Saolta University Health Care Group

An Options Appraisal for Saolta Model 4 Hospital Services in Galway

KPMG

August 2019

Glossary

ABP	An Bord Pleanala
AGV	Automated Guided Vehicles
AHP	Allied Health Professional
ALOS	Average Length of Stay
BCR	Benefit-Cost Ratio
BTE	Blood and Tissue Establishment
CAF	Common Appraisal Framework (DTTAS)
CBA	Cost Benefit Analysis
CCU	Coronary Care Unit
CDP	Competitive Dialogue Procedure
CEEU	Central Expenditure Evaluation Unit
CNU	Community Nursing Unit
CPE	Carbapenemase-Producing Enterobacteriaceae
CPN	Competitive Procedure with Negotiation
CRF	Clinical Research Facility
CSO	Central Statistics Office
CSSD	Central Sterile Processing Department
CTICU	Cardiothoracic Intensive Care Unit
D&B	Design and Build
DBFM	Design, Build, Finance and Maintain
DBFOM	Design, Build, Finance, Operate and Maintain
DC	Daycases
DCP	Development Control Plan
DoH	Department of Health
DOSA	Day of Surgery Admission
DRG	Diagnosis-Related group
DTTAS	Department of Transport, Tourism and Sport
ECI	Early Contractor Involvement
ED	Emergency Department
EIB	European Investment Bank
EL	Elective Admission
EOI	Expression of Interest
ES	Emergency Procedures
ESA	European System of Accounts
ESFI	European Fund for Strategic Investment
ETT	Exercise Tolerance Test
GCC	Galway City Council
GDV	Gross Development Value
GP	General Practitioner
GUH	Galway University Hospitals (UHG & MPUH)
HBN	Health Building Note
HDU	High Dependency Unit
HIQA	Health Information and Quality Authority
HPRA	Health Products Regulatory Authority
HSCP	Health and Social Care Professions
ICD	Internal Cardiac Defibrillator
ICD	Implantable Cardioverter-Defibrillator
ICT	Informational Communications Technology
ICU	Intensive Care Unit
IP	In Patient
IMLS	Integrated Medical Laboratory Services

ISIF	Ireland Strategic Investment Fund
JV	Joint Venture
LDA	Land Development Agency
LTC	Loan-to-Cost ratio
LUH	Letterkenny University Hospital
MC	Managing Contractor
MDT	Multi-Disciplinary Teams
MGDD	Manual on Government Deficit and Debt
MPUH	Merlin Park University Hospital
MRSA	Methicillin-Resistant Staphylococcus Aureus
MUH	Mercy University Hospital
NCCP	National Cancer Control Programme
NCP	New Communities Partnership
NDFA	National Development Finance Agency
NDP	National Development Plan
NEL	Non-Elective Admission
NOP	Non-Owner Participants
NPHDB	National Paediatric Hospital Development Board
NPRO	National Plan for Radiation Oncology
NPV	Net Present Value
OJEU	Official Journal of the European Union
OPD	Out Patient Department
OPRAH	Older People Remaining At Home
PAA	Project Alliance Agreement
PACU	Post-Anaesthesia Care Unit
PET Scan	Positron Emission Tomography (PET) Scan
PF4EE	Private Finance for Energy Efficiency
PFI	Private Finance Initiative
PNFC	Public Non-Financial Corporation
PPP	Public-Private Partnership
PSC	Public Spending Code
RFP	Request for Involvement
SACT	Systemic Anticancer Therapy
SPV	Special Purpose Vehicle
SQM	Square Metres
SRACC	Specialist Rehabilitation and Ambulatory Care Centre
SUH	Sligo University Hospital
TII	Transport Infrastructure Ireland
TOC	Target Outrun Cost
UHG	University Hospital Galway
URDF	Urban Regeneration and Development Fund
VfM	Value for Money Code
WL	Waiting List
WTE	Whole Time Equivalent

Definitions

Definitions	
Accelerated Development	A development timeframe of 12 years, which includes six years before and after the commencement of construction.
Detailed Business Case	The deliverable for the Planning stage of Project Appraisal and Management Process as per the PSC
ED	Emergency Department
Incremental Development	A development timeframe of 20 years, which includes 10 years before and after the commencement of construction.
Elective Hospital	Hospital which focuses on the provision of planned care.
Model 4 Hospital	Hospitals which provide 24/7 acute surgery, acute medicine, critical care, tertiary care and, in certain locations, supra-regional care.
Operating Period	A 30 year operating period has been assumed for all options.
NPRO	National Programme for Radiation Oncology
Preliminary Business Case	This Report
Project	A new model 4 tertiary hospital, located in Galway, for the West and North West region.
Project Team	KPMG Ireland, KPMG Netherlands, Scott Tallon Walker, AECOM and MJ Medical
Region	West/Northwest of Ireland including Donegal, Galway, Mayo, Roscommon, Sligo and Leitrim
Report	Options Appraisal for an Acute Hospital in Galway offering tertiary and secondary care Services to the West and, North West region and secondary care services for Galway.
Saolta Group	Saolta University Health Care Group
Steering Group	The Steering Group includes clinical staff and members from the Saolta management team. Members listed in Appendix A.8

Contents

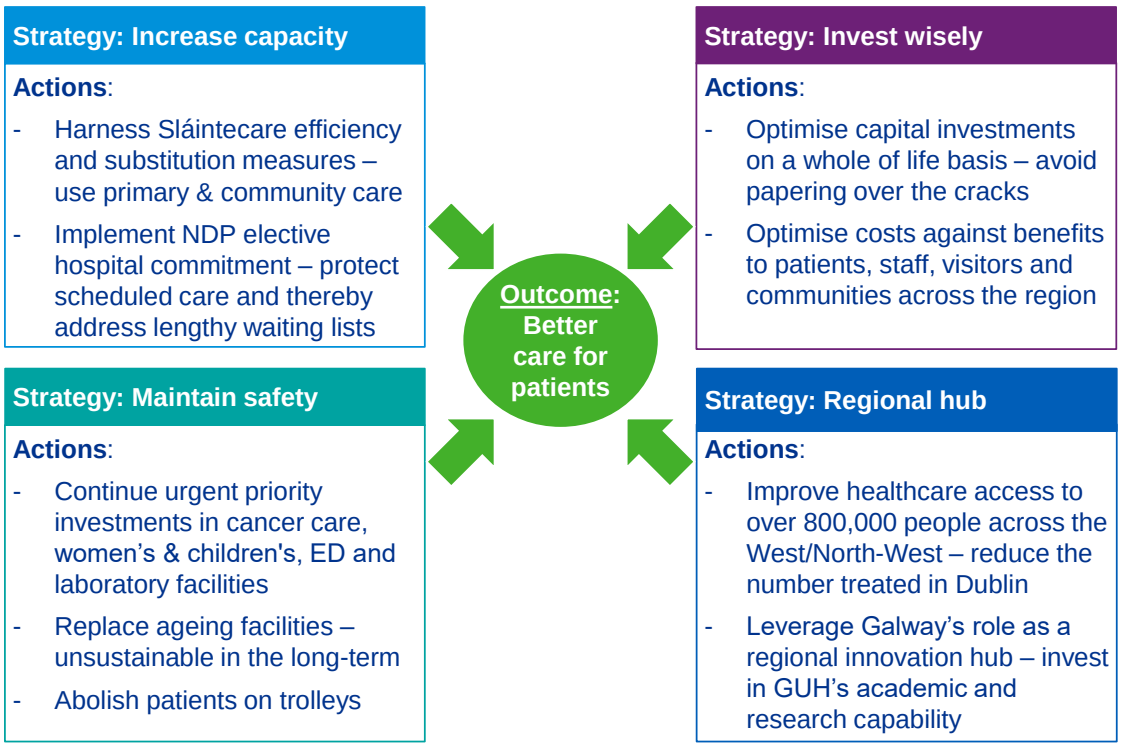
1 Executive Summary

1.1 Report purpose

The purpose of this report is to develop an overall plan of the high level infrastructure requirements for a new Saolta Model 4 hospital in Galway that will have the capacity to provide high quality, timely, patient focused care for the dual roles of secondary and tertiary care services.

The report aims to ensure that the Region has a model 4 hospital that meets best practice standards both now and into the future to enable delivery of the best possible outcomes for patients, as illustrated below:

Figure ES1 Integrated Care Strategy



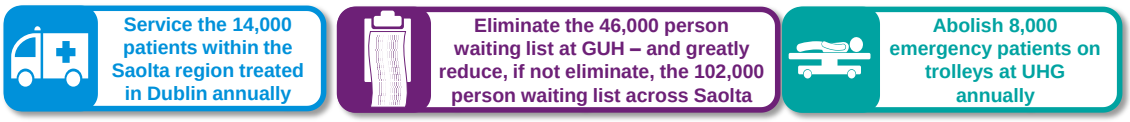
This study was made up of a number of workstreams, each of which considered a separate aspect of the future of healthcare for the Region. These included:

1 *Demand & Capacity Analysis*
2 *Current Infrastructure & Review of Developments*
3 *Options Identification & Appraisal*
4 *Service Upgrades*
5 *Funding Options*
6 *Extended Scope*

For more information on each workstream, please see Section 2.3 of the main report.

1.2 The Case for Change

Saolta is responsible for the care of over 800,000 people across the West/North-West of Ireland. It is currently unable to meet demand. Saolta requires a transformation strategy that – at a minimum – aims to:



A study carried out into the existing infrastructure showed that 64% and 95% of the infrastructure in UHG and MPUH (respectively) is 'not satisfactory/unacceptable' for its current function. Although configuring low risk care in lower standard areas of the estate has maintained the hospitals operationally while minimising risk, it is evident that existing facilities are not sufficient to provide long-term sustainability to GUH. Although Saolta continues to make substantial progress in improving its operational efficiency, such measures are unlikely to fully bridge its current demand capacity gap now or in the near future. By 2031:

Saolta will face increases of 45% and 71% in the 65-84 and over 85 years old age ranges. Even with the full implementation of Sláintecare efficiency and substitution measures, the demand capacity gap will grow to a shortfall of 276 beds at GUH alone.

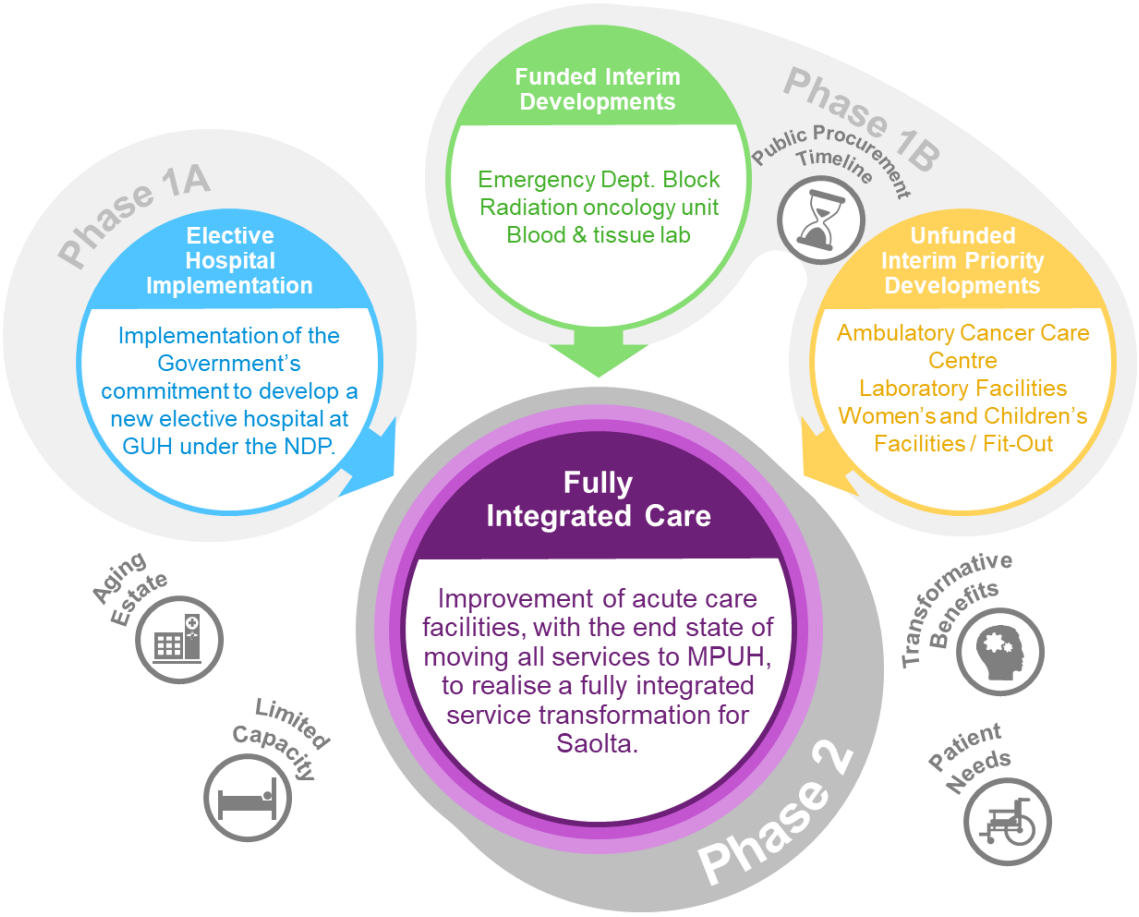
Without substantial capital investment in the near future, Saolta will face significant service delivery challenges at GUH – its largest hospital and one of the busiest in Ireland.

The case for change is, therefore, self-evident. Do nothing is not an option.

Even with ambitious efficiency targets and significant support from primary care assumptions with patient care models, significant growth is forecast for GUH between now and 2031. In order to cater for this increased demand, consideration must be given to the infrastructure required to provide the best possible outcomes for patients.

The report addresses the following three key phases of the proposed transformation strategy to address the above challenges.

Figure ES2 Recommended Next Steps



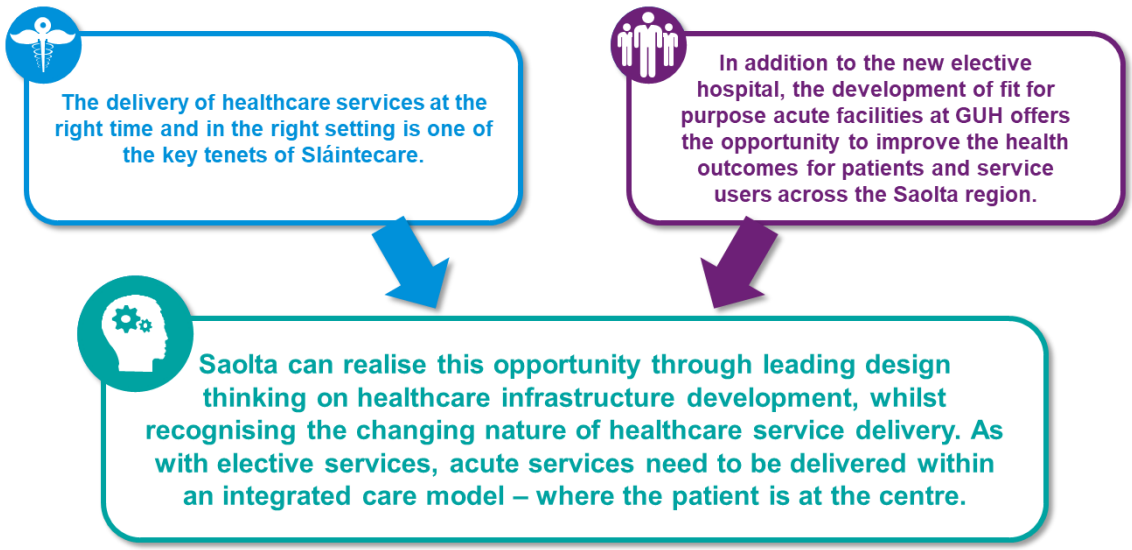
Given the long lead time required to deliver major infrastructure projects of this scale, planning for replacement of these facilities is required now. Even if planning commenced now, investment in critically deficient facilities will be required in the interim. As such, Phases 1A and 1B should continue concurrently, whilst planning for Phase 2 should commence now.

1.3 Fully integrated care: End-state of moving all services to MPUH

1.3.1 Vision for Integrated Care

The broader vision for providing care to the Saolta Region is demonstrated in Figure ES2 below, integrating both acute and elective care.

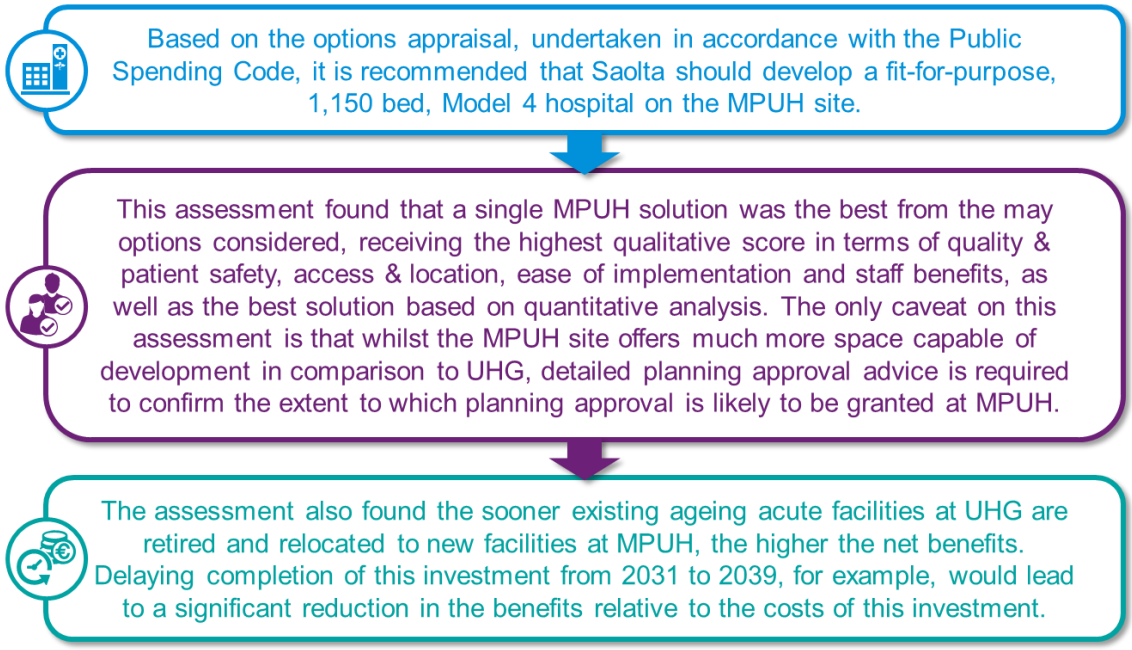
Figure ES3 Vision for the Saolta Region



The vision for new model 4 hospital capacity in Galway is fundamental to the efficient patient flow and regional access from other Saolta Hospitals. However, this investment at GUH should in no way be seen as replacing or in any way limiting the urgent need for investment in Saolta's other regional model 3 and model 2 hospitals.

In order to consider and compare the various ways to achieve this vision, an options appraisal was undertaken which led to the selection of the Preferred Option.

Figure ES4: The Preferred Option



The new build would address the demand capacity shortfall, if delivered by 2031 (i.e. in line with the demand forecasts, which are to 2031). The sooner the facilities are delivered, the greater the benefits relative to the costs of investment.

1.3.2 Service Delivery Benefits for Fully Integrated Care

Locating all acute services on one site, rather than splitting acute services across multiple sites, has a number of benefits:

Enhanced Patient Experience: Their continuity of care is seamless as opposed to having to attend multiple sites over the course of their episode of care and associated follow-ups.

Increased Economies of Scale: Clinical support and non-clinical support services (such as laboratories, diagnostic imaging, decontamination services and patient catering etc) will not be required across multiple sites and as a result, consolidated services can be provided in the single site at a larger scale that offers the potential to realise economies and savings.

Rationalised Staffing Numbers: Depending on the split of specialties across sites, additional staffing will be required to support services delivered at multiple sites.

Improved Operational Efficiencies: The disruption caused and associated travel time for moving between sites is a cost to service delivery.

Easier Innovation and Collaboration: Consolidating specialist services and staff on one site presents the greater opportunity for collaboration and innovation both within specialties and also on a multi-disciplinary basis.

More Effective Governance: Operating a Model 4 hospital over two sites would require enhanced governance at the day-to-day operational and a strategic governance levels.

1.4 NDP Implementation: Regional Elective Hospital at MPUH

Given the long timeframe required to deliver the end-state of providing all services at MPUH, it is important to consider ways in which this could be phased so as to release some of the benefits early while also reducing any risk to the provision of healthcare services in the West and North-West of Ireland.

Under the NDP, the Government has committed to the delivery of new dedicated elective-only hospitals in Galway, Cork and Dublin.

The NDP describes these elective hospitals as providing high volume, low complexity procedures on a day and outpatient basis. It indicates that a key principle underpinning these initiatives is the need to achieve greater separation between scheduled and unscheduled care, so that the system can respond better to emergency needs without adding to waiting lists for elective procedures.

The NDP commitment aims to increase capacity in the hospital system by separating scheduled and unscheduled care, consistent with the recommendations of the 2017 Sláintecare Report and the 2018 Health Service Capacity Review. Indeed, the Sláintecare Report specifically identified the need – in the short term – to designate certain hospitals within hospital groups as elective, in order to manage waiting lists for elective care.

1.4.1 Harnessing Sláintecare efficiency gains

Sláintecare is a vision for the delivery of integrated care, whereby people receive as much care as is appropriate at the lowest level of complexity in the community, rather than in hospitals. This approach aims to improve care, health and cost. This is consistent with the Saolta Strategy 2019-2023, which specifies that the provision of fully integrated care will require further significant realignment to ensure that there is clarity of responsibility, accountability and authority for all aspects of the care pathway between home, community and hospital and back, with hospital avoidance being the overriding priority, where possible.

Sláintecare recommends an integrated, single-tier health system should be introduced across Ireland. Under this model, healthcare should be delivered at the lowest level of complexity possible with an emphasis being placed on primary and community care. This reorientation of healthcare from acute settings to the community aims to free up space in acute hospitals as an enabler to deliver the right care, at the right time, in the right place and improving the model of service delivery. This formed the basis of the efficiency assumptions when estimating the future capacity requirement. The approach will have real benefits for not only efficiency of service, but also – more importantly – patient care, through the clustering of multi-disciplinary services and clinical pathways.

Notwithstanding this re-orientation towards primary and community care, Sláintecare recognises the important ongoing role of major public hospitals, such as GUH. The target operating model – and the resultant capacity – for the new Elective Hospital in Galway for the West and North-West of Ireland represents full implementation of the efficiency and substitution measures identified in Sláintecare, as outlined below. The analysis in this report assumes that these efficiency and substitution measures will achieve a reduction in demand at GUH of approximately 27%, as outlined in Appendix A1.

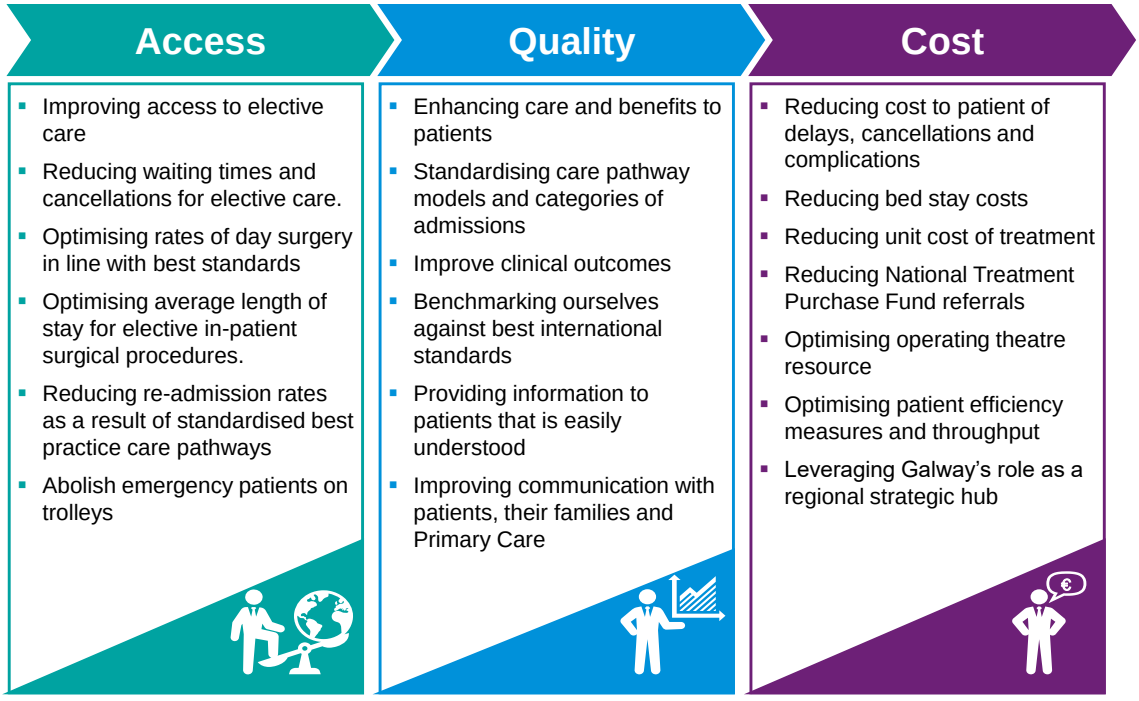
Table ES1 Sláintecare measures

Measure	Outcome
Efficiency	— Lower length of stay on average across all services — Less return visits for outpatients — Process improvements (i.e. theatre optimization and use of current infrastructure) and implementation of improved IT systems
Substitution	— Decrease in elderly inpatient and ED visits, due to increased primary and residential care — Chronic disease management partly at home — Shift some care to appropriate lower complexity care facilities — Decrease in ED visits, due to increased primary care

1.4.2 Service Objectives for the Elective Hospital

The ultimate aim for the national elective programme, outlined within The Model of Care for Elective Surgery report, is to improve the patient journey along the elective pathway by delivering on Access, Quality and Cost.

Figure ES5 Objectives for the elective hospital



As part of this programme, Saolta has produced a separate report which looks in more detail at the options available to delivering against these objectives, covering key aspects such as:

— Providing a high-level service delivery model for the integration of the proposed Elective Hospital on MPUH site with services on UHG.

— Determining the indicative floor space required and the estimated costs.

— Identifying the appropriate locations on the MPUH site for the Elective Hospital.

— Outlining next steps for the process, approvals and documents (tender, design, accommodation etc.) required to deliver the Elective Hospital.

For more information on this programme, please see the *"Regional Elective Hospital Scoping Study"* report.

1.4.3 Service Delivery Benefits for the Elective Hospital

Consistent with the objectives outlined in the NDP, an elective hospital in Galway has the potential to transform the capacity of not just elective care at GUH, but also the regional capacity of Saolta Group as a whole, including acute / specialist care delivery.

National plans for the future of elective surgery care are well developed, though direction for elective medical care and outpatients is less advanced. As such, this report has used the guidance already available to estimate the requirement for the elective facility, though this will need to be revisited as part of the Detailed Business Case as the national programme is developed. The proposed Elective Hospital will cater for not just surgical treatments, but also elective medical and outpatient care.

Key target benefits of the Elective Hospital include:

Eliminate GUH's c. 46,000 person waiting list – By segregating GUH's elective care capacity, all elective care would be scheduled. This would significantly increase GUH's efficiency, due to higher productivity and throughput, as well as reduce waste from cancellations. As a regional hub, the elective hospital will also greatly reduce, if not eliminate, the c. 102,000 person waiting list across Saolta.

Improvements in the health of over 800,000 people across the West / North-West of Ireland – The Elective Hospital would service patients from across Saolta's catchment area, not just in Galway. As the Elective Hospital is one of the three new proposed facilities in Ireland as per Project 2040 (others are Dublin and Cork), it is likely that GUH will have a broader catchment area in the future.

Enhancements to patient experience and outcomes – The Elective Hospital would:

- provide the 14,000 patients each year who travel to Dublin from the Saolta region with treatment options that are closer to home (with limited exceptions, such as neurosurgery)
- implement best practice services and facilities (including single patient rooms).

Enhancing Galway as an innovation hub and regional population centre – by improving Saolta's academic and research capabilities.

Improved staff recruitment and retention – by providing improved work and training facilities.

1.5 Interim Priority Developments

Even with a long term plan to invest in new elective and acute facilities at MPUH, there are a number of deficient facilities at UHG that require urgent upgrading to ensure continuity of the delivery of existing services. For example, the existing medical oncology and haematology day ward, outpatient suites and rapid access clinics are in urgent need of replacement. These Interim Priority Developments are required to alleviate some of the deficient areas and also give Saolta some flexibility in decanting the existing site.

A number of these projects have been developing over a number of years and are in the advanced stages of approval and implementation. In reviewing the scope of each project, we identified the need for additional investments in order to remediate a number of additional deficiencies, including:

Facility	Rationale
Pathology facilities	New laboratory facilities are required to ensure certain lab facilities retain their accreditation status and replace old prefabricated buildings.
Ambulatory Cancer Care Centre	Provide new rapid access clinics, day and outpatient wards and offices for the Multi-Disciplinary cancer team to ensure compliance with NCCP standards. Current facilities are overcrowded (either prefabricated or built in 1950s).
Women's and children's Facilities	To be developed as part of the existing project for a new emergency department at UHG
Other	Critical upgrades required for water and electricity infrastructure.

It is important that these projects continue to progress and are implemented as soon as possible – in order to ensure continuity of service delivery. The estimated investment required is summarised below:

Interim Priority Developments Capital Costs

Critical Interim Development	Capital Cost
Projects in the planning or procurement approval process	**Nominal (incl. VAT)**
ED Block including Women & Children's fit out and repurposing existing maternity facilities	€279m
NPRO – Radiation Oncology	€72m
Blood and Tissue Lab	€16m
Projects not yet in the planning or procurement approval process	
Pathology	€68m
Cancer ambulatory care	€51m
Miscellaneous infrastructure measures	€40m

Source: AECOM

The Project Team recommend the following:

- The BTE lab should proceed, noting that construction is expected to commence in 6-12 months;
- The NPRO (radiation oncology) building should proceed, noting that construction is expected to commence in the next 1-3 months;
- The ED block project including fit of Women's and Children's directorate and repurposing of existing maternity block, needs to progress to stage 2 of the Capital Works Management Framework. The build program for the ED block is expected to start on site in Q1 2022 and complete Q4 2024;
- Approval should be sought form the Department to progress to the Detailed Business Case stage in order to seek funding for the Elective Hospital;
- Development Control Plans should be prepared for both GUH sites; and
- The Interim Priority Developments and Elective Hospital plans need to be prioritised as strategic projects and the timeline for design and approval processes for these projects (see Section 14.2) should be accelerated as much as possible.

It is imperative that, in the process of delivering the Interim Priority Developments, the focus on long-term sustainability is not lost. Progressing the programmes in parallel can help to create efficiencies from both the delivery team, who will be able to consider both aspects together, as well as capital investment, where decisions for the Interim Priority Developments can be made with impact of the long-term plans in mind. This will help to deliver synergies and a joined-up view for the future clinical and estate strategy for GUH.

Given that a new acute hospital development is forecast to take at least 15 years to be delivered, and taking into account the results of the current functional suitability assessment, the current infrastructure cannot continue without substantial interim

investment. It is important that the interim developments proceed – in order to assist Saolta to manage risk and maintain service quality and safety for patients in the interim.

Furthermore, the interim enhancements at UHG are critical to the fully integrated strategy of moving to MPUH in the long term. The interim enhancements are required to enable the MPUH move (including by enabling future decanting of UHG). Overall, the interim enhancements and elective hospital represent a programmatic pragmatic phased approach to the realising the overall vision for MPUH.

As such, in order to deliver the single site solution at MPUH – a number of Interim Priority Development are required at UHG. Prior to the full move to MPUH, the two sites will require strong operational links and processes – maintaining patient safety will be paramount and further risk assessment will be required.

1.6 Next Steps

Support will be required from Government to progress with this programme. Next steps include:

1. Secure stakeholder support locally and nationally for the initiatives outlined in this report;
2. Provide additional funding now for the upgrades that are urgently required at the UHG site;
3. Proceed to next stage of project development process, which will require a detailed business case, development control plans for the UHG and MPUH sites (including reconfirming priority usage of MPH site for healthcare) and an analysis of the future clinical delivery model;
4. Prioritise the elective hospital to reduce the time required to deliver it;
5. Run the design and procurement process for the acute hospital in conjunction with the above;
6. Prepare to allocate funding for the elective hospital in 2-5 years; and
7. Prepare to allocate funding for the new acute hospital in 5-8 years.

2 Purpose of this Report

2.1 Scope

Consistent with Saolta's terms of reference, the scope of this study is as follows:

1. Develop an overall plan of the high level infrastructure requirements for a new Saolta Model 4 hospital in Galway that will have the capacity to provide high quality, timely, patient focused care for the dual roles of secondary and tertiary care services and that will address requirements for unscheduled, scheduled, cancer and maternity/paediatric care, including key enabling diagnostic and support functions. This should include consideration of where services are best located. This will involve:

    a) Reviewing the Saolta Group current clinical strategy;

    b) Undertaking a more comprehensive demand capacity analysis based on the existing demand;

    c) Capacity analysis and population demographics / likely requirements for the Region;

    d) Reviewing current and projected future activity / demand and annual financial implications;

    e) Impact of further changes in referral patterns/clinical care pathways for the Region;

    f) Incorporate likely impact of current and planned clinical programmes/HSE/DoH proposals including designation as a Trauma Unit; and

    g) Benchmark against best national and international practice.

2. Review current infrastructure on the UHG and MPUH sites in context of ability to meet demands.

3. Review developments currently in planning/design/development on the UHG and MPUH sites.

4. Appraise options for development of either a new hospital on the MPUH site, further twin development of both sites or redevelopment of the UHG site or any other potential feasible alternatives.

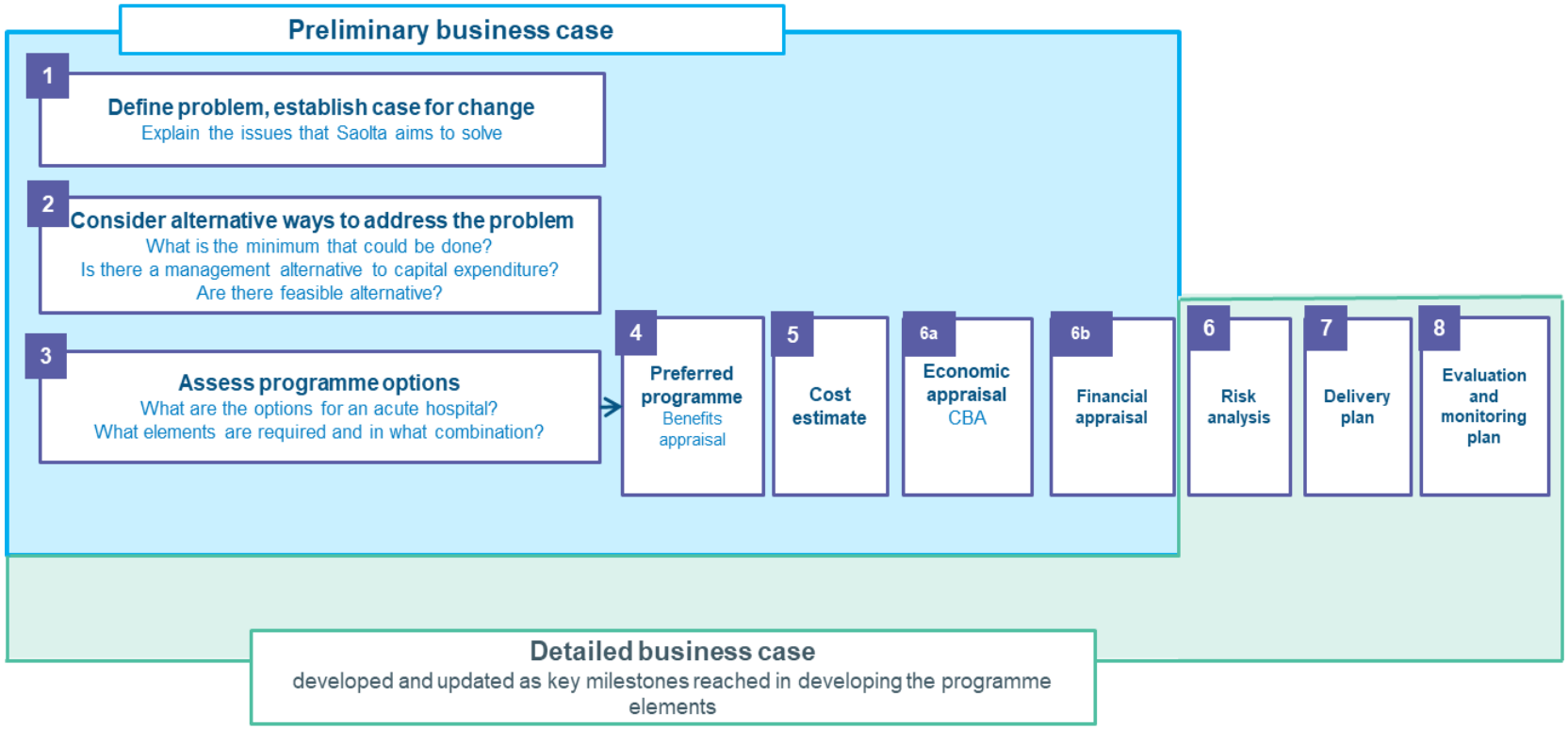
5. Provide options for the interim improvements of the deficient areas (including the ED in UHG) to improve patient safety and access for the duration of the development of the new hospital.

6. Provide an appraisal on potential funding options for such development.

7. Engage with key stakeholders both internally and externally as part of this process.

This Preliminary Business Case represents the scope in Figure 1 below. Subject to relevant approvals, Saolta will look progress the project by developing a Detailed Business Case.

Figure 1: Preliminary Business Case Overview

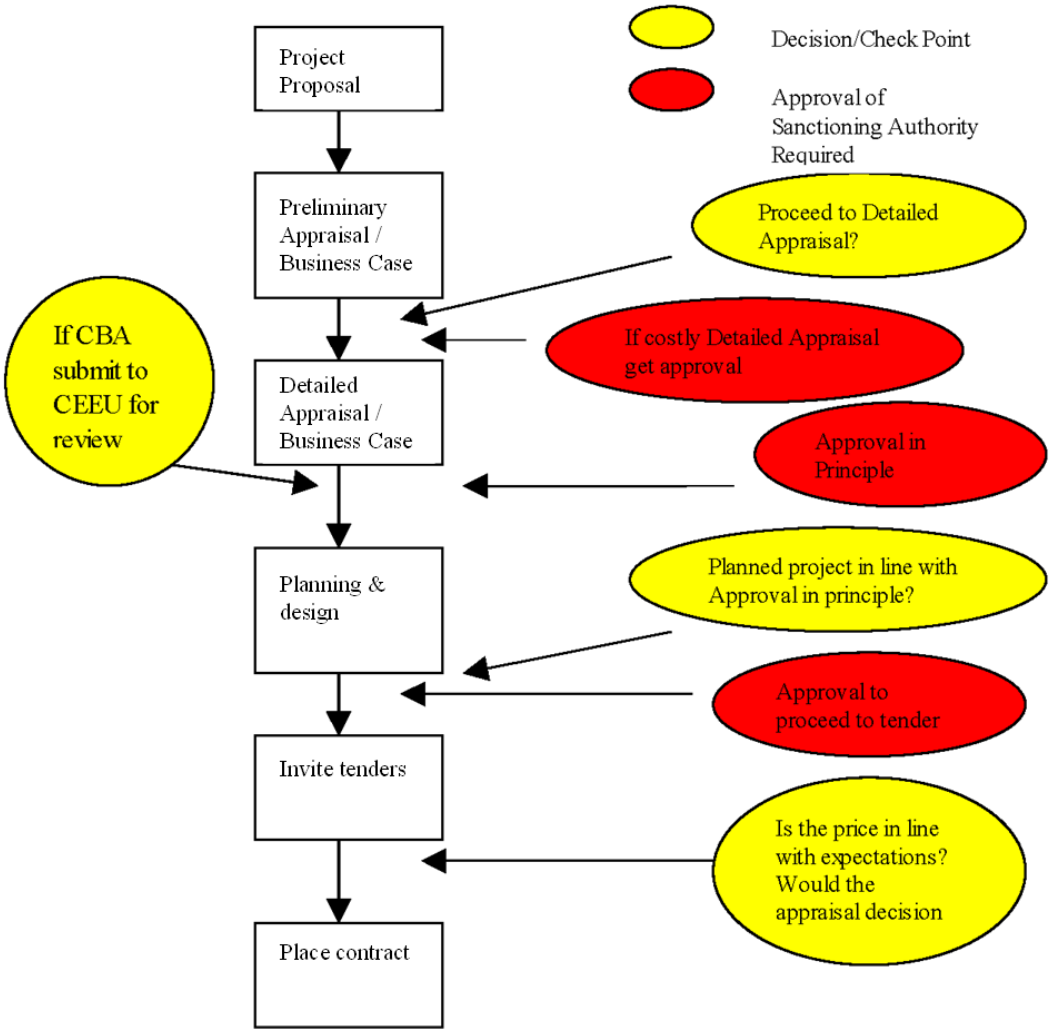


2.2 Methodology (Public Spending Code)

It is a requirement of The Central Expenditure Evaluation Unit in the Department of Public Expenditure and Reform that all capital expenditure proposals in excess of €20 million are subject to a CBA. As such, this report has been prepared in line with the Public Spending Code (PSC) Expenditure Planning, Appraisal & Evaluation in the Irish Public Service: Standard Rules & Procedures Document.

Figure 2 below outlines the Decision Points and Required Approvals that such proposals must follow.

Figure 2: PSC Decision Points and Required Approvals



Source: Public Spending Code

2.3 Process to date

The Project Team has worked together on the delivery of this Report, which has been subject to a rigorous process, comprising the completion of six different Workstreams that were all fundamental components in determining a Preferred Option.

Saolta created a Steering Group in order to oversee the development of the Preliminary Business Case for a new hospital development in Galway. The Steering Group includes Senior Management of the Saolta Group, Senior Clinical Staff, HSE Estates and GUH Management Team, a comprehensive list of the members can be found in Appendix A.8.

A brief overview of each Workstreams and the key activities included within each is outlined below.

Workstream 1: Demand & Capacity Analysis

KPMG Netherlands led Workstream 1 which included an assessment of GUH's current activity levels, both in terms of capacity and demand. An in-depth study was carried out to determine the projected future demand to 2031 and the resulting capacity requirements. The expected activity levels were determined after analysing demographic and epidemiologic trends, reviewing Saolta's strategy, national policy and incorporates the efficiency (e.g. lower length of stays) and substitution (shift to community care) gains which are expected to be realised through various policy changes and in particular, Sláintecare.

The Health Service Capacity Review suggests the current capacity nationally is extremely limited, with occupancy rates running close to 100%. For further details, refer to Section 3.3.2.

Workstreams 2 & 3: Current Infrastructure & Review of Developments

AECOM & STW led Workstreams 2 & 3 which involved a high level review of current & planned infrastructure on both GUH sites (UHG & MPUH). The infrastructure was classified according to function, location, condition and identified constraints that may affect any future developments on the sites.

Workstream 4: Options Identification and Appraisal

Workstreams 1-3 identified significant gaps between the existing demand and capacity level, along with a number of infrastructure deficiencies. With demand levels increasing, this gap will increase unless additional capacity is provided in GUH. KPMG Ireland led Workstream 4 and with the assistance from the Project Team, identified a number of options to address the both the capacity and infrastructure gap. A number of options were ruled out through consultation with the Steering Group and wider management team and a shortlist of options was agreed. Following this, the Project Team refined each of the shortlisted options to incorporate all of the service requirements.

A set of qualitative evaluation criteria was agreed and the Steering Group marked each option based on the scores applicable to the criteria. KPMG then prepared a financial model that compared each of the shortlisted options from a quantitative economic and financial appraisal perspective.

Workstream 5: Service Upgrades

Due to the length of time required to build a new hospital, Workstream 5 was incorporated in order to analyse what elements of the current infrastructure most immediately needed addressing, including those works currently in the planning/development phase and whether these works should proceed, taking the Preferred Option into consideration.

Workstream 6: Funding Options

The final Workstream then considered the affordability of the Project to Government and opportunities to enhance its affordability.

Workstream 7: Extended Scope

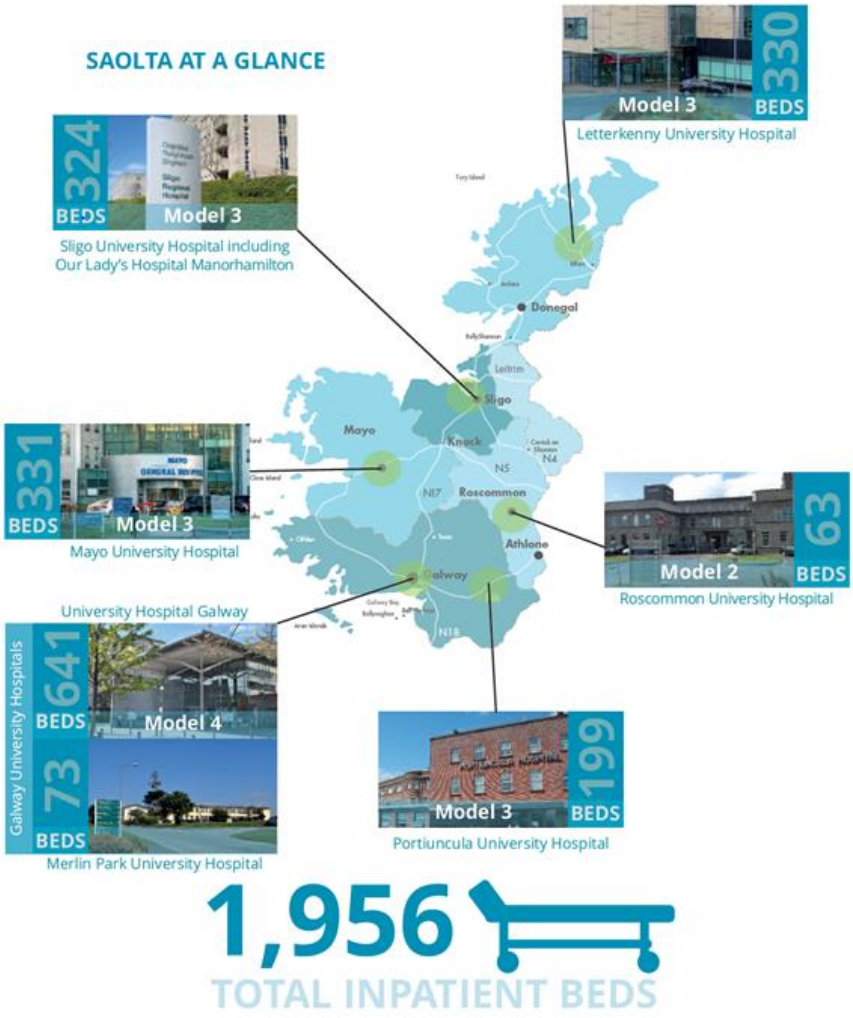
Following the submission of the Options Appraisal Report, Saolta requested the Project Team to provide a more detailed analysis on the Elective Hospital and identified additional Interim Priority Developments including laboratories, women's and children's and cancer care services.

3 The Case for Change

3.1 Background

GUH is one of six hospitals included in the Saolta Group serving the West/North West of Ireland. The combined bed numbers across GUH's two sites (UHG and MPUH) is 714[1], making it the largest hospital in the Saolta Group, holding 37% of the total bed capacity. Figure 3 shows the location and capacity of each hospital within the Saolta Group.

Figure 3: Saolta Group Overview



Source: Saolta University Health Care Group Operational Plan 2018

[1] Saolta University Health Care Group Operational Plan 2018

UHG, which was constructed in the 1950's is the only Model 4 hospital in the Saolta Group and provides secondary care to Galway City, county and surrounds (250,000 population) and tertiary care for the 800,000+ population across the Region. UHG is also a designated supra regional centre for cancer and cardiac services and houses the second busiest ED in Ireland[2].

MPUH is a Model 2 hospital that provides services that include: elective orthopaedic surgery, day-care, rehabilitation, a 5 day ward, outpatient activity and long-term elderly residential care units.

3.2 Key Challenges

Saolta has recognised the clinical need for a new acute/tertiary hospital in Galway to manage the growing healthcare needs of the Region. The suggested rationale behind the Project stems from capacity constraints, congestion, age and unsuitability of the existing infrastructure. GUH management including clinicians, have indicated that the current infrastructure is unsuitable to adhere to long-term requirements and is at risk of becoming non-compliant with regulatory requirements in the future. The Saolta Group has developed a medium/long-term strategic vision for acute hospital services for the Region, however they do not have a clear infrastructure plan for a model 4 tertiary hospital.

Some of the key challenges outlined by the Steering Group are set out below:

1. GUH is spread across two hospital sites (UHG and MPUH). UHG caters for all acute care and is extremely constrained as it is located in a congested city centre site while MPUH provides limited services and given the size of the site, is underutilised;

2. UHG is the one of the busiest hospitals in the country in terms of outpatients and daycases, treating over 256,000 outpatients and 86,000 day-cases in 2018[3] (second is Mater Hospital in Dublin which served 221,000 outpatients and 59,000 day-cases). It is also in the top three in terms of the number of patients seen within its Emergency Department (ED). Despite this, UHG has one of the greatest challenges in managing access for emergency and elective services due to a lack of capacity in the ED, ward blocks, theatres and other areas.

3. The MPUH campus consists of multiple, predominantly low-rise buildings dating from the early 1950s, with limited access for patients and staff;

4. The current ED at UHG, which is the second busiest ED in Ireland, is very limited in terms of size, layout and capacity. While the proposal to build a new ED on the UHG site is necessary, it does not address the overall capacity and infrastructure deficits throughout the rest of the hospital.

