bed base without the need for transfers, delayed discharges and prolonged bed occupancy for non-vascular issues.

Key Benefits

The following sets out the key benefits to patients and associated improvements gained from the proposed integrated clinical service model.

Service change	Improvements Benefits
Co-location with other dependent services at Aintree site	• Improved patient outcomes and complications. • Reduces Length of stay saved from no longer waiting for transfer before commencing treatment. • Improved patient experience
Increased capacity and access to diagnostics facilities	• Reduction in waiting times for diagnostics with improved diagnosis • Improved patient outcomes
Availability of emergency hybrid suite	• Rapid treatment of emergencies (currently not available). • Improved outcomes and reduced length of stay in critical care and wards through improved access to emergency hybrid theatre reducing delay in effective treatment
Lower Limb Prosthetic Inpatient facility on site at Aintree	• Better quality of care, reduced length of stay • Improvement in the patient experience.
Increased opportunities for medical staff as a larger unit	• Improved staff experience and aptitude, • Improved retention and recruitment in the future.
Establish LiVES as national centre of excellence	• Improved standing of LiVES and the Trusts' reputation. • Potential improvements in tertiary referrals and attract industry and research funding.

Additional benefits are described in more detail in the main document (section 3.2.4) which explains the key benefits covering Clinical /Patient Outcomes; Patient Access; Patient Experience; Workforce; and Operational / Financial Efficiencies.

Draft benefits realisation plans have also been developed for each clinical reconfiguration scheme and are set out in the Appendices (*Management Case – Appendix 1*). These detail the proposed benefits anticipated from the key service changes delivered and the indicative timescales for when these will be realised. These plans will be further developed alongside the detailed implementation planning for each scheme.

Estates Implications

A number of estate solutions have been considered to best facilitate the LiVES theatre activity at the Aintree site and provide the proposed theatre requirements.

The recommended estate solution would involve a first floor extension to the current C theatre complex at AUH site (former AED theatres) to create two bespoke hybrid operating theatres and remodelling of current theatres (C1 and C3) at the Aintree site. This extension would be connected to the existing theatre complex off the clean corridor adjacent to current theatres 1 and 2.

1.4 Urology

Strategic / Clinical Case

Overview of services

Urology is the largest surgical specialty after General Surgery and Orthopaedics and involves the treatment of conditions of the urinary tract and male genital tract. This includes some very common cancers including prostate cancer (which is now as common as lung cancer and bowel cancer put together), bladder, kidney and testicular cancer and some very common but debilitating benign conditions such as kidney stones (which cause severe pain and affect 6-18% of the population as some point in their lives), lower urinary tract symptoms (affecting about 50% of the population over 50), urinary sepsis and number of other problems.

Urological services for the people of Liverpool have been provided by two separate units based in each of the legacy trusts. With the exception of complex cancer work referred through the cancer network and small numbers of other tertiary cases, the units have largely functioned as separate, duplicated services although a common leadership structure has been introduced in 2020.

Case for Change – Current Challenges

The Urology departments of the Royal (RLH), Broadgreen (BGH) and Aintree hospitals (AUH) met for a series of merger discussions in 2014/15 and again in 2017 and considered the shortcomings of having duplicated and separate departments so close together in one city. They reviewed the opportunities to improve patient outcomes and experience, sustainability and value for money by coming together and on each occasion, made recommendations to create a single site Inpatient Urology base for both elective and non-elective care as the best configuration to achieve these aims.

A number of challenges and key drivers for change were identified for the service currently including:

i) **Provision of Timely and Equitable Access to Care** – this includes rising demand; addressing challenges in waiting time performance; and inequity of facilities provided to patients across Trust sites.

ii) **Clinical Workforce Sustainability** – areas include meeting procedure volumes within subspecialties and clinical sustainability challenges of on-call rotas.

iii) **Duplication of Resources** (e.g. equipment) – much of the urological equipment is duplicated across sites resulting in high rental and maintenance costs.

iv) **Fragmentation of Research and Innovation**

Proposed Clinical Model

The preferred option is to configure all inpatient Urology work at the new RLH site with Outpatients services and day case procedures to be split between the new RLH and AUH site. This will not only improve patient outcomes, access and experience in addition to the benefits for staff, it also aligns and enables the Trust's wider strategy for the reconfiguration of services across sites working on the principle of centralised where necessary and closer to home where possible.

The benefits are manifold and include providing a better patient service, improved working environment, increased support to, and from, interdependent services whilst reducing duplication and improving

sustainability. This configuration produces a central high capacity hub to act as a focal point for high quality inpatient care in addition to reducing inefficiencies and removing duplication of resources currently across sites.

Economics Case

Alignment to Trust Strategy

In developing the proposed model, consideration has been given to how the proposed clinical service model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

The benefits are manifold, and align to each of the Trust's strategic priorities of Great Care; Great People; Great Research and Innovation; and Great Ambition such as providing a better patient service by better access to care and patient experience, improved working environment and development for staff, increased support for interdependent services and facilitating the ability of LUHFT to strategically move elective cancer services into the new RLH and to have AUH as the predominantly non-elective site.

Options Appraisal

A number of service configuration options have been considered during this process with a view to having outstanding patient care provided by one outstanding team. Wide consultation through multiple modalities was performed across staff groups and stakeholders. Benchmarking work, modelling of pathways and demand, reviews of other units carried out. Consideration was given to how the various configuration options aligned with the trust's strategic aims to optimise patient care and experience, improve staff retention and experience, and be financially sustainable, to facilitate innovation and research and to create successful partnerships.

The 'long list' of options included:

Option 1 Do Nothing - No changes to current service provision

Option 2 All Inpatients based at the new RLH, Outpatients based at BGH & AUH

Option 3 Elective Inpatients at the new RLH, Emergency Inpatients at AUH, Outpatients at BGH & AUH

Option 4 All inpatients at the new RLH, Outpatients at AUH, and BGH Outpatients to new RLH

Option 5 All Inpatients and Outpatients at new RLH

Option 6 All Inpatients at AUH, Outpatients at BGH and AUH

Option 7 All Inpatients at new RLH, development of BGH Urology centre for outpatients

Each option was assessed against the Trust's Business Case evaluation criteria with option 4 (All inpatients at the new RLH, Outpatients at AUH, BGH Outpatients to new RLH) identified as the preferred option.

Key Benefits

The following sets out the key benefits to patients and associated improvements that would be gained from the proposed integrated clinical service model.

Service Reconfiguration change	Key Benefits
Streamlined pathways and colocation of outpatients at AUH and new RLH	• Improved ambulatory assessment of urgent problems, reducing admission • Improved continuity of care and improved patient experience • Minimise variation in services
Centralise Inpatients at new RLH site	• Improved subspecialty input into non-elective care pathways • Better access of Urology in-patients to specialist continence services • Better access of Urology in-patients to specialist cancer services • Opportunity to create sub-specialty non-elective ward rounds integrating with hot clinics • Improving access to care/waiting times • Ensuring smooth integration of elective and non-elective care
Combined Urology teams	• Creating a larger unit with elective and non-elective in-patient activity and much outpatient activity co-located on one site will give opportunity to strengthen subspecialty teams. • Improved Staff Recruitment and Retention • Reducing the intensity of on-call rota will amount to annual savings of £14k per annum.
Streamlined Day case /Outpatient across procedures avoiding need to duplication Kit across sites	Reduction in duplicated kit and associated rental/maintenance costs including: • Lithotripsy - Annual flat rate paid per annum saved amounts to £39k per annum. • Laser machinery - Reduce maintenance cost of 1 laser machine £13k per annum
Increase volume of procedures undertaken as day case	• Increase of day case TURBT procedures through streamlined and improved pathways, reducing need for inpatient stays • additional 36 TURBT cases done as day cases by per annum (from 23 to 59 cases) saving an additional 83 bed days per annum (based on current LOS of 2.3 days)

Additional benefits are described in more detail in the main document (section 4.2.4) which explains the key benefits covering Clinical /Patient Outcomes; Patient Access; Patient Experience; Workforce; and Operational / Financial Efficiencies.

Draft benefits realisation plans have also been developed for each clinical reconfiguration scheme and are set out in the Appendices (*Management Case – Appendix 1*). These detail the proposed benefits anticipated from the key service changes delivered and the indicative timescales for when these will be realised. These plans will be further developed alongside the detailed implementation planning for each scheme.

Estate Implications

- 42 inpatient beds in the new RLH with an integrated Urology Emergency Admissions beds and enhanced recovery
- 35 operating session at the new RLH with 5 day case sessions at AUH
- Developing a Urology outpatient facility with 3 treatment rooms and Urodynamics suite
- Adequate access to new RLH outpatient's facilities to include clinic and treatment rooms. Lithotripter located at new RLH

1.5 Breast Services

Strategic/Clinical Case

Overview of services

The Breast service is a specialist unit for the diagnosis and treatment of benign Breast disorders and Breast cancer. The service aims to provide a world class individualised service to patients with Breast concerns throughout the highly specialised multidisciplinary team that take pride in offering patients an efficient, high quality service.

Breast services for the people of Liverpool is currently being provided by 2 separate units based in each of the legacy Trusts. The ground floor of the Elective Care Centre, located on the Aintree site (AUH), accommodates the Aintree Breast Unit and the Breast Unit at the Royal Liverpool (RLH) site is situated on the 3rd floor of the Linda McCartney Centre. Both centres have worked closely pre-merger, however in line with the Trust wide integration agenda, the teams are working towards aligning clinical pathways as well as providing an equitable service for our patients across the city.

Case for Change – Current Challenges

LUHFT faces a number of challenges in relation to the Breast service, nationally Breast cancer is the most common type of female cancer in the UK with over 55,000 women (+370 men) diagnosed each year, this accounts for 15% of all new cancer cases. Incidence rates for Breast cancer are projected to rise by 2% in the UK to 210 cases per 100,000 females by 2035. Further specialty specific challenges are detailed as follows;

- **Duplication** – it is difficult for staff to collaborate, communicate and deliver best practice standards of care when operating on multiple sites with different care pathways. There are currently 2 referral points, one for each service, this creates duplication and the inability to work efficiently, it does not allow patients who need to be seen urgently to be allocated to the next available appointment. Furthermore, patients who opt to be seen at a different site will be seen again as a new outpatient.

- **Waiting list –** an urgent or symptomatic referral means that you should see a specialist within 2 weeks for the service to meet national 2 week wait targets. 80% of the total referrals received are due to Breast pain, these patients need to be seen within 2 weeks also. To be able to deal with the volume of referrals received, waiting list initiatives (WLIs) are regularly relied on to achieve the 2 week wait standard. In the current model, there is an imbalance of capacity, as AUH hold on average up to 8 additional evening clinic sessions per month, in contrast to the RLH who hold 1 weekly evening session every Wednesday, as well as some ad hoc additional clinics during the week.

- **Radio-pharmacy service provision** is located at the RLH site, there is a Cyclotron which creates radio-isotopes, an injection required for an auxiliary sentinel node biopsy, this procedure is required for between 80-90% of Breast patients who undergo Breast cancer surgery. This radio-isotope is not currently created at AUH and they are dependent on the service to deliver for cancer patients on the day of their operation (could be up to 4 days per week). This causes delays in cancer procedures at AUH.

- **Pre-operative assessment** – currently the AUH site offer assessments from the Breast case nurses and subsequently patients are sent to main pre-op for their appointments, which is a 2 stage process. The RLH team however, have devolved pre-operative services and offer telephone pre-op assessments with patients attending the site for Covid swabs and any pre-op tests.

- **Variation in the delivery of surgical pathways** – the service currently operates slightly differently across each site in order to deliver the surgical pathways. This is due to varying workforce and devolved services i.e. pre-op.

- **Workforce constraints –** currently there are variations in workforce within Breast Services between the two sites, with AUH seeing a higher volume of referrals however have a smaller consultant team. There is also a national shortage of both consultant Breast radiologists alongside Breast radiographers.

- **Dedicated Breast Ward** – unlike the RLH site, currently AUH site doesn't have access to a dedicated Breast bed base supported by specialty trained nurses to support patients. Moving forward, the new RLH has access to a dedicated Breast bed base.

Steps to address the growing challenges are being explored by the Breast service, such as attempts to unify the Breast patient pathway and to centralise Breast referrals. However, LUHFT will have to take more radical steps to tackle the challenges; the proposed reconfiguration aims to address these challenges.

Proposed Clinical Model

The proposed model for Breast service is for all surgery, both cancer and benign, to be consolidated at the new RLH site. This model includes an allocation of 2 dedicated Breast inpatient beds, as well as 6 day case beds. Outpatients and Diagnostic services would remain at both sites, however AUH patients who require cancer treatment or surgery would be referred to the RLH site. Breast Screening will remain at BGH site as part of the national NHS Breast Screening Programme.

Economics Case

Alignment to Trust Strategy

In developing the proposed model, consideration has been given to how the proposed clinical model would support Liverpool University Hospitals NHS Trust in achieving its vision and alignment to the Trust's strategic objectives.

There are multiple benefits that can be realised from the proposed model which aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition.

Options Appraisal

The following describes the different options considered to best address the challenges highlighted and continue to improve the quality of care for better health outcomes with rising demand and tighter financial constraints. For each of the 6 options, it is assumed that Breast Screening will remain at BGH as part of the national NHS Breast Screening Programme, thus will remain out of scope for this options appraisal.

Option 1: Do nothing - Doing nothing would involve continuing with the existing Breast service and model of care across three sites. The workforce would not be aligned and pathways would remain the same.

Option 2: All Surgery to New RLH - All surgery, both cancer and non-cancer would be consolidated at the new RLH hospital site. Outpatients and Diagnostic services would remain at both sites. However AUH patients who require cancer treatment or surgery would be referred to the new RLH site.

Option 3: All Surgery to AUH - All surgery, both cancer and non-cancer would be consolidated at the AUH site. Outpatients and Diagnostic services would remain at both sites, however RL patients who require cancer treatment or surgery would be referred to the AUH site.

Option 4: Split in Surgery (Cancer at new RLH / Non-Cancer at AUH) - Breast cancer surgery and treatment to be delivered on the RLH Site, with all benign and non-cancer Breast related surgery delivered on the AUH site. Outpatients and Diagnostic services would remain at both sites and refer to respective site depending on diagnostic outcome.

Option 5: Consolidate Service at the AUH Site - All Breast Services including surgery, outpatients and diagnostics will be consolidated on the AUH site within one major Breast Unit. All patients who require Breast related care will be referred to the new RLH site post screening or GP referral.

Option 6: Consolidate Service at the new RLH Site - All Breast Services including surgery, outpatients and diagnostics will be consolidated on the RLH site within one major Breast Unit. All patients who require Breast related care will be referred to the new RLH site post screening or GP referral.

Each option was assessed against the Trust's Business Case evaluation criteria with option 2 (all surgery to the new RLH site) identified as the preferred option.

Key Benefits of Proposed model

The following sets out the key benefits to patients and associated improvements that would be gained from the proposed integrated clinical service model.

Service change	Benefit
Centralised Breast inpatient bed base at the new RLH site	• Reductions in treatment variation. • Increased procedure volumes leading to better outcomes for patients. • Ability to meet best practice guidance. • Improved care outcomes from having a dedicated bed base for complex Breast inpatients who require an inpatient stay, thus reducing LoS & readmissions • Co-location with Clatterbridge Cancer Centre will provide greater access for cancer patients and will support partnership and research opportunities.
Centralised Surgery on the new RLH site	• Greater patient access through Saturday operating at new RLH site • A larger team allows for a comprehensive skill mix, resulting in better outcomes and an optimum quality • Increased procedure volume, day case activity and timely access to care • Reduction in day case patients treated as inpatients resulting in bed days saved • Reduced duplication of equipment and the cessation of annual maintenance • Single site procurement opportunities and savings
Integration of workforce	• Improved staff experience, morale and aptitude. • Improved recruitment, retention and creating a more attractive place to work. • Enhanced patient safety through sharing of knowledge and experience. • Breast link nurse support for the RLH site will ensure equitable and reliable access to post-op care, reducing emergency presentations and readmissions

Service change	Benefit
	• Operating one on call rota – leading to cost savings and staff flexibility
Theatre Assistance	• Allocated Breast theatre practitioners • Ability for every theatre list to be supported • Better utilised theatre lists and theatre planning • Increased throughput of day case patients
Single point of referral	• Streamlined process for referrals • Best use of resources, allowing patients to attend the site which has capacity to see them at the earliest opportunity • Continuity of capacity and demand across sites

Additional benefits are described in more detail in the main document (section 5.2.4) which explains the key benefits covering Clinical /Patient Outcomes; Patient Access; Patient Experience; Workforce; and Operational / Financial Efficiencies.

Draft benefits realisation plans have also been developed for each clinical reconfiguration scheme and are set out in the Appendices (*Management Case – Appendix 1*). These detail the proposed benefits anticipated from the key service changes delivered and the indicative timescales for when these will be realised. These plans will be further developed alongside the detailed implementation planning for each scheme.

1.6 Nephrology

Strategic/Clinical Case

Overview of services

The Nephrology footprint extends beyond LUHFT's sites; the LUHFT renal team provide all aspects of kidney care - Acute Kidney Injury (AKI); Chronic Kidney Disease (CKD); Renal Replacement Therapy (RRT); Constructive management of patients who choose not to have dialysis/transplant; and transplantation across Merseyside, including parts of Cheshire (Population c.1.06m). The Renal Transplant Unit provides services to the Wirral and North Wales (Population 2.5m). The service is currently provided at Aintree Hospital, the Royal Liverpool & Broadgreen hospitals and offers a number of satellite units.

Case for Change – Current Challenges

The greatest challenges within the Nephrology service currently is quick and equitable access to kidney transplants for patients across both sites. There is an increasing prevalence of renal disease in the population of Liverpool, and demands on current services – in particular dialysis services – which will increase in the next few years:

- In relation to kidney transplant services, patients at the Aintree Hospital site have lower uptake of kidney transplants, compared to patients at the Royal Liverpool site, due to sub-optimal pathways with transplant services being centred at the Royal Liverpool hospital.
- In relation to dialysis services, the Trust does not meet a number of best practice guidelines regarding certain estate not being fit for purpose and infection protection control guidelines are not met. Aintree patients do not have access to a nephrology led ward 24/7 and the ability to offer timely access to fistula and cannula insertions is limited. Workforce pressures and sub-optimal pathways limit the take-up of home therapy services.
- In relation to the diagnosis and treatment of Acute Kidney Injury (AKI), services at the Royal Liverpool site have not met best practice measures in a number of areas.
- In addition, access to clinical research and trials is sub-optimal across sites as these are fragmented across the city.

Steps to address the growing prevalence of renal disease have been taken but LUHFT will have to take more radical steps to tackle the challenges; the proposed reconfiguration aims to address these challenges.

Proposed Clinical Model

The proposed clinical model will create a Mersey and Cheshire Renal Service Model, centralising Nephrology services at the new Royal Liverpool Hospital site while providing in-reach consultant cover to Aintree Hospital to ensure appropriate care for patients with kidney disease as a co-morbidity. The proposed model will ensure that ALL complex renal patients in the region (transplant, dialysis, AKI needing organ support, complex immunosuppression) have equal access 24/7 to a bespoke MDT Tertiary unit.

This gives an opportunity to truly plan for a world class service with facilities to allow modern working. The benefits are manifold, including providing a better patient service, improved working environment and world class research and innovation.

Economics Case

Alignment to Trust Strategy

In developing the proposed model, consideration has been given to how the proposed clinical service model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

There are multiple benefits which align to each of the Trust's strategic priorities of Great Care; Great People; Great Research and Innovation; and Great Ambition. These include providing a better patient service by better access to care and patient experience; improved working environment and development for staff; increased support for interdependent services; and facilitating the ability of LUHFT to strategically move elective cancer services into the New Royal Liverpool and to have Aintree University Hospital as the predominantly non-elective site.

Options Appraisal

A number of service model options have been considered to address existing service challenges and improvement in services with the preferred option being to consolidate the Nephrology service at the Royal Liverpool Hospital site. This gives an opportunity to truly plan for a world class service with facilities to allow modern working.

Three options were considered and assessed as part of the options appraisal. These include:

Option 1: (Do Nothing) – Continue with the current model of care across sites.

Option 2: Majority of Nephrology services centralised at Aintree Hospital - This would involve the development of the Mersey and Cheshire Renal Service Model at the Aintree Hospital site.

Option 3: Majority of Nephrology services centralised at the Royal Liverpool Hospital Site – consolidation of the Mersey and Cheshire Renal Service Model at the new Royal Liverpool Hospital.

Each option was assessed against the Trust's Business Case evaluation criteria with option 3 (relocate the Nephrology services to the Royal Liverpool site) identified as the preferred option.

The preferred option would see patients benefitting from the larger bed base being at the new Royal Liverpool Hospital site. The enlarged inpatient bed base within the new Royal Liverpool Hospital will consist of 42 acute nephrology beds with an additional 14 beds that will be shared with Renal Transplant.

Inpatient beds at the new Royal Liverpool Hospital will be treated as a regional resource and will be ring-fenced from other uses which will enable patients to be seen by the 'right person at the right time'. This configuration will include a dedicated renal bed manager to ensure that these beds are prioritised for renal patients and early repatriation can occur where appropriate. This will enable better patient flow and ensure that patients are not staying in hospital longer than necessary.

There are 62 dialysis stations (33 in the dialysis unit and 29 in the wards) within the New Royal Liverpool Hospital to cope with inpatients and outpatients.

This preferred option would generate increased improved outcomes, better access to care and generate efficiencies due to the estate and the co-location with transplant services.

Estates Implications

A number of estate solutions have been considered to best facilitate the Nephrology service however at the Aintree site, the estate is not fit for purpose whereas the estate at the new Royal Liverpool hospital site has been specifically designed and purposed to accommodate the service with a large renal dialysis unit and inpatient beds co-located with transplant.

Key Benefits

The following sets out the key benefits to patients and associated improvements that would be gained from the proposed integrated clinical service model.

Service change	Benefit
Increased uptake of home dialysis	• Reduction in mortality of between 6 and 9 lives a year • Better control of blood pressure • Time saving of c.300 hours a year for each patient • Improved quality of life • Increased financial yield on home dialysis patient income
Continued roll-out of nurse led approach for first-time dialysis patients	• 2 lives saves per year • Reduction in average length of stay • Decrease in patient distress score
Increased uptake of vascular access for HD patients	• Decreased risk of infection
Insertion of catheter for PD patients within two weeks for all non-urgent patients	• Timelier access to the benefits of greater flexibility in lifestyle offered by PD.
Increased number of transplants	• Additional 8-13 patients surviving five years after original diagnosis • Improved quality of life • Potential to increase associated transplant income (Spec Com)
Improvement to AKI service	• Patients will receive care in accordance with AQuA criteria. • 19 fewer deaths a year • 13 fewer patients readmitted a year
Strengthening of clinical research	• All patients who are eligible for clinical trials will be able to participate, regardless of their location.

Additional benefits are described in more detail in the main document (section 6.2.4) which explains the key benefits covering Clinical /Patient Outcomes; Patient Access; Patient Experience; Workforce; and Operational / Financial Efficiencies.

Draft benefits realisation plans have also been developed for each clinical reconfiguration scheme and are set out in the Appendices (Management Case – Appendix 1). These detail the proposed benefits anticipated from the key service changes delivered and the indicative timescales for when these will be realised. These plans will be further developed alongside the detailed implementation planning for each scheme.

1.7 Financial Case

Additional financial investment has been identified to deliver the proposed clinical service models.

The following sets out the additional financial resources required that have been approved by the Trust, to implement and deliver the proposed clinical models from day one.

Capital Costs

Scheme	Description	*2021/22* £	*2022/23* £	*2023/24* £	*TOTAL* £
Vascular	Additional Hybrid Theatre	5.5m	7m	-	12.5m
Total		**5.5m**	**7m**	**-**	**12.5m**

Revenue Costs (recurring)

Scheme /Specialty	Description	Revenue Costs (Recurring)							
		2021/22	*2021/22*	*2022/23*	*2022/23*	*2023/24*	*2023/24*	*2024/25*	*2024/25*
		WTE	£	WTE	£	WTE	£	WTE	£
General Surgery	EGS consultants	-	-	3	325,644	3	434,192	3	434,192
	UGI Consultant	-	-	-	-	0.5	78,923	0.5	78,923
Nephrology	Additional Renal Dietetic Support	-	-	2	41,216	2	82,432	2	82,432
Total		**-**	**-**	**5**	**366,860**	**5.5**	**595,547**	**5.5**	**595,547**

The above revenue costs reflect the approved additional resources to deliver the reconfiguration schemes safely from day one.

Following the implementation of proposed clinical reconfiguration schemes in year one, the Trust will continue to monitor the impact of service changes and the associated resource requirements as part of its risk management processes together with the benefits realisation plan for each scheme. Any additional resources identified beyond year one will form part of the Trusts annual planning and budget setting processes including cases of need,

1.8 Management Case

Governance

Project teams for each of the 5 clinical specialties, are well established and consist of clinical and operational representatives along with project management support. The project groups report into the Trust's wider governance arrangements in relation to the Trust's Integration and New Hospital Programmes of work.

Key Milestones

Following Trust approval of the proposed clinical service models and supporting business case, detailed integration plans are currently being developed to help achieve successful implementation (subject to NHSEI assurance process and outcome of consultation) and deliver the clinical service models and associated benefits identified. These will be subject to clinical and operational lead review with progress monitored against key milestones and actions. Key milestones include the following:

Key Milestone	Date
Executive Decision /Approval on proposed service reconfiguration business case	21 September 2021
Detailed implementation planning for proposed service changes	November 2021 - May 2022
Staff Engagement Plan reviewed & completed	November 2021
NHSEI stage 1 assurance process commences	November 2021
Completion of all Deanery agreements	December 2021
NHSEI stage 2 assurance process commences	January 2022
Planning for Public consultation	January 2022
Staff consultation /workforce change completed	March to May 2022
Develop process maps to support operational planning and Standard Operating Procedures:- • IM &T and admin process plans • Estates, facilities and equipment plans • Workforce plans • Service description and protocols	November 2021 to March 2022
Executive led Quality Assurance Review (QAR) and approval of Operational Plans	April 2022
Public Consultation	May – July 2022
Update Business Cases and obtain Trust approval to include outcome of public consultation	July 2022
Implementation of proposed service changes	September 2022
Commence Benefits Realisation Review	October 2022 onwards
Undertake Lessons Learnt Exercise	October to November 2022

Public Engagement Requirements / Process

Significant stakeholder engagement and consultation with communities in the North Mersey region has been undertaken over the last few years, on the principles of adopting a single city wide service approach for the provision of hospital services – through the Healthy Liverpool Programme; the One Liverpool Plan; and the Shaping Sefton Plan.

Further stakeholder engagement was also conducted as part of the merger transaction to form LUHFT. This included targeted engagement involving patients likely to be impacted by proposed changes which also aligns with the wider Cheshire and Merseyside Sustainability and Transformation Plan.

The Committees in Common (CIC) is a joint committee of commissioners from Liverpool, Sefton, Knowsley, Southport and Formby CCGs along with Specialised Commissioning. At the CIC meeting held on 19th October 2021, a presentation on the proposed changes included in this document, along with the

process and timeline for engagement and consultation (aligned with the NHSEI assurance process on major service change) was supported.

It was agreed this supporting business case for proposed service reconfiguration schemes be shared with commissioners at CCGs and Specialised Commissioning for review and the NHSEI assurance process for major service change will be initiated. The NHSEI stage 1 review commenced in November 2021.

Subject to approval from NHS regulators, and the Joint Committee of CCGs, the preferred option will be subject to public consultation. The consultation will provide opportunities for people to share their views and highlight whether there is any other information that needs to be considered in decision-making.

Key Risks

The key risks and impact of not proceeding with the proposed clinical model are set out in the rationale for change including:

- Continued unwarranted clinical variation across clinical pathways, leading to sub-optimal patient outcomes, quality and experience of care.
- Theatre and bed capacity constraints impacting on the ability to provide timely access to care.
- Subsequent impact of timely access to care leads to adverse patient outcomes and experience.
- Operational inefficiencies including increased lengths of stay, inter-hospital transfers, and impact on interdependent services e.g. Radiology.
- Inability to deliver planned activity levels.

Key strategic risks associated with the delivery of the proposed model are set out below. Specific risks, scores and mitigations relating to the respective reconfiguration schemes are detailed in section 8.5:

Risk	Description
Public Consultation Outcome	• A negative outcome to the NHSEI Assurance process and public consultation would prevent the proposed clinical model to be implemented, and ability to address current challenges. This would also significantly impact on the operational planning for the new hospital.
Delayed Timescales to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the new hospital opening. Again, this would lead to multiple service moves in addition to equipment requirements for the new hospital and other key estate considerations.
Staff resistance to move	• Some staff may be resistant to moving to the Aintree site impacting on the availability of resources to staff the service.
Financial Implications /Affordability	• A lack of financial resources (capital and revenue) to fund the proposed clinical model and estates requirements may lead to proceeding with the 'Do nothing' option of the existing service model and moving to the new royal building and the subsequent impact of the existing challenges for the service as outlined above.

Benefits Realisation

As part of the process to monitor and track benefit delivery, a benefits realisation report will be prepared, aligned to the phased implementation of service changes introduced. These will be used monitor the impact of the proposed changes against the anticipated benefits including progress on delivery,

outcomes of service changes against key metrics to be agreed, in addition to any potential associated risks arising from the changes implemented.

Impact assessments

As previously mentioned, the proposed changes associated with the clinical services described in this document are limited to transferring an aspect of a service to another LUHFT site; expansion of service capacity; and/or alignment of clinical services to deliver a single service model of care.

The following highlights the nature and scale of the proposed changes. Using 2019/20 activity data, it indicates the number of patients that would be impacted by the changes which involve relocating aspects of the service to another of our hospital's three sites which are only a few miles apart - Royal Liverpool site is situated 5 miles from Aintree University Hospital and 4 miles from Broadgreen Hospital site; Aintree site to Broadgreen site is a distance of 5 miles (source: Google maps).

Nature and scale of proposed service changes

Scheme	Proposed Clinical Model & nature of change (Items in red indicate proposed change to current configuration)	Proposed scale of change (Number of patients impacted by change in location highlighted in red)[12]		
		RLH	AUH	BGH
General Surgery	**Nature of change:** • **Transfer aspect of service to another LUHFT site** • **Expansion/ Increase capacity** • **Align clinical standards to deliver single service model** **Outline Clinical model:** • Elective site at RLH • Non Elective site at AUH • Non-complex and day case UGI & Colorectal at AUH • Outpatients – No Change	**Inpatients (Elective)** • Upper GI 200 (50 impacted) • HPB (Pancreas) 296 • HPB (Liver) (475 impacted) • Colorectal 307 (145 impacted) **Total 1278** **Day Case** • HPB (Pancreas) 15 • HPB (Liver) 210 **Total 215** **Outpatients (New) 3052** No change **Total patient activity 4545** **Total impacted 880**	**Inpatients (Elective)** • Upper GI 483 (279 impacted). • Colorectal 441 (215 impacted) **Total 924** **Inpatients (Non Elective)** • Upper GI 245 (140 impacted) • HPB Pancreas 685 (685 impacted) • Colorectal 1608 (1077 impacted) **Total 2538** **Day Case** • Colorectal 140 (140 Impacted) • Upper GI 29 (29 impacted) **Total 169** **Outpatients (New) 4391** No change **Total patient activity 8022** **Total impacted 2565**	**Outpatients (New)** **Total 1196** No change
Vascular	**Nature of change:** • **Transfer aspect of service to another LUHFT site** • **Expansion/ Increase capacity** **Outline Clinical model:** • Inpatients centralised at AUH • Outpatients – No change	**Outpatients 2135** No change	**Inpatients** • Elective. (all 626 impacted) • Non-elective (all 883 impacted **Day Case 293** (88 impacted) **Outpatients 2013** No change **Total patient activity 3610** **Total Impacted 1597**	N/A
Breast	**Nature of change:** • **Transfer aspect of service to another LUHFT site** • **Align clinical standards to deliver single service model**	**Inpatients** • Elective 726 (235 impacted) • Non elective 73 **Day Case** 861 – (339 impacted)	**Inpatients** • Non elective 24 (no change) **Outpatients** 6836 **(**No change)	**Screening** No change

Scheme	Proposed Clinical Model & nature of change (Items in red indicate proposed change to current configuration)	Proposed scale of change (Number of patients impacted by change in location highlighted in red)[1][2]		
		RLH	AUH	BGH
	Outline Clinical model: • Inpatient /Day Case Centralised at RLH • Outpatients – No change • Diagnostics & Screening – No change • *Non Elective -* Very seldom patients will need emergency surgery. If required this can be done at either AUH or RLH as current.	**Outpatients 7534** No change **Screening** No change **Total patient activity 9194** **Total Impacted 574**	 **Total patient activity 6860** **No impact on patients**	
Urology	**Nature of change** • **Transfer aspect of service to another LUHFT site** • **Align clinical standards to deliver single service model** **Outline Clinical model:** • Inpatients centralised at RLH • Outpatients – BGH to RLH. (No change at AUH) • Day case (BGH to RLH). (No change at AUH)	**Inpatients** • Elective 1702 (668 impacted) • Non elective 2576 (1376 impacted) **Day Case** 2714 (2485 impacted) **Outpatients** 4518 (4457 impacted) **Total patient activity 11610** **Total impacted – 8986**	**Day Case** 6226 **Outpatients** 4513 **Total patient activity 10739** **No impact on patients**	-
Nephrology	**Nature of change** • **Transfer aspect of service to another LUHFT site** • **Align clinical standards to deliver single service model** **Outline Clinical model:** • Centralised Nephrology services (Renal & Dialysis) at RLH (main hub) • Consultant in-reach to AUH patients (minor site) • Outpatients /Dialysis – no change	**Inpatients** • Elective 1468 (724 impacted) • Non elective 376 **Outpatients** (including ambulatory clinics) 5739 **Total patient activity 7583** **Total Impacted 724**	**Inpatients** • Non elective 304 (no change) **Outpatients** (including ambulatory clinics) 6579 - no change **Total patient activity 6883** **No impact on patients**	Satellite Units – no change
Overall Total		**Total patient activity 15067** **Patients Impacted by service move to RLH site 11164**	**Total patient activity 36114** **Patients Impacted by service move to AUH site 4162**	**Total patient activity 1196** **No service changes involving service transfer to BGH site**

[1] **Data Source:** Inpatient (Elective & Non elective spells), Day case and Outpatient s (New) based on 2019/20 data. LUHFT Business Intelligence. Numbers

[2] **Patients impacted** - reflect the number of patients that would encounter a change in location of service delivered as a result of the service change

Quality and Equality Impact Assessments

Quality and Equality Impact assessments have been undertaken for each of the proposed clinical models.

Following completion of the EIAs and QIAs by the respective project teams, a clinical peer assessment led by the Associate Medical Director for Integration has been completed. This provides assurance that a consistent approach has been applied to each proposed service reconfiguration and ensures that any potential impacts are identified, assessed and managed appropriately.

The EIA and QIAs, including associated agreed action plans, are live documents which will continue to be reviewed and assessed throughout the approval, implementation and evaluation stages of the Integration Programme. Through the public consultation process, we will test our assumptions and ensure that the plans developed that meet the needs of local people.

Conclusion

Based on the current service provision, key challenges experienced by the services, it is recommended that the Trust proceed with the preferred clinical reconfiguration models set out in this document. This will not only improve patient outcomes, access and experience in addition to the benefits for staff, it also aligns and enables the Trust and wider system strategy for the reconfiguration of services to be achieved.

Chapter 2
General Surgery

2. General Surgery

2.1 Strategic / Clinical Case

2.1.1 Overview of Services

General surgery is a specialty that focuses on surgery in the abdominal area and intestines including the gastrointestinal tract, liver, colon, pancreas and other major parts of the endocrine system of the human body. General surgery is one of the two largest surgical specialties across the UK, employing over 30% of the country's consultant surgeons.

General surgery is delivered between the LUHFT's legacy Trust sites, Aintree University Hospital (AUH) site and Royal Liverpool and Broadgreen University Hospitals (RLBUHT) site and includes three sizeable sub-specialties:

- **Colorectal** surgery, which focuses on the lower gastrointestinal tract such as the colon and rectum, including operations for colon and rectal cancer, inflammatory bowel disease, anal cancer, prolapses, haemorrhoids and intestinal polyps, as well as bowel screening services.
- Upper gastrointestinal ('**upper GI'**) surgery, which is performed on the oesophagus and stomach and includes addressing issues such as oesophago-gastric (gullet and stomach) cancers, reflux, hiatus hernia, Barrett's oesophagus and ulcer disease;
- Hepato-pancreato-biliary ('**HPB'**) surgery, which focuses on the liver, pancreas, bile duct and gallbladder.[4]

In addition to these sub-specialties - linked to the part of the body being operated – AUH has developed services with dedicated consultants with special interests covering emergency general surgery and visceral trauma.[5] In this way, emergency general surgery is considered to be a sub-specialty in its own right, alongside the other sub-specialties of upper GI, colorectal and HPB.

Emergency General Surgery

The most common diagnoses requiring emergency surgical admission are acute diverticulitis, appendicitis, cholecystitis, pancreatitis and the incision and drainage of abscesses. Other general surgery emergency treatments include emergency laparotomies, emergency appendectomies, treatment of abscesses and emergency hernia repairs.

It is worth noting that only a minority of emergency patients admitted (under 10%) require major emergency surgery. A larger number of patients are admitted with abdominal and pelvic pain which require investigation and observation but for which no surgical procedure is indicated – these patients are typically under the care of a consultant surgeon and hence are included as general surgery spells.

The Trust's current Emergency Surgical Service is split between the Royal and Aintree sites, with each site providing a different model of service aligned to the legacy Trusts clinical service model. The Broadgreen site provides elective activity only. Both sites provide a 7-day Consultant led service for emergency surgery.

[4] Currently, AUH site only provides hepato-biliary surgery (HB), whilst RLH site only provides pancreato-biliary (PB) surgery.
[5] Trauma relating to internal organs in contrast to orthopaedic trauma.

AUH has a substantially greater number of admitted emergency surgery patients than RLH, though emergency laparotomy and appendectomy procedures are performed in similar numbers at both Trust sites.

Aintree University Hospital Site

The Emergency General Surgery Unit (EGSU) at the Aintree University Hospital site is a high-volume unit providing large volumes of emergency operating of all complexities and is in the highest volume tier for emergency laparotomies according to the National Emergency Laparotomy Audit. The EGSU is the gateway for 99% of all non-elective general surgery admissions into the Division of Surgery.

The unit sits at the heart of the major trauma service, with the major trauma centre at Aintree seeing one of the highest rates of penetrating trauma outside of London. The surgical aspect of EGSU maintains a close working relationship with Surgical Specialties in delivery of an emergency on-call service. This is also supported by junior doctor support and an Advanced Nurse Practitioner (ANP).The unit prides itself on its training and education and has both NTN Specialty Trainees in general surgery and Core Surgical Trainees attached to the unit, as well as regularly hosting international fellows who have sought training in an opportunity rich environment. The unit has an excellent reputation for education, and its Consultants are both faculty and course directors on national courses for the Royal Colleges of Edinburgh and England e.g. DSTS, PERT and SSET. There are regular innovative regional courses are run by the unit, such as a cadaveric trauma surgery course and surgical radiology course in the iMac computer suite. Most Consultants in the Unit have senior academic positions at the city's universities.

Established in 2010 to deliver a Consultant Surgeon led service for non-elective patients admitted into EGSU, the Unit's aim is to support the emergency access and average length of stay (ALOS) agendas by ensuring rapid review, diagnosis and treatment of patients.

Surgical Assessment Unit

The Surgical Assessment Unit (SAU) acts as an admission area for most of the surgical specialties however the EGSU team deals with the bulk of non-elective General Surgical admissions. The support of the 'right patient, right bed' agenda is key in delivering ALOS reductions in non-elective (NEL) surgical pathways. The table below details the source of admission for patients coming into the SAU.

Table 1 – SAU Patient activity by admission source (AUH)

	2018/19	2019/20	2020/21
A&E Department of another provider where the Patient has not been admitted	67	28	14
Elective – Booked	107	91	27
Elective – Planned	15	18	9
Elective - Waiting List	37	38	8
Emergency – Clinic	313	334	142
Emergency – GP	1,989	1,946	1,072
Emergency - Local A&E	5,729	5,947	4,863
Other emergency admission	384	317	344
Transfer from other hosp (not A&E)	10	8	11
Transfer of an admitted Patient from another Hospital Provider in an emergency	41	24	13

**Admission method names from the legacy sites are worded slightly differently when extracting data*

Major Trauma Unit

The Trust is now the single receiving site for major trauma in the Major Trauma Centre collaboration for Cheshire & Merseyside, located at the AUH site. The major trauma service has a close collaboration between Trauma and Orthopaedics and the general surgeons from the Emergency General Surgery Unit.

Patients admitted through the service are cared for on a dedicated ward. The daily trauma round includes Consultants from Orthopaedics, General/Trauma Surgery and Neurosurgery, with ITU input to facilitate high level decision making on a daily basis. The weekly Trauma MDT includes rehabilitation consultant input, meeting the National Service Specification for Trauma. Two weekly trauma team debrief sessions provide highly valuable educational purpose as well as to highlight inefficiencies in the service.

Currently there are over 100 Trauma Team activations per month with approximately 25-30 patients per month admitted with penetrating injuries, one of the highest rates outside London. The network has close working relationships with Pre Hospital Care services and transport of seriously injured patients is facilitated by the Northwest regional air ambulance service which utilises a purpose built helipad adjacent to the Emergency department at Aintree. The Mersey Regional Trauma network has some of the best national outcomes with respect to unexpected survival published by the TARN database.

Workforce

Aintree University Hospital emergency surgical cover is provided by six Emergency General Surgical (EGS) Consultants. Two consultants during working hours Monday to Friday manage all emergency admissions, operating and management of acutely admitted patients. Both of these Consultants are fully dedicated to emergency admissions during this period of time and do not sacrifice any of their elective activities. Out of hours and weekends cover is provided by the Trauma Consultant on call and a General surgeon on call rota is provided by the sub specialty teams alongside this.

EGSU also maintains a close working relationship with Surgical Specialties in delivery of an emergency on-call service. In addition to the EGSU and Trauma Consultants, there is a General Surgery Emergency rota with 24 hour availability of Consultant Surgeons on weekdays from 1700 to 0800 and weekends 24 hours.

Out of hours consultant cover is provided by the specialty surgeons however the EGSU Consultants provide a dedicated specialist rota for Visceral Trauma in support of the Major trauma service. There is an afternoon board round of all inpatients on EGSU and Trauma wards to review investigations and revise management plans to expedite ongoing care.

There is an established nursing team with a wide skill range who work flexibly throughout the Unit under the direction of the Ward Manager.

There is good support from Gastroenterology in the provision of ERCP, EUS and Endoscopy in the management of Emergency Surgical Patients. The emergency rota for gastrointestinal bleeding is staffed by consultant gastroenterologists who accept upper GI bleeding patients under their care.

Theatres

The Emergency General Surgery Unit at Aintree piloted a semi urgent programme of works in 2018 to improve the admission rate for general surgery patients via ED/SAU. This was initially funded via

'Dragons Den' at Aintree however following a review of its effectiveness was incorporated as core capacity to continue its improvements on flow and patient care.

EGSU runs 8.5 theatre sessions a week, this consists of 4 sessions of Urgent General Surgical lists (UGSL) to support admission avoidance for semi urgent cases via EDE/SAU. The remaining 4.5 sessions are providing elective capacity to urgent/routine referrals including day case capacity.

		Monday			Tuesday			Friday		
		WEEK 1	WEEK 2	WEEK 3	WEEK 1	WEEK 2	WEEK 3	WEEK 1	WEEK 2	WEEK 3
Inpatient	AM	UGSL	UGSL	UGSL	EGSU		EGSU	UGSL	UGSL	UGSL
Inpatient	PM	UGSL	UGSL	UGSL	EGSU		EGSU	UGSL	UGSL	UGSL
Daycase	AM	EGSU	EGSU	EGSU		EGSU				
Daycase	PM	EGSU	EGSU	EGSU						

Outpatients

Currently there are three consultant led outpatient clinics per week, See & Treat which supports patients who require local anaesthetic for minor procedures, i.e.; minor skin lesions, without impacting on day case/inpatient theatre capacity. Two face-to-face/ telephone clinics to support New and follow up general referrals.

Beds

The Aintree site have beds located within Ward 29, made up of 4 bays of six beds, totalling 36 inpatient beds plus 8 single patient side rooms. These are acute beds but these are not ring-fenced and are shared with other specialities. Some outlier beds are provided in wards 3, 4 and 17; however these wards are also shared with other specialties.

Diagnostic Facilities

There is no dedicated slot capacity at Aintree for interdependent services such as Radiology and Endoscopy. Emergency ultrasound and CT scanning is available, with MRI, PET and nuclear medicine scanning on request. Interventional radiology support on site is of a high standard and available 24/7.

Royal Liverpool Hospital Site

The Emergency General Surgery Unit (ESAU) at the Royal Liverpool site is a high-volume unit providing large volumes of emergency operating. The surgical aspect of ESAU is staffed on a rotating basis between the Pancreatic UGI, and colorectal teams, with support for complex patient provided by a 7 day consultant led on call service for each subspecialty. This is also supported by junior doctor support and two Advanced Nurse Practitioners (ANP).

The Royal Liverpool Hospital has developed and takes pride of the fact it has a 7-day consultant delivered service for all patients, with consultant review of all inpatients daily, including weekends. This means that there is always both breadth and depth in consultant support for emergency and elective patients.

Table 2 highlights the admission methods for all spells within the Royal, for patients who visit the ESAU.

Table 2 ESAU Patient activity by admission source (RLH)

	2018/19	2019/20	2020/21
Elective – Booked	7	4	11
Elective – Planned	6	8	6
Elective - Waiting List	4	3	10
Emergency - Bed Bureau	893	1,880	695
Emergency – Clinic	21	60	35
Emergency – GP	67	719	1,182
Emergency - Local A&E	2,551	2,730	3,016
Transfer from other hosp (not A&E)	4	5	17

**Admission method names from the legacy sites are worded slightly differently when extracting data*

Workforce

Royal Liverpool Hospital's emergency surgical cover is provided by Sub-Specialty Consultants that care for all patients admitted during his/ hers on-call week. This is supported by a second Consultant on-call (also Sub-speciality) to assure safe assessment and management of patients. The Emergency General Surgery Unit (ESAU) is a high-volume unit providing large volumes of emergency operating.

Emergency general surgery patients are admitted via an Emergency Surgical Assessment Unit (ESAU). The ESAU is open 24/7 and 365 days a year. The ESAU is a dedicated space with 16 beds available for emergency patients, of which six beds are dedicated to general surgery.

The ESAU also covers emergency GP referrals in a GP assessment clinic open Monday to Friday from 10am until 8pm, and also pulls referrals directly from A&E for surgical assessments.

Following assessment at the ESAU, emergency patients with non-complex general surgical problems remain under the care of the surgeon of the week. More complex general surgery patients who require surgeons from a sub-specialty are referred by the surgeon of the week to a consultant from the relevant sub-specialty. Both types of patients would typically be assessed by the surgeon of the week within 24 hours, usually the day following admission depending on urgency.

As described above, Emergency general surgery is provided via the 'surgeon of the week' rota model, where one consultant general surgeon addresses emergency patients in a given week. The surgical aspect of ESAU is staffed on a rotating basis between the Pancreatic, UGI, and colorectal teams, with support for complex patient provided by a 7 day consultant led on call service for each subspecialty. This is also supported by junior doctor support and two Advanced Nurse Practitioners (ANP).

This however negates the ability of the first and second on call Consultant to undertake elective activity reducing patients' access to speciality service.

Theatres

The Royal has a shared emergency list running 24 hours a day – shared with Urology, Vascular, ENT and Transplant. Additional theatre capacity is created if there are on the day cancellations, and it is not unusual to have 2-3 theatre lists running.

Outpatient Services

The RLH site currently delivers two outpatient sessions per week for Emergency General Surgery.

Beds

General surgical patients who require a hospital stay are transferred to one of three wards, each of which includes a mixture of elective and non-elective patients. Each ward has a sub-specialty focus, and elective patients are matched to be admitted into the area specialising in the relevant sub-specialty. Non-elective patients, particularly those with less complex needs, could be admitted to any of the three wards. There are c.100 beds assigned to elective /non elective general surgery at the RLH across the different subspecialties (including ESAU).

Diagnostic Facilities

Within the Royal site, there is a semi ambulatory care pathway, with allocated slots for Radiological diagnostic services for ultrasounds, but not for CT.

Emergency General Surgery Activity (RLH and AUH sites)

The following highlights the activity (spells) for emergency general surgery patients and associated length of stay at both AUH and RLH sites.

	2018/19		
	Total Spells	Total Bed Days	Average LoS
Aintree			
Surgical Assessment Unit	6,868	16,178	2.4
Ward 29	1,824	10,749	5.9
Royal			
ESAU	3,553	19,801	5.6

	2019/20		
	Total Spells	Total Bed Days	Average LoS
Aintree			
Surgical Assessment Unit	7,334	16,463	2.2
Ward 29	1,417	9,790	6.9
Royal			
ESAU	2,766	14,702	5.3
ESAU – GP	2,643	4,371	1.7

	2020/21		
	Total Spells	Total Bed Days	Average LoS
Aintree			
Surgical Assessment Unit	5,528	13,387	2.4
Ward 29	975	8,972	9.2
Royal			
ESAU	3,248	16,582	5.1
ESAU – GP	1,724	1,986	1.2

Elective Sub-Specialty Services

As described earlier, elective services can be divided into a number of sub-specialties – Colorectal, Upper GI, Hepato-Biliary (Liver); and Pancreatic services.

Colorectal Services

Colorectal surgery focuses on the lower gastrointestinal tract such as the colon and rectum, including operations for colon and rectal cancer, inflammatory bowel disease, anal cancer, prolapses, haemorrhoids and intestinal polyps, as well as bowel screening services.

Prior to the merger, both legacy Trusts had its own established colorectal service in place for elective activity in addition to providing support for emergency general surgery. The current (pre-COVID) colorectal service is a duplicated service providing both benign and malignant services on both sites.

There are a number of Trust-wide initiatives, such as the Small Early Rectal Cancer Multi-Disciplinary Team (MDT), which is a regional service, as well as the Advanced Colorectal MDT and the Complex Pelvic MDT.

Trust-wide, the full range of neo-adjuvant colorectal cancer treatment and complex or specialist rectal surgery is also provided.

In June 2021, a merged colorectal MDT was established.

AUH Site

Specialised colorectal surgeons largely focus on elective work, although they also contribute to the on-call rota for emergency services.

The Colorectal team is composed of 5 WTE consultants. The team performs procedures on the lower gastrointestinal tract such as the colon and rectum, including colorectal resections, treatment for inflammatory bowel disease and intestinal failure. On top of surgical procedures, the team based at the Aintree site also provide bowel cancer screening.

Colorectal consultants provide care only for referrals made specifically to them according to their availability, and therefore there is no elective colorectal scheduled coverage. However, colorectal sub-specialist surgeons do provide a sub-specialist rota specifically for colonic stenting.[6]

RLH and BGH sites

The colorectal team at the RLH /BGH site provides bowel cancer screening services for southern and central Liverpool, Wirral and West Knowsley. Services include colonoscopies for patients aged 60 to 74 years old and also bowel scope screening tests for 55 year olds.

For colorectal patients, there is a 24 bedded ward and a 6 bedded accelerated colorectal unit (ACRU) designed to speed recovery and reduce length of stay.

Post-operative colorectal patients have a dedicated enhanced recovery after surgery (ERAS) area.

Day case elective general surgery is provided at the Broadgreen site. However, the case mix is limited by the lack of on-site High Dependency or Intensive Care facilities.

Colorectal services are provided by 7 WTE colorectal surgeons who work on weekdays during standard opening hours. Ward rounds are provided only during weekdays.

[6] Colonic stenting is a procedure through which a hallow tube, which keeps the lumen of the large bowel open, is used to relieve complete or partial large bowel blockage. The procedure falls under the Gastroenterology department rather than General Surgery, which is why a rota exists for it.

Upper Gastrointestinal Surgery

AUH site

The Upper GI team at AUH site historically provides surgical procedures of the oesophagus and stomach, including treatment for hiatus hernias, gallstones, anti-reflux surgery as well as oesophago-gastric cancer resection surgery.

The upper GI service is part of the Cheshire and Merseyside strategic clinical network. AUH provides single site diagnostic, staging, surgery and post-operative care for all patients undergoing oesophago-gastric cancer resection surgery with appropriate intensive care and high dependency facilities. The team provides all that is required for the care of patients with upper GI disease on one site with state-of-the-art facilities including laparoscopic theatres, endoscopy rooms, interventional and diagnostic radiology and dedicated ward areas.