[2] HSE Service Level Agreement for the Provision of an Options Appraisal for Acute Hospital Services in Galway
[3] Acute Hospital Summary Statistics 2018 – BIU

3.3 National Programmes & Strategies

The OECD has found that: "Public funding for capital projects … fell considerably following the economic crisis, exacerbating capacity constraints."[4] The number of beds per 1,000 people in Ireland is 3.0, which is substantially below the OECD average 4.0[5]. In 2015, Ireland had the highest hospital bed occupancy rate (94.7%) when compared against other OECD countries[6]. The high occupancy rate creates a number of critical challenges including a large number of people on waiting lists for long periods of time. Waiting times have long been a major health policy concern and consecutive Irish governments have developed policies to try to address this issue over the past 25 years[7], including:

– Sláintecare

– Health Service Capacity Review

– National Cancer Strategy

– National Maternity Strategy

– Review of Trauma Services

– Plus other National Clinical Programmes.

3.3.1 Sláintecare

The 2017 Sláintecare policy outlines the Government's long-term vision and strategic plan to address the current issues within the Irish healthcare system. At present the Irish healthcare system is facing severe capacity constraints, lengthy waiting times, and an absence of equality at times due to patients being treated due to their ability to pay rather than health status and a lack of value for money being achieved across the system[8]. The objective of Sláintecare is to provide the triple aim of health systems by improving care, improving health and reducing costs.

The policy indicates that Ireland's growing and aging population will result in an increase in the number of patients who will require a complex set of clinical needs. In addition, there is a growing prevalence of chronic disease which is expected to grow by 29% by 2020[9].

Sláintecare recommends an integrated, single-tier health system should be introduced across Ireland. Under this model, healthcare should be delivered at the lowest level of complexity possible with an emphasis being placed on primary and community care. This reorientation of healthcare from acute settings to the community aims to free up space in acute hospitals as an

[4] OECD. 'State of health in the EU: Country Health Profile 2017 – Ireland', p. 7.
[5] OECD. Health at a glance 2017. OECD indicators. Paris: Organisation for Economic Co-operation and Development, 2017
[6] OECD. Health at a glance 2017. OECD indicators. Paris: Organisation for Economic Co-operation and Development, 2017
[7] State of Health in the EU Ireland Country Health Profile 2017
[8] Sláintecare Report May 2017
[9] Sláintecare Report May 2017

enabler to deliver the right care, at the right time, in the right place and improving the model of service delivery.

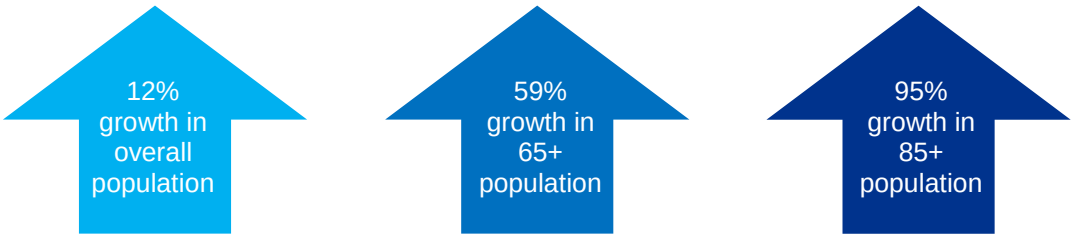
3.3.2 Health Service Capacity Review

The 2018 Health Service Capacity Review analyses the Irish healthcare system's current and future capacity constraints. The review suggests the current capacity is extremely limited, with occupancy rates running between 95% and 100%[10]. There are significant risks associated with patient safety and the spread of infection when a hospital is running at such high occupancy levels. This is far beyond industry norms and creates risk to the health and safety of patients and staff.

Ireland is also facing demographic challenges as the population is becoming older. In 2016, the 65+ age group accounted for 13% of the Irish population but accounted for approximately 40% of day case procedures[11] and 56% of bed-days used. It is estimated that 86% of people in the 65+ age category will be diagnosed with one or more chronic diseases[12]. Demand will increase as the population ages and therefore the level of capacity constraints will also increase, unless major reforms are introduced.

Figure 4 below illustrates the expected increases across selected demographics in Ireland between 2016 and 2031.

Figure 4: Anticipated population increase between 2016 and 2031



Source: Health Service Capacity Review 2018 Executive Report

Between 2011 and 2016, the number of people aged 65+ in Galway County increased by 18.5% and it now has an age dependency ratio of 23.1%, with its neighbouring counties Mayo and Leitrim having the highest ratios nationally of 28.3% and 27.4% respectively[13]. Consequently, the population across the Region collectively has one of the highest old age dependency ratios in Ireland.

When considering the future capacity (without reform), the number of additional acute beds required by 2031 is estimated below at 7,150[14].

[10] Health Service Capacity Review 2018 Executive Report
[11] Health Service Capacity Review 2018 Executive Report
[12] National Service Plan 2018
[13] https://www.cso.ie/en/releasesandpublications/ep/p-cp3oy/cp3/aad/
[14] Health Service Capacity Review 2018 Executive Report

Table 1: Summary of capacity requirements assuming no reform introduced[15]

Sector	Point of Delivery	2016	2031	Change	% Change
Acute Care	AMU Beds	430	590	160	37%
	Day Case Beds	2,140	3,140	1,000	47%
	IP Beds (85%*)	10,500	16,300	5,800	56%
	ACC Beds (80%*)	240	430	190	79%
	Total	**13,310**	**20,460**	**7,150**	**54%**

Source: KPMG Netherlands

However, the capacity review considered the impact of reforms outlined in the Sláintecare report, which are based around health and wellbeing initiatives, productivity measures, and an improved model of care that integrates a community-based care model into the Irish healthcare system. It found that the revised number of additional acute beds required in 2031 is only 2,590[16] as outlined in the table below.

Table 2: Summary of capacity requirements assuming reforms are introduced [17]

Sector	Point of Delivery	2016	2031	Change	% Change
Acute Care	Acute Medical Unit Beds	430	430	0	0%
	Day Case Beds	2,140	2,440	300	14%
	Inpatient Beds (85%*)	10,500	12,600	2,100	20%
	Adult Critical Care Beds (80%*)	240	430	190	79%
	Total	**13,310**	**15,900**	**2,590**	**19%**

Source: KPMG Netherlands

The methodology used in the completion of this Report is underpinned by the information and scenarios included in the Health Service Capacity Review. However, the Project Team believe the Health Service Capacity Review ambitious as it assumes that a number of reforms will be fully implemented by 2031. As such, this Report assumes a slower level of implementation of reforms.

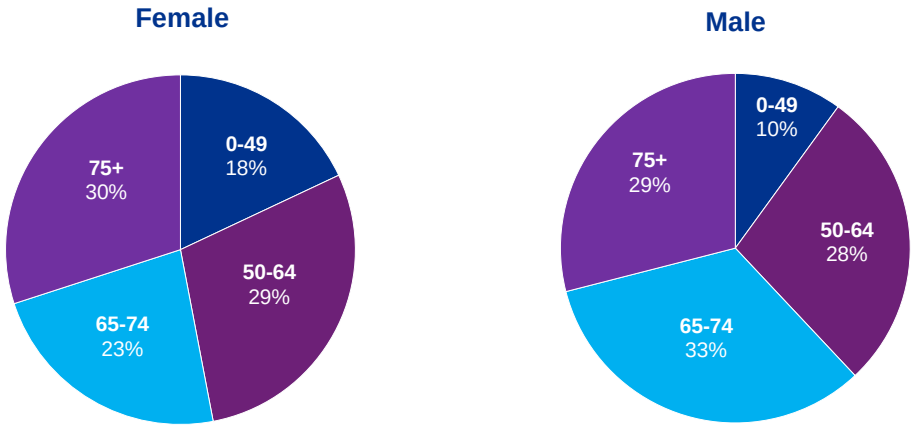
3.3.3 National Cancer Strategy

Cancer is one of the leading causes of death in Ireland and accounted for one third of deaths in 2013. The number of cases of cancer is expected to almost double by the year 2040[18]. Figure 5 provides a breakdown of the age at which males and females in Ireland have been diagnosed

[15] Health Service Capacity Review 2018 Executive Report
[16] Health Service Capacity Review 2018 Executive Report
[17] Health Service Capacity Review 2018 Executive Report
[18] National Cancer Strategy 2017 - 2026

with cancer, with over 50% of cancer diagnosis being in the 65+ age category. There are also 150,000 cancer survivors in Ireland who require additional care support[19].

Figure 5: Age at diagnosis, all malignant cancers (excluding NMSC) 1994 – 2014



Source: National Cancer Strategy 2017 - 2026

Irelands changing demographic is a major factor contributing to the expected increase in cancer cases. Counties within the Saolta Group's Region held the highest old age dependency ratios in 2016 which will continue to have a direct impact on demand levels. The ageing population is not the only factor contributing to the increase in the number of diagnosed cancer cases. Research shows that the number of age-standardised cancer cases has been increasing by c.1% a year since 1994[20]. Factors contributing to age-standardised cancer cases include obesity, alcohol consumption and sun exposure.

Modifiable lifestyle risks can reduce incidence of cancer by between 30% and 40%[21]. Increased awareness, reducing smoking, increased fitness levels and reducing societal risk factors such as deprivation are all measures that the government has introduced with the aim of reducing the number of cancer cases. However, detecting and diagnosing cancer early is critical step in reducing mortality as a result of cancer. The strategy sets out ways to strengthen the care pathways to encourage early detection.

The delivery of optimal care to cancer patients requires an integrated health care system with close links and clear clinical pathways between GP's primary care centres and the acute setting. The acute setting requires multi-disciplinary teams to be located in specialist treatment centres where coordinated and improved quality of care can be provided. In particular, specialised surgery, radiology, radiation oncology and pathology services are required to meet patient needs. The increasing number of cancer incidences, numbers of cancer survivors and increasing complexity of new drugs and treatments require a greater level of specialisation which may only be feasibly offered in a small number of locations. Less complex oncology services will be located in hospitals that are as close to the patients home as possible.

GUH is one of eight designated cancer centres in Ireland and is also one of five locations that offer radiation oncology treatments. The strategy sets out that rolling capital expenditure will be

[19] National Cancer Strategy 2017 - 2026
[20] National Cancer Strategy 2017 - 2026
[21] National Cancer Strategy 2017 - 2026

required to meet the needs of cancer patients. In particular, Galway was noted as one of three locations that require urgent investment to provide increased radiation oncology services.

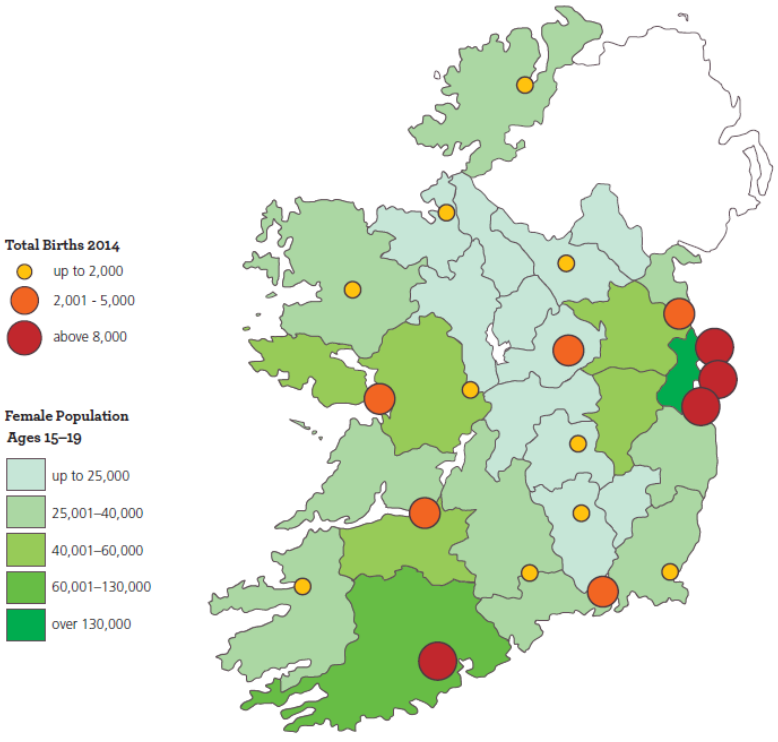
3.3.4 National Maternity Strategy

The National Maternity Strategy outlines a blueprint to transform the Irish maternity service over a 10 year period. This strategy has been developed after a number of incidents resulted in a lack of confidence in the system and it aims to rectify this through modernising current facilities and implementing a culture of learning to ensure continuous improvement.

In 2017, there were 62,053 births in Ireland, which makes it one of the most active areas in the Irish healthcare system[22]. The challenges associated with pregnancy and child birth are increasing in Ireland as a result of women having children at a later stage in their life. As this trend continues, designated maternity hospitals must have the necessary facilities to allow them to cope with complex pregnancies.

Figure 6 below illustrates the dispersion of births across Ireland in 2014. In 2014, Galway experienced the largest number of births and had the largest female population at child bearing age within the Saolta Group.

Figure 6: Number of Births across Ireland in 2014



Source: National Maternity Strategy 2016-2026

Following consultation with stakeholders, neonatal services was highlighted as an area which needed consideration as part of this report. As such, it was considered appropriate to review the

[22] https://www.cso.ie/en/releasesandpublications/ep/p-vsys/vitalstatisticsyearlysummary2017/

neonatology strategy. A new model of care for neonatology services in Ireland has recently been published by the HSE and is intended to ensure sustainability in neonatal services. The model has three core objectives[23]:

1 Improve safety and quality in the delivery of baby-centred care;

2 Improve access to the appropriate services;

3 Improve cost-effectiveness of services delivered.

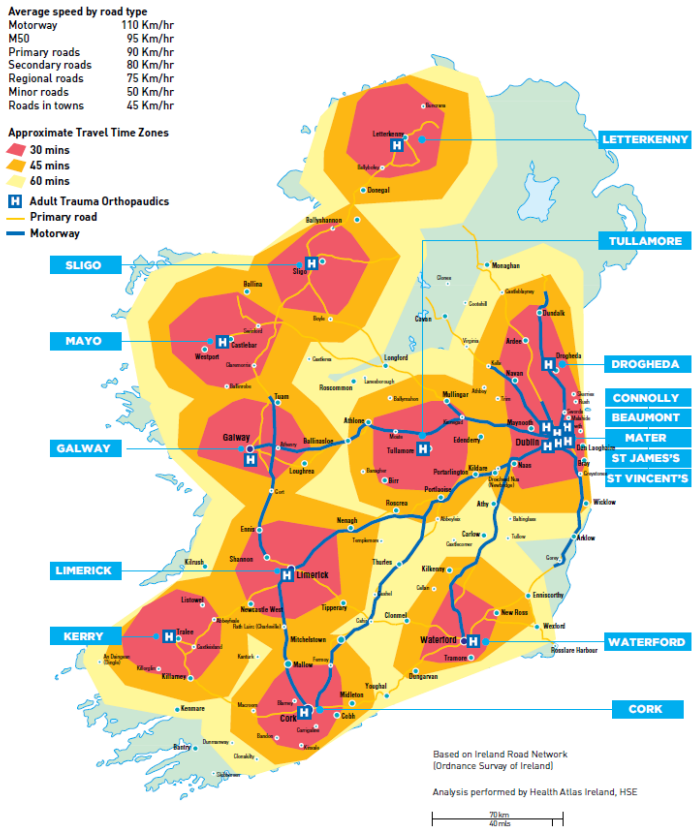
3.3.5 Review of Trauma Services

The introduction of a trauma system in the UK improved the odds of survival for patients suffering from major trauma by 25% between 2011/12 and 2014/15[24]. As a result, Ireland decided to implement a national trauma strategy. The current system in Ireland is not fully integrated which resulted in 30% of major trauma patients travelling to different hospitals in 2014 and 2015[25]. The aim of the trauma review is therefore to reduce this number and increase Ireland's survival rate.

This objective will be achieved through developing an integrated approach that provides the Irish population with equitable access to trauma care. The report has identified 16 hospitals that could act as Trauma Units in the future. This is based on their current 24/7 ED, trauma & orthopaedic surgery and general surgery capabilities. When the plan is implemented 96% of the population in Ireland will be located within 60 minutes a Trauma Centre, see Figure 7 below[26].

[23] National Maternity Strategy 2016-2026
[24] A Trauma System for Ireland
[25] A Trauma System for Ireland
[26] A Trauma System for Ireland

Figure 7: Road Travel Times to Potential Trauma Units



Source: A Trauma Service for Ireland

GUH will become the designated Trauma Unit in Galway when the plan is implemented. It is anticipated that GUH will provide all the essential treatments for trauma patients except those needing neurosurgery or neuro-critical care, which will continue to be treated in Dublin or Cork.

3.4 Saolta Group Strategy

The Saolta Group has highlighted a number of challenges that it is facing, including a lack of adequate infrastructure to meet its specialist tertiary requirements and an aging population that is relatively dispersed across the Region[27]. In order to address these challenges the Saolta Group has developed the Saolta Group Strategy 2019-2023.

The strategy aligns with government policy and will improve patient flow through developing an integrated healthcare system across the Region and clinical services. It is anticipated that patient flow will be improved through implementing a number of initiatives including:

– Implementing new governance structures through the roll-out of the Integrated Governance Programme which will support the provision of the safe, staffed and sustainable services;

[27] Saolta University Health Care Group Operational Plan 2018

– establishing closer links and clear patient pathways through GP's, community services, primary care, Model 2-4 hospitals and older person care;

– reengineering delivery of scheduled and unscheduled care which will result in the development of acute and scheduled surgical patient flow pathways across the Region;

– increasing the number of DOSA; and

– introducing early discharge initiatives.

To address these key concerns and wider strategic issues the Saolta Group has developed a plan across 7 key themes, as shown below in Figure 8.

Figure 8: Key Strategic Themes

Source: Saolta Strategy 2019 - 2023

1. **Quality and Patient Safety –** The Saolta Group has an ongoing strategy of continually improving the quality and safety of clinical services. GUH requires particular focus regarding this objective, with recent inspections conducted by HIQA indicating that many of the buildings do not meet the required standards. Consequently, GUH requires significant re-development and investment in order to ensure that the services provided meet the standards.

2. **Patient Access –** A key priority under this theme is the ability for the Saolta Group to provide patients with timely access to both scheduled and unscheduled care. Increasing demand will further negatively impact the existing capacity constraints.

3. **Governance and Integration –** The objective is to develop a clinically led integrated governance structure within the Saolta Group over the next two years. This will result in increased referrals to Galway University Hospitals as all services in the Group are working closer together in the model 4 hospital.

4. **Skilled Caring Staff –** A key strategic aim for Saolta is to recruit and retain staff to ensure the required standard of care can be delivered. This is a national issue facing all hospitals, however the Saolta Group has noted that it experiences particular difficulties in its hospitals located in rural areas within the Region. This requires innovative approaches to working together across the group with many of the Consultants having sessions in GUH as well as the regional facilities.

5. **Education, Research and Innovation –** Saolta has highlighted that promoting research and learning is an integral part of a world class healthcare system and it believes excellence in academia will attract the best health professionals to the West of Ireland. Furthermore, the Group aims to improve the quality of care delivered to patients through fostering a culture of learning, research and innovation.

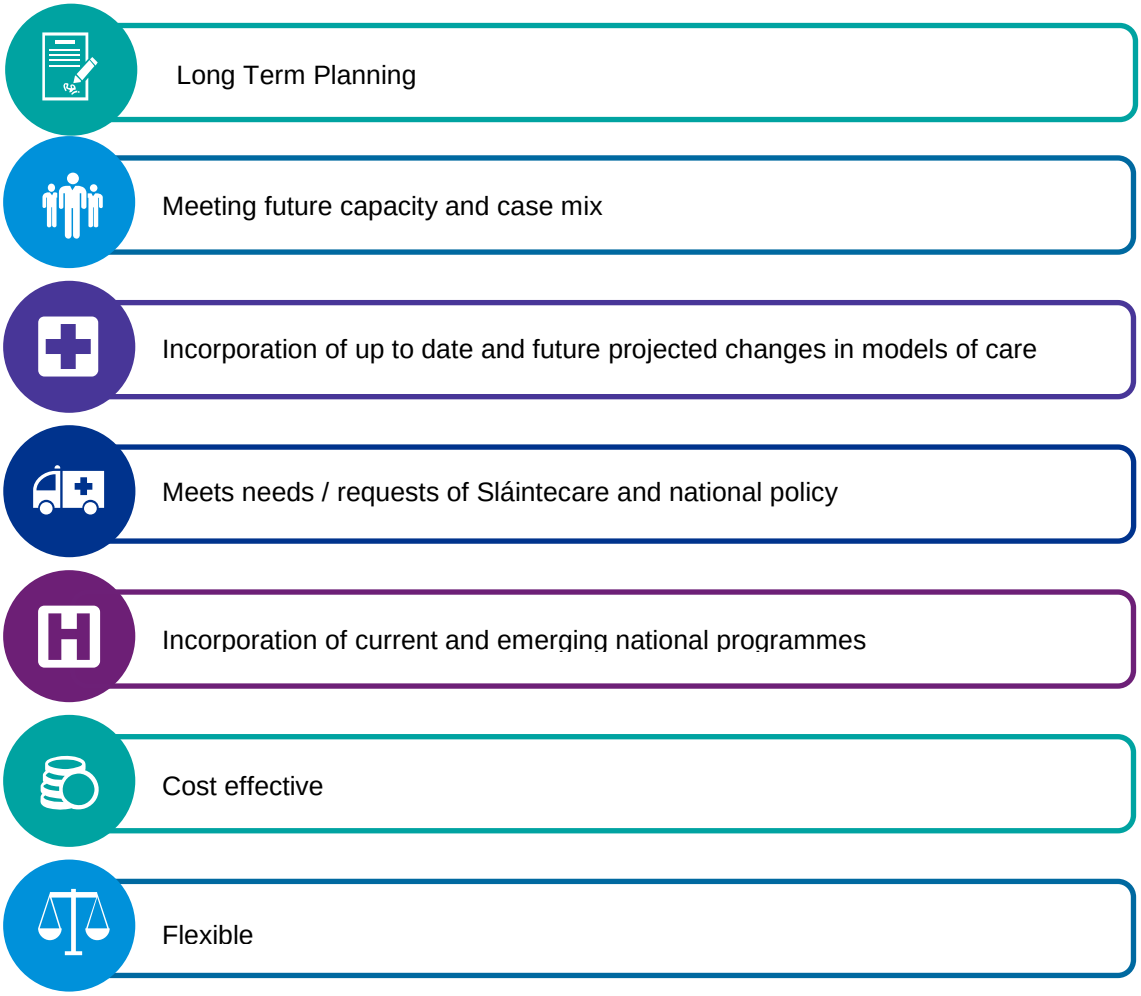
6. **eHealth – I**nvestment into ICT infrastructure is a key objective for the Saolta Group in order to help facilitate the integrated healthcare system.

7. **Infrastructure –** The Saolta Group has identified significant investment is required in order to meet demand and future capacity requirements. The group require a rolling capital development plan over the next 30 years to address the current and projected capacity constraints.

3.5 Programme Objectives

The fundamental objective of the Project is to ensure the Region has a model 4 hospital that meets best practice standards both now and into the future to enable delivery of the best possible outcomes for patients. Saolta have been in continued engagement with key national stakeholders such as the Acute Operations division within HSE, Sláintecare, and the Acute Hospitals Section of the Department of Health to progress this and ensure alignment with National Programmes discussed in Section 3.3.

There are a number of overarching principles in respect of the fundamental objective that impact on the evaluation of the options for new hospital facilities and the assessment of VfM. These principles include the following and were considered by the Steering Group in developing the evaluation criteria for the options assessment:



3.6 Conclusion

The case for change presents the critical nature of this programme to future-proof the provision of health services in the West and North-West of Ireland and the programme objectives form the baseline test against which all future decisions will be made for the scheme, i.e. how does this

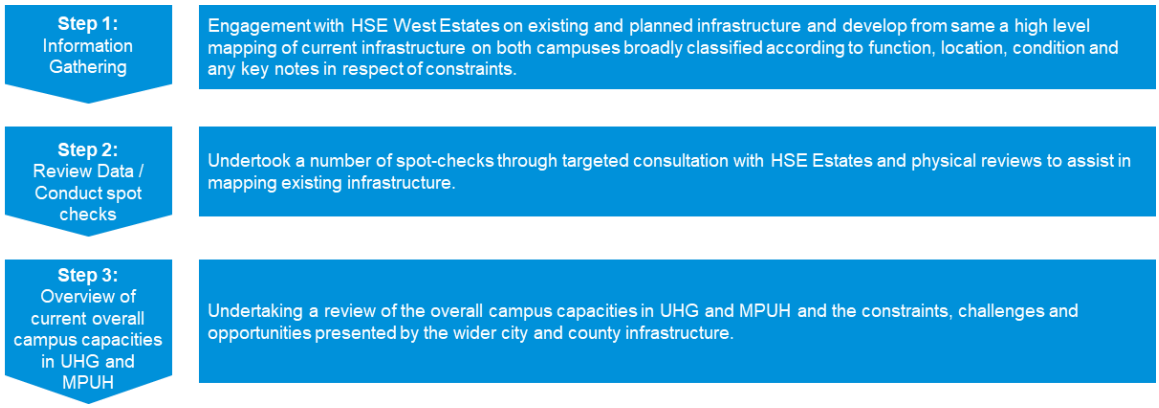
help to achieve the core aims? Now that these have been agreed, the next step was to assess existing infrastructure and identify any issues which may inhibit Saolta's ability to deliver against these aims.

4 Existing Infrastructure Assessment

4.1 Introduction

This section of the report provides a summary of AECOM & STW's review of current infrastructure at GUH, having regard to developments currently in planning / design / development. The methodology deployed in undertaking this work is presented below:

Figure 9: Methodology

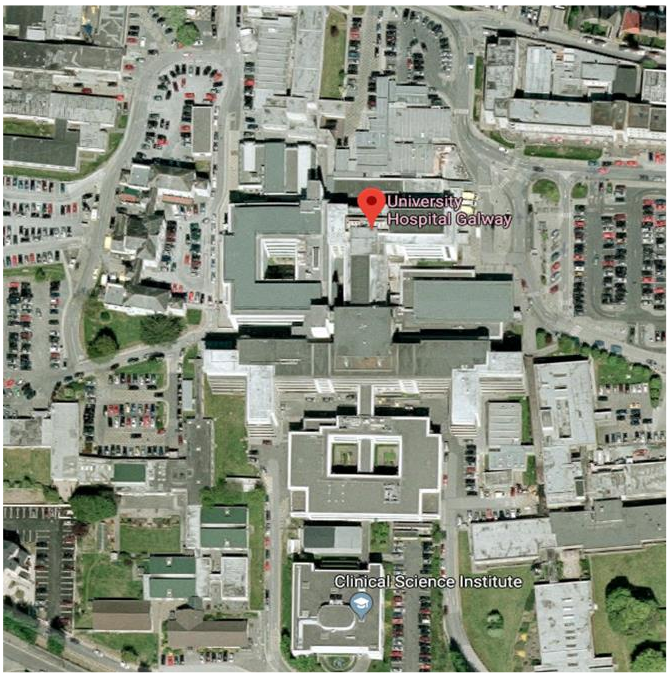


4.2 Campus Capabilities

4.2.1 UHG

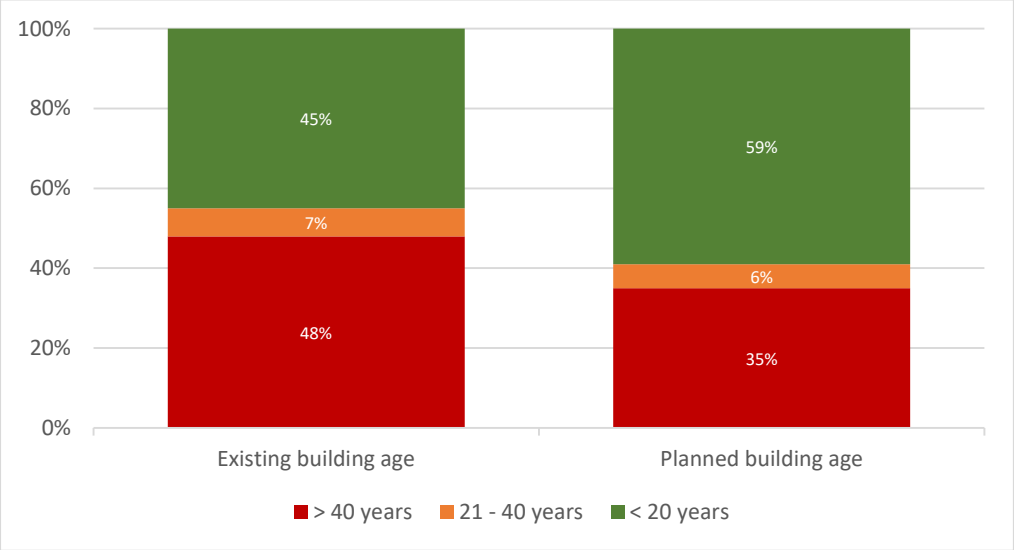
UHG's current building stock comprises of a gross floor area of circa. 98,968 sqm. This increases to 126,157 sqm when the 3 planned buildings, NPRO, the Blood & Tissue Lab and the Emergency Department with a four storey Women & Children's Department are included. 59% of the primary building function is acute hospital with space of 58,779 sq. m, this increases to 70% with the 3 planned buildings. A detailed breakdown of the buildings (and their primary function) included within these gross floor areas is provided in Appendix B of the "Review of Current Infrastructure and Developments Report" included within Appendix A.2.

Figure 10: UHG Site



The existing building stock is broadly split between over 40 years and under 20 years with 48% over 40 years and 45% under 20 years. The building stock under 20 years increases to 59% with the 3 Planned Buildings, while the building stock over 40 years reduces to 35% as set out in Figure 11 below.

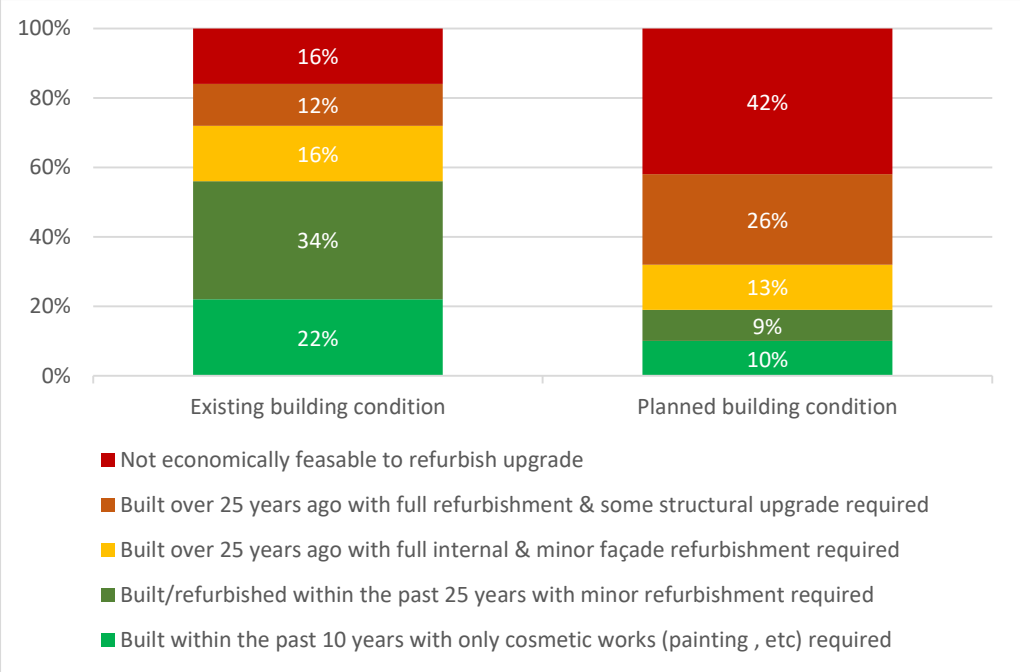
Figure 11: Existing and Planned Building Age (including planned developments)



Notwithstanding the age profile of the building stock or its functional suitability, approximately 16% of the existing building area was classified as not being economically feasible to refurbish/upgrade. Furthermore, only 22% of the current buildings require cosmetic works,

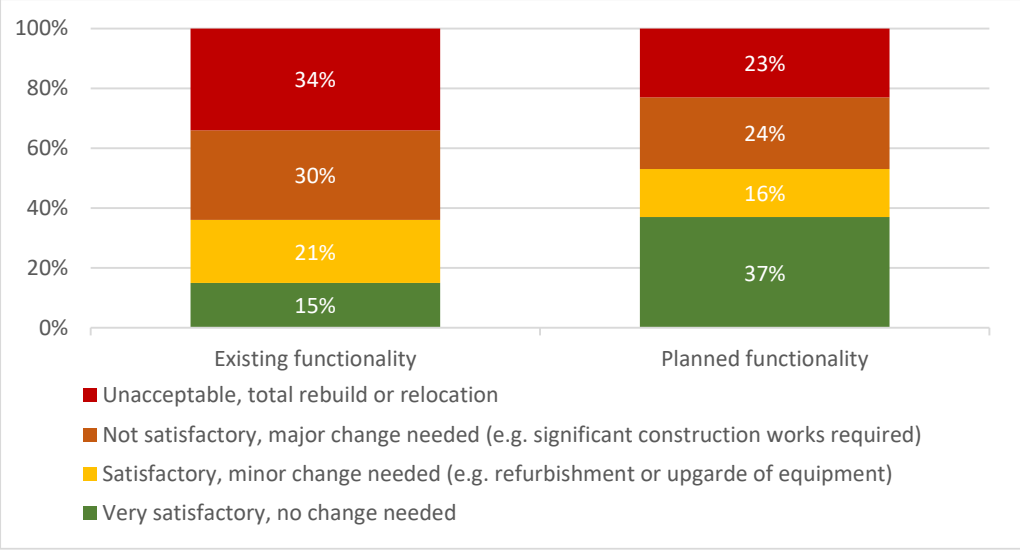
reflection that the majority of the buildings are in need of full refurbishment. Figure 12 below displays how the planned buildings will result in improved building condition. For information on methodology used please refer to Appendix A.2.1.3.

Figure 12: Existing and Planned Building Condition



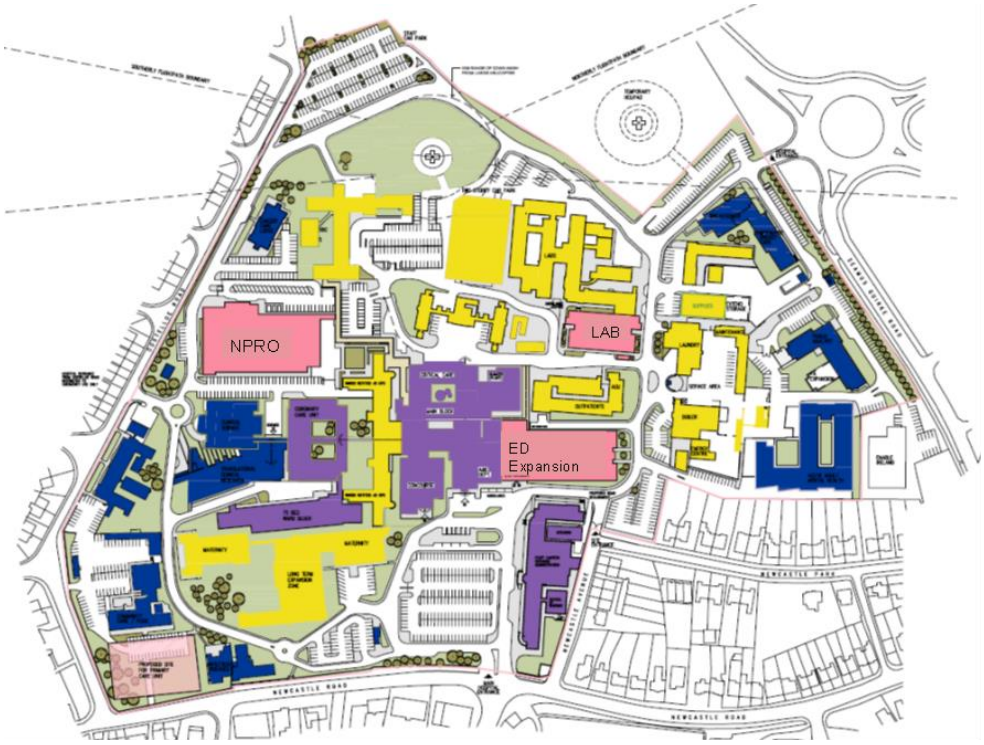
However, when the current functional suitability of the existing building areas is taken into account, 64% of the existing building areas are considered 'Not Satisfactory' or 'Unacceptable'. This reduces to 47% with the Planned Buildings as set out in Figure 13 below.

Figure 13: Existing and Planned Functional Suitability



The UHG campus requires a very significant network of utilities infrastructure in order to ensure the operation of the hospital. In common with building infrastructure, utilities infrastructure requires continuous investment in order to maintain it in full operational mode. The existing utilities and site infrastructure at the UHG campus generally meet the requirements of an acute hospital, but do require some targeted and continuous investment.

Figure 14: Building Condition UHG



The legend for Figure 14 is shown below:

	Functional / structural deficiencies are the buildings categorised with a condition of 4 or 5 and / or rated D in the functional suitability review**.**		Proposed includes the capital projects currently in planning / development stage (CNU and day surgery unit)
	Retained structures are buildings with a condition of 1 to 3 and / or rated A-C in the functional suitability review.		Co-located services include clinical science and CNU

For more information on classifications refer to the “Review of Current Infrastructure and

Developments Report" included within Appendix A.2, page 12 and 13.

Proposed includes the capital projects currently in planning / development stage (ED block, NPRO, Blood and Tissue lab,)

Co-located services include community care, cancer care

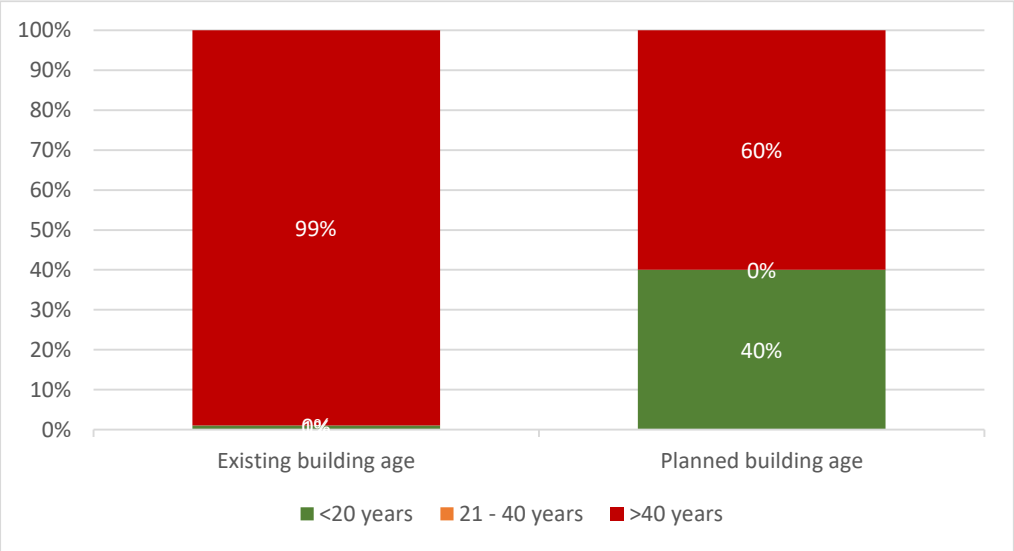
4.2.2 MPUH

MPUH current building stock comprises of Gross Floor Area of circa 30,670 sq. m of usable space. 42% of the existing building's function is administration space of 12,742 sqm. A detailed breakdown of the buildings (and their primary function) included within these gross floor areas is provided in Appendix B of the "Review of Current Infrastructure and Developments Report" included within Appendix A.2. The primary building function changes to 50% acute care when the Planned Buildings are taken into consideration.

Figure 15: MPUH Site

The building stock is almost entirely over 40 years old with new capital building projects being either refurbishment / upgrade of existing building and or community and other buildings not falling under the Saolta Group remit, such as St. Anne's School and Unit 9a – for full list see end of Appendix B of the "Review of Current Infrastructure and Developments Report" included within Appendix A.2. The planned projects will reduce the percentage of building stock >40 years from 99% down to 60%. For functional breakdown by percentage of accommodation under Saolta Group remit refer to Section 4.1 of Appendix B of the "Review of Current Infrastructure and Developments Report" included within Appendix A.2.

Figure 16: Existing and Planned Building Age (including planned developments)

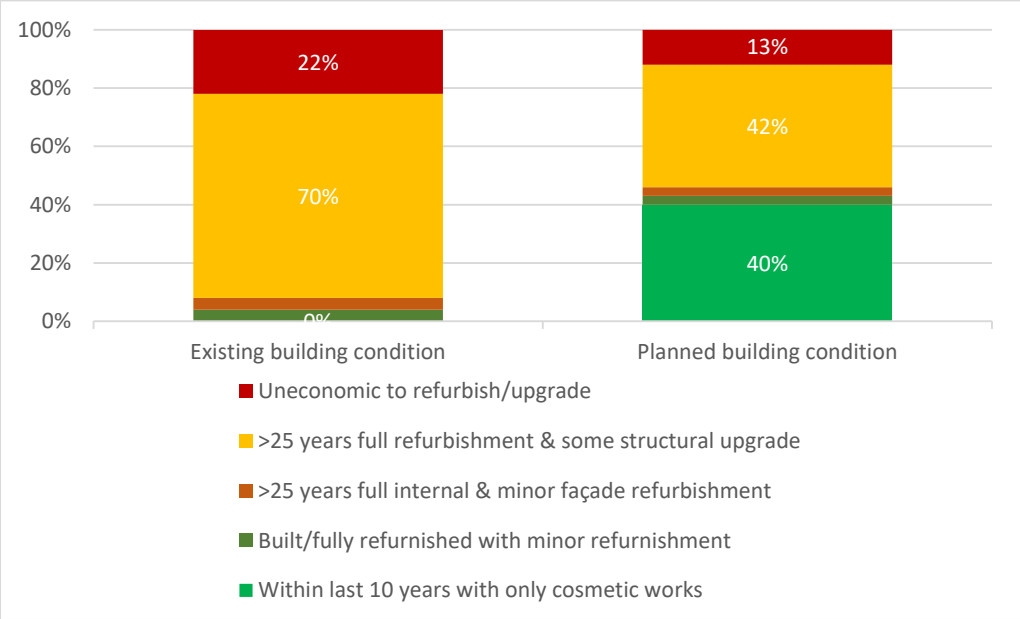


In contrast to UHG, the condition of the building stock is more reflective of the age profile as there has been low levels of investment in the majority of the building stock, approx. 92% of the building area was classified as:

(i) Uneconomic to refurnish; or
(ii) Full refurbishment required.

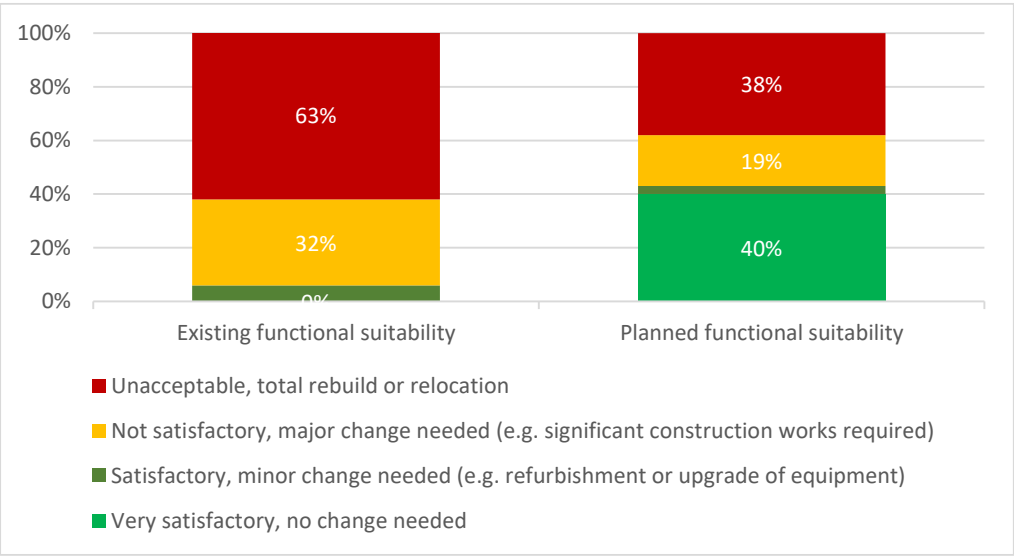
This is a reflection of the challenges posed by buildings of an older generation. The areas classified within this range reduces to 55% when planned projects are included as set out below:

Figure 17: Existing and Planned Building Condition



With respect to the functional suitability, 95% of the existing buildings are considered 'Not Satisfactory' or 'Unacceptable'. This reduces to 57% when planned buildings are included see Figure 18 below.

Figure 18: Existing and Planned Functional Suitability



The MPUH campus similarly requires a significant, albeit not as complex as UHG, network of utilities and site infrastructure in order to ensure the operation of the current hospital facilities. In common with Building Infrastructure, utilities infrastructure requires continuous investment in order to maintain it in full operational mode. **The existing utilities and site infrastructure at the MPUH campus require significant investment to the majority of utilities and site infrastructure**.

Figure 19: Building Condition MPUH

The legend for Figure 19 is shown on the next page:

	Functional / structural deficiencies are the buildings categorised with a condition of 4 or 5 and / or rated D in the functional suitability review.		**Proposed includes the capital projects currently in planning / development stage (CNU and day surgery unit)**
	Retained structures are buildings with a condition of 1 to 3 and / or rated A-C in the functional suitability review.		Co-located services include clinical science and CNU

4.3 Conclusion

Having the right infrastructure in place will be imperative to delivering a new and improved service delivery model. This current infrastructure review emphasises that the majority of building conditions across the two sites are unacceptable to provide the models of care that will be necessary in the future, with the infrastructure soon to approach the end of its useful life. 64% of the infrastructure on UHG and 95% of the infrastructure on MPUH has been classified as Not Satisfactory / Unacceptable for its current function, bringing about cause for concern. The full site assessment can be found in Appendix A.2.

This assessment looks at the current infrastructure's ability to deliver to current service levels, but it is important to get an understanding of how patient numbers and required capacity are expected to grow in the future so a plan can be developed to cater for the regional health economy in the longer term.

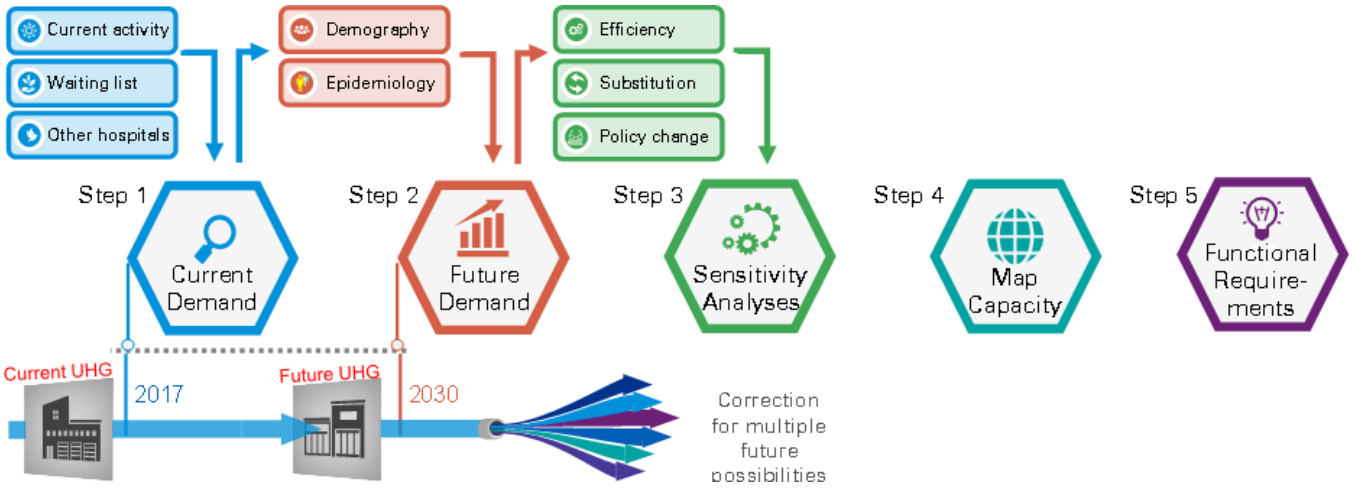
5 Estimating Future Demand

5.1 Introduction

KPMG Netherlands prepared the demand analysis to estimate the future capacity requirements for GUH. This set the basis for all other findings of the Report as all further analysis is based on these forecasts.

To estimate the size and facilities of the future hospital, the Project Team conducted five steps that are shown Figure 20 below. Based on the current care demand (step 1), the future care demand was calculated by including demographic and epidemiological changes (step 2) into the analysis. After combining the current care demand and the future changes, changes in demand based on three scenarios were calculated: changes due to substitution, changes due to efficiency and a projected scenario for substitution and efficiency - based on the National Capacity Review 2018 (step 3). The results of the projected scenario were used to translate the future care demand into capacity needed in terms of beds (step 4) and capacity needed in terms of wards and square meters (step 5).

Figure 20: 5 Step Approach



The scope of the demand analysis includes health care demand by the population within the GUH catchment area, except for transplantation and neurosurgery. An overview of the demand analysis calculation can be found in Appendix A.1.1. The appendices on process (list of interviewees, list of invitees for the validation sessions and the list with the literature used) can be found in Appendix A.1.6.

5.2 Step 1: Calculating current care demand

The demand of the Region in 2017 was calculated by taking into account three different sources: the activity of GUH for the year 2017, the patients added to the waiting list ("WL") and the patients who received a treatment in another hospital (i.e. patients who were outsourced and patients who were treated in Dublin HSE Hospitals but were from and could potentially have been treated in the Region).

5.2.1 Activity GUH in 2017

The key figures based on the data are shown in Figure 21 below. The source of the data and remarks on the quality of the data are included in Appendix A.1.2. The edits that were performed on the raw data are included in Appendix A.1.2.3.

Figure 21: Key Figures for GUH activity 2017

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
227,457	87,791	282,871	12,762	64,426	167,935

All figures for the activity in 2017 including the split by specialty are included in Appendix A.1.2.4.

5.2.2 Waiting list GUH for 2017

The ambition for the future hospital is to eliminate all waiting lists at GUH and significantly reduce, if not eliminate, waiting lists across the Saolta region.