Upper GI services at the AUH site are delivered by 2.3 whole time equivalent (WTE) consultants (including 0.3 WTE of a visiting consultant from Arrowe Park Hospital) during the working week.

RLH site

The RLH site's service delivers both cancer and benign upper GI work with most activity delivered at the RLH site and some day-case and short stay activity at Broadgreen (BGH). The cancer service is hosted in a dedicated ten bedded UGI unit fully supported by the specialist Upper GI Professionals (Including specialist nurses, dieticians, nutrition team etc.)

Upper GI services at RLH site are currently delivered by 5.8 WTE upper GI consultants.

Following temporary changes to services in response to the COVID -19 pandemic, a review of elective Upper GI services is currently underway. However, non-elective services will be aligned to the proposed Emergency general surgery model outlined in this document.

Hepato-Biliary (Liver) Services

AUH Site

Currently, AUH site provides only hepato-biliary surgery services, while pancreatic care is provided through RLH site for the city of Liverpool and surrounding area. This is an arrangement that has historically developed within the legacy Trusts. This presents some challenges to patients, which have to be moved across the two hospitals if they require both set of therapies, including transfer of records. HB care is provided by 3.7 WTE consultants.

AUH currently provides services for liver resection, removal of the gall bladder (cholecystectomy) and reconstruction of the bile duct.

RLH site

The RLH site does not provide Hepatic surgery.

Pancreatic Services

AUH site

There is no Pancreatic service delivered at AUH site.

RLH site

In contrast to AUH, RLH site does not provide hepatic surgery, but provides surgical care for pancreato-biliary conditions. This includes resections for pancreatic cancer and a regional service for patients with severe pancreatitis across North West England.

There is a 15 bedded ward plus a 10 bedded enhanced recovery unit for the PB patients. Services are provided by 4.25 (NHS and University of Liverpool) pancreato-biliary WTE surgeons. Ward rounds are provided seven days per week.

General Surgery Enhanced Recovery After Surgery (ERAS)

Enhanced recovery after surgery (ERAS) is a multi-step process, including pre-operative patient optimisation, as well as intra-operative and post-operative care. ERAS is seen as a standard of care treatment in most hospitals.

Services therefore generally cover the whole patient pathway (i.e. before, during, and after surgery). The purpose of ERAS services is to ensure that patients:[7]

- are as healthy as possible before receiving treatment;
- receive the best possible care during their operation; and
- receive the best possible care while recovering

This is achieved through in part encouraging patients to maintain a healthy lifestyle (for example, through diet and exercise), and also through high quality care, such as the use of minimally invasive surgery. After surgery, patients will have access to rehabilitation services such as physiotherapy. ERAS principles therefore focus on the quality of recovery, as opposed to speed. However, as a result of the focus on quality, ERAS services are associated with lower complication rates, and as a consequence, a shorter length of stay. As per ERAS guidelines, the provision of the service requires the consolidation of surgeons, anaesthetics, an ERAS coordinator (often a nurse or a physician assistant) and further staff that care for the patient.[8]

AUH offers ERAS programmes in general surgery elective sub-specialties with a seven-day service.

AUH site

AUH has led on the development of enhanced recovery, for example, the legacy Trust has published the world's largest evidence of ERAS in liver surgery. In addition, the liver service at AUHFT has developed an integrated pre-operative assessment pathway and has led on pre-habilitation (i.e. pre-operative optimisation using dietetics and exercise intervention).

[7] <https://www.nhs.uk/conditions/enhanced-recovery/>, last accessed 27 February 2019
[8] Francis, N., et al (2013), 'Guidelines for Perioperative Care in Elective Colonic Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations', *World Journal of Surgery*, February 2013, Volume 37, Issue 2, pp 259–284. <https://link.springer.com/article/10.1007/s00268-012-1772-0>

RLH site

The RLH site also offers ERAS services, with dedicated enhanced recovery areas for colorectal, upper GI and pancreas patients. The pancreatic care unit was the first such unit dedicated to the sub-specialty, and was recognised by a national award in 2013 (the HSJ Award for Acute Sector Innovation).

Changes to Services during COVID-19

During the COVID-19 Pandemic Emergency General Surgery continued with a 7 day rota cover with a backup system for Consultants who required isolation periods or periods of sickness due to COVID -19.

Theatre capacity was significantly reduced but fell in line with the reduction of surgical admissions via AED due to COVID-19. As the levels of COVID-19 reduced the reimplementation of the semi urgent UGSL operating lists was reintroduced as the AED attendances for surgery increased.

Outpatient activity was moved to a triage and telephone service with only those deemed urgent being seen face to face. This allowed the service to maintain activity albeit at a reduced rate. Virtual reviews of ward discharges/follow up patients was undertaken with communication to patients via clinic letter and telephone communications to support decision making and instructions to ongoing care plans and treatment via GP's.

Patients seen in clinics were triaged and listed via a priority system to allow for those more urgent cases to be reviewed in good time.

2.1.2 Case for Change – Current Challenges

General surgical emergency admissions are the largest group of all surgical admissions to UK hospitals and account for a large percentage of all surgical deaths. Complications occur in as many as 50% of patients undergoing some common procedures, and these result in dramatic increases in length of stay.

A minority of patients presenting to the acute general surgical service require operative treatment. Patient flow depends upon effective triage, early access to senior decision makers, diagnostics, emergency theatre capacity, peri-operative and social support.

The current models across sites experience constrains and limitations to service provision and are unaligned; having two different service models also increases inequity amongst the population of Liverpool.

In addition to inequity of services areas across sites, neither service are able to provide best recommended (RCS, AUGIS) practice. It is the belief that this restraint leads to inability on occasions to meet Best Practice Tariff and recommended timeframes.

The following describes the key challenges for Emergency General surgery currently across the sites in addition to challenges within the elective general surgery sub-specialties.

Emergency General Surgery

Clinical Outcomes

Trust performance on clinical /patient outcomes are mixed across sites. Whilst there are some great successes with regard to meeting local and national KPIs, these differ across sites. Furthermore, some metrics highlight limitations in performance indicators for outcomes and quality of care, and therefore prompts concerns around the success of operations.

- **The National Emergency Laparotomy Audit (NELA)** is carried out by The Royal College of Anaesthetists as well as The Royal College of Surgeons. It provides organisations with a range of data which demonstrates how organisations are meeting key performance indications (KPIs) related to emergency general surgery Laparotomy procedures, with regards to outcomes and quality of care, and how they compare against target standards and benchmarked with other Trusts. These include:

- **Consultant present in theatre for high risk patients (when risk of death ≥ 5%)**

  The RLH site was rated 'Amber' rated during 2016/17 and 2018/19. AUH was rated 'Red' during 2016/17 and 2017/18. However in 2018/19 (Q1), performance has improved with both sites meeting standards, with 87% at AUH and 96% at RLH for Consultant surgeon and anaesthetist presence in theatre.

- **Arrival to theatre appropriate to urgency – 6 hours (Urgent CT scans)**

  There has been some improvement in achieving the 6-hour arrival KPI in 2018/19 when both Aintree and Royal improved performance and reached a 'Green' rating based on 86% and 84% in 2018/19, for arrival to theatre appropriate to urgency. Work undertaken to develop Emergency laparotomy pathways, with improvements made at AUH for performance in Consultant Radiologist reporting on Urgent CT scans for critically unwell patients that require urgent surgery. However both sites are still not reaching National Standards.

- **Getting it Right First Time (GIRFT) & RCS recommendations –** In addition to NELA, both sites fail to meet GIRFT recommendations and Royal College of Surgeons (RCS)'s standards on key areas of performance:

  i) Length of Stay following Emergency Laparotomy Procedures

  The length of stay for patients undergoing emergency laparotomy procedures has historical been below the standard, however, both sites did manage to achieve the national average of 16 days on both sites in year 2018/19.

  ii) Patient to be reviewed by Consultant within 14 hours of admission

  Both AUH and RLH sites currently do not fulfil RCS recommendation for all patients to be reviewed by Consultant within 14 hours of admission.

Clinical Sustainability

EGS Workforce Model

As set out in section 1.1, at the RLH site, emergency surgery is provided by sub-specialist surgeons who deliver both emergency and elective care. This model is not consistent with recommendations or clinical evidence on best practice. Specifically, based on clinical evidence, AUGIS recommends that only centres of sufficient scale should provide an emergency general surgery service, that care should be provided by consultants trained in emergency surgery and that support for complex patients should be provided by surgeons fully trained and experienced within a sub-specialty.[9] The delivery of emergency surgery at the RLH site by surgeons who specialise in surgery of specific areas of the body rather than in emergency work contradicts these recommendations.

[9] AUGIS (2015), 'The future of emergency general surgery', March 2015. <http://www.augis.org/wp-content/uploads/2014/05/Future-of-EGS-joint-document_Iain-Anderson_140915.pdf>.

Recruitment

There have been difficulties in recruitment of consultants without them already having subspecialty interests.

Operational Challenges

- Both sites perform below the National Referral To Treat (RTT) 18 week waiting times threshold for general surgery (for example 85.9% and 80.9% respectively against 92% in 2017/18) – following the recent pandemic this has dropped significantly to 45.53% as a combined LUHFT position.
- There is a lack of rapid access service (Ambulatory Care 'Hot Clinic') leading to multiple procedures and operations (like uncomplicated hernia, appendicitis, abscess) being performed as inpatient rather than day case. This increases burden on NCEPOD theatre and emergency surgical and anaesthetic teams.
- The current location of the SAU at AUH is removed from the main ED and therefore lacking speedy access to diagnostic support. The impact of which is pressures within flow which adversely affects the four hour access standard.

Estate

- There is no ring fenced assessment space within New Royal dedicated specifically for Emergency General Surgery, so change is needed in order to locate services within an appropriate estate footprint.
- The current estate in AUH does not provide sufficient capacity to provide safe and quality rapid assessment and efficient patient flow. The current location of the SAU is removed from the main ED and therefore speedy access to diagnostic support. The impact of which is pressures within flow which adversely affect the four hour access standard.

Colorectal Services

Rising Demand

The population of Liverpool faces worse health outcomes across a number of areas compared to the national average. This is the case as regards colorectal cancer - the population of Cheshire and Merseyside face particular challenges as concerns this type of cancer, both in terms of incidence overall and significant variation across the patient population in the region:[10]

- There has been a 6% increase in incidence rates of colorectal cancer over the past ten years in the region, compared to a two per cent reduction nationally.[11]
- Over half of colorectal cancers in the region (56.1%) were classified as stage three or stage four at diagnosis, with variation across CCGs (50% to 66%). [12]
- There are also sizeable variations across Cheshire and Merseyside for two-year colorectal and lung cancer survival.[13]

[10] The reasons underlying these trends are multifactorial and not clearly understood. For the second of the listed trends – being at a further stage at diagnosis – may be a sign of lower uptake in screening.
[11] AUHFT and RLBUHT (2017), 'Service Integration Planning Template – General Surgery', 21 September 2017
[12] AUHFT and RLBUHT (2017), 'Service Integration Planning Template – General Surgery', 21 September 2017
[13] National Bowel Cancer Audit (2017), 'Annual Report 2017', version 2. Table 7.4 provides an overview of the variation in mortality across Cheshire and Merseyside hospitals.

- Against this backdrop, it is particularly important for elective services in colorectal general surgery to be configured optimally to provide the best services to address these local challenges. However, the Trust currently faces significant challenges in the provision of elective colorectal cancer services at both sites.

Limited procedure volumes at each site due to fragmentation of services

Volumes of elective colorectal patients are far lower at both sites than the national average. The following table provides further indication of number of elective procedures per consultant at the Trusts, based on the GIRFT reports.

The Royal Colleges, Improving Outcomes Guidance, Clinical Networks and NHS national guidelines increasingly relate patient outcomes to catchment population size and emphasise the importance of sufficient clinical volume. The number of operations performed per consultant at the Trusts is relatively low – for colorectal cancer, short of relevant AUGIS guidance, which indicates around 20 procedures per year per surgeon.[14]

Table 3: Number of colorectal procedures per surgeon

	AUH site		*RLH site*	
WTE Consultants	**5**		**7**	
Procedure	***Number of procedures***	***Per consultant***	***Number of procedures***	***Per consultant***
Colorectal cancer – Local excisions including minimally invasive procedures	16	3.2	18	2.6
Colorectal cancer: Rectal resection	58	11.6	62	8.9
Colorectal cancer: Colonic resection	74	14.8	59	8.4
TEMS procedures[15]	14	2.8	11	1.6
Rectopexy – ventral mesh	2	0.4	22	3.1
Rectopexy – other	0	0	2	0.3
Sacral nerve stimulators placement	0	0	36	5.1
Stapled Heamorrhoidopexy	4	0.8	0	0
Banding of haemorrhoids	263	52.6	69	9.9
Ulcerative colitis procedures: ileal pouch anastomosis	0	0	4	0.6

Source: NHSI GIRFT reports for AUHFT and RLBUHT.

At present, for example, not all surgeons are trained in laparoscopic colorectal surgery which means that not all patients who are referred for treatment are offered this technique which may be beneficial in terms of post-operative complications and shorter length of stay. GIRFT reports show that RLBUHT in particular has a low laparoscopic resection rate.

Clinical evidence[16] indicates that a statistically significant relationship has been observed over a number of studies between surgeons performing a high number of colorectal procedures and improved mortality rates and a lower rate of permanent stomas, as described in the discussion of the fragmentation issue

[14] As per NICE guidance, <https://www.nice.org.uk/guidance/csg5/resources/surveillance-report-2016-colorectal-cancer-2011-nice-guideline-cg131-and-improving-outcomes-in-colorectal-cancer-2004-nice-cancer-service-guidance-csg5-2304668989/chapter/Commentary-on-selected-new-evidence?tab=evidence> last accessed 27 February 2019
[15] Transanal Endoscopic Microsurgery.
[16] Morche, J, el at (2016), 'Relationship between surgeon volume and outcomes: a systematic review of systematic reviews', *Systematic Reviews,* 2016 5:204. <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-016-0376-4>

above.[17] It follows that the current provision of services for the Trust's hospital sites will suffer when minimum surgeon volumes are not attained.

Clinical sustainability

Additionally, both hospital sites face challenges due to the fact that the workforce has to be divided between elective colorectal care, in which they are specialised, and non-specialised emergency cover (through the 'surgeon of the week' model at RLH site and the out of hours rota at AUH). This means that the colorectal specialists at both sites are currently required to spend a significant amount of time providing emergency cover for treatments outside their sub-specialty field, thus providing further limitations on, for example, junior doctors' ability to obtain appropriate experience in the field. This additionally implies that the consultant staff are at times, unable to provide colorectal specialism when required.

There is therefore no colorectal specialist cover beyond 8am-5pm Monday to Friday at either Trust, unless a colorectal surgeon happens to be on-call for general surgery out of hours. This is due to the relatively small size of the colorectal surgeon workforce, and means that patients that require specific colorectal expertise will face either delays or treatment by a non-specialist where this is possible.

Additionally, the full range of techniques are currently not available at each of the Trust's sites as it is a complex sub-specialisation and the expertise is not uniform across the Trusts. Instead, the two Trusts do cover all relevant expertise between them, but this can involve referrals of patients between the Trusts, which can contribute to some of the delays to care that are observed.

Variation in Patient Outcomes

There are several examples specific to elective colorectal surgery that evidence the effects of the challenges to patients, and that link back to the overall challenges, namely that volumes are fragmented and that the workforce is stretched. This is evidenced by lower quality of care and higher length of stay compared to benchmarks, as indicated below:

- **Quality of care**

  At both sites, a higher than average share of colorectal cancer rectal resections resulted in admissions with complication or adverse outcome of care. At AUH the number was 25.9%, while at RLH, the figure is 25.8%, both above the average of 19.3%.[18]

  GIRFT data also indicates that in relation to diverticulitis admissions (a subset of colorectal surgery patients), both RLH and AUH sites are somewhat worse than the benchmark in relation to the proportion of admissions with a hospital acquired condition recorded. The proportion at AUH and RLH was 1.7% and 2.6% respectively compared to the benchmark of 1.5%.

- **Length of stay:** Length of stay (in days) was also higher than average for both rectal and colonic resections at both Trust sites, still according to the GIRFT data.[19]

[17] A stoma is where a section of bowel is brought out through an opening on the patient's stomach area. Bowel movements are then collected in a pouch or bag attached to the skin around the stoma.
[18] NHS Improvement, 'Getting It Right First Time: Adult General Surgery, Royal Liverpool and Broadgreen University Hospitals NHS Trust'.
It should be noted that the report itself caveats that this measure does not mean the condition was acquired during the relevant hospital admission, or at the hospital in question. Additionally, the GIRFT programme National Specialty Report on General Surgery also stated that "Just four of the 50 hospitals that participated in the GIRFT review programme were able to report wound infection rates reliably. Very few units have a clear picture of the complications that occur following surgical treatment; the overall picture is of a significant lack of understanding of these vital quality measures". See GIRFT (2017), 'General Surgery GIRFT Programme National Specialty Report', August 2017, page 40. <https://gettingitrightfirsttime.co.uk/wp-content/uploads/2017/08/GIRFT-GeneralSurgeryExecSummary-Aug17v1.pdf>.
[19] NHS Improvement, 'Getting It Right First Time: Adult General Surgery, Aintree University Hospital NHS Foundation Trust' and NHS Improvement, 'Getting It Right First Time: Adult General Surgery, Royal Liverpool and Broadgreen University Hospitals NHS Trust'.

Table 4: Length of stay for colorectal cancer procedures

	AUHFT – LOS (days)	*RLBUHT – LOS (days)*	*England average – LOS (days)*
Rectal resection	11	9	8
Colonic resection	8	9	7

Source: GIRFT reports.

Upper GI services

The main challenges for elective upper GI services include:

i) **Low procedure volumes as separate units**, where bringing services together would increase procedure volumes delivered by a single unit and, in turn, deliver patient outcome improvements;

ii) **Separate, smaller specialty workforce pools** bringing about medical workforce challenges, such as more intense rotas, and recruitment and retention challenges;

iii) **Inequity of service across the city**; different models of care and support services input between the two sites meant patients from different parts of the city did not receive the same quality of care;

iv) **Poorly performing benign upper GI service** in terms of day case rates, length of stay (LOS) and waiting times.

v) **Lack of 'critical mass' not conducive to innovation and research programmes**

The main driver for upper GI service reconfiguration proposed originates from the 2012 Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland (AUGIS) document mandating single site provision of cancer services; providing a comprehensive, multidisciplinary approach to the management of UGI cancer. It also defined a minimum patient population of between one to two million.

As such, the upper GI team developed a proposed model where the final integration of all cancer surgical services would be located at the RLH site, supported by the new Clatterbridge Centre for Oncology, University of Liverpool and the Knowledge quarter. This has resulted in a combined patient population in excess of two million. There was a clear pathway to support this starting with a unified MDT meeting commencing 2017, a single site MDT from June 2019 and a proposal to facilitate single site working following the formal merger of the two legacy trusts in October 2019.

Hepatobiliary and Pancreatic surgery

Fragmentation of HPB surgery

HPB surgery is particularly fragmented in Liverpool. AUH site covers Hepato-Biliary services whilst RLH covers Pancreato-biliary services: neither site provides a comprehensive service for HPB surgery. Nationally, most HPB units provide liver and pancreatic surgery from within the same team, even if not all HPB surgeons will do both liver and pancreatic resections.

The split of HB and PB services between the two legacy Trusts (and now, two hospital sites), leads to HPB staff being also split between these sites. Guidance states that a HPB unit must be able to provide management for both elective and emergency HPB patients at all times and this means that there must be no fewer than five surgeons at an HPB unit: neither the RLH site, or the AUH site complies with this.[20]

[20] Association of Upper Gastrointestinal Surgeons (2016), 'The provision of services for upper gastrointestinal surgery'. <http://www.augis.org/wp-content/uploads/2016/06/Provision-of-Services-June-2016.pdf>.

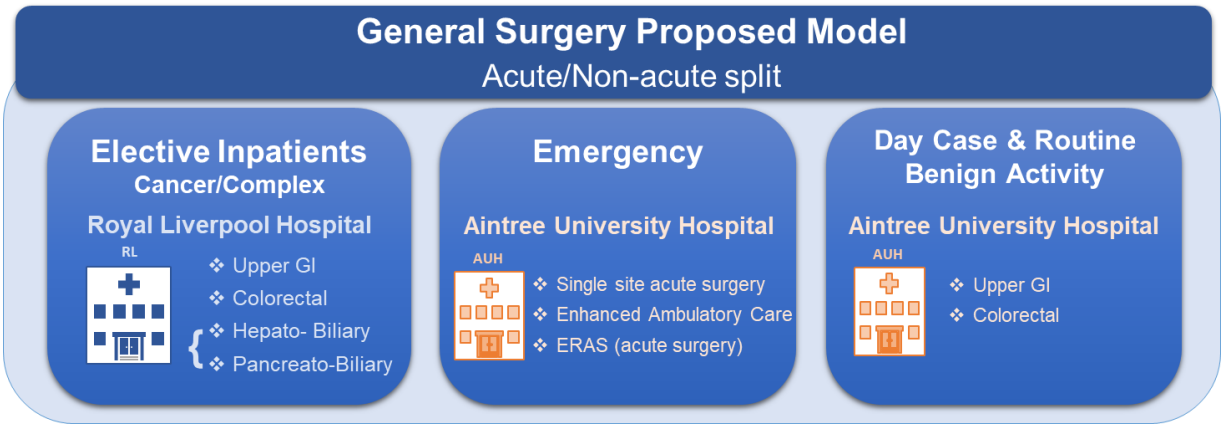
This also has an evidence-based impact on patient outcomes - higher volumes of pancreatic and hepatic surgery are associated with lower postoperative mortality rates.[21]

The key challenge relates to the split in services across sites. The split in HPB services and MDTs make pathways difficult for hospitals making referrals, as patients may require treatments that are currently offered at only one of the Trust's sites, creating issues in cross-city referrals and transfer of documentation. For example, an interventional radiologist performs radio frequency ablation of inoperable liver cancer at RLH whilst all surgical procedures are at AUH.

2.1.3 Addressing Service Challenges – Proposed service model

The key proposal underpinning the integrated model for general surgery is to consolidate similar services and patients onto the same site, establishing a 'hot' (non-elective) site at the AUH site where dedicated teams are in place to carry out emergency surgery, and a 'cold' (elective) site at RLH site specialising in carrying out planned surgery, with limited disruption to waiting lists caused by emergency cases.

The separation of elective and non-elective general surgical care will allow both aspects of the service to be managed efficiently, improve availability of staff for pre and post-operative reviews, allow for patients to be seen in a timely manner and treated by appropriate specialists, and ensure that trauma and other emergency demands do not impinge on the ability to deliver elective general surgical care. The model has the additional benefit of ensuring enough scale in each sub-specialty for effective service and for junior doctors to get relevant experience.



The 'hot' and 'cold' sites

Non-elective services will be concentrated at AUH, which will remain a hot site for general surgery, bringing in patients from across the merged Trust. AUH will host a single emergency care unit for emergency general surgical A&E and GP admissions and provide care seven-days a week, in line with best practice. Ambulance protocols will be updated to direct patients who require emergency surgery to AUH.

The proposed service model will include the emergency general surgery service being delivered by consultants with specific sub-speciality elective and EGS interests, with the remaining Out of Hours (OOH) on-call delivered by existing sub-speciality consultants. The proposed model will incorporate the utilisation of ambulatory care pathways to support delivery of acute general surgical care as well as the development of a triage system, to support 'Hot clinics' being established and reduce the requirement for

[21] Morche, J, el at (2016), 'Relationship between surgeon volume and outcomes: a systematic review of systematic reviews', *Systematic Reviews,* 2016 5:204. <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-016-0376-4>

patients to be within Surgical Assessment Unit, or admitted awaiting diagnostics unnecessarily. The model will also include an enhanced peri-operative medical care for emergency general surgery patients, with development of ERAS pathways as well as support by geriatricians for our elder patients using the Ortho-geriatrician model.

In delivering this improved model for unplanned care for Emergency General Surgery, this will also enable and drive the changes required to achieve improvements and wider vision for elective General Surgery such as:

- A best in class specialist tertiary centre for general surgery subspecialties (HPB, Upper GI and Colorectal).
- Access to advanced treatments including Peritoneal Surface Malignancies and Robotic surgery.
- Rapid access to diagnostics to treatment.

The RLH site will be transformed into a ‘cold’ site for general surgery, and will specialise in elective general surgery, including complex benign and cancer cases (i.e. elective upper GI, HPB and colorectal cases). General surgical emergency cover will continue to be provided for occasional patients at RLH who may require emergency surgery but are not fit for transfer – this may include inpatients admitted to RLH site for other conditions and occasional patients who present at the RLH A&E. Both sites will have on-site support from anaesthesiology, radiology (diagnostic and interventional), and intensive care.

Providing elective care on a separate site to the emergency centre will improve the learning and development of junior doctors by allowing them to gain more consistent and thorough experience in elective work. Junior doctors will split their time across the two sites. Trainees will undertake their emergency surgery training in blocks, which would be best for continuity, planning and work-life balance of the trainees. This model has received support from the Programme Director for General Surgery from Health Education North West England.

2.2 Economics Case

2.2.1 Alignment with Trust Objectives

In developing the proposed model, consideration has been given to how the proposed clinical model would support Liverpool University Hospitals in achieving its vision and alignment to the Trust's strategic objectives.

The following provides a high level overview of how the proposed model aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition.

Strategic Priority	Rationale / Expected Benefits
Great CARE	• Adopting best practice guidelines in line with AUGIS, RCS and GIRFT recommendations will improve patient outcomes, patient experience and provide timely access to care. • Reduces variation of services across the city thus improving the equity of general surgery services for the population. • Separating the operating streams allows the development of individual pathways that promote enhanced recovery, and enhanced day case operating with reduced morbidity and length of stay.
Great PEOPLE	• Separation of emergency and elective services for the respective subspecialties will streamline job planning across both sites improving cross cover, better utilisation of lists and clinics and help minimise cancellations. • Provides an opportunity for surgeons who currently provide on-call at RLH to evolve throughout their career as consultants are able to maintain expertise in some elective procedures as well as undertake EGS work, thereby improving recruitment and retention. • Increase opportunities for Professional development of staff in clinical procedures using latest minimally invasive and robotic services leading to improved outcomes and patient experience • Will also better facilitate training for subspecialties, strengthening current training provision as identified by the Deanery.
Great RESEARCH & INNOVATION	• The combination of UGI, Colorectal, Urology, Liver and pancreatic services at a single site will allow development of an integrated robotic service that will facilitate a national proctorship program. • The centralisation of subspecialty cancer services at RLH will further build on the collaborative working with the University of Liverpool; resulting in supervision of PhD students and a number of academic peer reviewed publications. Combined with the establishment of the knowledge quarter adjacent to RLH, there will be further opportunities for further joint working.
Great AMBITION	• Increased efficiencies generated through standardised clinical standards and enhanced pathways including ERAS, reducing length of stay and critical care bed usage. • Optimised use of estate in theatre capacity for planned and unplanned activity with an increased day case conversion through ambulatory care. • Enhance Trust Reputation and collaboration with other institutions – the integrated subspecialty units will be amongst some of the biggest centres by case volume and will place them in a strong position to appoint high quality clinical fellows as well as developing collaborative links with other institutions. This will have a significant positive impact of the reputation of the hospital as a whole.

2.2.2 Options Appraisal

The following describes the different options considered to best address the challenges highlighted and continue to improve the quality of care for better health outcomes with rising demand and tighter financial constraints.

Option 1: Do Nothing (AUH and RLH services remain delivered in the same way as they are currently)

Doing nothing would involve continuing with the existing model for Emergency General Surgery and elective sub-specialty services across RLH and AUH site with non-standardised pathways and models of care.

Option 2: Implement the current AUH Model for EGS across AUH and RLH Site

This option proposes implementing the current existing AUH clinical model for Emergency General Surgery across the RLH and AUH site. While this option would provide a streamlined approach for delivery of EGS, it would however result in the requirement to provide EGS Assessment Unit or 24/7 Emergency Surgery at the New Hospital, reducing allocation of estate from other LUHFT services.

This model would also mean that recruitment of dedicated EGS surgeons would be required to provide the acute service for Emergency General Surgery. Alternatively using the existing staff, would result in removing the elective sub-specialty of surgeons to fulfil this role.

Option 3: Implement the current RLH Model for EGS across AUH and RLH

This option proposes implementing the current existing RLH clinical model for Emergency General Surgery across the sites. This option would provide a streamlined approach for delivery of EGS. However, as the department moves into the new RL hospital, the planned allocation of space and theatres is inadequate to provide the current EGS demand at RLH resulting in the need to allocate additional space in the new building to provide ESG theatres and Assessment Unit, reducing allocation of new hospital estate from other LUHFT services.

To implement the RLH model across sites would require the consultant surgeons currently delivering emergency general surgery at AUH, to retrain for sub speciality or be at risk of redeployment. This model would also require those who currently deliver sub speciality surgery at AUH and RLH, to cover emergency surgery, impacting elective capacity.

Option 4: Unified Acute Surgical Single Site Service on Aintree site

This option provides a single Emergency General Surgery service for the population of Liverpool, to allow a unified centralised service at Aintree, providing dedicated cover for Emergency Generel Surgery. This model will provide focus on the development of ambulatory care pathways and rapid access diagnostics and general surgical lists to support delivery of acute general surgical care within the city. This provides the potential to enhance pathways and work with key departments such as Radiology, Theatres and other Diagnostic services to streamline pathways and reduce diagnsotic waiting times.

An options appraisal exercise was undertaken to assess the clinical service model options against the Trust's criterion. The following outlines the aggregate scoring from the Options Appraisal. Further detail on scoring and rationale behind scores provided are set out in Appendix 1 ('Options Appraisal scoring').

Option 1 – Do nothing

Criterion	Indicators	Weighting (out of 5)	Option 1 Aggregated weighted score (based on 4 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	8	• Would not align to the Trust's strategic direction in terms of elective/non-elective work with the Royal site concentrating on cancer/complex elective services • The merger strategy was based on integration of services to improve patient care across the region
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	20	• Continued inequity of service across sites and no anticipated improvements can be realised • Different outcomes across sites
Estates Risk	**What is the level of estates risk being addressed?**	**1**	6	• Not enough provision in emergency theatres within the new hospital • Would affect capacity for admissions and theatres • Would affect ED capacity for patients at RLH • Risk of loss of elective activity
Quality	**How much does the project contribute to the patient quality of care?**	**3**	21	• Unaligned models of care across sites • Long term will access to timely care
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	28	• Lack of efficient ambulatory care therefore greater numbers of unnecessary admissions • Increases in waiting list • Locum shifts continue
Total weighted aggregate score and ranking			**83** **(Ranked 3rd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 2 - Implement the current AUH Model for EGS across AUH and RLH Site

Criterion	Indicators	Weighting (out of 5)	Option 2 Aggregated weighted score (based on 4 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	8	• Keeping the units split results in duplication of effort • Does not align with strategy of the organisation • Centralised acute emergency service is not being delivered as part of this option
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	40	• Some equality in terms of access to services • Same way of working across sites is a benefit but risk around deliverability particularly around workforce required
Estates Risk	**What is the level of estates risk being addressed?**	**1**	4	• Lack of ring fenced estate at RLH with no SAU • No emergency theatre at RLH
Quality	**How much does the project contribute to the patient quality of care?**	**3**	24	• Would improve quality of outcomes for RLH but would not improve model as is currently in place at AUH • Allows for a standard model across sites to deliver an equitable service but no improvements expected
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	16	• Substantial investment needed in estate and workforce • Expected displacement of elective activity • Increase to 3+ consultants to support consultant of the week model • Requirement in the medium/long term for RLH estate changes to support • Duplication across sites meaning a great level of capital costs
Total weighted score and ranking			**92** **(ranked 2nd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 3 - Implement the current RLH Model for EGS across AUH and RLH

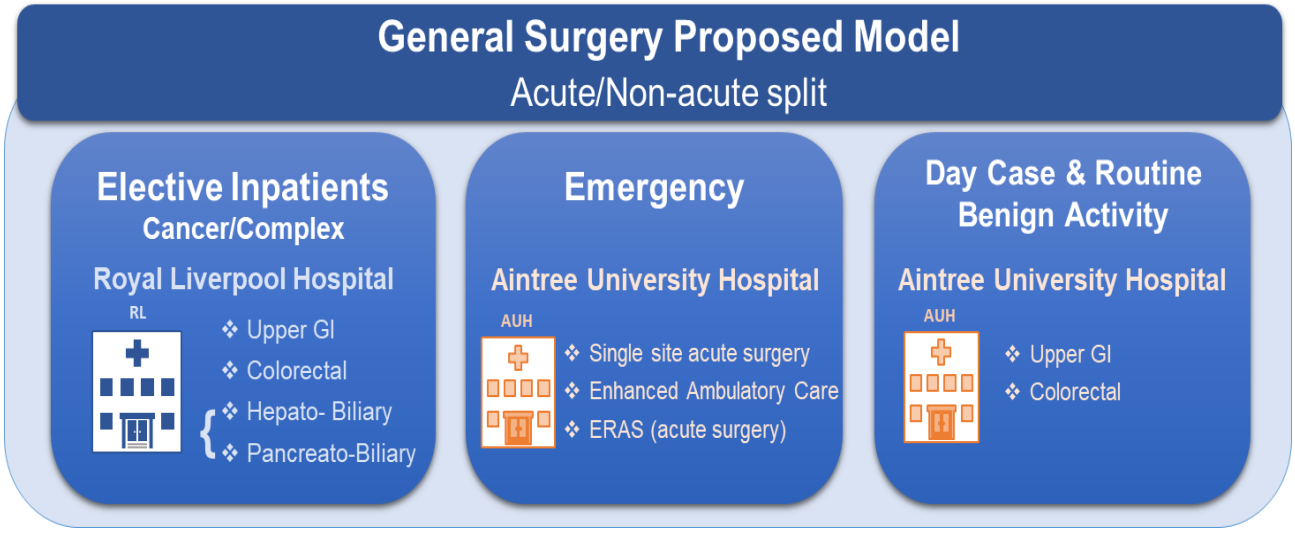
Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 4 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	8	• Keeping the units split results in duplication of effort • Does not align with strategy of the organisation • Centralised acute emergency service is not being delivered as part of this option
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	20	• Would be a step back from current AUH model for AUH staff as is less efficient • Will lead to longer waits for consultant review and theatre waiting lists
Estates Risk	**What is the level of estates risk being addressed?**	**1**	4	• Estate at RLH not sufficient to support • Considerable consideration would be needed around theatre, staffing clinics and SAU
Quality	**How much does the project contribute to the patient quality of care?**	**3**	12	• Expected decrease in quality and reduction in performance, affecting KPIs and quality of care
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	16	• Back-fill required for EGS work due to sub-speciality consultants contributing towards rota • Expected short-fall in elective capacity
Total weighted aggregated score and ranking			**60 (ranked 4th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 4 - Unified Acute Surgical Single Site Service on Aintree site

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 4 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	40	• Fits perfectly with the Trust's strategic direction
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	80	• Implements an equitable service across sites
Estates Risk	**What is the level of estates risk being addressed?**	**1**	17	• With suitable Aintree estate, this mitigates the requirement for additional capacity within the RLH • Optimising the estate across sites • Emergency theatre utilisation being explored to support
Quality	**How much does the project contribute to the patient quality of care?**	**3**	60	• Implement ambulatory care, support timely senior reviews and improvement in length of stay • Implementation of Hot Clinics to support admission avoidance • Streamlined pathways supported by appropriate diagnostic services
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	64	• Would require investment but with significant benefits realised
Total weighted aggregated score and ranking			**261 (ranked 1st)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

2.2.3 Preferred Option

Given the challenges faced under the current model (Option 1) and the subsequent challenges and limitations arising from option 2 and 3 including increased estates constraints, the preferred clinical model identified is option 4 to consolidate similar services on the same site. Planned cancer /complex subspecialty activity will be consolidated at the RLH site and a centralised emergency site will be established at Aintree, where dedicated teams are in place to carry out emergency surgery with enhanced access to diagnostics.



Emergency General Surgery

The separation of elective and non-elective general surgical care will allow both aspects of the service to be managed efficiently, improve availability of staff for pre and post-operative reviews, and for patients to be seen in a timely manner and treated by appropriate specialists, and to ensure that trauma and other emergency demands do not impinge on the ability to deliver elective general surgical care. The model has the additional benefit of ensuring enough scale in each sub-specialty for effective service and for junior doctors to obtain relevant experience. It is anticipated that this model will be in place by September 2022 to coincide with the opening of the new hospital which is based on the Royal site.

The centralisation of acute surgery and the use of dedicated consultant staff to provide emergency care is becoming more common place within the NHS, but is particularly well developed at Aintree site. This allows for early review by a senior decision-maker with regards to aspects of care such as need for admission, targeting of investigations and decision as to whether it is appropriate to operate. This is in contrast to previous models of emergency surgery care where a consultant would take on care for an emergency patient and provide treatment of this patient around elective commitments. Developing the EGS has led to a reduction in mortality for acute surgery, reduced lengths of stay and a greater utilisation of ambulatory care pathways to manage patients without the need for admission.

This option provides a single Emergency General Surgery service for the population of Liverpool, to allow a unified centralised service at Aintree, providing dedicated cover for Emergency Generel Surgery. This propsoed model will provide focus on the development of ambulatory care pathways and rapid access diagnostics and general surgical lists to support delivery of acute general surgical

care within the city. This also provides the opportunity to enhance pathways and work with key departments such as Radiology, Theatres and other Diagnostic services to streamline pathways and reduce diagnsotic waiting times.

Patient pathways

The following figures highlight the proposed patient pathways for both GP referrals (figure 1) and ambulance/walk-in patients (figure 2).

Figure 1 – Proposed GP referral pathway

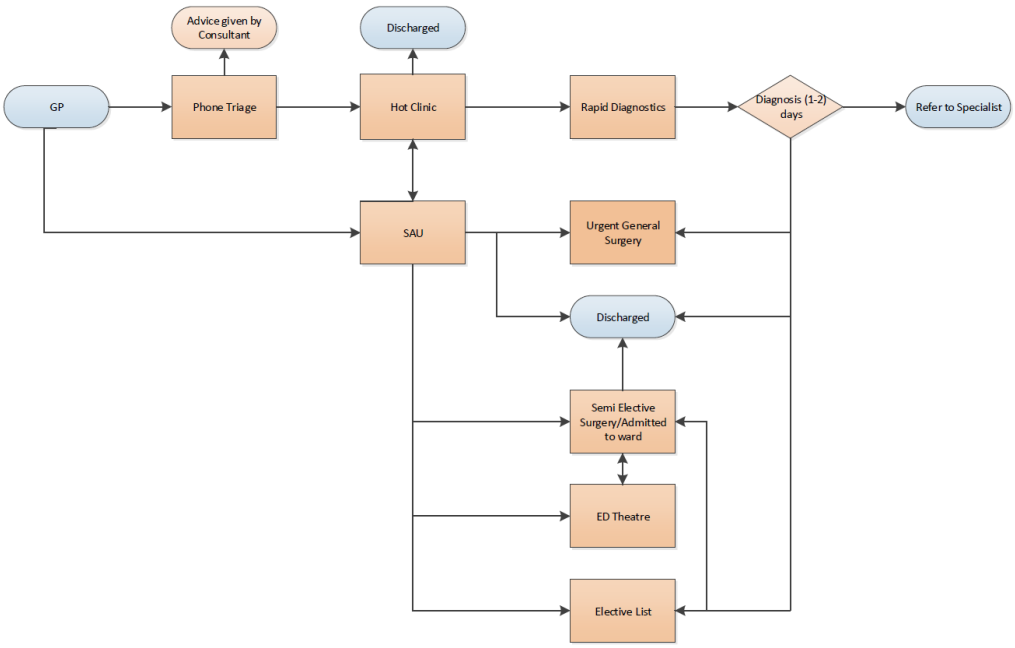
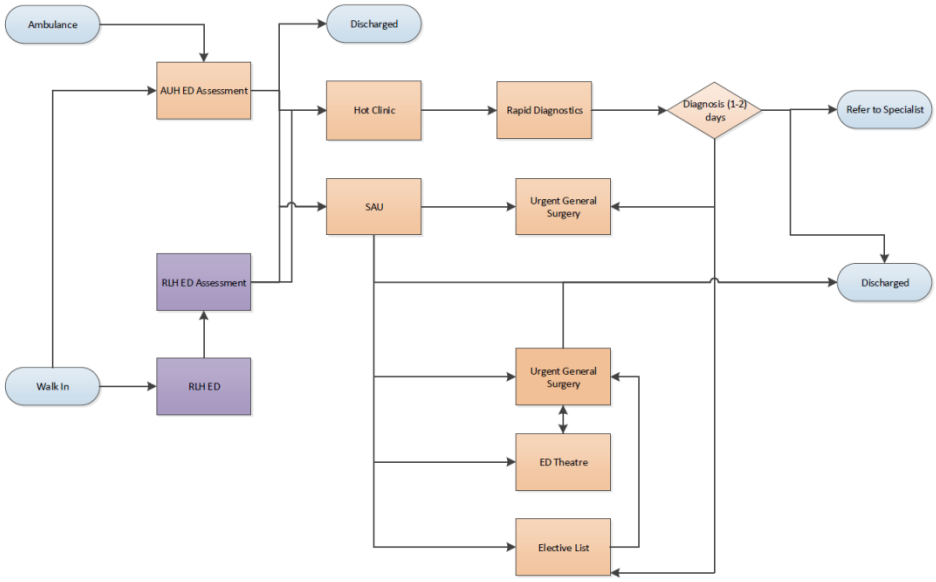


Figure 2 - Proposed ambulance/ walk-in pathway



Surgical Assessment Unit (SAU)

The Surgical Assessment Unit (SAU) will support early decision making through appropriate clinical triage, with timely access diagnostics. It will offer a streamlined ambulatory care with clinics / treatment areas and have the ability accept direct conveyance patients.

Within the SAU, EGS patients will be assessed which includes patients admitted directly from the emergency department (ED), using predefined pathways, ambulatory patients and GP referrals, and will operate in a dedicated area. The assessment at SAU prior to treatment by EGS surgeons aids rapid diagnosis and access to surgery for acute surgical problems, i.e. pancreatitis, and allows EGS surgeons to focus on patients who require their expertise.

If the assessment at the SAU indicates that a patient requires an inpatient stay, the patient will be transferred to theatre if they require immediate surgery, or to a ward.

The SAU will continue to operate as a defined area staffed during normal working hours potentially expanding to 08:00 – 20:00, 7 days per week with cover provided by dedicated Emergency General Surgeons working.

Patient Flow: Emergency Department to SAU

Patients would be assessed and triaged within the Aintree Emergency Department (ED) assessment area and then would be either discharged, referred to a Hot Clinic, or transferred to the 25 bedded Surgical Assessment Unit.

For those who would be admitted to SAU, based on 2019/20 data, it is expected that 2,700 patients per year attend via ambulance and are admitted to SAU following attendance within ED, with 5,850 patients per year and attend ED via other means; for example, private or public transport or a walk in.

Patient Flow: SAU to EGS and sub-speciality care

Patients attending SAU will be admitted under the Emergency General Surgeons and following review, will be reallocated to sub-speciality teams across surgery for further management. Those patients who remain under the care of EGS surgeons will either be admitted to the wards or diagnostics requested whilst they remain on the unit or discharged with urgent outpatient diagnostics requested.

Any patient who requires urgent surgery will be assessed for suitability to be discharged home with a return to Urgent General Surgery theatre lists within the week. The EGS provides “office hours” emergency care from an EGS Surgeon from 8am to 5pm, five days a week covering acute inpatients, emergency theatres and admissions / referrals (with long term plan to expand it to 7 day service) and a weekend on call rota covered by sub-specialities.

Patient Flow: From ED to ‘Hot Clinics’

The proposed model and enhanced ambulatory care will involve the introduction of ‘hot clinics’. The purpose of the ‘Hot Clinics’ are to ensure that patients who do not require admission for diagnostics or procedures, are managed appropriately to minimise overnight stays and therefore discomfort to patients.

If a patient is considered medically fit, they will return home with a clear plan and further investigations or appointments scheduled on an outpatient/virtual inpatient basis, within 48 hours where urgency/capacity permits. Some of these patients may still require surgery under an inpatient stay, but the key difference is that they are not admitted as inpatients prior to their surgery unless medically necessary. There is also access to an Urgent General Surgery operating list to support patients following the SAU pathway and reducing the impact on emergency theatres.

The benefit of this approach is to enable the reduction of hospital admissions which, as well as being convenient for patients, can also avoid complications associated with hospital admissions such as reduced mobility and hospital-acquired infections. It is anticipated that this approach would be appropriate for uncomplicated appendicitis, abscess, hernia and gallstone patients.

Hot Clinics will be available 5 days per week during working hours and staffed by EGS Consultant, ANP, Nurse and Junior trainee with support of radiology department.

Transfers from Royal to Aintree

There would be consultant cover during the hours of 8am – 5pm at the Royal site. Patients requiring emergency treatment would be stabilised and transferred to Aintree for appropriate treatment.

The table below shows the total number of patients arriving at the Royal ED by their own means; for example, public/private transport or own transport, of which some would require transfer to the Surgical Assessment unit. Effective communication of location of service provision would be required to reduce emergency transfers between sites. Further detailed work will be undertaken with NWAS to understand full impact and develop standard operating procedures for how this will be operationalised.

Table 5 – Patients arriving RLH by own means

Year	Number of Patients
2018/19	1,331
2019/20	1,634
2020/21	2,120

ED arrivals by ambulance for EGS patients

The table below outlines the number of emergency arrivals on to the Royal site via ambulance transfer in 2019. As part of required discussions with NWAS, it is anticipated that those who would usually be transferred from home to RLH ED would be transferred instead, directly to AUH ED.

Table 6 – Patients arriving RLH by ambulance

Month	Emergency arrivals at RLH via ambulance
January 2019	73
February 2019	59
March 2019	65
April 2019	77
May 2019	76
June 2019	81
July 2019	99
August 2019	111
September 2019	89
October 2019	94
November 2019	83
December 2019	67
Total	**974**

Improvements in Enhanced Recovery after Surgery (ERAS)

Enhanced Recovery After Surgery (ERAS) is based on a protocol which does not require weekend medical review, as nurses can discharge patients if they follow the protocol.

ERAS will be modified to cover Emergency General Surgery (both perioperative period and discharge process) to reduce length of stay, particularly for common acute surgical presentations, especially laparotomy. The combined, holistic approach to Emergency General Surgery and ERAS pathways, coupled with physician input will help deliver services in line with best practice, including for example:

i) Admitted under the joint care of a consultant geriatrician and a consultant sub-specialty general surgeon

ii) Admitted using an assessment protocol agreed by geriatric medicine, general surgery and anaesthesia.

iii) Assessed by a geriatrician in the preoperative period: within 72 hours of admission.

iv) Postoperative geriatrician-directed multi-professional rehabilitation team.

Elective Sub-specialties

Colorectal

The provision of elective colorectal surgery at the Trust's sites currently faces challenges of not providing a sufficient number of procedures to meet volume thresholds, as well as disruption to elective care as a result of emergency workloads. The proposed model offers the opportunity to rationalise specialist cancer surgery onto one site so that patients are seen by the right person at the right time, establishing a single service for patients. This is aligned with the specialist commissioner and cancer alliance strategy.

The proposed clinical model will create a single unit for colorectal emergency and elective specialist care across the City. This significantly increases the number of patients – approximately 400 colorectal cancer patients and 300 colorectal resections a year and will allow for further sub-specialisation.

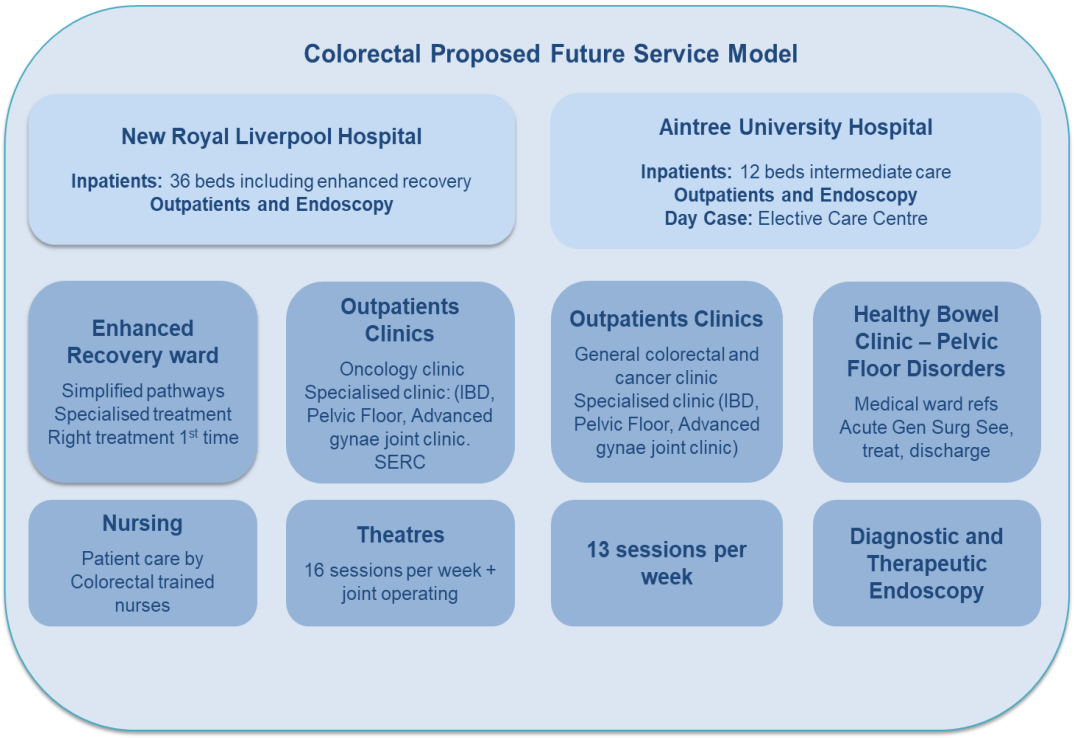
While overall, this does not demonstrate that the number of procedures per consultant will increase dramatically, it does imply that areas of very small ratios that are present in the current configuration of services will be smoothed – such as a very small number of haemorrhoid banding on the Royal Liverpool site or very small numbers of rectopexy ventral mesh procedures on the Aintree site. Complex colorectal operations will also be provided jointly by the consultant workforce Trust-wide.

The volume of elective procedures overall across the Trust are expected to increase. This is as a result of the separation of the cold elective site, and the dedicated emergency workforce, leading to fewer disruptions to elective care due to emergency demands. This will lead to fewer cancellations of elective procedures, and therefore higher volumes of elective procedures conducted each year, further contributing to an improvement in the number of procedures conducted by colorectal surgeons each year, in line with best practice.

In order to achieve optimal patient care, the model will deliver a split between elective specialist care provided at the Royal Liverpool hospital and benign, low risk surgery provided at Aintree. Furthermore, the model will enable on-call colorectal cover 7 days a week, providing telephone advice to the EGSU and hands-on support in theatre as required.

The model will enable specialist 24/7 colorectal cover, with daily ward rounds, including weekends at the elective site, and colorectal consultant cover at both sites every day.

The following diagram outlines how the service will be delivered across RLH and AUH sites.



The following table (colorectal procedures by site) details the procedures that will be undertaken at each site under the proposed model for colorectal surgery.

Table 7: Colorectal procedures by site

Procedure	Royal Liverpool Site	Aintree University Hospital Site
Cancer resections	✓	✗
IBD resections	✓	✗
Peritonectomy	✓	✗
High-risk non-resectional work – Robotic LVR	✓	✗
Benign major surgeries	✓	✗
All proctology	✗	✓
Reversal of stoma	✗	✓
TEMS	✗	✓
Pelvic floor	✗	✓
Familial polyp s-Lap-Endo Surgery	✗	✓
Abdominal wall hernia	✗	✓

Upper GI

The drive for a single GI centre for Cheshire and Merseyside has been a priority of NHS England via its Specialty Commissioners for over three years. The merger and integration of Upper GI service, enables a consolidation which has not been enacted previously because of the contribution that upper GI surgeons make at both sites to the general surgery emergency on call rotas.

The proposed clinical model would involve maintaining all of the UGI cancer and complex operating at the Royal site, whilst centralising routine benign UGI surgery at the AUH site, leading to improved outcomes, quality and access to care in addition providing better training and development opportunities for staff, supporting recruitment and retention.

HPB

The proposed model will lead to the Hepato-Biliary and Pancreato-biliary team located on one site at RLH, combining the hepatic surgery provided by AUH and pancreatic surgery provided by RLH, and aggregating the biliary surgery currently provided at both sites.