The numbers of patients on the different waiting lists (inpatients, outpatients, Radiology, Cardiac Investigations) are included as part of the current demand. The numbers are shown in Figure 22 below. To avoid double counting, only the annual increased number of patients on the waiting list are included, i.e. the difference between the number of patients on the waiting list on 1 January 2017 and 1 January 2018.

Figure 22: Key Figures for GUH Waiting List in 2017

Patients on WL inpatients	Bed days calculated for inpatient WL	Patients on WL day cases	Patients on WL procedures	Patients on WL outpatients
3,414[1]	29,938[2]	12,726[1]	1,897[3]	4,502

Notes to Figure 22

1 To calculate the waiting list figure for both inpatients and daycases all patients that were added to the waiting list in 2017 are taken as a starting point. Each of the patients were compared to the patients that were treated. If a patient received a treatment, he or she was removed from this figure.

2 The number of bed days for the patients on the waiting list (inpatients) is based on the current, average number of bed days per specialty.

3 In the absence of a waiting list for operating theatre procedures, additional demand for operating theatre procedures from the waiting list was computed under the assumption that demand can be derived from the inpatient waiting list. Due to the unavailability of necessary information, this Report has based the additional demand for operating theatre procedures on the inpatient waiting list.

The demand analysis forecasts in this report are based on 2017 data. More recent waiting list data is outlined below, for completeness only:

Hospital	In-Patient	Day Case	Out-Patient	Total
GUH	**3,260**	**7,880**	**35,760**	**46,900**
LUH	427	3,103	15,621	19,151
MUH	303	2,264	7,785	10,352
PUH	28	397	3,079	3,504
RUH	6	660	3,997	4,663
SUH	1,032	2,307	14,304	17,643
Saolta	**5,056**	**16,611**	**80,546**	**102,213**

***Source*: Saolta figures (as at 15 August 2019).**

5.2.3 Patients from the region treated in another hospital

To avoid underestimation of the future care demand, the patients living in the Region but who were treated in 2017 in Dublin HSE Hospitals were included. These numbers were provided by GUH and are shown in Figure 23 below.

Figure 23: Key Figures Relating to Care Delivered by Dublin HSE Hospitals in 2017

Inpatient patients and day case patients treated in Dublin	Bed days calculated for patients treated in Dublin
14,068	**25,738**[1]

Notes to Figure 23

1 The number of bed days for the patients that were treated in Dublin HSE Hospitals (inpatients) is based on the current, average number of bed days per specialty.

Moreover, scans that were outsourced from GUH to other hospitals were included, together with private clinics including outsourced patients and the change in waiting list for Radiology from 1 January 2017 and 1 January 2018, this resulted in additional demand for 4,405 scans. As part of the Detailed Business Case, further analysis will be required in order to take account of patients who GUH will not be able to treat – i.e. neurosurgery.

5.2.4 Total figures for care demand in 2017

Based on the current activity GUH, the waiting list numbers and the care delivered by other hospitals, the total figures for the current care demand in 2017 were calculated and are included within Figure 24 below. Assumptions were made on the related care demand for the patients that are on the waiting list.

Figure 24: Key Figures Relating to Total Care Demand in GUH for 2017

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
284,072	**108,397**	**308,113**	**15,967**	**64,426**	**196,486**[1]

Notes to Figure 24

1 Total care demand in 2017 for radiology consists of activity in GUH in 2017 (167,935), waiting list for radiology (8,049), outsourced scans (4,405) and care that's currently delivered in Dublin (16,097).

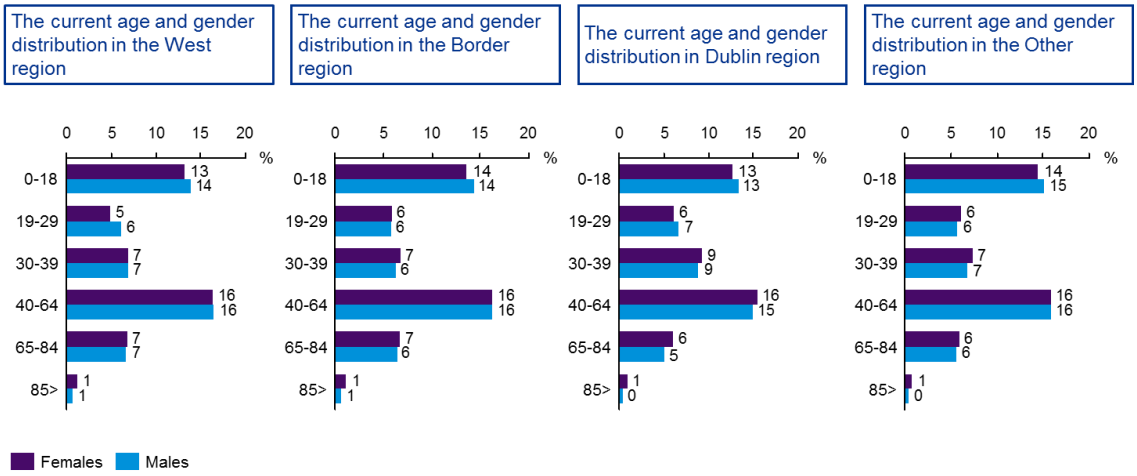
5.3 Step 2: Predicting future care demand

Future care demand will differ from current care demand as a result of demographical and epidemiological changes. Therefore, these were factored into the analysis.

5.3.1 Predicting future care demand

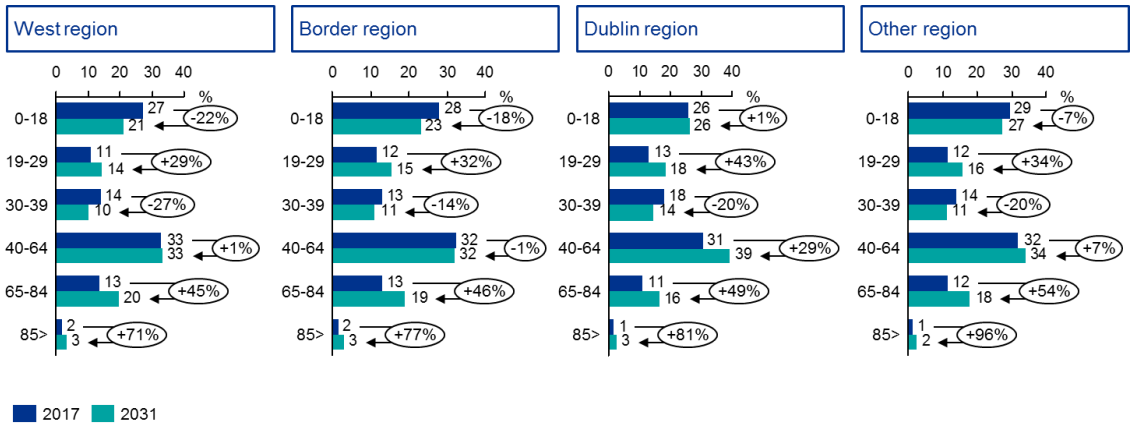
Changes in demography: To identify future demographic changes, the regional population projections from the CSO were used. The population changes for 2031 compared to 2017 were calculated by the CSO on regional level by subdivision in four areas: West, Border, Dublin, and Other (all remaining regions). Furthermore, the population was divided according to age and gender, please see Figure 25 below.

Figure 25: Current age and gender distribution for the regions West, Border, Dublin and Other



For each population strata, a multiplication factor of the population growth (positive or negative) was calculated by CSO, which was multiplied by the current health care demand for that strata. The future population distribution in 2031 shows that the majority of the population will be 40 years and older. There will be an overall decrease in the age group 0 – 18 years (except for Dublin) and a strong increase in people of 65 years and older.

Figure 26: Demographic changes towards 2031 per age group and region



Changes in epidemiology: To identify epidemiological changes in common diseases, desk research and interviews were carried out. Cancer was found to have an incidence increase. Five of the most common cancer types were identified during interviews with clinicians and linked to incidence increase through desk-research[28]. Furthermore, bariatric procedures were also projected to increase in the future albeit from a very low base. The figures are shown in the table below.

Table 3: Epidemiological changes towards 2031 per disease or surgery

Epidemiological Changes	Assumed increase to 2031	Number of patients in 2017
Colon cancer	115%	527
Breast cancer	122%	660
Lung cancer	115%	540
Prostate cancer	102%	875
Melanoma	154%	209
Bariatric Surgery	2300%	16

Source: Cancer projections for Ireland 2015-2040

Details on the data used can be found in Appendix A.1.3.

5.3.2 Results future care demand

Based on the demographical and epidemiological trends, factors were calculated for all types of care. The differences in percentages can be explained by the difference in population composition and the effect of the epidemiological changes.

[28] Cancer projections for Ireland 2015-2040

The figures for current care demand multiplied with the calculated percentages for demographical and epidemiological trends result in the base scenario. In other words, the base scenario is assuming there will be no changes in terms of efficiency or substitution. The key figures based on the base scenario are shown in the figure below (see Figure 28). The number of procedures contain both day cases and regular procedures.

Figure 27: Current care demand 2017 including waiting list and care from Dublin HSE Hospitals (without demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
284,072	108,397	308,113	15,967	64,426	196,486

Figure 28: Base scenario 2031 (with demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
396,990	136,826	369,338	20,451	68,952	253,872

Figure 29: Precentage increase between Current care demand 2017 and base scenasrio 2031:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
39.75%	26.23%	19.87%	28.08%	7.03%	29.21%

5.4 Step 3: Performing the Sensitivity Analysis

5.4.1 Using scenarios for performing the sensitivity analysis

KPMG undertook significant sensitivity analysis regarding demand. This analysis looked at multiple sensitivities though one “projected” scenario formed the baseline for further analysis. The projected scenario was based on the following assumptions:

- An increase of managed primary care and residential concepts for elderly would decrease the number of inpatient elderly visiting the hospital;
- Working more efficiently in the future (i.e. having the patients medicine ready before discharge and work with an expected discharge date) will lead to a lower length of stay on average;
- Working more efficiently in the future will lead to less return visits for outpatients;
- Chronic disease management will be partly provided at home, in the community or as a day case instead of as an inpatient or as an outpatient instead of a day case;
- A small part of the care that’s currently provided in GUH could shift to model 3 hospitals in the future. The model does take into account that a substantial part of the secondary care currently delivered by GUH will also be delivered at GUH in the future (due to the population demographics and the care landscape around Galway);

– The number of ED visits will decrease due to improvements in primary care and increased preventative care for the elderly;

Please refer to Appendix A.10 for more information on this step.

5.5 Step 4: Map Capacity

The results of the future care demand projections were transformed into capacity parameters.

5.5.1 Capacity parameters needed to deliver future care demand

The results of the projected scenario were used to calculate the capacity parameters needed to deliver the care in 2031.

Figure 30: Current care demand 2017 including waiting list and care from other hospitals (without demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
284,072	108,397	308,113	15,967	64,426	196,486

Diagnostics (Cardiac)
27,421

Figure 31: Base scenario 2031 (with demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
396,990	136,826	369,338	20,451	68,952	253,872

Diagnostics (Cardiac)
39,504

Figure 32: Precentage increase between Current care demand 2017 and base scenario 2031:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
39.75%	26.23%	19.87%	28.08%	7.03%	29.21%

Diagnostics (Cardiac) **44.06%**

Figure 33: Projected scenario – results in terms of demand parameters:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED Visits	Diagnostics (Radiology)
290,102	**100,871**	**318,688**	**17,835**	**58,609**	**211,981**

Diagnostics (Cardiac) **33,578**

Figure 34: Precentage difference between Projected scenario – results in terms of demand parameters: and base scenario 2017:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED Visits	Diagnostics (Radiology)
2.12%	**-6.94%**	3.43%	11.70%	**-9.03%**	7.89%

Diagnostics (Cardiac) 22.45%

Figure 35: Current capacity GUH in 2017:

Beds (inpatients)	Beds (day cases)	Beds (ICU/ critical care)	Outpatient rooms	Theatres	Resources Radiology
713	**134**	**26**[1]	**100**[2]	**18**[3]	**32**

Resources Cardiac **11**

1. This figure is based on the ICU, HDU, PACU and CTICU; CCU is not included in this figure.
2. This figure is based on the total number of available outpatient rooms. This figure is not corrected for the number of rooms currently not up to standard.
3. This figure is based on the total number of available theatre rooms. This figure is not corrected for the number of theatre rooms currently not up to standard. In addition, most of the current

rooms are only appropriate for specific procedures and therefore not used in the most efficient manner.

Figure 36: Projected scenario – results in terms of capacity parameters:

Beds (inpatients)	Beds (day cases)	Beds (ICU/ critical care)	Outpatient rooms	Theatres	Resources Radiology
935[1]	168[2]	46[3]	75[4]	16 (whereof 3 DC & 3 ES)[5]	27[6]

Resources Cardiac
9[7]

1. The number of beds (inpatients) were calculated under the assumption of a bed occupancy of 85%.
2. The numbers of beds (day cases) were calculated under the assumption of 50 operating weeks, 48 hours a week, and under the assumption of the duration of 4 hour per day case. The underlying assumption is that all beds could be used for all types of care, and all the beds are in the same building (using all beds most efficiently).
3. The number of beds (ICU) were calculated under the assumption of a bed occupancy of 85%. This figure is based on the ICU, HDU, PACU and CTICU; CCU is not included in this figure. Based on the current number of bed days per type of ICU/ critical care bed, the total number consists of 21 ICU beds, 12 HDU beds, 5 PACU beds and 8 CTICU beds.
4. The projected number of 71 outpatient rooms is based on assumptions outlined in the Elective Hospital Report and do not yet include outpatient rooms on the acute site. Key assumptions include operating the elective outpatient clinic for 40 hours a week, and an average consultation time of 25 minutes. These assumptions will need to reviewed (and determined by speciality) during the Detailed Business Case stage for both the elective and the acute. See appendix A19.
5. The number of theatre rooms were calculated using the assumption of 50 operating weeks, 48 hours a week with an average duration per specialty from literature, including anaesthetics[29]. Out of the in total 16 rooms there were 3 rooms calculated to perform day cases (DC) and 3 additional rooms to cover emergency procedures (ES). The underlying assumption is that all rooms could be used for all types of procedures, and that all the rooms are in the same building (using all rooms most efficiently). The underlying assumption is that all rooms are used under an occupancy of 80% - 85%. These assumptions should be reviewed as part of the Detailed Business Case, the scope of which should include a review of Saolta's service delivery model.
6. The number of resources required for Radiology was calculated under the assumption of 50 operating weeks, 48 hours a week. The number was made up of MRI = 3.2 / CT = 2.8 / X-Ray = 15.8 / US = 2.3 / Other = 2.2. Please refer to Appendix A.1.2.5 for further details on PET figures.
7. The number of resources required for Cardiac Investigations was calculated under the assumption of 50 operating weeks, 48 hours a week. This figure relate to Non-Invasive Cardiac Investigations and do not include Cardiac Catheterisation Laboratory work. The number was made up of Eco = 4.7 / Pacing/ ICD checks = 1.2 / ETT = 1.3 / Holter monitors = 1.0 / BP monitors = 0.1 / TOE = 0.2

[29] Modeling and prediction of surgical procedure times," *Statistica Neerlandica,* no. 09, 2009

The calculations and assumptions we used in this transformations are included in Appendix A.1.5. The results of the capacity parameters per specialty and type of activity are included in Appendix A.1.5.2. This analysis has been further refined in the context of the capacity required solely in the Elective Hospital. It is recommended that the demand figures are further refined and updated once the future service delivery model has been agreed

5.5.2 Points of attention

The analysis conducted to predict future care demand and the associated capacity parameters do not factor in all relevant current and future developments in the area. The results of the model – based on the current activity, waiting list and care provided to people from the GUH catchment area in Dublin HSE Hospitals – needs to be adjusted for future proofing of the facility against possible (funded) policy changes since this was not available within the data (see the last part of paragraph 2.5). Below we list points of attention that GUH should take into account and update the status per point when planning and building the new hospital:

- GUH is going to be a dedicated trauma facility unit;
- GUH is the tertiary referral facility for the West of Ireland. Four common types of cancer were included as epidemiological change. Nonetheless, being the tertiary referral facility needs to be taken into account since this needs attention in terms of facilities and accessibility (pathways inside the hospital but also pathways outside the hospital to accommodate referrals from other Saolta Group Hospitals);
- A new children's hospital is to be built in Dublin, and the implementation of the national paediatric model of care will impact the demand for paediatrics in GUH. Some level of paediatrics surgery is already going to Dublin, but much of the work will be repatriated back to the West. The expectation though is that paediatric care would in the long term still be delivered in the regions, with only specialist referrals to the new Children's Hospital;
- GUH has become the supra regional referral facility for plastic-, vascular- and cardio-thoracic surgery. Combining this with GUH as a model 4 hospital results in more high complex patients shifting towards GUH;
    - The current demand for urology patients in GUH is relatively high. The care for urology patients is mainly covered in outpatient care currently. Since some of this care will shift towards model 3 hospitals and primary care, this will lead to a change in urology outpatient facilities;
- An increased centralization of ICU and critical care to hub hospitals is expected by some of the clinicians;
- The care delivered to people with cystic fibrosis will be delivered more centralised, in Dublin.

Please refer to Appendix A.1.2.5 which includes additional information gathered that was excluded from the analysis.

5.6 Conclusion

Even with ambitious efficiency targets and significant support from primary care assumptions with patient care models, significant growth is forecast for GUH between now and 2031. In order to

cater for this increased demand, consideration must be given to the infrastructure required to provide the best possible outcomes for patients. The first step of this is to develop Key Design Principles to formulate the fundamental requirements for any new development.

6 Key Design Principles

6.1 Introduction

The demand analysis indicates that GUH will need an additional 222 inpatient beds and 34 day-case beds as well as a range of other facilities by 2031. In addition, a significant existing capacity / demand gap is evidenced through the numbers on waiting lists and the patients from the Saolta region travelling to Dublin to receive care. The condition of the buildings on both sites suggests a substantial underinvestment in infrastructure over a sustained period.

To address infrastructure deficiencies and capacity issues at the forecast scale, Saolta will need to commission built capacity on a phased approach that will allow a gradual ramp up of services both in volume and complexity, in line with demand increases. Therefore, regardless of the option selected, the design will need to demonstrate how the facility will be able to expand to accommodate this capacity growth, without impacting on operational efficiency and patient experience.

Phasing of developments should take account of the efficiency and clinical viability of individual services and clinical areas based on Saolta's view of the appropriate configuration of beds. For example, the phasing of inpatient accommodation reflects the view that 25 bedded units are the maximum clinical design solution.

New buildings must provide flexibility and expansion capacity as well as taking on more subspecialty or tertiary services over the life of the hospital, together with managing demand growth in less specialised areas. The design and configuration must also enable the Saolta Group to incorporate future technology with relative ease, minimising structural impact from such changes.

The final design must identify such challenges and eliminate them or provide appropriate mitigation strategies.

6.2 Land Use Zoning

Both the UHG and MPUH sites are zoned either in whole or in part as "CF" (to provide for and facilitate the sustainable development of community, cultural and institutional uses and development of infrastructure for the benefit of the citizens of the city).

34 of the 60 Hectare MPUH site are zoned as CF, the site is bounded by Merlin Park Woods (public ownership as distinct from MPUH) and there is over 10 hectares for passive and active recreation, wildlife conservation and education. The adjacent lands on the MPUH site are regarded as "Institutional Open Space" with some access to the wider public.

The full 17 Hectares of the UHG site are zoned as CF. The site is intensely developed in terms of footprint, however the site is underdeveloped from a plot ratio perspective, i.e. there is an overuse of low rise buildings on the site. The transition to a more efficient use of the site and greater volume to deliver the demand brief requires a multiphase approach, sometimes moving functions or departments more than once.

6.3 Transformative Benefits

6.3.1 Design Criteria

The new hospital should feature:

– All single bed rooms;

– Highly flexible room templates for patient units, operating theatres, interventional suites and other key areas. This will ensure flexibility to accommodate a range of equipment for service lines, departments and centres of excellence supporting multidisciplinary disease management;

– Sufficient redundancy and flexibility to accept state of the art equipment upgrades over time;

– Care environments organised by function. All invasive and non-invasive interventional technology should be consolidated to optimise utilisation and effective staff deployment;

– High-end technology, e.g. Imaging, Image-guided procedures should be centralised;

– Buildings which have a fully integrated information infrastructure to support the requirements of clinical, research, education and patients' communication needs;

– Breakout space for clinical/translational research, personalised health care, and education interactions which are accessible throughout the building;

– Clear and rational building organisation that minimises access times;

– Layouts, adjacencies and horizontal and vertical transportation pathways that reduce staff and patient travel time;

– High standards of infection control supported by an easily cleaned environment;

– Clinical pathways and adjacencies which simplify patient transfers in clinical areas including the interventional platform and reduce the number of patient handovers;

– Inpatient rooms that minimise physical hazards, thus reducing injuries from falls based on evidence-based design principles for patient safety; and

– IT and technological support to streamline information, logistics and communication.

Patients should experience environments in which they feel comfortable about their condition not just treatment locations. Factors including age, physical disability, sensory impairment, fatigue or stress may affect the patient's mobility, comprehension and way finding ability. These environments need to respond to the challenges of providing privacy and dignity to patients, offering a sense of place and public Image.

The buildings have been sized using NHS Health Building Note ("HBN") standards, where available. Other areas are based on desktop studies.

The facilities will be required to achieve nZEB and BREEAM Excellent standards.

6.3.2 Adjacencies

A modern designed hospital should include the optimal adjacencies which support best quality care. The design should also encourage the most efficient operating efficiency through a reduction in staff and patient internal transfers and encourage collaboration and automated delivery of supplies, equipment and medical records. The Project should include the following adjacencies (please refer to Appendix A.3 for further detail):

- Ambulatory services should be co-located and integrated in a single location to maximise opportunities for staff collaboration and to maximise flexibility and efficiency in use of capacity. Services provided will be for patients that are not admitted, and who are directed to specialised outpatient care on an appointment basis. This model will consolidate care around the outpatient, encouraging collaborative multi-disciplinary diagnosis, decision-making and service delivery in a single place. The Ambulatory Zone requires a direct physical link to Main Imaging and Diagnostic Services for patient and staff movement;

- All emergency care will enter the hospital via the ED, with the exception of obstetrics emergencies which will have a direct access to the maternity ward. Integration and co-location of all services will ensure consultants have direct and convenient access to ED to speed assessment diagnosis and decision-making;

- Vehicular and pedestrian access to the ED should be segregated from the ambulatory elective flow at the point of arrival on site and the entry point should be highly visible. Emergency vehicles should have a dedicated entrance and the helipad should have a direct route to resuscitation, avoiding public areas. Ambulances should deliver patients to a discrete and separate area to support rapid and effective triage and treatment;

- Outpatient and inpatient services will operate in separate, discrete environments to improve patient experience, flow and efficiency. The main public access to the site should lead directly to the ambulatory zone;

- With the exception of obstetrics, all surgical and interventional procedures should be co-located on a single platform for efficiency and effective use of capacity. The interventional platform should have an immediate proximity to ED and surgical critical care to ensure that critically ill patients can be quickly and easily transferred for advanced care;

- Inpatients arriving on the day of surgery and day surgery patients must have an immediate and convenient access to the day-care suites and should not cross with the inpatient and emergency flow;

- Procedural suites will be planned on a universal footprint for flexibility and adaptability over the building lifetime to accommodate hybrid technologies and robotics. Within the interventional platform, a number of suites will be available 24/7 for trauma and other emergencies and will have a direct dedicated vertical connection from ED. The interventional platform will be planned with three levels of circulation: restricted, semi-restricted, and unrestricted;

- Endoscopy will sit alongside Interventional services but outside the clean zone. It must be accessible separately by inpatient and outpatient services;

- Connection to the central sterile processing (“CSSD”) department will ensure availability of instrumentations and supplies for any procedure on a 24-hour basis;

– Imaging and Diagnostic services will be centralised and planned on a patient-centred care model to provide the best possible patient experience and health outcomes. All modalities will be planned to provide effective distribution and minimise patient travel, wait times, and discomfort, and maximise patient accessibility and convenience for care and treatment;

– Centralised diagnostics will reduce fragmentation of resources and provide a critical mass of staff and support outside regular business hours. Immediate and direct access to imaging 24/7 is required by ED, and specifically to CT services; and

– Flexibility for future service developments and as-yet-unknown modalities, equipment, systems and vendors will be enabled through universal room design and 'last-responsible moment' fit out.

6.3.3 Optimal Circulation and Flows

The principle of flow segregation both horizontally and vertically will apply to visitors, inpatients and staff, clean and dirty supplies. Supply flows will be automated to the point of use as far as possible. The pneumatic tube system will accommodate the majority of pathology samples and medication supplies, supplemented by manual transportation where response times are critical, or safety issues dictate. All information flows will be electronic.

Specific circulation flows are outlined below (please refer to Appendix A.3 for further detail):

– The design and planning of the facilities will reflect efficient and effective processes. Patient pathways and operational processes will be subject to value stream mapping applying lean techniques to ensure that activities and spaces add value to clinical outcomes, patient experience and staff efficiency;

– Inpatient circulation within the new facility will be discrete and protected allowing patients to move between the imaging, diagnostic and interventional platforms with minimum transfer time;

– The ED reception is the central circulation element of the public side of the ED and must accommodate large volumes of patients per day. Patients will be streamed into their respective flows, including paediatrics. Each stream will have separate waiting lounges and treatment areas;

– Horizontal and vertical movement of patients, visitors, staff and materials should be by separate, dedicated corridors and lifts;

– In highly IT-enabled facilities, patients will check-in electronically with a unique identifier at any point in their patient journey on arrival and in any of the clinical departments or visitor areas;

– Information flow will be electronic, facilitated by the latest technologies and an advanced clinical information system linking people, places and data.

– AGVs with dedicated horizontal and vertical distribution networks to the point of use should be the primary delivery systems for all supplies, medications, and equipment;

– Medication will be barcoded and traceable from receipt. The majority of inpatient medications will be dispensed from the central pharmacy via AGVs or pneumatic tube system;

- A centralised sterile services model should be planned with delivery direct to each department;

- Pathology samples will be transferred via the pneumatic tube system and results will be available electronically;

- Equipment will be transported via the clean and dirty supplies lifts; and

- The different categories of waste (general, recyclable, clinical and cytotoxic) will each be subject to a separate treatment.

6.4 Design Constraints on the UHG site

The section above outlines the optimal design criteria for a new build hospital and considers factors such as critical adjacencies which are required for patient safety and efficient operations. There will be difficulties achieving the optimal design on the congested UHG site. Examples of those difficulties are outlined below:

- **Basement spine corridor** – the corridor will be used predominately (in conjunction with lifts) by staff and AGVs to move supplies, medications and equipment around the hospital to allow for optimal flow. The basement should also include most of the hospital services utilities. Building a new spine corridor on the UHG will be difficult as some buildings on site will not be demolished and therefore the AGV's will not be able to service the whole estate.

- **Location of Ward blocks** – A number of existing ward blocks are approaching the end of their useful lives. The available locations for new ward blocks are unrealistic given the only available space is on opposite sides of the UHG site. This will create difficulties in achieving the segregation of patient, public and staff pathways. For example, inpatients may have to be transported through outpatients to reach the ward block.

- **Floor to ceiling heights** - The floor to ceiling heights in the retained structures on the UHG site will be lower than the heights in any new development, due to current planning and design legislation. The different floor heights will need to be addressed by sloping the corridors which join the two buildings or building steps with trolley lifts to accommodate patient transfers, at the points the new and old buildings join.

- **Continuation of services –** The UHG site is intensely developed with a large number of single storey or low rise buildings. The transition to more efficient use of the site and greater volume (i.e. taller buildings) to deliver the required 195k Sqm will require a multiphase approach sometimes moving functions or departments more than once. This may make the integration of services and delivery of care increasingly difficult throughout the development phase.

- **Phasing and deliverability -** The congested site will result in increased complexity when phasing works. For example construction contracts may be need to be distilled down to manageable sizes which allows the services on site to continue with minimal disruption and to manage health and safety risks. This may lead to a delayed construction time line and increased costs.

- **Decanting –** Decanting will be a complex task as services will need to be moved out of buildings before that building is demolished and replaced. Services will then transfer to the

new building to allow the demolition of the site they move from. This may result in services moving multiple times during the construction phase

– **Potential for further expansion –** The congested site requires taller buildings (6 floors and above) to exploit the plot ratio. This requires significant upfront funding which may be a further constraint.

6.5 Conclusion

This section outlines the optimal design criteria for a new build hospital including how the design might impact on quality of care, the service delivery model and the wellbeing of all users. As outlined above, building the scale of development required on the UHG site will be complex, however those complexities may be managed and there are examples of a number of international hospital projects which were developed on more challenging sites.

The site in Merlin Park is a less complex building project to design when compared to the UHG site. That is not to say a development on Merlin Park will be without risk or complexity. Those risks have been evaluated in greater detail as part of the options evaluation workstream, which is outlined in detail in Section 8.

The Key Design Principles presented within this section form the baseline requirement for any new development and were kept at the forefront of discussions when determining the long-list of options which were proposed to deliver against the programme objectives.

7 Long-listed Options

7.1 Overview

The Project Team identified a significant gap between the existing capacity of GUH and the current demand, evidenced by the number of patients from the Saolta catchment area on waiting lists and having to receive treatment in Dublin combined with high activity levels which leads to overcrowding in ED and unavailability of beds. The projected increase in demand will lead to negative health related outcomes if additional capacity is not delivered. Furthermore, the age and condition of the buildings on the GUH sites suggest underinvestment in infrastructure over many decades.

It should be noted that a service delivery redesign program was outside the scope of work for this Report. The Saolta Group advised that all material efficiency measures that are feasible within existing resources were being implemented. In addition, Saolta continues to review its operating model and identify any further improvements. For the avoidance of doubt, the demand analysis included the efficiency and substitution methods referenced in Section 5. This analysis included a review of Saolta and National Strategy, which resulted in the 2031 projected bed capacity requirement reducing from 1,280 to 935. A reduction of 345 beds.

To address the current and future capacity constraints, the Project Team developed a number of infrastructure options and then considered the feasibility of each one to shortlist the options. This analysis is outlined below.

7.2 Options Identification and Specification

In carrying out the options appraisal of a capital project, it is important to consider alternative means of delivering the sought-after benefits. The PSC requires that all realistic alternative ways of achieving the stated objectives are examined critically, and that in particular the “Do Nothing” option be considered.

The Project Team held a number of workshops with the Steering Group in order to determine potential options that would be suitable for the requirements of GUH. The following options were considered:

Option 1: Do nothing

Continue with the current operation of the acute hospital with no refurbishment or expansion of facilities. This option would involve undertaking no improvements in the functionality of the hospital.

Benefits

– No disruption to existing services;

Issues

– No opportunity to address patient care and safety issues, which will get progressively worse;

– Further disruption to the delivery of clinical services over the medium-long term due to lack of capacity;

– The physical issues facing the current hospital would remain unresolved;

– There would be significant limitations in providing the necessary capacity, improved significant adjacencies and workflow within the hospital to cope with current and future demand;

– No or little opportunity to improve the patient experience e.g. patients waiting in corridors during busy periods;

– No opportunity to improve staff experience;

– Estates issues relating to building condition, safety and access remain;

– This option is inconsistent with the national policies as outlined in Section 3 of this report; and

– No opportunity to re-profile workforce as a critical mass of services through co-location, as this would not be achieved.

For the reasons above, Option 1 'Do Nothing' is not viable.

Option 2: Redevelop UHG site

This option involves the redevelopment of the existing UHG site over the longer term and the relocation of services currently provided at MPUH to UHG. In order to facilitate this, some buildings would be re-developed while others would be demolished and re-constructed.

Benefits

– Hospital will be designed specifically to meet the future needs of the acute and elective services and deliver improved facilitates for the long term;

– Provides patients with access to 21st century facilities;

– Provides accommodation to meet future demand;

– Improved patient and staff experience;

– Improved accessibility;

– Impact on other Saolta hospitals given ability to refer specialty patients;

– The capacity and safety issues associated with the current hospital would be resolved;

– Benefits of workforce re-profiling can be maximised through co-location;

– There would be a significant contribution to the quality and functional suitability of the site;

– Design changes would improve adjacencies, patient pathways, clinical workflow and address current limitations created by the dispersed nature of services on the site;

– Meets the National Strategy Objectives as outlined in Section 3 of this report; and

– The MPUH site would be freed up for alternative purposes.

Issues

– Constraints to optimal design to support pathways of care due to the need to integrate old and new buildings on a congested site;

– Significant disruption to existing services likely to occur due to congested nature of the site and the extent of services currently being undertaken on the site;

– Limited opportunity for future expansion due to size and location of the site;

– Some access issues will continue to exist due to the site being located within the city centre;

– Short term solutions may be needed in the interim which may require some investment.

Option 3: Build new hospital on MPUH site

This option involves building a new elective and acute on the MPUH site and the relocation of services currently provided on the GUH site to the MPUH site. Locating all of the services on one site reduces duplications in terms of administrative services, creates economies of scale and also allows the hospital to work more cohesively. It is also possible to achieve this option on a phased basis due to the space available at MPUH.

Benefits

– Hospital will be designed specifically to meet the future needs of the acute and elective services and deliver improved facilitates for the long term;

– Provides patients with access to 21st century facilities;

– Provides accommodation to meet future demand;

– Improved patient and staff experience;

– Improved accessibility at this location as outlined in Appendix A.4.

– Impact on other Saolta hospitals through ability to refer specialty patients;

– The capacity and safety issues associated with the current hospital would be resolved;

– Benefits of workforce re-profiling can be maximised through co-location;

– There would be a significant contribution to the quality and functional suitability of the site;

– A purpose build facility will allow for optimal clinical pathways including segregated inpatient, outpatient and ED patient pathways, incorporating a basement spine corridor for deliveries and staff transfer, incorporate smart technologies and maximising the innovation which may be achieved through design;

– Minor disruption to existing services, as this site is currently underutilised and there is sufficient space to build;

– The UHG site would be freed up for alternative purposes;

– Meets the National Strategy Objectives through a phased approach; and

– The design could be developed to ensure in built flexibility for the future.

Issues

– Due to the phased completion of the project, some clinical adjacencies could be adversely affected in the short-term;

– The site accommodates a number of community buildings including: Community Healthcare Organisations; Children & Adolescent Mental Health Services; Regional Management & Administration Staff; Training, Day Care Centre & Social Club and St Anne's School. These will need to be relocated in order for the hospital to be built on this location;

– There are planning challenges due to the protected forest located here; and

– Short term solutions may be needed in the interim which may require some investment.

Option 4A and Option 4B:

This option involves splitting acute and elective care by locating each on either the MPUH site or UHG Site as depicted below.

Complex Acute, Oncology	Low-Acuity, Elective, Day Surgery & Ambulatory Care
ED ICU Maternity	Closed weekends

Option 4a was assessed with building an acute Hospital on the UHG site and an elective Hospital on the MPUH site and vice versa for option 4b.

Benefits

– Hospital would be designed specifically to meet the future needs of the acute and elective services and deliver improved facilitates for the long term;

– Provides patients with access to 21st century facilities;

– Provides accommodation to meet future demand;

– Improved patient and staff experience;

– Improved accessibility;

– Impact on other Saolta hospitals through ability to refer specialty patients;

– The capacity and safety issues associated with the current hospital would be resolved;

– There would be a significant contribution to the quality and functional suitability of the Estate;

– Meets the National Strategy Objectives; and

– Design changes would improve adjacencies and workflow and address current limitations.

Issues

– Inefficiencies and duplication of services and costs likely to occur due to the hospital being located across both sites, however as both hospitals will be new builds these can be mitigated to some degree;

– Due to the phased completion of the project, some clinical adjacencies could be made worse in the short-term;

– Short term solutions may be needed in the interim which may require some investment;

– Limited opportunity to re-profile workforce as a critical mass of services through co-location, as this would not be achieved;

– Some access issues will continue to exist due to the UHG site being located within the city centre;

– Neither the UHG nor MPUH sites would be freed up.

Option 5: Purchase of new site

This option involves the purchase of a new site in Galway for the development of a new model 4 hospital. The existing services currently undertaken at both GUH and MPUH would be re-located to the new site over the longer term.

Benefits

– Hospital will be designed specifically to meet the future needs of the acute and elective services and deliver improved facilitates for the long term;

– Provides patients with access to 21st century facilities;

– Provides accommodation to meet future demand;

– Improved patient and staff experience;

– Improved accessibility;

– Impact on other Saolta hospitals through ability to refer specialty patients;

– The capacity and safety issues associated with the current hospital would be resolved;

– There would be a significant contribution to the quality and functional suitability of the site;

– Design changes would improve adjacencies and workflow and address current limitations;

– Benefits of workforce re-profiling can be maximised through co-location;

– The Project would no longer need to be phased as the new hospital would be built on a greenfield site rather than a brownfield site;

– Limited disruption to current services as the new hospital would be built on a greenfield site;

– Meets the National Strategy Objectives; and

– Both the UHG and MPUH sites would be freed up for alternative purposes.

Issues

– KPMG undertook a high level review of large vacant sites in the Galway City area and was unable to find any obvious development locations.

– Short term solutions may be needed in the interim which may require some investment;

– There could be difficulty in locating a large site to build the new hospital;

– Planning permission could take a considerable amount of time;

Option 6: Purchase of private hospital in the Galway region

This option involves the purchase of a private hospital in the Galway region. As the private hospitals are small in size, this option would also involve the development of a hospital across two sites. Under this option, either MPUH or GUH would be retained and redeveloped in order to meet the additional capacity required.

Benefits

– Hospital will be designed specifically to meet the future needs of the acute and elective services and deliver improved facilitates for the long term;

– Provides accommodation to meet future demand;

– Improved patient and staff experience;

– Improved accessibility;

– Impact on other Saolta hospitals through ability to refer specialty patients

– Depending on the new private hospital, the capacity and safety issues associated with the current hospital could be resolved;

– Depending on the condition of the new private hospital, there could be a significant contribution to the quality and functional suitability of the site;

– Either the UHG or MPUH sites would be freed up.

– Depending on the condition of the new private hospital, design changes would improve adjacencies and workflow and address current limitations.

Issues

– Limited opportunity to purchase a private hospital in Galway;

– Due to the phased completion of the project, some clinical adjacencies could be made worse in the short-term;

– Short term solutions may be needed in the interim which may require some investment;

– Inefficiencies and duplication of services and costs likely to occur due to the hospital being located across both sites;

– Less opportunity to control what services are located on which site;

– Nationalisation of Private Hospital bed capacity reducing the private hospital market in the Galway region;

– Limited opportunity to re-profile workforce as a critical mass of services through co-location, as this would not be achieved; and

– Expensive path to pursue as you are buying a trading asset.

7.3 Constraints

With respect to any project, there are invariably some constraints to reaching the objectives. This section explores these constraints in order to limit the range of options to those that are feasible or acceptable. The constraints applying to the options are set out below and in Table 4.

1) **Financial Constraint – initial investment**: funding options for the development are not yet clear and financing may not be available for a number of years.

2) **Financial Constraint – ongoing costs**: the purchase of a private hospital in the Galway region by Saolta would involve a significant purchase price premium to compensate for foregone private revenue.

3) **Capacity Constraint**: under the 'Do Nothing' option, there will be an ongoing and growing constraint in term of ability to cater for the demand in the Galway region

4) **Clinical risk constraint**: Saolta has indicated that the current infrastructure is both unsuitable and inadequate, resulting in very serious safety issues

5) **Planning risk constraint**: planning issues such as height restrictions may exist with the UHG site due to its inner city location. Planning and environmental issues may also exist with the MPUH site due to the natural heritage and fauna surrounding the land zoned for developments. The time required to gain planning permission may vary depending on the zoning, and other factors associated with, the site.

6) **Co-operation required from other interests**: the 'purchase of new site' option and the 'purchase of new hospital' option require co-operation from external parties, which may not be achievable.

Table 4: Constraints applying to each option

Constraints	Option 1: Do Nothing/Do Minimum	Option 2: Redevelop UHG	Option 3: Build new hospital on MPUH site	Option 4a and 4b Twin Development	Option 5: Purchase of new site	Option 6: Purchase of private hospital
Financial (Initial Investment)		✓	✓	✓	✓	✓
Financial (Ongoing Costs)	✓					✓
Capacity	✓					✓
Clinical risk	✓					
Planning risk		✓	✓	✓	✓	
Co-operation from other interests					✓	✓

7.4 Shortlisting of Options

A workshop between the Steering Group (for the avoidance of doubt the Steering Group included clinical input to ensure that quality and patient safety is at the forefront of all aspects of decisions) and the Project Team reviewed the options and agreed option 5 (purchase of new site) and option 6 (purchase of new private hospital), should be discounted for the following reasons:

Option 5: Purchase of new site

– GUH's management team noted that GUH already has two sites, one of which is significantly underutilised. Therefore purchasing a third site would likely result in a number of inefficiencies and would also not address a number of the issues currently being experienced in GUH.

– There is difficulty identifying an appropriate site in Galway city. It is likely that this would result in time delays for the commencement of the Project and any new site is also going to require planning permission.

Option 6: Purchase of new Private Hospital

– The removal of hospital capacity from the Galway region would likely have adverse impact on healthcare services.

– The disruption to the overall healthcare market is likely to outweigh any benefits.

– This option would require co-operation from third parties i.e. willingness to sell their hospital which may not be achievable.

The detailed quantitative and qualitative appraisal has therefore been completed on the following shortlisted options:

– Option 1: Do nothing (retained for completeness only – quantitative costs and benefits associated with this option are not included, as this option is not viable)

– Option 2: Redevelop UHG site

– Option 3: Build new hospital on MPUH site

– Option 4(a): Acute UHG and Elective MPUH

– Option 4(b): Acute MPUH and Elective UHG

7.5 Conclusion

Now that the five shortlisted options (listed above) had been agreed, the next stage was to carry out an economic appraisal to determine which option could deliver the most benefit to Saolta and the Region, in line with the programme objectives.

8 Economic Appraisal of Short-listed Options

8.1 Introduction

The economic appraisal takes into account the external/unpaid for costs/benefits of the project, evaluated from the perspective of society as a whole. The options are evaluated on both a quantitative and qualitative basis, paying particular attention to the additional health benefits for patients, to the greatest degree possible. The qualitative and quantitative appraisals of the options analysis were conducted separately, an options evaluation workshop being the basis of the qualitative analysis, with a financial model being the basis of the quantitative appraisal. Further details of both appraisals are outlined below.

8.2 Qualitative Appraisal

In accordance with the PSC, a formal non-financial appraisal of the 4 shortlisted options was undertaken. This was carried out by a multi-disciplinary group of stakeholders and involved a sequential and systematic approach covering:

– Criteria selection;

– Weighting of criteria to reflect their relative importance;

– Consideration of the options and scoring against the identified criteria; and

– Analysis of the results to establish the robustness of the conclusions

8.2.1 Qualitative Criteria

Prior to the options evaluation workshop, the Steering Group and Project Team determined and agreed upon the criteria and associated weightings that would be used to evaluate each of the options. The qualitative criteria and relative weightings are summarised and defined in Table 5 below.

Table 5: Qualitative Criteria Definitions and Weighing

Criteria	Weighing	Description/Definition
Quality and Patient Safety (including Patient Experience)	30%	Supports safe and sustainable service provision. Enhances patient pathways Provides secure and safe environment for patients Meets patient's expectations with respect to privacy and dignity
Access & Location	25%	Improves access to emergency services (transport) Improves access for patients to services. Facilitates ease of access for tertiary referrals (wider Saolta population). Supports improved integration with other services internal and external to hospital (to include community and academic partners).

		Reduces movement and travel distances between departments Provides improved accessibility (location & parking) Supports potential for further expansion Allows for phasing and deliverability of the programme
Ease of Implementation	25%	Minimises disruption to service delivery during implementation Can be delivered within the optimal timeframe (by 2031) Supports phasing for development of Elective Hospital as per National Development Plan (2040)
Staff	15%	Optimises use of staff resources Provides improved accessibility for staff (location & parking) Supports recruitment and retention of staff Supports enhanced provision of high quality training and education
Site Risk	5%	Minimises project delivery risks (e.g. planning approvals, construction, operational, maintenance, environmental and other site risks) can be mitigated

8.2.2 Options Evaluation

Following on from agreeing the shortlisted options and associated rating criteria, an options evaluation workshop was held on the 28th November and was attended by representatives from the Steering Group and Project Team. The workshop analysed each of the options and determined a Preferred Option based solely on the qualitative criteria.

The Project team led the workshop, taking the group through each of the criteria and analysing each of the five options in order to determine which was most likely to achieve all or most of the desired outcomes. As a result of this workshop, Option 3 – build on MPUH, was identified as the option that would provide the largest benefit to stakeholders from a qualitative perspective.

Table 6 below outlines the ratings awarded based on a rage of +/- 5, with +5 awarded for options that were highly likely to achieve all or most of the desired outcomes and -5 to be awarded to options that were highly unlikely to achieve any of the desired outcomes. The ratings outlined in Table 6 do not take into consideration the weighting associated with each of the criteria, as it was determined that this would allow the Steering Group to see a comparison across the board. Based on this assumption, a maximum score of 25 could be achieved if it was deemed that it was highly likely that all or most of the desired outcomes would be achieved

Table 6: Options Score – Not Weighted

Criteria	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Quality and Patient Safety	-5	4	5	3	3
Access & Location	1	3	4	3	3
Ease of Implementation	0	3	4	4	3
Staff	-5	4	4	2	2
Site Risk		4	3	5	4
Total (-25 to 25)	**-9**	**18**	**20**	**17**	**15**

For ease of interpretation, the results were converted to a score out of 100 and the applicable weighting applied. The final rating that each option achieved is outlined in Table 7 below, with option 3 – build on Merlin Park receiving the highest score of 92.5/100 from a qualitative perspective.

Table 7: Options Score – Weighted

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Quality and Patient Safety	30%	0.0	27.0	30.0	24.0	24.0
Access & Location	25%	15.0	20.0	22.5	20.0	20.0
Ease of Implementation	25%	12.5	20.0	22.5	22.5	20.0
Staff	15%	0.0	13.5	13.5	10.5	10.5
Site Risk	5%	2.5	4.5	4.0	5.0	4.5
Total/100	**100%**	**30.0**	**85.0**	**92.5**	**82.0**	**79.0**

8.3 Quantitative Benefits Appraisal

8.3.1 Economic appraisal

The economic appraisal takes into account the external/unpaid for costs/benefits of the Project, evaluated from the perspective of society as a whole. In particular, health benefits to patients are included, to the extent that these benefits are capable of quantification with reasonable accuracy.

In contrast, the financial appraisal is concerned with the financial costs and benefits of the Project to its promoter, in this case the Exchequer. This is addressed in the next section.

In undertaking the economic appraisal for the CBA, the following costs and benefits were considered:

Table 8: Costs and Benefits to be considered in Economic CBA

External/Unpaid for	
Costs	Shadow price of public funds.
Benefits	Additional health benefits to patients (including improved quality of care and experience, patient safety, dignity & privacy, and better infection control and prevention) from enhanced facilities and delivery of care. Reduced waiting times for treatment and average lengths of stay. Additional earnings for ex-patients due to better health. Reduced suffering/distress/disruption on the part of family and friends, and saved time due to health benefits for patients. Servicing existing, as well as forecast increases in, demand

Each of these categories is assessed in the following sub-sections, over the lifetime of the project and for each of the options under consideration.

8.3.2 Shadow Price of Public Funds

Taxation gives rise to economic distortions by altering the incentives facing economic agents, leading to changes in their behaviour and reduced economic activity. For this reason, the shadow price of public funds is greater than one.

This project relies on Exchequer funding. As such, it is necessary to make an adjustment for the shadow price of public funds. An uplift adjustment on Exchequer funding of 30% on capital expenditure has been made in accordance with the PSC.

8.3.3 Additional Health Benefits

The key health-related benefits that this project delivers are in terms of providing larger capacity and fully up-to-date facilities with which the hospital can deliver its services. The deliverables, their impact and health benefits are summarised in the following table and discussed in more detail in the following sub-sections.

Table 9: Health – Related Impacts of the Proposed Option

Project Deliverable	Impact	Measurable Health Benefits
New Build ED	Reduced waiting times for ED patients Reduced inpatient length of stay as a result of reduced ED waiting time	Value of time saved by patients Inpatient bed occupation avoided Better health outcomes due to less time waiting
New Build Inpatient	Increased patient capacity Higher quality facilities and accommodation Appropriate facilities to undertake higher complexity procedures Reduced patients travelling to Dublin	Enhanced patient capacity Improved patient experience and privacy Increased capacity to undertake complex procedures
New Build Outpatient	Improved and appropriate facilities to undertake higher complexity procedures	Supports move to ambulatory care
New Build Daycase	Increased patient capacity Higher quality facilities and accommodation Appropriate facilities to undertake higher complexity procedures	Enhanced patient capacity Increased capacity to undertake complex procedures Supports move to daycase care from IP care which resolves patient risk due to reduced length of stay

8.3.3.1 *New Build ED*

Time Saved Waiting in ED

The ED at UHG is currently non-compliant with government policy for waiting time targets. The targets require the ED to deal with 95% of attendees within 6 hours and then the remainder within 9 hours. However, at present c. 54% of attendees have patient experience time of less than 6 hours, with c. 70% having patient experience time less than 9 hours.

Under each option, it is assumed that the project (including greater ED capacity, additional bed capacity and improved patient flows) will alleviate patient waiting times and abolish the practice of patients being care for on trolleys. The Project Team assumes that the new ED will enable the hospital to meet the 95% of attendees within 6 hours and the remainder within 9 hours. This will result in the following:

Table 10: Time saved waiting in ED

Target	Time saved
95% within 6 hours	16% of the current attendees within 9 hours will now be treated within 6 hours, thus resulting in time saved of 3 hours 25% of the current attendees being treated after 9 hours will now be treated within 6 hours. A current treatment time of 11 hours was assumed and thus time saved will be 5 hours.
5% within 9 hours	5% of current attendees being treated after 9 hours will now be treated within 9 hours. A current treatment time of 11 hours was assumed and thus time saved will be 2 hours.

Greater ED capacity – combined with additional bed capacity and improved patient flows – should result in reduced waiting times for attendees. A monetary value of these reduced waiting times can be estimated, based on defined time values. The PSC CBA guidance refers practitioners to the DTTAS Common Appraisal Framework (CAF) in calculating time value. The CAF specifies that the market value of commuting time is €14.03 (2011 figure), which when adjusted for inflation equates to €15.15 (2019) for the Project model.