This will ensure patients get the expertise needed at the earliest possible time to make the crucial decisions for that particular case. This integration of skill sets, sharing of best practice and concurrent decision-making will improve patient outcomes, reduce length of stay, enhance patient experience and enable workloads to be managed in a smaller bed space. This “wider-vision” service will foster new ideas both to enhance service delivery and generate research ideas.

Reducing duplication of support services, namely radiology and estate capacity, such as theatres and wards, a more sustainable service will develop. This will create robust seven-day working for both the elective site and sub-specialty HPB emergency cover. This will benefit the 1,436 HBP patients currently treated by the Trust. It will also bring the service in line with best practice guidance for a combined HPB surgical service.

2.2.4 Key Benefits of the proposed model

Clinical / Patient outcomes

Patients will see improvements in clinical outcomes in part due to the re-organisation of elective and emergency services. As consultants face less demand from having to manage unpredictable non-elective services, they can dedicate more time to elective services and thus deliver better patient outcomes. Further benefits will come from the consolidation of elective services at RLH and emergency services at AUH, which present the opportunity for consultants to get greater sub-specialist experience within general surgery.

Each specialty will have designated wards, with a cohesive service contributing to increased diagnostic delivery, timely reviews and reduced complications all in line with the clinical standards.

Improved Mortality Rates

Mortality rates will be improved through the dedicated emergency surgery service, with specialist consultants operating through an EGSU model for the whole Trust. The proposed model will allow patients to be managed by specialists with the appropriate expertise, with consultant attendance at higher risk procedures. Patients being treated by sub-specialists and sub-specialists developing greater experience will in turn, drive greater efficiencies, thereby reducing delays in accessing theatres. This stepwise process should ensure that the Trust’s mortality rates is in line or better than the national average, barring any effects that are driven by the underlying patient mix in Liverpool and Merseyside.

For elective subspecialties, a single service and therefore a combined, more robust workforce, will improve the availability of subspecialty surgeons e.g. colorectal surgeons. There is evidence of a significantly lower 30-day mortality for those emergency colonic procedures performed by sub-specialist consultant colorectal surgeons compared with procedures performed by non-colorectal specialists. Given that in the proposed model, the number of colorectal patients will double in the combined unit compared to the numbers seen as separate units, this is expected to improve mortality rates. This will in turn mean fewer deaths per year for colon, rectal and anal cancer patients per year, increasing number of lives saved each year for colorectal patients.

Centralising patients on separate sites for benign and cancer surgery (e.g. Upper GI, Colorectal) increases the relative volumes for operating surgeons, so that all surgeons undertake a reasonable volume of operating; in the case of benign upper GI surgery, this can be delivered in 'blocks' of operating. Both of these factors will improve surgical efficiency and expertise, improve surgical outcomes and length of stay.

Quality of Care

The EGSU model will also allow for early review by a senior decision maker with regards to aspects of care such as need for admission, targeting of investigations and decision to operate if appropriate. Again, the roughly 4,600 emergency patients currently seen each year at RLH site will benefit from this. Currently at RLH site, approximately 20 per cent of emergency admissions (i.e. 960 patients) relating to general surgery are not reviewed within the suggested 14 hours of admission.

The concentration of elective HPB services on one site will improve quality of care and patient experience due to the availability of all related diagnostic and treatment facilities for HPB on a single site and improved communication between MDTs, especially for surgical patients. This will in turn mean that patients will need to make fewer visits to hospital, and is likely to impact all 1,000 elective HPB patients currently seen at both sites.

Timely Access to Care

One of the aims of the proposed EGS model is to provide a seven-day ambulatory care service for all emergency general surgical patients from ED and GP referrals. This should reduce pressure on EDs with regards to the four-hour A&E target[22], which means that patients will benefit from decreased waiting times. Such a service would be beneficial for a number of acute conditions including: biliary colic[23], mild cholecystitis, appendicitis, abscess, renal colic[24], non-specific abdominal pain.

The main effect of this policy would be admission avoidance. Based on evidence from other sites,[25] which have delivered such solutions, a reduction of 25% in hospital bed days can be expected. Following a recent demand and capacity modelling exercise, this equates to 2,337 patients a year, with 1,731 bed days of LOS identified as a potential efficiency improvement of an improved ACU.[26] This means that patients will have to spend less time in hospital, reducing the risk of complications, as well as facing shorter waiting times.

Specifically, cholecystectomies will be provided within seven days of admission due to the creation of a seven-day service. This will lead to decreased waiting times for patients at the Trusts. These changes are expected to benefit 650 emergency HPB patients a year.

Workforce

Separation of emergency and elective services for the respective subspecialties will streamline job planning across both sites improving cross cover, better utilisation of lists and clinics and help minimise cancellations.

[22] At least 95% of patients attending A&E should be admitted to hospital, transferred to another provider or discharged within four hours.
[23] Abdominal pain caused by gallstones.
[24] Abdominal pain caused by kidney stones.
[25] This is based on a case study from the Royal United Hospitals, Bath. See for example Rance, Caroline (2016), 'Front door surgeons: the rise of consultant-delivered acute surgical care', *British Journal of General Practice,* 66 (646): 234-235. <https://bjgp.org/content/66/646/234>.
[26] This estimate is based on the assumption that emergency General Surgery patients staying between 8 hours and 2 days could be treated in an ACU with an average LOS of 8 hours. This has only been applied to emergency patients who are seen under General Surgery, Colorectal Surgery, HP Surgery and upper GI surgery. Any patients captured by enhanced recovery have been excluded to avoid duplication.

It will also provide an opportunity for surgeons who currently provide on-call at RLH to evolve throughout their career as consultants are able to maintain expertise in some elective procedures as well as undertake EGS work, thereby improving recruitment and retention.

The proposed model will increase opportunities for professional development of staff in clinical procedures and using latest minimally invasive and robotic services leading to improved outcomes and patient experience.

It will also better facilitate training for subspecialties, strengthening current training provision as identified by the Deanery.

Research and Innovation

The combination of UGI, Colorectal, Urology, Liver and pancreatic services at a single site will allow development of an integrated robotic service that will facilitate a national proctorship program.

The centralisation of subspecialty cancer services at RLH will further build on the collaborative working with the University of Liverpool; resulting in supervision of PhD students and a number of academic peer reviewed publications. Combined with the establishment of the knowledge quarter adjacent to RLH, there will be further opportunities for more joint working.

Efficiencies

The proposed clinical model will also deliver a number of efficiencies gained from changes introduced, and improvements in the service delivery and ways of working.

Service change	Number of patients Affected (approx.)	Efficiency Improvement
Enhanced Ambulatory Care pathways	2337 patients per year	• Implementation of a Hot Clinic and Ambulatory Care Unit would provide patient access to rapid diagnostics and treatment avoiding admission to hospital, and admission avoidance • The Avoidance of admission where possible would save 1,731 bed days per annum in total.
Standardised EGSU model centralised at AUH site including ERAS pathways for emergency general surgery patients	1500 per year	• To date, the development of SAU at AUH has resulted in significant reductions in length of stay - 32% between 2007 and 2015. The proportion of patients at AUH that has a LoS less than 24 hours has increased by 19% in the same period. • In the proposed model, patients who would have otherwise been seen at the RLH site would be able to benefit from the standardised EGSU model at AUH site, which will lead to a lower LoS in line with that observed at AUH site. • Overall, this will lead to around 1,500 general surgery patients currently seen at the RLH site, spending almost **c.1700 fewer days in hospital** (see table 8 –Comparison of LoS between AUH and RL sites). This table only represents a sample of the patients that undergo the procedure and therefore a total change of 1,700 fewer days is likely an

Service change	Number of patients Affected (approx.)	Efficiency Improvement
		underestimate.
ERAS pathways for emergency general surgery	300	• By adopting improved ERAS pathways for emergency general surgery procedures at the AUH site, emergency laparotomies provides a good illustration of the length of stay improvements that can be achieved within the proposed model. • The improvements in LoS through ERAS would help bring the average LoS in line with the national averages for this procedure. This will lead to around 900 fewer days in hospital each year for around 300 emergency laparotomy patients at the Trust, or around 3 days each.

Cancer/ complex Colorectal procedures centralised at RLH and low risk benign at AUH site	-	• The split in colorectal services between elective specialist care at RLH and low risk surgery provided at Aintree will lead to patients spending fewer days in hosptial, particularly for colonic resection patients..
		• There are 3 pathways that the team will focus upon to drive down the LOS:
		  • Anterior Resection – 468.06 bed day saving (compared to peer group)
		  • Right Hemicolectomy - 398.22 bed day saving
		  • Loop Colostomy – 421.52 bed day saving

Centralise routine UGI at Aintree and increase day case activity	137 patients per annum	• Reduction in inpatient bed days and as more procedures done as day case (Lap Chole, hernia repair, Laparoscopic Nissen Fundoplication based on upper quartile benchmark). • Total of 262 bed days saved per annum as 137 more patients treated as day cases per annum rather than inpatients.
Centralise UGI cancer services at RL site with equitable access to GERU, prehabilitation and wrap around services	150 UGI cancer resection patients	• By centralising cancer services at RL, this will increase procedure volumes for surgeons and also provide equitable access to enhance services /facilities such as GERU and wrap around services. • Reductions in length of stay would also be achieved through improved outcomes following the robotic programme and progressing with laparoscopic surgical programme of oesophageal resections. This would also lead to reduction on expenditure on blood products and would also result in less readmissions and associated costs. • Based on 150 cancer patients per annum, such improvements will lead to a reduction in length of stay amounting to 840 bed days saved per annum.
Increase access to GERU facilities at	150 UGI cancer	• Pathway redesign within the enhanced recovery area (GERU) is aimed at reducing the overall length

Service change	Number of patients Affected (approx.)	Efficiency Improvement
RL site to reduce need for critical care beds	resection patients	of stay within critical care by facilitating straight to GERU post-operatively. The predominant benefit will be a reduction in the number of elective cases that requires POCCU (Post-Operative Critical Care) cancellations. • In 2019/20, 54 elective cases were cancelled on the day due to lack of post-operative critical care bed across different specialties. In addition to impact on patient outcomes and patient experience, 104 theatre sessions lost and additional length of stay were lost due to lack of ICU beds. • The proposed new model would enable patients receiving complex/cancer UGI procedures that would have previously been treated at the AUH site (c.50 patients), to be treated at the RL site including the enhanced GERU facilities and access to enabling straight to 'ward' pathways resulting in a reduction of length of stay in critical care of between 24 and 48 hours. This amounts to between 50 and 100 critical care bed days saved per annum in addition to preventing theatre cancellations due to lack of critical care beds
Annualised Job Plans	N/A	• At the RL site, consultant job plans are annualised which ensures that prospective cover is provided for the Upper GI team for the planned theatre and clinic sessions. • Each consultant surgeon works to a 42 week timetable which will include annual leave/study & professional leave. By building into the job plans, this prospective cover enables the unit to utilise all available funded capacity, but also means that accessibility for patients is much improved. • By standardising this approach for the entire unit (including AUH site), this will mean that funded theatre sessions and clinics which not all are utilised at AUH due to consultant leave or study, would be utilised/covered by another member of the UGI team. This provides capacity to cover all funded theatre sessions and clinics which are sometimes lost. This would provide an additional 92 theatre sessions and 92 clinics per annum (based on theatres staffed for 50 weeks per annum as current) mitigating costs incurred for Waiting Time Initiatives and/or locum consultant cover.

Table 8: Comparison of length of stay between AUH and RLH sites.

	Number of cases		*Mean length of stay*		*Decrease in Length of stay*
	RHL [A]	***AUH [B]***	***RLH [C]***	***AUH [D]***	***Days across combined unit [E] = [A]*([C]-[D])***
Abdominal & pelvic pain	971	1,462	3.0	1.8	1,165
Diverticulitis	234	235	8.1	7.5	140
Appendicitis	191	176	3.8	3.1	134
Cholecystitis	74	153	8.5	5.3	237
Total	**1,470**	**2,026**	**4.2**	**3.1**	**1,676**

Source: AUHFT and RLBUHT GIRFT reports.

2.2.1 Resource Implications

Beds

Estate has been identified at the Aintree site that would not require any reconfiguration for the relocation of the Emergency Surgical Assessment Unit and would provide for the increase in activity from the Royal site.

Access on the Royal site to an assessment bay would be required but does not require this to be a dedicated area for sole General Surgical use. This has been discussed with the Acute Medical service and agreed in principle. This would be for ad hoc assessments of patients who arrive at Royal site who may be appropriate returns or can be safely transferred to the Aintree site.

The proposed model will result in 65 non-elective inpatient beds at the AUH site. In addition, 24 surgical assessment Unit trolleys will also be available at the AUH site.

An additional 12 beds will also be available for elective benign surgery, providing capacity for the more routine benign Upper GI and Colorectal procedures at the Aintree site.

At the RLH site, this will comprise of 84 inpatient beds dedicated to all elective general surgery subspecialties, all of which are located on the same floor in the new RLH hospital.

Theatres

RLH

Theatre sessions are allocated for each elective sub-specialties at the RLH site, maintaining current theatre sessions for each specialty. An emergency theatre will also be available at the RLH site to mitigate need for potential transfer of patients at RLH to AUH such as any post-operative complications.

AUH

Access to an Emergency General Surgery theatre will be available at Aintree 24/7. In addition, a second emergency theatre will also be made available from 8am to 6pm at AUH for general surgery and other specialties located at the AUH site (e.g. ENT). This will also provide capacity to undertake the hot clinics as part of the ambulatory care pathway.

Workforce

Consultant workforce

The current workforce of 6 EGSU consultants at AUH is not adequate to provide direct EGS patient care and Hot Clinic / Ambulatory Care cover for the proposed centralised EGSU at Aintree site, particularly given the significant increase in volume of patients that will be seen at the single unit, and the need to also provide a sub-specialty trauma rota.

To fully support the future general surgery proposed model, with all emergency general surgery provided by EGS consultants on a 24/7 rota, additional consultants would be required. These additional EGS surgeons, whilst majoring on EGS, would each have a designated sub-specialty interest (Colorectal, Liver, Pancreas, Upper GI) and would be able to contribute a proportion of their time to that sub-specialty.

At present, when on-call for EGS, the specialty consultants at the RLH site also provide cover for their own sub-specialty. When the EGS service moves to the Aintree site, however, this arrangement will no longer be possible (it is not possible to provide specialty cover on one site and EGS cover on the other site at the same time), and the specialty and EGS rotas will need to be split, thus increasing the burden on the current workforce.

As such, to fully deliver the proposed model safely on ‘day one’ (September 2022), there would be a minimum requirement of an additional 3 EGS consultants to ensure the safe delivery of patient care.

2.2.2 Key Interdependencies

The following outlines the proposed model’s key interdependencies with other serviices

Acute Speciality interdependencies

- Service model dependent on other acute specialties e.g. Gastroenterology, Urology, Radiology, Renal Medicine and Vascular aligned with model of care
- Service model dependent on A&E and the development of supported ambulatory handbooks or pathways
- Critical care support for all emergency laparotomy patients
- 24 hr access to emergency theatres and daily access to urgent theatre lists
- Work required with Anaesthetics teams to understand implications and agree any service changes required to align to proposed new model
- General medical acute support for surgical patients

Diagnostics

- Requires 24/7 access to imaging and pathology
- Dedicated Diagnostics slots (6 Ultra sound, 2 CT, 4 MRI)
- Defined rotas on hot site or by network for diagnostic and interventional radiology 24/7

As part of detailed implementation planning, work will be undertaken with Anaesthetics, A & E and Radiology, Gastro and Urology teams to develop interdependent workforce models and pathways.

Programme management and governance arrangements to implement the proposed changes are set out in Chapter 8 (Management Case).

Chapter 3

Vascular Services

3. Vascular Services

3.1 Strategic / Clinical Case

3.1.1 Overview of Services

Liverpool Vascular and Endovascular Service (LiVES) provide vascular services for the Merseyside region and a tertiary service for North England, Isle of Man and North Wales. This is based on a hub and spoke model in accordance with the Vascular Society of Great Britain and Ireland (VSGBI) template for vascular networks outlined in the Provision of Vascular Services (POVS) 2016.

LiVES has been an established integrated single service for several years, previously hosted by the Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUHT) before the merger with Aintree University Hospitals NHS FT (AUH) in October 2019 to create Liverpool University Hospitals NHS FT (LUHFT).

The Royal Liverpool Hospital (RLH) site acts as the main 'hub' site with 'spoke' (satellite) sites based at Aintree; Whiston and St Helens hospitals under a Service Level Agreement (SLA); and also Southport under a joint venture. In addition, cover was also provided at Liverpool Heart and Chest Hospital (LHCH) on an ad-hoc basis through a generic SLA but, as of 1st March 2021, a more formal arrangement is in place through a whole time equivalent (WTE) SLA allowing 5 consultants to offer a regular working pattern at LHCH including theatres, clinics, ward rounds and Multidisciplinary teams (MDT's). The tertiary referral work is primarily for complex aneurysms and covers a wide area and significant collaborative work with LHCH for thoraco-abdominal issues.

Workforce

The LIVES service is currently provided by 12 vascular consultants, having recently increased from 11 on 1st March 2021, delivering outpatient clinics at both hub and satellite hospitals, day case varicose vein surgery at satellite hospitals, arterial bed base and surgery at the Hub and an on-call service to 8 hospital sites including external organisations (RLH, AUH, LHCH, Walton Neuro, Whiston, Womens, Alder Hey, Southport and Ormskirk).

4 consultants are based at Whiston, with 1.66 whole time equivalent (WTE) of Vascular Nurse Specialists (VNS); 5 consultants cover Aintree Hospital site with 1.8 WTE VNS; 2 consultants serve Southport who employ their own VNS to support the service; 5 consultants contribute to the LHCH collaboration; all vascular consultants have clinical sessions at the hub at the RL main hospital.

There is also a requirement to travel to the various 8 hospitals covered on-call on a frequent basis. To facilitate this, a two tier daytime on-call system is in place with C1 covering the main LiVES activity and a supporting C2 covering outliers, referrals and emergency theatre or call out work. The intensity of this work is highly variable but the structure in place provides safe cover for LiVES across the region.

The out of hours on-call is delivered by a single consultant with a Specialist Registrar (SpR). The team may be required to visit any of the 8 sites/trusts and the intensity is highly variable. Increasing tertiary referral work out of hours is coming from LHCH since it became the main centre for Dissections and Adult Congenital Heart Disease (ACHD). LiVES represent a necessary partner in these areas because of its endovascular skills and the absence of vascular IR cover out of hours across the region.

(Current workforce structure is set out in Appendix 1: '*Workforce structure charts 1 and 2*')

Theatres

Theatre activity for LiVES is currently delivered as follows:

AUH site

Theatre activity at the Aintree site is limited to day case activity only which consists of 2 theatre sessions per week.

RLH site

Theatre activity at the RLH site is currently delivered through:

- A dedicated vascular hybrid suite available for 3 sessions Monday-Thursday and 2 sessions on Friday;
- Theatre 6 for open cases 2 sessions daily Monday-Friday;
- Theatre 3 and LHCH Hybrid Theatre B alternating Thursdays.

On-call and emergency work is usually directed through existing lists, some of which are dedicated to Surgeon of the Day cover, or the CEPOD list as needed.

BGH

No theatre activity takes place at the Broadgreen site.

Further information on the current theatre timetables for LiVES is set out in Appendix 2 ‘Current theatre timetables’.

Beds

AUH

There are no dedicated beds for the vascular service at Aintree site, where only day case activity takes place.

RLH

The total vascular bed base at the Royal Liverpool site is currently 37 as indicated below:

Ward	Number of Beds
Ward 8A	25
Ward 4A	12
Total	**37**

There is a requirement for variable use of HDU/POCCU and ITU, although all complex and open Abdominal Aortic aneurysm (AAA) routinely occupy level 2/3 beds post-operatively.

The bed use at RLH for 2019/20 was as follows:

Month/ Year	Total Spells	Total Bed Days	ITU Spell	ITU Days	POCU Spell	POCU Days	HDU Spell	HDU Days	Ward Bed spells	Bed Days
Jan-19	130	1531	7	48	10	22	16	63	97	1398
Feb-19	142	1679	3	131	11	19	17	81	111	1448
Mar-19	141	1491	1	7	8	21	14	56	118	1407
Apr-19	120	1276	5	18	5	6	9	27	101	1225
May-19	119	1176	6	52	13	25	15	55	85	1044
Jun-19	119	1534	6	84	8	25	11	102	94	1323
Jul-19	112	1464	10	32	10	26	18	69	74	1337
Aug-19	109	1559	3	20	15	26	19	85	72	1428
Sep-19	124	1248	8	41	12	21	14	33	90	1153
Oct-19	119	971	8	23	13	38	16	43	82	867
Nov-19	129	1470	5	20	10	24	12	54	102	1372
Dec-19	126	1242	4	47	9	20	16	82	97	1093
Total	**1490**	**16641**	**66**	**523**	**124**	**273**	**177**	**750**	**1123**	**15095**

BGH

There are no bed requirements.

Critical Care

AUH

There is no critical care bed requirement at Aintree hospital site currently.

RLH – ITU/HDU/POCCU

The current bed usage at RLH site is 4 per day.

Diagnostic Facilities

AUH

The service has access to MR, CT, and plain x-ray facilities at the Aintree site.

RLH

The service has access to MR, CT, and plain x-ray facilities at the Aintree site.

BGH

There is no requirement for Diagnostic facilities at BGH.

Outpatient Services

AUH

4 Consultants hold outpatient clinics from Monday to Wednesday at the Aintree site with an average of 56 patient appointments per week. In addition, Vascular Nurse Specialists hold clinics daily also with an

average of 56 patient appointments per week in Clinic E. The service is facilitated by a clinic room, dressing room and also occupy a nurses' office.

RLH

At the current RLH site, there is a dedicated vascular clinic area providing a 5 room clinic area, a fully functional MDT seminar room, 2 room dressing clinic, a 3 room vascular lab with office space and additional storage facilities for Endovascular aneurysm repair (EVAR) consignment. There are a further 3 Vascular Nurse Specialists who work at RLH and provide cover for general clinics and the Critical Limb Clinic.

Further information on the current Outpatient clinics can be found in Appendix 3 '*Current Consultant Clinic Timetables*' and Appendix 4 '*Current VNS/CLI Clinic Timetables*'.

Activity

AUH

At the AUH site, 1 day case theatre list* is held every 2 weeks with 4 cases undertaken per list.
**(1 list has restarted since being suspended during the Covid-19 pause)*

RLH

Submission of index cases to the National Vascular Database can give some indication of caseload at the RLH site. This data is published yearly and acts as a quality assurance for Governance reviews such as GIRFT. It is recognised that there is variable submission and these figures require cross referencing with HES data and the ORMIS system in house to achieve accurate activity figures.

April 2019 to March 2020

Procedure	Total	Emergency	Elective	LoS
Abdominal Aortic Aneurysm (AAA)	**151**	32	119	Longest : 119 nights Shortest : 1 night Most frequent: 2 nights
Carotid	**121**	17	104	Longest : 54 nights Shortest: 1 night Most frequent: 1 night
Amputation	**101**	80	21	Longest : 119 nights Shortest: 3 nights Most frequent: 9 nights
Lower limb bypass	**174**	60	114	Longest : 119 nights Shortest: 1 night Most frequent: 3 nights

LHCH activity

Monthly activity at LHCH for the last year is summarised below. The SLA agreed in April includes 42 all-day lists covered by 2 vascular consultants per list.

2019/20 Monthly activity (LHCH)													
Month	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sept 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Total
No. of cases	3	4	5	3	0	1	2	0	0	6	6	4	**34**

This does not include the emergency on-call cases that were performed as they have been difficult to quantify.

3.1.2 Case for Change – Current Challenges

The greatest challenges within the LiVES service currently is that of capacity, both theatres and beds, in addition to challenges on inter-hospital transfers and Interventional Radiology services. These challenges significantly impact on the Trust's ability to providing timely access to care and subsequently on patient outcomes and experience as described below.

Theatre Capacity

Services are delivered from one open and one hybrid theatre on a daily basis. An additional list is also delivered on alternate Thursdays, as previously described. Despite this, the vascular service struggle to achieve national targets for AAA, Carotid Endarterectomy (CEA) and Critical Limb Ischaemia (CLI) and have been put onto special measures for all these index procedures by Specialised Commissioning (*source:* National Vascular Registry (NVR) metrics).

Abdominal Aortic Aneurysm

NVR data for AAA 2018-20: This indicates high volume and good outcomes compared to national figures but poor delays between referral and treatment times.

	Total NVR cases	% treated <8/52	Median delay days	Mortality
LiVES	70	23.8%	128 (57-186)	1.1%
National	3445	41.9%	69 (36-114)	1.4%

Carotid Endarterectomy

NVR data for CEA 2018-20: This indicates high volume and good outcomes compared to national figures but poor delays between referral and treatment times.

	NVR cases	Pts treated <14/7	Stroke/death rate	Symptom-surgery
LiVES	101	39%	2.3%	19 days (12-29)
National	4141	60%	1.9%	12 days (8-22)

Bypass

NVR data for Bypass 2018-20: This indicates high volume and good outcomes compared to national figures but poor delays between referral and treatment times.

	NVR cases	In Hospital mortality	Median LOS	% treated <5/7
LiVES	460	2.9%	8 (4-18)	29%
National	18,090	2.4%	7 (4-15)	50%

Amputations

NVR data for Amputations 2018-20: This indicates high volume and good outcomes compared to national figures but poor delays between referral and treatment times.

	NVR cases	In Hospital mortality	AKA:BKA	Median delay from DTT
LiVES	217	6.1%%	1.52	11
National	10,022	4.6%	0.93	7

This has prompted pathway developments and focussed attention (see appendix 5 'Clinical Pathways'). The NVR metrics demonstrate clearly that in all 4 domains, LiVES is one of the busiest units in the UK, has good clinical outcomes but some of the worst RTT times, largely due to bed and theatre capacity issues.

LiVES were initially allocated 2 hybrid suites in the new Royal Liverpool. However it would provide less theatre capacity than they currently have and would offer no improvement in the ability to deliver and further develop the service.

The service has a large throughput of hybrid and purely endovascular cases (EVAR, FEVAR, BEVAR and angioplasty) that currently struggle to fit into 1 hybrid suite. This delays treatment times and jeopardises outcomes with the potential for tissue and limb loss.

Approximately 80 open AAA repairs, 100 CEA, 150 amputations and 120 lower limb bypasses are also performed each year. These do not require hybrid operating and use of an open theatre would provide adequate space to perform this caseload in a safe and timely manner without imposing on the specialist requirements of hybrid cases.

Bed Capacity

The service currently has 37 allocated inpatient beds at RLH. The daily usage has been calculated at 42 with an additional 4 critical care beds. The original allocation in the new Royal Liverpool was 32 beds. Whilst the current allocation of 37 beds is challenging, but one that they are able to work around, a move to the new Royal Liverpool with 32 beds would present enormous challenges that would seriously restrict the service and delivery of care.

Inter-hospital transfers

Further challenges are experienced with the inter-hospital transfers. Currently LiVES cover 3 satellite hospitals (Southport, Whiston and Aintree). The transfer cases are predominantly from diabetes and stroke, requiring arterial reconstruction, amputation or carotid endarterectomy.

These patients often have complex medical and rehabilitation needs and occupy significant theatre and bed capacity. There is considerable administrative time spent in the organisation of transfers and repatriation has proved very difficult and time consuming. The demand on transport for transfers is also considerable. This also impacts on the patient experience of needing transfers and lack of continuity of care. A move to the new Royal Liverpool will exacerbate this issue due to the reduction in beds and theatre capacity.

Interventional Radiology (IR)

The *Vascular Society Provision of Vascular Services 2016*, *NHS Abdominal Aortic Aneurysm Screening Programme* (NAAASP) external review and *Getting it Right First Time* (GIRFT) all recognise the importance of a 24/7 IR service to support an arterial centre.

LiVES does not have that level of Interventional Radiology support currently as there are insufficient vascular IR consultants to provide a comprehensive elective or on-call service. This was highlighted by both NAAASP and GIRFT reviews. This has led to delays in treatment and contributed to a failure to achieve national targets, especially in critical limb management.

Results of a recent audit of critical ischaemia patients on the CLI pathway (National QIP target is 2 and 7 days for Referral to Imaging and 5 and 14 days referral to treatment for CLI in-patient and out-patient groups respectively):

Time period: 1/8/20 to 28/1/21:

Time to CT from request:	23 patients	Mean = 16.6 days; Range = 25 days
Time to Angio from request:	12 patients	Mean = 25.5 days; Range = 55 days
Time to Treatment from Decision to Treat:	48 patients	Mean = 18.3 days; Range = 74 days

There is inadequate interventional theatre capacity currently at RLH in addition to inadequate staffing levels (partly due to retention and recruitment which remain an issue).

Over the last 2 decades there has been an evolution in vascular surgeons' interventional skills such that most are independent in EVAR and much of the peripheral hybrid interventions. This reflects the national direction and is in line with jointly agreed British Society of Interventional Radiology (BSIR)/ Vascular Society (VS) curriculum developments. Whilst there has been no conscious divergence between IR and LiVES, the pressures of workload and capacity have promoted such a move.

The patient demand has increased pressures further and therefore LiVES has needed to provide limb and life-saving care independent of IR in an increasing number of cases. This is a direction that neither unit wishes and there is a clear intention on both parts to re-establish the strong collaboration they had in the past.

It is the firm belief of the vascular consultants that this is in the patients, clinicians and Trust's interest in terms of outcomes, timelines, working lives, training, unit development and reputation. A move to the new Royal Liverpool would clearly stress an already challenged system as outlined above. This will obstruct the development of a collaborative unit as there will be competition for the limited hybrid/theatre space.

Changes to services following COVID-19

The impact of Covid on LiVES has been significant. Theatres and clinics have been significantly reduced and, whilst the service have kept abreast of emergency and urgent work (CEA, critical limbs, large high risk AAA), there have been long delays incurred for AAA particularly.

The Vascular service anticipates that it will take many months to work through the patients on the waiting list. Additional capacity at the AUH site would facilitate this as well as future-proofing the service with regard to coping with on-going surges of Covid or new pandemics.

Anticipated long-term changes to the service as a consequence of Covid are not profound. Telephone consultations will be maintained for tertiary and follow-up patients and may reduce the number of face to face consultations required. There is no change to operating patterns anticipated.

3.1.3 Addressing Service Challenges – Proposed service model

LiVES is an expanding, internationally recognised vascular unit and, as such, is attracting ever more complex cases. The centralisation of services has seen an inevitable increase in the tertiary referrals, which, married with the poor socio-economic population we serve and the increasing diabetic and elderly population, has seen the unit become busier with increasingly complex patients. The demands on the service and capacity are constantly challenging despite trying to improve efficiencies and develop strategies.

The merger of AUHFT and RLBUHT to create Liverpool University Hospitals NHS FT (LUHFT) has created an opportunity for the service to reconfigure services to address the challenges outlined in this document in addition to enabling other proposed service reconfiguration aligned with the Trust wider clinical strategy of an elective/non-elective split in the delivery of many services with RLH being the elective site and AUH non-elective.

A number of service model options have been considered and are described in the following section. This highlights that the preferred and proposed clinical model would be to move LiVES to the AUH site. This gives an opportunity to truly plan for a world class service with facilities to allow modern working. The benefits are manifold, including providing a **better patient service**, **improved working environment**, **increased support for interdependent services** and facilitating the ability of LUHFT **to strategically move cancer services into the New Royal Liverpool**.

The preferred and proposed option would see the relocation of LiVES services to Aintree. This would be based on 2 hybrid theatres, an open theatre, 33 vascular beds, 7 ICB (Stoddard House) 4 critical care beds, comprehensive outpatient, vascular lab and office facilities, potential for research facilities, a percentage of a CT scanner and co-location of dependent services.

3.2 Economics Case

3.2.1 Alignment with Trust Objectives

In developing the proposed model, consideration has been given to how the proposed clinical model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

The following outlines how the proposed model aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition. These benefits are described in further detail in section 2.3 (Key Benefits of Preferred Clinical Model).

Strategic Priority	Rationale / Expected Benefits
Great CARE	❖ A co-located service with additional hybrid theatre capacity will lead to improvements in waiting times for referral, diagnosis and treatment. This will enhance the delivery of time-critical vascular care for trauma patients and give greater opportunities to improve endovascular interventions and ruptured EVAR. ❖ LiVES will also compliment and can offer many benefits related to other dependent services based at Aintree such as Stroke, Diabetes, Orthopaedic, Trauma and Interventional Radiology. ❖ A cohesive and well supported, modern vascular unit will also lead to considerable improvements in patient experience through the improved treatment times, outcomes and reduced need for patient transfers across sites.
Great PEOPLE	❖ Moving to a new unit with enhanced facilities and integrated with other interdependent services, would enhance staff experience. ❖ Improved bed and theatre capacity pressures will increase efficiency, boost morale, engage individuals and encourage recruitment into a dynamic tertiary referral centre of excellence. ❖ Engaging Interventional Radiology in vascular interventions will play a major role in attracting IR trainees and consultants; collaborative working with IR and LCS will provide the opportunity to develop, train and innovate.
Great RESEARCH & INNOVATION	❖ Vascular Surgery in Liverpool has gained a national and international profile and is actively engaged in academia which is, in turn, imparted to trainees and students giving opportunities to produce original work which has been extensively presented and published. ❖ The opportunities provided by revised model would further support the research an innovation programme. ❖ Changes in the LiVES services would lead to an improved clinical department that can provide the foundation for ongoing work that would strengthen relationships and collaborative working with Liverpool University and LHCH.
Great AMBITION	❖ Proposed service reconfiguration would lead to optimised use of estates supported by the strategic alignment with other dependent services. ❖ Improvements gained from reducing current inefficiencies such as patient transfers, reduced length of stay, better access to use of theatre capacity leading to a more sustainable service delivery model. ❖ Changes in the LiVES services would lead to an improved clinical department that can provide the foundation for ongoing work that would strengthen relationships and collaborative working with Liverpool University and LHCH.

3.2.2 Options Appraisal

The following describes the different options considered to best address the challenges highlighted and continue to improve the quality of care for better health outcomes with rising demand and tighter financial constraints.

Option 1 (Do Nothing) – Continue with current model including move to new Royal Liverpool Hospital

A move to the new Royal Liverpool would result in a reduction in current provision. As highlighted, the service is currently challenged with beds and theatre capacity such that they are on special measures for AAA, CEA and CLI.

Moving to the new Royal Liverpool would challenge this further to the point where it may not be possible to deliver the regional service currently provided. It would also remove LiVES from interdependent services such as major Trauma, Orthopaedics, Diabetes and Stroke, hence transfers and split site working would continue to be an inefficient provision of service. Interventional Radiology would be in competition for limited hybrid space, further diverging the two units. This option would also limit the ability to achieve the Trust's clinical strategy of reconfiguring services to create an elective cancer centre at the RLH site and non-elective site base at AUH site.

Option 2: The Northern Aortic Centre (divert activity to LHCH)

There is increasing collaborative working with LHCH regarding complex thoraco-abdominal aneurysms and acute aortic dissections. This is a recognised regional centre for the North of England and is dependent on a regular LiVES presence. This has culminated in a Service Level Agreement (SLA) that provides LiVES with a 12th consultant, which facilitates a weekly presence at LHCH.

The development of the Liverpool Cardiovascular Service as a formal collaboration funded through the SLA (1 WTE) allows LiVES to be recognised for work already done at LHCH (TEVAR, Dissections, EVAR/CABBAG/TAVI and access issues), as well as providing regular lists to accommodate some of the complex aortic work currently undertaken at LUHFT. These include Thoracoabdominal aneurysms (open and branched grafts) and open complex juxtarenal AAA repairs with either left heart bypass or the cardiac HDU facility post operatively. The LHCH is recognised as the regional tertiary referral centre for complex Thoracoabdominal aneurysms and dissections already but this collaboration will cement this position and enhance the profile of both LiVES/LUHFT and LHCH. The expertise is on one site (surgeons, anaesthetists, perfusionists) and there are clinical benefits for patients in dealing with them at LHCH. These cases are complex procedures that utilise a great deal of capacity in clinic/MDT, theatre, critical care ward beds and often continued surveillance and reintervention. Moving this service in its entirety to LHCH will free up capacity in all these areas as well as providing optimum care for patients.

This would likely be the only way LiVES could continue to provide tertiary aortic work. The proposal for a Northern Aortic Centre has some merits in terms of efficiency and expertise. However, under the current LiVES structure, it would undermine the unit in terms of expertise, reputation, cohesion and future development of the service. It would also result in reduced income for the Trust from Vascular services. A move to the new Royal Liverpool would reinforce the argument for a Northern Aortic Centre.

Option 3: Relocate LiVES to Aintree site (preferred option)

The argument for relocating LiVES to Aintree is based on the opportunity to enhance existing capacity through two hybrid theatres, an open theatre, 33 vascular beds, 7 Intermediate Care beds, 4 critical care

beds, comprehensive outpatient, vascular lab and office facilities, potential for research facilities, a percentage of a CT scanner and co-location of dependent services.

A purpose-built vascular unit, as summarised above, will address the main challenges LiVES currently faces. Co-location of dependent services will greatly improve efficiency and remove a significant proportion of transfers. This will have a marked impact on bed capacity such that it's anticipated being able to cope with 40 allocated vascular beds, as detailed above.

It will also improve RTT and allow compliance with national targets, thereby removing the special measures currently imposed. Open theatre access will allow them to perform the required open arterial work (AAA, CEA, bypass, amputations) without impacting on the hybrid theatres.

This will also facilitate timely hybrid interventions (EVAR, FEVAR, BEVAR and angioplasty) as well as supporting IR in delivering peripheral interventions in any surplus space. This will also foster collaborative working and rebuild the cohesion and co-working previously enjoyed with IR.

The unit will be adequately supported through outpatients and vascular labs which underpin the service, along with secretarial support. Access to a CT scanner is pivotal to the service as cross-sectional imaging remains the norm for almost all cases and much of the follow-up and surveillance. Access to CT remains an issue with audit identifying this as a key factor in delays from RTT (see CLI audit above). Commissioning a percentage of a CT scanner (presumed share with radiology) would allow LiVES to plan pathways in the knowledge that appropriate imaging can be accessed promptly, hence significantly reducing delays. This will allow compliance with national targets for RTT. The EVAR programme has in excess of a thousand patients within it and a significant proportion require CT at various time intervals. The continued utility of EVAR is dependent on prompt access to CT imaging which dictates treatment options. This further reinforces a share of a CT scanner.

Most importantly, all the points favouring the move to Aintree and an appropriately funded facility will benefit the patients. Less transfers, co-location of expertise, prompt delivery of specialised care in purpose built facilities and an engaged, cohesive unit will enhance patient experience and improve outcomes. Other than relocating the arterial centre away from the city centre and the investment required, there are no negative impacts on LiVES anticipated.

An options appraisal exercise was undertaken to assess the clinical service model options against the Trust's criterion. The following outlines the aggregate scoring from the Options Appraisal. Further detail on scoring and rationale behind scores provided are set out in Appendix 6 ('Options Appraisal scoring').

OPTION 1 – Do Nothing				
Criterion	**Indicators**	**Weighting**	**Option 1** Aggregated weighted score (based on 5 people scoring)	**Rationale for score**
Strategic fit	How well does the project (option) fit within the Organisational /Divisional Strategy?	**2**	16	• Would not align to the Trust's strategic direction in terms of elective/non-elective work with the new Royal concentrating on cancer/complex elective services. • Concerns that it would give 1 less theatre for vascular, which needs to expand going forward. There would be pressure to shrink it, therefore it would be an on-going problem for vascular services. • There would be a solution for vascular in the new build but that would not give long-term sustainability for the service.
Clinical Risk/Safety	What is the level of clinical risk being addressed?	**5**	30	• Doesn't address any areas in terms of capacity and theatres, worst possible option.
Estates Risk	What is the level of estates risk being addressed?	**1**	5	• Due to current estate, beds, configuration, service would be compromised. • Score given on the basis of the discussions about the new Royal does cannot accommodate needs of the service • Two hybrids are not going to make a significant impact.
Quality	How much does the project (option) contribute to the patient quality of care?	**3**	33	• Similar to the reasons highlighted on Clinical Risk and estates risk, it would come down to the impact on quality of care. • Whilst would have some quality improvements e.g. single rooms, and is a new build, but timeliness of care is a quality, so whilst some additives, there are some disadvantages. • Quality estate at the new Royal would be better but co-dependent services at Aintree, benefits are less patient transfers.
Financial	How likely is the project (option) to be affordable/earn an acceptable rate of return	**4**	56	• Least expensive option in terms of expenditure but, going forward, there would be a realisation quickly that not adequate. Transferring patients across the city would be costly to the Trust, so not sustainable for long-term financial viability, although it may be in the short-term.
Total weighted aggregated score and ranking			**140 (ranked lowest)**	NB: *Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.*

OPTION 2 – The Northern Aortic Centre (divert activity to LHCH)				
Criterion	**Indicators**	**Weighting**	**Option 2** Aggregated weighted score (based on 5 people scoring)	**Rationale for score**
Strategic fit	How well does the project (option) fit within the Organisational /Divisional Strategy?	**2**	14	• Against strategic direction of the Trust. In terms of the strategy for LiVES, this is divisive and would lead to problems. Would need to move aortas to LHCH as a Joint Venture and keep the rest of vascular at the new Royal. • Whilst has the potential to solve other issues, strategic in that it's an existing collaboration that could be boosted. As a partnership collaboration between vascular and cardiology work.
Clinical Risk/Safety	What is the level of clinical risk being addressed?	**5**	60	• Whilst would provide a solution to moving to the new Royal, Clinical problems may arise in shifting aortas to LHCH and allowing the rest of care to new Royal, team would be broken up, this introduces risk in terms of processing of patients, divided team between two operating sites. • There is an assumption that LHCH may have capacity to do aortas but it's not confirmed given they have full theatres and may have to build another theatre.
Estates Risk	What is the level of estates risk being addressed?	**1**	11	• Would address estates risk at RL as vacating some work from there but jeopardising at LHCH - therefore they cancel each other out as benefits as well. • Score reflects the work that would need to be done to accommodate the service at LHCH.
Quality	How much does the project (option) contribute to the patient quality of care?	**3**	33	• Would benefit patients left at the Royal and an aortic centre would give expertise to the aortic centre, but splitting teams could reduce quality of care.
Financial	How likely is the project (option) to be affordable/earn an acceptable rate of return	**4**	40	• Concerns regarding financial impact of estates requirements as potential costs are a significant unknown along with viability. • Would require a lot of investment to make it work.
Total weighted aggregated score and ranking			**158 (ranked 2nd)**	NB: *Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.*

OPTION 3 - Relocate LiVES to Aintree site				
Criterion	**Indicators**	**Weighting**	**Option 3** Aggregated weighted score (based on 5 people scoring)	**Rationale for score**
Strategic fit	How well does the project (option) fit within the Organisational /Divisional Strategy?	**2**	**50**	• Fits perfectly with Trust's strategic direction • Also aligns to Trust's wider service configuration e.g. elective/non elective, T & O, etc.
Clinical Risk/Safety	What is the level of clinical risk being addressed?	**5**	**100**	• Co-location with other aligned services, and the ability to expand which addresses current risk. • This solves more clinical risks/problems than it creates.
Estates Risk	What is the level of estates risk being addressed?	**1**	**20**	• Whilst needs major investment, estates work, for interim and permanent estates options, very positive as it provides an extra theatre as well as increased capacity for LiVES.
Quality	How much does the project (option) contribute to the patient quality of care?	**3**	**63**	• In terms of facilities, will have the ability to better treat patients with co-location and 2 hybrid theatres. • Same co-location with stroke, diabetes and trauma - would be a significant alignment with things that affect most across the city, plus percentage with an expansion that's required.
Financial	How likely is the project (option) to be affordable/earn an acceptable rate of return	**4**	**72**	• Huge outlay for both estates solution (interim and permanent) but would give expansion opportunities. Benefits outweigh initial costs as looking at a 2020-2025 solution. • Conscious of upfront concerns, but unquestionably if investment is found and made then got a very good footing for vascular services for the foreseeable future.
Total weighted aggregated score and ranking			**305 (ranked highest and preferred option)**	NB: *Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.*

3.2.3 Preferred Option

Given the challenges faced under the current model (Option 1) and the limitations arising from option 2 including adverse strategic implications for the Trust, option 3 was identified as the preferred option and is further described in more detail.

Beds

As outlined previously, the new clinical model would involve a transfer of beds to the AUH site with at least 33 allocated beds (1 ward), 7 ring-fenced Intermediate Care beds in addition to adequate critical care beds (approximately 4) to enable the service to progress and address the challenges highlighted.

Currently the service works out of two wards with outliers under joint care or LiVES. Bed capacity is challenged through prolonged discharges awaiting social support, the need to transfer patients for CEA/CLI, delayed treatment due to IR/theatre capacity and long stay after complex aortic surgery. This proposal addresses each of these:

- Proposed 7 ring-fenced beds in ICB (Stoddard House) would relieve the demand on the acute beds.
- Co-location of the interdependent services (stroke, diabetes, orthopaedics) leading to significant reductions in hospital transfers.
- 2 Hybrid suites and collaborative working with IR will dramatically improve theatre capacity and reduce treatment times, in particular CLI, CEA and AAA.
- The LCS collaboration will defect a small number of complex AAA that are very demanding of theatre and bed capacity.

This option would, therefore, generate increased efficiencies due to improved theatre capacity and better collaboration with dependent services would allow any expansion in numbers to be accommodated. For example, co-location with Diabetes, Orthopaedics and Stroke allows vascular interventions on inpatients from their bed base without the need for transfers, delayed discharges and prolonged bed occupancy for non-vascular issues.

Theatres

A number of estates options were considered to configure the current theatres at Aintree site and enable the vascular services to be delivered at the Aintree site. These options were costed, assessed by the Vascular Project Group in collaboration with the senior Estates team in January 2021 concluding that the preferred option would be to remodel and extend AUH main theatres to include 2 hybrid theatres. These options and recommendations were incorporated within the initial service model business case for Vascular service reconfiguration which were further reviewed and recommended at the Clinical Strategy Group (CSG) on 4th February 2021, and subsequently supported by the Trust Management Group (TMG) on 10th March 2021. (Further details of all estate options considered are set out in Appendix 7 – ‘Permanent Estate solution options’).

The recommended estate solution would involve a first floor extension to the current C theatre complex at AUH site (former AED theatres) to create two bespoke hybrid operating theatres and remodelling of current theatres (C1 and C3) at the Aintree site. This extension would be connected to the existing theatre complex off the clean corridor adjacent to current theatres 1 and 2.

The current theatres C1 and C2 will be retained in the current configuration as they are standard laminar flow ultra clean theatres. The existing theatre (C3) will be decommissioned and the space reconfigured to provide substantial theatre CSSD and consumable storage.

The existing storage areas will be incorporated into an improved and extended recovery and forward wait area which will also provide an opportunity to improve staff welfare accommodation in the complex.

This estates configuration would provide additional capacity - in the new RL hospital, there would be two theatres compared rather than one currently. Whilst there would be an opportunity for some sessional use of the hybrid theatres, however, this would be constrained by other specialties sharing space or potentially given priority where pressure on demand. In the proposed model at AUH site, theatres are less likely to have to absorb other specialty work.

In addition, by being at the Aintree site, it is better placed to receive trauma work being the trauma centre. There is also a potential benefit should the single North Mersey HASU be accommodated in the adjacent building.

It should also be noted that this development is best delivered as a combined scheme with a ground floor Emergency Department extension for best value.

Extension of AUH Emergency Department

There is an existing project under consideration to extend the AUH Emergency Department (ED) adjacent to the current AMU (the former frailty unit) and in doing so, to create connectivity to the ground floor of the former maternity block.

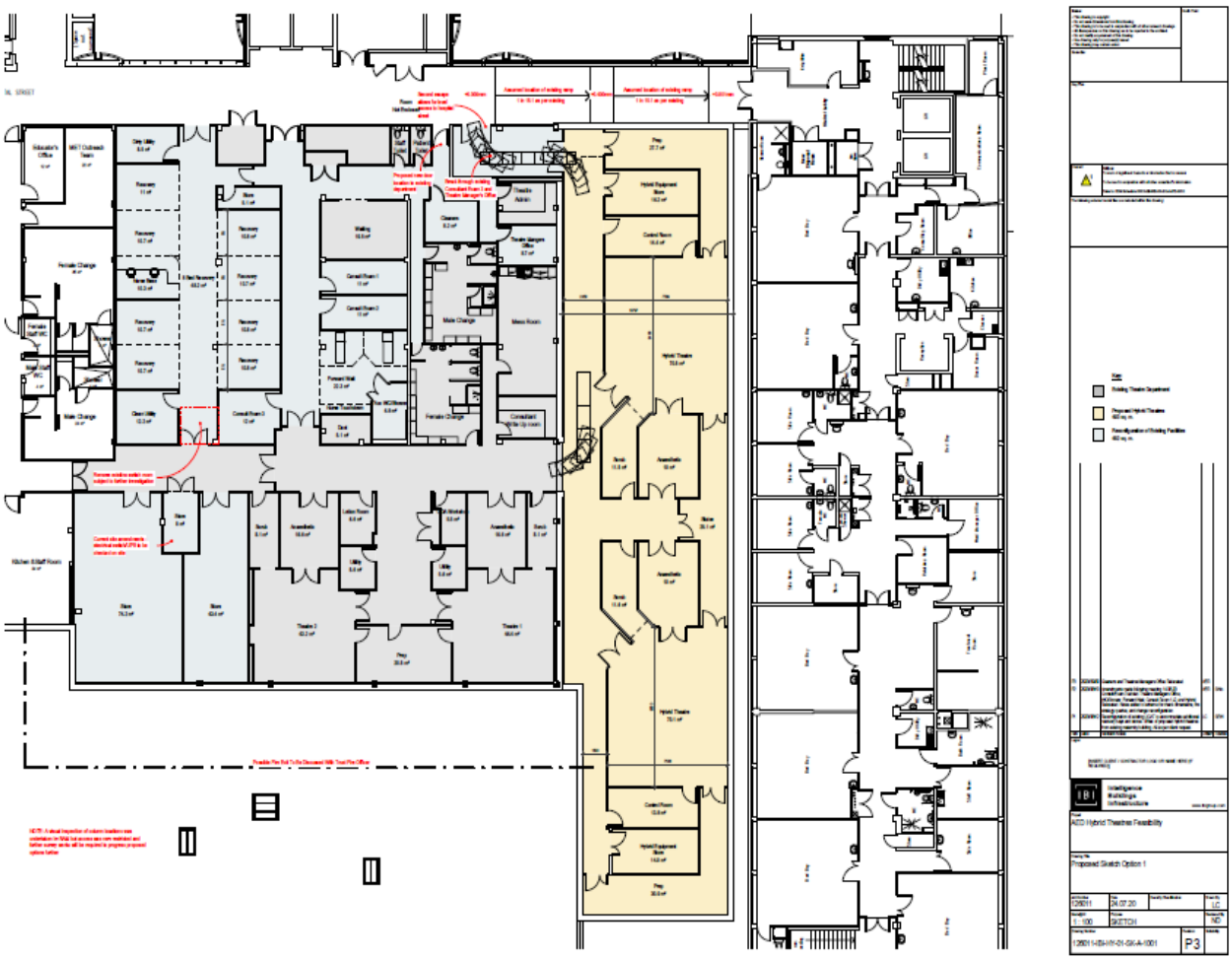
The current proposed project is to consider the location of specialist assessment services which currently are provided with the main ED department. These specialist services may include an option for a future North Mersey HASU (Hyper Acute Stroke Unit) with an associated dedicated CT scanner. This gateway facility would provide dedicated ambulance drop off and initial assessment of specialist emergency medical patients with potential specific focus on stroke patients that would subsequently be passed through for ongoing treatment into the adjacent HASU within the ground floor of the former maternity building.

In order to release the ground floor of the former maternity building, there would be a requirement to work with the Women's hospital on the relocation of the current Liverpool Women's hospital antenatal service. There is a potential that this complex could be a specialist of Interventional Radiology (IR). This would support Vascular and other interventional specialties including Stroke.

Financial Implications

A capital investment would be required for the permanent solution which amounts to approximately £12.5 million to meet the building requirements.

A plan for the proposed Vascular theatres development is illustrated below:



3.2.4 Key Benefits of Preferred Clinical Model

Patient Access

Patients local to Aintree would have improved access to LiVES. Inpatients at Aintree needing vascular intervention would not require transfer to RLH. Co-location of dependent services at Aintree should reduce the need for transfer of patients from RLH to AUH site. The satellite hospitals (Southport, Whiston, and LHCH) would still need to transfer patients, as before, but relocating to Aintree would not influence the number or complexity of transfer. Improved bed and theatre capacity, as outlined above, would improve the timeline for such transfers. Repatriation would remain the same.

RLH would become a new satellite site with regular LiVES outpatient clinics to service the demand with relocation of dependent services to Aintree. However, it's anticipated that the need for clinics, intervention and transfer would be reduced. Currently there are up to 6 consultant clinics at Aintree and 10 at RLH per week. The demand at Aintree would increase to 11 per week (1 per consultant) but decrease at RLH to probably 3 or 4. Depending on demand, these and the VNS clinics may be further reduced on the RLH site.

Inpatient access to LiVES would remain as before for Southport, Whiston and LHCH. RLH would access LiVES through planned clinics and ward review if required. A comprehensive vascular lab would still be required at RLH to allow one-stop and in patient Duplex assessment as well as being the likely hub for aneurysm and EVAR surveillance.

Patient Outcomes

There are several areas where LiVES at Aintree would provide better patient outcomes and experience. There would be improved timelines for specialist review and interventions due to co-location of dependent services, less transfers and improved bed and theatre capacity. Two hybrid theatres provides the opportunity to deliver optimum treatment without delay as it allows concurrent endovascular interventions to be performed rather than patients' needs competing with each other for restricted hybrid access. A dedicated proportion of a CT scanner reduces delay in investigations that have been identified as a key factor in increased treatment times (CLI audit).

Co-location with the Trauma Unit will enhance the emergency delivery of vascular care, which is usually time critical and can be challenging. The second hybrid is critical in providing an opportunity to improve endovascular interventions in trauma care. Similarly, the opportunity to provide rupture EVAR more routinely will be greatly enhanced through a second hybrid theatre. This is in accordance with NICE guidelines.

Collaboration and integration of IR into LiVES will improve treatment times as well as potentially improve outcomes through co-working. The opportunity to utilise the second hybrid theatre for endovascular cases has already been highlighted as a significant potential improvement in service and patient outcomes.

Lower Limb Prosthetic Centre (Donald Todd)

The lower limb prosthetic centre is currently based at Aintree and has always been an outpatient service for the many amputation patients (approx. 100 per year). Guidelines suggest an inpatient service, which could be facilitated with a move of LiVES to Aintree. This would greatly benefit patients both pre and post-operatively, hasten rehabilitation and raise efficiencies.

Varicose Vein treatment

The treatment of symptomatic and complicated varicose veins is a NICE recommendation, supported by POVS document and funded by CCG. The multi-site working pattern of LiVES, combined with the necessity for C1/2 cover, has precipitated excessive job plans which consistently exceed 12 PAs.

In an attempt to reduce the individual surgeons' workload and to avoid punitive pension tax regulations, a recent job plan review has prompted several veins lists being dropped from LiVES commitment. Previously there were insufficient lists to cover the demand (approx. 500 cases/year) and LiVES has accrued a large waiting list due to a year-long suspension of lists through Covid and now have even fewer lists covered within the new job plans.

This is the only area of LiVES that is not urgent, limb or life-saving surgery. It is therefore the only aspect of the service that can be reasonably sacrificed. The block contract from CCG will need to be met if LUHFT is to continue to offer vein surgery. As such, a new strategy is needed. Preliminary meetings have been held with industry (Medtronic) and management have been informed regarding the proposals for a separate veins treatment structure. This potentially involves utilising the Sefton Suite at Aintree for regular, extra-curricular veins lists through a separate funding structure, thereby offering a veins service to patients, protecting some income for LUHFT and protecting surgeons from the penalties of excessive NHS contracts.

A move of LiVES to Aintree would facilitate this proposal greatly since presence at the hub will allow lists to be incorporated into the week more easily.

Patient Safety

The enhanced patient safety of a move to Aintree are implicit in the description of improved outcomes above. There are no perceived increases in safety issues related to the move as there will be adequate cover at RLH and maintained presence at other satellite sites. The opportunity to transfer patients will likely be enhanced due to less pressure on beds and theatres, hence there may be improved patient safety for all satellites.

Patient Experience

The move to Aintree is anticipated to improve treatment timeline, outcomes, reduce numbers of transfers and hasten those transfers required and facilitate a cohesive, well supported, modern vascular unit. There will be considerable improvement in patient experience in light of these factors and their feedback through formal questionnaires and family and friends responses will provide evidence for this.

Workforce

A move to Aintree would require relocation of the vascular workforce, including all consultants, registrars (SpRs and Fellows), CST and FY trainees, Vascular Nurse Specialists, ward staff, vascular lab staff, Aneurysm Screening Team, research team and vascular theatre team. There is also an Associate Physician and Surgical First Assistant trainees that would require relocating with the team.

A move to a new unit with enhanced facilities at Aintree, as described above, would represent an exciting opportunity for the extended team. Improved bed and theatre capacity pressures will increase efficiency, boost morale, engage individuals and encourage recruitment into a well-funded, dynamic tertiary referral centre of excellence. They have active research and educational programmes as well as decades of experience, as the training centre for vascular and endovascular surgery. This will only be enhanced by working in a more efficient, well supported unit. The research and educational facilities at Aintree would also support the delivery of regional and national training courses and supporting MD and PhD theses. Existing longstanding relationships with University of Liverpool and the facilities at Aintree would support the on-going work they do.

The additional hybrid suite provides a unique opportunity to collaborate with IR and embed them into LiVES. Currently IR training is challenging. However, we are required to provide our trainees with experience according to the National Curriculum. The 2 hybrid suites will focus most of the aortic and peripheral endovascular work into the LiVES theatre complex, providing an excellent opportunity for training of both vascular and IR SpRs. It also provides the platform for specialist training and generates international reputation. Such a profile is a key factor in recruiting Fellows, research students, regional training recognition and ultimately consultant colleagues. It enhances the working experience for the whole team which, in turn, attracts quality personnel. Having the opportunity to engage IR once more in vascular interventions will play a major role in attracting future IR trainees and consultants.

The ward and theatre nursing teams will also have improved working experiences with an integrated, well supported LiVES structure. Retention and recruitment has been an issue, primarily due to challenging working conditions. The proposed unit has the ability to offer a working environment far superior to any experienced so far. To have a unit that is co-located with sufficient ward and theatre/hybrid capacity, collaborative working with IR and LCS and looking to develop, train and innovate will be hugely stimulating for all concerned. It's LiVES vision that the unit at Aintree would be one of the most exciting, interesting and satisfying places to work. Recruitment and retention of staff is imperative in future-proofing a unit and a focus on the working lives of staff paramount and one that is not underestimated by LiVES.

Innovation

Aortic

LiVES have been at the forefront of innovation of open and endovascular AAA repair for 25 years (see Appendix 8 – Research & Innovation). They would look to continue this and enhance their international and national reputation with a move to Aintree.

The increased theatre and bed capacity would allow the tertiary referral practice for complex aneurysms to grow, fuelling the innovation they have always been a part of through clinical registries, studies and laboratory research. Collaboration with LHCH will also provide a platform for innovation in the treatment of dissections and thoraco-abdominal aneurysms. This is dependent, however, on the strong foundations of a cohesive and comprehensive unit at Aintree. For example, LiVES and LHCH are about to start an aortic arch branched programme which would be only the second in the UK outside of London.

Peripheral

With the arrival of 3 new consultants with specific peripheral endovascular skills and diabetic Peripheral Vascular Disease (PVD) experience, they anticipate a growing programme of peripheral innovation. LiVES is the lead organisation for the ground-breaking Limbflo study searching for novel revascularisation techniques in complex lower limb ischaemia. Further peripheral studies are about to begin and, with a cohesive unit at Aintree with additional hybrid/CT facilities, such innovation can evolve.

Diabetes

There is a need to develop the vascular engagement with diabetes in the treatment of ischaemic diabetic feet. This has never been possible due to the disparate arrangement of care across the city. With potential co-location (diabetes, vascular, orthopaedic) to AUH, there is a unique opportunity to progress a cohesive service. There is ambition to drive forward innovative treatment strategies and pathways for this and they are currently a pilot site for the national PVD Quality Improvement Programme.

Research

Vascular Surgery in Liverpool has gained a national and international profile, particularly in relation to the endovascular aortic interventions performed. This has been built up over 3 decades and has resulted in several higher degrees, a NIHR research grant, numerous clinical and laboratory studies, publications and national and international presentations.

Various consultants have presented to learned societies around the world and held faculty positions at national and international meetings. LiVES organise an International aortic meeting (Critical Issues) and act as faculty for the International Liverpool Aortic Symposium organised by LHCH. Several consultants have held positions on National Societies such as Vascular Society GBI council (JB, RKF, KS) and British Society of Endovascular Therapy (JB, SRV, SN). This active engagement with academia is imparted to our trainees and students who have opportunities to produce original work which has also been extensively presented and published.

A move to Aintree could support the research and innovation programme through the opportunities provided by the infrastructure at LUHFT. Much of the work is through close collaboration with Liverpool University and LHCH and these relationships would be strengthened through an improved clinical department that can provide the foundation for on-going work.

Areas of particular interest are:

- UK COMPASS: An NIHR funded study comparing FEVAR and open repair for juxtarenal AAA.
- LIMBFLO study: Novel arteriovenous revascularisation for peripheral ischaemia in the absence of reconstruction options. Industry funded.
- Biochemical and biomechanical characteristics of AAA: (Collaborative with UoL)
- NIHR application for Global Health Research Group for Aortic disease: £3 million grant application investigating health economics for improving treatment of aortic diseases in Thailand and Sri Lanka (collaborative with UoL).
- Industry funded registries: GREAT, ANCHOR, CLEVAR, ENGAGE. All related to stent graft repair of aneurysms.

A progressive, collaborative and functional LiVES at Aintree would enhance all these on-going studies and support further grant applications and research projects. A more detailed summary of the units experience and ambitions are described in the Research and Innovation document (Appendix 9 – Research and Innovation) constructed by our research Lead, Professor Vallabhaneni.

Strategic Benefits

Moving LiVES to Aintree is an enabler for wider Trust strategy with regards to the reconfiguration of elective/non-elective split. LiVES compliments services proposed to be at Aintree site e.g. stroke, diabetes, orthopaedic, trauma, IR. These benefits have all been described above.

Efficiencies

The proposed clinical model will also deliver a number of efficiencies gained from changes introduced, and improvements in the service delivery and ways of working.

Post-change from Service Reconfiguration	Number of patients Affected (approx.)	Efficiency Improvement
Co-location of LiVES with other dependent services at AUH site with improved access to facilities including 2nd hybrid	200 patients	• Current performance indicates that we exceed 20 days for open revascularisation and even more than 20 days for endovascular treatment. • There is a potential 7-15 day saving in LoS or even more if secondary interventions and complications from delayed treatment are taken into account. The Trust currently undertake over 200 lower limb revascularisations for CLI per year for inpatients. Based on a prudent estimate of 2.5 days saved per patient, this equates to an length of stays reduction opportunity which equates to 500 bed days per annum.
Emergency interventions performed due to availability of Emergency hybrid suite - ability to perform emergency intervention (REVAR, Peripheral and TEVAR for	43 patients	**Ward Impact** • The current inability to gain access an emergency hybrid suite will be addressed through an additional hybrid theatre reducing delays in treatment (waiting until the following day for a hybrid suite) or less effective treatment modalities (e.g. Open instead of

Post-change from Service Reconfiguration	Number of patients Affected (approx.)	Efficiency Improvement
trauma, IR emergency intervention) - Ward impact		rEVAR; embolectomy instead of thrombolysis, angiography or angioplasty/stenting). • 43 ruptures were conducted in 2019/20. Circa 10 patients (approx. 20%) were done as EVAR, the rest done as open procedures. Median postoperative length of stay was 15 days for open repair compared with 9 days for EVAR patients among patients discharged alive (difference of 6 days) • By increasing the ability to perform rEVAR by up to 50% i.e. increase from 10 to 20 procedures. This equates to 60 bed days saved (i.e. 10 x 6) per annum in addition to better outcomes for patients
Emergency interventions performed due to availability of Emergency hybrid suite - ability to perform emergency intervention (REVAR, Peripheral and TEVAR for trauma, IR emergency intervention) - ITU impact	43 per annum	**ITU Impact** • Out of the 43 ruptures undertaken in 2019/20, half the number of EVAR patients went to ITU and those that did, required 1 bed day less than after open repair. • As above, currently less than 20% done by EVAR, due to access to Hybrid out of hours. Over 80% of patients who had an open procedure required level 3 critical care after the procedure, with a median length of stay of 4 days. For every 10 open patients this requires 40 ITU beds days. With Endo-Vascular repair half as many patients require level 3 beds. Median length of stay = 3 days. • By treating an extra 10 ruptures a year by EVAR instead of open, this would require 15 ITU bed days (i.e. 5 patients requiring ITU x 3 days LoS in ITU) compared to (10*4) if done by open procedure. A reduction of 25 ITU days (40-15) in total.
Lower Limb Prosthetic Centre on site	200 per annum	• By having a Lower Limb prosthetic centre on site, this will lead to reduced length of stay and rehabilitation costs (as improved input on rehabilitation as inpatient will reduce this and improve outcomes) • Based on the number of revascularisations currently undertaken per annum (approx. 200 per year), 3 bed days per patient would be saved (median 3 day time saving) leading to a total of 600 bed days saved per annum.
Co-location of LiVES with other dependent services at AUH site	22 per annum	• Reduction in patient transfers following co-location at Aintree will significantly reduce need for patient transfers across sites of at least 24 per year. • The average wait for patient transfer is 2 days. Hence there is an opportunity for length of stay reduction of c. 48 days per annum.

Activity Implications

One of the key benefits of the proposed clinical service model is the increased theatre capacity to deliver activity and improve timely access to care. The following sets out current activity for various procedures undertaken by LiVES, and the forecast increase in activity enabled by the additional capacity.

Procedure	Current Activity (expected/ Commissioned)	Current activity (actual performed)	Anticipated increase in activity from 2nd hybrid theatre	Total number of additional cases anticipated with 2 hybrids/year	Anticipated growth with 2nd hybrid therefore =	Year on year anticipated increase in activity – say by year 3
Open AAA	55	37 (shortfall of 18)	+ 25	62	7	21
EVAR	60	46 (shortfall of 14)	+ 25	71	11	33
Carotid	120	111 (shortfall of 9)	10	121	1	3
Angioplasty	280	200 (shortfall of 80)	80	280	0	0
Bypass	160	153 (shortfall of 7)	10	163	3	9
Amputations	80	71 (shortfall of 9)	10	81	1	3

Assumption indicative and based on:

- Data from submitted NVR cases in 2019 NVR report
- Complex EVAR not included above
- Does not include LHCH Activity

3.2.5 Resource Implications

Estates Requirements

- **Beds:** 44 (33 bed acute ward (ward 1-4 preferred), 7 Intermediate Care beds, 4 critical care) – both options

- **OPC/Vascular Lab Aintree:** AUH vascular clinic E would be the Outpatient heart of LiVES and the new Hub. This is necessary to prevent the dissipation of the workforce across the region. Having it centralised at the hub optimises clinicians' time and facilitates efficient and fulfilling working as part of the team. As such, the CLI, VNS, dressing and general and virtual clinics would all operate out of clinic E. A fully equipped vascular lab is required to facilitate this. That would entail 3 scanning rooms, an office space, at least 5 clinic rooms and 2 dressing rooms. To facilitate this, Infectious Diseases and IV Lines Unit that currently occupy space in Clinic E would have to be relocated and clinic room 6 converted into offices for the vascular lab, plus converting the current storage hub into the 3rd scanning room.

- **New Royal Vascular Lab:** In addition, would require the retention of the new Royal vascular lab facility

- **New Royal OPD**: There will be a requirement at the new Royal for outpatient accommodation including clinic facilities, clinic rooms, dressing rooms for 4 days of Consultant and Vascular Nurse Specialist clinics, plus AAA screening.

- **Theatres**: 2 Hybrid theatres and one open theatre.

- **Day case**: Ambulatory and open theatre space for varicose veins and toe amputations as outpatients (GA/LA).

- **LiVES offices** for management, secretaries, consultants, VNS, trainees and students and MDT room. The need for image reconstruction for treatment requires dedicated workstations and office space.

- **SpR on-call** accommodation.

- **Aneurysm Screening office** with space for: 3 desks with 3 PC and external telephone, 2 Tamber cupboards for portable USS machine storage, 1 filing cabinet, 1 small stationery cupboard. In addition there would need to be a separate Managers office with PC and external telephone.

<u>New Royal Requirements</u>

The New Royal would still require satellite presence of LiVES to service the local community and the in-patients. However, with co-location of the primary dependant services (stroke, diabetes, gerontology, orthopaedics and trauma) there would be less requirement for LiVES at the Royal Liverpool Hospital than is currently required covering Aintree as a satellite hospital. This would offer a further efficiency in the service.

The extent of this is unknown until the specialties occupying the New Royal Liverpool have been determined. However, one may expect that 3 consultant OPC and 5 VNS clinics per week would be ample to cover the demand. There would be Vascular Nurse Specialists (1.5 WTE) required to cover clinics and the wards. There is currently ample OPC space allocated to LiVES and this would need to be retained in part at least to support this satellite service.

In addition there would be a requirement for continued vascular lab facilities at the New Royal Liverpool to support the clinics and wards. There is good provision for LiVES vascular lab in the New Royal in the current allocation with offices and 2 scanning rooms. The USS machines would require transfer from the old Royal.

There is a remodelling of vascular lab services across LUHFT currently and rotation of staff across both sites has been identified as important for governance, training, service delivery and working life satisfaction. In order to facilitate this, a concept of AUH vascular lab covering the acute LiVES hub, whilst New Royal vascular lab covers a more elective service has been developed. In keeping with this there would still be the AAA surveillance, EVAR surveillance and bypass surveillance service based at the New Royal Liverpool. This would justify the staffing and facilities proposed across both sites and optimise efficiencies in terms of patient flow, as acute service demands are disruptive to an elective surveillance programme.

Currently, across the two sites, vascular labs perform 8,500 scans per year in 5 rooms with 6 Technologists. This cannot be delivered on one site but with the reconfiguration of the service as described above, the provision of 3 scanners at AUH performing 5,500 scans per year and 2 scanners performing 3000 scans per year at the New Royal Liverpool would deliver the service. This equates to 1700 scans per year, per room or 8 scans a day, which complies with the current guidelines. It would also require a minimum of 6 Technologists (currently funded) but would benefit from an additional member which is currently being explored.

The Cheshire and Merseyside AAA Screening Programme requires relocating at either Aintree or the New Royal Liverpool. There needs to be vascular surgical presence for opinion and vascular labs for training, governance and complex screening. There are also office requirements, as described above. There is potential for the programme to be housed at either site either in the offices if at Aintree or in the clinic area if at the New Royal Liverpool.

3.2.6 Interdependencies

There are many benefits in moving to Aintree if the Trust strategic development runs in parallel. The co-location of the interdependent services will greatly improve efficiency, patient experience and outcomes and working conditions. Each is briefly addressed below.

Stroke: LiVES currently perform approximately 100 carotid endarterectomies per year within 2 weeks of cerebral event to patients across Merseyside (Southport, Whiston, RLH, and Aintree). The pathway of clinical review, MDT, transfer of information and patient, theatre utilisation, rehabilitation and repatriation would be greatly improved with an acute stroke service at Aintree, amalgamating at least two thirds of the clinical demand onto the Aintree site. There would be significant financial and clinical benefits with this.

Diabetes/Orthopaedics: There has been inadequate provision of collaborative diabetic foot services across Aintree and RLH due to disparate working patterns of the 3 main stakeholders (Diabetes, orthopaedics and vascular). A coalescence of all 3 units onto an acute Aintree site would represent a progressive step in delivering a cohesive service. Aintree, as the hub for all 3, would facilitate regular MDT, ward rounds, joint clinics and excellent theatre access without the need for transfer. This would make the service compliant with national guidelines (POVS, PVD QIP), offer improved service with likely improvement in patient outcomes (tissue and limb salvage), reduce re-interventions and length of stay,

support training and staff satisfaction and promote innovation through a coordinated, progressive service.

Trauma: The co-location of LiVES and the Trauma centre would allow a more cohesive service. Delays in treatment and limited options would be reduced with immediate access to hybrid suites, specialist care and post-operative support/ re-intervention. The enhanced service would hopefully attract personnel and improve training and research.

IR: If Aintree becomes a hub for IR along with LiVES, then there is an opportunity to develop the collaborative working discussed above. There are many benefits, as highlighted, with significant improvements in service delivery, quality, outcomes, efficiency, bed/theatre days, working lives, recruitment, training, research and Trust profile.

Walton Neuro: There is a need for LiVES to support aortic exposure for spinal surgery. Although this would be infrequent, it will likely increase and co-location would greatly improve the efficiency of the service and reduce risk inherent with remote emergency cover. An SLA is currently being developed that may expand to address future demands.

Programme management and governance arrangements to implement the proposed changes are set out in Chapter 8 (Management Case).

Chapter 4

Urology

4. Urology

4.1 Strategic / Clinical Case

4.1.1 Overview of Services

Urology is the largest surgical specialty after general surgery and orthopaedics and involves the treatment of conditions of the urinary tract and male genital tract. The includes some very common cancers including prostate cancer (which is now as common as lung cancer and bowel cancer put together), bladder, kidney and testicular cancer and some very common but debilitating benign conditions such as kidney stones (which cause severe pain and affect 6-18% of the population as some point in their lives), lower urinary tract symptoms (affecting about 50% of the population over 50), urinary sepsis and number of other problems.

Urological services for the people of Liverpool have been provided by two separate units based in each of the legacy trust sites at AUH and RLH. With the exception of complex cancer work referred through the cancer network and small numbers of other tertiary cases, the units have largely continued to function as separate, duplicated services although a common leadership and governance structure has been introduced in 2020 as part of the Trust's organisational change following the merger of both legacy Trusts.

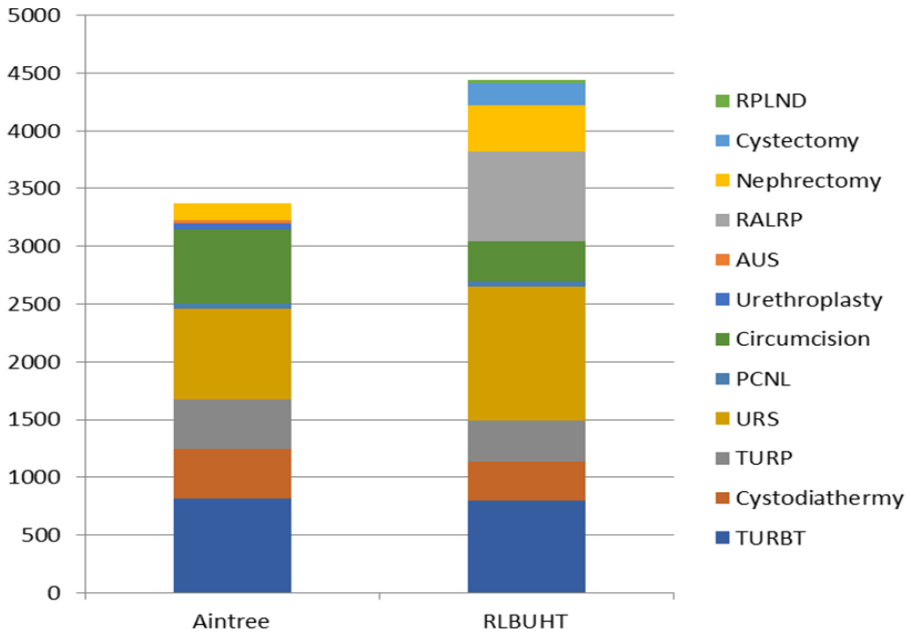
The Urology service at AUH treats a range of conditions including the subspecialty strengths of urethral and bladder reconstruction, andrology and urological implantation surgery and the site houses its own urodynamic equipment and provides a lithotripsy service using the mobile lithotripter.

The current RLH site is the region's designated urological cancer centre and performs the majority of the complex urological cancer surgery. Both units perform a similar amount of core urological surgical procedures and the Royal site has strengths in complex kidney stone surgery, has the region's only metabolic stone clinic and performs tertiary referral lithotripsy from Warrington. Tertiary referral video-urodynamics studies are performed at BGH. The AUH site has strengths in reconstructive Urology acting as the region's urethral reconstruction referral centre and links in with Alder Hey hospital to care for adolescents with serious congenital or childhood urological problems. AUH site also acts as the regional referral centre for complex Andrological surgery.

Activity

Urology units at legacy trust sites have similar sized footprints for core Urological elective procedures overall, although there is more Penoscrotal day surgery performed at AUH and more stone surgery performed at the current RLH. The RLH also performs the complex tertiary pelvic cancer work from the Regional Cancer network and AUH performs some specialist andrology and reconstructive surgery. Figure 1 demonstrates the range and frequency of the more common procedures.

Figure 1: Main elective urological procedures 2016-20



A substantial proportion of the Urology time spent in theatre is for complex surgery or surgery on patients of high co-morbidity scores. Safe care for the elective procedures therefore depends on having patients cared for by appropriately skilled nursing staff and having Urology medical staff readily available out-of-hours. At least 50% of Urology elective operating is performed for cancer or other urgent procedures.

Table 1 gives an overview of the numbers of elective and non-elective episodes on each site with length of stay data comparisons and readmissions. Previous drill-down audits indicate that the coded readmission data overestimates the causal readmission rate by about 30-50%.

Table 1: Inpatient capacity and demand data across Urology departments in legacy trusts

Capacity and Demand: Aintree (Emergency / Elective)

INPATIENT ACTIVITY	2017/18	2018/19	2019/20	2020/21
Elective – Inpatient Spells	707	768	669	254
Elective – Avg LoS	2.1	2.3	2.4	1.9
Emergency – Inpatient Spells	1176	1329	1376	774
Emergency – Avg LoS	3.3	3.2	3.2	3.4
Sum of Speciality Bed Days (Elective)	1472	1759	1600	491
Sum of Speciality Bed Days (Emergency)	3836	4291	4457	2668

EMERGENCY READMISSIONS	2017/18	2018/19	2019/20	2020/21
Emergency within 30d	295 (16.5%)	378 (18.9%)	416 (21.3%)	172 (24.9%)
Emergency within 7d	116 (6.5%)	169 (8.5%)	164 (8.4%)	69 (10%)

Capacity and Demand: Royal / Broadgreen (Emergency / Elective)

INPATIENT ACTIVITY	2017/18	2018/19	2019/20	2020/21
Elective – Inpatient Spells	1105	1117	1034	446
Elective – Avg LoS	2.3	2.5	2.1	1.9
Emergency – Inpatient Spells	1061	1071	1205	660
Emergency – Avg LoS	3.2	3.3	2.5	2.2
Sum of Speciality Bed Days (Elective)	2568	2758	2161	836
Sum of Speciality Bed Days (Emergency)	3371	3481	3050	1437

EMERGENCY READMISSIONS	2017/18	2018/19	2019/20	2020/21
Emergency within 30d	237 (11.5%)	242 (11.7%)	287 (13.7%	122 (17.7%)
Emergency within 7d	105 (5.1%)	88 (4.2%)	139 (6.6%)	65 (9.4%)

Overall, the number of new non-elective admissions on both the RLH and AUH sites is similar at just under 3 per 24 hours. Previous data suggests that typically this includes about 1 GP referral per 24 hours, about 1 ambulance case to A&E and about 1 walk-in through A&E on each site.

Urology's outpatient activity is currently provided on the BGH and AUH sites. This activity includes a large amount of cancer diagnostic work based on 2 week referral pathways, is integrated with radiological investigation and involves a number of outpatient diagnostic procedures such as flexible cystoscopy and prostate biopsy. These services are run by Urology consultants, junior doctors, cancer specialist nurses, outpatient Urology nurses and HCA's with Urology specialist skillsets, cancer support workers and administrative staff. These pathways feed into specialist multi-disciplinary team meetings and link into joint oncology clinics. From there, patients may go onto to have radiotherapy or surgery based on different hospital sites.

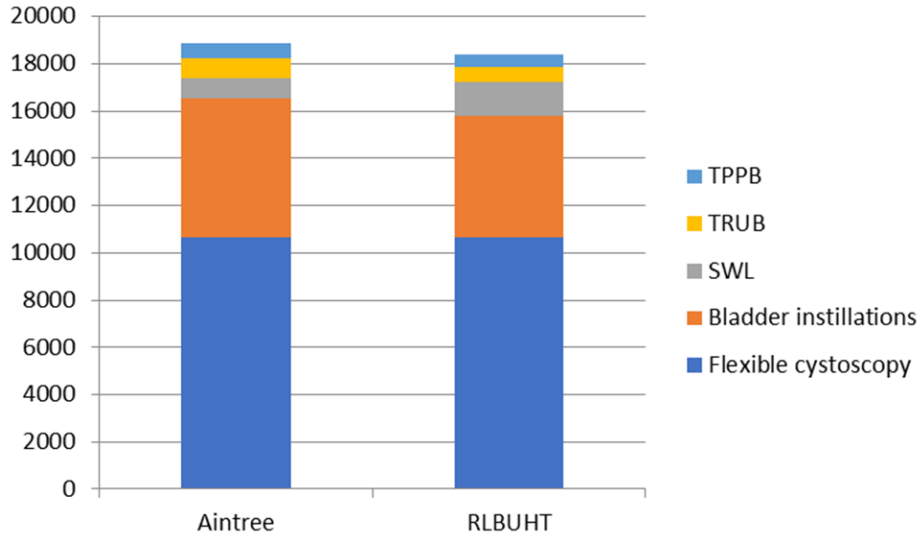
Urology outpatient appointment numbers through Clinic G at AUH and the BGH Urology Centre are shown in Table 2. BGH has more capacity to perform one stop diagnostic clinics through pathways developed with radiology and service level agreement to ensure timed ultrasound slots to link in with flexible cystoscopy. This reduces the number of follow-up visits, however overall BGH has more follow-up visits, principally due to increased long term follow-up of cancer patients and complex stone patients.

Table 2: Urology outpatient appointments across sites

	Aintree		Royal & Broadgreen	
	2018-9	2019-20	2018-9	2019-20
First OPA booked	4880	4515	4401	4460
First OPA DNA	577	522	514	563
FU Booked	7196	7416	11136	11040
FU DNA	612	653	957	9635
Total Attend	10887	10725	14066	14002
Total DNA	1189	1205	1471	1498

Coding of outpatient procedures in the legacy organisations is inconsistent, particularly with the attribution of a day case or outpatient designation and meaning that direct comparison of such numbers is quite inaccurate. Nevertheless, figure 4 shows drill-down derived data of some of the more commonly performed outpatient procedures. Overall numbers are very similar although more shockwave lithotripsy is performed in BGH on the fixed site lithotripter.

Figure 2: Common outpatient procedures performed at AUH and BGH based on drill down derived data. Excludes TWOCs, catheter changes, Hormone injections and Urodynamics studies as coding very inconsistent



Benign outpatient Urology activity includes diagnostic services for lower urinary tract symptoms and continence, stone diagnostic and follow-up services and outpatient services for Penoscrotal problems, andrology and reconstructive services. Shockwave lithotripsy, pressure flow Urodynamics, bladder instillations and some hormone injection and catheter services are also provided in outpatients (although most hormone injections and catheter services are provided in the community).

Outpatients

Aintree Hospital site

Most outpatient-based activities at the AUH site take place within the small clinic G area within a modular build unit situated outside the main hospital. The location of the area poses logistical problems for transportation of equipment e.g. flexible cystoscopes from the endoscopy processing unit and prohibits the provision of any urological care in clinic G for any inpatient who is ambulatory.

The area provides 8 rooms of which 5 are Consultation rooms, and 3 are multi-use including Transrectal/Transperineal Prostate Biopsy, Urodynamics/Flowrate, and Flexible Cystoscopy. There is no separate changing or recovery area, and no sex-specific areas in which male and female patients can be offered separate seating when waiting for or recovering from a procedure. There is a small counselling room, a utility room, a storage cupboard, one flowrate toilet cubicle, one standard and one disabled access toilet.

One outpatient clinic each week takes place in the Elective Care Centre outpatient area due to capacity restrictions in clinic G. A busy nurse-led interventions session takes place on the Chemotherapy Unit (Marina Dalglish Unit) on Friday morning, again due to capacity restrictions within clinic G, which poses logistical issues of transfer of equipment, staff efficiency, provision of clerical/receptionist support etc.

Royal Liverpool and Broadgreen sites

Urology Outpatient facilities are provided at BGH in the Urology Centre. This is a self-contained facility with 10 clinic rooms and five treatment rooms, two for flexible cystoscopy, one for Transperineal prostate biopsy, one for video-Urodynamics and one for Shock-wave lithotripsy. There is a reception, waiting area, nurse assessment cubicle, several toilet facilities, changing facilities, clean utility and sluice, scope processing plant and 3 offices and a staff room. X-ray and ultrasound facilities are located nearby.

Inpatients

Urological inpatient services are provided through a bed base of 48 located across two wards on the RLH and AUH sites, providing care for both elective and non-elective patients. Current arrangements involve much duplication of resources and there is some difficulty in sustaining duplicated out-of-hours medical cover. Nationally, 93% of Urology procedures are performed on an elective basis but a substantial proportion of Urology beds are occupied at any one time by non-elective patients, who often have non-surgical management.

Aintree Hospital site

The AUH site has one inpatient ward in the main hospital tower block, with 18 beds for elective and non-elective Urology patents and includes 4 side rooms and three bays. In addition, Urology non-elective admissions are often accommodated in the Emergency Surgical Admissions ward (Ward 29) and elsewhere within the surgical bed footprint of the site.

Royal Liverpool and Broadgreen sites

The Urology Inpatient facilities are based around a 30-bed ward (4B) on the Royal site. This is comprised of 20 standard beds for elective and non-elective Urology patients, 4 enhanced recovery beds (the Chavasse Unit) and 6 same day admission/day case beds for elective patients which are staffed from 7.30am until 8pm. Ward 4B includes a treatment room equipped for Inpatient flexible cystoscopy or minor procedures such as suprapubic catheter insertion, has a sluice, clean utility room, storage areas, sister's office, staff room and a patient waiting room which aids patient flow.

On days where there are a larger number of planned elective admissions, some patients will be admitted through the generic same-day admission facility on 11z. There are on average about 3 new non-elective admissions per 24 hours and they are usually admitted first through the generic Emergency Surgical Admissions unit before later coming to ward 4B. HDU, ITU, interventional radiology and dialysis facilities are on-site.

Theatres

Aintree Hospital site

The Urology department at AUH runs 15 theatre sessions a week, including parallel all-day lists in main theatres on Monday/Wednesday/Friday and other lists in main theatres on Tuesdays and Thursdays. Dedicated day surgery lists are held in the Elective Care Centre theatres.

Royal Liverpool and Broadgreen sites

Urology have 23.5 operating sessions per week at the RLH, general running 2-3 all day lists each day Monday-Friday. Non elective operating is less frequent than for general surgery and is carried out on the generic surgical emergency list, although the co-location of non-elective and elective activity not infrequently allows non-elective cases to be accommodated on elective lists where capacity has become available at short notice due to patient illness or non-attendance.

The Urology theatres are sufficiently large to accommodate the bulky Da Vinci surgical robot and X-ray C-arms and lasers (being certified for X-ray and laser use with suitable power points). Flexible scope processing capacity with rapid turnaround is needed and available.

Workforce

Aintree Hospital site

The AUH site's medical workforce consists of 6 consultants supported by other medical staffing as outlined in table 3:

Table 3: Aintree Medical staffing workforce

Medical Staff Groups	Posts
Consultant	6
Specialist Registrar	2
Clinical Fellow	1
Associate Specialist/Trust Doctor	2
Foundation Year 1	2

Royal Liverpool and Broadgreen sites

The legacy RLH and BGH Urology Department has 12 Consultant Urologist posts. Urological practice in larger UK teaching hospitals has become quite sub-specialised, in part due to the drive to centralise more complex surgery because of the evidence of a positive correlation between procedure volume and outcomes. While there is some overlap, the main subspecialty groups at the RLH and BGH are cancer and stones and while most Consultants have some elective and non-elective core Urological practice, 2 consultants focus principally on diagnostic Urology and do not participate in non-elective on-call duties.

Middle grade out of hours cover is provided by a 1 in 6 rota including 5 SpRs and a senior robotic clinical fellow. (One of these SpRs is sent on paediatric Urology rotation to Alder Hey during non-on call working hours and one to Liverpool Women's Hospital for Urogynaecology experience 3 days out of 5). Urology CST's and F1s currently participate in combined surgical specialties on call rotas at the RLH.

The medical staffing resources is outlined in table 4.

Table 4: AUH Medical staffing workforce

Medical Staff Groups	Posts
Consultant	12
Specialist Registrar	3.4 (+1.6 on-call)
Clinical Fellow	4
Core Surgical Trainee	1-2
Foundation Year 1	3

A Service Level Agreement (SLA) provides some support for Oncology Inpatients with Urological problems at the new Clatterbridge Hospital and by historical informal agreements urological support is provided for patients with acute urological problems in Liverpool Heart and Chest Hospital and Liverpool Women's hospital, these arrangements need to be formalised.

Administration

Aintree Hospital site

All administrative services are based on ward 12 within the main hospital. There are three Consultant offices, 2 offices for middle grade doctors, an office for HOOP/Deputy/Assistant Clinical Business manager use, a small office for Cancer Services manager, and three secretarial/clerical/admin rooms. There is a seminar room designed for small meetings with IT data point and PC facilities.

Royal Liverpool and Broadgreen sites

The main office facility is based in Kent Lodge on the BGH site with some further offices on 4Z link at the RLH. In Kent Lodge there are 5 small offices for 1-2 people and 3 larger open plan rooms (stone, diagnostics and cancer). These are used by consultants, secretarial staff, senior operational team and administrative supervisor offices.

There is a further larger open plan office used as the cancer hub for specialist nurses, MDT coordinators, cancer support worker staff and another large open plan office where main admin team coordinating clinics and waiting lists are based. There is a small room used for the Referral Assessment service call and remote video clinic. The registrar rooms allow space for trainees to be based with computing facilities and a projector screen which doubles as a large meeting room and there is a smaller conference room with meeting table. There are also toilet and kitchen facilities.

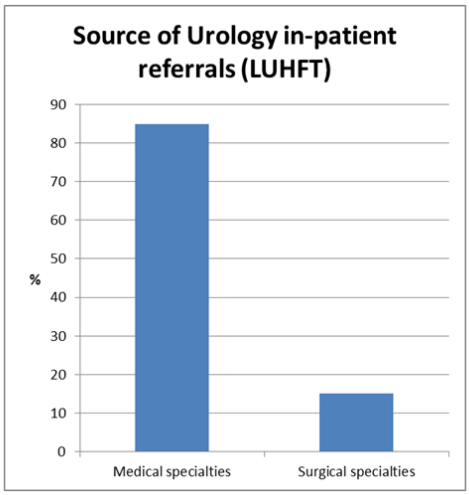
Interdependencies

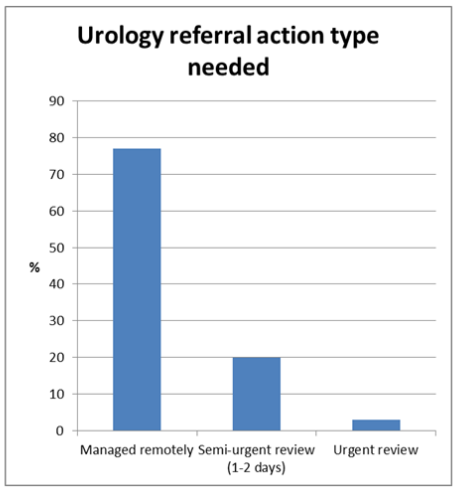
While Urologists spend the majority of the time caring for patients admitted electively or non-electively with Urological problems under Urology, Urologists work closely on a day to day basis with diagnostic radiology, anaesthetics, interventional radiology, oncology, renal medicine and histopathology.

Some major pelvic cancer surgery work requires close working with elective colorectal and complex gynaecology services and for some of the more complex renal and retroperitoneal surgery, Urologists have worked variously with pancreatic/liver or vascular surgeons.

Urologists have a number of interactions with transplant surgery both electively and non-electively. Renal medicine is responsible for the largest number of Urology referral and, overall, 85% of Urology referrals are from medical specialties (see Figure 3).

Figure 3: Urology referrals from other specialties and required action type in LUHFT. Patterns are very similar in both AUH and RLH.





On average, there are approximately 3 inpatient referrals per site every 24 hours at AUH and the RLH. Audits have shown that the referral patterns and required actions are similar on each site, with almost 80% being managed remotely with telephone advice or written advice through the electronic systems, the remainder required clinical review, although less than 5% of referrals required urgent review.

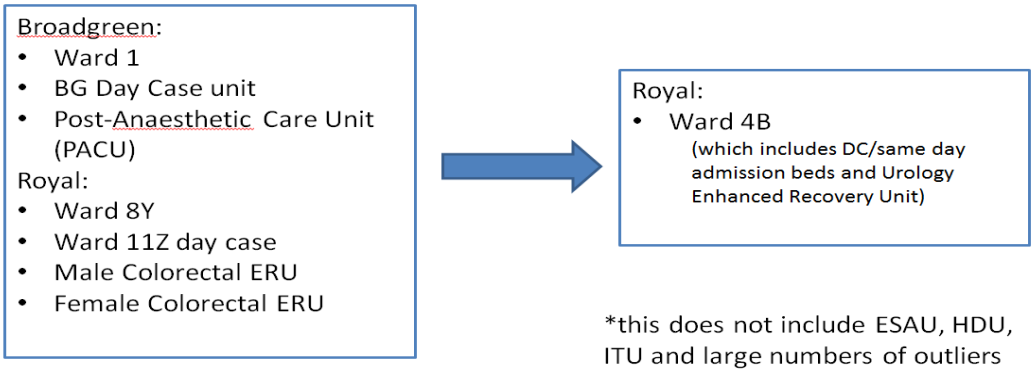
General surgery and Urology currently share FY1 and CST grades on common rotas on the RLH and AUH sites, but the vast majority of non-elective admissions are clearly defined by specialty. The most common presentation where there is uncertainty at time of admission is for lateralising abdominal pain, query renal colic. The British Association of Urological Surgeons recommends that such patients have a CT scan in the Emergency Department which clarifies the diagnosis before the decision is made to refer to a specialty but this is happening inconsistently across LUHFT. Less commonly, urologists and general surgeons are required to assist each other in emergency theatres.

Changes introduced during LUHFT's Service Reconfiguration Phase 1 (T & O, ENT)

Up until 2019, Urology's inpatient care at RLH and BGH sites was scattered across 7 different wards on 2 sites (RLH and BGH) with frequently Urology outliers housed outside of the base wards or within HDU or ITU. Unfortunately this resulted in most Urology Inpatients not being cared for by Urology nurses, with a significant detriment to patient continuity.

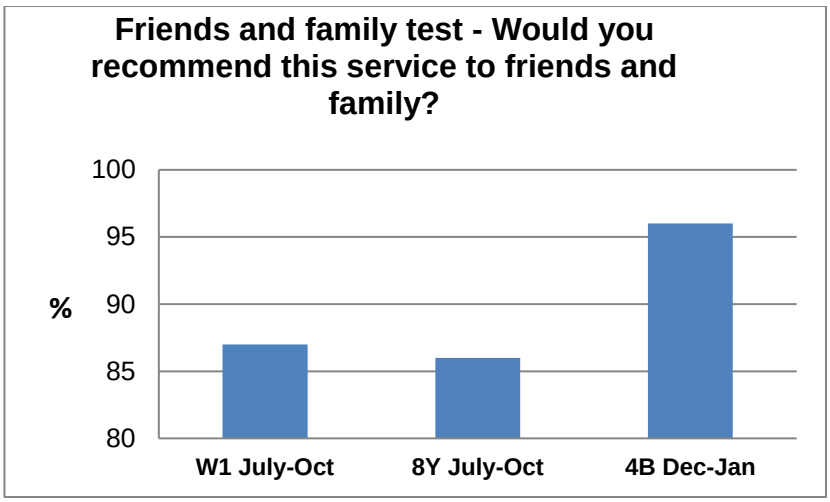
Following the merger of both legacy Trusts, as part of LUHFT's initial phase of Integration and Reconfiguration in November 2019, Urology inpatients was all brought into Ward 4B under one Urology experienced nursing team (see Figure 4).

Figure 4: Merger phase 1 – Legacy RLBUHT Urology inpatient centralisation 2019



This resulted in improvements in the Friends & Family Recommendation scores compared to the legacy arrangements (see Figure 5) and allowed the majority of Urology Inpatients to be cared for by Urology staff and a reduced length of stay for both elective and non-elective patients.

Figure 5: Friends and Family test pre- and post- RLBUHT Urology centralisation in Merger phase 1



Changes to Services during COVID-19

The COVID pandemic has posed huge challenges for the whole NHS, including the Urology service but has also driven a number of changes.

Virtual Clinics

LUHFT Urology adapted very quickly to virtual clinics as between April and October 2020, 60% of outpatient clinics were virtual, higher than any other Urology service in the region. In the longer term, many such appointments will remain virtual although the anticipated number will stabilise at a slightly lower level.

COVID safe outpatients

Outpatient flow has been redesigned to ensure social distancing and it is anticipated that many of these changes will remain. Virtual clinic appointments have often made this possible with face to face appointments alternating with virtual appointments.

4.1.2 Case for Change – Current Challenges

A number of challenges and key drivers for change have been identified for the service currently including:

v) Provision of Timely and Equitable access to care

vi) Clinical Workforce Sustainability

vii) Duplication of Resources (e.g. equipment)

viii) Fragmentation of Research and Innovation

i) Provision of Timely and Equitable access to care

Rising Demand

Population health data (ONS) predict that suspected cancer referrals will rise at an annual rate of approximately 1.4% - a cumulative increase of 13.8% over ten years. The number of newly diagnosed prostate cancers is likely to rise by 1.8% per year (17.8% over ten years); bladder by 2.1% p.a. (21% over ten years); and kidney cancer by 1.3% p.a. (13.4% over ten years). The recent trend, however, has shown a significantly steeper increase for Urology referrals on the two week wait (2WW) pathway, increasing by 17.8% between 2016/17 and 2018/19.

There is no nationally registry for kidney stone but HES data has shown dramatic increases in the number of hospital episodes and procedures nationally, in part related to changes in diet and obesity levels.

Waiting time performance

There is a continued pressure on capacity for Urological services (see table 6) and the demand for them as previously highlighted, is predicted to substantially increase in coming years with increased cancer screening, the aging-population and increasing obesity which is linked to a number of urological conditions. Waits for cancer diagnostic services and routine referrals is an ongoing challenge. Streamlining pathways across LUHFT is needed to optimise resource utilisation and patient access.

Table 6: Historic access target performance for cancer waiting times, outpatient and in-patient referral to treatment times (from GIRFT 2021)

Metric	Source and Year	Trust 2016	Trust 19/20	England 19/20	Position	Score % (0 – 10% | 10 – 25% | 25 – 75% | 75 – 90% | 90 – 100%)
Urological cancer waiting times						
Achievement of 2-week wait referral seen by specialist	NHS England Apr 2016 - Mar 2017, Apr 2019 - Mar 2020	93.6%	87.1%	94.5%	7/124	
Achievement of 31-day wait - diagnosis to treatment (all care settings; %)	NHS England Apr 2016 - Mar 2017, Apr 2019 - Mar 2020	92.5%	85.8%	95.3%	12/126	
Achievement of 62-day wait - referral to treatment* (all care settings; %)	NHS England Apr 2016 - Mar 2017, Apr 2019 - Mar 2020	83.5%	60%	72%	19/126	
Outpatient referral-to-treament adjusted waiting times						
Achievement of 18 weeks - % patients waiting < 18 weeks	NHS Digital Mar 2019 - Feb 2020	94.9%	74.9%	82%	29/123	
Failure to achieve 52 weeks - % patients waiting > 52 weeks**	NHS Digital Mar 2019 - Feb 2020	0%	0%	0.1%	1/123	Not Applicable
Median weeks waiting	NHS Digital Mar 2019 - Feb 2020	5.1	8.5	7.3	80/122	
Inpatient referral-to-treament adjusted waiting times						
Achievement of 18 weeks - % patients waiting <18 weeks	NHS Digital Mar 2019 - Feb 2020	92.7%	75.7%	72.1%	78/123	
Failure to achieve 52 weeks - % patient waiting > 52 weeks**	NHS Digital Mar 2019 - Feb 2020	0%	0%	0.4%	1/123	Not Applicable
Median weeks waiting	NHS Digital Mar 2019 - Feb 2020	6.9	9.1	9.9	55/122	

Equity of access to care

Urology patients experience different waits and have access to different facilities in the legacy RLH, BGH and AUH units and the AUH outpatient facilities in particular need upgrading.

Continuity of care also differs across sites. Current service configuration at the RLH and BGH sites results in poor continuity of care for many patients in post-operative or non-elective care as the clinicians (Urologists and specialists nurses) who have seen them in clinic or performed their operation are frequently off-site.

ii) Clinical Workforce Sustainability

Volume-outcome relationship

Multiple studies have a positive correlation between volume and outcome in surgical care.[27] The link between volumes and better patient outcomes for Urology is not currently being exploited to its best potential at AUH and RLH sites. Bringing together Urological care from two units increases the number of operations done and gives opportunity to streamline care bringing the best practice from each legacy unit and giving more opportunity to innovate.

A larger unit gives opportunity to strengthen subspecialty teams, such that patients are more likely to be cared for by a clinician with focused expertise in the problem they present with rather than a generalist who treats fewer such cases.

Sustainability of on-call rotas

[27] [27] One systematic review examining this link found positive relationships across a number General Surgery sub-specialties. See Morche, J, el at (2016), 'Relationship between surgeon volume and outcomes: a systematic review of systematic reviews', *Systematic Reviews,* 2016 5:204. <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-016-0376-4>.

Urology on-call rotas at consultant and middle grade level are duplicated in each legacy trust. These rotas are difficult to sustain and are supported by locum shifts. Combining the rotas would improve their sustainability but requires the reconfiguration of services to allow patient care to be provided safely.

Having inpatients on two sites with the duplication of on-call rotas is not only difficult to sustain but inevitably reduces the availability of medical staff for elective Urological care, which represents the bulk of the department's activity. Services should be planned to avoid this, but yet provide appropriate and proportionate Urological support to the needs of other specialties on other sites in the trust.

Safety of post-operative procedures, emergencies and readmissions

LUHFT performs the most complex and high risk elective Urological procedures in the region and it is important that the service is configured such that the provision of non-elective Urological care complements and does not detract from the availability of clinicians in the safe post-operative care of these elective procedures. Elective patients who require readmission following a procedure need to have easy access to sub-specialist input from the original team.

Similarly, bringing together non-elective and elective Urological Inpatients care on one site allows more input from subspecialty teams into patients presenting as an emergency, this being more difficult to achieve with services and clinicians dispersed across 3 sites.

Patient accessibility to the right procedure first time

Ensuring the correct configuration of services would minimise the use of temporising procedures such as ureteric stent insertion for ureteric stones. Co-locating the lithotripter with non-elective patients would help facilitate this.

Urology patients being care for by Urology nurses

Urology patients often require specialist nursing skills in the management of bladder irrigation, washouts, nephrostomies, specialist drains etc. Service configuration should maximise the chance of Urology patients being cared for by Urology nurses, which frequently is not the case.

Staff resilience and career progression

Staff absence in smaller units places a larger burden on the smaller group of remaining staff. Bringing medical, nursing and administrative staff together in a larger single unit is an opportunity to improve resilience and reduce the knock-on stress that absences can cause. In addition, skilled staff sometimes leave smaller units as career progression opportunities are limited. Consolidating into a single service is an opportunity to improve retention.

iii) Duplication of Resources (e.g. equipment)

Urological care requires a lot of specialised kit which have high procurement and maintenance costs. Currently, much of this kit has been duplicated at AUH and RLH. This includes Urodynamics machines, lasers, rented lithotripsy services, scope processing plants, rigid endoscopes, flexible ureteroscopes, ultrasound machines, various energy generators for resecting and ablating.

Delivering services on multiples sites lead to duplication of equipment and increased costs. By bringing elective and non-elective services together on one site and rationalising outpatient pathways offers significant opportunities will help reduce current duplication across sites.

iv) Fragmentation of Research and Innovation

Urological care has changed dramatically in recent years as technology, clinical and scientific research and better ways of delivering care have changed what is possible. In some areas, the legacy units have been at the forefront of this, but the adoption of new ways of practice and unit driven innovation has been uneven and fragmented.