Resultant Reduced In-Patient Length of Stay

Reducing patients waiting time/length of stay in ED (through increasing capacity) leads to a reduced length of stay in hospital, once admitted as an inpatient. An Australian study, Liew et al. (2003) indicates that the average length of stay in hospital based on hours spent in ED were as follows:

– ≤ 4 hours: 3.73 days

– 4 - 8 hours: 5.65 days

– 8 - 12 hours: 6.60 days

– > 12 hours: 7.20 days[30]

At present, approximately 27%[31] of ED attendees are admitted as inpatients. This is in line with national norms and it is assumed that this will be maintained into the future for the purposes of calculating this benefit. Furthermore, based on the time saved waiting in ED, the majority of ED patients would save on average 0.93 days (6.60 days less 5.65 days). It is estimated that the excess inpatient bed days generated by reducing waiting times amounts to (approximately) an additional 16,460 in-patient bed days based on current demand. The Health (Amendment) Act 2013 has set down in legislation that the average cost of treating patients in an acute setting is €1,000 a night. As a result of a reduced length of stay, this would be a cost avoided to GUH.

It should be noted the €1,000 per night charge has not increased in the period 2014 to present. A recent report noted that expenditure on healthcare increased by €2.6bn (19%) in the period 2013 to 2018. This suggests the €1,000 per night charge is understated.

There is also additional pain, suffering and lost time to patients. While the pain and suffering are difficult to measure, lost time can be:

(i) measured, on the basis of 16 waking hours per day per inpatient, and

(ii) valued based on values specified in the CAF (as above).

Other options

All the options with the exception of 'Do Nothing' deliver the full increased ED capacity and thus the full benefits as estimated above apply.

[30] Emergency department length of stay independently predicts excess inpatient length of stay, Liew et al.
[31] UGH data

8.3.3.2 *New Build In-patient*

This arises in all the options with the exception of 'Do Nothing'. Benefits arise in terms of better patient experience and privacy, elimination of waiting lists and reduced lengths of stay and avoidance of the need to travel from the Saolta region to other hospitals in Dublin.

Elimination of waiting lists

The ambition for the future hospital is to eliminate all waiting lists. As such, the number of patients on the different waiting lists (Inpatients, Radiology, Cardiac Investigations) have been included as part of the current demand. Further analysis may be required to refine estimates of the number of additional staff that may be required.

Using the current and forecast demand and capacity analysis data, it is estimated that the construction of the new hospital will enable 3,414 additional patients to be seen, based on 2017 figures, however this amount will grow into the future. This will result in reduced pain, suffering and lost time for patients. While the pain and suffering are difficult to measure, lost time can be:

(i) measured, on the basis of 16 waking hours per day per inpatient, and
(ii) based on time value specified in the CAF, as above.

Improved Patient Experience & Privacy

In terms of patient experience, patients will move from multi-bed wards that are over-crowded to single bed rooms in a modern facility that is fully compliant with all quality standards. The new facilities will also reduce the risk of infection between patients (e.g. CPE and MRSA).

GUH will have approximately 290,102 bed days per annum on average, based on the projected scenario. GUH already have 23,270 single room bed days and as such this benefit has been calculated on 266,832 bed days. The overnight single room accommodation charge for private patients in a 5th Schedule Hospital in 2014, under the Health (Amendment) Act 2013 (i.e. €1,000 per night).[32] It should be noted the €1,000 per night charge has not increased in the period 2014 to present. A recent report noted that expenditure on healthcare increased by €2.6bn (19%) in the period 2013 to 2018. This suggests the €1,000 per night charge is understated. This Report assumes a €500 per night value for this benefit, on the basis that:

– This assumption is consistent with the recent ED CBA.

– The difference in costs between a multi-occupancy and single occupancy room charged is €187 (i.e. €813 versus €1,000 per night), which represents the minimum value that could be reasonably assumed to apply to this benefit.[33]

– Given the additional benefits associated with infection control, "privacy, better sleep due to noise reduction, reduced probability of medication errors and diet mix-ups"[34], a €500 per night estimate represents a reasonable proxy for this benefit.

[32] Health Budget Oversight & Management: Alignment of Health Budget and National Service Plan
[33] Health Budget Oversight & Management: Alignment of Health Budget and National Service Plan
[34] The Use of Single Patient Rooms versus Multiple Occupancy Rooms in Acute Care Environments "Coalition for Health Environments Research" 2004.

– Yet another important aspect of single-bed room provision concerns intensive space utilisation and multiuse of space, including re-use for other functions. Single-bed in-patient rooms provide the ability to increase room utilisation – from a 75–85% average to, theoretically, 100 percent. This is due to the elimination of patient "incompatibility" factors such as differences in sex, diagnoses, and disease communicability. Furthermore, single-patient rooms enable more treatments to be administered by the bedside, thus reducing the need to transport patients to procedure rooms off the unit, and they can accommodate changing levels of care to be provided in one location, rather than transferring patients to different nursing units. Finally single-bed patient rooms give hospitals a competitive edge, providing more desirable "private" patient rooms, which can be personalised and offer "move in" space for patients' visitors and family members[35]

For completeness, the new facilities will also reduce the risk of personal injury and public liability claims to Saolta. This potential benefit is not capable of quantification with reasonable accuracy, at this stage, and has therefore not been included in the analysis.

In-patients patients travelling to Dublin Hospitals

Significant numbers of in-patients receive treatment in Dublin Hospitals due to lack of specialist capacity in the Saolta Hospital Group. In 2017, 4,204 in-patients from Saolta's catchment area were treated in Dublin Hospitals. Time is lost by patients travelling to Dublin which is estimated at 5 hours (2.5 hours each way). Time is also lost in terms of excess journey time for visitors travelling to Dublin. An average of two visits per in-patient and 1.5 persons per visit was assumed. The lost time is valued consistent with the CAF, as above. This approach is consistent with Sláintecare which is outlined in Section 3.3.1.

8.3.3.3 *New Build Daycase*

Daycase patients travelling to Dublin Hospitals

A large number of daycase patients seek care Dublin Hospitals due to limited capacity in the Saolta Hospital Group. A total of 9,864 daycase patients travelled to Dublin Hospitals for treatment in 2017. Time is lost by patients travelling to Dublin, which is estimated at 5 hours (2.5 hours each way). Time is also lost in terms of excess journey time for visitors travelling to Dublin. An average of one visit per day case and one person per visit is assumed. The lost time is valued consistent with the CAF, as outlined above.

Other options

All the options with the exception of Do Nothing deliver the full increased capacity and ability to deliver more complex procedures and thus the full benefits as estimated above apply.

8.3.4 Improved Experience of Family and Friends

This benefit relates to reduced suffering/distress on the part of family and/or friends due to improved outcomes for patients. It is difficult to quantify and value these benefits. One way of quantifying is to assume they act as a complement to the benefits experienced by patients, which

[35] Kobus et all 200

were estimated earlier in this section. Family and/or friends are likely to be related in some reasonably constant way, i.e. the greater the benefit for the patient, the greater the benefit for family and friends. In other cases the Project Team are aware of these benefits are estimated at approximately 20% of patient benefits. Therefore, 20% was applied to the patient health benefits estimated above, with the exception of waiting time and visitor travel time with respect to patients travelling to Dublin, as the additional time and other costs incurred by family/friends has already been valued in these cases.

8.3.5 Servicing existing and increased demand

The new hospital development will ensure that GUH has the ability to, at a minimum, continue treating its current capacity of patients. Under the Do Nothing option, there will be economic costs associated with treating these patients elsewhere.

The Health (Amendment) Act 2013 values an overnight stay at €1,000 a night per patient in a 5th Schedule Hospital.[36] This value has then been multiplied by the average length of stay and patient numbers for inpatients, day cases and ED visits (as estimated in the demand analysis). It should be noted the €1,000 per night charge has not increased in the period 2014 to present. A recent report noted that expenditure on healthcare increased by €2.6bn (19%) in the period 2013 to 2018. This suggests the €1,000 per night charge is understated.

As there was limited information available for the average length of stay for outpatients (and given that the duration of an outpatient's stay is usually short), this Report has not quantified benefits associated with the treatment of outpatients.

8.3.6 Overview of Economic Benefits

Table 11 below outlines that under Options 2 – 4b, there is an estimated resultant real economic benefit of €55bn through pursuing a new hospital development in Galway. By deducting the present value of cost estimates, the Net Present Value, and subsequent net benefit, of options 2 – 4b is estimated at €10.6bn. This analysis assumes a 5% discount rate, consistent with the Public Spending Code at the time this analysis was developed. Due to the benefits having been determined based on a common number of patients (i.e. each option will cater for the total expected demand), the quantitative benefits across these options are consistent.

The below table outlines the benefits that will be realised over a 30 year operating period. However, one point to note is that the Project's timeline will have an impact on when these benefits can be realised. As it is likely that funding and other constraints will impact the Project Timeline, two construction timeframes were determined. Assuming a funding constraint exists, the Incremental Development timeline will result in operations being delayed until 2039, however if this is not the case, then services could commence in 2031, meaning that the economic benefits will be available 8 years earlier.

The table also illustrates that there is no benefit applicable with the 'Do Nothing' Option. This is due to the fact that the 'Do Nothing' Option is unable to service demand at present or in the future.

[36] Health Budget Oversight & Management: Alignment of Health Budget and National Service Plan

Table 11: Economic Benefits in Real Terms

	Option 1: Do Nothing	Total Benefits: Options 2 – 4b	Annual Benefits: Options 2 – 4b
Time Saved Waiting in ED	N/A*	€57m	€2m
Reduction in In-Patient Length of Stay	N/A*	€664m	€22m
Elimination of In-Patient Waiting Lists	N/A*	€33,387m	€1,113m
Improved Patient Experience and Privacy	N/A*	€4,003m	€133m
Avoided travelling to Dublin	N/A*	€110m	€4m
Improved Experience of Family and Friends	N/A*	€7,524m	€251m
Economic Cost Avoided of Servicing Patients in GUH	N/A*	€9,231m	€308m
Total Benefits	N/A*	€54,976m	€1,833m

*Note: * As outlined in Section 7, Option 1 'Do Nothing' is not viable. As such, costs and benefits associated with this option are not applicable.*

The report on the New Children's Hospital suggests the business case overstated the maturity of the New Children's Hospital and overestimated the confidence in the forecasts. For the avoidance of any doubt this Report is a preliminary business case to assess the feasibility of the proposed Project. Therefore the BCR and the figures on which they are based are preliminary and no level of certainty should be applied against them. If this Project gains approval to proceed to the detailed appraisal stage the advisors should state the level of certainty inherent in the forecasted numbers.

8.4 Conclusion

Following the assessment of economic benefits for each option, the next logical stage was to consider the financial implications of each in terms of both capital and operating costs and savings. This is discussed in more detail in the next section.

9 Financial Appraisal of Short-listed Options

The Financial Appraisal reviews the incremental financial costs and benefits of the Project that may be expected to flow to the promoter (i.e. the Exchequer).

Table 12: Exchequer Cashflow Revenues & Savings and Costs

Project Deliverable	Impact
Costs	Capital costs net of VAT, less residual value of buildings at the end of the evaluation period. Additional operating costs (direct and indirect)
Revenues & Savings	Additional revenues from patient charges Additional non-medical hospital income (e.g. car parking, retail) Reduction in transportation costs arising from consolidation of hospital site Reduction in ongoing maintenance costs

Each of these must be assessed over the lifetime of the project and for each option under consideration.

9.1 Capital Costs

Table 13 below provides a comparison between the high-level cost estimates for each option. According to the PSC the financial appraisal should consider VAT-exclusive costs.

The Capital Costs included in the AECOM cost report are an Order of Magnitude Costs, which should be used for comparative purposes of the proposed options only. There is currently no brief or design information upon which to base an accurate capital cost estimate. The Schedule of Accommodation prepared by STW is preliminary only and needs to be fully developed and agreed with Saolta. The Project Team recommends that an updated Development Control Plan is prepared for MPUH to define the Scope of the Project and associated Development Costs.

Table 13: Indicative capital costs for each option

Option	Construction	Equipment	Client Direct & Design	Project Contingency	Total Capital Costs (excl. VAT & Inflation)	Total Nominal Capital Costs (excl. VAT)	Total Nominal Capital Costs (incl. VAT)
1. Do Nothing	N/A*	N/A*	N/A*	N/A*	**N/A***	**N/A***	**N/A***
2. Redevelop UHG	€966m	€347m	€174m	€74m	**€1,591m**	**€2,543m**	**€2,944m**
3. Build MPUH	€1,082m	€361m	€195m	€82m	**€1,719m**	**€2,807m**	**€3,247m**
4a. Acute UHG, Elective MPUH	€1,046m	€356m	€188m	€80m	**€1,670m**	**€2,725m**	**€3,152m**
4b. Acute MPUH, Elective UHG	€1,162m	€373m	€209m	€87m	**€1,832m**	**€2,993m**	**€3,461m**

Source: KPMG analysis based on the AECOM capital costs, which have been adjusted for general inflation to convert them from real to nominal terms.

*Note: * As outlined in Section 7, Option 1 'Do Nothing' is not viable. As such, costs and benefits associated with this option are not applicable.*

Note: Design and construction costs in respect of the development of a helipad are included in the above capital costs, however this is subject to change as the location for the helipad is still to be confirmed.

Note: The timeframe for construction is estimated to be 10 years, commencing in 2029, for all of the options excluding the Do Nothing Scenario.

9.1.1 Residual Value

Existing buildings are assumed to have no value at the end of the operational period.

Infrastructure developed under each option is assumed to have a residual value the end of the Project Timeline. New buildings are estimated to have a useful life of 40 years based on standard straight line depreciation. As such, at the end of the operational period, it is estimated that the residual value will be 10% of total original cost of construction.

Table 14: Residual value for each option

Option	Residual Value of Buildings (excl. VAT)
Do Nothing	N/A
Redevelop UHG	€96m
Build MPUH	€111m
Acute UHG, Elective MPUH	€103m
Acute MPUH, Elective UHG	€116m

Source: KPMG Analysis

9.2 Additional Operating Costs

Operating costs are categorised between direct pay, direct non-pay, indirect pay and indirect non-pay. The incremental costs associated with operating the new facilities are included in the financial model across the Operating Period.

9.2.1 Direct Pay

Additional WTE staff will be required to operate the new hospital. WTE staff are assumed to increase in line with the number of additional patients, using the existing staff/patient ratio. Optional resourcing requirements will be reviewed in detail at the Detailed Business Case stage.

9.2.2 Direct Non - Pay

General non-payroll costs have been calculated based on current costs and are expected to increase in line with the increase in patient numbers.

Table 16: General Non-Payroll Costs Excluding Overheads and Maintenance

Point of Delivery	Cost per patient	Increase in Patients Treated in GUHs	Increase in Non-Pay Costs per annum
Inpatients	€2,419	35,842	€86.7m
Day cases	€257	41,155	€10.6m
Outpatients	€31	65,727	€2.0m
Emergency Department	€70	0	€0m
Total	**€2,778**	**142,725**	**€99.3m**

9.2.3 Indirect Pay

No additional indirect pay costs are expected to arise.

9.2.4 Indirect Non - Pay

9.2.4.1 *Maintenance*

Regarding the 'Do Nothing' scenario, it has been assumed that maintenance costs will continue at the current level of c. €5.8m per annum. However, for the other options, maintenance costs are estimated as follows:

– 1.25% of capital cost per annum for fully fitted elements; and

– 1% of capital cost of construction for shell & core elements.

To ensure the new facilities are maintained to the appropriate standard incremental maintenance costs are included in the model.

Table 17: Additional Maintenance Costs per Annum in Real Terms

	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Additional Maintenance Costs	N/A	€5.5m	€7.1m	€6.3m	€7.8m

The whole of lifecycle cost estimates do not provide for the replacement of equipment, due to uncertainty associated with advances in technology and costing of such equipment.

9.2.4.2 *Overheads*

Overheads are assumed in increase in line with the increased footprint of the new build

Table 18: Additional Overheads per Annum in Real Terms

	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Additional Overheads	N/A	€7.3m	€8.1m	€8.6m	€9.7m

9.3 Revenues & savings

9.3.1 Medical

Under each of the options except the 'Do Nothing' scenario, additional revenue will be generated as more patients will be treated. Additional revenue for the numbers of people on waiting lists and the number of patients currently travelling to Dublin hospitals is included as all those patients are expected to be treated in the new hospital.

Outpatients are not currently charged for services patients attending ED are expected to remain at the same level. Therefore, no additional revenue is included for inpatient or ED patients.

Based on current hospital charges, the expected increase in patients treated at GUH each year will result in an annual increase in revenue of c. €20.9m. The analysis of this revenue increase is outlined in Table 19 below.

Table 19: Medical Revenue Increase per Annum in Real Terms

Patient Type	Rev per Patient	Average Length of Stay	Increase in Patients Treated in GUH	Revenue Increase
Inpatient	€80	6.15	35,842	€17.6m
Day Case	€80	N/A	41,155	€3.3m
Total			**76,997**	**€20.9m**

9.4 Conclusion

Now that both the economic and financial impact of each option had been considered, the next step was to compare the financial implications of each through a Cost Benefit Analysis (CBA) exercise.

10 Cost Benefit Analysis

From a quantitative perspective, the CBA compares all revenues and costs on an equivalent basis on an NPV basis. The NPV for each option is equivalent to discounted benefits and/or revenues minus discounted costs and/or expenditure. The discount rate used is 5%[37] (consistent with the PSC). Discounting brings all figures to a common base for comparison and stimulates the cost of financing over the evaluation period. A positive NPV indicates that the benefits of investing outweigh the costs. This is also represented by a BCR that is greater than 1.

10.1 Investment decision

The following table summarises the results of the CBA, displaying both the NPV and BCR of each option.

Table 20: Results from CBA

	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
NPV total	N/A*	€6,516m	€6,316m	€6,370m	€6,164m
NPV of Benefits (incl. Rev)	N/A*	€10,715m	€10,715m	€10,715m	€10,715m
NPV of Costs	N/A*	(€4,199m)	(€4,399m)	(€4,345m)	(€4,551m)
BCR	**N/A***	**2.55**	**2.44**	**2.47**	**2.35**

Note: As outlined above, Option 1 'Do Nothing' is not viable. As such, costs and benefits associated with this option are not applicable.

Each option achieves a positive NPV and a BCR of greater than 1. The difference between the options is marginal. This demonstrates that the benefits of investing in new hospital facilities outweighs the costs, irrespective of the option selected.

[37] The Secretary General of the Department of Public Expenditure and Reform Robert Watt gave a speech at The Oirechtas Joint Committee on Climate Action on 14 November 2018. In that speech he indicated that the discount of 5% will reduce to 4% and for longer term projects, this discount rate will decline over time. A reduction in interest rates will increase the BCR of any given project. 5% has been used in this case as the PSC guidance has not, to date, being updated to reflect the Speech. Table 27 provides a sensitivity analysis which indicates the BCR will increase from 2.44 to 2.56 if a discount rate of 4% is applied to the projected cashflows of this Project. The Secretary General's speech indicated a reduced discount rate may be applied to long term projects. Therefore, a discount rate of less than 4% may be applied to the later years of this project, if the PSC is updated to reflect the Secretary General's speech.

10.2 Sensitivity analysis

This section of the Report analyses a range of scenarios, to evaluate the impact of varying our assumptions, regarding each of the main costs and benefits discussed in this report.

As outlined in the table below, the sensitivity analysis highlights critical factors and the areas that may require further analysis in order to quantify the key outputs of the CBA more accurately.

Table 21: Summary of Scenario Analysis Test

Sensitivity Factor	Impact of NPV for the Preferred Option		
	NPV & BCR downside	NPV & BCR Base	NPV & BCR upside
Construction Cost (+/-10%)	€6,129m	€6,316m	€6,503m
	2.34	**2.44**	**2.54**
Construction Cost (+40%)	€5,566m	€6,316m	-
	2.08	**2.44**	
Valuation of Benefits (+/-10%)	€5,433m	€6,316m	€7,199m
	2.23	**2.44**	**2.64**
Shadow price of construction labour (0.8)	-	€6,316m	€6,691m
		2.44	**2.66**
Discount Factor (+/-1%)	€4,491m	€6,316m	€8,891m
	2.30	**2.44**	**2.56**

Costs and Benefits

The construction costs contained in this Report represent Order of Magnitude Costs, which is a reasonable level of accuracy at the preliminary options analysis stage (refer to Appendix A.5 for further details). The analysis above illustrates the impact of an:

– **increase / decrease in construction costs of +/-10%**, which demonstrates a less than €200 million difference. This shows that the Project NPV is more sensitive to an equivalent **+/-10% change in the level of benefits** (which demonstrates almost a €1 billion change)

– **increase in construction costs of 40%**, which would represent a typical adjustment to account for the tendency of infrastructure projects to cost significantly more than estimated due to optimism bias.

Shadow Price of Construction Labour

The CEEU's guide to economic appraisal suggests that a shadow price of labour is considered within an assessment framework. This is where the undertaking of the project creates employment that would otherwise not be realised.

The CEEU's guide suggests that labour costs included in the CBA are adjusted by a factor within the range 0.8 to 1.0 to reflect these potential benefits.

We have considered that there could potentially be some positive effects from the capital delivery stage of the project. For operating costs, there is currently a shortage of medical professions, and so we would not expect there to be a material change in overall employment rates once the hospital had been extended. Typically, labour costs make up around 50% of infrastructure delivery (although it varies by project).

The regional unemployment rate in Ireland is currently around 6-8% and was 11.6% in Galway County in 2016[38]. This is significantly lower than it has been in recent years, which may suggest there would be less value from job creation now than at previous times.

Given this low unemployment level, we do not consider that a value towards the low end (0.8) of the range to be appropriate. We have modelled this as a sensitivity, but consider a factor close to 1.0 (i.e. no labour market benefit) to be the most appropriate assumption for the CBA.

10.3 Conclusion

The CBA exercise led to the conclusion that Option 3: Build New hospital on MPUH site was the most desirable option when both qualitative and quantitative considerations were taken into account. This is discussed in more detail in the following section of this report.

[38] https://www.cso.ie/en/media/csoie/newsevents/documents/census2016summaryresultspart2/Chapter_2_Unemployment.pdf

11 Preferred Option

As outlined in the following table, the qualitative evaluation of options identified Option 3 as the Preferred Option.

Table 22: Results from Options Evaluation Workshop

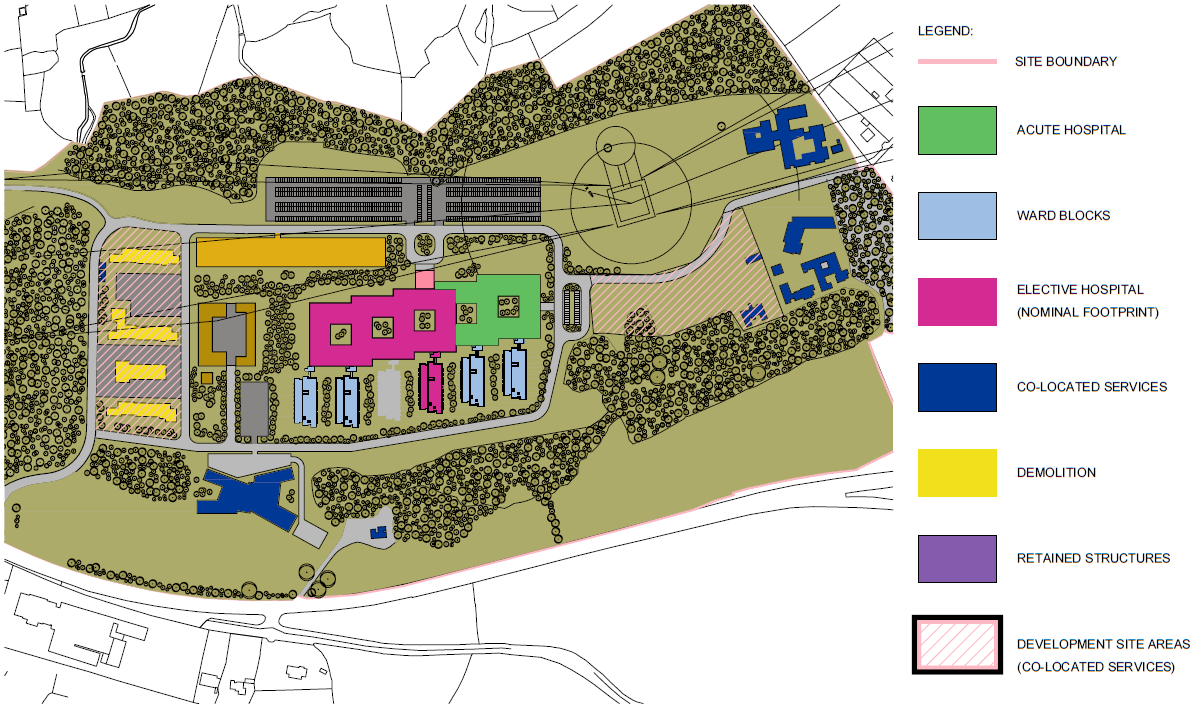
	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Total/100	30.0	85.0	92.5	82.0	79.0

The quantitative evaluation of options does not provide material findings that would change the result of the qualitative evaluation.

As such, this Report concludes that Option 3 should be progressed as the Preferred Option at the Detailed Business Case stage.

Figure 37 below outlines the indicative layout for the proposed clinical development on the MPUH site (the Preferred Option). This is merely a high level drawing as the final design will depend heavily on proposed clinical pathways, operating models, phasing and decant of current services, as well as further consideration for cost/benefit of demolishing certain existing buildings.

Figure 37: Indicative end state MPUH



11.1 Key Constraints

The move to MPUH is a major intervention in a single or two phase approach. The key constraints on the MPUH site which will impact the development of the Project include:

- Planning approval may be challenging particularly in light of ABP's recent decision to overturn GCC planning permission for a new hospice at Merlin Park;
- Enabling works including the decanting of existing buildings before demolishing the vacated units will be required as a first step;
- Public transport links (see Appendix A.4 for detailed accessibility report) will need to be expanded to service the new hospital in MPUH;
- An additional vehicular access road will be required; and
- The development of a heliport will impact on the location of co-located services.

An integrated stewardship plan for the parkland as a whole will also be required.

11.2 Implications for UHG

The aim for the UHG site in this scenario will be to leave the site free for future uses. These might be health, educational (NUIG), civic or commercial / housing subject to rezoning – this will be examined in more detail as part of the Detailed Business Case.

11.3 Conclusion

Although the Preferred Option aims to provide long-term sustainability to GUH, it will not provide the required capacity over the short and medium term. Interim developments have been considered to help maintain the high standard of care provided to the West and North West of Ireland in anticipation of delivery of the Preferred Option. These are discussed in more detail in Section 12 of this report.

12 Interim Priority Developments

As outlined in Section 4, many of the GUH facilities are (or are soon to be) at the end of their useful life. During the development of this Report, the Steering Group highlighted that the poor condition of the facilities is having a negative impact on the experience and safety of patients and staff. Some of the deficient infrastructure is in such a condition that Saolta must provide solutions as soon as practicably possible, while Saolta is planning and developing the Project.

In order to address the most critical areas as soon as practical, Saolta requested the Project Team to perform an additional scope of services. The table below highlights some the areas included in the Interim Priority Developments (Women's and Children's services, Cancer Care and Laboratories). The table also highlights other areas that are significantly below standard for which no interim works are proposed (for example, no solution for ward blocks is provided in the Interim Priority Developments). This approach is predicated on a new development proceeding with a reasonable timeframe. The Interim Priority Developments have been prioritised, having regard to the Preferred Option. As such, were Saolta to pursue a different Preferred Option, the timing and scope of any interim developments would require re-examination and updates to the associated estimated costs.

Table 23: List of Critically Deficient Buildings on UHG site

Ref.	Building	GFA (m2)	Current Department Name	Current Function Classification	Building Age	Current Functional Suitability	Current Building Condition
1.00	Maternity - Level 0	694	Maternity	Acute	> 40 years	D	5
2.00	Maternity - Level 1	4,178	Maternity	Acute	> 40 years	D	5
3.00	Maternity - Level 2	2,416	Maternity	Acute	> 40 years	D	5
4.00	Fever Hospital - Level 1	600	Dermatology & Cancer Services	Acute	> 40 years	D	5
5.00	Labs/Mortuary - Level 0	3,580	Labs & Mortuary	Acute	> 40 years	D	5
6.00	Labs - Level 1	770	Labs	Acute	> 40 years	D	5
7.00	Ward Block - Level 0	1,865	Wards	Acute	> 40 years	D	4
8.00	Ward Block - Level 1	1,857	Wards, Acute Dialysis, Maxillofacial & Oral Surgery	Acute	> 40 years	D	4
9.00	Paediatric Unit	1,650	Paediatric Unit	Acute	> 40 years	D	4
10.00	Stem Cell Lab	106	Cryobiology Lab	Acute	< 20 years	D	4
11.00	Main Hospital Block - Level 4	1,040	Endoscopy, HSSD	Acute	> 40 years	D	3
12.00	Outpatients & Oncology Day Care - Level 0	1,012	Out-Patients, Audiology, Eye Clinic	Acute	> 40 years	D	3
13.00	Outpatients & Oncology Day Care - Level 1	778	Haematology / Oncology	Acute	> 40 years	D	3
16.00	Outpatients & Oncology Day Care - Level 2	778	Haematology / Oncology	Acute	> 40 years	D	2
17.00	OPD Prefab (T7)	367	Rapid Access Prostate Assessment Clinic	Acute	< 20 years	D	2
15.00	Radiotherapy - Level -1	687	Radiotherapy	Acute	< 20 years	D	2
14.00	Main Hospital Block - Level 0	1,850	A&E, X-Ray, Urology	Acute	> 40 years	D	2
18.00	Modular Units	1,029	Neurology, Respiratory	Acute	< 20 years	D	2

ED block with Women's and Children's fit out

NPRO & Ambulatory Care Cancer Centre

Hatching indicates partially covered by new development

B&T Lab & Lab Extension

ED Block

	Current Functional Suitability
D	Unacceptable in its present condition, total rebuild or relocation needed
	Current Building Condition
5	Not economically feasible to refurbish / upgrade
4	Built over 25 years ago with full refurbishment & some structural upgrade required
3	Built over 25 years ago with full internal & minor facade refurbishment required
2	Built / Fully Refurbished within the past 25 years with minor refurbishment required

12.1 Proposed Projects

The tables below summarise the projects on the UHG site which currently in the planning or approval stage and those which the Steering Group identified as being urgently required to ensure continuity of service.

Table 24 Summary of proposed projects in planning / approval stage

Building	Status	Category
Emergency Department block	Pre planning stage	Planning / approval stage
Women's and Children's fit out	Funding and approval required	Planning / approval stage
Radiation oncology unit	Planning approved, funding allocated, site decanting ongoing	Planning / approval stage
Blood and tissue lab	Planning approved, awaiting funding, site enabling works ongoing	Planning / approval stage

Table 25 Summary of projects to be included as Interim Priority Developments needed in advance of a new Model 4 hospital in Galway

Building	Rationale
Pathology facilities	New laboratory facilities are required to ensure certain lab facilities retain their accreditation status and replace old prefabricated buildings.
Ambulatory Cancer Care Centre	Provide new rapid access clinics, day and outpatient wards and offices for the Multi-Disciplinary cancer team to ensure compliance with NCCP standards. Current facilities are overcrowded (either prefabricated or built in 1950s).
Utility infrastructure upgrades	Critical upgrades required for water and electricity infrastructure.
Enabling Project: Clinical Support Accommodation	Provide a centralised location for administration and corporate services which will in turn increase clinical capacity

12.2 Pathology

Pathology services on the UHG site serves as the regional hub for all hospitals in the Saolta Group.

There are seven clinical pathology departments. These include the following:

1 Anatomic Pathology: incorporating post-mortem services and subspecialties of Histopathology, Cytopathology (including diagnostic aspiration cytology), and molecular pathology. Supra-regional services include Direct Immuno-Flourescent techniques;

2 Biochemistry: specialist technologies and expertise in endocrinology, toxicology, immunochemistry, Point of Care testing (POCT). Supra-regional services include Mass Spectrometry;

3 Blood and Tissue Establishment: provides both national and supra-regional services for autologous serum tears, stem cell therapy, tissue supply and antibody screening;

4 Haematology: Specialised Coagulation laboratory; flow cytometry. Supra-regional services include clinical haematology including stem cell transplants;

5 Immunology: flow-cytometry, autoimmune disease. Supra-regional services include clinical Immunology;

6 Microbiology: including Tuberculosis (TB) to all Saolta hospitals; Public Health laboratory (food and water, including endoscopy and Legionella testing), National Salmonella, Shigella, Listeria and Carbapenemase Producing Enterobacteriales (CPE) Reference laboratories. Specialist technologies and expertise in molecular diagnostics including whole genome sequencing (WGS), infection prevention & control; antimicrobial stewardship; and

7 Virology: provide services to GUH, RUH and MUH. Specialist technologies and expertise in serology and molecular diagnostics including respiratory, hepatitis and HIV viruses as well as STI. Rapid diagnostics to facilitate patient management.

Requirement

The majority of existing pathology facilities on site are located in a number of temporary single storey prefabricated buildings or units built in the 1950's. The current arrangements present operational constraints which detrimentally impact on the provision of modern laboratory science. Many of these are beyond or coming near to the end of their useful lives. There is an urgent need to replace the pathology facilities with modern buildings.

12.2.1 Case for change

This section of the Report outlines the background to the pathology services including an overview on the proposed new Blood and Tissue Establishment (BTE) building, the infrastructure deficits on site, Saolta's strategy for pathology services and key adjacencies required. An outline of activity and demand is then presented, together with constraints and a number of options considered for pathology services. Finally this section concludes with recommendations and next steps to progress the provision of new pathology facilities.

12.2.1.1 *Background to pathology facilities*

The UHG pathology estate consists of multiple single storey buildings, some dated from 1958. Since that time, nine extensions have been developed, seven of these were built as prefabricated units which have been in place for between 19 and 45 years. The last permanent extension was delivered 33 years ago: A summary of pathology facilities is provided in Appendix A13. According to stakeholders, many of these prefabricated facilities were put in place as temporary measures at the time to address safety issues – and were never intended to be used as permanent facilities.

There are plans to build a new BTE unit and the project has progressed through approvals, design and planning stages. Enabling works have commenced and construction is due to start in 2019 or 2020. The new BTE building has been defined as phase 1 in this section of the report. The replacement of all other laboratory facilities (as outlined in the requirement section above) is defined as phase 2, in this section of the report.

The BTE lab is one of the most deficient pathology facilities. A recent Health Products Regulatory Authority (HPRA - formerly Irish Medicines Board) external inspection highlighted the deficiencies in the current facility and advised that the building will be beyond its useful life within a one to two year timeframe[39]. According to management, the lab is essential, as the services supports all emergency clinical and surgical disciplines across the group. The loss of the lab would result in suspension of supply of blood and blood products to GUH and other hospitals in the Saolta Group, which would impact surgical and medical procedures.

The proposed BTE lab includes a new two storey building with plant located on the third floor, on a site adjacent to the existing main laboratory. The ground floor will accommodate the blood and tissue lab while the 1st floor is proposed as shell accommodation for an Integrated Medical Laboratory Services (IMLS) lab. The total sqm of the proposed building is 2,490 sqm. Each floor will have an approx. gross area of 1,245 sqm, however only approx. 958 sqm of each floor is actual useable space (for laboratory services) after taking account of circulation and other non-laboratory related space.

The current proposal for the shell and core floor (the first floor) in the new BTE building is to fit it out with an IMLS lab.

12.2.1.2 *Current facilities*

Pathology facilities on the UHG estate are dated, poorly configured and congested. Several prefabricated buildings are nearing ‘end of life’ and the buildings are not conducive to modern laboratory practices. Some of the issues on site include:

- The age and fragmentation of adjoining prefabricated units are difficult to maintain and restricts the implementation of modern LEAN working practices;
- There is no central reception area for the receipt of specimens and there are many duplicated areas within each discipline of pathology;

[39] Replacement of the Blood and Tissue Establishment and provision for the an integrated medical laboratory services facility at UHG design team brief (Section 1.3, page 5)

— Over the years, corridors, toilets and other unsuitable areas have been reconfigured as laboratory space;

— Wooden benching in Microbiology is not conducive to a clean working environment;

— Non-compliant corridor widths for fire access;

— Disabled access is limited

— The lack of lift access has limited choice of laboratory equipment over the years to certain areas;

— Storage for all items is insufficient and poorly laid out: this includes supplies; equipment; patient specimens and processed specimens; blood, blood & tissue products; and

— Current buildings have ventilation challenges posing additional risk to staff, patients and very expensive equipment.

12.2.2 Saolta strategy and vision for Pathology

The Clinical leads and Laboratory Managers presented key objectives[40] including:

— Pathology should be located in one building to facilitate key adjacencies with different services, e.g. Microbiology, Virology, Public Health & reference laboratories; Haematology Blood and Tissue and Anatomic Pathology;

— A centralised specimen reception for all services;

— Single laboratory accreditation with INAB;

— Close linkages to waste storage, autoclaving and disposal;

— This facility must be linked to the main clinical wards/theatre/departments to facilitate best patient care, rapid specimen processing (e.g. frozen sections & FNAs; PTH testing; bone marrows) and close clinical liaison;

— Phlebotomy should be conveniently located to specimen reception but sited in a clinical (patient) area of the hospital rather than in the laboratory itself. Some tests require rapid processing e.g. Cold agglutinins for immunology;

— A suitably positioned set down and collection point for delivery, collection and services to be provided;

— There needs to be a proper waste collection area and collection of same; and

[40] P*athology Stated Objectives April 2019*

— Pathology should be designed as a secure area and any requirement for public access needs to be planned.

12.2.3 Key adjacencies required

Pathology must be collocated on the site with ED, Maternity & Theatres to facilitate the rapid transfer and testing of samples. Histopathology should ideally be on the same site as the Mortuary. Therefore pathology needs to remain on the UHG site. The proposed Elective Hospital on the Merlin Park site may be supported by the pathology services on UHG with a small satellite laboratory on the MPUH site supporting a Point of Care testing provision. This position will need to be reconsidered as acute services relocate to the Merlin Park site.

12.2.4 Constraints[41]

There are two principal constraints

1) **Funding** – There is no funding allocated to the additional works required beyond the BTE phase 1 development. In order to develop phase 2, Saolta need to progress through the various procurement processes and approvals.

2) **Footprint of proposed BTE lab** – Each floor in the new BTE building will have a gross floor area of 1,245 sqm, and a net useable space of approx. 958 sqm. This dictates the floorplate of any additional floors provided on the proposed building. A redesign to increase the floor area to potentially incorporate phase 2 will require planning permission and the necessary approvals from Government, which will delay the project. The Steering Group indicated that delays would increase the risk that the accreditation status of the existing BTE services is withdrawn; if new facilities are not provided within the construction timeframe for the proposed BTE lab. Were delays to occur, a robust contingency plan would require development to prioritise services.

Other constraints include:

— The construction of new pathology facilities may require space to be decanted and buildings demolished which will present operational challenges. In some cases substantial enabling works to accommodate specialist laboratories may be required;

— Sufficient space will be required to allow for vehicular access for the provision of suppliers, specimens including Liquid Nitrogen and concealed discrete entrance for the mortuary;

— Specialist Laboratory design will be required in the BTE for processing and Microbiology labs to accommodate category 3 (containment of hazardous material) facilities; and

— The site has a gradient such that the link corridor to the main hospital will be on the1st floor of the proposed building. Therefore, this may influence which pathology elements are located on the ground or first floors.

[41] *Pathology Stated Constraints April 2019*

12.2.5 Demand Analysis

The table below shows the current pathology area, a benchmark facility and the area proposed by members of the pathology team.

Table 26: Summary of Benchmark Comparison (Net of Circulation & Plant) (M2)

Section	Current Area[42] (m^2)	Benchmark Lab (m^2)	Proposed by pathology team (m^2)
Histopathology	513	1,238	1,576
Microbiology	660	1,068	1,109
Shared Automated Facilities	239		942
Ancillary Support Services		122	484
Post Mortem	340	723	442
Haematology	435	450	441
Clinical Immunology	192	252	415
Clinical Biochemistry	476	411	402
Shared Common Facilities	286	533	352
Transfusion	90	75	245
Directorate Services			184
Donor Services			182
Tissue Facility	112		165
Cytology		253	164
Total	**3,343**	**5,124**	**7,103**
Available space			(5,748)
Refinement required			**1,355**

— The current net occupied space (i.e. excluding circulation and plant) for UHG Pathology is 3,343 sqm.

— The benchmark site of net occupied space (i.e. excluding circulation and plant) for Pathology is 5,124 sqm. The benchmark is a hub laboratory in London consisting of three hospitals including a large London Teaching Hospital, see appendix A14 for further detail

— A stated net space (i.e. excluding circulation and plant) requirement for UHG Pathology is 7,103[43] sqm based on a stated requirement from each pathology service.

— The available space is 5,748 sqm assuming the maximum number of floors in the proposed BTE lab is 6, plus 1-2 stories plant. Each floor is assumed to have 958 sqm of net space.

[42] Some areas were not available at the time the analysis was performed
[43] This figure is subject to review as the Pathology team are currently working to review the required space and this number reflects the iteration at the time of publication

The stated requirements are significantly increased on current footprint and exceed both the benchmark site and the HBN 15 guidance (3,338 sqm) for a full pathology service acting for a network[44]. The Project and Pathology team agreed further refinement of the space may be identified and the Pathology services will be accommodated in the 5,748 sqm of space available.

Following stakeholder feedback, it became evident that the current floor-plate estimates may be insufficient to cater for future service levels and the needs of the Region. Further review will be carried out as part of the Detailed Business Case to finalise the size and location of Category 3, autoclave(s), molecular space and shared space.

12.2.6 Options

The table below summaries the list of options considered, further detail on each of the options is outlined in appendix A15.

Table 27: List of Options

#	Option	
1	Proceed with phase 1 - current building plans – BTE / ILMS	BTE Ground floor – continue with plans. ILMS on 1st floor
2	Option 2: Proceed with phase 1 current building plans – BTE / Microbiology	BTE Ground floor – continue with agreed plans. Microbiology on 1st floor
3	Proceed with phase 1 - current building plans. Build phase 2 upward or outward at a later stage	Option 1 or 2 for the proposed building Create a second new building adjacent to first building or build additional floors without redesign of existing footplate.
4	Redesign the current building plans Build phase 2 upward –later addition of floors	Add other floors to BTE building at a later stage for remainder of pathology
5	Redesign the current building plans Build Upward – Single Build Phase	Create a new single building with multiple floors for Pathology

The options and options assessment as per Appendix A15 were reviewed by the Steering Group.

[44] BN 15 Facilities for Pathology Services - example 1: Full Pathology Service on an acute site serving a whole network. Total example space allowance is listed as 3,338 sqm excluding plant and circulation

Option 3 was selected as the preferred choice, which incorporates options one and two. There are a few considerations in respect of Option 3 that the pathology team need to address to deliver Option 3. These include the fit out of the first floor and building above or adjacent to the phase 1 BTE lab.

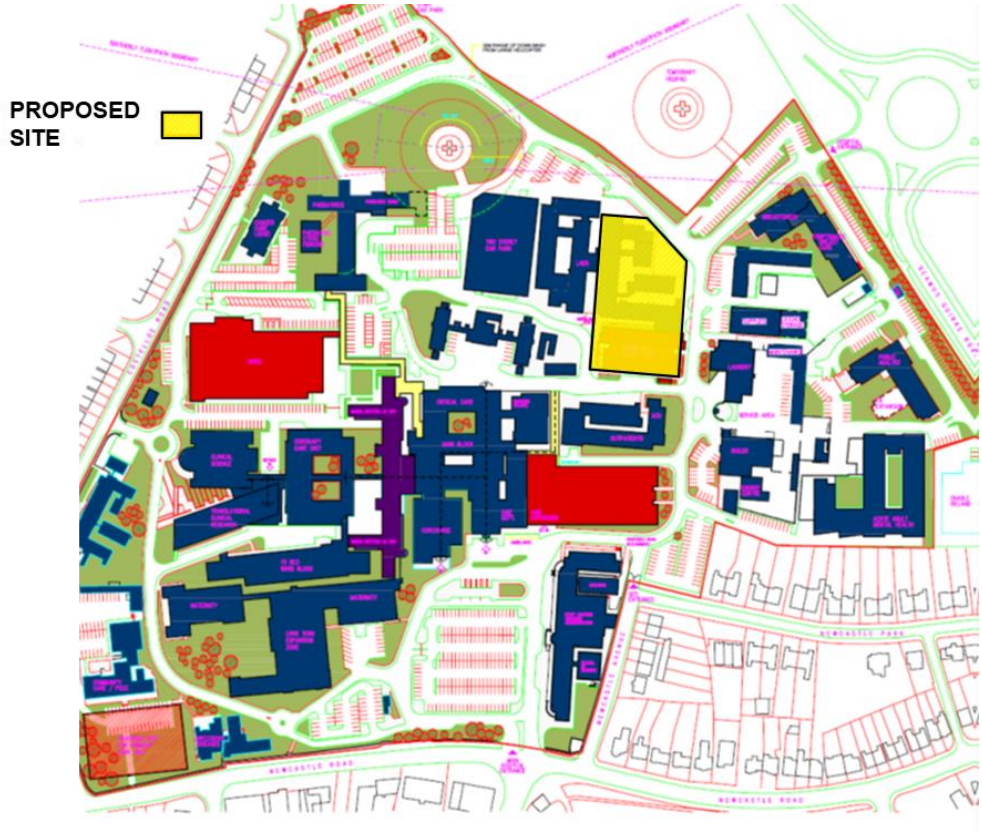
HSE Estates recently commissioned RPS Engineers to consider the feasibility of building four additional floors on the proposed BTE lab. RPS concluded that: "The addition of three floors to the Phase 1 building is feasible, however, the existing tender documents produced to date for the Phase 1 building will require significant re-design/ co-ordination/ updating to allow provision for Phase 2".[45] On this basis, the findings would not preclude the proposed two stage development – from a structural perspective. Even so, adding additional floors may require a redesign of the phase 1 works (e.g. the width of fire stairs must be sufficient to evacuate all users). RPS went on to indicate that they examined the options independently of HSE's architects and engineering advisers – and that a co-ordinated approach is required. We would agree with this and recommend that an integrated report is required, as part of the next stage of the project development process.

[45] RPS, 'UCHG Laboratory Blood and Tissue Building Additional Floors Feasibility Study', 10 July 2019, p.23.

12.2.7 Site Locations

The figure below illustrates the location for the new laboratory facilities

Figure 38 Proposed site for new laboratory facilities



12.2.8 Next Steps

Step 1: Existing proposed phase 1 BTE building to continue as planned

- The BTE lab includes provision for Donor, Phlebotomy and Patient treatment areas, which will be relocated to other clinical areas in the hospital. This will release space for a centralised reception and other support services, which are required to be on the ground floor. In addition the proposal for IMLS on the first floor will create difficulties as the equipment is difficult to move and the full suite of IMLS services cannot fit on the first floor. Further consideration on the optimal use of the proposed BTE lab needs to be considered by the Pathology team. This detailed analysis should be undertaken at the next stage of project development.

Step 2: Further assessment needed on proposals for additional capacity above or adjacent

- HSE Estates to confirm viability of building additional floors on the BTE building, without delaying the delivery of the two storey unit.

- More work is required as the proposed UHG as the space requirement seems overstated when compared to HBN15 and the benchmark site. Further justification for the space needs to be presented or the required amount needs further scrutiny so that the pathology services can fit in the proposed space available.

Step 3: Approvals required

- Approval is required from Government to progress to the detailed business case stage which should include the phase 2 pathology facilities on the UHG site;

- The phase 2 pathology facilities needs to progress the Project to stage 1 of the Capital Works Management Framework; and

- The timeline for design and approval processes for the Project should be streamlined as much as possible. This will require some phases (e.g. pathology) to be delivered much earlier than the indicative timeline for the Elective Hospital as set out in section 13.3.

- Given the increase in demand, the Government should look to approve the requirements above as soon as possible.

12.3 Cancer Ambulatory Care

There are 8 dedicated cancer centres in Ireland, which were introduced based on national cancer strategies developed over the past 3 decades. The principal reason for designated cancer centres is to ensure all complex oncology services are provided in appropriate settings by an MDT, who specialise in tumour types and specific treatments, which has been proven to improve patient outcomes. This is increasingly important as cancer treatments are becoming more complex with developments such as personalised medicine and robotic surgery.

UHG is the tertiary hospital for the Saolta Group which serves a population of over 800,000. Galway is one of four public hospitals (James, Beaumont and Cork are the others) which provide radiation oncology facilities. Public access to private facilities is also available in Waterford and Limerick, as satellites to the Cork and Galway services. All cancer patients within the remit (from the Region and border counties) of Saolta have their diagnosis confirmed and treatment planned by the MDT in UHG.

Cancer centres will become more specialised in the future. The NCCP who lead Ireland's cancer strategy indicate the key features[46] of a comprehensive cancer centre are as follows:

- A focus on cancer clinical care, education and scientific endeavour;
- Breadth and depth of experienced high quality staff across all disciplines;
- High volume multidisciplinary cancer services in diagnostics, surgery, radiation oncology, medical oncology and haematology;
- Dedicated resources within a designated building usually linked with an associated University Hospital;
- Dedicated modern clinical facilities, including outpatient, day care, inpatient and associated interdisciplinary shared resources;
- Clinical and other research facilities;
- Integration with scientific institutions to research, and develop clinical and public health intervention strategies for cancer care; and
- Recognition of the Comprehensive Cancer Centre as a formal organisational structure.

The Cancer Care Ambulatory Centre is one of the key facilities required to ensure UHG meets the standards of a designated cancer centre. Further investment will be required to deliver a comprehensive cancer centre in Galway. Delaying the relocation of acute services to MPUH will increase the need for facilities, for cancer care (e.g. theatres and beds) in the future. For the avoidance of doubt, this scope of this work is limited to the Cancer Ambulatory Care Centre, see below.

Requirement

The existing medical oncology and haematology day ward, outpatient suites and rapid access clinics are in urgent need of replacement. There is also a need to provide an assessment area with 24/7 emergency access for cancer patients who experience adverse effects when undergoing treatment. A further requirement is to provide facilities for Saolta's Managed Clinical and Academic Network which will enable the alignment of clinical and executive governance for cancer cervices across the Saolta Group.