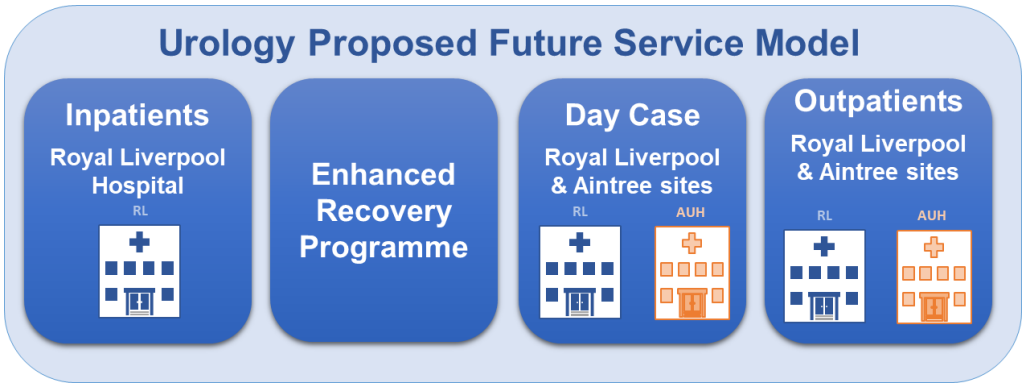
Various clinicians across sites have been and are involved in clinical research of various kinds but, in the absence of a formal academic unit, this research is poorly coordinated and opportunities are missed. Clinical research drives care quality and innovation and helps with reputation, identity and recruitment. The combined unit must work to address this.

A larger centralised hub would create an environment with many people focused on Urological care, improving dialogue and allowing ideas and innovation to grow and spread.

4.1.3 Addressing Service Challenges - Proposed Service Model

A number of service model options have been considered (described in section 4.2). Based on the current service provision, the preferred option is to undertake all Inpatient Urology work at the new RLH with provision of Outpatients at AUH. Day case procedures will be undertaken at either RLH or AUH site (dependent on procedure).

The proposed service model is illustrated as follows:



Inpatients Centralised at Royal Liverpool site

Urology patients who require inpatient stay require a 42-bed unit on 1.5 adjacent wards on the new RLH site. This is a reduction from the current 48 bed allocation, resulting from a change in same day admission arrangements. LUHFT Urology has generally performed well in adjusted lengths of stay but there is still some room for improvement. Nevertheless, given the widely expected future increased in demand for cancer and stone services, this will cancel any length of stay improvements.

The Urology bed base will be divided into an elective and non-elective zone, each with its own nursing complement. Analysis of previous bed usage indicates that the proportion of Urology beds occupied by elective and non-elective patients varies significantly over time so the bed base is designed to allow this proportion to be flexed by the ward sister in consultation with patient flow to optimise bed usage.

Urology Enhanced Recovery Programme

In 2015, the British Association of Urological Surgeons (BAUS) published guidance on the implementation of enhanced recovery protocols across various types of major urological surgery. Carefully designed enhanced recovery programmes reduce the duration of an inpatient stay in hospital and patient achieve a faster return to normality after surgery. The Royal site has established a 4-bedded Urology Enhanced Recovery Unit (the Chavasse Unit) on Ward 4B and it is proposed that is incorporated as part of the elective bed base, with a requirement for 4 beds for this purpose, in the new RLH.

Day Case procedures at new RLH and AUH sites

Increasing numbers of Urology procedures are being done as a day case and the legacy Urology units have been successful in pushing a number of inpatient procedures to day case or even outpatient settings. A number of procedures (such as Penoscrotal surgery, cystoscopy and biopsy and stent changes) have high day case successful completion rates. Other procedures such as Ureteroscopy and Laser Stone Fragmentation or TURBT are often done as a day case procedure but have high unplanned admission rates due to less predictable post-operative symptoms or haematuria.

It is proposed that the former group will have their day case surgery at AUH Hospital, reducing the pressure on theatre space at the new RLH, while the latter group will have their surgery at the new RL hospital and will be accommodated post-operatively in the 20 room generic same day admission/day case facility on the theatre floor.

If unplanned admission is required, no inter-hospital transfer is then needed. This latter group of procedure also have substantially increased specialist equipment requirements and not needing to maintain such duplicated kit will reduce the cost of the service.

Outpatients at both AUH and RLH sites

In the proposed configuration and following a full review of the Outpatient activity requirements across the service, it is proposed that Urology outpatients will be located on two sites (AUH and the new RLH). Cancer diagnostic activity and continence services will be located on each site while services such as outpatient andrology, reconstructive Urology and Urodynamics studies will be located on the AUH site. Other activity that is currently delivered at the Urology Centre will relocate to the new RLH hospital including complex cancer, other diagnostics and stone services including lithotripsy will be provided at the new RLH.

The proposed model will reconfigure services to deliver:

- ✓ Volume related improvement in clinical outcomes
- ✓ Urology patients more likely to be cared for by condition-specific subspecialist teams
- ✓ Opportunity to streamline and improve pathways taking the best from each site and working together
- ✓ Better for staff training, career progression and staff retention
- ✓ Substantial reduction in duplication of expensive specialist equipment
- ✓ Much simpler to provide around the clock expert emergency cover
- ✓ Better for innovation, teaching and research
- ✓ Patients can still access the most commonly used services (outpatients) closer to home
- ✓ A balanced approach to proportionate deployment of out-of-hours resources to where most needed while providing a safe and accessible service to other specialties across sites.

4.2 Economics Case

4.2.1 Alignment with Trust Objectives

In developing the proposed model, consideration has been given to how the proposed clinical model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

The following provides a high level overview of how the proposed Urology model aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition.

Strategic Priority	Rationale / Expected Benefits
Great Care	❖ Improve patient outcomes by creating a large capacity inpatient hub to realise volume-outcome relational benefits, strengthened subspecialty teams for both elective and emergency care, smooth integration of elective and emergency care and making sure patient have access to the best treatment first time. ❖ Improving post-operative care of complex surgical cases, optimising the care of elective readmissions and make sure more Urology patients are looked after by Urology nurses ❖ Improving the timeliness and equity of care access across the city ❖ Improving continuity of care, and simplifying care pathways where possible ❖ Close to home where possible, centralised where necessary
Great People	❖ Creating a strong identity and vision across the city with improved communication, mutual respect and common purpose ❖ Improved training and educational opportunities with more career progression options ❖ Better staff resilience as a larger unit, with more sustainable on-call rotas ❖ Minimising unnecessary travel
Great Research & Innovation	❖ Fostering and harnessing innovation - a larger centralised hub would create an environment with many people focused on Urological care, improving dialogue and allowing ideas and innovation to grow and spread ❖ Integrating research and developing an area of academic excellence will deliver clinical care that improves outcomes in patients ❖ Various clinicians across sites have been and are involved in clinical research of various kinds but, in the absence of a formal academic unit, this research is poorly coordinated and opportunities are missed. Clinical research drives care quality and innovation and helps with reputation, identity and recruitment. The combined unit must work to address this.
Great ambition	❖ Urology services often require expensive equipment, much of which is duplicated on different sites, presenting opportunities to reduce costs and use resources better while maintaining good care ❖ Duplication of rotas across sites is expensive and difficult to maintain ❖ A balanced approach to proportionate deployment of out-of-hours resources to where most needed while providing a safe and accessible service to other specialties across site ❖ A coordinated approach to providing Urological services where needed but inside LUHFT hospitals and in city specialist hospitals ❖ Playing a central role as the provider of many regional tertiary services within the cancer and benign Urology networks

4.2.2 Options Appraisal

Following the February 2021 staff workshop where there was further discussion and about the process and the relative merits of the options, the integration team reviewed and formally appraised the long list of options. The service configuration options had been outlined in October 2020 and reviewed as part of the initial staff engagement workshop, in terms of benefits and disadvantages of each (see appendix 2 – staff engagement session outputs).

The long list of service configuration options considered is described below:

Option 1 - Do nothing

Doing nothing would involve that current service provision would carry on as is. Leadership and governance will continue to operate as a fully merged organisation, with any recruitment and tasks to support this to continue, e.g. alignment of SOPs, processes and procedures in line with the merger. However Urology would continue to offer the service as is currently delivered, across three sites.

Option 2 – All Inpatients based at the new RLH, Outpatients based at BGH & AUH

A central inpatient hub would enable Urology patients to be treated by Urology staff, with potential volume related improvements in efficiency and clinical rotas. It would benefit on-call rotas and could improve movement between related elective surgery including nephrology and transplant.

This arrangement would involve north Liverpool patients with Urological emergencies being diverted to the new RLH and those that walk in to AUH ED would need transferring. Staff would be dispersed across 3 sites and continuity of care would remain an issue, particularly in the post-operative management of patients.

Option 3 – Elective Inpatients at the new RLH, Emergency Inpatients at AUH, Outpatients at BGH & AUH

This arrangement would involve South Liverpool patients with urological emergencies being diverted to AUH and those that walk in to new RLH ED would need transferring. This option is expected to allow for some volume related improvement in efficiencies and clinical outcomes, with patients being provided with services across sites allowing for a variety of access. The Urological emergency service would be adjacent to general surgery on-call but distant to Urology elective care, most renal services and transplant. There would be a requirement for duplication of rotas and duplication of kit. There would be less scope for sub-specialty input into Urological emergencies or elective readmissions dual on-call rotas and some staff may feel this approach is disjointed with wards, clinics, administration all being in separate sites.

Option 4 - All inpatients at the new RLH, Outpatients at AUH, BGH Outpatients to new RLH

This option offers a centralised inpatient hub, with increased volume and good integration of elective, non-elective and outpatient care for many patients while still allowing North Liverpool patients to attend outpatients closer to home. It maintains a large Urology presence on the AUH site while focusing out-of-hours resources where they are needed most by co-locating complex elective and non-elective patients. It a greater likelihood of patients being cared for by Urology nurses and improves subspecialty input into non-elective pathways. Services are close to renal medicine, transplant and elective colorectal surgery. Alternative estate for AUH outpatients would need to be considered.

Option 5 – All Inpatients and Outpatients at new RLH

Single site for all Urology services is the chosen model for many units within the country and enables more streamlined pathways and the best continuity of care improving patient experience. It produces a cohesive unit with all services available on site, offers the most efficiency and reduces staff time spent travelling rather than caring for patients. This configuration optimises the input of subspecialist clinicians and specialist nurses in in-patient care and allows them to be available to more patients. In the absence of routine inpatient or outpatient Urology activity at AUH, clear arrangements would need to be made to see ward referrals or provide Urological advice on inpatients there. The increased Urology outpatient activity would increase estates demands at the new RLH.

Option 6 – All Inpatients at AUH, Outpatients at BGH and AUH

This option allows many of the advantages seen within option 3 and 4 but with the single in-patient site being AUH. In the absence of a routine presence on the new RLH site, there would need to be specific arrangements made to cover Urological referrals, particularly from Renal medicine but the service would be closer to acute General Surgery. It is recognised though that there is currently no staff transport between AUH & BGH sites. Moving the existing large Urology inpatient service from the new RLH to AUH would put significant demands on the need for ward space and theatre.

Option 7 – All Inpatients at new RLH, development of BGH Urology centre for outpatients

This option is similar to option 1 in that all in-patient services would be centralised at the new RLH but all outpatient services would be centralised in BGH. While this would allow efficiencies of scale in outpatients, north Liverpool patients would have to travel further and there would be no routine Urology presence at AUH.

An options appraisal exercise was undertaken to assess the clinical service model options against the Trust's criterion.

The following outlines the aggregate scoring from the Options Appraisal. Further detail on scoring and rationale behind scores provided are set out in appendix 3 ('Options Appraisal scoring').

Option 1 – Do nothing

Criterion	Indicators	Weighting (out of 5)	Option 1 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	8	• Does not fit into the strategic aims of the organisation • Does not support acute/non acute split • Does not meet requirement for integrated teams
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	30	• Maintains status-quo for services, with no scope to improve • Unproductive option
Estates Risk	**What is the level of estates risk being addressed?**	**1**	8	• No change to inadequate estate within AUH • Utilisation of three sites is not productive
Quality	**How much does the project contribute to the patient quality of care?**	**3**	15	• No expected improvements to opportunities for improvement
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	24	• Duplicated kit across sites means there is on-going costs • No other financial benefits can be achieved
Total weighted aggregate score and ranking			**85** **(ranked 7st)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 2 - All Inpatients based at the new RLH, Outpatients based at BGH & AUH

Criterion	Indicators	Weighting (out of 5)	Option 2 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	18	• Option provides a centralised inpatient unit which would allow for some strategic objectives to be achieved
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	45	• Inequality with staff being based across multiple sites would not streamline pathways • Would enable for co-location alongside interdependent services at new RLH.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	9	• Outpatients across both AUH and BGH would stay 'as is' but alternative estate would be required for AUH • New RLH can support the number of inpatients required for this model
Quality	**How much does the project contribute to the patient quality of care?**	**3**	27	• Continues as a three site model which affects quality and patient experience • Staff would continue to work across sites and not be able to deliver care in the way they strive to
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	32	• Duplication of kit across sites would not be financially beneficial • Would require sourcing alternative AUH estate to support outpatients model • No immediate estate work would be required in the short/medium term
Total weighted score and ranking			**131 (ranked 3rd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 3 - Elective Inpatients at the new RLH, Emergency Inpatients at AUH, Outpatients at BGH & AUH				
Criterion	**Indicators**	Weighting (out of 5)	**Option 3** Aggregated weighted score (based on 3 people scoring)	
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	22	• Meets some strategic aims and the aims of the Division
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	30	• Some improvements to clinical risk expected as part of this option • Some improvements expected to volume based outcomes • Basing inpatients across two sites carries some risk • Some clinical benefits may still be achieved
Estates Risk	**What is the level of estates risk being addressed?**	**1**	7	• Utilisation of all three sites, utilising current estate with little change • AUH would require estate development to support model due to it being poor estate facilities
Quality	**How much does the project contribute to the patient quality of care?**	**3**	12	• Risk around continuing to have staff across sites, meaning streamlined pathways could not be achieved as effectively • Some benefits around volume outcomes
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	28	• Utilisation of existing estate, but medium/long term requirement to develop AUH estate would be needed with investment • High cost of locums and tiered rotas
Total weighted aggregated score and ranking			**99 (ranked 5th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 4 - All inpatients at the new RLH, Outpatients at AUH, BGH Outpatients to new RLH

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	18	• Meets most strategic quality and efficiency requirements • Does not directly fit with strategic aims of a hot/cold split
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	65	• Implements an equitable service across sites • Implements a two site model, to support continuity of care • Supports access to services for north and south Liverpool
Estates Risk	**What is the level of estates risk being addressed?**	**1**	10	• Suitable new RLH estate for the provision of inpatients and outpatients with some limitations around new RLH outpatients allocation is comparison to current estate footprint at BGH
Quality	**How much does the project contribute to the patient quality of care?**	**3**	36	• Enable a continuity of care within a single site • Will require greater amount of travel for north Liverpool patients • Keeps on-call presence at AUH for patients presenting through ED
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	44	• Good financial savings in relation to reduction in duplicated kit • • Space allocated within new RLH means there would be no further investment required
Total weighted aggregated score and ranking			**173 (ranked 1st)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 5 - All Inpatients and Outpatients at new RLH

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	12	• Does not fit preferred strategic models • Does meet models of care from other organisations
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	55	• Excellent continuity of care for all patients on a single site • No presence at AUH site which poses a risk
Estates Risk	**What is the level of estates risk being addressed?**	**1**	6	• Limited outpatient facilities to accommodate all outpatient work on a single site • Limited day case facilities to also include day case, currently within AUH to a single site
Quality	**How much does the project contribute to the patient quality of care?**	**3**	36	• Would provide continuity of care for all patients within a single site • More travel for north Liverpool patients • Removes all presence on AUH site
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	48	• Large reduction in duplicated kit across sites • Large amount of investment required to 'house' all activity – new RLH estate does not have the capacity to support this without investment to add space on, or for another service to be located elsewhere
Total weighted aggregated score and ranking			**157 (ranked 2nd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 6 - All Inpatients at AUH, Outpatients at BGH and AUH

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	12	• In keeping with centralised inpatient hub • No presence on new RLH site and away from dependent services such as renal
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	30	• Risk around Urology being based away from co-dependant specialities based at new RLH.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	3	• Limited space to support within AUH estate • Insufficient theatre capacity to support this
Quality	**How much does the project contribute to the patient quality of care?**	**3**	24	• Good location with inpatient and outpatient services being located within one site for continuity of care, with BGH still being utilised • Risk around lack of presence within RL site
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	24	• Some efficiency savings could be made due to centralised services • Rota tiering would be expected with no new RLH presence which has financial implications • Significant investment in AUH estate to support model would be needed
Total weighted aggregated score and ranking			**93 (ranked 6th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 7 - All Inpatients at new RLH, development of BGH Urology centre for outpatients

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	14	• Not in line with hot/cold strategic objective • No AUH presence expected as part of model
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	45	• Some expected volume related outcomes • No AUH presence at all poses a risk to clinical outcomes
Estates Risk	**What is the level of estates risk being addressed?**	**1**	4	• New RLH estate suitable for expected inpatient numbers • BGH would require significant estate developments to support AUH relocated activity for Outpatients
Quality	**How much does the project contribute to the patient quality of care?**	**3**	21	• Outpatients away from inpatient site does not support opportunities for continuity of care • Some benefits of scale can be achieved • Quality decrease at AUH site with no presence expected
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	28	• Not financially efficient • Expected financial cost expected for BGH estate development
Total weighted aggregated score and ranking			**112 (ranked 4th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

4.2.3 Preferred Option

Based on the current service provision, it is recommended that the preferred model is to proceed with option 4 of undertaking all Inpatient Urology work at the new RLH with provision of Outpatients at AUH. The Outpatient service currently running from the Urology Centre at BGH site will also be relocated to the new RLH. This will not only improve patient outcomes, access and experience in addition to the benefits for staff, it also aligns and enables the Trust's wider strategy for the reconfiguration of services across sites.

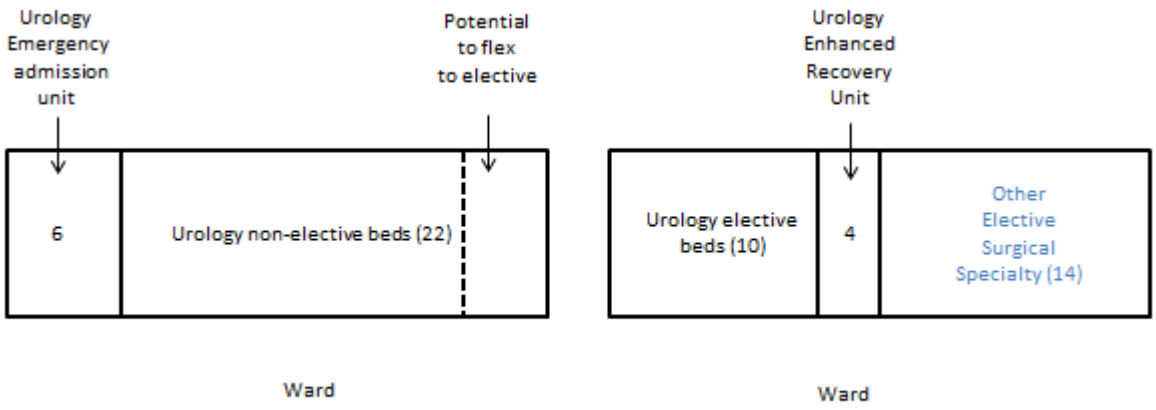
The following describes the preferred model and its implications in more detail:

Inpatients Model - centralised at new RLH site

Urology patients who require inpatient stay require a 42-bed unit on 1.5 adjacent wards on the new RLH site. This is a reduction from the current 48 bed allocation, resulting from a change in same day admission arrangements. LUHFT Urology has generally performed well in adjusted lengths of stay but there is still some room for improvement. Nevertheless, given the widely expected future increase in demand for cancer and stone services, this will cancel any length of stay improvements.

The Urology bed base will be divided into an elective and non-elective zone, each with its own nursing complement. Analysis of previous bed usage indicates that the proportion of Urology beds occupied by elective and non-elective patients varies significantly over time so the bed base is designed to allow this proportion to be flexed by the ward sister in consultation with patient flow to optimise bed usage. The layout of the wards, being large, with defined sections and all single room facilitates this way of functioning, as outlined in Figure 6.

Figure 6 - Schematic diagram of Urology in bed ward zones



Within the non-elective ward unit there will be 6 beds allocated as the Urology admissions unit which will be designed to accept patients directly from A&E or from GP referral. Urology trained nursing staff will now care for Urology non-elective patients throughout their inpatient stay, something which is not currently achieved in either legacy unit. This arrangement will allow early assessment of the Urology admissions by the medical team. Patient will have COVID rapid swabs (lateral flow point of care tests with results available in 30 minutes) before moving through to the main non-elective bed base, although the number of non-elective Urology admission found to be COVID positive on swabbing on admission during the first 3 waves of COVID was extremely small.

The majority of elective Urology patients will be admitted through the same admission facility on the theatre floor and post-operative beds allocated in the Urology elective bed base. Staggered patient admission times for patients may be needed for patients whose surgery is planned later in the day, particularly where 3-session theatre days are used.

Inpatient nosocomial risk

Detection of Covid infection in non-elective Urology patients on admission has been extremely rare in the first 3 waves of the pandemic. The principal risk to Urology in-patients, elective or non-elective is from being in mixed bays with outlying medical patients. In order to minimise the risk of nosocomial infection, patient pathways for Urology in-patients will be managed as follows:

- Nursing teams will be rostered to work in individual zones to allow for separation of patient pathways and staff flow to minimise contacts
- Establish one-way entrance/exit systems
- Single bedroom accommodation within the new RLH allows for segregation until the results of any Covid tests are available
- Robust cleaning schedules with supporting documentation
- Use of physical barriers as deemed appropriate (e.g. reception areas)
- Use of face masks for staff and patients (if tolerated)
- Physical distancing of 2 metres during times where clinical or personal care is not being provided (e.g. communal staff areas, break rooms)
- Covid swabbing in line with current Infection Prevention and Control measures
- Staff participation in LAMP testing to ensure early identification of asymptomatic Covid and commencement of self-isolation
- Encourage vaccination of staff where appropriate
- Awareness and training in IPC measures for all staff, where relevant to the specialty area
- These measures are underpinned by standard infection control precautions for all care, including Surgery or procedures, including use of appropriate PPE and hand hygiene measures to further reduce the risk of transmission.
- Robust review mechanism in place where lapses in infection control have been identified, with improvements outlined in action plans and escalated through Departmental and Divisional Governance structures

LUHFT Urology elective patients are all pre-screened and isolated and Covid infection in non-elective Urology patients during the first 3 waves of COVID was extremely rare at LUHFT. There are many strong drivers for integrating non-elective and elective Urology inpatients but this would need to be done in a way that protects all patients and staff.

It is imperative that any decisions around appropriate bed utilisation in a situation where non-elective Urology capacity needs to be utilised for elective patients for a specified period of time are

discussed between the Ward Manager/Nurse in Charge and the Patient Flow team in order to ensure that nosocomial infection risk can be minimised, in line with Trust policy and protocol. Medical outliers should not be admitted in proximity to elective Urology patients to avoid nosocomial spread.

Enhanced Recovery Programme

As outlined in section 1.3, carefully designed enhanced recovery programmes will be developed further to reduce the duration of an inpatient stay in hospital and patient achieves a faster return to normality after surgery. This will build on the success of the existing programme at the current RL site, a 4-bedded Urology Enhanced Recovery Unit (the Chavasse Unit) on Ward 4B, and it is proposed that is incorporated as part of the elective bed base, with a requirement for 4 beds for this purpose, in the new RLH.

Theatres

The majority of Urology operating will be carried out at the new RLH post-integration as there will be no provision for inpatient beds on the AUH site. The combined operating capacity is currently 40 sessions per week (24 at RLH and 16 at AUH).

Following a review of suitable case-mix volume, divisional demand across surgical specialities and capacity at different sites, it has been recommended that 35 sessions are allocated in the new RLH with 5 half day sessions allocated within at AUH for day case lower complexity procedures.

The operating theatres at the new RLH will need to be sufficient large and high to accommodate the Da Vinci Surgical robot and the C-arms, lasers and fragmentation devices needed for stone surgery. The theatres will also require suitable power point and be laser accredited.

Bringing elective and non-elective services together allows a focused concentration of Urology-skilled theatre staff and will improve efficiencies and quality of care and prolong equipment life-span.

Emergency Presentations and non-elective activity

Emergency Presentations at the new RLH hospital

Non-elective Urology patients will be admitted though the Urology Emergency Assessment beds which are on the Urology non-elective ward. Previous modelling indicates that there are on-average 6 New Urology admissions per 24 hours in LUHFT. GP and ambulance divert are expected to divert 5/6 of these patients directly to the new RLH. The non-elective Urology admissions will now be managed by Urology nurses rather than general surgery nurses. During working hours they will be admitted by the Urology F1 and CST doctors before review by the more senior doctors. There will be a registrar and consultant of the week who will be freed from normal elective duties and there will be consultant-led ward round of all Urology inpatients 7 days a week.

During weekdays it is proposed that the increased stone team will run a ward round of stone patients' daily, providing sub-specialist input into emergency stone patients with planned access to hot theatre and lithotripsy sessions. This is likely to lead to improved outcomes, shorter lengths of stay and reduced cost of stone care.

Similar arrangements with daily specialist ward round are also proposed for the cancer subspecialist team for elective and selected non-elective urological cancer inpatients.

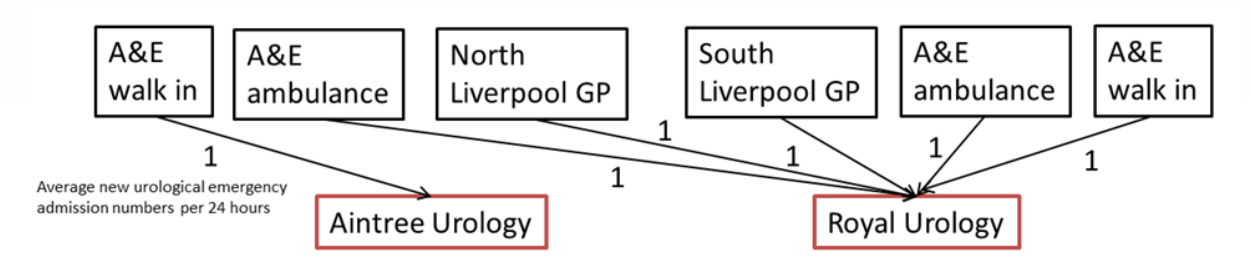
Out-of-hours ward and Urology admissions cover will be by the generic surgical junior on-call rota and the Urology F1/CST/ junior clinical fellow posts will participate in this and provide mutual cover for other surgical wards. The non-resident Urology middle grade Urology out-of-hours rota will be merged.

Emergency Presentations at AUH Site

As part of the proposed model, Urology will have a single admission site located within the new RLH due to open in summer 2022.

It is anticipated from modelling that the majority (5/6) of Urology patients who require admission will be diverted as these are GP referrals of ambulance patients with clear Urological problems, see figure 10. It is anticipated that, on average, one walk-in patient per 24 hours who requires Urological admission will attend AUH A&E department. It may be possible to reduce this number further as patients are meant to ring NHS111 before going to A&E and a proportion of patients are re-attenders to the Urology service and will be aware of the service configuration. Patients who do need admitting should be referred by the AUH A&E staff to the Urology middle grade on-call at the new RLH and will need ambulance transfer. Detailed protocols for transfer will be drawn up.

Figure 7: Schematic diagram of modelled 24 hour average emergency urological presentation routes and proposed divert arrangements



In some patients (typically those with lateralising abdominal pain) there may be some initial uncertainty as to whether the underlying diagnosis may need Urological or General Surgical care. The British Association of Urological Surgeons recommends that such patients have a non-contrast CT scan in the A&E department, but this practice is inconsistent both in AUH and the new RLH Emergency Departments.

Application of such a protocol more rigidly would reduce both the number of patients with General Surgical diagnoses walking into the new RLH emergency department being incorrectly admitted under Urology and the number of patients with Urological diagnoses walking into AUH Emergency Department being incorrectly admitted under General Surgery. It also reduces patient morbidity, anxiety and length of stay by getting the correct diagnosis earlier, is good practice and considered the standard of care. Such practice has been widespread and successful around the country for years, particularly in similarly configured units, as evidenced by the structured interview process which the Urology project team carried out (see appendix 1 – external interviews)

The Urology team expect and acknowledge that Urology advice or review may still be needed at times at AUH. It is proposed that Urology Consultants will be on-site at AUH 8am to 5pm, Monday to Friday. In the morning session they will be completely freed up and time tabled to see ward

referrals (which is anticipated to be the bulk of the work) and deal with any queries in A&E or any patient where the general surgical or medical team assesses has been misdirected. They will be timetabled for clinic work in the afternoon but with some flexibility to deal with any other problems as required. Out-of-hours Urological cover will be provided by a single non-resident on-call team. It is anticipated that most of their out-of-hours activity will be at the new RLH but they will occasionally be required to also visit AUH to deal with a patient. Urology out-of-hours cover at AUH and the new RLH is currently non-resident at middle grade and consultant level. They will also be covering any queries from BGH, Liverpool Heart and Chest Hospital, the New Clatterbridge Hospital, Walton Hospital and Liverpool Women's Hospital.

Following discussion with general surgery, it has been agreed that, in addition to the normal cross site out-of-hours Urology cover there will be a second consultant Urologist timetabled on a sessional basis to perform ward-rounds at AUH on Saturday and Sunday mornings, to deal with any Urological issues which there may be in Acute General Surgical patients and to see any urgent ward referrals. This transitional arrangement will be kept under review to assess whether the on-going need justifies the duplicated resource allocation or whether it can be redeployed.

This proposed level of support is substantially more than Urology services provide at any of the units who participated in the structured interviews. Leeds, Sheffield and Nottingham had no routine Urologist presence on the main acute site and support was provided by the on-call team both in and out of normal working hours.

Testicular torsion is less common over the age of 15 and most is managed at Alder Hey. Nevertheless, when cases do present to AUH Emergency Department it is often managed by a surgical registrar. It is anticipated that the Urology Team will always be available to manage a patient who presents to AUH with torsion without delaying treatment.

Outpatients

In the proposed configuration and following a full review of the Outpatient activity requirements across the service, it is proposed that Urology outpatients will be located on 2 sites (AUH and new RLH). Cancer diagnostic activity and continence services will be located on each site while services such as outpatient andrology, reconstructive Urology and Urodynamics studies will be located on the AUH site. Other activity that is currently delivered at the Urology Centre will relocate to the new RLH including complex cancer, other diagnostics and stone services including lithotripsy.

Co-location of these outpatient and in-patient services will allow:

- Improved ambulatory assessment of urgent problems, reducing admission
- Better access of Urology in-patients to specialist continence services
- Better access of Urology in-patients to specialist cancer services
- Improved continuity of care and improved patient experience
- Better access of emergency stone patients to lithotripsy, reducing need for theatre and reducing length of stay
- Less staff travel with more time for patient care
- Opportunity to create sub-specialty non-elective ward rounds integrating with hot clinics

The regional tertiary video Urodynamics suite provides a less acute service and will be relocated to the AUH site (subject to the outpatient development approval). The lithotripsy services are currently located at BGH. GIRFT and NICE recommendations require increased lithotripsy use acutely on emergency patients presenting with ureteric stones, which is problematic to deliver in the current configuration. This will need to be relocated to the new RLH site.

This arrangement does intend to duplicate many outpatient services allowing many patients to have their Urology outpatient episodes closer to home. Nevertheless, outpatient services where integration with in-patient care is important will be located at the new RLH.

Co-dependencies with intra and inter hospital partners

On average, there are three referrals from other specialties per day on each site. About 85% of ward referrals are from medical specialties, the largest number being from Renal Medicine. Most referrals are made electronically and the system is viewed by the on-call Urology registrar several times a day. Almost 80% are dealt with remotely which has been facilitated by electronic notes and advice typed on Dashboard appears on the PENS electronic record. AUH site has adopted this IT system in May 2021 which has created a simple referral management system across the whole Trust. Referred inpatients that need to be seen are reviewed by the on-call registrar (and/or consultant as needs) on the new RLH site and by the daily rotated ward cover consultant on the AUH site.

Fewer than 5% of ward referrals need immediate review but specialties who have such a referral should telephone the on-call Urology registrar who will see the patient wherever they are located. The Department/division will seek a more detailed service level agreement with other Trusts for urgent Urology referrals. This includes Liverpool Heart and Chest Hospital, new Clatterbridge, Liverpool Women's Hospital and Walton Hospital. Referrals need to be made by telephone by a SpR or Consultant in the referring trust. A single use portable flexible cystoscope should be available to the Urology team to aid complex catheterisation problems. Mechanism to reduce frivolous calls from other organisations such as by-referral inter-charging needs to be explored.

Although the precise locations of other specialties has not been finalised, it is probably that the location of Urology in-patient services at the new RLH would facilitate the working of the complex pelvic team and joint procedures with complex Gynaecology and Colorectal Surgery. Joint working with HPB/Liver teams may sometimes be necessary for complex renal/ retroperitoneal cases and this is facilitated by the proposed arrangement. The arrangement is also convenient for Renal Medicine shared cases and joint working with Renal Transplant surgery and Colorectal Surgery and will need Vascular surgical support on occasion.

It is proposed that the RO and flexible scope processing facilities in the BGH Urology Centre are not replicated in the new RLH outpatients and that flexible scopes will be processed in the large facility in the new RLH Endoscopy Unit. Initial discussion with Gastroenterology indicates that there is sufficient capacity. Ultimately this would be a saving to the Trust.

The Urology Department have a service level agreement with Radiology to facilitate one stop clinics and for lithotripsy. This agreement would need to be revised to take account of the New service configuration.

4.2.4 Key Benefits of proposed model

Patient Outcomes and Experience

Patient accessibility to the right procedure first time

- Focusing inpatient and outpatient services on one site allows all services to be available to a patient and would minimise the use of temporising solutions such as emergency ureteric stent insertion rather than just treating the stone.
- Co-locating the lithotripter with non-elective patients would help facilitate this, is better for patient care and more efficient.

Improving access to care/waiting times

- Provides the most efficient use of the resources available.
- Streamlining pathways across LUHFT will further optimise resource utilisation and patient access.
- The integration will bring together departments, providing a larger pool of staff and will enable sharing of best-practice and expertise developed at each of the merging Trusts.

Equity of timely access to care

- The merged service configuration will combine waiting lists and minimise the variation in service availability and waiting times.

Improving continuity of care

- Poor care continuity is a big problem in multi-site services – this model will enable improved care.
- The proposed configuration strikes a good balance in optimising care continuity while balancing other considerations such as patient travel, specialty interdependency and estates.
- In-patients will be more likely to be seen post-operatively by the specialist nursing teams who counselled them in clinic and by the surgeon who performed their operation.

Simplifying care

- The proposed configuration reduces multisite patient journeys.
- Patients being required to attend multiple hospital sites during common standard care pathways cause confusion and patients not infrequently go to the wrong hospital.
- This proposal minimises the need for patients to navigate difference journeys, car parking arrangements, hospital layouts and unfamiliar staff

Close to home

- This configuration strikes the best balance between simplifying care, continuity of care efficiency and having services close to home.

- Commonly utilised, low-overhead, outpatient services remain duplicated such that patient travel distance is reduced.

Clinical Sustainability

Volume outcome relationship

- Multiple studies have a positive correlation between volume and outcome in surgical care.
- Bringing together Urological care from 2 units increases the number of operations done and gives opportunity to streamline care bringing the best practice from each legacy unit and giving more opportunity to innovate.

Sustainability of on-call rota

- Urology on-call rotas at consultant and middle grade level are duplicated in each legacy trust.
- These rotas are difficult to sustain and are supported by locum shifts.
- Combining the rotas will improve their sustainability but requires the reconfiguration of services to allow patient care to be provided safely.

Strengthened sub-specialty teams

- A larger unit with elective and non-elective in-patient activity and much outpatient activity co-located on one site will give opportunity to strengthen subspecialty teams.
- Patients are more likely to be cared for by a clinician with focused expertise in the problem they present with rather than a generalist who treats fewer such cases.
- The current specialisations and good practice developed at each Trust will be amplified through the larger organisation, leading to the merged Trust providing care, at a minimum, at the best level currently seen at one of the merging Trusts.

Improved subspecialty input into non-elective care pathways

- LUHFT performs the most complex and high risk elective Urological procedures in the region.
- The large majority of Urology activity is elective.
- Co-locating elective and non-elective activity focuses the out-of-hours resource and provides the safest care for post-operative management of complex elective cases.

Optimised safety of post-operative complex surgical cases

- Co-locating elective and non-elective care means that patients who require readmission following an elective procedure will have the advantage of being care for by the team who is most familiar with them and who has the necessary sub-specialty expertise to optimise outcome.

Urology patients being care for by Urology nurses

- Urology patients often require specialist nursing skills in the management of bladder irrigation, washouts, nephrostomies, specialist drains etc.
- Non-elective Urology patients are currently cared for by general surgery nurses for much of their in-patient stay and are required to change wards.
- This service configuration maximises the chance of Urology patients being cared for by Urology nurses throughout their stay and minimises ward changes for non-elective patients

Ensuring smooth integration of elective and non-elective care

- Many urological procedures lie somewhere between what can be managed on an emergency list and a planned elective list in terms of urgency.
- This configuration allows hybrid elective/ non-elective lists with planned gaps filled just a few days before are the most efficient way to accommodate this.

Workforce

Staff Recruitment and Retention

- The larger integrated unit will provide more opportunities for career progression allowing high quality ambitious staff to be retained.
- Having staff with Urological interests scattered in different locations has led to poor communication.
- Bring staff together in an integrated hub is an opportunity to improve the sharing of ideas, better ways of working and improve teamwork.
- There are many unfilled Urology medical posts nationally and nursing also has many gaps across the country.
- Improving care quality, patient experience, training and research gradually improves the reputation of a unit.
- This service configuration proposal is roadmap to create a unit where appointments opportunities are highly sought after, allowing the appointment of the best talent, further improving quality.
- The new Urology unit will be one of the largest in the country and taking the opportunities available will improve care quality, innovation and research and build further its reputation.

Professional Development and Staff Experience

- Provision of education opportunities is critical to improving care quality, staff experience and planning for the future.
- The creation of a larger hub offers the opportunity for more staff to benefit from the opportunities provided and for training to be more focused given the larger staff numbers.

Minimising unnecessary travel

- Some travel between sites will be inevitable.
- The proposed configuration minimises unnecessary travel and improves staff experience.
- This is achieved by a focused deployment of resources while maintain a safe level of service on the AUH.

Research and Innovation

- A larger centralised hub will create an environment with many people focused on Urological care, improving dialogue and allowing ideas and innovation to grow and spread.
- Various clinicians across sites have been and are involved in clinical research of various kinds but, in the absence of a formal academic unit, this research is poorly coordinated and opportunities are missed.
- Clinical research drives care quality and innovation and helps with reputation, identity and recruitment.
- The large centralised hub proposed is viewed as the best environment to facilitate research development, engagement and coordination.

Building successful partnerships

- Urological support is often required by specialty hospitals in Liverpool including Liverpool Heart and Chest Hospital, new Clatterbridge Hospital, Liverpool Women's Hospital and the Walton Centre. These services are best provided through a hub and spoke arrangement as outlined.
- The proposed configuration with co-location of elective and non-elective services with outpatient services certainly gives the best level of support to the regional complex tertiary cancer services which the unit carries out.
- This arrangement also provides strong base to further develop the Benign Urology Area Network as recommended by GIRFT.

Efficiencies

Service Reconfiguration change	Number of patients Affected (approx.)	Efficiency Improvement
Streamlined Day case /Outpatient across procedures avoiding need to duplication Kit across sites	N/A	**Rental cost Saving of Lithotripsy kit** • Lithotripsy will be located at RLH site, avoiding need for rental of kit at AUH site. **Annual flat rate paid per annum saved amounts to £39k per annum.**
	N/A	**Rental cost saving of Urodynamics kit** • Reduced need to rent UDS machine or maintain 2 machines due to centralisation of Urodynamics. • Annual flat rate saved per annum amounts for minimum amount of session's amount to £10k per annum.
	N/A	**Reduction in Laser machinery maintenance cost and replacement costs** • Reduction of 1 laser machinery following Urology move to new RLH. Will lead to needing 1 laser equipment at AUH instead of 2. • **£13,427 per laser (per laser machine) saved per annum**. Will also avoid need for replacing the laser machine every 10 year which amounts to £100k per replacement.
Centralised Inpatients at new RLH will improved streamlined pathways for non-elective patients	1350	• Through centralised admissions unit, standardised pathways and single processes for non-elective patients, Length of stay for emergency patients that would have been treated at AUH (average LoS 3.3 days) will be aligned to current RLH LoS (currently 2.3 days). Difference of one day per patient • Based on 1350 non-elective Urology patients seen per annum at AUH site, this **equates to 1350 bed days saved per annum.**
Combined on-call rota	-	• Combining the rotas will improve their sustainability but requires the reconfiguration of services to allow patient care to be provided safely. • Reducing the intensity of on-call rota will amount to **annual savings of £14,121 per annum.**
Procedures undertaken as day case to be converted to Outpatient setting procedures	50	• Some TURBT procedures currently undertaken as day case activity in theatres to be converted to TULA procedures undertaken within Outpatient setting. • This would reduce procedure time by 30 mins and optimise use of estate by undertaking as outpatient, releasing theatre time within theatre session for other activity. This equates to 75 hours in theatre setting saved (i.e. 90 mins per procedure, for 50 procedures per annum) in addition to recovery and admission required, replaced by 25 hours in Outpatients setting (i.e. 30 mins x 50)

Service Reconfiguration change	Number of patients Affected (approx.)	Efficiency Improvement
Increase volume of procedures undertaken as day case	340	• Increase of day case TURBT procedures through streamlined and improved pathways, reducing need for inpatient stays • Out of the 240 TURBT cases done at LUHFT annually. It is anticipated that day case activity for this procedure will increase from 6.8% (currently day case TURBT activity) to England average of 17.4%. This would lead to an **additional 36 TURBT cases done as day cases by per annum** (from 23 to 59 cases) **saving an additional 83 bed days per annum** (based on current LOS of 2.3 days)

4.2.5 Resource Implications

Workforce

Medical Workforce

There is no proposal to change to the overall numbers of consultant, middle grade or junior medical staff required as a result of the integration project.

Consultant Grade

Urology inpatient activity will be based at the new RLH. Urologists who previously practiced on the AUH site will manage their inpatients on a different site. Most BGH Urology outpatient activity will move to the new RLH and Urologists who previously ran their outpatient services there will move. This new arrangement will create a large centralised hub with increased volume, larger subspecialised teams and will result in improved team working and innovation. It is hoped that this configuration will improve the units' ability to attract and retain the best urological staff from around the country.

The consultant rotas from each legacy site will be merged and consultants will operate a consultant of the week model where they are freed from other clinical activity to manage non-elective patients.

There will be Consultant Urologist presence on the AUH site Monday-Friday between the hours of 0800-1700. A Consultant Urologist (supported by a middle grade Urology doctor) will be timetabled to manage in-patient queries including ward referrals or any queries from A&E or Acute General Surgery during the morning session (patients with urological problems walking in to AUH Emergency Department should be referred by A&E directly to new RLH Urology and should not involve AUH Acute General Surgery). Consultants currently AUH based have indicated that they would be interested in providing this service and may run outpatient activity in the afternoon. Initially there will also be a duplicated consultant timetabled on Saturday and Sunday morning's forward referrals and seeing any patients which have incorrectly come under the care of AUH Acute General Surgery. The on-going need for this extra layer of out-of-hours cover will be kept under review.

Middle Grade

The middle grade rotas will be combined improving sustainability, reducing locum expenditure and reducing the frequency of on-call which will allow for more training opportunities. The SpRs will

largely be based on the new RLH site, but there will also be a daily presence on the AUH site to support the Consultant Urologist and provide some additional outpatient activity.

The larger group of SpRs will allow a bigger group of trainee to benefit from educational session run and it is proposed that the educational programme will be expanded and improved and include more staff groups. The intensity of night work will be kept under review.

SpR timetables are changed frequently to match the specific educational needs of incumbents and the process will continue with a whole trust perspective. Job plans of SAS doctors and clinical fellows will also need to be reviewed.

Junior Grade

There are currently 5 Urology FY1 and 2 CST doctors across sites and their educational experience has historically been strong. It is anticipated that the proposed service configuration will strengthen this further. They are likely to be mainly new RLH based and the co-location of outpatients there will also strengthen their outpatient experience. It is anticipated that they will participate in a generic surgical out-of-hours junior rota at the new RLH providing cross-cover for other surgical wards. Whether this is a hybrid rota involving clinical fellows from surgical specialties and whether there is a separate FY1 and clinical fellow/CST tier needs to be worked through. Any role for Physicians Associates will be kept under review.

Wards

On the basis that the Urology Ward will have a combined inpatient bed base of 42 beds, including 4 enhanced recovery beds; a nursing professional judgement tool has been completed in order to assess the required safe staffing levels. The ward on the new RLH site has single room patient accommodation requiring an increased nursing ratio in order provide safe and effective nursing care, however the costs associated with this and recruitment planning will sit as part of the New Hospital Programme.

Outpatients Nursing Establishment – New RLH

It is proposed that the outpatients nursing staff currently employed in the Urology Centre at BGH would relocate to form part of the centralised outpatients nursing establishment at the point of integration, and would continue to support Urology outpatient activity due to their experience within the service.

Outpatients Nursing Establishment – AUH

The current outpatients nursing establishment for Clinic G is operated on a hybrid model. The central outpatients' team do not sit within the Urology budgets and are a support service for general Urology outpatient clinics. The nursing team managed by Urology provide staff for specific specialist and interventionist clinics, for example biopsies, as well as the necessary non-qualified support staff. It is proposed that the same nursing teams will continue to provide support to Urology.

Estates Requirements

New RLH

In summary, the maximum space requirements for Urology within the new RLH based on a 42 week calculation are:

- *Consultation Rooms –* ***9***
- *Lithotripsy -* ***1***
- *Treatment Rooms –* ***3***

It is proposed that within the treatment room allocation there should be provision for at least 2 Flexible Cystoscopy all day sessions daily, and one Transperineal biopsy session on a daily basis in order to respond to the needs of the service. As these clinics require specific equipment to be available, it would be preferable if these rooms, as a minimum, could be retained as dedicated Urology sessional space.

Programme management and governance arrangements to implement the proposed changes are set out in Chapter 8 (Management Case).

Chapter 5

Breast Services

5. Breast Services

5.1 Strategic / Clinical Case

5.1.1 Overview of Services

The Breast service is a specialist unit for the diagnosis and treatment of benign Breast disorders and Breast cancer. The service aims to provide a world class individualised service to patients with Breast concerns throughout the highly specialised multidisciplinary team that take pride in offering patients an efficient, high quality service.

The unit provides a full and comprehensive range of all diagnostic and treatment services; from one stop diagnostic clinics to oncoplastic, reconstructive and cosmetic procedures. All services are tailored to the individual needs of the patient with minimal delay.

The unit actively participates in numerous clinical trials and continuously strives for excellence in improving care and treatment options for patients.

Patients can be referred to the Breast service by their GP, via consultants based at another department in the Trust or from the Breast Screening Programme following a screening assessment.

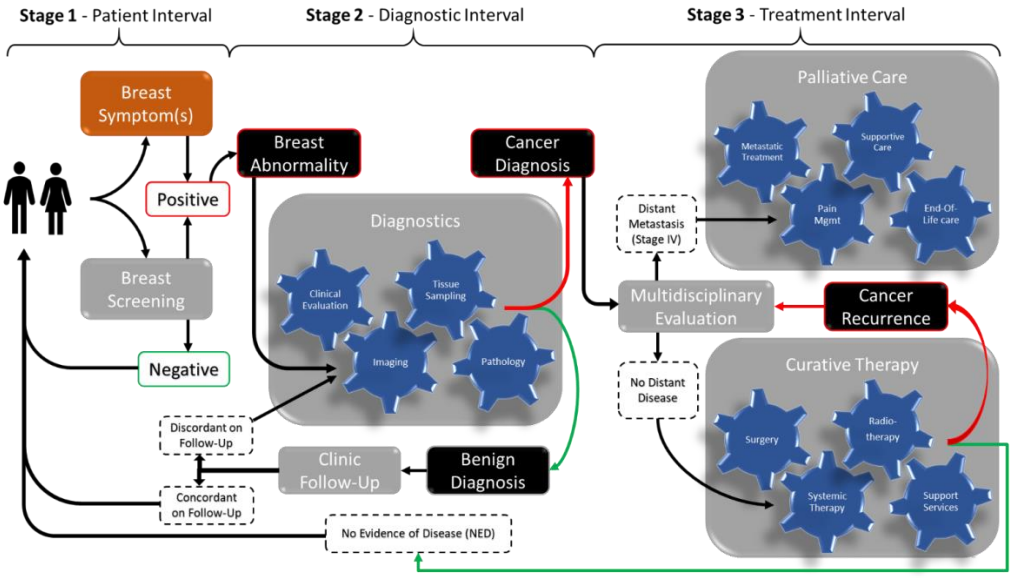
The Breast Screening Programme is a national NHS initiative whereby Women, aged 50 up to their 71st birthday, are invited to have Breast screening every three years to detect Breast cancers at an early stage, when they are too small to see or feel. Breast screening also accommodates self-referrals and assessments at BGH as the main hub for LUHFT Breast screening, as well as numerous other community locations across the city.

After a Breast screening assessment, patients are then referred on to either the current RLH or AUH Breast Unit, should they require further Breast service intervention (Pathway illustrated in figure 1).

Breast services for the people of Liverpool is currently being provided by 2 separate units based in each of the legacy Trusts. The ground floor of the Elective Care Centre, located on the AUH site, accommodates the Aintree Breast Unit and the Breast Unit at the RLH site is situated on the 3rd floor of the Linda McCartney Centre. Both centres have worked closely pre-merger, however in line with the Trust wide integration agenda the teams are working towards aligning clinical pathways as well as providing an equitable service for our patients across the city.

Both sites provide a rapid diagnostic service which enables for patients to have radiological imaging and cytology alongside their clinic appointment.

Figure 1 - Breast Service Pathway



Aintree Hospital

Within the AUH estate, the Breast Unit provides a state of the art, fully integrated diagnostic specialist service which provides all the examinations and tests necessary to diagnose both benign and malignant Breast disease affecting both men and women. The Breast Unit at AUH is situated on the ground floor of the Elective Care Centre and serves the population across Liverpool, Sefton and Knowsley.

The Breast Unit team prides itself on providing a five-star service within a caring and supportive environment whereby our specialists use state of the art diagnostic techniques to diagnose, assess and treat Breast problems.

All patients undergo triple assessment in one of five one-stop clinics, which include radiological imaging and cytology.

The Breast Unit offers a wide range of services to patients with Breast problems providing tests and diagnostic interventions such as, ultrasound, mammography, core biopsies, three yearly (or more frequently) Breast screening, surgery and reconstruction, management of benign and malignant Breast conditions and complementary therapies including reiki amongst others.

The Unit provides patients access to a Rapid Access/Assessment Clinic which can be accessed via their GP.

The Breast team are made up of multi-disciplinary staff, including consultants, specialists nurses, radiographers, consultant radiologists, advanced nurse practitioners and administrative staff, who aim to continuously improve the quality of the service and patients are offered holistic and complimentary therapies within the Marina Dalglish Unit and, where appropriate, receive full support from specialist nursing staff.

The team ensure that all urgent and symptomatic referrals are seen within a 14 day standard. Dedicated specialist clinics exist for family history, aesthetic, reconstruction patients and young patients.

The Breast service at AUH delivers day case activity where patients are admitted to surgical forward wait on the day of their operation, taken to theatre and recover in the recovery area in the Elective Care Centre. On the occasion that a patient needs to be admitted as a result of a complication or a complex case, the patients are bedded on ward 4.

Royal Liverpool Hospital

The RLH Breast Unit is located within the Linda McCartney Centre on the RLH, and offers services for Breast screening, research and trials as well as compassionate care for those with Breast cancer. The aim of the unit is to deliver high quality, patient focused care; diagnosing and treating patients who have Breast cancer or Breast problems. The centre houses a state of the art Breast assessment area. At the heart of the Breast Unit is the development centre; leading in the research of Breast treatment to continuously strive to provide the highest quality care and innovative treatments to patients across the city. Due to the services provided at the Breast Unit people from all over the North West travel to the Centre to receive some of the most advanced and innovative treatments available in the UK today.

The RLH Breast Unit also provides Breast screening for women aged 50-70 every 3 years, as part of the National Breast Screening Programme. This service is delivered from BGH as well as out of numerous community based screening trailers across Liverpool, Sefton and Knowsley. This service is accessible to patients via GP referral, self-referral or as part of a follow up to an emergency presentation or Breast treatment.