[46] National Cancer Strategy 2017 – 2026

12.3.1 Case for change

This section of the Report outlines the background to the Cancer services including an overview on the proposed new radiation oncology building and the infrastructure deficits on site. Saolta's strategy for the Cancer Ambulatory Care Centre and key adjacencies required is then outlined together with a number of options considered for Cancer services. Finally this section concludes with recommendations and next steps to progress the provision of the Cancer Ambulatory Care Centre.

12.3.2 Overview of Cancer Care facilities

The day ward and outpatient facilities are dated. There are overcrowding issues which causes delays for patients and inefficiencies for the care team. In some cases patients have to be admitted to hospital due to capacity constraints in day wards. Other issues include narrow corridors which impacts transport of patients, no piped oxygen and lack of consultation rooms which impacts patient privacy. See Section 12.3.4 for further detail.

There are some modern cancer facilities on site, these are outlined below:

- A recently built ward block accommodates 50 Inpatient beds for Cancer services (excluding diagnostic and surgical services). A further 10 inpatient beds are provided for radiation oncology patients;
- A modern state of the art Breast Check unit incorporating symptomatic and screening services;
- The Lambe Institute and HRB clinical research facilities are modern research facilities to enable research and education opportunities to support a high quality cancer care programme[47];
- Cancer Care West provides accommodation to cancer patients travelling to Galway for Radiotherapy treatment, in a 33 bed facility located on the UHG site;
- A new Radiation Oncology unit is due to commence construction shortly, the delivery of the building is critical as the existing radiation equipment is approaching the end of its useful life.

Operating theatres are congested as cancer care competes with acute and elective services. However Saolta recently introduced robotic surgery on site and have plans to develop this innovative service further.

12.3.3 National Policy

Over the past number of decades numerous strategies and policies have been adopted by Government and health officials, most notably the three consecutive cancer strategies and the establishment of the NCCP. The strategies aim to:

- Ensure all cancer patients have their cancer diagnosis confirmed and treatment planned by a MDT working in a designated cancer centre. MDT's are the cornerstone of modern cancer care as subspecialty expertise in diagnosis and treatment leads to improved decision-making, more coordinated patient care and improvements in the overall quality of care. The MDT should have links to regional hospitals to support lower complexity oncology treatments

[47] Cancer Centre Annual Report 2017

(therefore providing care as close to a patients home as possible) and with international hospitals to seek guidance and support on rare and more complex cancer types.

- Increase the probability of early cancer diagnosis through expanding access to screening facilities and rapid access clinics. The radiology / imaging services should be dedicated to cancer patients and mainly done in outpatient settings, separate from ED and inpatient services.;
- implement clear clinical guidelines and efficient patient pathways throughout primary, secondary and tertiary care centres;
- Establish cancer centres of excellence, on selected acute hospital sites to offer all complex treatment facilities (e.g. radiation oncology, high intensity chemotherapy, stem cell transplantation and rare cancers) collocated with research and clinical trial facilities and provide the base location for the MDT
- Ensure pathology services are integrated with the designated cancer centre. Histopathology and molecular cancer diagnostics (in particular) are fundamental elements of cancer diagnosis, early detection and treatment planning to ensure therapeutic effectiveness and cost efficiencies are achieved.

12.3.4 Current facilities

The existing medical oncology and haematology dayward and outpatient building is located in a building which was constructed in the 1950s. The building is at the end of its useful life. Consultants have highlighted their concerns in relation to the standards of these facilities and have stated the building creates inefficiencies as patients are often admitted to hospital to commence what should be day-treatment due to issues with the existing facilities.

The majority of existing rapid access clinics on UHG are accommodated in prefabricated units which are too small and old. The Symptomatic Breast Clinic is the exception which is accommodated in a modern two storey 2,304 sqm building

Haematology Oncology dayward and outpatient facilities

The Steering Group outlined some of the issues with the existing facilities, which are listed below:

- There is no acute assessment area (for the 24/7 emergency evaluation of patients) which means patients have to present to UHG's ED which is already overcrowded (see Section 12.4). In a 2014 report[48] cancer patients (nationwide) stated they would "in no circumstances" go to ED for care unless they absolutely had to, because of excessive waiting times. This results in patients attending later and increases the risk of complications thereby further increasing the LoS. According to Clinicians, another factor affecting LoS is the fact some patients admitted as inpatients through ED, could have been treated as an outpatient in a cancer ambulatory care setting, if 24/7 emergency access was provided;
- A significant number of Patients who should be treated as day cases are treated as outpatients due to lack of capacity in the day ward This adds to the overcrowding in the outpatient rooms, but is the only solution available to ensure patients receive treatment, Patients have to wait up to 3 hours on OPD, as a result;

[48] National Cancer Strategy 2006: a Strategy for Cancer Control in Ireland Evaluation Panel Report 30th December 2014

- The lack of capacity increases the number of return visits for patients as they cannot be accommodated in the day ward for minor treatment on the same day they attend as outpatients;
- New patients referred to UHG for Systemic Anti-Cancer Therapy must wait for over 30 working days (6 weeks) to commence treatment. The national target is for 95% of patients to commence treatment within 15 days of referral.
- The lack of space and rooms (e.g. consultation, Advanced Nurse Practitioner, phlebotomy, assessment suites, treatment rooms) leads to increasing overcrowding which decreases efficiency thereby compounding the capacity issues and the numbers on waiting lists;
- Corridors are too narrow for portable x-ray machines which results in patients having be moved for x-rays;
- Piped oxygen not available which creates patient safety issues, particularly for lung cancer and elderly patients;
- Corridors / doors too narrow to fit hospital beds so ambulance trolley has to be used for patient transfers;
- Multi bed treatment rooms are too small which poses safety risks as only the patient next to the door can be transferred out of the room. Therefore each patient has to vacate the room if the patient furthest away from the door suffers an emergency;
- Waiting rooms are too small so patients have to wait on corridors, in stairwells or in different buildings;
- Patients privacy and dignity is negatively affected as test results and treatment plans are often discussed in corridors due to the lack of capacity;
- There are insufficient isolation rooms, scarcity of toilet, sluice and bedpan washing facilities which increases the risk of infection and creates inefficiencies as areas cannot be reused until thoroughly cleaned; and
- Consultation rooms are too small and are also used as doctor's offices and chart storage, adversely affecting the quality of patient care and increasing the risk of data breaches.

Rapid Access Clinics

The majority of existing rapid access clinics on UHG are accommodated in prefabricated units which are too small and old.

- Lung rapid access unit will be demolished to build proposed ED block, there is currently no plan for its relocation;
- There is no access for wheelchairs, or stretchers;
- No air conditioning or oxygen;
- Insufficient number of consultation rooms which results in private discussions with patients often occurring in public spaces;
- Interventional procedures are performed on the MPUH due to lack of capacity in UHG, which is inefficient as consultant and nursing staff travel between hospitals;
- Insufficient number of recovery bays and existing bays are too small – some patients in recovery have to sit in corridors;
- Delayed access to imaging and diagnostic services;
- Shortage of toilets;
- Scarcity of storage space which results in supplies being stored in corridors;
- Up to 100 people a day come through rapid access clinics – small cramped facilities poses serious infection risk;
- Up to one year waiting list for Transperineal (template or targeted) biopsy.

12.3.5 Saolta strategy and vision for an Ambulatory Cancer Care Centre

As outlined above, the Ambulatory Cancer Care Centre in one of the key facilities required in Galway in order for the hospital to meet the standards as a designated cancer centre. Saolta's strategy for the Ambulatory Cancer Care Centre is to ensure all day case and outpatients have access to the right treatment in as few return visits as possible. The centre will service patients who may be attending hospital as the first time as a cancer patient for diagnosis and those cancer patients who are on long term treatments. Patients should be able to access consultation rooms, minor procedure rooms, diagnostics and treatments in one visit. The new centre will provide that access. The centre will also accommodate the governance team who oversee cancer care services for the Region.

The section below outlines the Steering Groups strategy and vision for the each of the components of the Ambulatory Cancer Care Centre, which include:

— Haematology / Oncology day ward and outpatient facilities;

— Rapid Access Clinics;

— Acute Assessment area; and

— Facilities for Saolta's Oncology Managed Clinical Network.

Appendix A18 includes a list of references and recommendations from the national cancer strategy which aligns with Saolta's vision for the cancer ambulatory care centre.

12.3.5.1 *Haematology Oncology dayward and outpatient facilities*

An expert panel review[49] in 2014 stated that most systematic anti-cancer therapy centres in Ireland were not purposely designed, which has led to significant difficulties in the delivery of modern state-of-the-art care including patient privacy and comfort, and inability to segregate immune-compromised patients.

An indicative schedule of accommodation is included in appendix A17 which outlines Saolta's vision for state of the art facilities where patients can access the treatments they require in one visit. For example, the outpatient facilities will be adjacent to the day ward, therefore patients who require minor procedures (e.g. bone marrow aspirate) will be accommodated in the day ward on the same day. This cannot be facilitated in the current setting due to the capacity issues.

Management also suggested patients will be treated in the ambulatory setting rather than inpatient, where clinically appropriate to do so. This will both improve outcomes and reduce the number of delays for patients who require surgeries and /or complex treatment as inpatient beds may be utilised more effectively when appropriate cancer ambulatory care services are provided

[49] National Cancer Strategy 2006: a Strategy for Cancer Control in Ireland, Evaluation Panel Report, 30th December 2014 (page 35)

12.3.5.2 *Rapid Access Clinics*

The same expert panel review[50] determined that there was considerable delays in in obtaining appropriate diagnostic tests and outpatient appointments for symptomatic patients. Rapid access clinics are essential to increase the probability of early cancer diagnosis which reduces the morbidity rate and is very cost effective as treatments are less complex in earlier stage cancers.

Rapid access clinics provide patients with direct access to consultants and diagnostic equipment (e.g. x rays, CT, MRI, procedure rooms with adjacencies to pathology) required to diagnose and stage (how far the cancer was spread) the disease in one setting. The national cancer strategy supports Saolta's vision as the strategy suggests imaging should be mainly done in an outpatient setting, separate from inpatient and emergency services[51]

An indicative schedule of accommodation is included in appendix A17 for new rapid clinics for Lung, Urology, Melanoma and Gastrointestinal cancers.

12.3.5.2.1 Acute Assessment area

Direct access to 24/7 emergency oncology care will be provided in the Ambulatory Care facility. The Steering Group advised that appropriate treatment will be made available, in the majority of cases, without the requirement of an inpatient bed. This will provide a more efficient service as the adverse impacts on scheduled care will be reduced. Importantly 24/7 access will also provide a much safer and higher quality of care as cancer patients will not be subjected to delays or be forced to wait in ED waiting rooms.

An indicative schedule of accommodation is included in appendix A17

12.3.5.3 *Managed Clinical and Academic Network*

The Saolta Strategy sets out the vision for the governance and delivery of cancer services for the Region through a dedicated Managed Clinical and Academic Network (MCAN) model and supporting the model 3 hospitals as part of the cancer service. The MCAN will implement international best practice and national policy to improve patient outcomes by ensuring appropriate provision of staffing ratios, skill mix and training as well as access to space, treatments and diagnostic services. The MCAN will lead cancer services across all hospitals in the Saolta Group, leveraging resources while facilitating the centralisation of complex cancer surgery in UHG

Facilities in the ambulatory care centre will include space for the MCAN Senior Management Team, business intelligence, and other supporting team members (e.g. data managers, secretaries, clinical co-ordinators). A MDT conference room with video conferencing facilities will be included to ensure the team have convenient access to facilities required to support the regional hospitals. A clinical trials hub will also be available to coordinate and enrol patient where appropriate to do so.

[50] National Cancer Strategy 2006: a Strategy for Cancer Control in Ireland, Evaluation Panel Report, 30th December 2014 (page 35)
[51] National-Cancer-Strategy-2017-2026 (pg 71)

An indicative schedule of accommodation is included in appendix A17

12.3.6 Key Adjacencies required

The cancer ambulatory care centre requires adjacencies to

- MDT including oncologist (medical, surgical, radiation), pathologist, radiologist and nurses, to assist with efficient service delivery. Management stated they currently experience difficulties hiring specialist oncology staff.
- Pathology including molecular diagnostics, microbiology and blood testing to allow for rapid testing of cancer samples;
- Diagnostics / radiology – e.g. PET-CT, MRI, CT, ultrasound, endoscopy and procedure rooms; and
- Theatres, ICU, inpatient beds, pathology, cancer research facilities and breast check facilities are on the acute site.

12.3.7 Options

The Project Team considered locating the proposed Cancer Ambulatory Centre to Merlin Park. However International best practice guidelines indicate cancer care requires a fully integrated model of care with multi-disciplinary teams including pathology, radiology, medical & surgical oncology and other critical support services offered in an acute setting[52]. The Steering Group advised that it is not possible to delay the delivery of the new radiation oncology unit as the existing equipment is approaching the end of its useful life, and the existing capacity cannot meet the current and future (increasing) demand across the Region. In addition the Steering Group pointed to the adjacencies required and national policy which does not support a twin site solution for cancer care, see Section 3.3.3.

Two possible locations were identified in the UHG site which are illustrated in figure below.

[52] The Development of Radiation Oncology Services in Ireland

Figure 39 – Possible locations for the Cancer Ambulatory Care Centre

Site 1 (top left of picture with yellow dotted circle) adjacent to the proposed radiation oncology building, will become available when paediatrics moves into the proposed ED block and existing maternity ward and the existing paediatric single storey building is demolished.

Site 2 (top right of picture with yellow dotted circle) adjacent to the existing Breast Check facilities and pathology services requires the decanting of the Diabetes Clinic and other functions which are currently accommodated in a single storey structure. Storage facilities will also have to be decanted, which could potentially be located off site.

12.3.8 Next steps

The NPRO (radiation oncology) building will commence construction shortly, decanting works are ongoing. This should continue as planned.

In light of current deficiencies in functional suitability and overall proposed timeline for a move to MPUH, the Project Team recommends that work is progressed on the Cancer Ambulatory Care Centre as a matter of urgency. Next steps to deliver this include:

— Saolta needs to refine the clinical brief;

— Approval is required from Government to progress to the detailed business case stage...

— The Cancer Ambulatory Care Centre needs to be prioritised as an Interim Priority Development and progressed to stage 1 of the Capital Works Management Framework; and

— The timeline for design and approval processes for the Project should be streamlined as much as possible, this will require some phases (e.g. cancer ambulatory care) to be delivered much earlier than the indicative timeline for the Elective Hospital as set out in Section 14.2.

12.4 ED Block with Women's and Children's Department fit out

The Women's and Children's Directorate delivers Obstetrics and Gynaecology, Paediatric and Neonatology services across the each of the five hospital sites within Saolta Group. UHG is the tertiary referral centre. Currently neonates requiring level 3 care are very often forced to travel to specialist units in Dublin.

A Level 3 neonatal unit is required for UHG to fulfil its role as tertiary referral centre, within the Women's and Children's directorate for the Saolta Group[53]. Level 3 (tertiary units) provide the full spectrum of neonatal care to term and pre-term infants who are critically unwell. This will reduce the number of mothers and babies travelling to hospitals outside the Region and secure Level 3 status for the Neonatal Unit in UHG.

In compliance with national policy, a new governance structure, Women's and Children's Managed Clinical and Academic Network, is currently being implemented across the Saolta Group for the Women's and Children's Services. This will facilitate sharing of expertise across sites, strengthen the operational effectiveness of smaller units and ensure safe quality services. The new governance will also create greater alignment between clinical groups and ultimately streamline the way services are delivered.

Requirement

The proposed ED block is 7 stories, 2 of those will be fitted out with ED and another floor is allocated for plant. Current plans for the remaining 4 floors are to build them as shell and core. However there is a requirement to fit-out these floors for the Women's and Children's services in conjunction with the fit out of ED.

12.4.1 Case for Change

This section of the Report outlines the background to the Women's and Children's Services including an overview on the proposed new ED block, in which 4 floors are available to locate the Women's and Children's Directorate. Saolta's strategy for the Women's and Children's Directorate and key adjacencies required is then outlined together with constraints.

12.4.1.1 *Overview of ED block development*

ED Block

A detailed CBA was carried out in 2016 to review the options for developing a new ED on the UHG site. The CBA recommended the development of a 7 story block adjacent to the existing ED, which will accommodate a new ED on 2 floors, women's and children's on 4 floors and a plant room on the 7th floor. The BCR calculated was 5.48.[54] Saolta expects to apply for planning permission for this block in 2019 and the NCP allocated €120m for the delivery of the unit.

[53] Saolta University Health Care Group Strategy 2019-2023
[54] Proposed Hospital Development, UHG, Cost Benefit Analysis

The Current ED is overcrowded to such an extent that it consistently poses safety risks and is subject to a trolley limit, which has been developed with input from the Fire Authority and Health & Safety Authority[55]. Other issues noted in the 2016 CBA report[56] included:

- Lack of isolation facilities;
- Significant deficit of resuscitation capacity;
- Limited paediatric ED accommodation;
- Inadequate footprint for current volume of attendances; and
- Non-compliance with national standards, infection control HCAI, emergency medicine programme.

The ED department is one of the busiest in the country[57] in a facility which management describe as one of the smallest. Furthermore, in 2017 and 2018 circa 8,000 patients were accommodated overnight in trolleys, patients attending UHG ED suffer longer waiting times than the national average, see GUH's ED waiting times in Table 28 below.

Table 28: Current ED Waiting Times

Waiting Time	Percentage of Patients
Less than 6 hours	54%
Less than 9 hours	16%
Greater than 9 hours	30%

The 2017 National Patient Experience Survey highlighted that UHG's performance was lower than the national average[58].

12.4.1.2 *National Policy*

A National Women and Infants Health Programme office was established in January 2017 to oversee developments in Obstetrics and Neonatal services throughout Ireland. In October of the same year, the office lunched the Implementation Plan for the *National Maternity Strategy Creating a Better Future Together 2016-2026.* At the time of the launch the programme office suggested that the National Maternity Strategy will have similar transformative effects as those achieved through the National Cancer Strategies.

The National Maternity Strategy was introduced after a period when confidence in Ireland's maternity services was at a low point after a number of reports and reviews highlighted significant shortfalls in service delivery. Aging infrastructure was noted as one of the key deficiencies.

[55] Emergency Department clinical Project Brief
[56] UHG Emergency Department Clinical Project Brief
[57] Acute Hospital Summary Statistics By Region And Hospital 2018
[58] 2017 National Patient Experience Survey

One of the overarching aims of the strategy is to ensure all patients have access to maternity networks where the appropriate level of care is provided as close to the patients home as possible, while ensuring access to specialised and more complex care is provided at tertiary centres. The Model of Care is made up of three care pathways, based on the risk profile and needs of the woman and baby:

1) Supported Care Pathway; Midwifery led and delivered care

   This care pathway is intended for normal-risk mothers and babies, with midwives leading and delivering care within a multidisciplinary framework.

2) Assisted Care Pathway; Obstetric led, Midwifery and Obstetric delivered care

   This care pathway is intended for mothers and babies considered to be at medium risk, and for normal risk women who choose an obstetric service. Care will be led by a named obstetrician and delivered by obstetricians and midwives, as part of a multidisciplinary team.

3) Specialised Care Pathway; Obstetric led, Obstetric and Midwifery delivered care

   This care pathway is intended for high-risk mothers and babies and will be led by a named obstetrician, and will be delivered by obstetricians and midwives, as part of a multidisciplinary team

12.4.1.3 *Current Facilities*

The existing maternity and paediatrics buildings date from the 1950s, have no direct access to ED, are dispersed across the site and are isolated from vital healthcare services such as intensive care, diagnostics and theatres. For example, obstetrics and gynaecology services (delivery suites, neonatal and OPD) are located at the south east of the site, while paediatrics is located on the opposite corner of the site. ED is not adjacent to either obstetrics, gynaecology or paediatrics, but takes emergency admissions for those services.

Currently there is only one theatre on the gynaecology ward which services (emergency and elective) both gynaecology and obstetrics patients. As a result, the waiting list for patients who require elective gynaecology procedures is one of the highest in the Country. A new theatre dedicated for obstetrics patients (emergency and elective) is required to reduce the waiting list numbers.

The Saolta Group do not accept infants under 27 weeks gestation as they do not have a tertiary neonatal unit and cannot accept infants less than 27 weeks gestation unless capacity and expertise increases. As a result, patients travel to Dublin if a preterm delivery is imminent.

The Steering Group indicated the current facilities are overcrowded, which impacts on patient pathways and the efficiency of service delivery. For example, due to over-crowding there is an ongoing issue with MRSA positive colonisation swabs in Neonatal infants with 9 cases being reported since January 2019. This is a risk to the preterm infants in the unit.

12.4.2 Key adjacencies required

Relocating the Women's and Children's unit to the floors above the ED will provide adjacencies to vital hospital services. Co-location allows the mother access to a full range of medical and support services should the need arise, for example, cardiac and vascular surgery, diabetes services, intensive care facilities, haematology services, psychiatric services and many others. Therefore, locating Women's and Children's services closer to the adult and paediatric services within the hospital will improve clinical pathways.

12.4.3 Constraints

The exiting capacity on UHG is unable to accommodate the volume of services required to provide a comprehensive and timely service to women and babies in the Region.

It is envisaged that the principal constraint facing the development of new facilities for the Women's and Children's directorate is the available floor space in the proposed ED block of approx. 12,000 sqm. Saolta estimate over 16,000 sqm is required for the Women's and Children's directorate in its entirety. The existing maternity block can be fitted out to accommodate the additional space required

12.4.4 Saolta strategy and vision

The infrastructure deficits as outlined in the section above, are among the principal challenges within the Women's and Children's Services. A key objective for relocating the Women's and Children's Services is to ensure UHG can function as a tertiary referral centre to support the other maternity and neonatal units within the Saolta group. A key requirement is to provide a level 3 Neonatal unit, which combined with increased capacity will improve access for patients across the Region and reduce the number of patients and babies that travel to hospitals outside of the Saolta Group

Due to the constraint of the available floor space in the proposed ED block the entire services offered by the Women's and Children's directorate will not fit in the block. Therefore the existing maternity facilities will be repurposed (for the services which will not fit in the ED block). The strategy for the Women's and Children's directorate is in three phases

1) **Phase 1 All services relocated on UHG site**

   The intention is to locate the acute Women's and Children's services in the proposed ED block and locate the elective services in the existing maternity unit, after refurbishment and fit-out is complete. This will ensure the adjacencies critical for Women's and Children's acute services are optimised as access will be provided to theatres and the main hospital. The elective procedures, principally elective gynaecology surgery, outpatient clinics and allied health services do not require the adjacencies identified above.

   Decanting the paediatric building will free up the site, which may be used for the Cancer Ambulatory Care Centre

2) **Phase 2 move elective services**

The strategy is to move the elective services to Merlin Park when the proposed Elective hospital is built. This will provide flexibility to the Saolta Group as plans are progressed to relocate to Merlin Park. For example, the decanted maternity unit may be repurposed as additional inpatient beds as a temporary measure while new acute facilities are being developed on the MPUH site.

3) Phase 3 move all services to MPUH

The overall strategy is to relocate all services to Merlin Park. The decanting strategy, timelines and revised demand projections will be prepared in the next stage of the process – the Detailed Business Case stage.

12.4.5 Demand Analysis

The table below compares some of the existing core rooms with the proposed number of the same core rooms in the fit out of the ED block.

Table 29: Projected Capacity Requirements in Women and Children's Development Block

Core Rooms	Existing	Projected
Obstetrics and Gynaecology Outpatient Clinics		
Admissions unit, consult/exam	2	4
Outpatient clinic, exam rooms	6	8
Fetal medicine, scan rooms/places	4	5
Pregnancy day care, places	4	8
Parent education, group places	2	0
Patient recliner places	N/A	2
Gynaecology Inpatient Care, Surgery, Ambulatory Treatment and Day Ward		
Gynaecology inpatient beds	16	14
Gynaecology operating rooms	1	1
Gynaecology ambulatory treatment rooms	2	1
Gynaecology day places	4	8
Paediatric Inpatient, Day and Outpatient Care		
Paediatric inpatients, beds	32	40
Paediatric day beds	3	8
Outpatient clinic, exam rooms	5	2
Obstetrics Labour and Delivery, Inpatient and Neonatal Care		
L&D, labour/delivery & birthing	7	12
L&D, operating theatre	1	3
Antenatal inpatients, beds	18	22
Postnatal inpatients, beds	30	30
Neonatal care unit, cots	17	30
Operating Theatres	2	3

The table above shows an increase in the number of rooms in the majority of cases. Activity levels under certain scenarios may to decrease in the period to 2031, based on the analysis performed during workstream 1. There are a number of reasons why workstream 1 data may be understated, which include:

- I**nduced demand from within Saolta** – Increase in regional referral due to the model 4 character of GUH and standard of care in available in other units. This cannot be quantified but some allowance needs to be made for it;

- **Fertility trends** – Change in birthing patterns (expected number of babies per female in 2031 may increase); and

- **Peak capacity** – On any given moment of any given day, the required capacity in a maternity ward will vary. It is therefore prudent to allow for additional operational capacity to allow for peaks in the demand for services. For example, the CSO data indicates that the number of births in the peak month (July) in Ireland is approximately 6.7% above the median.

Furthermore the Steering Group advised that the increased capacity in the new Women and Children's unit is required to ensure:

- The Integrated Saolta Group activity with risk stratification for high risk referrals to GUH. This process has not happened up to now as such referrals have frequently been to Dublin;

- The establishment of neonatal services in GUH for the Group, with increased referrals;

- Due to a variety of contributing factors, including demographic, lifestyle and medical co-morbidities, maternity care in Ireland has become more complex, resulting in more referrals to tertiary hospitals; and

- There is a requirement to future proof the hospital to ensure UHG can continue to operate as the tertiary centre for the Saolta Group.

12.4.6 Options

The Project Team considered expanding the proposed ED block, relocating the proposed ED block to an alternative site on the UHG site, building the new ED on the MPUH site, replacing the proposed block with a modular unit and reducing the scale of the block. All these options were ruled out, the rationale is outlined below:

- Expanding the proposed ED block was not considered viable due to the probable severe negative impact on service delivery during construction works;

- The relocation of the proposed ED block to another site was not considered viable as the Project Team could not identify a suitable site which would provide the adjacencies to the existing hospitals critical care facilities;

- A move to Merlin Park was not considered viable as there is no acute hospital located on this site;

- A modular build was not considered viable as the only site suitable (adjacent to existing ED) is a core site on the campus. Obtaining planning permission for a modular build on a core site will be challenging and may cause delays; and

– Reducing the scale was not deemed appropriate as this would increase the risk of planning delays. Furthermore the additional 4 floors will provide flexibility to the Saolta Group as plans are progressed to relocate to Merlin Park.

12.4.7 Next Steps

In light of current deficiencies in functional suitability and overall timeline for a move to MPUH, the Project Team recommend that work is progressed on the ED block including Women's and Children's fit out and repurposing of the existing maternity facilities. Next steps to deliver this include:

— Saolta need to submit planning permission for the ED Block;

— The ED block project including fit of Women's and Children's directorate and repurposing of existing maternity block, needs to progress to stage 2 of the Capital Works Management Framework. The build program for the ED block is expected to start on site in Q1 2022 and complete Q4 2024; and

— Funding approval is required from Government. The NDP 2018 – 2027 allocated €120m to the GUH ED block, the estimated cost prepared for the purposes of this report is €279m (nominal, incl. VAT). See Section 12.5 for further detail.

12.4.8 Enabling Project: Clinical Support Accommodation

Additional works that may be required, subject to further analysis, include infrastructure works and the refurbishment of the former clinical support accommodation.

Critical Infrastructure works required include electrical works and water temperature regulation systems. The Project Team estimate approximately 50% of the estimated infrastructure cost will be required within the next four to five years.

The purpose of refurbishing the clinical support accommodation would be to provide a centralised location for administration and corporate services which will in turn increase clinical capacity. Currently these facilities are dispersed across the UHG campus. The Steering Group advised that relocating these services will relieve some of the capacity constraints within the acute setting, which will go some way in the short term, prior to the delivery of the Project.

The purpose of the Interim Priority Developments is to address some of the critically deficient areas that need to be addressed prior to the delivery of the overall Project. Further works may be required which will be dependent on the timeline for delivery of the Project.

12.5 Indicative costs

Current estimates of the capital costs (nominal, incl. VAT) associated with these Interim Priority Developments are outlined in Table 30 below. For more details refer to the AECOM order of magnitude cost report, appendix A12. The utility infrastructure upgrades will be required initially to enable decongestion of the site for other facilities to be built.

Table 30: Interim Priority Developments Capital Costs

Critical Interim Development	Capital Cost
Projects in the planning or procurement approval process	**Nominal (incl. VAT)**
ED Block including Women & Children's fit out and repurposing existing maternity facilities	€279m
NPRO – Radiation Oncology	€72m
Blood and Tissue Lab	€16m
Projects not yet in the planning or procurement approval process	
Pathology	€68m
Cancer ambulatory care	€51m
Miscellaneous infrastructure measures	€40m

Source: AECOM

It should be noted that the Interim Priority Developments outlined above in no way address all of the current infrastructure deficiencies across the GUH sites. Rather, they address some of the most urgent ones. There are other areas which are significantly below standard for which no interim works are proposed. This is predicated on a new development proceeding within a reasonable timeframe and would need to be revisited if that assumption changed.

A key advantage of beginning to plan for the future beyond 2039 is that these interim, smaller scale capital projects can now begin to be structured with consideration of and in conjunction with the longer-term plans for the hospital sites. This will be beneficial in that any interim investments can consider how they will be incorporated into the future design of the UHG site and help to contribute to the long-term sustainability of GUH.

12.6 Elective Hospital

A new Elective Hospital on the MPUH site is proposed as the first phase in the transfer of all services to the MPUH site. The proposed Elective Hospital will assist in reducing waiting lists and relieving some of the capacity constraints within the existing hospital on the UHG site.

Patient waiting lists will continue to grow until the new Elective Hospital is open. This will have a knock-on effect of increasing the pressures on staff and infrastructure of UHG, leading to decreased confidence from the public in the service provided, as well as increased attrition levels where talented staff will relocate to provide services in another acute facility within the country or abroad.

In order to help combat and prevent these issues from escalating, this report requests that the Elective Hospital development is promoted to the status of a strategic project to ensure the project progresses through the procurement and approval process in as short a time as possible (see Section 14.2 for the existing indicative timeline). A commitment of capital also needs to be secured from Government to allow plans and development to progress.

This new development is crucial to the sustainability of the healthcare economy in the west of Ireland. It will not only provide a modern, built for purpose healthcare facility, but it will also allow some services, currently provided at UHG, to be relocated to the MPUH site. This additional space at UHG will help to improve patient care and adapt models of care for the site in preparation for the long-term acute hospital development. This will help to improve patient experience, clinical pathways and staff attrition by being able to offer best-in-class services and facilities.

Please see the separate report titled “Elective Hospital Galway” in appendix A19, for further details.

12.7 Conclusion

Noting that a new acute hospital development will take at least 15 years to be delivered, and taking into account the results of the current functional suitability assessment, the current infrastructure cannot continue without substantial interim investment. It is important that the interim developments proceed as outlined in this report in order to assist Saolta to manage risk and maintain service quality and safety for patients in the interim.

The Interim Priority Developments are required to alleviate some of the deficient areas and also give the Saolta Group some flexibility in decanting the existing site. These should not be redundant facilities in the longer term. For example, the ED block may be repurposed multiple times as services are decanted. Ultimately, the block may be retained and used as a primary care hub and urgent care centre, once the acute services are operational on MPUH. This aligns with Sláintecare strategy and will allow for a smaller scale ED block in MPUH.

The Project Team recommend the following:

- The BTE lab should proceed, noting that construction is expected to commence in 6-12 months;
- The NPRO (radiation oncology) building should proceed, noting that construction is expected to commence in the next 1-3 months;
- The ED block project including fit of Women’s and Children’s directorate and repurposing of existing maternity block, needs to progress to stage 2 of the Capital Works Management Framework. The build program for the ED block is expected to start on site in Q1 2022 and complete Q4 2024;
- Approval should be sought form the Department to progress to the Detailed Business Case stage in order to seek funding for the Elective Hospital;
- Development Control Plans should be prepared for both GUH sites; and
- The Interim Priority Developments and Elective Hospital plans need to be prioritised as strategic projects and the timeline for design and approval processes for these projects (see Section 14.2) should be accelerated as much as possible.

In addition to the above, there will be operational elements which must also be considered as the programme progresses. These include:

— **Clinical Pathways:** What will the new model of care look like for GUH and how will this help to improve patient journeys through the care system?

— **Interim Priority Developments Impact on UHG:** How will the Interim Priority Developments and construction of the Elective Hospital impact on operations at UHG? Will the transition of services increase the capacity available at UHG? And if so, by how much?

— **Complimentary Design of Interim Priority Developments:** How can the Interim Priority Developments be designed to ensure they support the long-term vision for GUH and ensure that the capital invested in these projects provides long-term benefits?

— **Operational Efficiencies:** How will the proposed theatres and wards operate in practice to provide best use of space and resources while maintaining high quality care for patients?

— **Educational Space:** How will this be incorporated into the new facility, and to what extent, to allow for an academic medical centre to support Saolta's commitments to education?

— **Proposed Phasing:** How will the development programme be delivered to minimise disruption to services?

For the avoidance of doubt, there are many deficient areas on the UHG site that will not be addressed by the Interim Priority Developments and Elective Hospital. The scale and cost of works required will increase depending on the timeline for delivering the Project.

These Interim Priority Developments, as well as the longer-term Preferred Option, will require significant levels of capital in order to implement. Therefore it is important to consider the availability of capital and potential sources. This consideration of the affordability of these developments is considered in detail within Section 13 of this report.

13 Affordability Assessment

13.1 Introduction

13.1.1 Purpose

The purpose of this section of the Report is to examine options to enhance the affordability of the Project, having regard to the scale of funding that is likely to be required.

13.1.2 Terminology

At this stage, it is important to distinguish between 'funding' and 'financing'. Put simply 'financing' refers to the money required to build an asset, which often includes some form of borrowing with an associated cost e.g. at least the cost of Exchequer borrowing. This money must be paid back, at a cost, by the funding sources.

'Funding' refers to the money required to operate and maintain an asset – including any interest cost and repayments. This may come from a variety of sources, e.g. government, taxpayers, customers (commercial elements) and does not have to be paid back. Funding is the critical element, as finance will flow to any project where the projected cash flows illustrate demonstrable and reliable repayment capacity.

13.1.3 Governance structure

For the purposes of the discussion below, it is envisaged that Saolta would act as the Sponsoring Agency (potentially with the assistance of the NDFA), while HSE and/or the Department of Health and Government would act as Sanctioning Agency. These roles would require confirmation as part of the development of the governance structure for the Project going forward.

13.2 Exchequer funding availability

As outlined in the preceding sections of this Report, the cost of bringing the GUH facilities up to standard and meeting forecast demand is significant (at least €2.5bn).

Exchequer funding constitutes public funding from the government, comprised of tax and other public funds. In Ireland, the National Treasury Management Agency ("NTMA") has responsibility for the management of Exchequer funds and its allocation across a portfolio of public assets and liabilities, by way of instruction from Government.

The primary issue associated with Exchequer funding at present in Ireland is the limited capital funding available.

Thus, the key question for Exchequer finance and funding is whether the funds are certainly available and can be ring-fenced for a project.

13.2.1 Budget pressures

The NDP outlines an ambitious programme of capital projects out to 2040. That will inevitably put pressure on the availability of exchequer finance for this project. It is not possible at this preliminary stage of the project appraisal and management process. For the avoidance of doubt the PSC stipulates that a preliminary appraisal should *"establish whether, at face value, a sufficient case exists for considering a proposal in more depth."*

Should this Project be approved and commence to the Detailed Business Case phase the exchequer finance available for the Project will need to be determined which will allow the financing and funding gap to be estimated with reasonable certainty. All stakeholders will need to collaborate and share knowledge during the process to ensure the targeted objectives remain achievable.

13.2.2 Project Ireland 2040

Project Ireland 2040 has two distinct phases, the National Planning Framework (NPF) and National Development Plan (NDP).

The NPF is the Governments high level strategic plan for shaping the future growth and development of Ireland up to 2040. It is a framework document which guides public and private investment required to cater for an expected rise in population of one million.

The NDP 2018 to 2027 is a 10 year national investment plan which includes a commitment for public capital investment of almost €116bn. This illustrates how the NDP framework will be fully supported by Governments Investment Strategy. Combined the plans aim to improve the quality of life for each citizen across all the major infrastructure asset classes including health, education, water, transport and housing.

Project 2040 (and the Sláintecare report) recognises the need for the development of new healthcare facilities particularly in acute, elective and community settings. The demand analysis as outlined in Section 5 of this report considered the location, number, profile and needs of the population on the West and North West Region. The demand analysis also considered Saolta's service delivery model which will evolve over time to take account of the various reform packages including Sláintecare, the National Maternity Strategy, National Cancer Programmes and National Plan for Radiation Oncology.

€10.9bn of the €116bn has been allocated to the Health service, €8.4bn of which has been included on the Project Ireland 2040 Capital Tracker. The Capital Tracker allocates finance to numerous projects. The largest amount already allocated to Galway is €200m for an elective hospital. There are also various other headings which may be applicable to the development of the Project (e.g. acute hospital capacity and National Cancer Strategy). However, it is clear that the finance allocated in the Capital Tracker will not be sufficient to cover the cost of construction fort the Project.

The gap between the amount of exchequer funding available and the level of funding required may be significant. The sections below outline how financing and funding gaps may be addressed.

13.3 Strategies to enhance affordability

The primary strategies of relevance to the Project to enhance affordability are outlined below.

13.3.1 Off balance sheet structuring

It should be noted, at the outset, that the key determination when analysing different funding and procurement options should always be the extent to which each option is likely to achieve best VFM to the State. Reinforcing this principle, a recent review of PPPs[59] recommended that the capital cost of all projects should be charged to the relevant Department's overall approved capital investment programme, during the period of construction. Such an approach aims to ensure that on and off balance sheet funding approaches are assessed on an equal basis.

KPMG has examined the options available for the off balance sheet delivery of public health facilities in Ireland on numerous occasions. KPMG is of the view that the only potentially viable off balance sheet option that Saolta could explore for the delivery of some or all of its core hospital facilities is the use of a PPP. For completeness, some ancillary facilities (particularly any car park) could be delivered through an off balance sheet concession, as outlined later in this section.

Availability PPP

A PPP may be used to deliver the Project or used to deliver one (or more) packages, for example, the Elective Hospital and CNU's may be procured under PPP since planned care is more attractive to private investment, while the rest of the Project is financed through Exchequer and alternative finance sources.

PPP contracts may be classified as off balance sheet, provided that they meet specific Eurostat requirements. Refer to Appendix A.7 for a detailed description of off balance sheet classification issues. However, this should not be the main driver in deciding to deliver a project as a PPP. The PSC correctly focuses on ensuring that PPPs achieve best value for money (VFM).

An Availability PPP is commonly used to enable the provision of public assets as a result of a long-term contract between the government and a non-government partner. A typical PPP contract covers a 25 year period, however, the duration of the contract will alter depending on the nature of assets. The contractor is typically responsible for building and maintaining the asset over the lifecycle of the project. The asset is handed back to the client at the end of the contract term with a specified residual life and condition.

The private partner provides equity and raises project specific debt on a limited recourse basis – specifically to fund the design and construction costs associated with delivery of the infrastructure asset(s). Under this approach, the funds raised would be ring-fenced from any existing operations and/or assets of the private partner and set aside specifically for the infrastructure project.

The key benefits associated with PPP type contracts include the ability to harness the innovation, commercial, efficiency and project management skills the private sector can contribute to large capital projects. These advantages manifest through quicker construction timelines (compared to traditional procurement), reduced lifecycle costs (as the private sector is typically responsible for maintaining the asset and handing the asset over with a specified residual life remaining) and cost certainty provided the appropriate risk transfer arrangements are in place.

Key advantages of PPP contracts include:

- Well understood contracting method with both the public and private sector;

[59] Report Of The Inter-Departmental / Agency Group On PPPs

- The selection of the "right" partner could result in a private sector partner that brings complementary skills, expertise and resources to the project, creating efficiencies;

- Receiving higher quality infrastructure, as the private sector is responsible for the asset for an extended period of time there might be an incentive to increase standards in order to reduce maintenance costs in the long run;

- Some evidence to suggest PPPs can achieve superior value for money than other procurement methods, when applied to appropriate projects; and

- Significant precedent for PPP delivery of public hospitals globally.

Availability PPPs are particularly suitable to assets that have a predictable lifecycle and usage pattern. Roads are a good example, as once a road is built it is unlikely significant unforeseeable alternations will be required. Hospitals are more complex buildings. Changes in models of health care over time may require substantial modifications in the building layout. Standard commercial principles for PPPs provide reasonable flexibility and the ability for the contracting authority to ensure that VFM is achieved. However, the perceived lack of flexibility of PPPs (and a number of other generic criticisms) are often raised by stakeholders, as outlined in the table below.

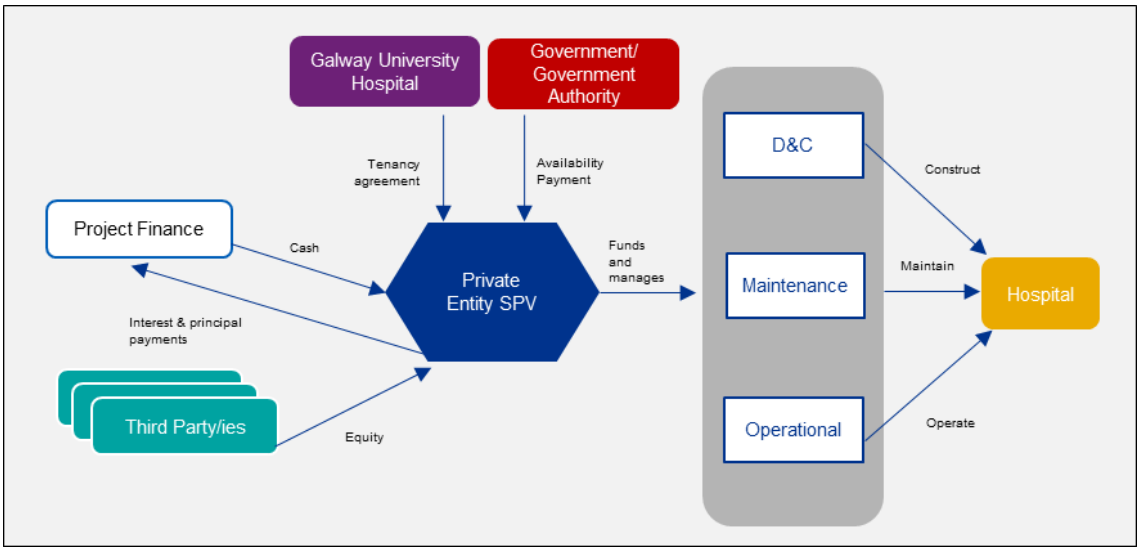
Generic criticisms of PPPs and mitigating strategies include:

Criticism	Mitigating strategies
Private financing is more expensive than government financing	Use of capital contributions to reduce the amount of private finance required. Payment of lifecycle costs on a 'lumpy' basis, during the operating term. Use of EIB and / or ISIF financing to achieve a lower cost of debt.
Lack of flexibility	Use of an efficient and effective modifications regime to allow administrative ease in making required changes. Separate regimes for changes of different types and scales can be included.
Inappropriate risk transfer in certain instances	The UK has signalled its move to a PF2 model for PPPs that aims for a more equitable balance of risk between the public and private sector. However, PF2 remains largely unproven. Risk transfer can be reviewed to address lessons learned elsewhere.
Significant administrative effort and bid costs	Greater standardisation of process and documentation to limit public and private sector costs. High quality request for tender and procurement process efficiency.
Overly Off-BS driven	Requirement for PPPs to achieve value for money, including against a public sector benchmark.

The following diagram provides an overview of a possible PPP contract structure for a hospital development. In practice, Saolta may seek to procure the Project in more than one package.

Figure 40 represents a commercial PPP structure which is separate to the Clinical Operational and Governance Strategy.

Figure 40: Availability PPP contract diagram



Relevant case studies

Queen Mary's Hospital Redevelopment Project, UK

- The design, construction, maintenance, equipment provision, of a new integrated community hospital, incorporating a new state of the art rapid diagnostic centre and 70 beds for the elderly, amputees and neurorehabilitation patients in return for a monthly availability payment.

- Existing hospital equipment was sold to the Preferred Tenderer at book value on hospital handover and this is reflected as a saving in the PFI unitary payment. The fully integrated managed equipment service was one of the first in the market where equipment was bank funded as part of the overall scheme.

Radcliffe Infirmary Relocation Project, UK

- Oxford Radcliffe Hospitals NHS Trust's acute health scheme to build facilities and provide full-site facilities management services on the John Radcliffe site.

- The project was part of the Trust's long-term strategy for relocation of the Radcliffe Infirmary to sites in North Oxford.

- New buildings were built alongside and integrated into the current hospital on the John Radcliffe site, part of the current hospital was refitted, and the private sector partner took over whole site services provision under a fully integrated availability payment mechanism.

Irish PPPs

– PPPs have successfully been implemented in Ireland with this option being a common selection for the development of many education and transport facilities. Such projects include the Roads Programme (tolled and non-tolled), Primary Care Centres, Education Programme, Convention Centre and various Justice Projects.

Royal Liverpool and Midland Metropolitan Hospital

The two hospitals mentioned above have been affected by the collapse of Carillion. The projects were procured on under privately financed Initiative contracts, the UK equivalent of Irish PPP's. In Q3 2018 both of the contracts were cancelled and public funds are now financing the build cost. Both projects have been delayed by 3 years.

The original equity providers for the Royal Liverpool hospital (Carillion value unknown and Pensions Infrastructure Platform £15.5m) lost all their equity investment, while the debt providers (EIB and Legal & General Investment Management) lost approximately £140m.

The Midland Metropolitan contract was also has been delayed by 3 years and costs have increased from £350m to £605m. It is unclear how much was lost of the deal by equity and debt providers.

PPP Projects, Australia

There have been 24 hospital PPP projects undertaken (or currently in procurement) in Australia to date[60]. The most comprehensive study of the relative performance of PPPs and traditional procurement (i.e. construct only, D&C, etc.) in Australia was undertaken by the University of Melbourne[61]. This study assessed the cost and time performance of 25 PPP projects and 42 traditionally procured projects throughout Australia since 2000 (including 6 hospitals). The study found that:

– From the time the relevant contract is signed:

  - The PPPs experienced average construction cost over-runs of 4.3 per cent, compared with 18 per cent for the traditionally procured projects. PPP projects provide far greater cost certainty than traditional contracts and there is little variation in cost of a PPP project after the contract is signed; and
  - The average construction phase delay for the PPPs was 1.4 per cent, compared with 25.9 per cent for the traditionally procured projects.

– Only 43.3 per cent of traditionally procured projects were completed within 5 per cent of the expected cost.

This study therefore found that procuring authorities remain exposed to a higher degree of cost/time uncertainty under the contractual arrangements for traditionally procured projects vis-à-vis PPPs beyond the date of contractual commitment.

[60] Inframation, 2019
[61] Colin Duffield, Peter Raisbeck and Ming Xu, National PPP Forum – Benchmarking Study, Phase II – Report on the performance of PPP projects in Australia when compared with a representative sample of traditionally procured infrastructure projects, University of Melbourne, 2008.

EIB financing

To reduce the cost of debt, Saolta could seek EIB financing, irrespective of whether it seeks to deliver the Project as a PPP.

For example, the NDFA secured funding from EIB in the form of a 25 year €490m exchequer loan to support construction of the new National Children's Hospital. This finance was more cost-effective than alternative sources of finance, including borrowing on the sovereign bond markets[62]. The finance was not secured as part of PPP package as the hospital was procured on a design and build type contract.

Hospitals are a major focus for EIB financing and some of the key lending criteria are listed below:

- Projects which enable universal access to effective, safe and affordable preventative and curative health services;
- Projects which provide sustainable health services;
- Projects with the highest expected economic value for society, taking into consideration outcomes and impacts, such as health outcomes, employment creation and social gains;
- Individual project must be over €25m;
- May cover 50% of the total cost but typically the EIB funds approximately 33%;

The EIB are not the only potential lender as generally, there is significant market depth and appetite amongst financiers looking to lend to large scale capital projects in Ireland. The types of instruments can incorporate commercial bank debt, mezzanine finance, privately placed institutional debt and publicly issued project bonds. The challenge is ensuring projects are structured appropriately and funds are available to repay the finance.

Deferring the construction costs may also be possible through phasing developments over a number of years. The Incremental Development timeline suggests a 10 year pre-construction period, over which time Saolta will secure funding and all other necessary approvals for the Project. Following this, a 10 year construction period is assumed which will enable phasing of works and spread the construction costs over a longer time period. In reality, the procurement strategy (as part of the Detailed Business Case) may recommend a phased approach to construction as the industry may not be in a position to deliver a megaproject of this scale without reducing the phases into a larger number of small packages.

Concession

The preliminary design for the new hospital in Merlin Park includes a multiple storey car park, which may be procured in a standalone package.

In a concession type contract a contractor would design, finance, build, operate, maintain and transfer the car park in return for the cash flows generated by the car park over the lifetime of the contract. Depending on demand and tariff rates, this mechanism may or may not offset the cost of building the new car park.

[62] NDFA Briefing Note for Public Accounts Committee Members submitted 15 March 2018

Other structures

Other structures provided under Eurostat guidelines that are not recommended are outlined below.

Leasing

Eurostat guidelines provide for the possibility that a lease may be off balance sheet where it is classified as an operating lease.

This Report does not recommend such an approach, primarily because:

- The concept of an 'operating lease' has recently been eliminated under International Financial Reporting Standard 16 (since 1 January 2019) and it is highly likely that Eurostat will take a similar approach prior to implementation of the Project (noting that the facilities may not be delivered until 2039).

- The commercial terms of an operating leases are unlikely to be sufficiently robust or appropriate for a major health facility with the complexity and criticality of a public hospital. In contrast, operating lease terms may be more suitable to smaller / less complex facilities, such as primary care centres (e.g. where availability risk is less critical, and ownership at end of term is not required).

For further details, refer to Appendix A.7.