The Breast service delivers day case activity, with a total of 5 day case beds utilised, for procedures such as Breast conserving surgery/wide local excisions and mastectomies. Of these procedures, most patients will be discharged home with follow up appointments made within approximately 2 weeks' time. If a patient has a procedure which will result in an admission, for example if a patient is deemed complex, has a chronic condition or there has been a complication during surgery then there is an inpatient bed available on Ward 9Y. This is rare and will only usually be a small number of patients per year who need to be admitted following a day case procedure.

Workforce

The Breast service operates with a multi-disciplinary workforce comprising of consultants, specialist nurses, advanced nurse practitioners, radiographers, theatre practitioners, pre-op nurses and various administrative members of staff. Details of the current staffing for each site are detailed below *(a full breakdown of the workforce is set out in the Appendix 1 'Workforce breakdown')*:

Current Workforce	Sum of WTE
AUH	**17.08**
ADMINISTRATIVE AND CLERICAL	4.78
MEDICAL AND DENTAL	6.3
NURSING MIDWIFERY AND HEALTH VISITING	6
RLH & BGH	**117.81**
ADMINISTRATIVE AND CLERICAL	30.63
AHPS	33.8
EXECUTIVE BOARD AND SENIOR MANAGERS	2
HEALTHCARE ASSISTANTS AND OTHER SUPPORT STAFF	5.17
MEDICAL AND DENTAL	18.35
NURSING MIDWIFERY AND HEALTH VISITING	27.86
Grand Total	**134.89**

Currently at RLH site, there are various devolved services including pre-op and some administrative functions. This is not replicated on the AUH site therefore moving forward the vision would be that Breast continues to operate with devolved services equitable on both sites.

There is a reliance on other colleagues across the organisation in relation to the Breast Multi-disciplinary meeting. The core membership is as follows:

- Designated Breast surgeon(s)
- Radiologist
- Histopathologist
- Oncologist
- Breast care nurse(s)
- MDT Co-ordinator

Extended members of the MDT include:

- Plastic and reconstructive surgeon
- Data management personnel
- Research nurse(s)
- Clinical psychologist
- Palliative care team

The team meet weekly and there is representation from each of the core membership groups.

Theatres

It is important to note that 84% of Theatre activity for Breast surgery are day cases (figure as a combined Trust), this is well above the national average of 68%, and a national target of 75%.

Aintree Hospital

On the AUH site there are 9.5 weekly theatre sessions, with 7 sessions being allocated to Breast Surgery. On average the Breast service utilise three day case beds per week average within the recovery area of the Elective Care Centre. Theatre sessions take place in the main on a Monday and Thursday. The Breast cases that occupy the theatre sessions in the main are cancer patients, however routine electives are also accommodated as well as some cosmetic cases.

Royal Liverpool Hospital

On the RLH site there are currently 11.75 weekly theatre sessions, providing surgery for Breast cases. Patients are admitted to 9Y pre-operatively, taken to theatre and will recover on 9Y before discharge if day case. If the patient needs to stay in overnight then they will remain on 9Y. There are Breast operating lists each day of the week including Saturday sessions therefore patients are spread out in terms of admissions throughout the week.

Beds

Aintree Hospital

The Breast service at AUH does not have an allocated ward as most patients are day cases and therefore recover in the Elective Care Centre post op. In the event that a patient needed to be admitted a bed is allocated on Ward 4. Ward 4 is a surgical ward which also houses other surgical specialty based patients for example, colorectal.

Royal Liverpool Hospitals

Breast services at RLH share Ward 9Y with Ophthalmology. Breast services occupy 5 day case beds as well as 4 inpatient beds, of which 1 is flexed to also be utilised for any additional day case activity. It is important to note that Endocrine Surgery patients also occupy the allocated inpatient beds on 9Y.

Critical Care

There is access available on both the AUH and RLH site to Critical Care, should Breast patients require it. However, this is seldom required due to the low complication rates and types of procedures associated with the service. There are no ring-fenced beds specifically for Breast patients.

Diagnostic Facilities

Women or men with suspected Breast cancer following an appointment with their GP are referred into a specialist Breast service (Breast diagnostic service - also sometimes known as a Breast symptomatic service) and are offered a triple diagnostic assessment in one single hospital visit in accordance with National Institute of Clinical Excellence standards (NICE 2016).

The triple assessment involves:

- Clinical examination
- Breast imaging (mammography and / or ultrasound)
- Taking a sample of Breast tissue

This ensures rapid diagnosis whilst reducing anxiety associated with multiple hospital appointments.

The LUHFT Breast imaging facilities include:

Aintree Hospital	Royal Liverpool Hospital
2 mammography rooms	3 mammography rooms
2 ultrasound rooms	3 ultrasound rooms
1 reporting room	1 reporting room

Outpatient Services

Aintree Hospital

Outpatient services are located within the Breast Unit on the ground floor of the Elective Care Centre on the AUH site. The area includes a waiting area, with 5 consultation rooms and 1 treatment room which doubles as a consultation room (included in the 5). In addition the unit has a diagnostic

area which includes a small waiting area, 2 ultrasound rooms, 2 mammographic rooms and changing facilities for patient.

	2017/18	Virtual	2018/19	Virtual	2019/20	Virtual
First OPA booked	5,965	12	6,331	12	6,836	96
First OPA DNA	459	0	485	0	438	0
FU Booked	5,039	203	4,697	221	4,783	770
FU DNA	402	0	409	0	267	0
Total Attend	10,143	215	10,134	233	10,914	866
Total DNA	861	0	894	0	705	0

Royal Liverpool Hospital

Outpatient services are located within the Linda McCartney Centre on the RLH site. Rapid access diagnostic clinics are located on the 3rd floor of the building and general Breast clinics are held on the 2nd floor of the building within various outpatient suites. The 3rd floor of the Linda McCartney Centre includes a waiting area, with 3 consultation rooms and 1 treatment room which doubles as a consultation room (included in the 3). In addition the unit has a diagnostic area which includes a small waiting area, 3 ultrasound rooms, 3 mammographic rooms and changing facilities for the patients.

	2017/18	Virtual	2018/19	Virtual	2019/20	Virtual
First OPA booked	6,852	-	7,388	-	7,354	48
First OPA DNA	626	-	599	-	585	0
FU Booked	10,971	-	10,792	-	10,545	167
FU DNA	924	-	9,970	-	780	5
Total Attend	16,273	-	16,759	-	16,535	210
Total DNA	1550	-	1421	-	1365	5

Activity

Aintree Hospital - Capacity and Demand (Emergency / Elective)

Breast patients that present to the Emergency Department at the AUH site would typically be transferred to the Surgical Assessment Unit for further assessment. Emergency presentations would include Breast abscesses. The patients would be assessed by the clinical team on the Surgical Assessment Unit and if required a member of the Breast team would attend to examine the patient. Very few patients are subsequently admitted.

Elective Breast surgery includes procedures to support the Breast cancer pathway i.e. lumpectomy mastectomy, procedures to support preventative surgery i.e. mastectomy, and procedures to support benign Breast lumps. In addition, elective Breast surgery can be carried out for cosmetic reasons; Breast reconstruction following cancer surgery, Breast reduction. The elective pathway for Breast surgical admissions at AUH promotes day case procedures. Patients present at surgical forward wait pre-operatively prior to going to theatre. Patients then recover in the elective day care

centre recovery area prior to being discharged home. In the event of complex patients an inpatient stay may be required. There is no allocated ward for Breast patients at the AUH site, however the bed management team would likely allocate Breast patients a bed on ward 4 or the Sefton Suite.

	2017/18	2018/19	2019/20
Elective – Inpatient Spells	400	330	235
Elective – Avg LoS	0.9	1.1	1.1
Emergency – Inpatient Spells	88	62	24
Emergency LoS	2.9	3.0	3.3
Sum of Speciality Bed Days (Elective)	331	327	256
Sum of Speciality Bed Days (Emergency)	161	86	64

The number of elective inpatient admissions has reduced significantly over the last 4 years due to patients being mainly treated as day case. The length of stay for the AUH site is low which supports the idea that 80% of procedures are carried out as day case. In contrast the length of stay at the RLH site is higher at 6.3 days, however due to the Royal having a dedicated Breast ward, (9Y), it is likely endocrine surgical patients are included within the data as they attend the same ward and fall under Breast from a data perspective.

Emergency Readmissions

Emergency re-admissions following Breast surgery are an uncommon event however can happen. Usually the types of patients that would present as readmissions would include patients with a haematoma or a possible infection. The “link nurse” role within the AUH Breast unit helps to pre-empt any patients that would be possible readmissions with a view to deal with the complications and avoid the patient presenting at the emergency department.

	2017/18	2018/19	2019/20
Emergency within 30d	24	22	17
Emergency within 7d	17	11	9

Day case

Breast surgery over the last 4 years has transitioned more towards day case procedures. We can see from the below data that the number of day cases has increased in comparison to the number of elective inpatients reducing. In order to support Breast procedures converting to day cases the AUH site introduced the role of the ‘Breast link nurse’. This role carries out home visits for patients post operatively to manage drains and any post op care. For the RLH site this care is carried out by community nurses. There is opportunity in the new vision for the service to expand the link nurse role to ensure patients receive equitable care post operatively and to continue to support day case delivery.

2017/18	2018/19	2019/20
232	268	339

Royal Liverpool Hospital – Capacity and Demand (Emergency / Elective)

Breast patients who present to the Emergency department at the RLH site are often assessed in ED and the on call Breast surgeon would be contacted. Patients will either be subsequently admitted to the ward or be given a clinic appointment or discharged.

As discussed above the elective procedures for Breast surgery at the RLH site are the same as those listed for AUH. The RLH site have a dedicated Breast ward, 9Y, which is shared with Ophthalmology. All Breast elective patients are admitted to 9Y whether they are day case or inpatient. As Endocrine Surgery also sits within the overall Care Group, Endocrine surgery patients are also admitted to the ward under Breast. Therefore the length of stay as per above could also refer to some Endocrine surgery activity resulting in the length of stay being longer. Following the GIRFT report in 2018, the Breast Unit at the RLH site have moved more towards day case procedures therefore reducing the overall length of stay. Patients are followed up in the community by the district nursing team post operatively to support patients with post op care and drains.

	2017/18	2018/19	2019/20
Elective – Inpatient Spells	598	533	491
Elective – Avg LoS	2.0	1.9	1.8
Emergency – Inpatient Spells	131	122	73
Emergency LoS	7.2	7.3	6.3
Sum of Speciality Bed Days (Elective)	1026	966	785
Sum of Speciality Bed Days (Emergency)	348	288	210

Emergency Readmissions

Emergency re-admissions following Breast surgery are an uncommon event however can happen. Usually the types of patients that would present as readmissions would include patients with a haematoma or a possible infection. Although the numbers are slightly higher for readmissions for the RLH site in comparison to AUH, there is a possibility that Endocrine surgery patients are included as they are coded under Breast.

	2017/18	2018/19	2019/20
Emergency within 30d	33	40	32
Emergency within 7d	17	18	11

Day case

The number of day cases are higher at the RLH site in comparison to AUH due to having an increased number of operating surgeons available at the RLH site. As mentioned above there has

been a drive since the 2018 GIRFT visit to increase the number of day case procedures for the organisation resulting in the overall Trust now sitting above the national median on 68% day case procedures.

2017/18	2018/19	2019/20
650	592	522

Changes to Services during COVID-19

Breast Screening was paused across Liverpool, Sefton and Knowsley in March 2020 due to the global Covid 19 pandemic; it was restarted on 16th September 2020 but during this time the service incurred a backlog of over 18,000 clients, who were waiting approximately 6 months for their screening mammogram. When screening resumed, it did so at 64% of pre Covid capacity in order to adhere to infection prevention & control (IPC) and social distancing guidelines.

The service has increased capacity gradually since September 2020 keeping in line with IPC and social distancing guidelines to provide a safe environment for staff and clients. Capacity is currently 69% of pre Covid capacity and the teams are continuing to work towards achieving the backlog by March 2022 as per Public Health England guidelines.

During the Covid pandemic the Breast Service across both sites increased their telephone consultation clinics to accommodate new patients. Unfortunately, this proved to be unsuccessful as most if not all Breast patients require examination and therefore this was stopped. Telephone follow up consultants were established within Breast services pre Covid, however they have continued as normal throughout.

5.1.2 Case for Change – Current Challenges

LUHFT faces a number of challenges in relation to the Breast service, nationally Breast cancer is the most common type of female cancer in the UK with over 55,000 women (+370 men) diagnosed each year, this accounts for 15% of all new cancer cases. Incidence rates for Breast cancer are projected to rise by 2% in the UK to 210 cases per 100,000 females by 2035. Further specialty specific challenges are detailed as follows;

- **Duplication** – it is difficult for staff to collaborate, communicate and deliver best practice standards of care when operating on multiple sites with different care pathways. There are currently 2 referral points, one for each service, this creates duplication and the inability to work efficiently, it does not allow patients who need to be seen urgently to be allocated to the next available appointment. Furthermore, patients who opt to be seen at a different site will be seen again as a new outpatient.

- **Waiting list –** an urgent or symptomatic referral means that you should see a specialist within 2 weeks for the service to meet national 2 week wait targets. 80% of the total referrals received are due to Breast pain, these patients need to be seen within 2 weeks also. To be able to deal with the volume of referrals received, waiting list initiatives (WLIs) are regularly relied on to achieve the 2 week wait standard. In the current model, there is an imbalance of capacity, as AUH hold on average up to 8 additional evening clinic sessions per month, in contrast to the RLH who hold 1 weekly evening session every Wednesday, as well as some ad hoc additional clinics during weekdays.

- **Radio-pharmacy service provision –** is located at the RLH site, there is a Cyclotron which creates radio-isotopes, an injection required for an auxiliary sentinel node biopsy, this procedure is required for between 80-90% of Breast patients who undergo Breast cancer surgery. This radio-isotope is not currently created at AUH and the AUH site are dependent on the service to deliver for cancer patients on the day of their operation (could be up to 4 days per week). This causes delays in cancer procedures at AUH.

- **Pre-operative assessment** – currently the AUH site offer assessments from the Breast case nurses and subsequently patients are sent to main pre-op for their appointments, which is a 2 stage process. The RLH team, however, have devolved pre-operative services and offer telephone pre-op assessments with patients attending the site for Covid swabs and any pre-op tests.

- **Variation in the delivery of surgical pathways** – the service currently operates slightly differently across sites in order to deliver the surgical pathways. This is due to varying workforce and devolved services i.e. pre-op.

- **Workforce constraints –** currently there are variations in workforce within Breast Services between the sites, with AUH seeing a higher volume of referrals, however they have a smaller consultant team. There is also a national shortage of both consultant Breast Radiologists alongside Breast Radiographers.

- **Dedicated Breast Ward** – currently the AUH site doesn't have access to a dedicated Breast bed base. Patients, if admitted are bedded to ward 4. The RLH site has access to a dedicated Breast bed base, 9Y with specialty trained ward nurses to support the patients. Going forward, all patients having access to a dedicated ward will provide equitable care.

5.1.3 Addressing Service Challenges – Proposed service model

The proposed model for the Breast Service is for surgery and theatre activity to be centralised at the new RLH site with interdependent services such as radiology, pathology and pre-operative services. Surgery on the RLH site supports access for cancer patients to the new Clatterbridge Cancer Centre, as well as offering more research opportunities to patients from both AUH and RLH sites.

Outpatients and diagnostic services will continue to operate across both the new RLH and AUH sites, this includes access to Rapid Diagnostic Clinics for emergency patients who require urgent diagnostics to determine their course of treatment and next steps.

There will be 2 dedicated inpatient beds allowing for patients to be treated by specialty trained nurses and for the service to have a dedicated bed base for complex Breast patients who require an overnight stay. Furthermore, the service will have access to 6 day case beds which should reduce the length of stay and sustain increased throughput of patients. The devolved pre-op will streamline the pre-op element of the elective pathway for all patients (particularly AUH) and support improved management of theatre list planning.

The Breast screening for women, as part of the National Breast Screening Programme, will remain within the static site already established at BGH site.

Key challenges addressed

- ✓ **Duplication** – A single point of referral allows best use of resources, allowing patients to go to one single unit, and to whichever site has capacity. This would reduce duplication and allow continuity with capacity and demand across the city. Furthermore, the new model supports patients only being seen once, as consultants will travel to see patients.

- ✓ **Waiting list initiatives –** Going forward, a centralised referral point will continue to allow for patients to be given a choice as to which site they attend, however the demand will be matched against capacity across the service.

- ✓ **Radio-pharmacy service provision –** If all operating is at the new RLH site, then there is no risk to delay on the theatre lists. Theatre lists would be adjusted appropriately taking in to account that nuclear medicine cannot release the isotope until after 09:30, therefore improved list planning could be adhered to.

- ✓ **Pre-operative assessment** – The future model allows opportunity to offer telephone pre-op for all Breast patients with the option of patients attending either site for their relevant tests. This would require some additional pre-op nurse support in order to cope with the volume of patients.

- ✓ **Variation in the delivery of surgical pathways** – Combining Breast surgery on a single site will standardise the surgical pathway, streamline procedures and merge best practice from each unit.

- ✓ **Workforce constraints –** Combining the service and centralising surgical personnel will allow for posts to become more attractive, in an attempt to narrow the gap in vacancies for radiographers/consultants. Working towards a centralised referral point for Breast services will also allow for demand to match the capacity across the 2 outpatient sites.

- ✓ **Dedicated Breast Ward** – The RLH site has access to a dedicated Breast bed base, which will incorporate specialty trained ward nurses to support the patients. Going forward, all patients having access to a dedicated ward will provide safe, effective and more equitable care.

5.2 Economics Case

5.2.1 Alignment with Trust Objectives

In developing the proposed model, consideration has been given to how the proposed clinical model would support LUHFT in achieving its vision and alignment to the Trust's strategic objectives.

The following provides a high level overview of how the proposed model aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition.

Strategic Priority	Rationale / Expected Benefits
Great Care	• Optimised multidisciplinary team working – improving quality and consistency in clinical practices and patient outcomes • Increased level of safe, caring and effective care due to a dedicated Breast bed base which allows for patients to be treated buy specialty trained nurses and for the service to have a dedicated bed base for complex Breast patients who require an overnight stay • Better utilised theatre lists, ward space and theatre planning, as well as increased throughput of day case patients
Great People	• A Merged Breast MDT will enhance collaboration, learning and promote a culture of continuous improvement • An integrated model of care making the organisation a more "attractive place to work"
Great Research & Innovation	• This model offers more research opportunities due to an increased pool of patients operating at the new RLH site • A consolidated surgical workforce on the RLH Global Digital Exemplar (GDE) site increases opportunities for technological and digital innovation Widened access to research opportunities being geographically situated close to Liverpool Universities and the Knowledge Quarter.
Great Ambition	• Sustainable service through an integrated, streamlined, and collaborative MDT process • Being financially sustainable - by removing duplicate equipment & processes, reducing maintenance, and procuring as a one site surgical unit • Increased partnership opportunities with the new Clatterbridge Cancer Centre

5.2.2 Options Appraisal

The following describes the different options considered to best address the challenges highlighted and continue to improve the quality of care for better health outcomes with rising demand and tighter financial constraints. For each of the 6 options, it is assumed that Breast Screening will remain at the Broadgreen site as part of the national NHS Breast Screening Programme, thus will remain out of scope for this options appraisal.

Option 1 – Do nothing

Doing nothing would involve the continuing with the existing Breast service and model of care across three sites. The workforce would not be aligned and pathways would remain the same.

Option 2 – All Surgery to New RLH

All surgery, both cancer and non-cancer would be consolidated at the Royal Liverpool Hospital site. Outpatients and Diagnostic services would remain at both sites, however AUH patients who require cancer treatment or surgery would be referred to the Royal Site.

Option 3 – All Surgery to AUH

All surgery, both cancer and non-cancer would be consolidated AUH. Outpatients and Diagnostic services would remain at both sites, however Royal Liverpool Hospital patients who require cancer treatment or surgery would be referred to AUH.

Option 4 – Split in Surgery (Cancer at new RLH / Non-Cancer at AUH)

Breast Cancer surgery and treatment to be delivered on the new RLH site, with all benign and non-cancer Breast related surgery delivered on the AUH site. Outpatients and Diagnostic services would remain at both sites and refer to respective site depending on diagnostic outcome.

Option 5 – Consolidate Service at the AUH Site

All Breast Services including surgery, outpatients and diagnostics will be consolidated on the AUH site within one major Breast Unit. All patients who require Breast related care will be referred to the new RLH site post screening or GP referral.

Option 6 – Consolidate Service at the RLH Site

All Breast Services including surgery, outpatients and diagnostics will be consolidated on the new RLH site within one major Breast Unit. All patients who require Breast related care will be referred to the new RLH site post screening or GP referral.

An options appraisal exercise was undertaken to assess the clinical service model options against the Trust's criterion. The following outlines the aggregate scoring from the Options Appraisal. Further detail on scoring and rationale behind scores provided are set out in Appendix 2 ('Options Appraisal scoring').

Option 1 – Do nothing

Split in surgery / Outpatients & Diagnostics at each site

Criterion	Indicators	Weighting (out of 5)	Option 1 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	14	• Would not align to the Trust's strategic direction in terms of the Royal site concentrating on cancer services. The merger strategy was based on integration of services to improve patient care across the region. If Breast were to continue as is the current challenges would be exacerbated.
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	40	• Lack of theatre staff at AUH would continue to put stresses on the service – mainly emergency patients operated on at AUH site Radioisotope is created at the RLH site, thus has to be transferred to the AUH site, this prevents cancer patients being operated on before 10 am on the AUH site.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	7	• This model would see the Breast service operating across 2 sites, which is a dilution of capacity and duplicates estate demand. The new RLH site has been designed to accommodate all day case and ward capacity requirements for service.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	24	• Although this serves both north and south Liverpool patients nearer home (as well as Southport and Ormskirk patients) - the disparate nature of service delivery reduces collaboration and creates inequity in service (e.g. community FU only at AUH site, Reconstruction support greater at RLH site, more research at RLH site, more surgical practitioners at RLH site)
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	32	• Doesn't make best use of staffing, theatre sessions and limits procurement/equipment opportunities. There are opportunities to expand services in future i.e. provide support to Isle of Man patients. However, due to resource and estate in current model, this would be challenging if we "do nothing".
Total weighted aggregate score and ranking			**117** **(ranked 5th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 2 – All Surgery to New RLH

Outpatients & Diagnostics remain at both sites

Criterion	Indicators	Weighting (out of 5)	Option 2 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	28	• Model is based on the strategic alignment for cancer care within the trust thus keeping with the proposed benefits of merging the trusts The split site diagnostics also maintains equity of access to both north and south Liverpool patients Cancer service would be near to Clatterbridge Cancer Centre. Cancer research is at RLH site.
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	60	• One clinical pathway offering treatment for benign and cancer patients on one defined footprint, thus increasing throughput, effectiveness and collaboration on a dedicated cancer site. Access to RLH devolved pre op model which could be used for all Breast patients.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	9	• Better utilised theatre lists, ward space and theatre planning. Most of the Breast surgical activity is day case and the RLH site accommodates for this demand. The diagnostic estate is small at AUH site which limits opportunities to expand in future if required.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	36	• This option creates more opportunities for surgical collaboration on one site, increasing quality standards, surgical support, efficiencies, and opportunities to share best practice. Cancer patients are also close to Clatterbridge Cancer Centre. This option should also reduce wait times for surgery, as the Radioisotope is created at the RLH site. As above, this also serves both north and south Liverpool patients nearer their home for diagnostics, FU, surveillance FU.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	48	• This model delivers the most value for money in terms of capital and the benefits associated with the deliverables such as LOS, reduction in theatre cancellations, best use of theatre lists and increased throughput of day case patients. This also reduces costs in terms of equipment and procurement for the service.
Total weighted score and ranking			**181 (ranked 1st)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 3 – All Surgery to AUH

Outpatients & Diagnostics remain at both sites

Criterion	Indicators	Weighting (out of 5)	Option 3 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	12	• Similar to Option 1: this option does not align with wider Trust strategy to deliver cancer care on the new RLH site
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	50	• Although this option supports one clinical pathway for all cancer patients and surgical Breast patients - there is no designated Breast ward on the AUH site and links to cancer support services are geographically displaced. Theatre support is not as readily available on the AUH site.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	10	• No designated ward for Breast patients in current setup, therefore the estate is not fit for purpose to accommodate the required demand for all Breast surgery to be moved to AUH.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	30	• Similar advantages to option 2, however; There will be delays in cancer surgery (transfer of radioisotope from new RLH) Cancer Patients are not as close to Clatterbridge Cancer Centre Smaller Day Case Centre at AUH less easy to support 6 – 8 Breast patients a day.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	44	• As with option 2 - this model delivers value for money by operating and delivering the service on one site. However, investment would be required on the AUH site to facilitate RDC and additional theatre practitioners.
Total weighted aggregate score and ranking			**146** **(ranked 2nd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 4 – Split in Surgery (Cancer at new RLH / Non-Cancer at AUH)

Outpatients & Diagnostics remain at both sites

Criterion	Indicators	Weighting (out of 5)	Option 4 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	24	• Cancer at new RLH – only a very few non cancer procedures – most benign resections undertake radiologically Only other 'benign 'cases would be cosmetic cases which will be old cancer patients or prophylactic genetic mastectomies (would need all the cosmetic equipment) All complex cosmetic procedures will not be on same site – dual operating more difficult if on two sites.
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	35	• Same as continued split site operating but worse as no benefits of one site operating and needing cosmetic facilities/equipment in both operating sites.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	9	• Same as option 1 - This model would see the Breast service operating across 2 sites, which is a dilution of capacity and duplicates estate demand. The new RLH site has been designed to accommodate all day case and ward capacity requirements for service.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	24	• Although higher quality cancer care will be delivered on the new RLH site, a split site would create a disjointed service and patients would need to be referred between sites.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	40	• Operating with two different pathways is not cost effective - i.e. duplicate equipment, staffing, procurement etc.
Total weighted score and ranking			**132 (ranked 3rd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

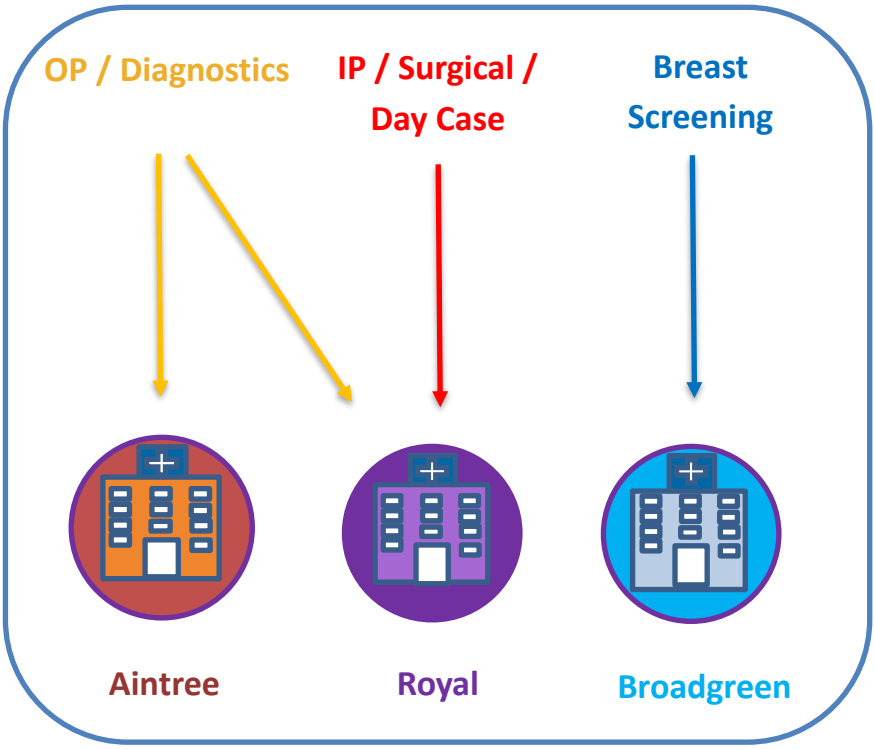
Option 5 – Consolidate Service at the AUH Site				
Criterion	**Indicators**	**Weighting (out of 5)**	**Option 4** **Aggregated weighted score (based on 3 people scoring)**	**Rationale for score**
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	10	• Similar to option 3 - this option is not aligned to the Trust strategy to focus cancer care on the new RLH site. Furthermore, diagnostic services will be taken away from demand within the centre of the city.
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	30	• Benefits to having all staff groups (radiologists/radiographers/surgeons/administrative staff/ANPs/BCN) on one Breast Unit. However, Breast don't have the demand to occupy a self-contained ward and would need to share, thus increasing risks to IPC. The move may also risk losing staff that are already in high demand for the service (and Trust alike).
Estates Risk	**What is the level of estates risk being addressed?**	**1**	4	• This option would require sizable increases to the diagnostic facilities and Elective Care Centre (ECC), as estate space is already limited compared with current demand. Screening base further away on BG site (already isolated) - would need to facilitate large numbers of administrative staff.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	27	• The one site model is a positive (same pathways/staff collaboration) and AUH receives higher number of referrals (as well as better parking facilities). However, this removes Outpatients/Diagnostics from the centre of the city and removes links to cancer site, thus affecting equity of access and quality of care respectively.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	24	• This option would benefit from economies of scale with only having one single site to procure equipment for. However, large investment is required to accommodate the space required to support one Breast Unit.
Total weighted aggregate score and ranking			**95** **(ranked 6th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 6 – Consolidate Service at the Royal Liverpool Site				
Criterion	**Indicators**	**Weighting (out of 5)**	**Option 6** **Aggregated weighted score (based on 3 people scoring)**	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	24	• This option is aligned to the Trust strategy to focus cancer care on the new RLH site & integrated pathways in keeping with the proposed benefits of merging the trusts. However, diagnostic services will be taken away from the north of the city (where most of the demand is for the service).
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	40	• Alike with option 5 - reduced clinical risk, as all staff groups (radiologists/radiographers/surgeons/administrative staff/ANPs/BCN) would be present on one dedicated Breast Unit to support and enhance care. However, the move may risk losing staff that are already in high demand for the service and Trust alike.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	7	• Estate space on the new RLH site is limited, therefore expansion of current capacity to support demand would be a challenge.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	21	• Similar to option 2 - this option creates more opportunities for collaboration (including research/Clatterbridge), thus increasing quality, standards of best practice and provides opportunities for research. Similar to option 5 - The one site model has positives. However, this removes ease of access to Outpatients/Diagnostics services at AUH (which receives higher number of referrals), thus affecting equity of access and patient experience.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	36	• This model delivers value for money in terms of capital and the benefits associated with the deliverables such as LOS, increased theatre planning, reduction in theatre cancellations and increased throughput of day case patients This option would benefit from economies of scale, due to only having one single site to procure equipment for. However, large investment is required to accommodate the space required for one Breast Unit.
Total weighted score and ranking			**128 (ranked 4th)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

5.2.3 Preferred Option

Given the challenges faced under the current model (Option 1) and the subsequent challenges and limitations arising from options 3 through 5, including adverse strategic implications for the Trust, the preferred clinical model identified is option 2. This option will involve centralising Breast surgery at the new RLH site, while remaining Outpatient and Diagnostic services at both the AUH and RLH sites. This preferred model (Figure 2) is described in more detail:

Figure 2: Proposed model



Beds:

Breast has 2 dedicated IP beds on a mixed surgical ward, currently shared with Ophthalmology and Urology on Level 6B of the new RLH. Breast would also accommodate 6 day case beds located in the Same Day Admission Suite (Level 2).

Theatres:

Breast will be allocated 18.75 weekly Theatre sessions at the new RLH site, comprising all activity from AUH (7) and the current RLH (11.75) weekly sessions – 2 theatres every day.

OP Clinics:

Outpatients at the new RLH site will be allocated 48 weekly OP session within their designated Breast Outpatient Department on the Lower Ground Level (-1), however the service also has access to the generic Outpatient Department to facilitate any additional demand – AUH tbc (diagnostics remain both sites).

Diagnostic Services:

In support of the OP service, diagnostic services will remain on both sites with the following facilitates;

Aintree Hospital	Royal Liverpool Hospital
2 mammography rooms	3 mammography rooms
2 ultrasound rooms	3 ultrasound rooms
1 reporting room	1 reporting room

Emergency Patients:

Rapid Diagnostic Clinics will remain at both sites, this is to accommodate any emergency patients who present with Breast problems that require an urgent diagnostic assessment. Patients who are diagnosed with cancer, or a Breast problem that requires non-urgent surgical treatment will be referred to the new RLH site (if not already present). Very seldom will patients require emergency surgery; however this can be facilitated at either site via emergency general surgical procedures.

5.2.4 Key Benefits of Proposed preferred clinical model

There are a number of benefits associated with the proposed model to centralise Breast surgery on the new RLH site, of which will be detailed below within the following themes;

Patient Outcomes

- ✓ Patients admitted for an in-patient stay at the new RLH site are admitted to a dedicated Breast bed base with specialist nursing staff to provide safe and effective care, bringing together Breast surgery from both units will streamline care, improve standards, and merge the best practice from each unit.
- ✓ Bringing together Breast surgery from both units will streamline care, improve standards, and merge the best practice from each unit. A single point of referral allows best use of resources, allowing patients to go to one single unit, and to whichever site has capacity. This would allow continuity with capacity and demand across the city.
- ✓ Mortality and morbidity are similar across sites at present, but potential to introduce improvements in enhanced recovery for all procedures, further improving efficiencies and patient satisfaction within an integrated surgical unit.
- ✓ One Consultant on call 7 days a week receiving telephone calls for out of hour's patient concerns/advice.
- ✓ Bringing together Breast surgery from both units will streamline care, improve standards, and merge the best practice from each unit.

Patient Access

- ✓ Patients from the current AUH site catchment would benefit from greater access to Saturday operating. This would improve access and choices available to patients who may struggle to get in during the week (The NHS Choice Framework, 2020).

- ✓ The centralised referral point will allow for patients to still have a choice in terms of preferential site for diagnostics, it provides a more equitable share of referrals across the two hospital sites to balance capacity and also supports the delivery of the 2 week wait standard.
- ✓ Care should be delivered by the right person, at the right time, in the right place, and by staff appropriately trained and at the right grade. A larger team allows for a comprehensive team and skill mix, to ensure the optimum quality of care is provided.

Patient Experience

- ✓ It is important and appropriate that care is as close to home as possible; the majority (90% plus) of symptomatic patients do not need inpatient care. Therefore, initial clinic appointment and diagnostics remaining at each site would mean that the patient majority would have excellent care provided by a nationally recognised MDT.
- ✓ The rising proportions of operations carried out as day cases has been good for patients and a much more efficient use of NHS resources. Within the new RL hospital, the Breast service has more access to beds in the dedicated day case area. Thus, throughput will be increased, and patients will experience shorter lengths of stay.
- ✓ The new RLH site has single bedrooms which will mean that we can offer the highest levels of comfort, privacy and dignity whilst reducing the risk of hospital infection and the overall length of stay.
- ✓ Streamline of Breast screening patients – currently patients are seen at the RLH and then if they opt for AUH they will be seen again as a new outpatient. The new model supports patients only being seen once, as consultants will travel to see patients.

Clinical Sustainability

- ✓ Combining surgical staff gives both greater flexibility and greater resilience.
- ✓ More support for all surgeons for dual operating (bi-lateral and or complex oncoplastic reconstructive surgery)
- ✓ The CCC devolved model of supporting a large number of MDTs and clinics across the regions is demanding of time and resource; better integration would allow a more sustainable service reducing the number of MDTs by at least one (Southport) and so improving sustainability, while allowing patients to still have their chemotherapy close to home in nurse-led clinics. MDT can be truly multi-disciplinary reducing the number of times patients are discussed (RLH MDT MSK, Nuclear medicine, palliative care, orthopaedic presence).
- ✓ The NHS is, and will remain, ‘cash strapped’, the only ‘new money’ is through the various research monies and grants, all of these are subject to competitive tender. A joint surgical unit allows the service to compete more effectively for money which will otherwise not come to the City. Further, this research money allows us to attract ‘the brightest and the best’, adding further to sustainability.
- ✓ A single point of referral allows best use of resources, allowing patients to go to one single unit, and to whichever site has capacity. This would allow continuity with capacity and demand across the city.
- ✓ A single nationally recognised surgical Breast unit would provide enhanced recruitment opportunities

- ✓ A single unit would provide development opportunities for staff across both sites and would promote succession planning.
- ✓ Consultants would have greater access to surgical support from the Advanced Surgical Assistants at the new RLH site.

Research & Training

- ✓ Further training opportunities are opened up for all grades of staff which adds further to sustainability, as advanced practise nurses and radiographers in particular need to be trained in-house.
- ✓ This model builds on the teams existing partnership with Clatterbridge Cancer Centre, which is collocated on this site for the care of metastatic Breast cancer and offers further scope for research and development.
- ✓ Widened access to research opportunities being geographically situated close to Liverpool Universities and the Knowledge Quarter.

Efficiencies

The proposed clinical model will also deliver a number of efficiencies gained from changes introduced, and improvements in the service delivery and ways of working.

Service Reconfiguration change	Efficiency Improvement
Move to single site at new RLH for surgical procedures	• Remove duplication of equipment and the cessation of annual maintenance charges when operating on one site surgical model.
Aligned Procurement processes and supplies for Breast services	• Procurement and ordering of Breast implants and theatre trays – theatre stores ordered on one site, currently ordered separately for the two sites. • While there are no defined procurement savings at this stage of the proposal, the move to surgery at a single site may lead to de-duplication of some equipment and the cessation of annual maintenance charges (c10% of purchase price).
Operating one on-call rota which combines consultants from each site	• Should the service move to a combined rota for on-call consultants (from 9 to 13 staff), rudimentary rota savings based on the assumption all consultants on a larger rota and their intensity payments move to 1% (from 3%) – saving on this basis would be **£28,040 per annum.** • However, these are still to be confirmed by the service and dependent on the approval of the clinical model. Once Trust approval has been obtained for the proposed clinical model described in this document, further work will be undertaken to develop an approach to realise these assumptions within Trust policies and procedures.

Chapter 6

Nephrology

6. Nephrology

6.1 Strategic / Clinical Case

6.1.1 Overview of Services

Nephrology services are been provided by two separate units based in each of the legacy trusts' sites, Aintree University Hospital and The Royal Liverpool & Broadgreen University Hospitals.

The sites have dedicated renal units offering a wide variety of tertiary services. These include:

- Dialysis – haemodialysis (HD) is offered at the sites 'main' dialysis units located in renal wards and at satellite dialysis units, specifically operated to provide dialysis on an outpatient basis, in the wider Merseyside area; this also expands to Cheshire and Lancashire.[28] Home HD and peritoneal dialysis (PD) are also offered across sites.

- Monitoring and treatment of inpatients with Acute Kidney Injury, which is a common complication in inpatients and carries significant risks of mortality and prolonged hospitalisation.

- Outpatient nephrology clinics that include a range of specialist clinics including genetic kidney conditions, complex autoimmune conditions including vasculitis[29] and glomerulonephritis, pre-dialysis and conservative care, care of kidney disease in pregnancy and others.

The Royal Liverpool Hospital (RLH) site provides Kidney transplant services, offered on an inpatient basis, as the regional provider for patients of all Trusts in the area; there are also approximately 750 stable transplant recipients in follow up.

Aintree University Hospital

Aintree University Hospital (AUH) site provides nephrology services to the patients in the Aintree Hospital site catchment area and to the Southport and Ormskirk Hospitals NHS Trust catchment population.

Inpatient services provided at the Aintree site include HD[30], PD, and plasma exchange[31] support for patients with kidney failure.

Royal Liverpool University & Broadgreen Hospitals

The Royal Liverpool hospital site is the tertiary referral centre for renal transplantation for the Merseyside region, covering some two million people. Approximately 120-140 renal transplants are carried out each year. It also provides nephrology services at Warrington and Halton Hospitals NHS Foundation Trust (WHFT), Liverpool Women's Hospital (LWH) and St Helens and Knowsley Teaching Hospitals NHS Trust (STHKT).

[28] Haemodialysis uses a machine to filter blood externally whilst peritoneal dialysis is carried out using the lining of the patient's abdomen, i.e. in-body filtering.
[29] Inflammation of the blood vessels.
[30] Dialysis fall into two categories: acute and chronic. Acute haemodialysis is undertaken for patients with sudden renal failure. This involves filtering the blood of waste poisons and fluid using a process of diffusion (haemodialysis) or diffusion and convection (haemodiafiltration). Chronic haemodialysis is for patients undergoing regular dialysis.
[31] A way of separating plasma from blood cells using a machine called a cell separator. It is used to treat several conditions and removes harmful antibodies

Table 1 - Elective and non-elective activity

Renal Medicine Service

Count of Episodes by Admission Date

**Elective Admissions - including DAYCASE*

**Admissions excluding REGCASE*

Hospital Site	Elective Admissions					Non-Elective Admissions					Grand Total
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Aintree	643	720	724	464	296	236	283	304	344	143	4,157
Royal	719	891	744	701	151	363	350	376	369	72	4,736
Grand Total	**1,362**	**1,611**	**1,468**	**1,165**	**447**	**599**	**633**	**680**	**713**	**215**	**8,893**

Beds

Aintree University Hospital

Inpatient services are provided across two wards:

- Ward 15 (a renal ward): this ward has 24 beds, including 8 side rooms (of which, 4 are plumbed[32] for dialysis).
- Ward 14: this ward hosts the acute HD unit and a home therapies training/education area. The ward has 9 beds plumbed for dialysis, although only 6 are used due to a lack of staff. There are also 4 further dialysis stations based in the home therapy unit, but are only suitable for use with a chair due to space constraints.

Royal Liverpool & Broadgreen Hospitals

The current nephrology in-patient facilities are as outlined below; there are no beds on the Broadgreen site.

- Ward 6A: consisting of 21 acute nephrology beds. Patients are admitted to the ward from A&E, clinics and other hospitals.
- Ward 9A: includes 14 beds where patients requiring transplants and patients with planned vascular-access surgery for dialysis are admitted.[33] Ward 9A also includes Ward 9HDU, a five-bedded area where high-dependency care is provided to renal patients.
- Ward 9HDU, a five-bedded area where high-dependency care is provided to renal patients. It is situated at the end of 9A.
- Outlying patients may also be admitted to Ward 8A and 3A, which are sister wards to the above. The two wards are 'overflow' wards' where nephrology patients may be placed in the absence of space in the other wards. The wards are located next to the nephrology wards and therefore patients placed there will have access to specialist nurses and physicians as required.

[32] A bed with a dialysis machine fitted.

[33] The fourteen beds in Ward 9A are not dedicated nephrology beds, but rather are surgical transplant beds which are managed separately.

Outpatient Services, Day Case and Dialysis

The Royal Liverpool Hospital site has a higher number of follow-up outpatient appointments compared to the Aintree site; this is driven by differences in the way data is recorded between the legacy Trusts and differences in service provision. For example, a dialysis patient may require three sessions a week and these are all recorded as follow-up activities at the Royal Liverpool & Broadgreen Hospitals therefore driving the higher numbers here.

The higher elective admissions at the RLH site compared to AUH site also drives some of the difference and in particular due to the fact that the RLH provides kidney transplant services, which require a large number of follow-up appointments. Around 800 follow-up appointments a year are attributable to those on the transplant list (with around 100 patients joining every year). In addition, live kidney donors must also have a lifetime of follow-up appointments. The increases in patient numbers are a reflection of the ageing population and increase in comorbidities, which in turn, has led to a rise in the prevalence of renal disease.

The table below, sets out the number of nephrology episodes and appointments over the past five years at the legacy Trusts.

Table 2 – No of nephrology episodes & appointments over the past five years at the legacy Trusts

	Aintree			Royal		
Year	New	Follow up	Number of patients	New	Follow up	Number of patients
2016	3187	9768	4382	3183	21825	6092
2017	3001	11589	4484	2762	23486	6108
2018	2937	12249	4434	2760	21987	5991
2019	2697	10962	4696	3149	20868	6130
2020	1908	12465	6576	2399	17808	5739

*Source: LUHFT Business Intelligence

Aintree Hospital - Outpatient Services, Day Case

Outpatient services (for both new patients and follow-up appointments) are conducted at both the Aintree site and at the Southport & Ormskirk Hospital (SOHT) site. Aintree operates three haemodialysis satellite units: Aintree Satellite Dialysis Unit (ASDU), Waterloo Dialysis Unit (WDU), and Southport Dialysis Unit (SDU).

Kidney transplants are not performed at the Aintree site; patients requiring a kidney transplant are transferred to the Royal Liverpool Hospital. For patients who require combined kidney and pancreas transplants, these are performed at Manchester Royal Infirmary (MRI).

A number of clinics are run at the Aintree Hospital site, these include:

- **Nephrology clinic:** a clinic for new patients or patients with complex kidney problems who are unfit to be managed through primary care. All new referrals are triaged by a consultant through a virtual clinic, and then filtered to the appropriate clinic with all necessary tests arranged in advance of the first review to limit repeat visits wherever possible.

- **Diabetic renal clinic:** a clinic for patients with impaired kidney function with poorly controlled diabetes. This clinic is run in the Diabetes Centre alongside Aintree Hospital endocrine physicians.

- **Polycystic Kidney Disease clinic**: a clinic that occurs monthly at Aintree Hospital Elective Care Centre for the review of patients with an inherited kidney condition. Advice is standardised and patients are given the opportunity to be seen with other family members. This clinic focuses on the safe usage and monitoring of Tolvaptan[34].

- **Immunosuppression clinic:** a weekly clinic at Aintree Hospital Elective Care Centre that is solely for patients on immunosuppressive medication for inflammatory kidney conditions including vasculitis. All cases are discussed in an MDT which complements the existing work of Band 7 clinical nurse specialist (CNS) to safely monitor patients on immunosuppression medication.

- **CKD 5/low clearance[35] clinic:** a weekly clinic for patients with advanced kidney failure where it is important that these patients are seen regularly as they progress towards renal replacement therapy.

- **Pre-dialysis education clinic:** patients with advanced kidney failure (CKD 5) are referred to the pre-dialysis nurse specialist for advice, education and support.

- **PD access clinic:** a monthly combined clinic hosted by a consultant nephrologist, consultant EGSU surgeon and a member of the home therapies team for patients who require intervention for PD access or manipulation.

- **Home therapies clinic:** patients on home therapies are reviewed in a dedicated clinic at Aintree hospital with a consultant, home therapies nurse and dietician.

- **In-centre haemodialysis clinic:** a clinic to monitor patients on in-centre haemodialysis therapy with a dietician, consultant nephrologist and (monthly) a palliative care nurse.

- In addition, at SOHT, outpatient services take place at either the Southport Dialysis Unit or the Outpatient Department; clinics at Southport include General nephrology clinics where both new and follow up patients are seen, Southport Priority clinics which include patients with CKD5 and on Immunosupression and dedicated haemodialysis clinics.

Table 3 - Aintree Dialysis activity

Breakdown of AUHFT dialysis patients	**2018/19 data**			
	HD	PD	Total patients	% of patients
ASDU	69		69	30.80%
Ward 14	17		17	7.59%
SDU	56		56	25.00%
WDU	34		34	15.18%
Home treatment	18	30	48	21.43%
Total	194	30	224	100.00%

*2018/19 data

[34] Tolvaptan is a Hospital-only provided drug which was licensed in 2016. It has shown to retard kidney cyst progression and function which requires mandatory monthly monitoring.
[35] Chronic Kidney Disease. CKD is split into stages, with stage 5 being the most severe and requires the patient to have dialysis and/or a kidney transplant.

Royal Liverpool Hospital - Outpatients and Day Case

- Ward 6B at the Royal Liverpool Hospital site provides 27 stations for inpatient HD services with 24-hour cover. This ward specialises in the providing HD, haemodiafiltration and plasma exchange. Ward 9HDU provides a further 5 dialysis stations for patients who require care in a high-dependency bed and can provide HD and HDF as well as plasma exchange.
- Ward 6B: includes a 27 station in-centre haemodialysis unit and a day-case area with seven beds/chairs.
- Ward 6PDU: a five-bedded peritoneal dialysis unit where patients receive PD training and are reviewed by community PD nurses.
- Ward 11C: a training area for home haemodialysis patients that includes two haemodialysis stations.

A number of clinics are run at the Royal Liverpool Hospital site and the Broadgreen site, including:

- **General Nephrology clinic:** a clinic for new patients or patients with complex kidney problems and who are unable to be managed by primary care. All new referrals are triaged by the on call consultant through a virtual clinic, and then filtered to the appropriate clinic.
- **Transplant Follow up clinic:** a once weekly clinic where most transplants over a year old are followed up. All patients in Merseyside along with some from Wirral are followed up in this clinic. A transplant Immunosuppression MDT is held weekly as well to discuss patients seen at this clinic.
- **Glomerulonephritis**[36] **(GN) Clinic:** once a month GN and vasculitis patients are cohorted to this clinic.
- **Low clearance clinic:** Patients with low eGFR (<20mls/min) are referred to this MDT clinic for information on choice of renal replacement therapy (RRT), Transplant is promoted as first choice and information is given including conservative management in appropriate patients.
- **Obstetrics/Nephrology Clinic**: outreach obstetrics clinic held at the Liverpool Women's Hospital where preconception patients and those in early pregnancy are treated for renal conditions.
- **Tuberous sclerosis and Polycystic Kidney disease clinic:** patients with these genetic conditions are seen this clinic, where specialist interventions and medications can be prescribed.
- **Diabetic renal clinic:** the joint diabetic renal clinic is open to any complex renal patients, including dialysis or transplant patients with poorly controlled diabetes.
- **Adolescent review clinic:** the clinic allows adolescents and their parents to be introduced to an adult clinic, and provides them with early education, preparation for RRT including pre-emptive kidney transplant.

[36] A disease of the kidneys in which the glomeruli, the tiny filters in the kidneys that help to clean the blood, become inflamed or damaged. This allows protein and red blood cells that normally circulate in the bloodstream to pass into the urine.
If glomerulonephritis does not respond to treatment, the glomeruli may slowly be destroyed. The kidneys will then lose their ability to clean your blood and this will lead to kidney failure.

- **Anaemia clinic:** anaemia correction is provided to all patients with anaemia associated with chronic kidney disease. Patients are referred from clinics to a team of anaemia nurse specialists.
- **Pre-dialysis education clinic:** patients with advanced kidney failure are referred to the pre-dialysis nurse specialist for advice, education and support.
- **Home therapies clinic:** patients are referred to the home therapies clinic once all pre-dialysis education is complete. Patients are assessed by the consultant nephrologists for consideration for home therapies, and patients are then placed on the home therapies pathway prior to commencement of dialysis.

In addition to the above, the Royal Liverpool and Broadgreen hospital sites also operate a number of outreach clinics. The clinics are run by a multi-professional team of nephrology experts who travel from the Royal Liverpool Hospital once per week to run clinics at St Helens Hospital, Warrington Hospital and Halton General Hospital. Furthermore, an outreach obstetrics clinic is held at the Liverpool Women's Hospital where preconception patients and those in early pregnancy are treated for renal conditions.

Table 4 - RLBUHT Dialysis activity

Breakdown of RLBUHT dialysis patients across sites				2018/2019
	HD	PD	Total patients	% of patients
Royal	106		106	23.82%
Broadgreen	123		123	27.64%
Halton	44		44	9.89%
St Helens	53		53	11.91%
Warrington	38		38	8.54%
Home treatment	47	34	81	18.20%
Total	411	34	445	100.00%

Source: LUHFT Business Intelligence team

Peritoneal Dialysis (PD) is performed by patients in the community, supported by community nurses. The initial training is provided in the community too. When these patients are unwell they are managed by Ambulatory care at the Home Dialysis units, or when admitted to the renal ward the staff can support their dialysis. The treatment involves 4 fluid exchanges per day manually by the patient, or automated fluid exchanges overnight using a machine on the bedside table.

In-centre haemodialysis patients receive treatment for 3-5 hours, 3 times per week. The dialysis stations are utilised as follows:

- Mon/Weds/Fri 3 shifts – morning, afternoon, evening
- Tues/Thurs/Sat 3 shifts – morning, afternoon, evening
- Therefore 25 stations could potentially allow 150 patients to dialyse 3x/week (although achieving this maximal efficiency would not be realistic)

Further services for patients with chronic renal failure are provided at the following satellite dialysis units:

- The St Helens dialysis unit has 12 dialysis stations and is open Monday-Saturday. Twilight dialysis is available on Monday, Wednesday and Friday for patients with their own means of transport.
- The Halton and Warrington dialysis units each have 12 stations and are open Monday-Saturday as well. Twilight dialysis is also available on Monday, Wednesday and Friday for patients with their own means of transport.
- The Broadgreen satellite unit is fully managed by Fresenius (independent supplier of dialysis products and services) and has 22 stations.