Public Non-Financial Corporation (PNFC)

Refer to Appendix A.7 for an overview of off balance sheet strategies that involve the classification of a delivery body outside of the General Government Sector. Critically, Eurostat recently reclassified all public and private hospitals in Belgium on balance sheet. The Irish Government experienced similar issues in respect of Irish Water. As such, pursuing an off balance sheet entity (as opposed to an off balance sheet contractual) structure would pose a significant delivery risk to the Project. KPMG does not recommend that Saolta pursue such an approach, as it is highly unlikely of achieving off balance sheet classification.

13.3.2 Mixed use development and / or asset disposal

Mixed use development and/or asset sales may reduce the overall cost to the State of delivering the Project, to the extent that the State is able raise revenue from the sale of commercial rights (e.g. commercial leases, property development rights) and/or assets (e.g. surplus land).

Should acute services transfer to Merlin Park, Saolta may find that a substantial part of the UHG site is surplus to its requirements. Saolta could consider ways to maximise the value of the site though maximising the development potential and / or adopting innovate commercial structures. They may be also limited scope for commercial development on the Merlin Park campus.

As per Section 4 of this Report, 64% of the existing buildings on UHG are not satisfactory, when evaluated on the basis of providing the services applicable to a model 4 tertiary hospital. Those buildings may be suitable for other health related services such as a private hospital, primary care hub, urgent care centre, training or research facilities, residential, respite and rehab care. The current zoning on the site also allows for social usage, which may include family hubs, asylum

seeker homes, crèche and other health related facilities. There is also the possibility of rezoning the UHG site when the acute services move to Merlin Park.

The Detailed Business Case should evaluate and determine the best use value of the UHG site and establish the most appropriate mechanism to achieve that value. The scope and level of work required to establish the best use value should not be underestimated. For example, determining the best use value may lead to a separate competitive dialogue procurement process to establish the best use value. This may (or may not be) separate to the procurement package which deliverers the new hospital.

Over the past number of years, the government have taken some innovative steps to encourage investment and drive economic growth in Ireland. Three of the most notable initiatives being the establishment of NAMA, ISIF and the LDA. NAMA was established to deal with Ireland's non performing property loans, which has now evolved to become a property developer tasked with maximising site values and delivering social housing. ISIF is a sovereign investment fund which has a dual mandate to invest on a commercial basis to support economic activity and employment in Ireland. The LDA is new agency which is seeking to leverage state owned land to maximise value and deliver housing. Saolta may be in a position to harness that expertise and maximise the value of the UHG site which will be offset against the cost of the new hospital.

We have outlined three broad options below (sale, licence or joint venture).

Sale

The scope for the Detailed Business Case should include a request for property, financial and legal expertise who will be required to estimate the value of the site under a number of different scenarios. They will be tasked with evaluating the most appropriate usage for the site and calculating the potential GDV. This will include a review of planning and zoning potential. They would then recommend options for Saolta to ensure the group capture the maximum value of the site. This will likely involve Saolta obtaining planning permission which maximises the GDV and offering the site for sale with planning.

Licence

An alternative to a sale is a licence agreement. CIE have entered such agreements notably in Ceannt Quarter, Galway and Spencer Dock in Dublin.

A licence agreement essentially forgoes the upfront cheque from a sale in return for an annual payment. Generally, this works well in commercial development where a portion of the annual lease levied to tenants is paid to the landowner.

Joint Venture

A joint venture may take many different forms. For illustrative purposes, we have outlined one possible commercial arrangement below.

The Department and Saolta may decide to transfer the ownership of both MPUH and UHG sites into a commercial vehicle in partnership with a private entity. In return, the private entity would invest equity, development expertise and knowledge. Both parties would raise additional equity and debt to develop both sites.

The intention of this structure would be to leverage private sector innovation and expertise, as well as to seek additional non-medical related funding sources. For example, the JV may seek funding from the URDF announced as part of Ireland 2040, to the extent that the Project involves elements of urban and regional development. ISIF and EIB may also provide equity and/or debt capital, similar to financing provided to for the Abbey Quarter in Kilkenny and Limericks project 2030.

However, it should be noted that for similar reasons to why a PNFC is not recommended, this Report does not recommend the use of a JV for off balance sheet structuring purposes. In summary, Eurostat's specific public hospital classification guidance would almost certainly put the JV on balance sheet, to the extent that the JV is involved in the delivery of hospital and/or related medical facilities.

Relevant case studies

Herston Quarter Project, Queensland

- The Herston Quarter Project involves the development, over 10 years, of a new five-hectare mixed use precinct for health, residential, commercial and recreational activity

- The Project will deliver the Specialist Rehabilitation and Ambulatory Care Centre (SRACC), public realm and childcare facilities at no net cost to the State

- Under this arrangement, Australian Unity (the developer) will acquire ownership of the site and develop not only the public facilities, but also:

    - A new private hospital, incorporating medical suites, commercial space and potential for biomedical space;
    - Adaptive re-use of heritage buildings as student accommodation;
    - Aged care and retirement living facilities;
    - Car parking;
    - Retail and restaurant facilities, potential research and commercial space; and
    - Residential accommodation.

Limerick 2030

- Limerick County Council are regenerating strategic sites in the city through a property development company the council own. They intend to deliver the following 62,000 sqm Office, 850 residential units, 10 acres mixed use development and a 32,000 sq. m, film hub facility.

- The total development cost is expected to be over €500m. To date over €2bn debt finance has been raised through EIB, Council of Europe Development Bank loans, UDRF and Council loans.

Abbey Quarter, Kilkenny

– Kilkenny County Council and ISIF established a joint venture which acquired a 10-acre brewery site. They intend to develop over 60,000 Sq. M of office, retail, residential, civic and amenity space on the site.

InfraVia

– Acquired CareChoice nursing home group and Knightsbridge in 2017 and the Mater private in 2018.

13.3.3 Defer delivery and/or reduce scope

Such an approach would not deliver the Project objectives in the timeframe required. However, this approach is common in practice. Ultimately, this would mean deferring and/or diminishing the extent to which the Project achieves the target benefits. Put simply, patients may go untreated or seek treatment in other facilities / jurisdictions.

13.3.4 Service Delivery Model

A review of the service delivery model was excluded in the scope of work for this Report. This should be included in the DBC to identify efficiencies which may be generated through technology, service redesign, artificial intelligence and other measures. Any savings identified in the operational budget, through an analysis of the future delivery model, may be allocated against the capital costs of the Project.

14 Conclusion & Next Steps

This section outlines a high level implementation plan for the project and the Project Team's recommendations.

14.1 High Level Implementation Plan

The key next steps required to deliver the Project are as follows:

- Obtain relevant approvals for Preliminary Business Case;
- Continue to progress Interim Priority Developments which are already ongoing, such as Women's & Children's Department, Cancer Ambulatory Care and Pathology;
- Carry out further consultation with the relevant stakeholders;
- Engage a specialist planning advisor to consider the likelihood of gaining planning approval for the Preferred Option, including the extent to which ABP's recent decision to overturn GCC planning permission for a new hospice at Merlin Park, as this may set a precedent that could constrain Saolta's ability the redevelop the MPUH site[63];
- Obtain approval from the sanctioning authority (Department of Health) to proceed to the Detailed Business Case stage of the project appraisal stages outlined in the PSC;
- Prepare a Detailed Business Case to seek funding approval for a phased programme of works that maximises affordability and mitigates delivery risk;
- Prepare a DCP for each of the GUH sites;
- Undertake a preliminary market consultation with construction companies and developers to gain market knowledge on the capacity within the industry to deliver a megaproject at this scale in Galway;
- Develop a schedule of accommodation and costs for the Elective Hospital,
- Develop a strategy for service redesign post construction of the elective and acute hospitals
- Obtain approval from the sanctioning authority to proceed to tender stage;
- Submit planning application and begin construction on the Elective Hospital;
- Submit planning application and begin construction on the acute hospital.

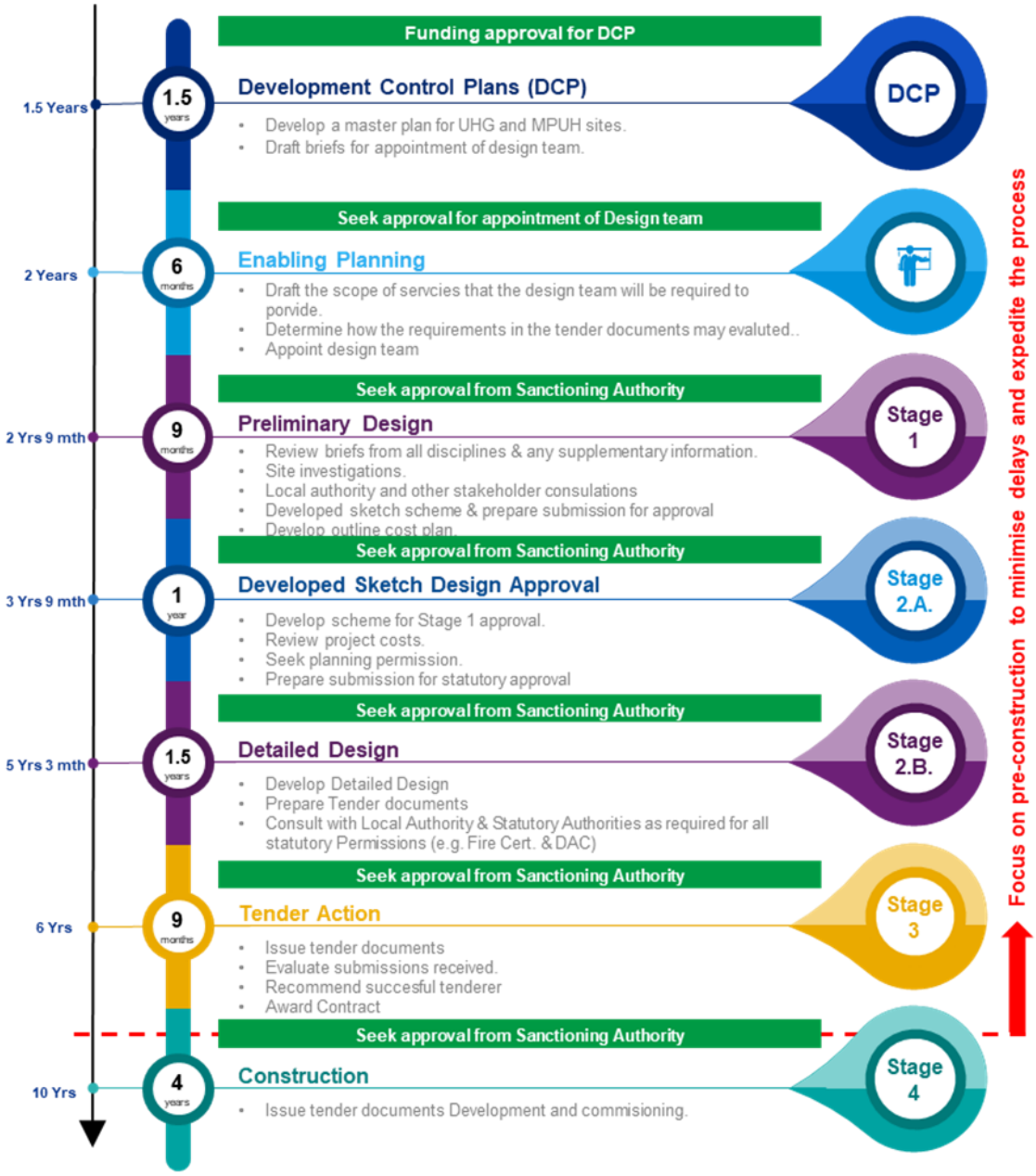
[63] Galway Hospice was previously granted planning permission by GCC for a new 36 bed day-care and residential unit adjacent to the MPUH. On 5 February 2019, ABP quashed the approval. Of note:
- The hospice was proposed for development on land that is zoned for 'natural heritage, recreation and amenity'. ABP found that the development would be incompatible with that zoning.
- In contrast, the MPUH site is zoned for 'community, cultural and institution use'. The appellants suggested that the hospice could have been built on the hospital grounds.
- Further details are available at: http://www.pleanala.ie/casenum/302511.htm

14.2 Indicative Timeline (for Elective Hospital)

The estimated timeline for delivery of the Elective Hospital is presented below. This estimate assumes that the process to obtain internal approvals, develop detailed design, gain planning permission and deliver other enabling works will take up to 6 years, with procurement of developers, construction and commissioning taking a further 4 years. This results in an estimated total timeframe of 10 years before the proposed Elective Hospital would be operational.

Given the limited ability to reduce the time required for procurement and construction, it is important to focus on reducing the time required to obtain the appropriate approvals and design to make it as streamlined and efficient as possible. As such, it is recommended that this programme is made a priority. This will help to reduce the risk of delays and also potentially expedite delivery through fast-tracking the programme through governance and gateway approvals.

Figure 41: Indicative timeline for delivery of the Elective Hospital



14.3 Recommendation

The analysis presented within this report to this point has led to two key programmes which need to be progressed in parallel in order to cater for the short to medium and long-term needs of the regional healthcare economy. The short to medium term aspect is to commence with the Interim Priority Developments on the UHG site (see Section 12.7) plus phase 1A on MPUH, being the development of the Elective Hospital with the long-term focusing on progressing the proposed new hospital development by developing a Detailed Business Case.

Accepting the longer timescale required to deliver the larger acute hospital redevelopment, this report requests support and commitment from Government to progress the Project to developing a Detailed Business Case for the Interim Priority Developments, Elective Hospital and Integrated Care Hospital. This will take the form of approval and acceptance of this report, alongside a commitment of capital to deliver the aforementioned business case. This capital will go towards a number of activities required to deliver the in-depth analysis that a Detailed Business Case entails, such as:

— Assigning a dedicated in-house team to develop and deliver the programme on behalf of GUH;

— Ongoing consultation with both local and national stakeholders to obtain support for the scheme and solidify the purpose of Merlin Park as a health campus that is critical to the future of healthcare in the West and North-West;

— Appointment of architects and planning advisors to help develop designs for the proposed development;

— Appointment of cost consultants to estimate the capital requirement for the proposed development, based on the architect's work;

— Appointment of commercial advisors to develop commercial funding options, carry out financial assessments and write the Detailed Business Case on behalf of GUH;

— Land studies to validate the viability of the development;

— Consultations with both internal and external stakeholders to better understand the future requirements the new facility would need to deliver;

— Soft market testing to assess the viability of any proposed commercial delivery options; and,

— Establishment of a robust and layered governance structure to ensure the key decisions are made by the correct representatives of Saolta Group.

This is just a selection of activities are anticipated to be included within the next stage of the programme.

14.4 Areas for Further Consideration

The purpose of the Detailed Business Case will be to build upon the work done to date in defining the outlook for GUH. The process will be similar to that covered already, but will look at

each stage at a more granular level to provide more concrete assumptions. Suggested areas to be looked at in more depth are summarised in the Table 31 below:

Table 31: Areas for greater analysis as part of Detailed Business Case

Area	Suggested Analysis
Clinical Model	• Further assessment of the future methods for delivering clinical services, e.g. alternative patient pathways, changes in technology, etc.
Capacity Modelling	• Consider additional areas to further refine the assumptions driving capacity modelling and space requirements for the development, e.g. operational efficiencies, seasonality of patient demand, etc.
Delivery Options	• Development of “Do-Nothing" option and potential impact if the programme does not progress. • Further develop Preferred Option through potential phasing of development.
Scheme Design	• Go beyond identifying the space required in terms of floor areas and look to develop detailed architect drawings to demonstrate how the development would fit onto the site. • Determine viability of the design from both a construction and planning perspective.
Funding Options	• Identify potential commercial opportunities by unlocking surplus land that will not be required post-development – this may give rise to potential private sector partnerships and third-party investment.
Development Vehicle	• Look at various options through which the construction could be delivered, e.g. private partnerships, development management agreements, direct development, special purpose vehicles, etc.

This is by no means an exhaustive list of areas that could be explored further. There will undoubtedly be other aspects which will arise throughout the programme that will merit a closer examination but this aims to provide an indication of the questions that the Detailed Business Case will seek to answer.

In addition to the above, there will be operational elements which must also be considered. These include:

— **Clinical Pathways:** What will the new model of care look like for GUH and how will this help to improve patient journeys through the care system?

— **Interim Priority Developments Impact on UHG:** How will the Interim Priority Developments and construction of the Elective Hospital impact on operations at UHG? Will the transition of services increase the capacity available at UHG? And if so, by how much?

— **Complimentary Design of Interim Priority Developments:** How can the Interim Priority Developments be designed to ensure they support the long-term vision for GUH and ensure that the capital invested in these projects provides long-term benefits?

— **Operational Efficiencies:** How will the proposed theatres and wards operate in practice to provide best use of space and resources while maintaining high quality care for patients?

— **Educational Space:** How will this be incorporated into the new facility, and to what extent, to allow for an academic medical centre to support Saolta’s commitments to education?

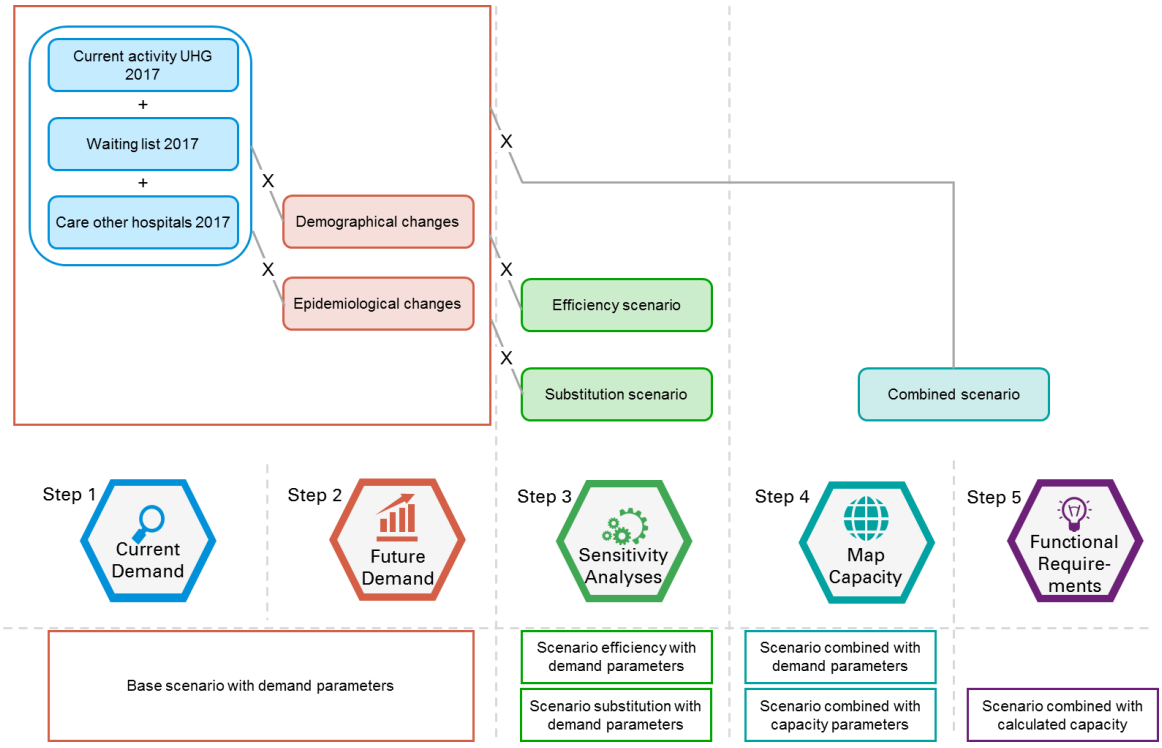
— **Proposed Phasing:** How will the development programme be delivered to minimise disruption to services?

It is imperative that, in the process of delivering the Interim Priority Developments, the focus on long-term sustainability is not lost. Progressing the programmes in parallel can help to create efficiencies from both the delivery team, who will be able to consider both aspects together, as well as capital investment, where decisions for the Interim Priority Developments can be made with impact of the long-term plans in mind. This will help to deliver synergies and a joined-up view for the future clinical and estate strategy for GUH.

A Appendices

A.1 Demand Analysis Report

A.1.1 Overall approach Workstream 1



A.1.2 Data

A.1.2.1 Source data – current care demand GUH 2017

Data type	Data for the current health care demand	Source
Current activity	— Data inpatients 2017 (detailed dataset including care demand [on DRG level], specialty, duration, patient profile and number of bed days/ number of day cases/ number of ICU hours) — Data outpatients 2017 (dataset including specialty, patient profile and number of visits) — Data theatre 2015 (dataset including specialty) and 2017 (figure) — Data ED 2017 (dataset including patient profile and number of visits) — Data diagnostics 2017 - Radiology (dataset including patient profile, type of scans and number of scans) — Data diagnostics 2016 (extrapolated to 2017) – Cardiac Investigations (dataset including type of scans and number of scans) — Data HSCP 2017 (dataset including number of visits for physiotherapy, occupational therapy and medical social work)	HSE / Saolta
Waiting list **Other hospital activities**	— Data inpatients 2017 — Data outpatients 2017 — Data diagnostics 2017 – Radiology — Data diagnostics 2015 (extrapolated to 2017) – Cardiac Investigations — Data diagnostics 2017 outsourced to MPIC and RUH — Data inpatient activity in Dublin HSE Hospitals for patients who live in GUH catchment area	HSE / Saolta

A.1.2.2 Assumptions made on the data of current demand

Data type	Assumptions for the future health care demand
Current activity	— For this model, the future health care need and demand is assumed to be similar to the current demand except for epidemiological and demographic changes; — The sum of current health care activities of GUH, the GUH waiting list growth and the patients from GUH area that are outsourced or served in other Saolta hospitals or Dublin, equals the current health care demand for the GUH catchment area. — The total number of bed days in the dataset contains both regular bed days and ICU bed days. Therefore, the number of bed days has been corrected in the analysis by subtracting the number of ICU days from the original number.
Waiting list	— The waiting list growth is evenly distributed over the year; — The waiting list growth is the difference between the number of patients waiting on the 1st of January 2017 and the 1st of January 2018; — Without having a waiting list the current demand would be similar; — The complexity mix of waiting list patients is similar to current activities; — The waiting time (expressed in number of bed days) in other Saolta hospitals for patients that require model 4 hospital care was not taken into account, since this is already part of the data with the correct assumptions already being made with respect to occupancy rate when calculating capacity in terms of number of beds.
Other hospital activities	— We assume each patient in the GUH catchment area that goes to a Dublin hospital would go to the GUH for model 4 hospital care if there was adequate capacity (now or in the future); — Only patients travelling to Dublin HSE hospitals were included in the care delivered by other hospitals; patients travelling to private hospitals in Dublin were not included in the model; — Because the exact breakdown for the 14,088 patients in terms of consultant specialty (like general surgery, urology, etc.) or DRG is unknown, we assumed the breakdown on consultant specialty level is the same as in the regular production.

A.1.2.3 Comments on data quality of current demand

Reliability To project the future demand, the current care demand for 2017 is used as the base. To our knowledge, the current care demand in 2017 represents the current care demand in other years and has been accurately collected. If this is not the case, this might lead to projections that are less accurate due to a deviant base.

Validity The health care demand is based on health care need which is not identical. Unfortunately, health care demand is not collected and therefore our projections are limited. The current health care activity in the GUH hospital was validated during multiple sessions with various stakeholders in the GUH.

Estimations The quality of current activity data varied among the different types of care. For some of the data sets more assumptions and estimations were made compared to other datasets.

The main points around the quality of the data and the assumptions made were stated in the table below.

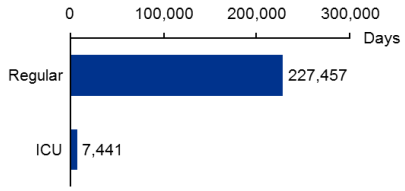
Types of care	Quality of the data and the assumptions
Inpatients	— The number of bed days per patient were calculated based on the difference between admission date/ time and discharge date/ time; — An estimation has been made to quantify the number of bed days for people attending ED for a longer period (between one and two days) and also being discharged from ED; — The duration of day cases was partly captured in the dataset, but limited and therefore unreliable to use for the calculation into capacity parameters. For our calculations we used the assumption that every day case is four hours; — Based on the admission types two labels were created: Elective (categories Elective and Elective readmission) and Non elective; — Since data was registered for both Gynaecology, Obstetrics and Gynaecology/ Obstetrics all three categories were mapped into 'Gynaecology/ Obstetrics'; — Based on the DRG description a list with chronic diseases was composed (this list was used for the sensitivity analysis and plotted on the inpatient data). This list was validated by GUH.
Outpatients	— The number of first and return visits was provided per specialty. Since there was no data available on the type of care provided some assumptions were made by GUH around the treatment of patients with chronic diseases; — No standard or norm is used for outpatient visit duration. Therefore the OPD management was requested to give an estimation of the average duration per specialty.
Theatre	— Detailed data for all four theatres (day case theatre, maternity theatre, emergency theatre and regular theatre) was available for

	2015. Multipliers for patient count and average duration per procedure were used to extrapolate the data to 2017; — Procedures without a date or date not within the year 2015 were excluded; — We have not received a waiting list for theatre procedures. Therefore we used the inpatient waiting list on specialty level. For each specialty we have multiplied the ratio [theatre procedures] / [inpatient appointments] with the number of patients on the waiting list to compute the total demand for theatre procedures. The distribution of these waiting list patients between regular and day cases is assumed to be equal to the current distribution.
ED	— Information about the type of care (i.e. the speciality that has been visited or the diagnosis) was only available for the admitted patients (approximately 25%). For the other part of the patients, this data was not available for 2017.
Diagnostics - Radiology	— The location of residence was completed as a free text field. This means that no option was selected however, KPMG mapped the locations to the regions (West, Border, Dublin or Other).
Diagnostics - Cardiac investigations	— For Cardiac Investigations no patient profile was provided. Therefore the patient profile (age, gender, location of residence) was derived from the Cardiology patients in 2017 from the inpatient dataset.
HSCP	— The number of visits for Physiotherapy, Occupational therapy and Medical Social Work was provided. For the Physiotherapy we had the distribution for outpatient visits and inpatient visits; — No patient profile was provided for Physiotherapy, Occupational therapy or medical social work. Estimations were provided in interview as 8% 0 – 15 years, 32% 16 – 64 years and the remaining 60% 65 years and older, but were not verified; — Other HSCP include Speech & language therapy, Dietetics and Orthoptists. No data available for this report.

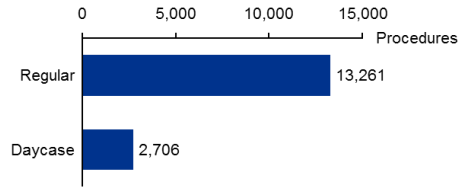
A.1.2.4 Activity Data GUH 2017

The graphs below show the 2017 GUH activity data. In these graphs, waiting list data is not included.

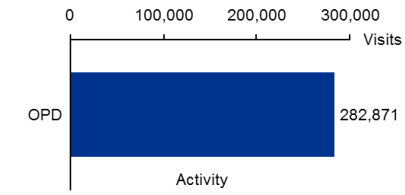
Total number of bed days in 2017



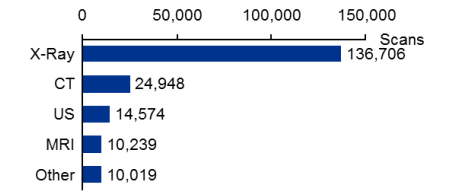
Total number of theatre procedures per year in 2017



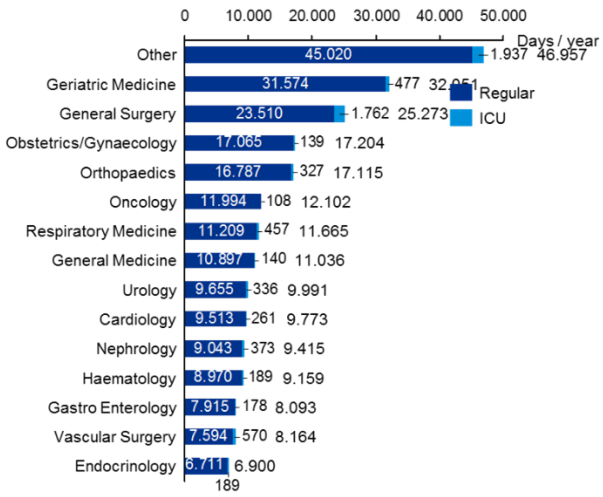
Total number of outpatients visits in 2017



Total number of radiology diagnostic activities in 2017

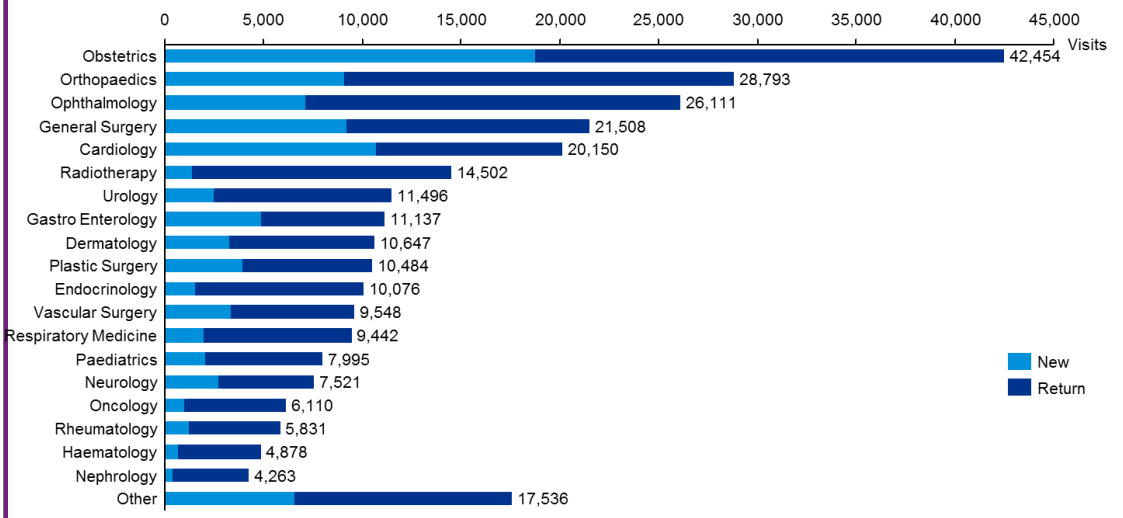


Total number of bed days per specialty and average number of bed days per specialty (top 14 specialties based on the number of bed days)

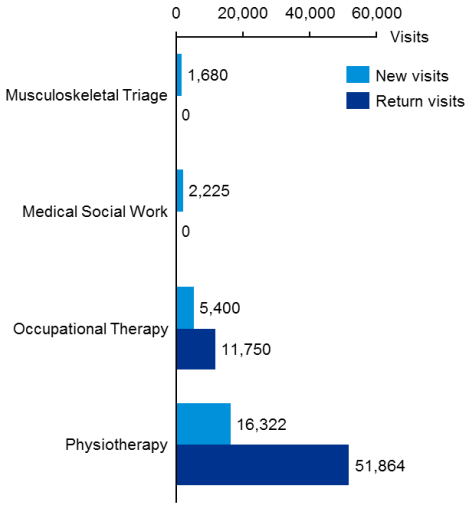


Average number of bed days	
Principal Diagnosis Consultant Specialty	**Average length of stay**
Geriatric Medicine	21,2
General Surgery	6,5
Orthopaedics	5,8
Obstetrics	2,5
Oncology	10,5
Respiratory Medicine	6,8
General Medicine	4,3
Urology	6,4
Cardiology	5,0
Nephrology	4,0
Haematology	11,5
Gastro Enterology	5,2
Vascular Surgery	12,2
Endocrinology	5,4

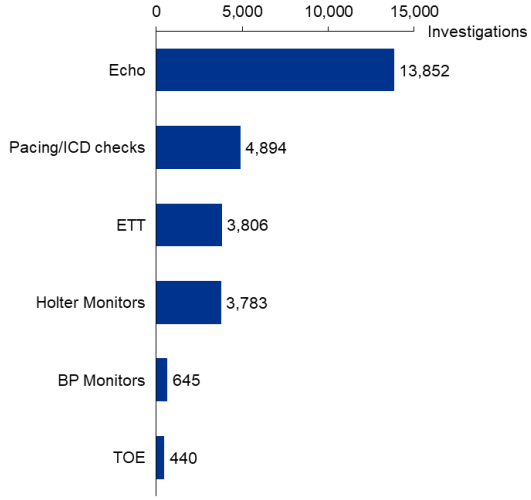
Total share of new and return visit per specialty for outpatients (top 19 specialties)



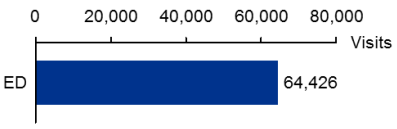
Total visits HSCP



Total investigations per type of cardiac investigation



Total number of ED visits in 2017



A breakdown was delivered to new and review patients. The review patients cover around 5% of all visits (in 2017).

A.1.2.5 Figures 2017 provided by GUH but not part of the model

The data of the current activity within GUH is captured within many different sources. The main data sources such as inpatients, outpatients and procedures are part of the model and were linked to each other (i.e. a decrease in length of stay results in a decrease of physiotherapy). The result of this model is translated into capacity. The figures shown below were not included in the model and will be translated directly into capacity.

Data	Total figures for 2017
Laboratory	Tests: 14,301,443 Products issues: 17,381 Tissues: 253 Products manufactured: 622,456
EEG data	Total of 2017 was not yet available. Figures for 2016 (745) and 2015 (694)
Maternity ultrasounds	8,933
Vascular (ultrasound) diagnostics	7,720 in total 517 (ED), 1,377 (inpatients) and 5,826 (OPD)
Outsourced PET/CT-scans	— In the 2017 and 2018 GUH does not have a PET/CT-scanner. In 2017, 497 PET/CT-scans were outsourced from Radiology GUH to private institutions. It is envisaged that the demand for PET scans will increase due to the following factors: 1. The provision of a local service with consequent increase in referral rates; 2. Projected increase of incidence of cancer; 3. There is additional demand from model 3 hospitals within the Saolta Group (in 2016 a total of 547 PET CTs were outsourced from MUH, LUH and SUH combined). A – Yet to be formed - Cancer Centre Galway University Hospitals will require a PET/CT-scanner by 2031. Further research will be required for the development of this service.’

Note. Part of the EEG data, maternity ultrasounds and vascular diagnostics are also included in the current activity data.

A.1.3 Future Care Demand

A.1.3.1 Assumptions made on the data for demographic and epidemiological changes

Data used	Quality of the data and the assumptions
Demographic projections	The population projections are based on the last available CSO data (on regional level, with a split for males and females). However, this data is outdated because the projections are based on data from 2011. The projections in the analysis are limited by the quality of this data.
Epidemiology projections	To project epidemiology on the subset of five diseases (melanoma, lung cancer, breast cancer, colon cancer, and prostate cancer) a linear trend is assumed. Therefore, the trend is inter- or extrapolated to identify the projections of 2031. In reality, a linear trend might not be the closest fit to describe this data. The epidemiological change is limited by the quality of this assumption. To project the increase in Bariatric surgery, we compared the number of bariatric surgeries per 100.000 inhabitants to the same number in the UK. We assumed that both populations are similar in their demand for Bariatric surgery. To make epidemiological projections for patients with melanoma, lung cancer, breast cancer, colon cancer and prostate cancer an estimation of the care demand in one year was made by GUH: — Estimation of the average number of procedures; — Estimation of the average number of outpatient visits for a single patient; — Estimation of the average number of diagnostics for a single patient (MRI, X-Ray, CT and US). These numbers are multiplied by the expected number of patients.

A.1.3.2 Comments on data quality of data used for the demographic and epidemiological changes

Data used	Assumptions for the future health care demand
Demographic projections	— For the projections, the M2F2 scenario of the Central Statistics Office (CSO) was used. This assumes that: — the improvement in life expectancy will continue to increase;

	— the fertility rate of 1.9 will remain at this level over the whole projected period till 2031; — the net migration will continue at moderate levels till 2021, falling from 50,000 a year to 10,000 a year after 2021; — The health care demand will grow every year in a linear manner from current demand to 2031; — Non-Irish patients have a similar population growth as the Irish patients from other regions; — A similar proportion of people outside the GUH catchment area will continue to use the GUH health care facilities in the future.
Epidemiology projections	— Most of the epidemiological trends can only be estimated related to age profiles. Therefore age-adjusted incidence increase cannot be easily identified / used; — To take into account the epidemiological trend for cancer we used the incidence increase for a subset of five diseases (melanoma, lung cancer, breast cancer, colon cancer, and prostate cancer). Since we're using the incidence increase (not adjusted for expected demographical changes) we know the current figures are an overestimation of the epidemiological changes. The underlying assumption is that this corrects for the cancer diseases that were not separately taken into account. — The epidemiological trend is linear and can therefore be inter- or extrapolated.

A.1.4 Sensitivity Analysis

A.1.4.1 Scenarios used for sensitivity analysis

Scenario's National Health capacity review	*Variants used by KPMG*	
Scenario: Improved Health and Wellbeing — The non-demographic growth in acute care will reduce	This scenario was not calculated by KPMG. See Appendix C, section C2 for the substantiation	
Scenario: Improved Model of Care Centered around Comprehensive Community-Based Services — For patients of 65 years and older; LOS and admission will reduce such as ED, NEL, and EL medical admission	**Variant conservative:** Substitution – shift inside the hospital to lower clinical setting or to primary care — Change will occur for patients of **65 and older** in the LOS, ED, NEL and medical EL admission	**Variant progressive:** Substitution – shift inside the hospital to lower clinical setting or to primary care — Change will occur for patients of **65 and older** in the LOS, ED, NEL and medical EL admission. — A change will occur in the **low complexity care** (mainly chronic diseases) for the whole population
Scenario: Hospital Productivity Improvements — Reduced ALOS and OPD follow up ratio, IP NEL and acute hospital medical activity — More day & AMU patients — Medical day cases shifts to OPD	**Variant conservative:** Efficiency – improving the delivery model's speed and efficiency **Consequences of productivity improvements are:** — Some reduction in ALOS and OPD follow up ratio, IP NEL and acute hospital medical activity — Some increase in day & AMU patients — Some medical day cases shifts to OPD	**Variant progressive:** Efficiency – improving the delivery model's speed and efficiency **Consequences of productivity improvements are:** — Further reduction in ALOS and OPD follow up ratio, IP NEL and acute hospital medical activity — Further increase in day & AMU patients — Further medical day cases shifts to OPD

A.1.4.2 Scenarios on improved health and wellbeing excluded from the sensitivity analysis

Although health and well-being have a major impact on care needs, experts have various views on the impact of health and wellbeing on care demand; some believe that this will increase while others believe that this will decrease.

During the interviews, the view of the GUH personnel about health and wellbeing factors differed. While some people think that the strategic national projects such as healthy Ireland will improve the health and well-being in the future, others think this will have an opposite effect. On one hand, the obesity prevalence could decline due to better eating behaviour and more physical exercise. On the other hand, the obesity prevalence could increase due to western diet and less physical activity. Some people think obesity surgery is the best treatment option and should be easier to access. More people might look for treatment. Also smoking, alcohol consumption and other life style factors could increase.

Risk factors for health and well-being in Ireland show historical fluctuations; while one factor is decreasing, another is increasing. Key risk factors that indicate public health issues are smoking, alcohol consumption, and obesity. Smoking rates have been declining from 33% to 19% from 2000 to 2015[64]. This is below the European Union average. However, alcohol binge drinking is still a major problem among 32% of the population in 2015. The alcohol consumption is still above European Union average. Furthermore, obesity rates in 15-year-olds have been increasing from 12% to 19% between 2001 and 2014[65]. These numbers indicate that fluctuations in health and wellbeing have been occurring in the past. Moreover, lifestyle risk factors are more common in disadvantaged populations while it is hard to address this problem due to a lack of data[66]. These health inequalities are important in current health care demand and explain up to 20% of the total healthcare costs[67].

Also the opinions on the effect of technology on care demand differs. In the past, technology had an influence on health and wellbeing and it is likely that this will have an impact on this in the future as well. Historically, technology has created more possibilities in treatment and diagnostics. Therefore, demand in the future can increase due to earlier diagnosis, and longer and better treatment. On the other hand, better treatment could lead to shorter disease duration and a decrease in demand.

Due to the various beliefs, we decided not to include the changes in health, well-being and technology as one of the scenarios; not as scenario 1 and also not as part of the projected scenario.

[64] State of Health in the EU, Ireland, *Country health profile ,* 2017
[65] State of Health in the EU, Ireland, *Country health profile ,* 2017
[66] Planning for Health - Overview, 2017
[67] Economic costs of health inequalities in the European Union, *J Epidemiol Community Health,* 2011

A.1.4.3 Scenarios

Operating Theatre Assumptions

The data that was collected for operating theatres did not contain the same level of detail as the data collected from the inpatient database. To be able to take the different scenario's into account for operating theatre data, the assumption was made that the relative (%) increase or decrease of the number of patients per specialty (e.g. urology, general surgery) per age group (e.g. 0-16) was equal for inpatient cases and regular theatre sessions, and day cases and day case surgeries. For example a decrease from 25 day cases per year to 21 day cases per year, means that the ratio (or multiplication factor) is 1:0.84. This number is multiplied with the number of day surgeries in the base scenario to compute the number of day surgeries for scenario efficiency progressive (for vascular surgery patients in the age group 75-84). The same applies for all other combinations of age groups and specialties.

Day case patients 75-84 for vascular surgery	Number of day cases base scenario for patients aged 75-84 with vascular surgery	Number of day cases scenario efficiency progressive for patients aged 75-84 with vascular surgery	Multiplication factor daycase patients scenario, for patients aged 75-84 with vascular surgery
	25	21	0.84 (21/25)

Day case patients 75-84 for vascular surgery	Number of day surgeries base scenario for patients aged 75-84 with vascular surgery	Multiplication factor daycase patients scenario, for patients aged 75-84 with vascular surgery	Number of day case surgeries scenario efficiency progressive for patients aged 75-84 with vascular surgery
	10	0.84	0.84 (21/25)

Factors for scenario Substitution

Legend: <65 means all people under 65 years; 65+ means all people of 65 years and older

The substitution scenario was based on the following assumptions:

- An increase of managed primary care and residential concepts for elderly would decrease the number of inpatient elderly visiting the hospital;
- Chronic disease management will be partly provided at home, in the community or as a day case instead of as an inpatient or as an outpatient instead of a day case;
- Some of the care that's currently provided in GUH could shift to model 3 hospitals in the future (please note: since this is not typical for the health care system in Ireland, only small factors are taken into account for this assumption);
- The number of ED visits will decrease towards the future since the change in primary care and increased prevention of elderly;
- In line with the assumptions for inpatients, outpatients, ED visits and procedures (for example the reduced length of stay or the shift from care outside the hospital) we adjusted the figures for diagnostics and HSCP.

These assumptions are based on the various health policies in Ireland and are further re-affirmed by the Sláintecare Report which urges that a more integrated health service, focussed on primary and community care be developed. The Sláintecare Report preferred design of healthcare model is one where the vast majority of healthcare is provided in the community with the expansion of community diagnostics and shifting treatment from the acute sector to the community.

Type of data	Variant	Factor	Source and rationale
Inpatients	**Conservative**	— -5% medical elective admissions (65+) — -10% medical non elective admissions (65+)	— Note: this scenario only takes factors into account for people 65 years and over as set out in the National Service Capacity Review 2018 — Main source: National Service Capacity Review 2018

Type of data	Variant	Factor	Source and rationale
		— ALOS to average other model 4 hospitals (65+)	— Currently 25% of patients attending ED are admitted. The proportion of elderly admitted is much higher than other age brackets. Some elderly patients do not have the proper care at home and as such, extra caution tends to be taken when an elderly patient presents at ED. The move to an integrated model of care has been a core part of the health policy in Ireland for numerous years and reaffirmed by the Sláintecare report particularly relating to the development of strategies for Primary Care and Services for Older Persons. As such, managed care and residential care for elderly patients is expected to increase into the future resulting in a lower proportion of elderly admittance due to elderly being better catered for through Primary and Community Care Service for older age cohorts resulting in (i) less elderly presenting at ED and (ii) better support at home allowing elderly to be discharged as is the case in other jurisdictions i.e. Sweden and Netherlands. — Rationale for assumptions used: — Long term care facilities for elderly will lead to a reduction in ED attendances — For the people 65+, social services will increase which is one of three main contributors to NEL reduction — Managed primary care will be delivered by GPs working with practice nurses and other community health workers — A support coordinator will be used to make sure that people live safe, at home while Implementing Older People Remaining at Home (OPRAH) in identified location.
Inpatients	**Progressive**	— -5% medical elective admissions (65+)	— Note: this scenario takes factors into account for people in all age groups for chronic disease management

Type of data	Variant	Factor	Source and rationale
		— -15% medical non elective admissions (65+) — ALOS to standards (all) — -8% chronic disease management to community (<65) — -10% chronic disease management to outpatients (<65) — -30% shift to dayward Endocrinology, Geriatrics, Oncology, Haematology and Obstetrics (all)	— Main source: National Service Capacity Review 2018, validation sessions (shift from inpatient to dayward) and KPMG knowledge (chronic disease management) — The HSE's National Clinical Programme takes into account four integrated care programmes, one of these is the prevention and management of chronic disease and another is elderly care. The Sláintecare report promotes integrated health service being centred on a community based care model. — The assumptions here take into account both of these. — Rationale: — See above
Outpatients	**Conservative**		— Note: this scenario only takes factors into account for people 65 years and over as set out in the National Service Capacity Review 2018 — Main source: National Service Capacity Review 2018 — No care will be outsourced to model 3 hospitals.
Outpatients	**Progressive**	— +10% shift chronic disease management from inpatients to outpatients (all) — -10% chronic disease management to community (all)	— Note: this scenario takes factors into account for people in all age groups — Source: National Service Capacity Review 2018, validation sessions (shift from inpatient to dayward) and KPMG knowledge (chronic disease management) — The first assumption here relates to the transfer of Inpatients progressive (described above) to outpatients.

Type of data	Variant	Factor	Source and rationale
			— The second assumption here takes into account the proposal set out in the Sláintecare Report around increased community based care. — No outpatient care for chronic disease management is outsourced in the model, because there is no DRG or diagnosis in the outpatient data to determine if the visits are related to chronic disease care. This leads to overestimation of future care demand.
ED	**Conservative**	— -10% (all)	— Source: Validation sessions September (management) — Due to the improvements in community health care, it is estimated that a conservative assumption would be that 10% would move from ED to primary care.
ED	**Progressive**	— -20% (all) — -50% review shift outside hospital (other 50% sticks to ED)	— Source: Validation sessions September (process), KPMG (shift review patients) — Due to the improvements in community health care, it is estimated that an aggressive assumption would be that 20% would move from ED to primary care and 50% review patients would shift to primary care.
Diagnostics	**Conservative**	— -10%	— Source: Validation sessions September (process)

	Progressive	— Cardiac investigations:
		— -10% Cardiac investigations (both in- and outpatients)
		— Radiology:
		— -100% General X-ray (only outpatients)
			— Source: Validation sessions September (management, process)
			— Rationale:
			  — Capacity in hospitals will be freed up by shifting care into the community by integrating that care throughout primary, hospital and social care settings, through:
			  — Access to diagnostics in the community

Type of data	Variant	Factor	Source and rationale
		— -100% Ultrasound (only outpatients)	— Access to GP care without charge — Access to primary care — Availability of direct pathways to specialist clinics and knowledge in primary care of alternative care pathways — Please note that the progressive factors were provided during some of the validation sessions. The 100% shift to community is factored in as a progressive variant, but does not seem to be realistic since a part of the outpatients also need to have access to direct diagnostics before or as part of their appointment. We adjusted for this in the projected scenario.
HSCP (Health and social care)	**Conservative**	— -30% care delivered to outpatients	— Source: Validation sessions September (management, process) — It is considered that more of these services will be provided in the primary care setting with a shift in outpatient attendances with the goal on integration and patient-centred care under Sláintecare. The acute and more complex cases will be treated at the Model 4 hospital.
HSCP	**Progressive**	— -35% care delivered to outpatients	— Source: Validation sessions September (clinicians) — It is considered that more of these services will be provided in the primary care setting with a shift in outpatient attendances with the goal on integration and patient-centred care under Sláintecare. The acute and more complex cases will be treated at the Model 4 hospital.

Factors for scenario Efficiency

The efficiency scenario was based on the following assumptions:

- Working more efficient in the future (i.e. having the patients medicine ready before discharge and work with an expected discharge date) will lead to a lower length of stay on average and a shift from inpatients to day case or a shift from day case to outpatients;
- Working more efficient in the future will lead to less return visits for outpatients;
- In addition to this some of the diagnostics are currently unnecessary (wrongly requested) or duplicated (lack of IT system). This will lead to a relatively small decrease of number of scans or investigations.

These efficiencies are supported by health care policy in Ireland and have been the focus of the Special Delivery unit, particularly reducing the average length of stay.

Type of data	Variant	Factor	Source and rationale
Inpatients	**Conservative**	— ALOS to standards — ALOS to average other model 4 hospitals per specialty	— Source: Validation sessions September 2018

Inpatients	**Progressive**	— ALOS to standards
		  — ALOS to average other model 4 hospitals per specialty
		— -10% day cases to community
		— -10% shift day cases to outpatients
			— Source: National Service Capacity Review 2018
			— Rationale:
			  — More efficient surgery procedures by making Day Case surgery mandatory for most surgical disciplines (shift from inpatients to day case). This is underpinned by the many of the National Clinical Programmes which outline specific care models to improve patient flows such as the Surgery Programme's work.

Type of data	Variant	Factor	Source and rationale
			— Operating a better model of care. GUH currently provides low complex care that can be outsourced to model 3 hospitals.
Outpatients	**Conservative**	— Efficiency only in terms of duration	— Source: Validation sessions July/ September
Outpatients	**Progressive**	— Follow up ratio to national standards (1:2). Factor General Surgery should be 1:1 (new : return) — Efficiency also in terms of duration visits — +10% shift from day cases to outpatients	— Source: National Service Capacity Review 2018 and validation sessions September (clinicians, process) — Compared to national standards, the follow up ratios are currently high in GUH and as such it is considered that GUH should aim to meet national standards for these. — Assumption around+10% shift from day cases to outpatients is driven by inpatient assumption.
ED	**Conservative**	— 0%	— Source: National Service Capacity Review 2018 (no specific factor is taken into account for ED)
ED	**Progressive**	— 0% (efficiency in terms of duration)	— Source: Validation sessions September (process)
Diagnostics	**Conservative**	— 0%	— Source: National Service Capacity Review 2018 (no specific factor is taken into account for diagnostics)
Diagnostics	**Progressive**	— -5%	— Source: Validation sessions July/ September (process) — Rationale: — Improved technology and process will improve diagnostics in the future.