Acute Kidney Injury

The number of Acute Kidney Injury (AKI) patients is set out in Tables 5.1 and 5.2, alongside the number of patients treated for AKI and the number of patients undergoing dialysis at both legacy Trusts:

Table 5.1: AKI patient numbers

AKI recorded as primary diagnosis

Year	Aintree	Royal	Grand Total
2016	1008	864	1872
2017	977	873	1850
2018	973	1101	2074
2019	738	932	1670
2020	886	801	1687
Grand Total	**4582**	**4571**	**9153**

Table 5.2: AKI patient numbers

AKI coded as co-mobidity

Year	Aintree	Royal	Grand Total
2016	7740	5835	13575
2017	7572	6743	14315
2018	7474	6735	14209
2019	7286	6512	13798
2020	8476	6332	14808
Grand Total	**38548**	**32157**	**70705**

Source: Cyberen

Aintree University Hospital

In 2014, a standardised approach to identification of AKI with a patient safety alert was developed, and communicated to all trusts in the NHS. Prior to this, it is estimated that only 50% of patients with

AKI were thought to have received good care.[37] Potential cases for AKI are identified from laboratory data in real time, based on blood test results.[38]

This alert system is implemented at Aintree Hospital site, who are one of the leaders in AKI management in the North West. When blood test results in patients at Aintree Hospital indicate potential cases of AKI, an alert is sent out through the EPR system that also flags the likely severity of AKI. The AKI alerts trigger the provision of the 'AKI bundle' to treat patients. In addition, each ward has urine analysis equipment which helps to identify signs of AKI. Bundles are based on guidance from the NHS on recommended minimum requirements of care for patients and include guidance on initial assessment and treatments through to ongoing monitoring and specialist referral.[39]

All patients suspected to have AKI are seen by the critical care outreach team as first responders; the team is made up of specialist nephrologists and nurses. Once discharged, patients who had stage two or three AKI are referred to the AKI follow-up clinic and seen within a week of discharge. A second outpatient appointment is scheduled within the next week following the initial clinic appointment. Based on reviews at clinic, patients are either transferred to general nephrology outpatient clinics for ongoing review or receive virtual review and discharged from outpatient to primary care.

Royal Liverpool & Broadgreen University Hospital sites

Royal Liverpool & Broadgreen University Hospitals sites, like the Aintree University Hospital site, has an alert system for AKI with an AKI team that responds to AKI alerts and manages AKI patients. The RLH team have access to a specialist list which highlights AKI alerts as they are generated in real time; additionally, an email is sent to the AKI team three times daily reporting any new alerts. Currently when a patient is flagged with an AKI alert, the AKI team start patients on the AKI bundle.

The AKI team works alongside staff across wards in providing care to acutely unwell patients with AKI. The team ensures that episodes of AKI are planned and managed, including diagnostics, medication and up-to-date care plans. Morning handover meetings happen daily where the AKI team discuss existing AKI patients and any patients for whom an alert was generated overnight. Throughout the day, the AKI team review patients who have had a stage 2 and stage 3 AKI alert since the previous day. When patients are reviewed by the AKI team, they will receive procedures required for care (e.g. venepuncture[40], cannulation[41], ABGs[42], catheterisations[43], and prescribing/commencing fluids), which enables timely care for AKI patients.

The Royal Liverpool & Broadgreen Hospitals and the Aintree Hospital AKI models of care are similar, however, the Royal & Broadgreen service is managed by a team of 3 AKI nurses whilst the service at the Aintree Hospital site is managed by specialist nephrologists and nurses who work constantly across the critical care outreach team who see AKI patients as first responders. In addition, the Royal Liverpool & Broadgreen hospitals does not have urine analysis equipment on every ward.

[37] Chandrasekar, T, Sharma, A. et al. (2017), 'A whole system approach to improving mortality associated with acute kidney injury', *QJM,* 2017 Oct 1;110(10):657-666, p.2
[38] <https://www.england.nhs.uk/2014/06/psa-aki/> last accessed 27 February 2019
[39] NHS (2016), 'Recommended minimum requirements of a care bundle for patients with AKI in hospitals', December 2015
[40] The puncture of a vein as part of a medical procedure, typically to withdraw a blood sample or for an intravenous injection.
[41] A technique in which a cannula is placed inside a vein to provide venous access.
[42] Arterial blood gas report – this is used to determine whether the lungs are able to move oxygen into the blood and remove carbon dioxide from the blood. Imbalances in the oxygen, carbon dioxide, and pH levels of your blood can indicate the presence of certain medical conditions.
[43] A procedure used to drain the bladder and collect urine, through a flexible tube called a catheter.

AKI patients are treated at spoke hospitals by the admitting teams and the patients who are treated there are those who self-present or those who have come through A&E. If the patient requires care under a nephrology team, then then patient is transferred to the RLH. Any patients with AKI at Broadgreen are transferred to the RLH.

Workforce

Staffing arrangements, alongside the recommended staffing levels are outlined in Table 6 as follows.

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Current Workforce	Sum of wte
AUH	**105.79**
ADMINISTRATIVE AND CLERICAL	11.76
HEALTHCARE ASSISTANTS AND OTHER SUPPORT STAFF	0.93
MEDICAL AND DENTAL	9
NURSING MIDWIFERY AND HEALTH VISITING	84.1
RLBUH	**212.49**
ADMINISTRATIVE AND CLERICAL	13.72
EXECUTIVE BOARD AND SENIOR MANAGERS	2
HEALTHCARE ASSISTANTS AND OTHER SUPPORT STAFF	48.08
MEDICAL AND DENTAL	29.8
NURSING MIDWIFERY AND HEALTH VISITING	118.29
SCIENTIFIC AND PROFESSIONAL	0.6
Grand Total	**318.28**

The breakdown of the workforce is set out in appendix 1 ('Workforce breakdown)

Research

Aintree University Hospital Site

The Nephrology Department at the Aintree University Hospital site currently has 7 NIHR portfolio studies open which we are being recruiting/ or in follow up, and 3 NIHR portfolio studies in set up.

This is supported by a full time Registered General Nurse (RGN) dedicated solely to research, as well as support from the Generic Trial team for some individual clinical trials. The portfolio of research has increased significantly over recent years. All full-time consultants contribute to clinical trials with Aintree Hospital as the host hospital for several of them. The department continues to expand its research activity with the introduction of on-going Phase 3[44] clinical trials.

Examples of nephrology research undertaken by the Trust include a study (looking at over 12,000 patients over five years) to evaluate whether a whole system approach to the management of AKI would lead to better outcomes for patients[45] and the development of the Cheshire and Mersey AKI Network Manual.[46]

[44] Phase 3 clinical trials are randomized controlled trials on large patient groups to determine how effective a drug is. These occur after Phase 1 and 2 which assess the safety and dose of the drug.
[45] Chandrasekar,T., Sharma, A. et al. (2017), 'A whole system approach to improving mortality associated with acute kidney injury', *QJM.* 2017 Oct 1;110(10):657-666
[46] <http://www.nwcscnsenate.nhs.uk/files/2914/1398/7603/AKI_Network_Manual_FINAL_21_OCT_2014.pdf>

The department has a robust research strategy – see appendix 2 ('research strategy on a page') which includes driving NIHR Portfolio recruitment to commercial and non-commercial studies, capacity building through collaborative projects (MD/PhD, Clinical academic fellow posts, Masters by Research (MRes) & Selective Advanced Medical Practice-SAMP) and to drive home grown research portfolio that spans the entire translational pathway.

The department is working with Clinical Academic Department of Paediatric Nephrology (Dr Louise Oni), Liverpool Centre for Cardiovascular Science (LCCS) (Prof. Gregory Lip) and Cardiovascular and Metabolic Medicine, ILCaMS (Dr. Deirdre Lane) to develop a Cardio-Renal academic theme in Liverpool region.

Royal Liverpool University Hospital Site

A Clinical Research Unit (CRU) is based at Royal Liverpool Hospital. The primary aim of the CRU is to support and conduct early phase academic and commercial clinical trials in patients and healthy volunteers. The unit was the first NHS organisation in England to achieve MHRA Phase 1 Accreditation which it still maintains. The CRU conducts clinical trials across a number of diseases, nephrology being one of five areas of focus.

At the Royal site there are four portfolio studies actively recruiting and three in set up.

Dr A Rao has received a fellowship grant of £193,000 from Kidney Research Northwest for the study "Defining strategies to address the supply and demand of deceased donor kidney transplantation with optimised equity of access."

Dr A Rao has also received a materials only grant from Roche for £ 83,000 for the study "Sarscov2 immunity Evaluation post-vaccination in patients On Renal Replacement Therapy- SENIOR STUDY" which is currently awaiting REC approval.

Like Aintree the department has a robust research strategy – see appendix 2 ('Research Strategy') which includes driving NIHR Portfolio recruitment to commercial and non-commercial studies, capacity building through collaborative projects (MD/PhD, Clinical academic fellow posts, Masters by Research (MRes) & Selective Advanced Medical Practice-SAMP) and to drive home grown research portfolio that spans the entire translational pathway.

The department is working with Clinical Academic Department of Paediatric Nephrology (Dr Louise Oni), Liverpool Centre for Cardiovascular Science (LCCS) (Prof. Gregory Lip) and Cardiovascular and Metabolic Medicine, ILCaMS (Dr. Deirdre Lane) to develop a Cardio-Renal academic theme in Liverpool region. (See appendix 3 – Clinical Health Psychology – Renal services')

Changes to Services during COVID-19

In response to the COVID-19 pandemic, patients were moved from AUH and RLH hub dialysis units, out to home dialysis and satellite units to create regional red and amber capacity in the hub units. There was a rapid expansion of satellite units and home dialysis to facilitate this. A temporary suspension was placed on non-COVID research and non-urgent outpatient activity.

6.1.2 Case for Change – Current Challenges

LUHFT faces a number of challenges in relation to all of the main areas of nephrology services. As there is an increasing prevalence of renal disease in the population of Liverpool, and demands on current services – in particular dialysis services – will increase in the next few years.

- **Dialysis Service provision** - the Trust does not meet a number of best practice guidelines regarding certain estate not being fit for purpose, infection protection control guidelines are not met. Aintree patients do not have access to a nephrology led ward 24/7 and the ability to offer timely access to fistula and cannula insertions is limited. Workforce pressures and sub-optimal pathways limit the take-up of home therapy services.

- **Workforce constraints** – clinical workforce shortages along with constraints within support services has a direct impact on the quality and equity of services available to patients.

- **Estates** – The current estates at RLH and AUH sites are not fit for purpose as do not comply with national guidelines in relation to renal units. This also impacts on clinical risk and patient experience.

- **Provision of Renal transplants** - patients at the AUH site have lower uptake of kidney transplants, compared to patients at the RLH site, due to sub-optimal pathways with transplant services being centred at the RLH.

- **Acute Kidney Injury -** In relation to the diagnosis and treatment of Acute Kidney Injury (AKI), services at the RLH site have not met best practice measures in a number of areas.

- **Fragmentation of clinical research -** access to clinical research and trials is sub-optimal across sites as these are fragmented across the city.

Steps to address the growing prevalence of renal disease have been taken at system level, but LUHFT will have to take more radical steps to tackle the challenges; the proposed reconfiguration aims to address these challenges. The following describes these challenges and their impact in model.

Challenges in Provision of Dialysis Services

Context

The Trust provides dialysis services for around 750 patients a year, the number of dialysis patients is expected to grow in the near future, substantial change is needed to ensure safe and resilient services that enable dialysis patients a good quality of life with minimal disruption their lives. Analysis indicates that the prevalence of patients requiring renal replacement therapy (RRT) is positively associated with the size of the ethnic population, an ageing population, the level social deprivation and co-morbidities such as diabetes, hypertension and cardiovascular diseases.

The standardised prevalence ratio of patients requiring RRT are significantly higher in areas where the minority ethnic population exceeds 10%[47] – this population in Liverpool represents 11.1 % of the population. Liverpool has a high level of social deprivation, an ageing population, and the population is at greater risk of cardiovascular disease; considering the national trend RRT is likely to increase.

Disparities in care and outcomes in the dialysis pathway

The Trust operates across three separate sites and pathways and services have been developed independently, best practice is often not transferred across the sites, leading to disparity of outcomes and quality of care across the two patient populations. Differences in governance

[47] The Renal Association (2014), 'Renal Registry 17th Annual Report', pp. 55-56

structures make collaboration difficult. This is most evident in capacity for HD provision, whereby AUH site constantly facing demand and capacity issues, the RLH and BGH sites often has spare capacity especially in satellite units, including Broadgreen Hospital.

One example of the variation in pathways developed is the approach to care for first time dialysis patients. The legacy Royal Liverpool & Broadgreen University Trust (RLBUHT) developed an innovative nurse-led approach to the first time dialysis pathway for patients, and awarded a Patient Safety Innovation Award in 2018. The RLBUHT Hospital legacy site typically sees around 100-120 new dialysis patients each year, with 93 patients starting on the pathway during the evaluation period. The new pathway has resulted in a number of patient benefits to date, as seen in Table 7.[48]

Table 7: Impact of RLBUHT first time dialysis nurse-led pathway on patient outcomes

	Before nurse-led Pathway	*Following introduction of nurse-led pathway*[2]
90-day mortality (unadjusted)	5.1%	2.9%
Average length of stay	12.2 days	8.75 days
Patient distress average score[1]	4.3	2.4

Source: RLBUHT data as at 2018/19

(See appendix 4 – 'First time dialysis pathway')

Note: [1]Patient distress scores are measured on a scale of 0-10, with 0 meaning no distress and 10 meaning the highest distress possible. Hence, a lower number is preferable for this score. Please note that this was a measure created for the purposes of the evaluation, and hence a comparative figure is not available for AUHFT, and the current period.

These results have been achieved through a combination of mandatory and personalised interventions delivered over the first six sessions of dialysis. It was designed to improve communication and co-ordination of care delivered by a large, complex multi-disciplinary team. This compares to previous strategies which either focused on single clinical issues (e.g. anaemia, vascular access) or on in-centre dialysis care with little attention to home-care and transplantation.

A similar approach was attempted at the legacy Aintree Hospital in 2011, based on the Royal London Crash Lander programme however outcomes were not measured and therefore the benefit was uncertain. The approach at the Royal Liverpool & Broadgreen University Hospital was implemented in March 2016 and has been recently rolled out at the Aintree site. A key enabler was the prospect of the merger of the two legacy hospitals which helped to kick start conversations and the move to share best practice between the Trusts. Royal Liverpool & Broadgreen Hospital were able to benefit from extra funding from a grant to allow an experienced nurse to help run the programme, with support from the Business Intelligence and Service Improvement teams. With the extra resource available, the team were able to create bespoke data collection and display tools and use these to their advantages to improve outcomes. These resources were not available to Aintree Hospital during their previous attempts to implement a similar approach.

If the programme was implemented at the same time, around 200 first time dialysis patients at Aintree Hospital could have benefited from an earlier roll-out of the programme.[49] Indeed, as per the most recent data available – data analysis prior to the pandemic, the 90-day unadjusted mortality rate at the Royal Liverpool 1.1% compared to 3.3% at Aintree Hospital, highlighting a key difference

[48] The Health Foundation, 'A nurse-led approach to personalised, coordinated multidisciplinary care in new haemodialysis patients', <https://www.health.org.uk/programmes/innovating-improvement/projects/nurse-led-approach-personalised-coordinated> last accessed 27 February 2019.
[49] Based on around 102 patients seen each year at AUHFT, across the two years where the programme was available at RLBUHT but not AUHFT.

in outcomes as a result of the differences in approach and the late take up of the Royal Liverpool pathway.

Disparities in vascular access and catheter insertions

Neither of the hospital sites (Aintree or Royal Liverpool), meet recommendations in relation to methods of dialysis access for patients for HD patients. In addition, Aintree Hospital also fails to meet practice with regard to timely access to initiate Peritoneal Dialysis.

NICE recommends that HD patients should commence their treatment with dialysis permanent access, as this reduces infection rates and means that patients do not require multiple invasive procedures. Similarly, best practice guidelines from the UK Renal Association recommend that for patients who have been on dialysis for over 3 months, 85% should have permanent access.[50] 80.3% (178 patients) and 72% (316 patients) of patients at Aintree Hospital and Royal Liverpool & Broadgreen Hospitals have permanent access respectively. Given the larger patient numbers at the Royal & Broadgreen sites, there is a lower rate of permanent access as demand cannot be met with the current number of staff.

Permanent access is achieved through the creation of an arteriovenous fistula (AVF)[51] or arteriovenous graft (AVG)[52], which is a permanent access point for dialysis treatment and mitigates the infection and complication risks of temporary access. In particular, AVFs are the gold standard for patients who require dialysis on a regular basis, offering several advantages over the more traditional methods of accessing blood during dialysis. Patients without permanent access are at a greater risk of infection and face higher rates of hospital admissions, mortality and morbidity. Temporary, rather than permanent access also limits the option of home HD, which in itself, is associated with a number of clinical benefits.

The NHSE service specification for PD indicates that for PD patients, routine catheter insertions should be performed within 2 weeks and urgent catheter insertions within 24 hours. Aintree does not comply with these guidelines, despite an effort to improve by introducing a new dedicated monthly PD access list provided by EGSU consultants. Efforts to increase surgical provision for catheter insertions are hampered by theatre time and surgeon availability. In FY 2017/18, 9 (53%) of the 17 patients at Aintree hospital who required a catheter insertion for PD received this within 2 weeks (none required insertion within 24 hours). By contrast, the Royal Liverpool Hospital site operates an outpatient clinic for the procedure, and therefore, all the 32 patients requiring the procedure within two weeks are seen within this time. The one patient at the Royal Liverpool & Broadgreen hospital who required insertion within 24 hours was able to do so within the timeframe.

Challenges in Home Dialysis

Patients requiring dialysis will often have co-morbidities or other health challenges, and as such require a carer with home dialysis. Furthermore, where patients cannot afford the modifications to their home required for home dialysis, this hinders the uptake.

For home dialysis to be an option, the water quality must be suitable and the patient must be able to physically accommodate the equipment needed for it in their home; and the provision of home dialysis is challenged by the lack of a resilient workforce, for example, in instances where staff are

[50] The Renal Association (2011), 'Renal Association Clinical Practice Guideline on Vascular Access for Haemodialysis', *Nephron Clin Pract 2011*, p. 4, <https://www.karger.com/Article/PDF/328071>

[51] A fistula is created by connecting an artery directly to a vein, allowing the vein to grow larger and therefore the flow of blood to increase

[52] If the patient's veins are too small for a fistula or the veins are blocked an AVG may be used instead. A graft is a man-made tube that is inserted into the arm to connect an artery to a vein. Grafts can usually be used for dialysis within two to six weeks.

absent due to holidays or sickness. At Royal Liverpool & Broadgreen Hospitals, where staff are trained in either the provision of PD or home HD, it is difficult to provide cross-cover in times of staff absence. At the Aintree Hospital site, there are comparatively few home therapy staff, given the size of the legacy Trust: 4 WTE band 6-7 nurses as compared to 7 band 6-7 and 3 WTE band 3 staff at RLBUHT. This in turn leads to delays at both sites in training patients in administering dialysis at home and refresher training in dialysis techniques.

Furthermore, whilst Aintree Hospital and Royal Liverpool both provide home HD and PD, Aintree Hospital has focussed on developing a robust home PD service, whilst the Royal Liverpool Hospital has also focussed expertise on home HD. This is reflected in the proportion of home dialysis patients using each type of dialysis: at Aintree Hospital 67% of home therapy patients receive PD and 33% receive HD, while at Royal Liverpool & Broadgreen Hospital 42% receive PD and 58% receive HD. As a result, opportunities for ensuring that patients make full use of available dialysis options may be missed at either Trust, given the differences in focus and expertise at each Trust.

Both types of dialysis are equally effective for most people, although each has its own pros and cons. With home HD, patients can have 4 days of dialysis-free days. Patients are, however, required to use a dialysis machine 3 times a week, with each session usually lasting about four hours. Hence, patients need to plan their professional and social commitments around these sessions. A disadvantage of home HD is that patients' diet and fluid intake need to be restricted.

In comparison, PD provides more flexibility to patients. The equipment used for PD is more portable, allowing patients more freedom to travel than they would if having HD. There are also fewer restrictions on diet and fluid intake. However, there are several disadvantages of PD as patients need to carry out the procedure on a daily basis, which some patients may find disruptive to their daily routine and a catheter is left permanently in the patient's abdomen. Another main disadvantage is that patients are at risk of developing peritonitis[53].

Workforce Challenges

Clinical workforce shortages have a direct impact on the quality of services available to patients, and there are challenges at both sites in relation to both the consultant, nursing and other clinical specialist workforce.

Medical Staffing

Due to lack of middle grade support, consultant numbers and the nursing resource the AUH site is unable to provide 24 hour access to a nephrology-led dialysis unit for patients requiring acute HD. Access to 24-hour provision in a nephrology-led dialysis unit is set out as a part of the service specification for haemodialysis services.[54] With the present medical and nursing staff resource, nephrology-led inpatient dialysis can only be provided 8am-6pm, Monday to Sunday. Outside of these hours, dialysis for inpatients at Aintree is provided in the Critical Care Unit. Thus, while patients may receive dialysis in the evenings and overnight, they will not have the same level of specialist nephrology input or care as would be the case in a nephrology-led unit. Furthermore, junior doctor numbers are also limited with 1 WTE & 2.24 WTE vacancies at Aintree Hospital and the Royal Liverpool site respectively. As a result of this, both sites rely on the support of locum junior doctors.

[53] An infection of the membrane that lines the abdomen and covers the abdominal organs
[54] NHSE England, 'Service Specifications - In Centre Haemodialysis (ICHD): Main and Satellite Units', pp. 7 <https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2015/01/a06-serv-spec-haemodialysis-ichd.pdf>

Nursing Workforce

Both sites face challenges in ensuring resilient staffing of renal wards and dialysis units. Current best practice recommendations suggests a minimum 1:3 nurse to patient ratio for dialysis units, given the acuity of patients seen at both Aintree Hospital and the Royal Liverpool & Broadgreen Hospital – at present,[55] Aintree Hospital has only recently recruited additional dialysis nurses and introduced the role of Dialysis Assistant (DA). Aintree Hospital site also operates a rotation of nurses between Ward 15 and WDU to ensure sufficient cover. In times of staff absence, the service must turn to agency staff to fill gaps. Acuity of patients on a renal ward exceeds a generic ward by virtue of cohorting patients with organ failure who are more sick.

Dieticians

There are also workforce concerns relating to an inadequate number of dietitians at Aintree Hospital. As kidney function deteriorates, patients must carefully manage their diets as their kidneys can no longer filter out substances from the blood, and the capabilities of dialysis machines are limited. Dialysis patients therefore need care and support from renal dietitians. The role of the renal dietitian is diverse, with involvement in the nutritional care of patients with renal disease in the early stages, pre-dialysis, dialysis and post transplantation. Dietary advice is often complex and changes depending on the stage of kidney disease and the individual needs of the patient. A dietitian will therefore help improve quality of life by providing relevant and practical dietary education and advice to meet nutritional requirements without compromising patient safety.[56] With only 2.0 WTE dieticians, the Aintree Hospital site is unable to meet British Renal Society (BRS) standards for the review of all dialysis patients on a six monthly basis.[57]

Estates challenges

Ward 14 is the renal hub at the Aintree site where there are currently 6 dialysis stations. Following the reconfiguration of Trauma and Orthopaedic services in 2019, Orthopaedic patients needing dialysis also receive their dialysis on the Aintree site leading to increased pressure on the dialysis slots.

Two of the legacy Aintree satellite dialysis units are not fit for purpose due to the quality of the facilities. Both WDU and ASDU do not comply with current Department of Health's guidelines in relation to the planning and design of renal units.[58] This creates significant safety risks as well as substantially worsening patient experience.

For example, WDU does not have sufficient physical capacity to safely and comfortably accommodate the number of beds which are located in that centre. This poses a fire risk and creates difficulties for patients in wheelchairs and with mobility issues when attempting to navigate around the unit. The lack of space between each of the beds also affords patients little privacy and increases the risk of cross-infection. In addition, WDU failed to meet local infection control internal

[55] SDU is planned to have a 1:3 nurse to patient ratio from December 2018; prior to this, the ratio at this site was 1:4.
[56] The Association of UK Dietitians, Specialist Dietitians in Renal Nutrition, <https://www.bda.uk.com/improvinghealth/healthprofessionals/keyfacts/tad_renalv2>
[57] UK Renal Association (2010), 'Clinical Practice Guidelines: Nutrition in CKD', p.7
[58] Department of Health, (2013), 'Renal care Health Building Note 07-02: Main renal unit' <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/147873/HBN_07-02_Final.pdf> and Department of Health (2013), 'Renal care Health Building Note 07-01: Satellite dialysis unit' <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/147869/HBN_07-01_Final.pdf>
In particular, the guidance notes that the main renal unit and any other satellite units should be located on the ground floor, easily accessible to people using wheelchairs or walking aids. To prevent the risk of cross infection and to allow privacy for patients, there must be sufficient space between dialysis stations, 90mm is the recommended distance, with non-fixed partitions to provide increased privacy if necessary.

guidelines due to a lack of space and age of the estate, and ASDU also does not meet guidelines in relation to space between stations. Further issues were exposed pipes for radiators.[59]

Furthermore, there have been capacity issues at Aintree Hospital's satellite units with all slots currently in use at WDU and SDU. Both of these units adhere to Renal Association (RA) recommended guidance of 2.5 shifts a day (i.e. 3 shifts Monday, Wednesday, Friday and 2 shifts Tuesday, Thursday and Saturday). ASDU, however, operates 3 shifts each day due to high patient demand and capacity constraints, which leads to deterioration of the estate, equipment and staff morale. Given the number of dialysis patients, there is also pressure to increase WDU to 3 shifts a day.

Issues with satellite dialysis facilities affect a particularly large number of patients at Aintree Hospital as a large proportion of patients receive dialysis at satellite units rather than at the main dialysis site: 155 patients or 74% of the Aintree Hospital dialysis patients receive dialysis at a satellite site, as compared to 30% at Royal Liverpool & Broadgreen and 45% nationally. [60]

Challenges in the provision of renal transplants

The RLH site provides kidney transplants for patients in the Cheshire and Merseyside area. While the RLH provides services for the region, including Aintree Hospital, the fact that AUH is a separate site means that there are delays for patients from Aintree Hospital due to needing a referral to be seen at the Royal Liverpool Hospital.

The latest data available shows that:[61]

- the median time to transplant wait listing is 837 days at Aintree Hospital, compared to 613 days at the Royal Liverpool; and
- the proportion of patients wait listed within two years of RRT is 39.8% cent at Aintree Hospital, compared to 47.4 per% at the Royal Liverpool & Broadgreen (adjusted figures).[62]

This in turn leads to patients from Aintree Hospital being less able to receive pre-emptive transplants ahead of receiving dialysis, since these patients may not receive in time to avoid needing dialysis. Anecdotal evidence suggests that direct contact with transplant surgeons in the first instance – as is the case at Royal Liverpool & Broadgreen Hospital sites – serves to increase the rate of living donor transplants, as the discussion is more likely to happen in the first instance and will occur earlier in a patient's care pathway. Patients at Aintree Hospital must be referred to the Royal Liverpool Hospital, and as such, do not benefit from this early interaction with transplant surgeons. Indeed, the data also shows a lower rate of pre-emptive listing at Aintree Hospital relative to the Royal Liverpool & Broadgreen Hospital. Between 2013 and 2016, 48% of patients registered for a pre-emptive transplant, compared to 46% at Aintree Hospital.[63]

There is currently a variation in practice across sites with differing expertise and services available depending on which site the treatment is received. The quality standard for Renal Replacement Therapy states that *"people with CKD requiring renal replacement therapy are supported to receive a pre-emptive kidney transplant before they need dialysis, if they are medically suitable."*[64]

[59] Department of Health (2002), 'Good Practice Guidelines for Renal Dialysis/Transplantation Units' , September 2002
[60] AUHFT and RLBUHT figures as per national average as per The Renal Association (2018), 'Renal Registry 20th Annual Report', pp.315
[61] KQuIP (2018), 'Leadership in Action Day 3: Transplant First and MAGIC', 12 December 2018
[62] Adjusted for age, gender, ethnicity and primary renal disease
[63] NHS Blood and Transplant (2018), 'Kidney Transplantation Annual Renal Unit Report', pp.12, Figure 1.6
[64] NICE Guidance (2014), Renal Replacement Therapy, 28 November 2014, p. 4.

The Royal Liverpool & Broadgreen patients received over twice as many transplants as Aintree patients (see Table 7). Given that the Royal Liverpool & Broadgreen Hospital sites and Aintree Hospital site nephrology departments see a similar number of patients, with similar patient population between the two legacy Trusts, these differences in transplant numbers are likely due to differences in pathways and services between the two legacy Trusts.

Table 8: Renal transplants by Trust of origin (FY 2018/19)

Mode of Dialysis		Dialysis Centre	Total
Dialysis	Cadaveric	Aintree	3
		Broadgreen	2
		Other	39
		RLH	19
	Living donor	Aintree	2
		Broadgreen	2
		Other	12
		RLH	2
		Dialysis Total	81
Pre Dialysis	Cadaveric	Other	5
		RLH	4
	Living donor	Aintree	2
		Other	3
		RLH	6
		Pre Dialysis Total	20
Grand Total			101

In addition, Table 8 is consistent with national evidence which shows that a patient starting dialysis in a non-transplanting renal centre (such as Aintree Hospital) is less likely to be registered for transplantation[65] or receive a transplant from a donor after cardiac death or a living kidney donor[66] compared with patients cared for in transplanting renal centres.[67]

Challenges in identification and treatment of AKI

The following table reports the outcomes of an assessment of AKI processes at both legacy Trusts completed by AQuA. As can be seen from this table, The Royal Liverpool & Broadgreen Hospital site does not have as strong processes regarding AKI as exists at Aintree, and in turn does not provide the same quality of care consistently across all areas.

[65] Odds ratio 0.85, 0.77 to 0.94
[66] Odds ratio 0.69, 0.59 to 0.80
[67] BMJ (2010), 'Variation between centres in access to renal transplantation in UK: longitudinal cohort study', <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2907479/>

Table 9: AQuA assessment of AKI services at AUHFT and RLBUHT

	2018/19		2019/2020	
Criteria	**AUHFT compliance %**	**RLBUHT compliance %**	**LUHFT AUH site**	**LUHFT RLH site**
Urine dipstick test within 24 hours of first AKI alert	99	77	93.8	84
STOP ACE inhibitors and ARBS[68] within 24 hours of first AKI alert	100	98	100	100
Serum creatinine[69] test within 24 hours of the first AKI alert	100	88	100	91.6
Ultrasound scan within 24 hours of the first AKI alert	92	67	97.7	84.1
Specialist renal discussion within 12 hours of first AKI stage three alert	86	84	99	100
Written self-management information provided prior to discharge	96	94	82.7	100
Pharmacist medication within 24 hours of first AKI alert	70	21	66.9	63.8
Composite process score	*96*	*85*	95.5	93.3
Appropriate care score	*85*	*67*	87.5	82.8

Source: AQuA, Advancing Quality Outcomes Report

The legacy Aintree Hospital is one of the leaders for AKI care management, and this is the underlying cause of the better performance at AKI set out in the table above. As also explained above the AKI care management programme at Aintree Hospital is provided by specialist nephrologists and nurses, whilst the AKI programme at the Royal Liverpool & Broadgreen sites is run by nurses. Additionally, not all wards have urine analysis equipment at the Royal Liverpool & Broadgreen sites, which leads to difficulty in timely urine testing at that Trust. As such, given the differences in workforce and equipment, it has been difficult for best practice to be spread between sites.

Furthermore, the success of the STOP AKI[70] programme at Aintree hospital can be seen in clinical outcome indicators, as set out in Table 10

Table 10: Outcomes before and after the implementation of the AUHFT STOP AKI programme

Outcomes (unadjusted)	*Before implementation*	*After implementation*
AKI mortality	26%	16.7%
Readmission rates	35.6%	18.5%

Source: AUHFT data before the implementation of STOP AKI from AUHFT internal data, after implementation is taken from the most recent comparable quarter available as per the Advancing Quality Outcomes Report (AQuA). AQuA data has been adjusted to exclude pregnant women, dialysis patients and palliative patients.

As seen above, both mortality rates and readmission rates have fallen significantly, in particular, the mortality rate of 16.7% at Aintree Hospital amongst AKI patients is much lower than the rate observed across the North West of 20% and the rate of 32.4% at the Royal Liverpool & Broadgreen sites. Moreover, the AQuA AKI Programme developed by Aintree Hospital was shortlisted for the

[68] An angiotensin-converting-enzyme (ACE) inhibitor and Angiotensin receptor blockers (ARBs) are drugs that relaxes blood vessels and decreases blood volume, resulting in lower blood pressure and decreased oxygen demand from the heart.
[69] Serum creatinine is the concentration of a creatinine, breakdown product of creatinine phosphate in muscles, in the blood or urine indicating a patient may be at risk of kidney disease.
[70] AUHFT, 'STOP-Acute Kidney Injury (AKI): A Streamlined Approach to the Management AKI Leads to Reduction in Mortality Rates' <https://www.nwcscnsenate.nhs.uk/files/6214/5640/6904/AKI_care_approach_-_impact_snapshot.pdf>

National Patient Safety Award in April 2018 for work to improve the early identification and treatment of AKI. [71]

Fragmentation of Clinical Research

Both sites have active programmes of clinical research in nephrology. However, different studies and focusses of research have been developed at each site, which in turn means that the trials available to patients at each site differ. Given the challenges in accessing clinical trials offered by another Trust, there is inequitable access to clinical research between the Trusts.

Specifically, there are a number of trials which are run at each Trust for which patients would be eligible at the other Trust. By way of example, table 11 illustrates instances where Aintree Hospital has set a target number of patients to be recruited for a trial, however, fewer patients participate than anticipated as the Trusts do not have a sufficiently large patient pool to recruit from. As can be seen in this table, there are groups of patients who would be eligible for trials relating to potentially life-saving treatment, but due to the fragmentation of acute services across two providers, are not able to participate in these.

Table 11: Nephrology clinical trials at AUHFT

Clinical trial	AUHFT proportion of target patients recruited
Ambulatory blood pressure versus clinic blood pressure	46% (target: 50, no. recruited: 23)
Quality of life and depression in chronic kidney disease	45.19% (target: 104, no. recruited: 47)
Reducing 30-day emergency readmission in dialysis patients using discharge care pathways	67.5% (target: 120, no. recruited: 81)
VERIFIE	20% (target: 5, no. recruited: 1)

Source: AUHFT data.

The Royal Liverpool Hospital hosts the Clinical Research Unit which was focuses on early stage and commercial clinical trials. Early phase trials in nephrology can be undertaken across the whole range of patients, for example, all patients that have CKD as a result of diabetes would be eligible for a trial targeted at that cohort.

Examples of recent research projects in nephrology at the CRU include new treatments for haemolytic uraemic syndrome (HUS)[72], innovative new phosphate binders[73], novel use of established drugs to improve health and quality of life in dialysis patients, treatments for secondary hyperparathyroidism[74], and extended dosing of erythropoietin[75] stimulating agents. Future studies include: new treatment regimens for patients with multiple myeloma[76], vasculitis and nephropathy[77], and looking at vitamin D levels with view to supplementation.

[71] <https://www.aquanw.nhs.uk/news/aqua-acute-kidney-injury-programme-shortlisted-for-national-patient-safety-award/65007> last accessed 27 February 2019
[72] A disease where patients have anaemia caused the destruction of red blood cells, acute kidney disease and a low platelet count.
[73] Drugs to control phosphate levels,
[74] Where the parathyroid glands, which are in the neck near the thyroid gland, produce too much parathyroid hormone. This causes blood calcium levels to rise (hypercalcaemia). Left untreated, high levels of calcium in the blood can lead to a range of problems.
[75] A hormone produced primarily by the kidneys which plays a key role in the production of red blood cells.
[76] Cancer of plasma cells
[77] A general term for the deterioration of the proper function of the kidneys.

6.1.3 Addressing Service Challenges – Proposed service model

The optimisation of nephrology services is in line with the regional strategy to promote better health outcomes. The prevalence of Renal Replacement Therapy (RRT) is positively associated with a number of co-morbidities including hypertension, cardiovascular disease and diabetes – regional strategies have been put in place at the CCG level to tackle these issues.

The merger of AUHFT and RLBUHT to create Liverpool University Hospitals NHS FT (LUHFT) has created an opportunity for the service to reconfigure services to address the challenges outlined in this document in addition to enabling other proposed service reconfiguration aligned with the Trust's wider clinical strategy of an elective/non-elective split in the delivery of many services with RLH being the elective site and AUH non-elective.

The proposed model will involve centralising nephrology services at the new Royal Liverpool Hospital site, while providing in-reach consultant cover to Aintree Hospital to ensure appropriate care for patients with kidney disease as a co-morbidity.

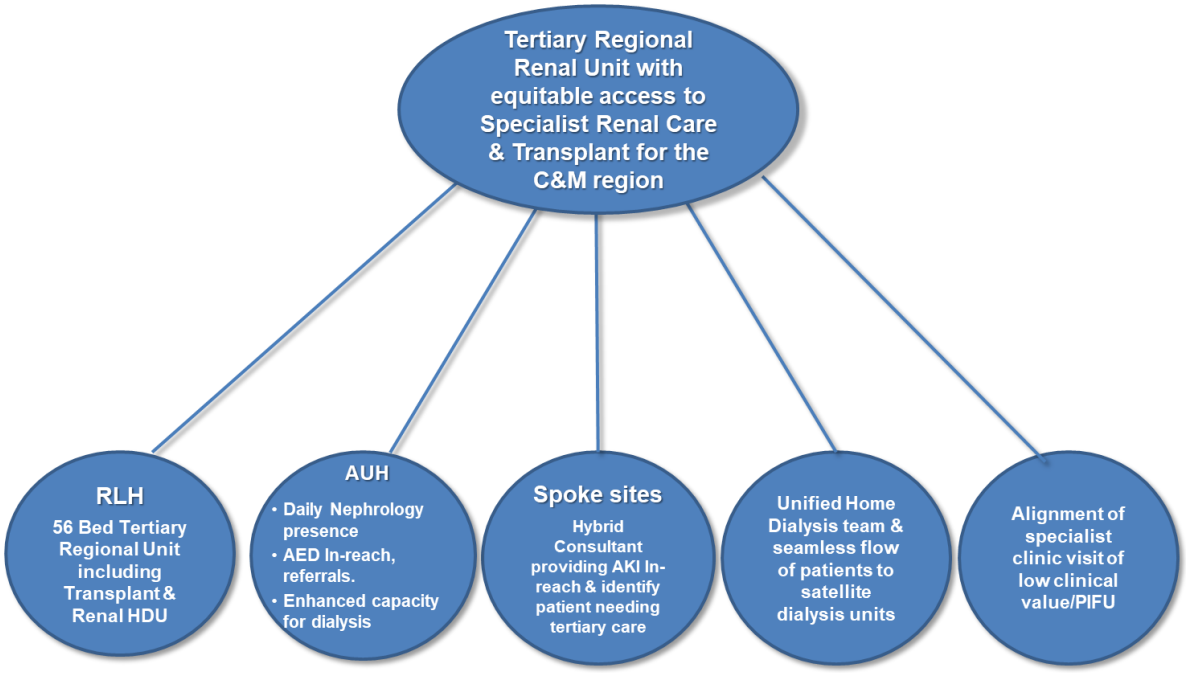
Specifically, the reconfiguration and integration provides the opportunity to address workforce issues by running a single, centralised department rather than fragmented services, for example addressing the challenges around access to a nephrology-led ward. Sub-optimal estates capacity will also be addressed as capacity will be available from across the merged Trust. Best practice, building on each legacy Trust's area of strength will be implemented, in line with clinical best practice.

Given the proximity of the two sites, there would no longer be a dedicated renal bed base at the Aintree site. Aintree would retain a daily nephrology consultant presence as well as ANPs to specifically cover in-house referrals. The team would provide support for those already at Aintree and WCNN under the care of other clinical specialties but suddenly require renal care, and to provide an in reach-service for existing dialysis patients under other clinicians (i.e. patients who have comorbidities that require care from another specialty). This arrangement would also allow for care to be provided for any patients at Aintree who diagnosed with AKI but have other comorbidities, and as such, remain under the care of another department. This would ensure patients continue to receive timely, specialist renal care, and benefit from an on-site nephrology presence, despite the nephrology bed base being centralised to the new Royal Liverpool Hospital. Referrals to RLH will be made as necessary.

A treat and transfer model would be in place for emergency patients. Any patients presenting to AUH with life-threatening renal emergencies would have dialysis initiated on-site by the renal consultant at AUH. Once stabilised, the patient will then be transferred to a renal bed at RLH. This will ensure that these patients receive specialist nephrology care upon admission, and then subsequently have access to a specialist nephrology team.

The Nephrology service configuration in the new proposed model is illustrated as follows:-

Proposed Service Model



The proposed service model addresses the key challenges:

- ✓ Challenges in service delivery
- ✓ Challenges in workforce
- ✓ Estate challenges including satellite estate
- ✓ Challenges in providing dialysis service
- ✓ Challenges in identification and treatment of AKI
- ✓ Challenges in Home Dialysis
- ✓ Challenges in provision of renal transplants
- ✓ Challenges in vascular access and catheter insertions at Aintree Hospital
- ✓ Disparities in care and outcomes in the dialysis pathway
- ✓ Fragmentation of clinical research

6.2 Economics Case

6.2.1 Alignment with Trust Objectives

In developing the proposed model, consideration has been given to how the proposed clinical model would support Liverpool University Hospitals in achieving its vision and alignment to the Trust's strategic objectives.

The following provides a high level overview of how the proposed model aligns to each of the Trust's strategic objectives of Great Care; Great People; Great Research and Innovation; and Great Ambition.

Strategic Priority	Rationale / Expected Benefits
Great Care	❖ A dedicated Renal 'Hub' offering patients timely access to specialist treatment leading to reductions in treatment variation. ❖ Timely access to Transplant, Transplant as a first option for the right patient ❖ More patients on Home therapies (Peritoneal dialysis and Home HD). In addition, Care closer to home with an expanded Community Dialysis team. ❖ Enhanced patient experience from timely and equitable access to care with improved quality of life gained from more home therapies ❖ Early identification of AKI and access to standardised AKI pathways.
Great People	❖ A wider clinical team with a number of specialist clinical staff working across Transplant and Nephrology including a sustainable specialist nursing workforce. ❖ Optimised Multi-Disciplinary Team working – reduces variation in clinical practice and releases clinical time to focus on patient care. ❖ Improved training and retention of wider MDT e.g. Renal Pharmacists, Dieticians, social workers and psychologists.
Great Research & Innovation	❖ Improved access to clinical trials - the CRU will become the largest serving the North of England for phase 1, 2 & 3 clinical trials for Nephrology. ❖ Research capability of the CRU can be expanded and offer greater options for patients to be involved in clinical trials. ❖ Increase in Research income through the increased pool of patients and the addition of a professor role. ❖ Integrating research and developing an area of academic excellence will deliver clinical care that improves outcomes in patients.
Great ambition	❖ Improved value for money due to a reduction of waste and duplication of multidisciplinary pathways such as reducing administration tasks, reduction in the duplication of diagnostics. ❖ Increasing the number of patients on home dialysis would reduce costs whilst also improving patient experience and quality of life ❖ One of the main advantages of clinical model is the anticipated development of unified working practices and common pathways across acute and community services ❖ Aligned with local C & M system Health & Care Partnership priorities for Nephrology on the C & M system Health & Care Partnership Elective Care board.

6.2.2 Options Appraisal

The following describes the different options considered to best address the challenges highlighted and continue to improve the quality of care for better health outcomes with rising demand and tighter financial constraints.

Option 1 – Do nothing

Doing nothing would involve continuing with the existing Nephrology service and model of care across three sites. The workforce would not be aligned and pathways would remain the same.

Option 2 – All nephrology services consolidated at Aintree Hospital Site

The majority of the Nephrology services would be consolidated at the Aintree Hospital site; with satellite units as previously configured. Patients would be transferred to the Royal Site for transplant surgery.

Option 3 – All nephrology services consolidated at the new Royal Liverpool Hospital

The majority of renal services would be consolidated at the new Royal Liverpool Hospital. Emergency nephrology patients presenting at Aintree Hospital would be treated on-site and then once stabilised, transferred to the new Royal Liverpool hospital.

An options appraisal exercise was undertaken to assess the clinical service model options against the Trust's criterion. The following outlines the aggregate scoring from the Options Appraisal. Further detail on scoring and rationale behind scores provided are set out in Appendix 5 ('Options Appraisal scoring').

Option 1 – Do nothing

Criterion	Indicators	Weighting (out of 5)	Option 1 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	8	• Would not align to the Trust's strategic direction in terms of elective/non-elective work with the Royal site concentrating on cancer/complex elective services. • The merger strategy was based on integration of services to improve patient care across the region. If nephrology were to continue as is the current challenges would be exacerbated.
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	15	• Current challenges and clinical risks would be exacerbated by not integrating the service. • Renal transplant would continue to be delivered at the Royal Site therefore Aintree patients would have to be transferred to the Royal Site.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	3	• The Aintree estate is currently not fit for purpose with regard to delivery of Nephrology services as highlighted by the recent CQC inspection (IPC and estate). Whilst the Royal Liverpool estate has been purposely designed to accommodate the expanded service.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	15	• Service would remain fragmented with no uniformity across the region impacting on quality of care.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	24	• The impact of the lack of standardisation of the service as the misalignment of existing service models would be lead to financial consequences for the health economy e.g. timely access to fistula insertions, prolonged Length of Stay.
Total weighted aggregate score and ranking			**65** **(ranked 3rd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 2 - Consolidate service at the Aintree Site

Criterion	Indicators	Weighting (out of 5)	Option 2 Aggregated weighted score (based on 3 people scoring)	Rationale for score
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	12	• This was scored low because the service needs to be co-located with transplant services which is based at RLH site. • This option would not align to the Trust's strategic direction in terms of elective/non-elective work with the new Royal concentrating on cancer/complex elective services.
Clinical Risk/ Safety	**What is the level of clinical risk being addressed?**	**5**	30	• There are multiple overlapping pathways affecting clinical risk and safety of services. • Transplant services being located at the Royal would mean services and remaining services at AUH site would lead to further fragmentation of services.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	3	• This was scored so low because the Aintree estate is currently not fit for purpose for Nephrology services. The estate capacity at the Aintree site is inadequate to meet the growing demand. • Aintree and waterloo satellite dialysis unit estate do not comply with Renal Association IPC standard & lacks side rooms/isolation facility. The estate in these two units is not suitable for patients with high dependency. Furthermore, both unit estates do not comply with DOH best practice guidance detailed in Health Building Notes.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	9	• Quality would be impacted as the service would be separated from transplant services which are currently located at the Royal site. One of the key objectives of the service is to drive up the transplant rate; if the service were to be consolidated at Aintree this would not be possible.
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	12	• The cost of repurposing the Aintree site would be significant.
Total weighted score and ranking			**66 (ranked 2nd)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

Option 3 - Majority of service consolidated at the Royal Liverpool Site				
Criterion	**Indicators**	Weighting (out of 5)	**Option 3** Aggregated weighted score (based on 3 people scoring)	**Rationale for score**
Strategic fit	**How well does the project fit within the Organisational /Divisional Strategy?**	**2**	30	• Fits perfectly with the Trust's strategic direction and infrastructure and is aligned with the Nephrology service's goals.
Clinical Risk/Safety	**What is the level of clinical risk being addressed?**	**5**	60	• Co-located with other aligned services e.g. transplant, and the ability to expand which addresses current risk. • Configuration of staffing will alleviate current challenges. Clinical cover at AUH will be enhanced with an integrated medical workforce enhanced by consultant/middle grade cover.
Estates Risk	**What is the level of estates risk being addressed?**	**1**	15	• No risk as the site has been purposed specifically for the service.
Quality	**How much does the project contribute to the patient quality of care?**	**3**	36	• Quality standards will be aligned and having a combined resilient workforce will support the patient quality of care. • Future proofs the service and creates further opportunities to attract speciality doctors and nurses. • Better access to research studies • Opportunities to share best practice
Financial	**How likely is the project to be affordable/earn an acceptable rate of return?**	**4**	201	This option would drive out savings through efficiencies from economies of scale.
Total weighted aggregated score and ranking			**342 (ranked 1st)**	NB: Criterion weighted 1 to 5 in terms of importance, with 5 being the most important. Scoring/Risk rating for each scorer ranked 1 to 5 in terms of importance, with 5 being the most important.

6.2.3 Preferred Option

Given the challenges faced under the current model (Option 1) and the subsequent challenges and limitations arising from option 2 including adverse strategic implications for the Trust, the preferred clinical model identified is option 3 which will involve centralising nephrology services at the new Royal Liverpool Hospital site, while providing in-reach consultant cover to Aintree Hospital to ensure appropriate care for patients with kidney disease as a co-morbidity. This preferred model is described in more detail.

Tertiary Regional Unit at Royal Liverpool Hospital

The majority of renal services would be consolidated at the Royal Liverpool Hospital site once the new hospital is opened. Emergency nephrology patients presenting at Aintree Hospital would be treated on site and then once stabilised, transferred to the new Royal Liverpool Hospital. Discussions have taken place with the North West Ambulance Service (NWAS) regarding the new proposed model in order to agree protocols for patient flows and transfers to accommodate the new service delivery model.

Tertiary and specialist nephrology services would be provided, including an Obstetric Nephrology services and polycystic genetic renal services for patients across the North West. This would mean that the 16000 (approx.) nephrology patients treated at present, would benefit from being treated at a specialist hub, with care from consultants in a renal ward available 24/7 (this will particularly be an improvement for Aintree Hospital's dialysis patients).

Aintree Nephrology service

The proposed model would have an in-patient dialysis facility at Aintree Hospital and would retain a daily nephrology consultant presence as well as ANPs to specifically cover in-house referrals. The Aintree Hospital team would provide support for those already at Aintree Hospital and The Walton Centre under the care of other clinical specialties but suddenly require renal care, and to provide an in reach-service for existing dialysis patients under other clinicians (i.e. patients who have comorbidities that require care from another specialty).

This arrangement would also allow for care to be provided for any patients at Aintree Hospital who have been diagnosed with AKI but have other comorbidities, and as such, remain under the care of another department. This would ensure that patients at Aintree Hospital would continue to receive timely, specialist renal care, and benefit from an on-site nephrology presence, despite the larger nephrology bed base being centralised to the Royal Liverpool Hospital; referrals would be made as necessary.

Emergency Patients

A treat and transfer model would be in place for emergency patients. Any patients presenting to Aintree Hospital site with life-threatening renal emergencies, would have dialysis initiated on-site by the renal consultant at the Aintree Hospital site. Once stabilised, the patient would then be transferred to a renal bed at the new Royal Liverpool Hospital. This would ensure that these patients receive specialist nephrology care upon admission, and then subsequently have access to a specialist nephrology team.

Beds

Patients seen across all sites would also benefit from the larger bed base being at the new Royal Liverpool Hospital site. The new Royal Liverpool hospital wards are specifically designed for nephrology patients. The enlarged inpatient bed base within the new Royal Liverpool Hospital will consist of 42 acute

nephrology beds with an additional 14 beds that will be shared with Renal Transplant. The wards will have urine analysis equipment.

Inpatient beds at the new Royal Liverpool Hospital will be treated as a regional resource and will be ring-fenced from other uses which will enable patients to be seen by the 'right person at the right time'. This configuration will include a dedicated renal bed manager to ensure that these beds are prioritised for renal patients and early repatriation can occur where appropriate. This will enable better patient flow and ensure that patients are not staying in hospital longer than necessary.

Dialysis

There are 62 dialysis stations (33 in the dialysis unit and 29 in the wards) planned within the New Royal Liverpool Hospital to manage Nephrology inpatients and outpatients. 42 beds are separately plumbed with a separate water supply. The renal dialysis unit has 33 plumbed dialysis stations for dialysis treatment.

Satellite units would remain configured as is currently at the spoke sites.

6.2.4 Key Benefits of Proposed preferred model

Patient Access

The current specialisations and good practice developed at each Trust will be amplified through the larger organisation, leading to the merged Trust providing care, at a minimum, at the best level currently seen at one of the legacy Trusts.

Waiting times would improve as patients gain rapid access to specialist care through increased utilisation of beds and satellite units with shared waiting lists and central booking system/ co coordinator that enables patients to attend the site with the shortest wait and closest to home.

Patients from the current Aintree catchment and from the spoke Trusts would benefit from greater access to kidney transplants. The transplant services at the Royal Liverpool hospital will lead to patients from across the merged catchment receiving the same level of service as patients who currently originate at Royal Liverpool & Broadgreen hospitals. Nephrology patient journeys often span non-elective, elective and outpatient episodes and the strict separation of these aspects of care into different locations is unhelpful and reduces productivity and the availability of the best treatment options.