Type of data	Variant	Factor	Source and rationale
HSCP (Health and social care)	**Conservative**	— 0%	— Source: Validation sessions September (process)
HSCP	**Progressive**	— 0% - not a factor in terms of visits, but in terms of duration and direct patient time	— Source: Validation sessions September (process) — Note: We only received the data for Physiotherapy, Occupational therapy and Medical Social Work

Factors for the projected scenario

The projected scenario was based on the following assumptions:

- An increase of managed primary care and residential concepts for elderly would decrease the number of inpatient elderly visiting the hospital (substitution – assumption based on scenario 2);
- Working more efficient in the future (i.e. having the patients medicine ready before discharge and work with an expected discharge date) will lead to a lower length of stay on average (efficiency – assumption based on scenario 3);
- Working more efficient in the future will lead to less return visits for outpatients (efficiency – assumption based on scenario 3);
- Chronic disease management will be partly provided at home, in the community or as a day case instead of as an inpatient or as an outpatient instead of a day case (substitution – assumption based on scenario 2);
- Some of the care that's currently provided in GUH could shift to model 3 hospitals in the future (substitution – assumption based on scenario 2);
- The number of ED visits will decrease towards the future since the change in primary care and increased prevention of elderly (substitution – scenario 2);
- In line with the assumptions for inpatients, outpatients, ED visits and procedures (for example the reduced length of stay or the shift from care outside the hospital) we adjusted the figures for diagnostics and HSCP (substitution – assumption based on scenario 2). In addition to this some of the diagnostics are currently unnecessary (wrongly requested) or duplicated (lack of IT system). This will lead to a relatively small decrease of number of scans or investigations (efficiency – assumption based on scenario 3).

The Hospital Group's report and Smaller Hospitals Framework provides a clear framework for the overall hospital development and other policies provide a more specialized role for Model 3 & 4 hospitals. These were also reflected in the Sláintecare Report and underpin the 'shift to other hospitals' assumption included in this scenario.

Type of data	Factor	Source and rationale
Inpatients	— -10% admissions non elective admissions (65+)	— Based on the trends for example the Netherlands and in Sweden, it is considered that the presence of elderly in the hospital should be

Type of data	Factor	Source and rationale
	— -5% medical elective admissions (65+) — ALOS to standards (all) — Additional reduction of -10% LOS for chronic disease management due to home monitoring — -8% chronic disease management (# patients) to community (all) — -10% chronic disease management (# patients) to outpatients (all). — -30% (# patients) shift to day case Endocrinology, Oncology, Haematology, Geriatrics and Obstetrics – elective care (all). — -10% (# patients) shift to day case all other specialties – elective care (all). — -10% shift day cases to outpatients. — -15% shift day cases to model 3 hospitals for general surgery, vascular surgery, gynecology, urology, and plastic surgery.	adjusted. Currently one out of four patients attending ED is admitted. The % of elderly admitted is high in comparison to other age brackets visiting ED. An increase of managed primary care and residential concepts for elderly would decrease the number of elderly visiting ED but also being admitted via ED; — Optimizing patient flow (discharge planning, cohorting older people etc.) would lead to a reduction in the length of stay; — Based on the trends in the Netherlands and Israel, patients with a chronic disease are increasingly treated in primary care settings, where possible supported by e-health. Therefore, it is assumed in accordance with public policy that individuals with a chronic disease could be shifted, partly to the community and partly to outpatients. The shift to outpatients is taken into account because the hospital can only partly influence the developments within the community; — Due to improved technology a part of the day cases can shift towards outpatients. — GUH currently provides low complex care that can be outsourced to model 3 hospitals. — In the current analysis, the assumption was made that 15% of the day cases for general surgery, vascular surgery, gynecology, urology, and plastic surgery can be shifted to model 3 hospitals, because the level of complexity is too low for model 4 hospitals. In Dutch university hospitals certain forms of inpatient care (e.g. hip replacements) are no longer performed. It is to be expected that low complex care will also move out of model 4 hospitals in Ireland in the future. This will result in less inpatient bed days, less radiologic scan, and less outpatient visits in GUH.

Type of data	Factor	Source and rationale
Outpatients	— +10% shift chronic disease management (#) patients) from inpatients to outpatients (all) — +10% shift from day cases (# patients) to outpatients — -10% chronic disease management from outpatients to community (all) — Follow up ratio to national standards (1:2). Factor General Surgery should be 1:1 (new : return)	— See for the increases the rationale above or below (corresponding to the category the care is shifted from); — Comparing the data with the national standards the number of follow up visits is high, as such this is adjusted to reflect UGH coming in line with other hospitals in Ireland.
ED	— -15% (all)	— Due to various reasons some people are attending ED when they could be treated in a primary care setting. It is assumed that through improved community care this will change in the future and as such an adjustment of 15% has been made; — UGH indicated that they expect all review patients to be seen at the Emergency Department. As such this has been reflected in our assumption here.
Diagnostics	— -15% Cardiac investigations (both in- and outpatients) — -10% Radiology (both in- and outpatients) — -30% General X-ray (only outpatients) — -30% Ultrasound (only outpatients)	— During the interviews it was mentioned that some of the diagnostics are currently unnecessary (wrongly requested/ double due to a lack of IT-system). This has been adjusted for; — During the interviews it was also mentioned that the need for diagnostics will increase due to increased technology and prevention measures. Since we suggest a decrease in inpatients and ED attendances it is considered that these will average each other out — In addition part of the Cardiac investigation should be done closer to people's homes (in the community). The percentage was given during the first round of interviews; — In addition part of the Radiology diagnostics should be shifted towards primary care. During the interviews it was mentioned that

Type of data	Factor	Source and rationale
		this should be 100% for outpatient visits for General X-ray and Ultrasound. We do believe 30% would be more realistic; a part of the patients can get their diagnostics within the community, but for some of them it would work better to combine it with their outpatient visit.
HSCP	— -35% (only outpatients) — -10% (only inpatients)	— It is considered that these patients do not need to be treated in a model 4 hospital and the majority of care for outpatients should shift towards primary care with the exception of those patients attending the hospital OPD. — There should be an additional decrease of 10 % due to the reduction in length of stay and the shift from inpatients to community and outpatients.

Summary Factors for all scenarios

Legend: <65 means all people under 65 years; 65+ means all people of 65 years and older

Type of data	Substitution - Conservative	Substitution - Progressive	Efficiency - Conservative	Efficiency - Progressive	Projected scenario (Substitution and Efficiency)
Inpatients	— -5% medical elective admissions (65+) — -10% medical non elective admissions (65+) — ALOS to average other model 4 hospitals (65+)	— -5% medical elective admissions (65+) — -15% medical non elective admissions (65+) — ALOS to standards (all) — -8% chronic disease management to community (<65) — -10% chronic disease management to outpatients (<65) — -30% shift to dayward Endocrinology, Geriatrics, Oncology,	— ALOS to average other model 4 hospitals per specialty	— ALOS to average other model 4 hospitals per specialty — -10% day cases to community — -10% shift day cases to outpatients	Substitution — -5% medical elective admissions (65+) — -10% admissions non elective admissions (65+) — ALOS to standards (all) Efficiency — Additional reduction of -10% LOS for chronic disease management due to home monitoring — -8% chronic disease management (# patients) to community (all)

Type of data	Substitution - Conservative	Substitution - Progressive	Efficiency - Conservative	Efficiency - Progressive	Projected scenario (Substitution and Efficiency)
		Haematology and Obstetrics (all)			— -10% chronic disease management (# patients) to outpatients (all). — -30% (# patients) shift to day case Endocrinology, Oncology, Haematology, Geriatrics and Obstetrics – elective care (all). — -10% (# patients) shift to day case all other specialties – elective care (all). — -10% shift day cases to outpatients Shift to other hospitals — -15% shift day cases to model 3 hospitals for general surgery, vascular surgery, gynecology, urology, and plastic surgery.

Type of data	Substitution - Conservative	Substitution - Progressive	Efficiency - Conservative	Efficiency - Progressive	Projected scenario (Substitution and Efficiency)
Outpatients	— n/a	— +10% shift chronic disease management from inpatients to outpatients (all) — -10% chronic disease management to community (all)	— Efficiency only in terms of duration	— Follow up ratio to national standards (1:2). Factor General Surgery should be 1:1 (new : return) — Efficiency also in terms of duration visits — +10% shift from day cases to outpatients	Substitution — +10% shift chronic disease management (#) patients) from inpatients to outpatients (all) — +10% shift from day cases (# patients) to outpatients — -10% chronic disease management from outpatients to community (all) Efficiency — Follow up ratio to national standards (1:2). Factor General Surgery should be 1:1 (new : return)
ED	-10% (all)	— -20% (all) — -50% review shift outside hospital	— 0%	— 0% (efficiency in terms of duration)	— -15% (all)

Type of data	Substitution - Conservative	Substitution - Progressive	Efficiency - Conservative	Efficiency - Progressive	Projected scenario (Substitution and Efficiency)
		(other 50% sticks to ED)			
Diagnostics	-10%	Cardiac investigations: — -10% Cardiac investigations (both in- and outpatients) Radiology: — -100% General X-ray (only outpatients) — -100% Ultrasound (only outpatients)	— 0%	— -5%	— -15% Cardiac investigations (both in- and outpatients) — -10% Radiology (both in- and outpatients) — -30% General X-ray (only outpatients) — -30% Ultrasound (only outpatients)
HSCP	— -30% care delivered to outpatients	— -35% care delivered to outpatients	— 0%	— 0% - not a factor in terms of visits, but in terms of duration and direct patient time	— -35% (only outpatients) — -10% (only inpatients)

A.1.4.4 Results of substitution and efficiency scenario

For the second and third scenario (substitution and efficiency) both the conservative variant and the progressive scenario were calculated. The results are shown the figures below. The first figure shows the key figures for the base scenario, followed by the key results for the conservative scenario, the progressive scenario and the projected scenario. In the graphs below that the key figures are shown for all scenarios combined in different graphs.

Current care demand 2017 including waiting list and care from Dublin hospitals (without demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
284,072	**108,397**	**308,113**	**15,967**	**64,426**	**196,486**

Base scenario 2031 (with demographical and epidemiological changes):

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
396,990	**136,826**	**369,338**	**20,451**	**68,952**	**253,872**

Conservative scenario substitution:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
391,810	**136,826**	**369,338**	**20,157**	**62,057**	**228,485**

Progressive scenario substitution:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
375,379	**113,791**	**374,010**[1]	**19,817**	**53,826**	**192,747**

1. Increases due to shift from daycase to outpatient

Conservative scenario efficiency:

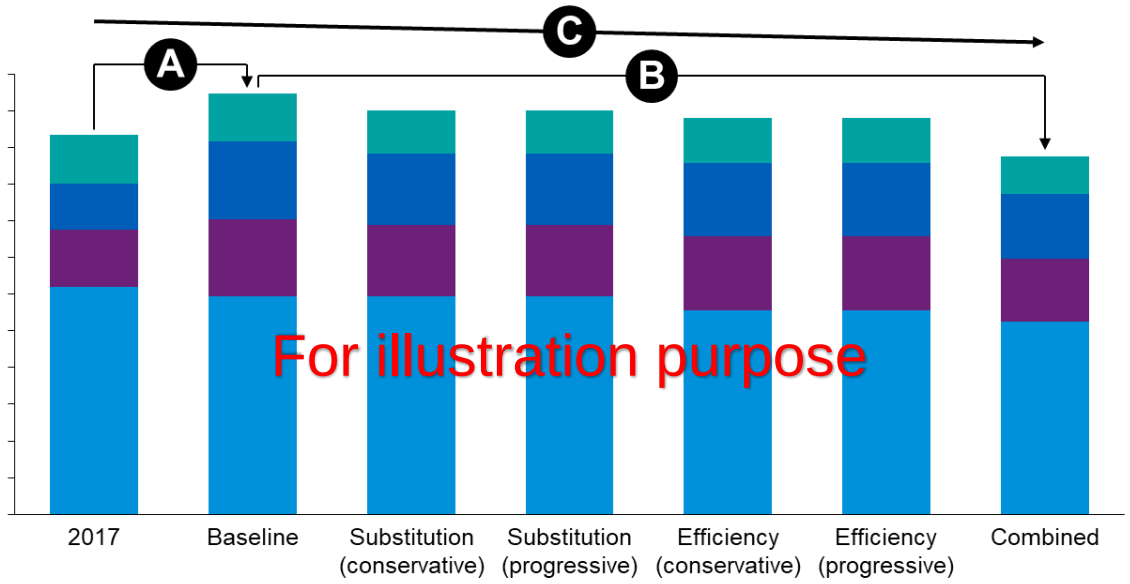
Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
389,846	**136,826**	**369,338**	**20,451**	**68,952**	**253,872**

Progressive scenario efficiency:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
389,846	**109,461**	**327,550**	**19,616**	**68,952**	**241,179**

Projected scenario:

Bed days	Day cases	Outpatient visits	Theatre procedures	ED visits	Diagnostics (Radiology)
290,102	**100,871**	**318,688**	**17,835**	**58,609**	**211,981**

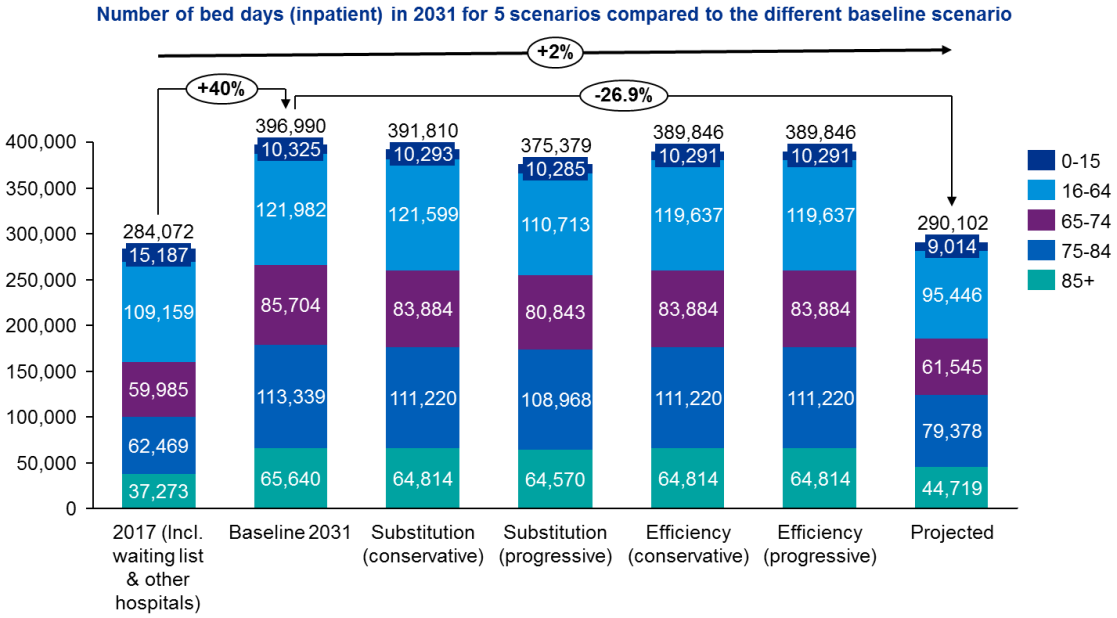


Legend:

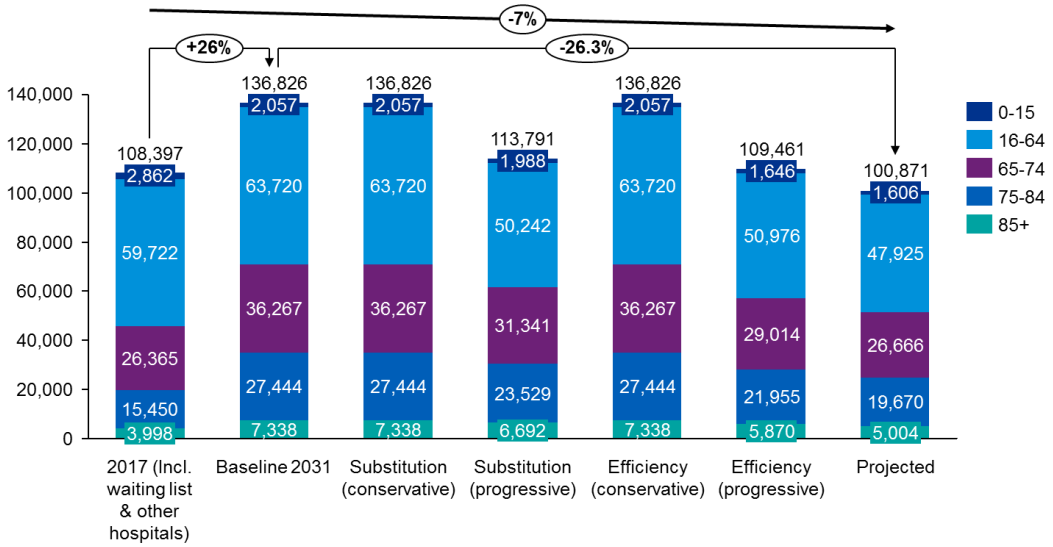
A Percentage difference between 2017 and Baseline Scenario which is demand in 2031 without efficiency and substitution improvements

B Percentage difference between Baseline and projected scenario with efficiency and substitution improvements

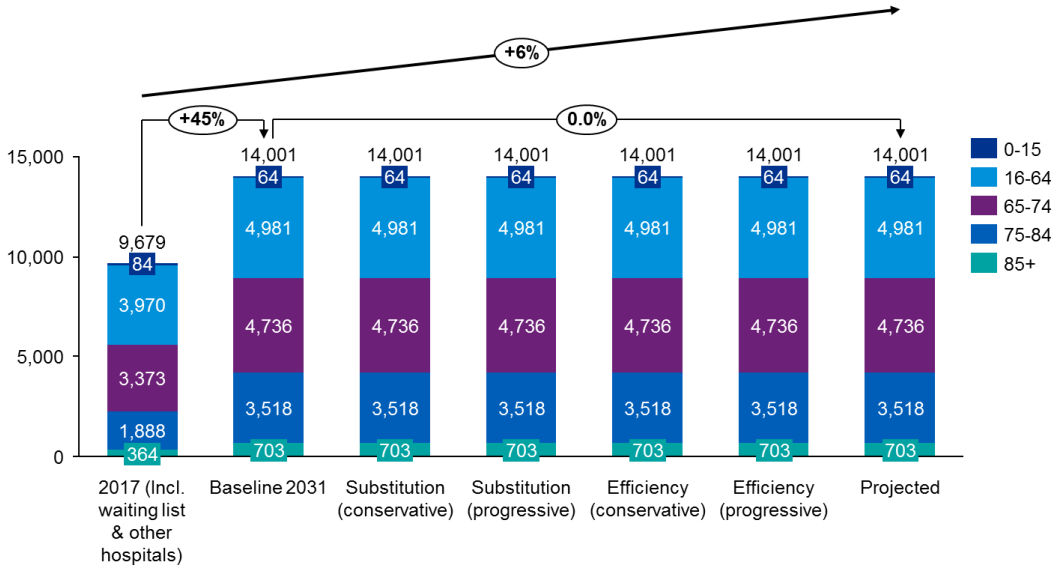
C Percentage difference between 2017 versus projected scenario with efficiency and substitution improvements



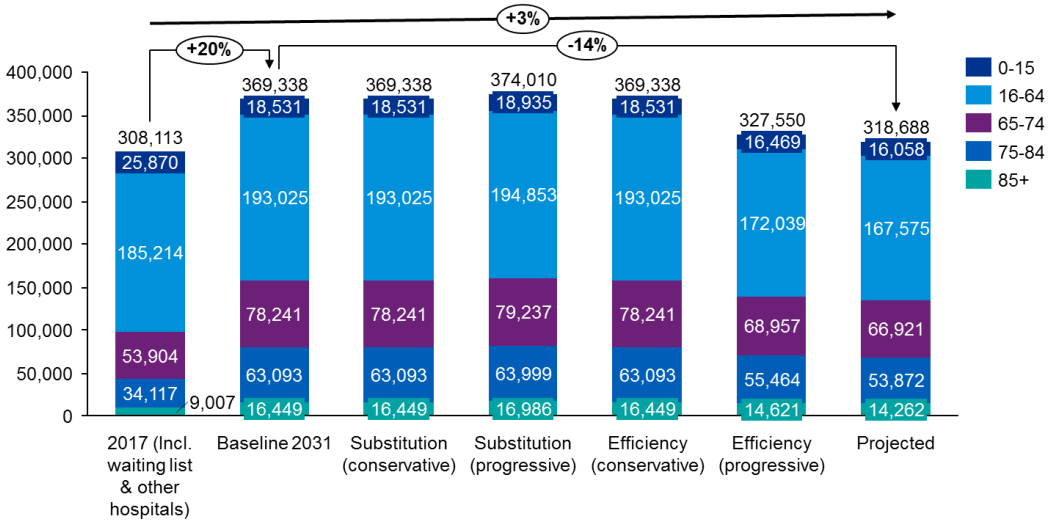
Number of day cases (inpatient) in 2031 for 5 scenarios compared to the different baseline scenario



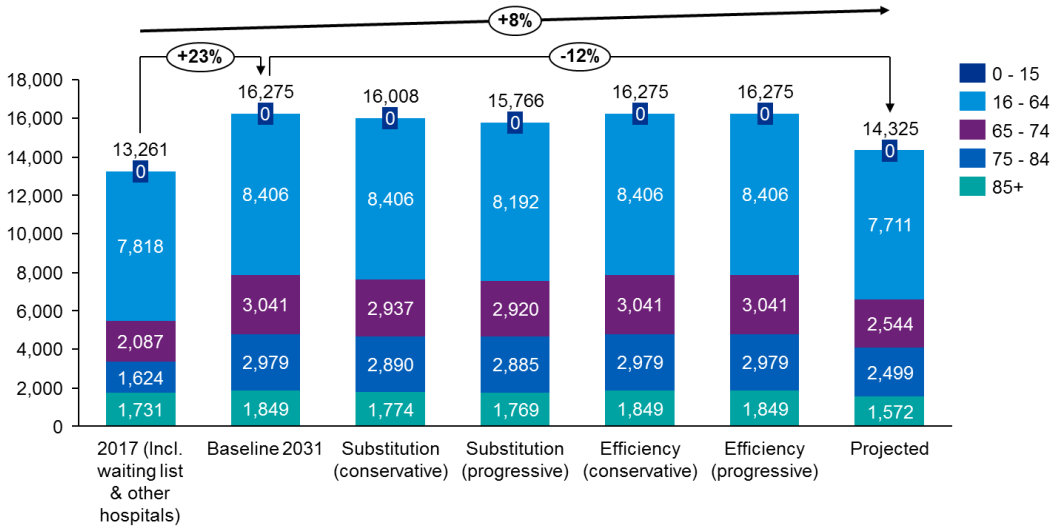
Number of ICU days in 2031 for 5 scenarios compared to the different baseline scenario



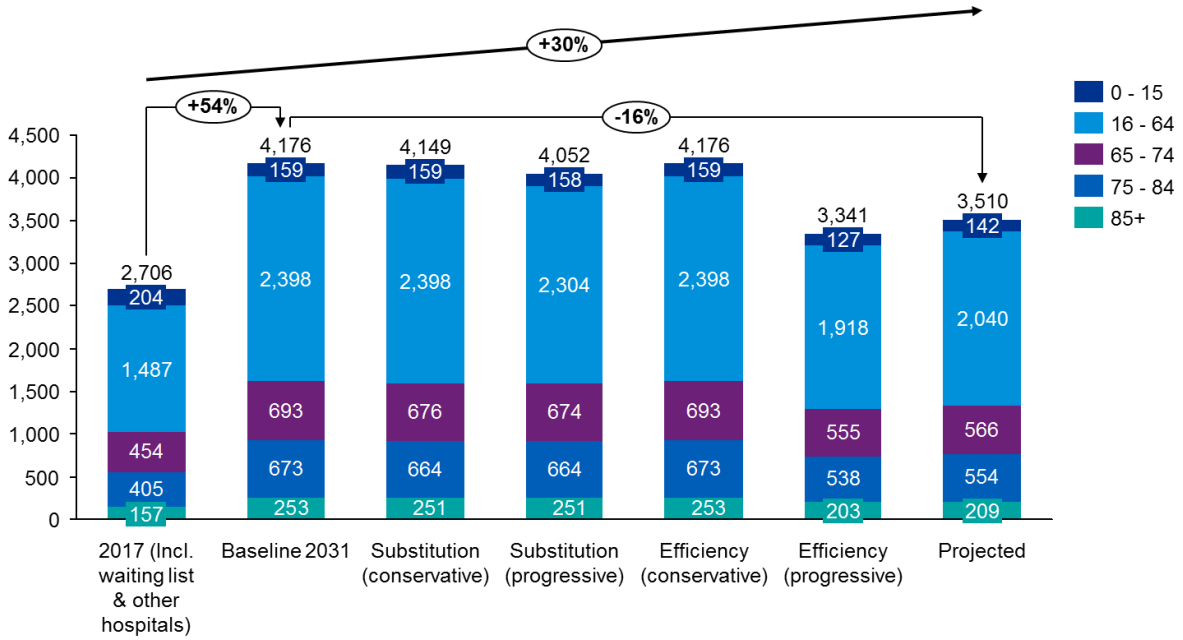
Number of Outpatient visits in 2031 for 5 scenarios compared to the baseline scenario



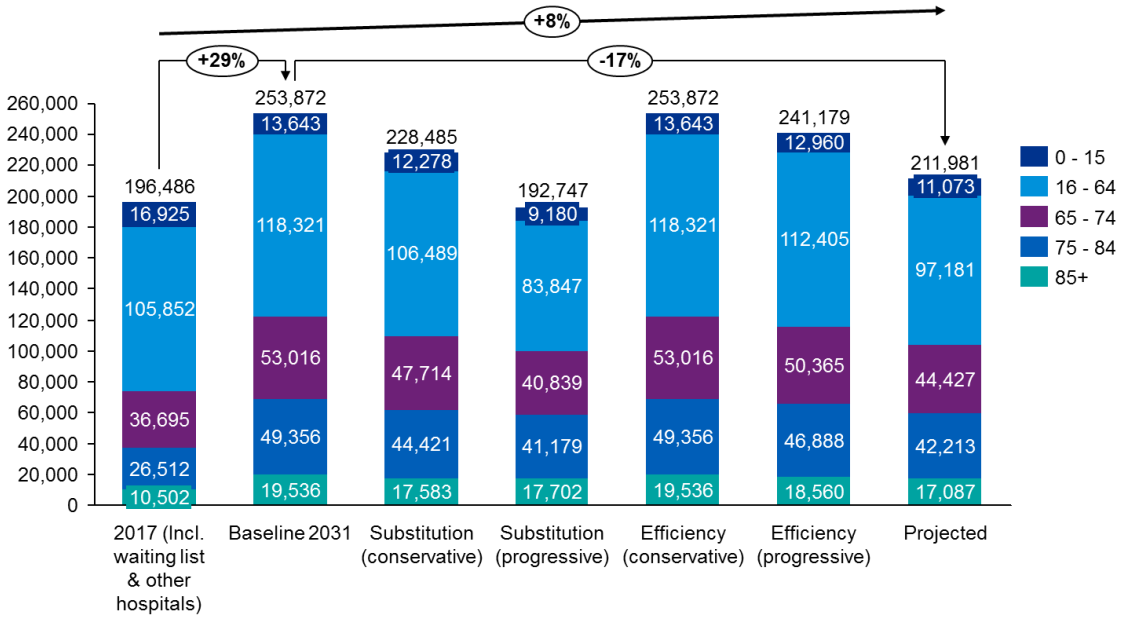
Number of Regular Theatre procedures in 2031 for 5 scenarios compared to the different baseline scenario



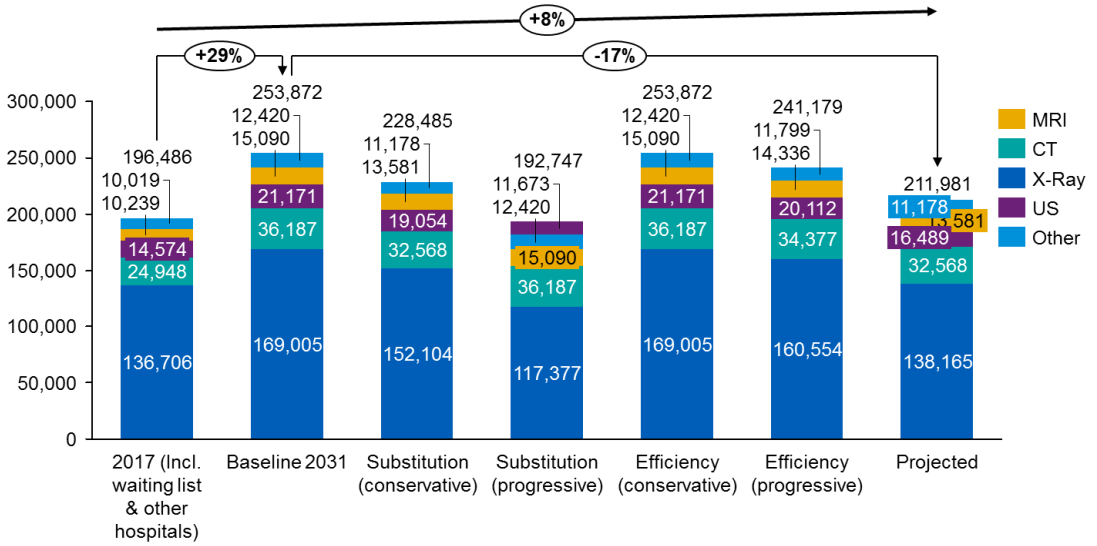
Number of Day case Theatre procedures in 2031 for 5 scenarios compared to the different baseline scenario



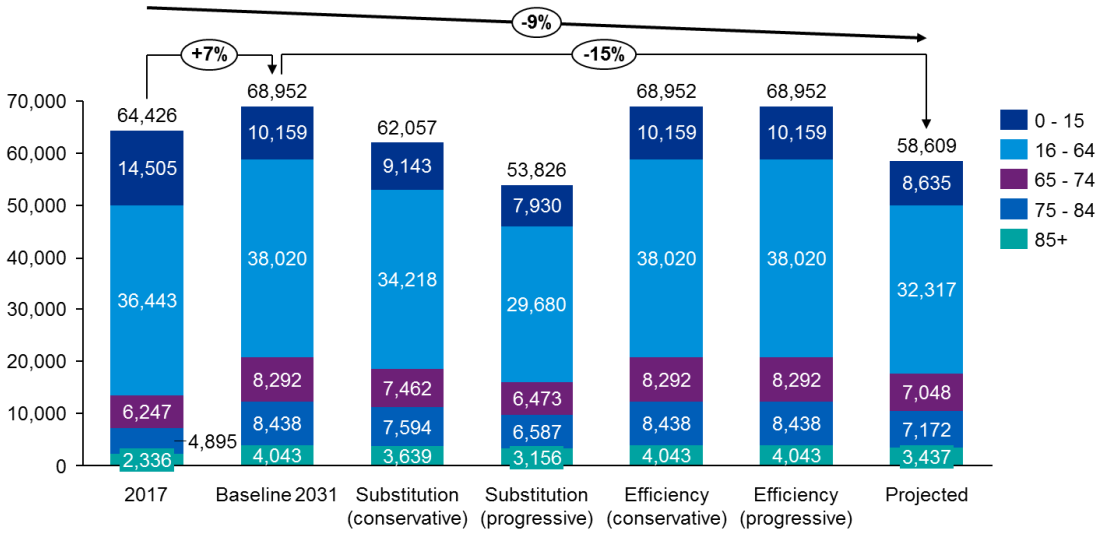
Number of Radiology investigations in 2031 for 5 scenarios compared to the different baseline scenario



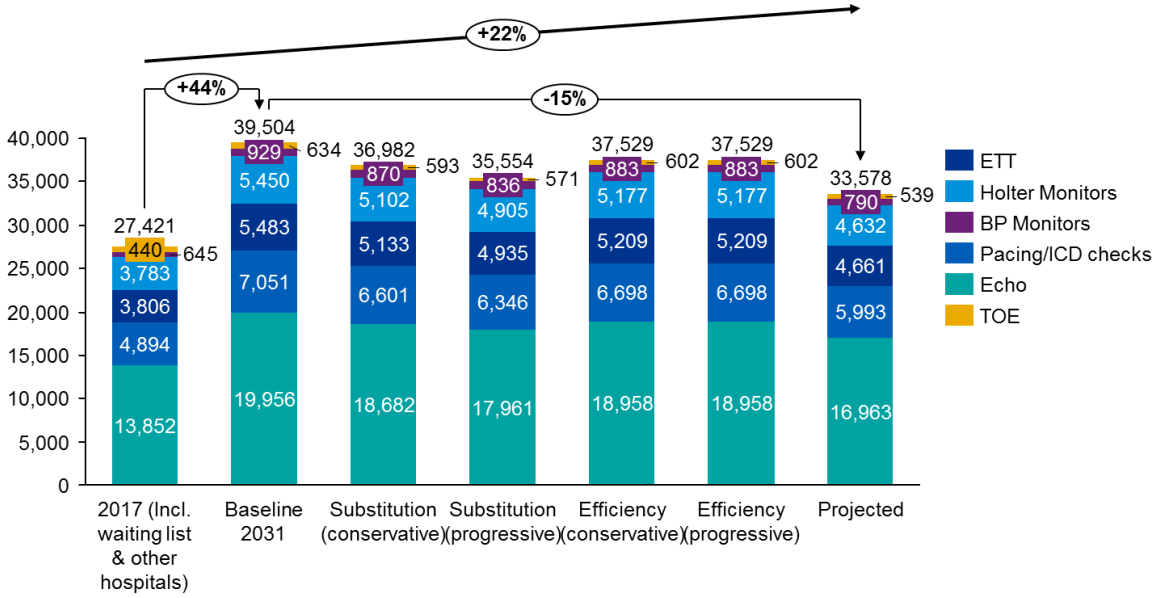
Number of Radiology investigations in 2031 for 5 scenarios compared to the different baseline scenario



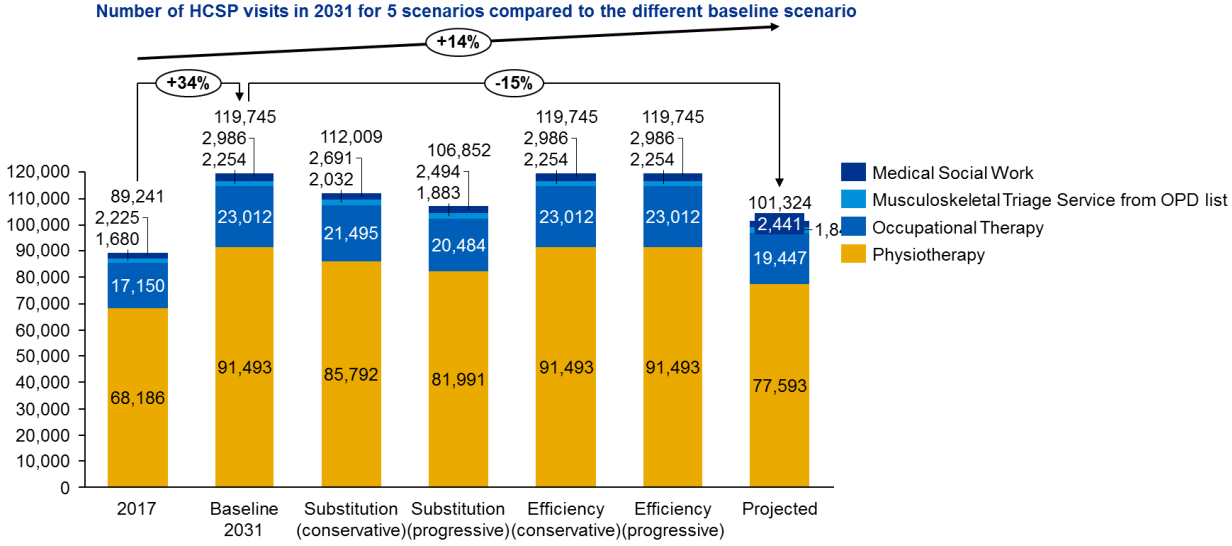
Number of ED visits in 2031 for 5 scenarios compared to the different baseline scenario



Number of Cardiac investigations in 2031 for 5 scenarios compared to the different baseline scenario



Number of HCSP visits in 2031 for 5 scenarios compared to the different baseline scenario



A.1.5 Map capacity demand[68]

A.1.5.1 Calculation methods to calculate capacity based on demand

We agreed with the Steering Group the assumptions of 50 working weeks per year, 48 working hours per day for daycases, outpatients, theatre, and diagnostics. There is no difference in terms of results when calculating with 48 hours in five days or six days.

Number of bed days into number of inpatient beds	
Assumptions	— 365 days a year — Occupancy rate = 85% (a) of 90% (b)
Rationale/ source assumptions	— Health Service Capacity Review 2015: Executive Report, 2018
Calculation example	Assume you have 3,650 bed days per year. To calculate the number of bed days per day you divide the number of bed days per year by 365. This means 3,650 bed days per year/ 365 days = 10 bed days per day. Dividing the number of bed days per day by the occupancy rate, this results in the number of beds required. This means 10 bed days per day/ 85% occupancy rate = 11 beds needed to cover the 3,650 bed days.
Current number of beds	713 (inpatients beds minus beds Intensive care for GUH)
Output projected scenario (number of bed days)	290,102
Number of beds calculated	290,102 bed days per year / 365 days = 795 bed days per day 805 bed days per day / 85% occupancy rate = 935 beds required (a) 805 bed days per day / 90% occupancy rate = 883 beds required (b)

[68] The report on the New Children's Hospital suggests the definitive [detailed] business case overstated the maturity of the New Children's Hospital and overestimated the confidence in the forecasts. For the avoidance of any doubt this Report is a preliminary business case to assess the feasibility of the proposed Project (see figure 6 on page 21). Therefore the figures presented in this section and throughout this Report are preliminary and no level of certainty should be applied against them. If this Project gains approval to proceed to the detailed appraisal stage the advisors should state the level of certainty inherent in the forecasted numbers.

Number of bed days into number of day case beds	
Assumptions	— 48 working hours a week — 50 working weeks a year — 2.0 (a) – 2.6 (b) day cases a day
Rationale assumptions	— Health Service Capacity Review 2015: Executive Report, 2018
Calculation example	[This calculation example is under the assumption of having 52 working weeks a year, 6 days per week, 8 hours per day.] Assume you have 1,850 day cases per year. To calculate the number of day cases per day you divide the number of day cases per year by the total working days per year. This means 1,850 day cases per year/ (6 working days a week * 50 working weeks a year) = 5.9 day cases per day. Dividing the number of day cases per day by the norm (number of day cases per day), this results in the number of day case beds required. This means 5.9 day cases per day/ 2 as norm = 3 beds required to cover the 1,850 day cases.
Current number of beds	134 (based on overview Caroline Ryder)
Output projected scenario (number of day cases)	100,871
Number of beds calculated	100,871 day cases per year / (6 working days a week * 50 working weeks a year) = 336 day cases per day 336 day cases per day / 2.0 as norm = 168 day case beds required (a) 336 day cases per day / 2.6 as norm = 129 day case beds required (b)

Number of ICU days into number of ICU/ critical care beds	
Assumptions	— Occupancy rate = 85% — 365 days a year
Rationale assumptions	— Occupancy of a teaching hospital adult intensive care unit,, Anaesthesia, 1998. — Critical Capacity A Short Research Survey On Critical Care Bed Capacity, March 2018.
Calculation example	Assume you have 365 ICU bed days per year. To calculate the number of bed days per day you divide the number of bed days per year by 365. This means 365 bed days per year/ 365 days = 1 bed days per day. Dividing the number of bed days per day by the occupancy rate, this results in the number of beds required. This means 1 bed days per day/ 85% occupancy rate = 1.1 beds needed to cover the 365 bed days.
Current number of beds (ICU/ critical care)	26
Output projected scenario (number of bed days)	14,001
Number of beds calculated	14,001 ICU bed days per year / 365 days = 38.4 ICU bed days per day 24.3 ICU bed days per day / 85% occupancy rate = 45.1 ICU/ critical care beds needed

Number of outpatient visits into number of outpatient rooms/ visits	
Assumptions[69]	— 48 working hours a week — 50 working weeks a year — Average duration of a visit per specialty — average duration of 21 minutes per visit. This is an aggregate number that differs between the different specialties.
Rationale assumptions	— Average duration of a visit per specialty was provided by GUH
Calculation example	This calculation example is under the assumption of having 52 working weeks a year, 6 days per week, 8 hours per day.] Assume 10,000 outpatient visits per year. To calculate the number of outpatient visits, divide the number of visits per year by the total working days per year. This means 10,000 visits per year/ (6 working days a week * 52 working weeks a year) = 32 visits per day. Dividing the number of visits per day by the total of slots available (8 working hours a week, average duration of 15 minutes per visit), this results in the number of day case beds required. This means 5.9 day cases per day/ 2 as norm = 3 beds needed to cover the 1,850 day cases.
Current number of rooms	100 consulting rooms and cubicles: 67 at UHG and 33 at MPUH
Projected scenario (number of outpatient visits)	318,688
Number of rooms calculated	318,688 visits * average duration per visit (21 minutes based on the assumption) = 111,317 hours of visits 111,317 hours of visits / (50 weeks * 48 working hours a week) = 47 outpatient rooms

[69] The assumptions were refined based on a review of capacity required solely in the Elective Hospital Report. These assumptions will need to be reviewed (and determined by speciality) during the Detailed Business Case stage for both the elective and the acute. See appendix A19

Number of procedures into number of theatre rooms	
Assumptions	— 48 working hours a week — 50 working weeks a year — Average duration of a procedure per specialty — Occupancy rate (percentage of available time that a patient is in the theatre) = 80% (a) or 85% (b). Numbers based on literature and bench mark numbers of Dutch hospitals.
Rationale assumptions	— Average duration of a procedure per specialty was provided by GUH
Calculation example	[This calculation example is under the assumption of having 50 working weeks a year, 6 days per week, 8 hours per day.] Assume you have 10,000 theatre procedures per year. To calculate the number of procedures per day you divide the number of procedures per year by the total working days per year. This means 10,000 visits per year/ (6 working days a week * 52 working weeks a year) = 33 procedures per day. Multiplying the number of procedures per day by the average duration of a procedure per specialty this results in the number of hours you need to operate per day. Let's assume for this example the duration is 1 hour. This means you multiply 33 procedures by 1 hours which results in 33 hours. With an occupancy rate of 80% (a) 41.7 hours will be required and with an occupancy rate of 85% (b) 39.2 hours will be required. Since you have 8 hours a day per room this means you need to divide 41.7 hours by 8 hours which results in 6 rooms (a) and 39.2 hours by hours 8 hours which results in 5 rooms (b).
Current number of rooms	18 theatre rooms
Output projected scenario (number of bed days)	— Day surgery: 3,510 — Regular surgery: 13,091 — Maternity: 1,234
Number of theatre rooms	(3,510 day surgeries * average duration per day surgery per specialty / occupancy rate 80%) / (50 weeks * 48 working hours a week) = 3 day surgery rooms (3,510 day surgeries * average duration per day surgery per specialty / occupancy rate 85%) / (50 weeks * 48 working hours a week) = 3 day surgery rooms

	(13,091 regular surgeries * average duration per regular surgery per specialty / occupancy rate 80%) / (50 weeks * 48 working hours a week) = 9 regular surgery rooms (13,091 regular surgeries * average duration per regular surgery per specialty / occupancy rate 85%) / (50 weeks * 48 working hours a week) = 9 regular surgery rooms (1,234 maternity surgeries * average duration per maternity surgery / occupancy rate 80%) / (50 weeks * 48 working hours a week) = 1 maternity surgery room (1,234 maternity surgeries * average duration per maternity surgery / occupancy rate 85%) / (50 weeks * 48 working hours a week) = 1 maternity surgery room 3 Emergency theatres: — 1 Paediatrics — 1 Orthopaedics — 1 General Emergency Total 3 + 9 + 1 + 3 = 16 theatres

Number of diagnostic activities into number of resources	
Assumptions	— 48 working hours a week — 50 working weeks a year — Average duration per scan (Radiology) – varies per modality and also within the modalities — Average duration per investigation (Cardiac investigations) – Echo = 0.67 hour/ Pacing/ ICD checks = 0.5 hour/ ETT = 0.67/ Holter monitors = 0.5 hour/ BP monitors = 0.25/ TOE = 1
Rationale assumptions	— Average duration per scan or investigation was provided by GUH
Calculation example	[This calculation example is under the assumption of having 50 working weeks a year, 6 days per week, 8 hours per day.] Assume you have 10,000 scans/ investigations per year. To calculate the total hours of scans/ investigations we multiply the number of scans/ investigations by the average duration per scan/ investigation. Let's assume the average duration is a half hour. In this example this means 10,000 * 0.5 = 5,000. To get the number of resources we divide the total of hours by the available hours. This means 5,000 * (48 working hours a week * 50 weeks per year). This results in 3 resources.
Current number of resources	— Radiologic investigations — 5 general x-ray machines, 6 mobile x-ray units, 2 mammography rooms — 2 CT-scanners — 4 ultrasound machines (1 of which is specialized for breast ultrasounds) — 1 MRI — 1 lithotripsy room — 1 fluoroscopy room — 1 room for nuclear medicine — 1 radio pharmacy room — 2 rooms for lines and embolization — 5 image intensifiers (1 urology, 1 vascular, 3 orthopedics) — 1 Ortho pentagram scanner

	— 1 DAT-scan — Cardiologic investigations — 5 Echocardiography machines — 2 ETT treadmills — 2 Cardiac devices clinics (pacemakers and ICD) rooms — 1 Holter analysis system — 1 Ambulatory blood pressure system
Output projected scenario (number of scans/ investigations)	Scans: 211,981 Investigations: 33,578
Number of resources calculated	211,981 scans * average duration per scan (in hours – depending on modality) = 62,873 62,873 hours of scans / (50 weeks * 48 working hours a week) = 27 resources 33,578 investigations * average duration per investigation (in hours – depending on type of investigation) = 20,465 hours of investigations 20,465 hours of investigations / (50 weeks * 48 working hours a week) = 9 resources

A.1.5.2 Calculated capacity per specialty, modality and investigation[70]

Procedures and theatre rooms			
	Baseline 2031	Projected scenario 2031	
Type	Procedures	Procedures	Theatre rooms
Regular	15,014	13,091	9
Day case	4,176	3,510	3
Maternity	1,261	1,234	1
Emergency			3
Total	20,451	17,835	16

[70] The report on the New Children's Hospital suggests the definitive [detailed] business case overstated the maturity of the New Children's Hospital and overestimated the confidence in the forecasts. For the avoidance of any doubt this Report is a preliminary business case to assess the feasibility of the proposed Project (see figure 6 on page 21). Therefore the figures presented in this section and throughout this Report are preliminary and no level of certainty should be applied against them. If this Project gains approval to proceed to the detailed appraisal stage the advisors should state the level of certainty inherent in the forecasted numbers.