Improvements in dialysis service - patients will have greater choice around where they can access and receive dialysis across a larger footprint. Home dialysis can be a much more convenient option for patients, and provides them with a higher quality of life, significantly improving emotional as well as physical well-being.

Patient outcomes

There are several areas where Nephrology centralised at the Royal Liverpool site would provide better patient outcomes:

i) Improved Outcomes from Dialysis Service

It is expected that the rate of home dialysis will increase to around 30%. This would lead to an around 20 additional patients receiving home dialysis – it is unlikely that the increase will be due to additional patients receiving Peritoneal Dialysis (PD), but rather that patients who would absent a merger be seen in a satellite HD unit, will be able to receive HD at home.

Dialysis services would be improved in a number of ways:

- A greater focus on making home dialysis available to patients rather than administering in centre dialysis;
- Vascular access and PD catheter insertion would be improved for patients; and patients currently treated at WDU and ASDU would no longer be treated as sub-standard satellite dialysis facilities.

These changes would be enabled by a combined, more resilient workforce. This will improve the staff to patient ratios and the alignment of patient pathways.

The combined capacity of the integrated team would allow more patients to have home dialysis as a first choice of treatment when dialysis is necessary. The aim is to increase the rate of home dialysis to 30% of dialysis patients. This would be achieved by complementary skill sets of home therapies and configuration of existing community support staff into the arrangements set out above. This will reduce the number of patients reliant on 'in centre' dialysis, driving the improved staff to patient ratios and allowing medical staff to dedicate more time to nephrology inpatients and nephrology research.

The Royal Liverpool & Broadgreen Hospital implemented a new, innovative nurse-led dialysis approach for first time dialysis patients, which has seen a number of benefits for patients such a reduction in mortality, a shorter length of stay and a fall in patient distress levels. Whilst Aintree Hospital site has begun the roll-out of this approach, this would not have been possible absent the catalyst provided by the plans to merge and integrate both teams. In the integrated model, the Royal Liverpool site team will be able to better share their knowledge and experiences to train nurses previously based at Aintree Hospital site in this approach and enable a more efficient roll-out. Patients who would have otherwise been treated at Aintree Hospital will be able to benefit from this new approach and receive the same benefits. Outcomes for new dialysis patients would converge under the care of nurses experienced in managing the pathway.

As the patient populations currently at Aintree Hospitals and the Royal Liverpool & Broadgreen hospitals are very similar, implementing the same approach and pathway is expected to lead to the same clinical outcomes. Specifically, this will mean that for the 102 patients previously seen at Aintree Hospital each year:

- **2 lives will be saved each year**, as the mortality rate will decrease from 3.3% seen at the legacy Aintree hospital currently to 1.1% as seen at currently;
- **Patients will spend fewer days in hospital**, in line with the trend observed at the Royal Liverpool hospital

ii) Home Haemodialysis

Patients receiving home Haemodialysis (HD) would no longer need to travel to a dialysis clinic multiple times a week and could instead undergo dialysis on their own time and in the comfort of their own homes. Patients could also dialyse more frequently than is possible in hospitals or satellite units, and could maintain a more enjoyable diet as a result.

Patients receiving home HD would save a substantial amount of time since they will not need to travel to a clinic or wait for pick up.

Patients receiving home HD would also benefit through better quality of life and opportunity for rehabilitation and employment.[78] According to the Home Dialysis Manifesto, in-centre haemodialysis "requires three hospital visits per week, lasting roughly four hours each. The regular hospital visits associated with in-centre dialysis can place strain on a patient's family and social life, as well as preventing them from working normal hours. In contrast, home dialysis allows patients to fit their dialysis schedule around their professional and social commitments, with minimal disruption to their day-to-day routine."[79] Home HD can be carried out overnight, minimising the disruption to day to day life for patients.

Inflexible treatment schedules for dialysis have been cited as a barrier to rehabilitation and gaining and maintaining a job. It has been found that that home dialysis has been associated with greater rates of employment amongst patients compared to those treated on site – these benefits can be expected for the additional patients receiving this service as a result of the merger. Home haemodialysis has also been associated with fewer intradialytic adverse events such as headaches and cramps.[80]

iii) Identification of Acute Kidney Injury

Patients currently treated at the Royal Liverpool site would benefit from the roll-out of legacy Aintree Hospital's Acute Kidney Injury (AKI) pathway. There are disparities with regard to the quality of the AKI service between the two legacy Trust sites. Outcomes are expected to converge to what is currently observed at the legacy Aintree Hospital. In particular, this would mean that more patients would receive a range of tests and medication review from a pharmacist after the first AKI alert. As a result, the 120 patients seen each year at RLH/BGH sites with Stage 3 AKI will receive care in accordance with the seven criteria identified by AQuA.

The treatment and monitoring of AKI would be led by the combined renal department, adopting the best practices from the successful STOP AKI programme currently at the AUH site. Sharing of knowledge and experience from the Aintree Hospital team, which is a leader in the region, would raise the quality of identification at the Royal Liverpool Hospital improving patient outcomes, in particular reduced mortality. This would in turn lead to timely in-reach review of new patients with AKI, including ward consult requests and monitoring of prevalent dialysis patients under the care of other teams.[81]

Any patient who are flagged for AKI at Aintree would be treated on site by the nephrology staff present there, and if necessary, would be transferred to a nephrology bed at the new Royal Liverpool Hospital. If not possible, because of other comorbidities for example, they would be treated at the Aintree Hospital site but the consultant presence, as explained above would ensure timely in-reach by a renal consultant.

The changes in care for AKI patients, bringing care in line with that currently provided at AUH will mean that for the Stage 3 AKI patients currently seen at the RLH site, clinical outcomes will be improved, specifically:

- Mortality rates will decline from 32.4% to 16.7%, meaning that **each year 19 lives will be saved**; and
- Readmission rates will decline from 29.4% to 18.5%, meaning that **each year 13 fewer patients will be readmitted to hospital**.

iv) Equity in provision of renal transplants

The proposed model would allow all patients equal access to kidney transplant services. Currently, Aintree Hospital's patients face reduced access to kidney transplants. This will mean the same number

[78] Kutner N et al. (2008), 'Dialysis facility characteristics and variation in employment rates: a national study', *CJASN* 2008;3(1):111
[79] <http://www.kidney.org.uk/documentlibrary/Home_Dialysis_Report.pdf> p. 6.
[80] Mowatt G et al. (2003), 'Systematic review of the effectiveness and cost-effectiveness, and economic evaluation, of home versus hospital or satellite unit haemodialysis for people with end-stage renal failure',. *Health Technol Assess.* 2003;7(2):1, pp.12
[81] Studies have shown that at any one point in time 10% of a Renal Unit prevalent dialysis patients are under the care of other specialties.

of patients overall will have cadaveric transplant and there will no longer be an inequity due to patient postcode between Aintree Hospital site and the Royal Liverpool & Broadgreen sites.

Steps could also be taken to encourage listing for live donor transplants. The rates of live transplants are higher at the legacy Royal Liverpool & Broadgreen Hospital compared to the legacy Aintree Hospital. Anecdotal evidence suggests this may be due to the ability of the friends and family of Royal Liverpool & Broadgreen Hospital's patients to speak to transplant surgeons earlier in their care pathway. A discussion with a transplant surgeon can clarify and make more salient to patients and their families the benefits of a renal transplant, encourage live organ donation from family. If the proposed model is approved as renal services would be consolidated at the new Royal Liverpool Hospital, all patients would have access to transplant surgeons from an early point in their care.

v) Vascular access and catheter insertions

AVFs are the gold standard and have a number of benefits for patients. They enable the highest blood flow during dialysis, reducing the period of time for which dialysis must be performed. Additionally, there is a lower risk of infection or clotting, resulting in fewer complications for patients.[82] Infectious complications are a major source of mortality among HD patients. A study performed on HD patients over a year of treatment found that 3.3% of patients with an AVF, compared to 52.2% of patients with a permanent catheter (PC) contracted a form of infection.

85% of patients are expected to have permanent access in the form of AVF/AVG, in line with national guidance. This will mean that an additional 10 patients from the AUH catchment and an additional 57 patients from the RLH &BGH catchment area, for a total of 67 patients will have permanent vascular access, and will consequently have a decreased risk of infection.

Similarly, PD patients will have catheters inserted in a timely manner, meaning that an additional 8 patients per year will have a catheter insertion within two weeks, in line with commissioning specification. These 8 patients will be able to access the flexibility and improvement that PD allows sooner than currently.

Patient Safety

Patients are more likely to be cared for by a clinician with focused expertise in the problem they present with rather than a generalist who treats fewer such cases. Patient Safety across the Trust is paramount however this would be improved by having a single consolidated service.

Improvements to physical estate of satellite units

Improved care for patients would lead to improved outcomes and increased convenience of treatment for patients. For example, it would be easier to transfer patients to satellite units nearer to their home without the need to transfer patients from the care of one organisation and renal department to another. This flexibility would ensure that the integrated team meets the Renal Association recommendation of a maximum travel time of 30 minutes. [83]

The estates capacity issues at Aintree Hospital's dialysis units would be resolved as some patients currently seen at Aintree Hospital's operated sites may move to sites which have some capacity to take on additional patients (especially at Broadgreen Hospital). Additionally, a new satellite unit with 24 stations will be opened near the Aintree Hospital site, with WDU and ASDU closing down; this will be

[82] https://www.niddk.nih.gov/health-information/kidney-disease/kidney-failure/hemodialysis
[83] Renal Association (2009), 'RA Guidelines – Haemodialysis, 2009'
<https://renal.org/wp-content/uploads/2017/06/haemodialysis-5th-edition-1.pdf>

enabled by the centralisation of nephrology inpatients to the new Royal Liverpool Hospital site, which would free up consultant time to cover a larger satellite site.

With regard to the Broadgreen Hospital satellite unit, the contract with Fresenius (independent supplier of dialysis products and services) is unlikely to change given that there are a number of years remaining on the 20 year contract.

Patient Experience

There will be considerable improvement in patient experience in light of all these improvements highlighted and their feedback through formal questionnaires and family and friends responses will provide evidence for this. These range from equitable access and quality of services and improved quality of life through increased provision of home dialysis, all of which will drive significant improvements in patient experience of Nephrology services.

Workforce

An integrated workforce would provide opportunity to strengthen subspecialty teams and provide more opportunities for career progression allowing high quality ambitious staff to be retained.

Bringing staff together in an integrated hub is an opportunity to improve the sharing of ideas and knowledge, better ways of working and improve teamwork. Knowledge sharing of skills from the innovative pathways introduced, eg the AKI pathway at Aintree and the first time dialysis pathway at the Royal site would improve care quality, outcomes and patient experience.

This service configuration proposal provides a roadmap to create a unit where appointment opportunities are highly sought after, allowing the appointment of the best talent, further improving quality.

The benefits described in earlier sections would be enabled by a combined, more resilient workforce. This will improve the staff to patient ratios and the alignment of patient pathways.

Combined rotas would reduce the reliance on agency/locum usage. The Consultant rota at Aintree would be planned to ensure 9-5 cover, 7 days per week enhanced by middle grade cover.

Research and Innovation

Bringing together care from 2 units increases the opportunity to streamline care bringing the best practice from each legacy unit and giving more opportunity to innovate. In some areas, the legacy units have been at the forefront of this, but the adoption of new ways of practice and unit driven innovation has been uneven. Integrating research and developing an area of academic excellence will deliver clinical care that improves outcomes in patients.

A larger centralised hub will create an environment improving dialogue and allowing ideas and innovation to grow and spread. Various clinicians across sites have been and are involved in clinical research of various kinds but, in the absence of a formal academic unit, this research is poorly coordinated and opportunities are missed. Clinical research drives care quality and innovation and helps with reputation, identity and recruitment. The large centralised hub proposed is viewed as the best environment to facilitate research development, engagement and coordination.

The Royal Liverpool Hospital would continue to host the Clinical Research Unit led by a clinical professor. This would help attract high volume Phase 1 and 2 clinical trials[84], helping to raise the research profile of the merged Trust, and most crucially, enabling patients to have access to new and innovative treatments. Clinical research will also be facilitated through the integrated Electronic Patient Record (EPR) system to reach a wider cohort of patients for clinical trials with one governance structure and fewer barriers to access. There is also the opportunity to develop a regional renal research 'hub' working within one of the largest renal services in the country, attracting not only research and development finance but also innovation streams which will greatly benefit patients.

All eligible patients attending the new integrated service would be able to participate in clinical trials, which represents a significant improvement in access to the current model where recruitment depends on the patient's point of entry into the service and their postcode. Through access to clinical trials, patients would benefit from access to innovative new treatments and medications which would have otherwise not been available.

Patients would have access to research trials currently only offered at one of the sites. This is a direct benefit to these patients, as clinical trials provide access to new treatments, and overall can improve the quality of care received. For example, the trials at Aintree would be expected to recruit at least the target number of participants due to the much larger pool of eligible nephrology patients.

Strategic benefits

Moving Nephrology to the Royal Liverpool site is an enabler for wider Trust strategy with regards to the reconfiguration of elective/non-elective split.

Efficiencies

The proposed clinical model will also deliver a number of efficiencies gained from changes introduced, and improvements in the service delivery and ways of working.

Service Reconfiguration change	Number of patients Affected (approx.)	Efficiency Improvement
Continued roll-out of nurse led approach for first-time dialysis	102 patients per year	• Reduction in average length of stay of c.3 days (12.2 – 8.75) following continued roll out of nurse led approach. Equates to 306 bed days saved per annum based on 102 patients affected.
Procurement efficiencies from combined Dialysis Units	N/A	• There is an opportunity to generate procurement efficiencies from combined purchase volumes for both the Satellite Units and Home Dialysis Units. • An initial estimate of potential savings from Baxter Healthcare and Nxstage Medical UK indicates this could amount up to c.£25k per annum.
Increased number of transplants	Additional 11 – 18 patients per year	• Increasing the number of transplants by another 11 per annum would generate savings to the wider Health economy of approx.£.£1.2m over 5 years (based on NHSE Spec Comm. standard contract for Transplant)

[84] A Phase 1 trial is when a new treatment or vaccine is tested in humans, usually within a small group. The trial aims to assess whether there are any safety issues, or any side effects, Phase 2 trials follow on from successful Phase 1 trials and involve a larger group of volunteers; the aim is to test the efficacy of the treatment.

Service Reconfiguration change	Number of patients Affected (approx.)	Efficiency Improvement
		• Increase in transplant may also lead to opportunity to increase transplant income
Improvement to AKI service	120 stage 3 AKI patients	• Reduction in costs associated with hospital readmissions as readmission rates decline from 29.4% to 18.5% meaning that each year, 13 fewer patients will be readmitted to hospital
Consolidated workforce and combined rotas leading to less intense on call rota	N/A	• Savings generated from moving from 5% to 3% intensity payment for AUH consultants on less intense on-call rota amount to £14,370 per annum.
Increasing number of patients on home dialysis	Around 20 patients per year	• Dialysing patients at home is not only better for patient outcomes but research shows that this has improved income opportunities and better financial return for the Trust from to the reduction in associated costs.[85] • This would provide an opportunity, based on national standard benchmarks to yield an annual net benefit of up to £136k based on a 10% increase in number of patients on home dialysis.
Strengthening of clinical research	15,000	• All patients who are eligible for clinical trials will be able to participate regardless of their location • Research capability can be expanded and offer greater options for patients to be involved in clinical trials • Research income should increase by 10-20% and potentially more through the increased pool of patients

6.2.5 Resource Implications

Beds

As highlighted earlier, patients seen across all sites will also benefit from the larger bed base being at the new Royal Liverpool Hospital site. The new Royal Liverpool hospital wards are specifically designed for nephrology patients. The enlarged inpatient bed base within the new Royal Liverpool Hospital will consist of 42 acute nephrology beds with an additional 14 beds that will be shared with Renal Transplant.

Workforce

Medical Workforce

[85] British Journal of Renal Medicine (Vol 21, No 1, 2018)

There is no proposal to change to the overall numbers of consultant, middle grade or junior medical staff required as a result of the integration project. In terms of the Junior Dr allocation there is a risk regarding junior medical staff across sites, this is described in section 8.5 (key risks and mitigations).

In the rota that is planned, there will be a consultant present at Aintree 9 to 5, 7 days per week with an enhanced middle grade support.

Nursing Workforce

On the basis that the Nephrology wards will have a combined Inpatient bed base of 42 beds, including 4 HDU beds; a nursing professional judgement tool has been completed in order to establish the required safe staffing levels. The ward/s on the New Royal site have single room patient accommodation and plumbed beds requiring an increased nursing ratio in order provide safe and effective nursing care.

Dieticians

With only 2.0 WTE dieticians at the Aintree site, Aintree Hospital site is unable to meet British Renal Society (BRS) standards for the review of all dialysis patients on a six monthly basis.[86] Therefore additional resource (2 wte) is required to meet the standards.

Estates

Aintree and waterloo satellite dialysis unit estate do not comply with Renal Association IPC standard & lacks side rooms/isolation facility. The estate in these two units is not suitable for patients with high dependency. Furthermore, both unit estates do not comply with DOH best practice guidance detailed in Health Building Notes. To address these shortcomings Trust has agreed to explore options for a new purpose built redesigned combined Aintree and Waterloo dialysis Unit. This combined new unit will be based at Aintree Hospital site & currently a scoping exercise is being undertaken with LUHFT estate team for this new unit to be built and part managed by private providers.

6.2.6 Interdependencies

There are many benefits in moving to the Royal Liverpool site if the Trust strategic development runs in parallel. The co-location of the interdependent services will greatly improve efficiency, patient outcomes, patient experience and working conditions. These particularly include:

- Co-location with Transplant service
- Access to Interventional Radiology - more interventional and diagnostic

[86] UK Renal Association (2010), 'Clinical Practice Guidelines: Nutrition in CKD', p.7

Chapter 7

Financial Case

7. Financial Case

As indicated in the respective service reconfiguration business cases, additional financial investment has been identified to deliver the proposed clinical models.

The following sets out the additional financial resources required that have been approved by the Trust, to implement and deliver the proposed clinical model from day one.

Capital Costs

Scheme	Description	*2021/22* £	*2022/23* £	*2023/24* £	*TOTAL* £
Vascular	Additional Hybrid Theatre First floor extension to the current C theatre complex at AUH site (formed AED theatres) to create two bespoke hybrid operating theatres and remodelling of current theatres (C1 and C3) at the Aintree site.	5.5m	7m	-	12.5m
Total		**5.5m**	**7m**	**-**	**12.5m**

Revenue Costs (recurring)

The following sets out the approved revenue costs (recurring) to implement the service changes from year one.

Scheme /Specialty	Description	Revenue Cost (Recurring)							
		2021/22	*2021/22*	*2022/23*	*2022/23*	*2023/24*	*2023/24*	*2024/25*	*2024/25*
		WTE	£	WTE	£	WTE	£	WTE	£
General Surgery	EGS consultants	-	-	3	325,644	3	434,192	3	434,192
	UGI Consultant	-	-	-	-	0.5	78,923	0.5	78,923
Nephrology	Additional Renal Dietetic Support	-	-	2	41,216	2	82,432	2	82,432
Total		**-**	**-**	**5**	**366,860**	**5.5**	**595,547**	**5.5**	**595,547**

Following the implementation of proposed clinical reconfiguration schemes in year one, the Trust will continue to monitor the impact of service changes and the associated resource requirements as part of its risk management processes together with the benefits realisation plan for each scheme. Any additional resources identified beyond year one will form part of the Trusts annual planning and budget setting processes.

Chapter 8

Management Case

8. Management Case

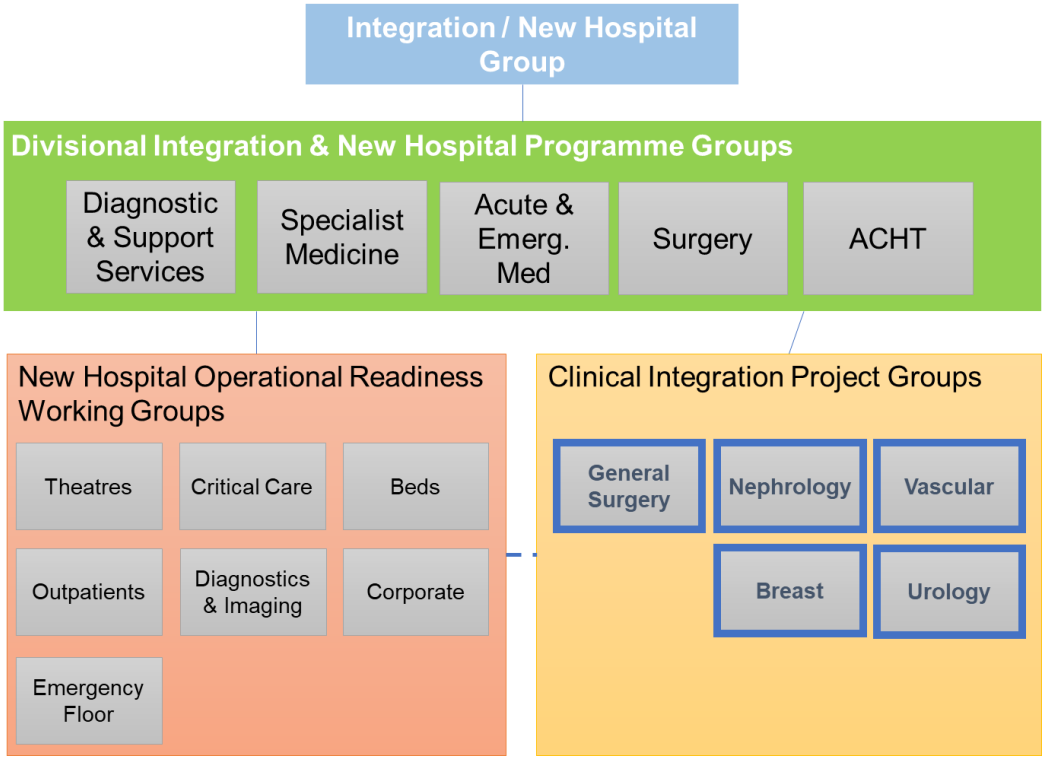
8.1 Project Governance

As part of the work to support the merger of the legacy Trust, project teams were established which support the development of the proposed models for the different specialties (e.g. General Surgery, Nephrology, Urology, etc.). These specialty level project teams have since been re-established and reports through the relevant governance arrangements as described below.

Core membership of the project teams are made up of the specialties' clinical directors, operational leads, nursing representatives, and the integration /reconfiguration project team. Additional members are also invited to project meetings as required.

Within the division, divisional leads have been fully sighted on plans, and wider audiences receive highlight reports monthly. This will continue as part of the planning and implementation process.

The following illustrates the governance structure and reporting arrangements for the respective clinical reconfiguration projects.



8.2 Project Milestones

Detailed integration plans are being developed to help achieve successful implementation and deliver the clinical service model and associated benefits identified (subject to external approval of proposed schemes). Plans will also be subject to clinical and operational lead review with progress monitored against key milestones and actions.

The programme plan will be managed by the Programme Manager and monitored through each clinical Project Team meetings.

The following sets out the key project milestones:

Key Milestone	Date
Executive Decision /Approval on proposed service reconfiguration business case	21 September 2021
Detailed implementation planning for proposed service changes	November 2021 - May 2022
Staff Engagement Plan reviewed & completed	November 2021
NHSEI stage 1 assurance process commences	November 2021
Completion of all Deanery agreements	December 2021
NHSEI stage 2 assurance process commences	January 2022
Planning for Public consultation	January 2022
Staff consultation /workforce change completed	March to May 2022
Develop process maps to support operational planning and Standard Operating Procedures:- • IM &T and admin process plans • Estates, facilities and equipment plans • Workforce plans • Service description and protocols	November 2021 to March 2022
Executive led Quality Assurance Review (QAR) and approval of Operational Plans	April 2022
Public Consultation	May – July 2022
Update Business Cases and obtain Trust approval to include outcome of public consultation	July 2022
Implementation of proposed service changes	September 2022
Commence Benefits Realisation Review	October 2022 onwards
Undertake Lessons Learnt Exercise	October to November 2022

8.3 Communications Plan

A communications plan is being developed to support the communications and engagement for internal and external stakeholders. The high-level communication objectives for this will include:

- **Access to information** – maximising opportunities for key stakeholders to access clear, relevant information about the integration process and specific service level details.
- **Internal communications** - enabling effective communication through and across the services themselves and the rest of the organisation, maximising reach, developing understanding and supporting input in the reconfiguration process.
- **Reputation management** – ensuring the communication of the service reconfigurations are well managed, enabling consistent and effective deployment of key messaging and management of risk.

The plan will be based on a set of **Communication principles**:

- Deliver consistent and transparent communications to staff groups, led by and informed by the respective Clinical Reconfiguration Project Teams.
- Provide platforms for open discussions which are owned by and responded to by the Clinical Reconfiguration Project Teams.

- Ensure change is led by the clinical and operational groups and sub groups as appropriate in order to inform and shape the service model to ultimately benefit patient care and experience.
- Communication approach to be reviewed and amended as and when appropriate.
  - Review of reach of messages
  - Review of staff feedback
  - Review of uptake through platforms utilised
  - Considerations around communication content e.g. specific concerns or questions which are raised by numerous staff and ensuring targeted communications around these where appropriate.

Communication tools:

- E-mail briefings to be provided as a minimum monthly, but ad-hoc when communication requires circulation sooner.
- Staff internal intranet updates monthly.
- Divisional newsletter to staff monthly.

Project Lifecycle Communications Approach

The following outlines the communication and engagement approach adopted for the duration of the project in developing and implementing the proposed clinical service model.

Stage	Stage Priorities
Clinical Vision	• Establish project team, with clearly defined ToR, and confirm regularity of meetings • Provide staff with key messages around the reconfiguration/integration process, reasons why this is happening and who to contact with any questions • Establish common goals and vision. • Begin monthly briefings for staff groups in order to update them with progress • Begin engaging staff within workshops and championing using audience participation and 'Temperature Test' approach as well as follow up feedback. • Intranet page set up and updated monthly • Establish 'Comms Link' within each area in order to link with and disseminate information as and when required. • Establishing Task and Finish Groups and providing them with a clear remit via a ToR and invite from project leads
Business Case	• Define new service model via options appraisal process. • Continue with monthly briefings, but also include any ad-hoc briefings around progress where required. • Utilisation of Divisional approaches for key messages, to incorporate New Hospital and Integration programmes
Operational Plan	• Task and Finish Groups to inform processes and contribute towards achieving key tasks • Provide staff working in the affected services with a definitive outline of the operational changes agreed to support the new models of care.
Staff Consultation	• A comprehensive Staff Engagement and Consultation Plan will provide the framework for informing, involving and consulting with staff on detailed service changes.
Implementation	• Face to face and virtual sessions, supported by regular one-page briefings will be provided to keep everyone informed of services changes. • Staff surveys and targeted group sessions, along with regularly updated online resources will provide multiple channels for staff to share their views and inform the

Stage	Stage Priorities
	development and implementation of service changes.
Lessons Learnt	• Official lessons learnt collated with input from data gathered from BI (baselined/horizon scanning), as recorded by the Programme Manager, all communication feedback and input from all workshops and sub-groups. • Patient Engagement groups to contribute towards this process. • Lessons learnt circulated to service via appropriate means
Benefits Realisation	• Ad-hoc briefings to communicate that following implementation what work is still going on and what success has been realised in the coming months

Staff

Structured staff engagement plans will be developed to ensure that communication and engagement remains a strong focus as the project continues to the next phase. This will provide staff with an opportunity to receive information and updates, but also enable them to further contribute to shaping and influencing plans for the future..

Support required to deliver the communications and engagement:

- Establishing of 'Comms Links' within service areas
- PMO support provided to maintain delivery of plan and support with briefing content and circulation within set time-scales.
- Divisional buy-in to support cascading information through the care groups, addressing both Integration and New Hospital

Communication & Engagement Risks and assumptions:

- Clinical and Operational pressures, particularly during Covid-19 and winter pressures may result in:
    - Delays in agreement of briefing content and circulation
    - Responses to platforms to staff and actioning concerns
- In order to mitigate these risks, PMO support will ensure that briefings are formulated within a timely manner and circulated with greater time to the deadline for circulation.
- Deputising may be required in order to manage online platforms.

Public Engagement Requirements / Process

Patients, the public and wider stakeholders

Significant stakeholder engagement and consultation with communities in the North Mersey region has been undertaken over the last few years, on the principles of adopting a single city wide service approach for the provision of hospital services – through the Healthy Liverpool Programme; the One Liverpool Plan; and the Shaping Sefton Plan; with further stakeholder engagement conducted as part of the merger transaction to form LUHFT. This included targeted engagement involving patients likely to be impacted by proposed changes which also aligns with the wider Cheshire and Merseyside Sustainability and Transformation Plan.

The proposed models of care and their associated business cases have been developed through a clinically led approach, with the outputs of the patient and public engagement exercise being used to inform the proposed clinical models.

The Committees in Common (CIC) is a joint committee of commissioners from Liverpool, Sefton, Knowsley, Southport and Formby CCGs along with Specialised Commissioning. At the CIC meeting held on 19th October 2021, a presentation on the proposed changes included in this document, along with the process and timeline for engagement and consultation (aligned with the NHSEI assurance process on major service change) was supported.

It was agreed this supporting business case for proposed service reconfiguration schemes be shared with commissioners at CCGs and Specialised Commissioning for review and the NHSEI assurance process for major service change will be initiated. The NHSEI stage 1 review commenced in November 2021.

Subject to approval from NHS regulators, and the Joint Committee of CCGs, the preferred option will be subject to public consultation. The consultation will provide opportunities for people to share their views and highlight whether there is any other information that needs to be considered in decision-making.

As part of this process, CCGs will also engage with Overview and Scrutiny Committees (OSCs) in the local authority areas, in line with statutory requirements. Detailed plans for public consultation, including timescales for communicating with OSCs and other stakeholders, will be developed over the coming months.

8.4 Benefits Realisation plan/ Post Implementation review

As part of the process to monitor and track benefit delivery, a benefits realisation report will be produced periodically following implementation, aligned to the phased implementation of service changes introduced. These will be used monitor the impact of the proposed changes against the anticipated benefits including progress on delivery, outcomes of service changes against key metrics to be agreed, in addition to any potential associated risks arising from the changes implemented.

The proposed benefits anticipated from the service changes delivered from each of the different reconfiguration schemes, and the indicative timescales for when these will be realised are included within the Appendices (Management Case – 1.1).

8.5 Risk Management (key risks and mitigations)

Key risks and impact of not proceeding with the proposed clinical models are highlighted in the case for change for each of the five clinical reconfiguration schemes.

Key risks associated with the implementing the proposed clinical service models are set out below including mitigations and mitigated Risk scores.

8.5.1 General Surgery

Risk	Impact	Mitigations	RAG Rating / Score (with mitigation)
Recruitment to deliver safe services within the delivery timeframe	• Potential for clinical risk • Difficulties with rota planning • Higher cost of locums required	• A recruitment drive will be needed to fill the gap • Training opportunities will be reviewed • Rota planning to continue	9
Some staff members may be reluctant to change sites and may leave	• Staff retention and staff morale affected • Potential for clinical safety issues if understaffed • Loss of knowledge and expertise • Increased short term recruitment needs	• Staff engagement and communication plan • HR business representation support early on with HR support/advice provided to staff. • Effective communication and ongoing Input from staff during and following integration process	6
A number of patients will need transferring from Royal Emergency Department to the Aintree but so will patients from other specialties which may put pressure on NWAS and lead to delays	• Some patients may have delays in transfer • Impact on ambulances and patient experience to be considered • Could cause complexities for bed management	• Clear criteria for referral and transfer • Cover to be provided at the RLH site with the aim to treat and stabilise patients and discharge to appropriate ambulatory care or be transferred	6
Failure to get sufficient beds or theatre time reducing capacity	• Inability to cope with demand • Inability to meet KPIs of patients receiving senior review/into theatre within specific timescales • Demand for service is expected to increase in coming years and would be unable to cope	• Focused efforts to improve theatre productivity • Increasing ambulatory care of non-elective patients • Agreements made for bed capacity in line with demand	6
Public consultation outcome not supportive of service relocating to Aintree	• Inability to proceed with proposed clinical model. Service would have to remain at RLH site and move to the new Royal.	• A robust business case developed emphasising the rationale for change and benefits of relocating to Aintree	6

Risk	Impact	Mitigations	RAG Rating / Score (with mitigation)
	• Inability to address current clinical/operational service challenges/risks and sustainability of service. • This would be detrimental to patients outcomes and experience • This would also significantly impact on the operational planning for the new hospital. • Reconfiguration of other services within new RLH, with potential to requiring them to be based elsewhere in order to house General Surgery including EGS	• Develop a robust stakeholder engagement approach and supporting communications plan to help communicate public understanding for the case for change and benefits of the proposed clinical service model • Patient engagement will be undertaken and affected groups invited to contribute to plans	
Proposal of model with Deanery rejected will affect the ability to implement and have an adverse effect on junior cover	• Inability to agree with Deanery around junior cover, will effect ability to have appropriate staffing across sites • Difficulties in meeting KPIs • Difficulties in delivering safe patient care • Unable to safely plan rotas for junior staff	• Deanery meetings are on-going and have been engaged early on • Deanery are aware of the merged organisation and strategic objectives of the organisation for hot/cold split	9
Capacity of interdependent services; including predominantly Radiology (Ultrasounds and CT scans) and Gastro (Biliary) services	• Unable to deliver timely care with the support of appropriate diagnostic services • Inability to support provision of hot clinics/ambulatory care without the capacity of interdependent services being in place • Delays in patient flow • Inability to meet key KPIs	• Meeting with interdependent services from the outset to present model and discuss challenges • Outline of requirements and rationale for diagnostic support	9
Delayed Timescales to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the new hospital	• Regular engagement and meetings with commissioners to track progress • Proposed timeline drafted and shared with commissioners incorporating contingency	9

Risk	Impact	Mitigations	RAG Rating / Score (with mitigation)
	opening. • Again, this would lead to multiple service moves in addition to equipment requirements for the new hospital and other key estate considerations.	to allow for potential delay	
Access to Day case capacity at Aintree site	• A lack of access to day case theatres at Aintree site would prevent ability to increased day care procedures and activity for benign upper GI and colorectal surgery. • This would result in failure to improve day case rates for these subspecialties leading to unnecessary patient admissions and hospital stays	• New Hospital planning including the review of all other sites, including AUH • As part of agenda for AUH Reconfiguration Group • Requirements have been defined and shared and are being divisionally reviewed. Risks highlighted to execs	6

8.5.2 Vascular

Risk	Impact	Mitigations	Risk Score (with mitigation)
Public consultation outcome not supportive of service relocating to Aintree	• Inability to proceed with proposed clinical model. Service would have to remain at RL site and move to the new Royal • Inability to address current clinical/operational service challenges/risks and sustainability of service • LiVES would be unable to deliver the service required to meet the demand • RTT times would remain an issue and LiVES would continue to fail to meet some of its targets and remain in special measures with Commissioners • This would be detrimental to patients outcomes and experience • This would also significantly impact on the operational planning for the new hospital	• A robust business case developed emphasising the rationale for change and benefits of relocating LiVES to Aintree • Develop a robust stakeholder engagement approach and supporting communications plan to help communicate public understanding for the case for change and benefits of the proposed clinical service model • Patient engagement will be undertaken and affected groups invited to contribute to plans	6
Delayed Timescales to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the new hospital opening • Again, this would lead to multiple service moves in addition to equipment requirements for the new hospital and other key estate considerations	• Regular engagement and meetings with commissioners to track progress • Proposed timeline drafted and shared with commissioners incorporating contingency to allow for potential delay	9
Lack of affordability for proposed clinical model and estates solution at Aintree site	• A lack of financial resources to fund the proposed clinical model and estates requirements may lead to proceeding with the 'Do nothing' option of the existing service model • Would result in moving to the new royal building and the subsequent impact of the existing challenges for the	• An options appraisal has been concluded which outlines the benefits and long term strategic direction of LiVES by relocating to Aintree University Hospital • Phased approach to implementation of clinical service model to help spread costs over number of yeas in line with Trust availability of resources	12

Risk	Impact	Mitigations	Risk Score (with mitigation)
	service as outlined above impacting on patient outcomes, timely access to care and patient experience.		
Reduction in referrals due to change in location	• A reduction in referrals due to the potential increase in distance from the Royal to Aintree site • Reduction in income generated from referrals.	• There is no anticipated reduction in vascular workload regionally or nationally. • Obesity, diabetes, increasing elderly population and increased tertiary referrals are expected to maintain or increase demand on LiVES. • The LHCH collaboration is primarily for thoraco-abdominal aortic work referred through to the regional LCS (Liverpool Cardiovascular Service: LHCH/LiVES).. • It is not anticipated that it will significantly impact on aortic work at Aintree nor undermine LiVES. • Anticipated improvements in service outcomes from proposed clinical service model mitigate potential loss of referrals due change in location	3
Some staff may be resistant to moving from Royal to Aintree	• Some staff may be resistant to moving to the Aintree site impacting on the availability of resources to staff the service. • Staff retention affected leading to loss of skills and expertise and increased short term recruitment needs. • Increased training requirements.	• Effective communication and staff engagement throughout the reconfiguration/integration process. • HR business partner support from the outset to identify solutions to support potential resistance	6
A small number of patients will need transferring from Royal Emergency Department to the Aintree site as well as patients from other specialties which may put pressure on NWAS and lead to delays	• Some patients may have delays in transfer • Impact on ambulances and patient experience to be considered • Consideration of bed management • This model is operated successfully from Aintree to the Royal for many years. Overall there will be a reduced number of transfers by LiVES being located at Aintree due to co-location with interdependent	• Develop clear criteria and standard operating procedures for referral and transfer • Availability of Vascular staff daily at the Royal with the aim to treat and stabilise patients and discharge or be transferred	6

Risk	Impact	Mitigations	Risk Score (with mitigation)
	services		
Failure to obtain suitable outpatient facilities at Aintree site	• Unsuitable outpatient facilities reduces productivity and diminishes patient experience	• The importance of appropriate outpatient facilities to deliver the service without compromise needs prioritisation • Demand and capacity modelling undertaken to optimise outpatients activity against capacity with demand • Use of virtual appointments where appropriate	9
Failure to obtain suitable office accommodation for the LiVES team	• Lack of suitable accommodation for the LiVES team at the Aintree site impacts on ability and efficiency of team to effectively deliver the service • The importance of suitable office accommodation for the whole LiVES team, closely located to the theatre complex need prioritisation	• Exploration of potential accommodation solutions in line with other service changes undertaken from AUH to RLH sites	9
IT systems different at Aintree site from the Royal.	• Different IT systems used at the Royal not available at the Aintree site • Staff required to train in new systems	• Implementation of cross site systems went live in May 2021, to ensure all sites are operating utilising the same systems and sharing information required • System should be embedded before business case enacted	6

8.5.3 Urology

Risk	Impact	Mitigations	RAG Rating / Score (with mitigation)
Recruitment to deliver safe services within the delivery timeframe	• Despite the proposed reduction in bed base there is a short-fall of nursing establishment principally related to the increased demands of single room nursing • Short term staffing cost from agencies to cover short fall	• A recruitment drive will be needed to fill the gap • Training opportunities can be reviewed	6
Some staff members may be reluctant to change sites and may leave	• Staff retention affected • Loss of knowledge and expertise • Increased short term recruitment needs	• HR business rep support early on • Effective communication and ongoing Input from staff during and following integration process	6
A small number of patients will need transferring from AUH ED to the new RLH but so will patients from other specialties which may put pressure on NWAS and lead to delays	• Some patients may have delays in transfer • Impact on ambulances and patient experience to be considered • Consideration of bed management • This model is operated successfully in many other cities	• Clear criteria for referral and transfer • Availability of Urology staff daily at AUH with the aim to treat and stabilise patients and discharge or be transferred	6
Failure to get sufficient beds or theatre time reducing capacity	• Estate is tight across the organisation • Demand for Urological services is expected to increase in coming years • Lengths of stay are already quite low in Urology • Many procedures have already been moved from theatre • Some evening sessions are already utilised in theatre	• Focused efforts to improve theatre productivity • Penoscrotal day case surgery to go to AUH • Improving day-case TURBT rates and increased hot lithotripsy and hot stone lists will improve efficiency • Increased evening and weekend working as needed • Increasing ambulatory care of non-elective patients	6
Failure to obtain suitable outpatient facilities in AUH or new RLH	• Unsuitable outpatient facilities reduces productivity and diminishes patient experience • Retaining current outpatient	• The importance of appropriate outpatient facilities needs prioritisation keeping in mind the over-view of the integrated	9

Risk	Impact	Mitigations	RAG Rating / Score (with mitigation)
	facilities reduces continuity of care, efficiency, increases patient and staff travel and makes increased subspecialty input to emergencies difficult as staff are on 3 sites	Urological service	
Public consultation outcome not supportive of service relocating to AUH	• Inability to proceed with proposed clinical model. Service would have to remain at current RLH site and move to the New RLH • Inability to address current clinical/operational service challenges/risks and sustainability of service • LiVES would be unable to deliver the service required to meet the demand • RTT times would remain an issue and LiVES would continue to fail to meet some of its targets and remain in special measures with Commissioners • This would be detrimental to patients outcomes and experience • This would also significantly impact on the operational planning for the New hospital	• A robust business case developed emphasising the rationale for change and benefits of relocating LiVES to AUH • Develop a robust stakeholder engagement approach and supporting communications plan to help communicate public understanding for the case for change and benefits of the proposed clinical service model • Patient engagement will be undertaken and affected groups invited to contribute to plans	6
Delayed Timescales to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the New hospital opening. • Again, this would lead to multiple service moves in addition to equipment requirements for the New hospital and other key estate considerations.	• Regular engagement and meetings with commissioners to track progress • Proposed timeline drafted and shared with commissioners incorporating contingency to allow for potential delay	9

8.5.4 Breast Services

Risk	Risk Description	Mitigations	RAG Score (with mitigation)
Public consultation outcome not supportive of service reconfiguration	• Inability to proceed with proposed clinical model. The surgical element of the service would have to remain at two sites • Inability to address current clinical/operational service challenges/risks and sustainability of service. • This would impact on patient outcomes and experience	• A robust business case developed emphasising the rationale for change and benefits of centralising the service to new RLH site. • Develop a robust stakeholder engagement approach and supporting communications plan to help communicate public understanding for the case for change and benefits of the proposed clinical service model. • Patient engagement will be undertaken and affected groups invited to contribute to plans.	6
Delayed timescales due to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the new hospital opening. • This would lead to multiple service moves in addition to potential key estate considerations required.	• Regular engagement and meetings with commissioners to track progress • Proposed timeline drafted and shared with commissioners incorporating contingency to allow for potential delay	9
Some staff members may be reluctant to change sites and may leave	• Staff reluctant to move site may affect retention • This may lead to loss of knowledge and expertise and increase short term recruitment needs	• HR business partners and OD support early on. • Effective staff communication and engagement ongoing. Input from staff during and following integration process.	6

8.5.5 Nephrology

Risk	Risk Description	Mitigations	RAG Score (with mitigation)
Recruitment to deliver safe services within the delivery timeframe.	• Shortfall of nursing establishment principally related to the increased demands of single room nursing. This may lead to short term staffing requirement and cost implications from temporary staffing from agencies to cover shortfall • Deficit of 9 PAs to complete the spoke model	• A recruitment drive will be needed to fill the gap. • Training opportunities can be reviewed. • 9 PAs agreed within division in March 2021.	6
Some staff members may be reluctant to change sites and may leave	• Staff reluctant to move site may affect retention • This may lead to loss of knowledge and expertise and increase short term recruitment needs	• HR business partners and OD support early on. • Effective staff communication and engagement ongoing. Input from staff during and following integration process.	6
Inability to move Junior doctors across sites due to HEE allocations	• Health Education England (HEE) does not recognise LUHFT as a merged organisation in relation to how junior doctors are allocated. As such, junior doctors continue to be aligned to legacy Trust sites. This impacts on the ability of junior doctors to work across sites and ability to align junior doctors based on needs of service and how the service is configured. This may impact on services and the education and development of junior doctors within Nephrology for the proposed model, when services are mainly delivered at the RL site.	• LUHFT Associate Medical Directors for Medical Education currently liaising with HEE and training programme directors to change current system to enable flexibility of junior doctors to work across sites aligned to where services are provided and ensure educational needs are met.	6
General Internal Medicine bed base at Aintree site	• A bed base at the Aintree site, which may expand during periods of increased demand, will require an extra Consultant to be on site at Aintree each day. This will impact outpatient capacity, and fragment the resources in the team, thereby impacting many of the intended gains from this model. • A bed base at the Aintree site, which may expand during periods of increased demand, will require an extra Consultant to be on site at Aintree each day. This will impact outpatient capacity, and fragment the resources in the team, thereby impacting many of the intended gains from this model.	• The impact of contributing to GIM activity at the Royal Liverpool site would have a less destabilising model.	6

Risk	Risk Description	Mitigations	RAG Score (with mitigation)
Out of Hours cover at both sites	• With the existing staffing numbers it will not be possible to provide resident out of hours cover at both sites.	• There will be robust resident cover at the Royal Liverpool site, with telephone advice at the Aintree site out of hours, augmented by a daily Consultant presence 7 days per week.	6
Additional pressure on RLH ED department	• All patients on dialysis will be conveyed directly to RLH AED by NWAS (unless another condition eg STEMI, trauma or stroke takes priority).	• As the hub unit is at the Royal site, these patients will have their life-sustaining dialysis therapy, while other needs are met. The demand for inter-hospital transfer will be reduced, and timeliness of safe care improved.	6
Acute dialysis unit at Aintree site located on Ward 14, supporting increased dialysis demand in future.	• Bed modelling for interdependent services i.e. orthopaedics, vascular surgery and impact on ward 14 will take place as part of integration planning.	• Acute dialysis unit at Aintree site located on Ward 14, supporting increased dialysis demand in future.	6
No SLAs in place and current issues with repatriation across DGH's.	• Without timely repatriation of patients needing rehabilitation or social care, access to patients needing tertiary care in the region will be effected.	• SLAs are being discussed with spoke hospital sites to agree timely repatriation after acute renal issues are addressed.	6
Aintree satellite dialysis unit & Waterloo satellite estate are not fit for purpose and impacts the quality of service.	• Aintree and waterloo satellite dialysis unit estate do not comply with Renal Association IPC standard & lacks side rooms/isolation facility. The estate in these two units is not suitable for patients with high dependency. Furthermore, both unit estates do not comply with DOH best practice guidance detailed in Health Building Notes.	• Trust has agreed to explore options for a new purpose built redesigned combined Aintree & Waterloo dialysis Unit. This combined new unit will be based at Aintree Hospital site & currently a scoping exercise is being undertaken with LUHFT estate team for this new unit to be built and part managed by private providers.	6
Public consultation outcome not supportive of service reconfiguration	• Inability to proceed with proposed clinical model. Service would have to remain at two sites • Inability to address current clinical/operational service challenges/risks and sustainability of service. • This would be detrimental to patients outcomes and experience	• A robust business case developed emphasising the rationale for change and benefits of centralising service to RL site. • Develop a robust stakeholder engagement approach and supporting communications plan to help communicate public understanding for the case for change and benefits of the proposed clinical	6

Risk	Risk Description	Mitigations	RAG Score (with mitigation)
		service model. • Patient engagement will be undertaken and affected groups invited to contribute to plans.	
Delayed Timescales to NHSEI Assurance Process /Consultation	• A delay in the NHSEI Assurance process would impact on the ability to implement the proposed model and potentially the ability to proceed with the service move in line with the timescales of the new hospital opening. • This would lead to multiple service moves in addition to potential key estate considerations required.	• Regular engagement and meetings with commissioners to track progress • Proposed timeline drafted and shared with commissioners incorporating contingency to allow for potential delay	9

8.6 Stakeholder sign-off

Stakeholder review and feedback has been essential in the development of the proposed service model and understanding of the key assumptions, interdependencies and associated implications. This includes a clinically led confirm and challenge process at divisional and trust wide level to review the proposed clinical models for each specialty, gaining assurance that the plans:

- Cover the right scope,
- Improve or maintain quality service delivery and maximise opportunities for patient and organisational benefits
- Identify and mitigate risks
- Ensure plans are deliverable.

Divisional leads have been fully sighted on plans, and wider audiences receive highlight reports monthly. This will continue as part of the planning and implementation process (subject to approval of the proposed clinical model and service changes).

Clinical Strategy Group

Whilst the preferred clinical models for General Surgery and Nephrology had already been presented and agreed at multiple forums during the merger business case process in 2018/19, all proposed clinical models for each of the five clinical services included in this document, were again presented, reviewed and discussed at the Clinical Strategy Group (CSG) meetings between January and July 2021.

The CSG meetings agreed on the preferred options for the proposed clinical models and recommended that the preferred models be supported and presented for final approval by the executive team.

Executive Review and Approval

The proposed clinical service models and supporting business cases were submitted for review /approval to the executive team following sign-off by each respective Deputy. The purpose of the process involving sign-off by the Deputies was to:

- To review the proposed reconfigured clinical models
- To understand the implications of the proposed service models costs and benefits (financial and non-financial)
- To give the opportunity to query or challenge some of the assumptions of the proposed model

The business cases were subsequently presented for approval by the executive team on July 27th with a follow up session held on September 21st. The purpose of the session with the Executives was to make a decision on each business case:

- To proceed with the proposed future service reconfiguration and associated financial resources required.
- If approved, agree implementation timescales (taking into account new hospital timescales, financial resources, etc.)
- To agree proposed interim models in support of the new hospital timescales.

8.7 Equality Impact Assessments (EIA) and Quality Impact Assessments (QIA)

A quality and equality impact assessment has been undertaken for each of the proposed clinical models.

Equality and quality impact assessments have been an integral part of the business case development process. Each business case has been developed around a clinically led model of care that is focussed on achieving improvements in individual patient outcomes and wider clinical sustainability.

The equality and quality impact assessments are a culmination of a clinically led and operationally managed approach through multidisciplinary project teams. This multidisciplinary approach ensures that any potential impact on patients, their visitors and our staff, are identified, assessed to ensure plans are put in place to manage these accordingly.

Following completion of the EIA and QIA by the respective project team, a clinical peer assessment led by the Associate Medical Director for Integration has been completed. This provides assurance that a consistent approach has been applied to each proposed service reconfiguration and ensures that any potential impacts are identified, assessed and managed appropriately.

The EIA and QIAs, including associated agreed action plans, are live documents which will continue to be reviewed and assessed throughout the approval, implementation and evaluation stages of the Integration Programme. Through the public consultation process, we will test our assumptions and ensure that the plans developed that meet the needs of local people.

8.7.1 Equality Impact Assessment (EIA)

The purpose of this assessment is to explore the potential positive and negative consequences of the proposal on protected characteristic groups.

The whole purpose of the clinical reconfiguration of services is to improve outcomes and access to specialist care for people. The EIA assessment for each scheme demonstrates that the improved access is for all people including those with protected characteristics. The assessments have evidenced that the impact is neutral.

The EIA was undertaken for each scheme and are included in the appendices (Management Case appendix 2.1 to 2.5).

8.7.2 Quality Impact Assessment

A Quality Impact Assessment was undertaken for each scheme, and are included in the appendices (Management Case appendix 3.1 to 3.5).

The assessment consistently demonstrates that the preferred option for each scheme will have the positive impacts on patient care categories.

Appendices

Appendices

Chapter	Appendix Reference and Description
2. General Surgery	1. Options Appraisal detailed scoring
3. Vascular	1. Current workforce structure charts 1 and 2 2. Current theatre timetables 3. Current Consultant clinic timetables 4. Current VNS/CLI clinic timetables 5. Clinical Pathways 6. Options Appraisal Scoring 7. Paper on proposed clinical model and Permanent Estate Solution Options presented to TMG 8. Research & Innovation document
4. Urology	1. External Interviews 2. Staff engagement session outputs 3. Options appraisal Scoring
5. Breast Services	1. Workforce Breakdown 2. Options appraisal scoring
6. Nephrology	1. Workforce breakdown 2. Research Strategy on a page 3. Clinical Health Psychology 4. First Time Dialysis pathway 5. Options Appraisal scoring
8. Management Case	1. Benefits Realisation Plans <u>Equality Impact Assessment</u> 2.1 General Surgery EIA 2.2 Vascular EIA 2.3 Urology EIA 2.4 Breast Services EIA 2.5 Nephrology EIA <u>Quality Impact Assessment</u> 3.1 General Surgery EIA 3.2 Vascular EIA 3.3 Urology EIA 3.4 Breast Services EIA 3.5 Nephrology EIA