Inpatient Bed Days per specialty

	Number of bed days				Number of Beds required (Occupancy Rate = 0,85)			
	Baseline 2031		Scenario 4		Baseline 2031		Scenario 4	
Specialty	**0-15**	**16+**	**0-15**	**16+**	**0-15**	**16+**	**0-15**	**16+**
Vascular Surgery	-	15,691	-	11,351	-	50.6	-	36.6
Urology	89	22,502	80	19,005	0.3	72.5	0.3	61.3
Rheumatology	16	9,007	13	6,760	0.1	29.0	0.0	21.8
Respiratory Medicine	12	19,351	10	14,955	0.0	62.4	0.0	48.2
Radiotherapy	-	10,031	-	6,786	-	32.3	-	21.9
Radiology	-	44	-	36	-	0.1	-	0.1
Plastic Surgery	215	4,275	187	3,627	0.7	13.8	0.6	11.7
Pain Relief	-	35	-	26	-	0.1	-	0.1
Paediatrics	3,899	153	3,310	115	12.6	0.5	10.7	0.4
Otolaryngology	394	3,980	353	3,399	1.3	12.8	1.1	11.0
Orthopaedics	503	31,466	441	26,131	1.6	101.4	1.4	84.2
Oral Surgery	38	1,903	34	1,625	0.1	6.1	0.1	5.2
Ophthalmology	32	3,493	29	2,575	0.1	11.3	0.1	8.3
Oncology	-	22,013	-	12,849	-	71,0	-	41.4
Obstetrics/Gynaecology	19	15,471	13	10,771	0.1	49.9	0.0	34.7
Neurology	32	8,014	23	5,919	0.1	25.8	0.1	19.1
Nephrology	16	14,131	12	10,664	0.1	45.5	0.0	34.4
Neonatology	3,803	-	3,412	-	12.3	-	11.0	-
Maxillo-Facial	22	844	20	748	0.1	2.7	0.1	2.4
Infectious Diseases	9	9,307	7	6,208	0.0	30.0	0.0	20.0
Haematology	2	12,867	1	8,366	0.0	41.5	0.0	27.0
Geriatric Medicine	10	55,726	7	32,265	0.0	179.6	0.0	104.0
General Surgery	1,057	51,075	928	42,813	3.4	164.6	3.0	138.0
General Medicine	23	18,914	15	11,132	0.1	61.0	0.0	35.9
Gastro Intestinal Surger	-	100	-	81	-	0.3	-	0.3
Gastro Enterology	32	19,128	27	14,990	0.1	61.7	0.1	48.3
Endocrinology	9	11,692	7	8,679	0.0	37.7	0.0	28.0
Dermatology	27	308	25	259	0.1	1.0	0.1	0.8
Clinical Pharmacology	-	0	-	0	-	0.0	-	0.0
Clinical Immunology	-	6	-	5	-	0.0	-	0.0
Cardiology	8	19,270	6	14,092	0.0	62.1	0.0	45.4
Cardio Thoracic Surgery	59	5,802	53	4,800	0.2	18.7	0.2	15.5
Anaesthetics	-	67	-	57	-	0.2	-	0.2
Total	**10,325**	**386,665**	**9,014**	**281,088**	**33.3**	**1,246.3**	**29.1**	**906.0**

Outpatient visits and rooms				
	Number of visits		Outpatient consulting rooms	
Specialty	Baseline scenario 2031	Projected scenario2031	Baseline scenario 2031	Projected scenario 2031
Obstetrics	35,327	30,814	4.91	4.28
Surgery	36,184	29,933	5.03	4.16
Ophthalmology	34,221	29,365	4.75	4.08
Orthopaedics	34,456	29,335	7.18	6.11
Cardiology	28,807	26,126	4.00	3.63
Radiotherapy	21,748	19,455	3.02	2.70
Urology	21,593	17,879	3.00	2.48
Vascular	14,487	12,345	2.01	1.71
Oncology	14,312	12,308	1.99	1.71
Plastic	13,118	11,287	1.82	1.57
Dermatology	12,686	10,828	1.76	1.50
Respiratory	13,035	10,743	1.81	1.49
Earnose&Throat	11,778	10,232	1.64	1.42
Endocrinology	12,471	10,231	1.73	1.42
Gastroenterology	9,328	8,215	1.30	1.14
Neurology	8,036	6,922	1.12	0.96
Rheumatology	7,449	6,357	1.03	0.88
Haematology	6,790	6,003	0.94	0.83
Nephrology	5,661	5,706	0.79	0.79
Paediatrics	5,509	4,767	0.86	0.74
Maxillofacialsurgery	4,661	4,029	0.65	0.56
Infectiousdiseases	4,092	3,322	0.57	0.46
Anaesthetics	2,881	2,943	0.40	0.41
Geriatricmedicine	2,649	2,388	0.37	0.33
Medical	2,733	2,294	0.38	0.32
Cardiothoracicsurgery	1,630	1,379	0.23	0.19
Gynaecology	1,154	1,197	0.16	0.17
Painrelief	1,212	1,107	0.17	0.15
Immunology	1,038	930	0.14	0.13
Pathology	216	182	0.03	0.03
Palliativecare	78	67	0.01	0.01
Total	**369.340**	**318.689**	**53,79**	**46,38**

Births per DRG		
DRG Description*	**Number of births 2017**	**Number of births 2031**
Caesarean Delivery\ Major Complexity	125	86
Caesarean Delivery\ Intermediate Complexity	417	296
Caesarean Delivery\ Minor Complexity	416	283
Vaginal Delivery W OR Procedures\ Major Complexity	13	13
Vaginal Delivery W OR Procedures\ Minor Complexity	45	32
Vaginal Delivery\ Intermediate Complexity	312	241
Vaginal Delivery\ Intermediate Complexity	906	679
Vaginal Delivery\ Minor Complexity	585	435
Total	**2,819**	**2,065**

The following DRG's were excluded:

- Postpartum and Post Abortion W/O OR Procedures\ Major Complexity
- Postpartum and Post Abortion W/O OR Procedures\ Minor Complexity
- Abortion W/O OR Procedures\ Major Complexity
- Abortion W/O OR Procedures\ Minor Complexity
- Antenatal and Other Obstetric Admissions\ Major Complexity
- Antenatal and Other Obstetric Admissions\ Minor Complexity
- Ectopic Pregnancy\ Major Complexity
- Ectopic Pregnancy\ Minor Complexity
- Postpartum and Post Abortion W OR Procedures\ Major Complexity
- Postpartum and Post Abortion W OR Procedures\ Minor Complexity
- Abortion W OR Procedures

A.1.6 Process

A.1.6.1 List invitees interviews 19 – 25 July 2018

Interview list	
Management	— Chris Kane, General Manager — Jean Kelly, Chief Director of Nursing & Midwifery — Maurice Power, Chief Executive Officer — Pat Nash, Chief Clinical Director
Clinicians	— Associate Clinical Directors — Group Clinical Director — Professor of Surgery
Data	— Fiona Malone, Clinical Coder — Mark Grogan, Management Accountant — Paul Hurney, Information Services
Process	— Goda Faherty, Project Management Officer — Helen Hanrahan, Assistant Director of Nursing, OPD — Judith McLucas, Business Manager, Peri-operative Directorate — Mairead McGovern, Theatre Nurse Manager — Marie Burns, Assistant Director of Nursing, ED — Ollive Gallagher, Assistant director of Nursing, OPD — Paul Nolan, Chief Cardiac Technician — Susan Coyle, HSCP Lead & Radiographer Services Manager 2
Others	— Breda Smyth, Public Health — Geraldine Cooley, Cancer Services Manager — Saemus Beirne, General Manager Primary Care

A.1.6.2 List invitees validation sessions 3- 6 September 2018

Validation list	
Management	— Ann Cosgrove, Chief operating officer *(interview around this time period)* — Chris Kane, General Manager — Jean Kelly, Chief Director of Nursing & Midwifery — Jo Short, Portfolio Manager, PMO — Maurice Power, Chief Executive Officer — Pat Nash, Chief Clinical Director
Clinicians	Group Clinical Director — Clare Roche, Radiology Directorate — Ethel Ryan, Women's and Children's Directorate — Kevin Clarkson, Perioperative Directorate — Margaret Murray, Laboratory Directorate Associate Clinical Directors — Karl Sweeney, ACD Perioperative Directorate — Una Conway, ACD Women's and Children's Directorate — Michael Kerin, Professor of Surgery — Tim O'Brien, Professor of Medicine
Data	— Mark Grogan, Management Accountant — Paul Hurney, Information Services
Process	— Deirbhile Keady, ACD GUH, Laboratory Directorate — Deirdre O'Brien, CNM111, Emergency Department & AMU — Elaine Dobell, expertise in hospital length of stay — Helen Hanrahan, Assistant Director of Nursing — Jennifer Greene, Physiotherapy Manager — Margaret Murray, Group CD, Laboratory Directorate — Margaret Tarpey, Laboratory Manager/Chief Medical Scientist — Olive Gallagher, Assistant Director of Nursing — Paul Nolan, Chief Cardiac Technician — Siobhan Foley, CNM11, OPD — Susan Coyle, HSCP Lead & Radiographer Services Manager 2

A.2 Review of Current Infrastructure and Developments Report

A.3 Design Brief Report

A.4 Accessibility Report

A.5 Order of Magnitude Project Costs

A.6 Financial Model Assumptions

Inpatients

In 2017, the number of inpatients treated in GUH was 38,572 and for the basis of our model we have assumed that this is the maximum capacity of inpatients that GUH can serve and therefore represents the 'Do Nothing' Option. The current activity in 2017 is derived from the fact that total inpatient demand at GUH was 46,190, with 7.4% of these inpatients being on the waiting list and 9.1% travelling to Dublin hospitals.

The assumption has been made that under Options 2, 3 and 4, all inpatients will be able to be served in GUH thereby reducing the number of patients on the waiting list and those travelling to Dublin Hospitals to zero. Based on this assumption, when considering Options 2, 3 and 4, the number of inpatients being served in GUH peaks at 64,550 in 2031, which is an additional 25,978 inpatients treated over the 2017 activity of 38,572.

The average length of stay for inpatients is 6.15 days. The number of bed days per patient was calculated by dividing the number of inpatient bed days by the total number of inpatient patients, for all patients across all specialties in the patient mix from the UHG 2017 production. This information was calculated by KPMG Netherlands during Workstream 1.

The cost to the inpatient is €80 per patient per day[71]. Therefore for Option 2, 3 and 4, additional revenue was calculated based on the increase in inpatients number, multiplied by the average length of stay multiplied by €80.

Daycase

In 2017, the number of daycases treated in GUH was 85,807 and again this figure has been assumed to be the maximum capacity of daycase in GUH and therefore represents the 'Do Nothing' scenario. The total demand for daycases in 2017 was 108,397 at GUH, which comprised 11.7% of patients being on the waiting list and 9.1% of patients travelling to Dublin.

The same assumption has been made regarding waiting lists and patients travelling to Dublin, as above. Therefore the number of daycases peak at 136,826 in 2031, when considering Options 2, 3 & 4, which is an increase of 51,019 patients from the 2017 position, where GUH serviced 85,807 daycase patients.

The cost to the daycase patient is €80 per patient[72]. Therefore for Option 2, 3 and 4, additional revenue was calculated based on the increase in inpatients number multiplied by the revenue received from a daycase patient of €80.

Outpatients

GUH treated a total of 303,611 outpatients in 2017, and this has been assumed to represent the hospitals maximum capacity and therefore denotes the 'Do Nothing' Option. The total demand that the hospital faced was 308,113 outpatients, with 1.5% of these patients being on the waiting list.

[71] https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/hospitalcharges.html
[72] https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/hospitalcharges.html

As above, it is assumed that there will be no waiting list associated with Options 2, 3 and 4, meaning that the number of outpatients peak at 369,338 in 2031 for these options, an increase of 65,727 outpatients when compared to the 2017 figure of 303,611.

Based on information received from GUH, it is understood that outpatients are treated for free. Therefore, despite the increase in outpatient numbers associated with Options 2, 3 & 4 there is no additional revenue.

Emergency Department Attendances

Regarding the ED, an assumption has been made that there is no waiting list or patients travelling to Dublin Hospitals. Essentially, we are assuming that all ED patients who show up at GUH will be treated eventually. Therefore, for Options 1, 2, 3 and 4, the number of ED attendances peaks at 68,952 in 2031 an increase of 4,526 when compared to the number of ED attendances in 2017.

The cost for an ED attendance is €100 per patient[73]. However, as it has been assumed that each Option will enable the same number of patients to be treated, all Options will benefit from the increase in revenue, and therefore this is excluded from the model.

Other Revenue

Based on the fact that any additional revenue received though the canteen and shop is likely to be minimal when compared to the current revenue generation. Therefore, it is assumed that this increase in revenue generation is not likely to offset the costs associated with the development of a new hospital. KPMG have decided to exclude it from the financial model as it has been assumed that it will not impact the overall decision due to its immateriality.

Regarding car park revenue, KPMG have assumed this will remain mainly in line with what it is today and therefore the model does not account for any changes to car park revenue. One factor influencing this assumption is that there is likely to be a cap placed on hospital car parking charges, with a review into this matter expected to be carried out by the HSE[74]. However, on the other hand, it is expected that there will be a stricter parking policy in place at the Merlin Park site, meaning that the visitors will have no option to park in the car park, unlike the current situation at the UHG site. Therefore, as a result of these two factors KPMG have assumed that revenue will remain steady.

Staff Costs

The staff cost information is set out in Section 9.2.1.

In order to generate the future staff numbers, KPMG have made a high level assumption regarding the current staff/patient ratio and increased this in line with the anticipated increase in patient numbers.

[73] https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/hospitalcharges.html
[74] https://www.irishtimes.com/news/health/hospital-car-parking-charges-should-be-capped-new-report-recommends-1.3709961

KPMG have also assumed that due to an increase in efficiencies, there will be no requirement for additional agency staff, meaning that there are no additional costs associated with this in the model.

Non-Pay Costs

KPMG have derived the future non-pay costs from data provided by GUHs. This data split the non-pay costs into a number of different categories which were able to be grouped into the four points of delivery; inpatients, day cases, outpatients and ED patients.

The total cost per point of delivery was divided by the total number of patients relating to each category in order to provide an average costing per patient.

The future costs are driven by patient numbers at each point of delivery, based on the assumption that future costs will be similar to current costs.

The overheads and maintenance costs were removed from the above costings and separated out.

Overheads have been derived based on a sq. m calculation, using 2017 overhead costings.

Maintenance costs have been calculated as follows;

- 1.25% of capital cost per annum for fully fitted new build elements for; and
- 1% of capital cost of construction for shell & core new build elements

With maintenance upkeep currently suffering from budget constraints, it is anticipated that these costs will increase in the new hospital in order to ensure that the hospital facilities are upheld to the highest possible standard.

Economic Costs

Other potential costs that could be quantified include additional pollution and congestion costs from the construction and operation of the new facilities. KPMG have assumed that these costs are unlikely to have a major impact on the outcome of the options analysis and have therefore excluded the costs from the financial model.

Such costs should be considered within a Detailed Business Case at the next phase of the project. However, it should be noted that the quantitative aspect of these economic factors was considered within the options evaluation.

Insurance Costs

As insurance costs are paid for by the State they have been excluded from the financial model.

Appraisal Period

Approximately 30 years including pre-construction and design, construction and operations.

Indexation	All costs are given in present value terms and a real discount rate is applied.
Discount Rate	The standard test discount rate for use in this CBA is in line with the guidelines in the Public Spending Code, which is set at 5%
Base Date	The base date for the model for the purpose of the NPV calculation is Q1 January 2019.
Residual Value	The residual value calculation is set out in 9.1.1
Capital Costs	The capital costs of each option has been provided by AECOM and is discussed in detail in Appendix A.5.
Funding	No funding is included in the model.
Opportunity Cost of Land	As there is no valuation available for land this has been excluded from the model. By doing so this also offers a more conservative approach.
Tax benefit	No tax benefit assumed

A.7 Balance Sheet Classification issues

This appendix provides supplementary analysis in respect of two key off balance sheet strategies, which are not recommended for the Project: (1) operating leasing; and (2) PNFC classification.

A.7.1 Leasing

Under an operating lease, the legal owner is also the economic owner and the economic owner "accepts the operating risks and receives the economic benefits from the asset by charging for the use of it, in a productive activity." In contrast, a finance lease on the other hand results in a change of economic ownership over the asset and "the legal owner of the asset is not considered to be the economic owner." Relevant factors to consider when classifying a lease as operating or finance include:

- Responsibility for external repair and maintenance of the asset remain with the legal owner;
- In the case of a building, the lessor is responsible for the structural integrity of the building….replacement in the case of damage due to natural disaster…responsibility for elevators, heating and ventilation systems;
- Lessor has significant and ongoing power on how to fulfil the contract;
- Lessor makes key decisions on design and construction;
- Lessor decides on how assets are operated and maintained;
- Nature of the partner – are they clearly an operating or financial lessor; and
- Is government contracting on normal commercial terms (including length of lease, indexation, contract break notices, renewal, dispute settlement etc.?

In a lease arrangement, significant construction delivery risk would be transferred to the developer. However, the tenant bears significant risk in respect of availability of the facility during the operational phase. Therefore, Saolta would take the risk of ensuring that all services are available (e.g. theatres) when required. This is different to availability PPP, as in that case the availability of services (e.g. theatres) are linked to performance payments. The private party entity is responsible for ensuring that the services are available when required.

Variations in layout and fit out over the lifetime of the asset may be problematic in an operating lease scenario as the residual value of any alternations to the structure will be lost if Saolta decide the exit the lease at the end of the term. There may be also be dilapidation charges at the end of the lease term as the asset may have to handed back in its original condition.

An operating lease may provide Saolta with a reasonable amount of operational flexibility, as the private sector's role during operations would predominately involve repairs and maintenance. However, the lessor will maintain significant responsibility including the power to:

- Decide how to implement the contract
- Make the key decisions on the design and construction of the asset

– Decide how the asset is to be operated and maintained in order to provide the services required.

These powers may limit aspects of Saolta's ability to ensure that the design of the facility meets its requirements, as well as limit aspects of its operational flexibility

The private operating lease model is currently adopted by the HSE for the development of primary care centres, in order to provide the services to meet demand while also keeping these off balance sheet, i.e. a specialised operating lease.

However, as noted above, given that the new FRS has eliminated the distinction between finance and operating leases, Eurostat may adopt a similar approach prior to delivery of the Project. The tests under the new leasing standard differ markedly from Eurostat's current guidance. Balance sheet treatment is dependant on whether or not a lease exists, with key determining factors including:

– Avoid identifying the specific asset; this might be achieved by considering:

  - Substantive substitution right (access/time to find alternatives, costs to substitute)
  - Economic benefits of substitution exceed costs (from supplier perspective)

– Avoid retaining any right to direct the use; specific considerations include:

  - Operational rights (scheduling, maintenance, breakdowns)
  - Termination/extension of contracts
  - Decisions over excess capacity
  - Ability for operator and other users to access
  - Secure desired commercial outcomes with protective rights/KPIs/penalties
  - Limited ability to pre-determine use

– Need third party users:

  - 'Take or Pay' terms
  - Ability/feasibility for future expansion.

A.7.2 Public Non-Financial Corporation classification

The key points to consider when dealing with the classification of public hospitals includes the degree of control of government, the presence of a situation of real competition with private hospitals and the absence of sustained financial losses of public hospitals.

A.7.2.1 Control

Control over a hospital is recognisable from the list of indicators prescribed in ESA 2010. If government determines the general policy of the public hospital, then it is government who has control over such hospital. In this context, it is important to properly determine the degree of control exercised by government. It is noted that in some cases, it is such that, de facto, the public hospital cannot act with full autonomy. Notably, this would cover cases where its capital formation

may be decided/vetoed by the entity whose control the hospital is under or by an independent authority responsible for health policy implementation.

A.7.2.2 Real Market Competition

Where public hospitals are competing in practice with private hospitals, verification of a real market competition is required, namely by:

- Checking the presence of private hospitals operating in all the different fields; and
- Assessing the willingness of the private sector to enter all fields of the market.

In a situation of real market competition, a hospital can decide which health services it wants to provide on the basis of profitability or price adjustments in order to influence demand. However, in cases where market competition is not found in substance and the hospital is unable to select the services it wishes to provide, it shall be classified in government.

A.7.2.3 Entering into Market

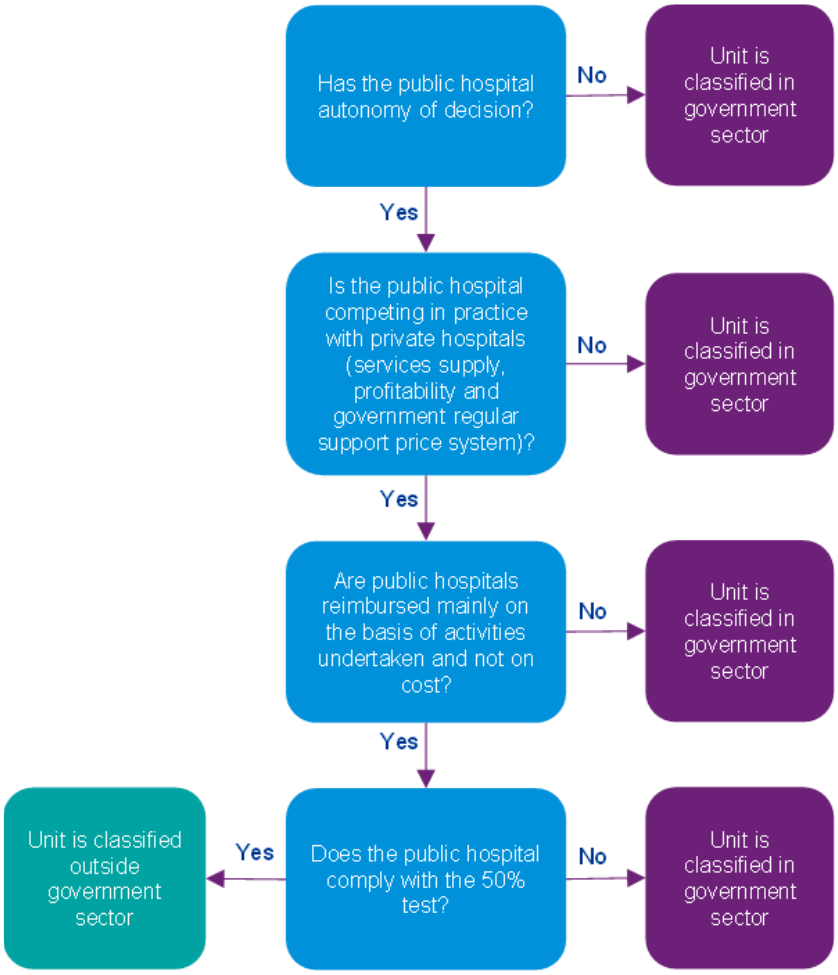
Due to their statute of 'public producers' in the healthcare sector, public hospitals may have an obligation to produce particular services which may not cover costs and consequently result in losses. This is unlike the practice within a private hospital, whereby it can decide to not enter into a market where the recoverability of cost and profitability of a particular service is not guaranteed.

As a result, private hospitals often provide a limited range of profitable health care services whereby public hospitals usually have an obligation to provide a wider range of health care services. In such circumstances, where competition would be limited and public hospitals would run losses on a persistent basis due to government policy, Eurostat's guidance provides that "public hospitals should be reclassified with the relevant controlling government subsector being responsible for covering the resulting deficits on a regular or irregular basis."[75]

Eurostat's Manual on Government Deficit and Debt (MGDD) provides guidance on the classification of public hospitals, this is outlined in Figure 44:

[75] Manual on Government Deficit and Debt, Implementation of ESA 2010, 2016 Edition

Figure 1: Public Hospital Classification



Source: Manual on Government Deficit and Debt, Implementation of ESA 2010, 2016 Edition

Per Eurostat's MGDD, public hospitals are a specific case in the context of the sector classification of public producers (service providers). This is due to the fact that the provision and organisation of healthcare services in an EU state is, ultimately, the responsibility of government.

The organisation of healthcare by the government in an EU state can be executed in several ways. For example:

- Regulating the supply of public and/or private hospitals by geographic area
- Imposing constraints in the provision of same services
- Regulating the pricing system with or without specifying treatment- specific pricing etc.

A.7.2.4 Support of Government

The support provided by government to public hospitals can take different forms, including covering losses, committing to assume any accumulated debt, financing the hospital generally,

or what is frequently experienced, the acquisition of equipment, etc. Government intervention which in turn covers the business risk of public hospitals, highlights a significant difference in respect to the private sector and reflects a situation of a de facto no real market competition. Eurostat guidance determines, therefore, if the hospitals are public and the conditions of a real market competition would not be satisfied, the public hospitals will have to be classified in government.

A.7.2.5 Key case study

Context

Following the National Accounts institute of Belgium determining that public hospitals fall under PNFC classification, Eurostat issued a classification analysis under ESA 2010 for Belgian hospitals in 2016.

In 2016, Belgium's public hospitals were owned by local government units, whereas those deemed 'private' hospitals were owned by charitable organisations, universities and not for profit funds.

Classification

It was the view of Eurostat that, under ESA 2010 rules, all public and private hospitals in Belgium were controlled by the Belgian government – and should be classified in the GGS. This decision was supported by the following factors:

- Belgian law regulated the hospitals sector. Eurostat deemed that hospitals did not have autonomy of decision over their main functions.
- Almost all Belgian hospitals have the legal form of a non-profit institution.
- All activities of hospitals are to be approved by government, with government determining the number of wards, beds etc. that a hospital should have.
- Pricing for medical provisions and the financing of hospitals was regulated.
- Hospitals classified as public were owned by local government units, whereas 'private' hospitals were owned by charitable organisations, sickness funds or universities.
- The vast majority of hospitals were publicly funded.
- It was unclear whether the sales-to-production cost ratio of 50% or above was met (e.g. Eurostat had doubts in relation to the treatment of certain sales items).
- Investment costs incurred by hospitals were primarily funded by government (which also set the 'building calendar', granting authorisation for infrastructure work and investment).

Eurostat found that, given the nature of control exercised by government, the financial responsibility for such as well as the unclear competitive market, it would be unlikely that under ESA 2010 that Belgian hospitals could be classified in the PNFC sector.

Additional findings

Additionally, Eurostat indicated that the existence of real competition between public and private hospitals did not exist in practice, further strengthening the GGS classification of the hospitals.

Eurostat then went on to draw parallels to other EU member states, noting that where investments are to be authorised by governments in other EU states, this would indicate the classification of public hospitals in the GGS.

A.7.2.6 Conclusion

It is clear from the analysis above that achieving an off balance sheet classification for a public hospital is extremely difficult. The fact that the proposed development will be a model 4 Hospital creates even more complexity and in our view makes an off balance sheet classification extremely challenging. We have included a brief summary of off balance sheet structures reviewed in the table below:

Saolta University Healthcare Groups
An Options Appraisal for Saolta Model 4 Hospital Services in Galway
August 2019

Table 1: Off Balance Sheet Structure

Strategy	Approach	Options	Key features	Indicative relevance to Saolta
On balance sheet	Non-GGS sector entity	1.Public	• Establish a public corporation that is controlled and funded by government.	✓ Provides greatest control, simpler transaction and may be combined with option 12 or 13.
Off balance sheet strategy	Non-GGS sector entity^	2. PNFC	• Establish a public corporation that has limited government control, is a market producer, competes with the private sector and is unlikely to sustain financial losses*.	✖ A model 4 hospital would be unlikely to compete with the private sector or decide which services to provide (or not) based on their profitability.
		3. Private Sector	• Private sector health service provider that would only deliver profitable health services (subject to regulation)	✖ Unlikely to be consistent with Saolta objectives
		4. Non-Profit Institution	• Set up a new voluntary hospital (i.e. an SPE owned by a charitable trust) that would raise finance. • Income stream via s 38 SLA with HSE.	✖ Limited guidance under Eurostat, clarification required regarding Irish precedents (i.e. Irish voluntary hospitals appear to be in the GGS)
		5. Joint Venture	• Joint public-private sector owned corporate (or other) entity. • Risk of complex / conflicting public / private interests.	✖ 'Borderline case' under Eurostat which will create delivery risk
		6. SPE	• Set up a new SPV under the ownership of Saolta. • Raise debt and equity in that structure. • Income stream via s 38 SLA with HSE.	✖ 'Borderline case' under Eurostat which will create delivery risk
		7. Quasi-corporation	• A non-corporate entity, with no legal status, but has autonomy of decision making, a set of accounts and a market producer.	✖ 'Borderline case' under Eurostat and limited precedents
	Private sector contract	8. PPP	• Standard Irish PPP contract, with minimal adaptation to ensure Off-BS classification under Eurostat PPP guidance	✓ Significant precedents and specific Eurostat guidance for structuring purposes
		10. Private Lease Model	• HSE model small-scale primary care centre leasing • Historically Off-BS as operating lease (TBC)	✖ Too simplistic for a major hospital development
		11. Operating lease	• Off-BS operating lease (i.e. capital repaid over the lease term, with the private sector lessor bearing residual value risk) • Robust risk allocation aligned to Saolta's objectives	✓ Reasonable level of Eurostat guidance for structuring purposes. However these are related to less complex primary care facilities.
Balance sheet neutral strategy	Revenue raising	12. Mixed Use Development	• Need not achieve Off-BS classification • Commercial revenue offsets public Project costs	? Some precedents and reasonable level of Eurostat guidance for structuring purposes
		13. Asset Disposal	• Need not achieve Off-BS classification • Asset redevelopment proceeds offset public Project costs	? Contingent on freeing up one site and rezoning land to maximise value

A.8 Steering Group Committee

Name	Department/Organisation
Ann Cosgrove	Saolta University Health Care Group
Chris Kane	Galway University Hospitals
Caitriona Meehan	Saolta University Health Care Group
Elaine Dobell	Saolta University Health Care Group
Grainne Cahill	HSE Estates – West
Goda Faherty	Saolta University Health Care Group
Jennifer Greene	Galway University Hospitals
Joe Hoare	HSE Estates- West
Jo Shortt	Saolta University Health Care Group
Michael Kerin	Saolta University Health Care Group
Margaret Murray	Saolta University Health Care Group
Maurice Power	Saolta University Health Care Group
Pat Nash	Saolta University Health Care Group
Tony Baynes	Saolta University Health Care Group
Tara Cahill	Galway University Hospitals
Paul de Freine	HSE Estates
Clare Roche	Galway University Hospitals
Kevin Clarkson	Galway University Hospitals
Ramona McLoughlin	Galway University Hospitals
Jean Kelly	Galway University Hospitals
Geraldine Murray	Galway University Hospitals
Anton O'Regan	Galway University Hospitals

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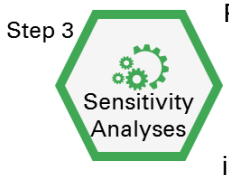
A.10 Step 3: Performing the Sensitivity Analysis

A.10.1 Using scenarios for performing the sensitivity analysis



For the sensitivity analysis, three scenarios were identified that could have a significant effect on future care and associated care facilities. The scenarios along with their underlying assumptions were informed by the National Health Capacity Review 2018 and are underpinned by other public policy documentation including Sláintecare which promotes a new model of integrated care with the vast majority of healthcare going forward being provided in the community.

The three scenarios identified were:

1. Policy changes – people's health improving towards the future and changes in the healthcare demand and provision due to an increase in technology utilisation;
2. Substitution – shift inside the hospital to lower clinical setting or to primary care;
3. Efficiency – improving the delivery model's speed and efficiency.

Using these as a starting point, desk research was carried out to identify factors within the different scenarios that influence future health care demand. An overview of the three scenarios can be found in Appendix A.1.4.1.

Next the scenarios were discussed during the first round of interviews with various Saolta Group staff, including the management, clinical, process and data team, to collect additional details on the underlying estimations. Based on the interviews, the scenarios and the associated factors were revised. As such, none of the scenarios match the exact assumptions of the scenarios used in the National Health Capacity Review.

During the second round of interviews the scenarios and the associated factors were validated, as well as the GUH data (activity 2017). The outcome of the interviews were as follows:

– The first scenario (policy changes) were not broadly recognised. For that reason it was decided to underpin this scenario qualitatively. This can be found in Appendix A.1.4.2.

– For the second and third scenario (substitution and efficiency) multiplication factors were defined that represent the effect on future health care demand. For both underlying scenarios a conservative variant (A) and a progressive variant (B) were developed. These scenarios and the associated factors were validated with the Steering Group.

Since the factors for the second and third scenario cannot be added up (this will cause double counting), a fourth scenario was set up based on the combination of the second and the third scenario:

4. The projected scenario – combination of the second and third scenario.

The factors for the projected scenario were pulled from the second and third scenario and some small factors were added (e.g. shift from model 4 to model 3 hospitals), this is supported by the Hospital Group Report. The projected scenario was discussed with the Steering Group and the factors were agreed.

The projected scenario was based on the following assumptions:

– An increase of managed primary care and residential concepts for elderly would decrease the number of inpatient elderly visiting the hospital (substitution – assumption based on scenario 2);

- Working more efficiently in the future (i.e. having the patients medicine ready before discharge and work with an expected discharge date) will lead to a lower length of stay on average (efficiency – assumption based on scenario 3);

- Working more efficiently in the future will lead to less return visits for outpatients (efficiency – assumption based on scenario 3);

- Chronic disease management will be partly provided at home, in the community or as a day case instead of as an inpatient or as an outpatient instead of a day case (substitution – assumption based on scenario 2);

- A small part of the care that's currently provided in GUH could shift to model 3 hospitals in the future (substitution – assumption based on scenario 2). The model does take into account that a substantial part of the secondary care currently delivered by GUH will also be delivered at GUH in the future (due to the population demographics and the care landscape around Galway);

- The number of ED visits will decrease due to improvements in primary care and increased preventative care for the elderly (substitution – scenario 2);

- Diagnostics and HSCP will shift in line with the assumptions for inpatients, outpatients, ED visits and procedures. For example, this shift may occur due to reduced length of stay or the shift to care outside the hospital (substitution – assumption based on scenario 2). There will be a small decrease in the number of scans and investigations required, as the efficiency and effectiveness of diagnostic technology evolves (efficiency – assumption based on scenario 3).

Further detail on the assumptions and the exact factors can be found in Appendix A.1.4.3.

A.11 Option Scoring Rationale

Criteria 1 – Quality and Patient Safety (Including patient experience)

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Quality and Patient Safety (incl. Patient Experience)	30%	0.0	27.0	30.0	24.0	24.0

The factors to consider under criteria 1 include: supporting a safe and sustainable service provision; enhancing patient pathways; providing a secure and safe environment for patients and meeting patient expectations with respect to privacy and dignity.

- Members of the Group allocated the highest rating of 30/30 to Option 3, the construction of a new hospital on the MPUH site, as they expressed confidence that it was highly likely that building a completely new hospital would deliver all or most of the expected outcomes as outlined in the paragraph above. In particular, the Steering Group advised that this option would provide the best chance of offering a safe and sustainable service and

enhance patient pathways, as the new design would not be compromised by the complex integration associated with joining a new building into an existing structure.

– A rating of 27/30 was allocated to Option 2, the redevelopment of a hospital on the UHG site. The Group acknowledged that the expected outcomes under Option 2 are similar to those expected under Option 3 and this was debated for some time. It was agreed that both Option 2 and 3 will support a safe and sustainable service provision that will provide patients with a secure and safe environment, in addition to enhancing patient's privacy and dignity through the provision of private rooms.

  However marks were deducted from Option 2 as the Steering Group advised that the patient pathways and the ability to provide a secure and safe and environment will not be as optimal when compared against Option 3. This is due to the fact that the UHG site is heavily congested and will not facilitate the placement of certain buildings to optimise patient pathways. In addition to this, the integration between the new and existing structures will create different floor and ceiling heights. The Steering Group found that the varying floor levels will result in either patients being transported up and down slopes or the need to install life mechanisms, this would impact the safe environment in addition to the sustainable service provision.

– The Steering Group allocated 24/30 marks to Options 4a and 4b as it was decided that both Options can be expected to achieve similar outcomes. It was agreed that both Options will offer improvements over the existing service regarding privacy, a safe and sustainable service provision and patient pathways, when compared to existing facilities.

  It was suggested that Options 4a and 4b should not achieve rankings as high as Option 2 and 3 as a two site solution will not ensure a better outcome for quality and patient safety when compared against a one site solution. This was principally due to the fact that patient pathways will be less optimal as patients will be required to travel between two locations, in addition, there are increased safety concerns over the fact that there would not be an ICU backup on both sites.

– Option 1 was allocated a rating of 0 due to the fact that it was highly unlikely that remaining as is would achieve any of the desired outcomes, as under this scenario there are no improvements to the current hospital. At present, the current service offerings are deemed unsatisfactory for non-elective and elective patients due to large waiting times, shared wards, a lack of flow between departments and facilities. Therefore, with no infrastructure improvements occurring, it was decided that these issues will become greater over time and that the quality and patient safety will deteriorate further.

Criteria 2 – Access and Location

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Access & Location	25%	15.0	20.0	22.5	20.0	20.0

There were a number of factors to be considered under improving the hospital access and location including: improving access for patients; tertiary referrals; emergency services; improving integration with other services internal and external to the hospital; reducing travel between departments; improving parking and allowing for a phased development with potential for expansion in the future. The Group also considered the accessibility assessment prepared by AECOM when evaluating the Options.

- The Group allocated a rating of 22.5/25 to Option 3, as locating the new model 4 hospital close to the Motorway network on the East side of Galway was deemed to provide the best opportunity in terms of ease of access for patients, emergency vehicles and tertiary referrals. Furthermore the development of a parking solution on the MPUH site was identified as being the Option that would offer the greatest outcome with an estimate of 1,400 car park spaces being available (based on standard patient, visitor and staff demand benchmarks and to the extent that planning approvals can be obtained). The Group also determined that Option 3 provided the best outcome in relation to potential for further expansion as there is a larger area available to develop.

  Marks were deducted as it was noted that the current public transport service was not as practicable as the current offering in UHG. However, the Group was confident that bus routes could be adapted to service a new Hospital should it be located on the MPUH site. Furthermore, as a result of the new hospital being located on the MPUH site and the new bus route, it is anticipated that congestion within the city centre would be reduced. Another issue raised related to facilitating students in NUIG and how as a result of locating the new hospital out at MPUH, this would create issues regarding integration with academic partners. This issue was debated for some time and the Group decided that public transport arrangements could be introduced to mitigate this NUIG issue.

- Option 2 received a mark of 20/25 as the Group was confident that this Option was likely to improve access, support improved integration and reduce movement time between internal services, when compared against the current service offering. However the Group identified some serious constraints which resulted in marks being lost when compared to other Options. The constraints principally related to congestion, parking, potential for further expansion and deliverability of the programme. Attendees outlined the fact the new hospital will be a tertiary hospital and that the access roads were congested which made it difficult for emergency vehicles, patients and visitors from outside West Galway to access the site. It was suggested that building a larger hospital would most likely lead to further congestion. Parking was also noted as an issue on the site and that public transport was not a real alternative for people travelling to the hospital from outside Galway City. The scope for further expansion would also be severely limited, as the proposed development will result in the site reaching the maximum site ratio limit.

- The Group decided to allocate marks of 20/25 to each of the Options 4a and 4b as they considered either proposal would improve access, offer a parking solution, support further expansion and allow for phasing and deliverability of the project, when compared to the existing services.

  However the Group did not think the two site solution would offer better outcomes than either Options 2 or 3 in areas including ease of access for tertiary referrals, improving integration with other services or reducing movement and travel distances between sites. It was suggested that a two site solution would introduce difficulties for all patients, as they may have to attend a consultation on one site and travel to a different site for a procedure and / or follow up appointment. The integration of services would also be affected as staff would be split between two sites.

– Option 1 received a lower score of 15/25 on the basis that leaving the hospital as is would support potential for future expansion, however marks for Option 1 were discounted in the other areas.

Criteria 3 – Ease of Implementation

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Ease of Implementation	25%	12.5	20.0	22.5	22.5	20.0

Criteria 3 reflects the requirement for the development to minimise the disruption to current services, to be achievable within the required timeframe and support the phasing for development of an elective hospital as per the National Development Plan ("NDP") 2040. Within the NDP the Government has committed to building three new elective hospitals across Ireland, one of which will be located in Galway.

– The Group allocated 22.5/25 marks to Option 3 as they considered that building a new hospital on the MPUH site would cause less disruption to services and offered the best possibility of being delivered within the expected timeline. This is due to the fact that MPUH is not GUHs main campus and therefore does not cater for as many patients, meaning that there will be less disruption amongst patients on the MPUH site during construction. The layout of the MPUH campus would also support phasing for development of a new hospital as there would be minimal constraints as a result of existing buildings or traffic congestion on or around the site. However, some marks were deducted as it is anticipated that there will be some disruption to services located on the site.

– Option 4a was also awarded a mark of 22.5/25 marks to Option 4a as the Group formed the opinion that building an elective hospital on the MPUH site would be easier to facilitate than building an acute hospital on the site. Locating the elective hospital on this site offers a greater ease of implementation as the Steering Group found that it would be more feasible to transfer elective services to MPUH and maintain the acute service on UHG. Furthermore, as a result of the twin development, the congestion issues associated with redeveloping solely on the UHG site are reduced.

– The Group allocated 20/25 marks to Option 2 as this was considered to support the development of an elective Hospital as per the NDP 2040. Marks were lost due to the anticipated level of service disruption which would be created by building on the UHG site. Furthermore, the fact that the UHG site is a heavily congested site will have an impact on the phasing of the project. This is due to the fact that redevelopment of current buildings will have to take place in order to facilitate relocation and decanting of those services from buildings that need to be demolished.

– Option 4b was also allocated a rating of 20/25. The differentiating factor between option 4a and 4b is mainly due to the fact that GUH would have to maintain a fully functioning acute hospital on the UHG site until the MPUH site is ready, meaning that there will be two acute hospitals at one point in time.

– Option 1 was awarded a 0 as this criteria was deemed not applicable.

Criteria 4 – Staff

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Staff	15%	0.0	13.5	13.5	10.5	10.5

Criteria 4 reflects the importance of attracting and retaining staff. The new hospital will need to optimise staff resources, provide an environment that is going to support the recruitment and retention of staff, facilitate high quality training and education and provide easy access. Another factor that was considered when evaluating the Options was the need for affordable housing to ensure that nurses and other staff members can access the selected site without long commutes.

- The Group allocated Options 2 & 3 with a rating of 13.5/15 as they considered that a single site will allow for the optimisation of staff resourcing as staff will not be travelling between the two sites. Furthermore, a single site solution will offer an enhanced provision of high quality training and education, as dedicated, modern, IT enabled training facilities will be provided. Option 2 was favoured with reference to education and training as it is located beside NUIG, allowing optimal access for students. However Option 3 was preferred when considering staff recruitment and retention as it was viewed that a completely new build would provide greater staff morale. On balance, the Group considered the outcomes to be equal across both Options 2 & 3.

- Options 4a and 4b were allocated marks of 10.5/15 on the basis that the Group was not confident that a two site solution would achieve the best results when compared against a one site solution. Marks were awarded on the basis that new facilities will support staff retention, recruitment and enhance the training and education facilities. However it was noted that a dual site results in certain staff travelling between sites, which negatively impacts the optimisation of staff resources.

- Option 1 was rated at 0 as there would be no additional benefits for staff under the current situation.

Criteria 5 – Site Risk

Criteria	Weighting	Option 1: Do Nothing/ Do Minimum	Option 2: Redevelop UHG	Option 3: Build New hospital on MPUH site	Option 4 (a): Acute UHG, Elective MPUH	Option 4 (b): Acute MPUH, Elective UHG
Site Risk	5%	2.5	4.5	4.0	5.0	4.5

The objective under this criteria was to rate the different options against project delivery risks including: planning approvals; construction; operational; maintenance and environmental risks.

- The Group allocated 5/5 marks to Option 4a as it was identified as being highly likely of minimising all the project delivery risks. The Steering Group found that there will be less risk associated with planning approval due to the reduced plot ratios on both sites. The

congestion in the dual site scenario is also anticipated to be less severe as building across two sites would allow construction traffic easier access, provide adequate space for site offices, equipment storage and present less risk to health and safety of construction workers, patients, staff and the public.

– Option 4b was allocated a lower rating of 4.5/5 as the Steering Group advised that the planning approval risks associated with building the acute facility on the MPUH site were greater than building it on the UHG site. The Steering Group advised that there might be some planning risks associated with developing on the MPUH due to the protected forest located here. However, the option was awarded a higher mark than Option 3 as it was suggested that building an acute facility posed less planning risk than a full service hospital.

– Option 2 was also awarded a rating of 4.5/5 as there are some planning risks associated with re-developing UHG based on the fact that the site is very congested. This means that there are limitations regarding the location of facilities and planning approval. There is also a risk associated with building where a live hospital is located and ensuring safety of members of the public. However, as UHG is in the city centre, the required infrastructure in terms of sewers and electricity lines were assumed to be in place. This is subject to a further detailed condition assessment which will be required to determine the extent of any upgrades or expansion required. Further details of this can be found the Workstream 2/3 report in Appendix A.2.

– Option 3 was allocated a mark of 4/5 as there are a number of planning, infrastructural and environmental considerations to be taken on board when building on the MPUH site. The proposed development would increase the plot ratio close to the current maximum allowed under existing zoning. Environmental issues were also noted as the site includes a large area of protected forest which is open to the public and will have to be preserved, meaning that planning permission may be subject to objections from the public. However, the Group were still confident that the required permission would be achievable as a result of a number of discussions. Furthermore, the Steering Group found that the services infrastructure would need to be upgraded on and surrounding the MPUH site, meaning that there is a larger construction requirement, but again this is something that was identified as being feasible.

– Option 1 was awarded a 0 as it was determined that it couldn't be rated against this criteria.

A.12 Service Upgrades

A.13 Pathology - Summary of facilities

Table 2 Building age

The table below shows the year of construction, type of structure and age

Year	Description	Type	Age
1958	Main lab building/Specimen reception; Microbiology	Permanent	61
1981	Immunology, Histopath & Mortuary	Permanent	38
1986	Histopathology	Permanent	33
1974	Biochemistry	Temporary	45
1977	Haematology & Rest of Microbiology	Temporary	42
1983	Microbiology	Temporary	36
1984	Biochemistry Extension	Temporary	35
1991	Haematology Extension	Temporary	28
2000	Haematology Extension	Temporary	19
2000	Cytology	Temporary	19

The table below shows the current gross footprint (4,346m^2) occupied by Pathology

Table 3: Current Footprint

Current Footprint Net Areas	Gross	Net	Circ & Plant
Stem Cell	146	112	34
Haematology Incl Transfusion	683	525	158
Biochemistry	619	476	143
Clinical Immunology	250	192	58
Microbiology	858	660	198
Histopathology	667	513	154
Post Mortem	442	340	102
Shared Common Facilities	372	286	86
Automation	309	239	70
Subtotal	**4,346**	**3,343**	**1,003**

Source: UHG ILMS Design Brief Nov 2017 & Current Floorplans

A.14 Pathology Benchmark

The Project Team compared UHG with a hub laboratory in London consisting of three hospitals including a large teaching Hospital. The total working footprint, the number of staff and volume of samples were compared.

The Activity Levels can only be indicative as the method of counting activity is different between the sites.

Table 4: Benchmarking Activity

Department	Activity UHG	Activity Benchmark
Biochemistry	7,202,017	11,687,294
Blood Transfusion	17,263	
Cytology		205,302
Haematology	6,486,661	3,408,246
Histopathology	36,495	466,530
Immunology	273,225	421,800
Microbiology	479,231	3,113,661
Grand Total	**14,494,892**	**19,302,833**

Table 5: Benchmarking Staff - Table of Staffing (Administrative, Scientific & Clinical)

Department	WTE UHG	WTE Benchmark
Biochemistry	30.8	42.9
Blood Transfusion	22.1	
Cytology	48.0	20.8
Haematology	40.8	54.0
Histopathology	48.0	74.3
Immunology	15.1	20.9
Laboratory Admin	37.7	16.2
Laboratory Support	4.1	3.0
Microbiology	50.1	97.0
Mortuary	2.0	4.0
Reception	2.0	51.2
Grand Total	**300.7**	**384.3**

Of note is that the higher volume of staff and quoted higher overall tests numbers utilise less space at the benchmark site compared to the area proposed by the members of the Saolta Pathology team, but more space compared to HBN and the current UHG footprint for Pathology.

A.15 Pathology Assessment of Options

A.15.1 Option 1: Proceed with Current Building Plans

BTE Ground floor – continue with agreed plans

ILMS on 1st floor – create plans with pathology team

Pros:

- ✓ No change of plans, No delay - programme proceeds to agreed timeframe
- ✓ Decant space created for Phase 2 pathology build.

Cons:

- × ILMS costs not yet determined
- × not all ILMS can be accommodated in the available space
- × Reception is not included in ground floor plans
- × Microbiology estate issues and risk of loss of licence for TB service

A.15.2 Option 2: Proceed with Current Building Plans

BTE Ground floor – continue with agreed plans

Microbiology on 1st floor – create plans with pathology team

Pros:

- ✓ No change of plans, No delay - programme proceeds to agreed timeframe
- ✓ Both BTE & Microbiology licences are no longer under threat.
- ✓ Decant space created for Phase 2 pathology build.

Cons :

- × Microbiology costs not yet determined
- × Stated requirement needs to be challenged to fit into the available space
- × Reception is not included in ground floor plans

A.15.3 Option 3: Proceed with Current Building Plans

Option 1 or 2 for the proposed building

Create a second new building adjacent to first building or build additional floors on BTE lab without a redesign, for remainder of pathology

Pros:

- ✓ Allows Phase 1 to progress
- ✓ Key services can be accommodated on the ground floor (Mortuary, Phlebotomy & Reception)
- ✓ Footprint to be large enough to accommodate remainder of pathology
- ✓ Can be designed as multistorey building to accommodate future growth / expansion
- ✓ Enables Pathology build around key dependencies such as new equipment contract
- ✓ No longer constrained by existing available space on Phase 1 build

Cons:

- × Pathology to be supported in the existing estate for a further period
- × Pathology Phase 2 is without funding or approval
- × Costs not determined at this stage

A.15.4 Option 4: Redesign the Current Building Plans

Add other floors to BTE building at a later stage for remainder of pathology

Pros:

- ✓ Footprint to be large enough to accommodate all Pathology services
- ✓ Can be designed as multistorey building to accommodate future growth / expansion
- ✓ Allows Phase 1 to progress
- ✓ Enables Pathology build around key dependencies such as new equipment contract
- ✓ No longer constrained by existing available space on Phase 1 build
- ✓

Cons:

- × Requires a redesign for planning and funding approvals
- × Major building constraint if floors added above a function building
- × Delay to build for BTE with associated risk for licence status for BTE and Micro
- × Pathology to be supported in the existing estate for a further period
- × Costs not determined at this stage

A.15.5 Option 5: Redesign the Current Building Plans

Create a new single building with multiple floors for Pathology

Pros:

- ✓ Key services can be accommodated on the ground floor
- ✓ Footprint to be large enough to accommodate all Pathology services
- ✓ Can be designed as multistorey building to accommodate future growth / expansion
- ✓ Creates a single phase project plan
- ✓ Enables Pathology build around key dependencies such as new equipment contract
- ✓ No longer constrained by existing available space on Phase 1 build

Cons:

- × Phase 1 does not progress
- × Delay to build for BTE with associated risk for licence status for BTE and Micro
- × Pathology to be supported in the existing estate for a a further period
- × Pathology building project goes back to start without funding or approval

A.16 Pathology Reference Documents

Various design documents / briefs developed by Saolta since 2004 and reviewed as part of this exercise. The full list is below (Please note, no single planning brief was shared for overall pathology services which addresses the plans for the future estate on the GUH site. Only the BTE Stem Cell laboratory has progressed through planning and approvals stages)

- Ver 5 Nov 2017 DAP Cancer Laboratory Project Planning Brief Master.pdf
- Galway Laboratory Workload Haematology.xlsx
- Stated Objectives 190419.docx
- Current constraints.190419.docx
- ILMS Planning Brief including appendices GC 25-09-07.pdf
- 12 December 18 GUH Monthly Accounts.xlsx
- Activity Analysis Jan to January 2019.xlsx
- Wte anonymised.xlsx
- ILMS Planning Brief including appendices 250907.pdf
- 1245 Haematology Phase drawing.pdf
- 1245 MU Biochemistry Phase Drawing.pdf
- 1245 Immunology Phase drawing.pdf
- 1245 Biochemistry Phase drawing.pdf
- Galway Biochemistry Agreed Floor Plan.pdf
- Galway Haematology Agreed Floor Plan.pdf
- Galway Immunology Agreed Floor Plan.pdf
- Galway Imm_Nov_2nd.pdf
- Labs 1st Floor.pdf
- Labs GRD Floor.pdf
- Stem Cell Lab.pdf
- Redevelopment of medical laboratories at UHG
- Galway Laboratory Workload.xlsx
- Biochemistry Clinical Service Strategy.pdf
- Haematology Clinical Service Strategy.pdf
- Microbiology Clinical Service Strategy.pdf
- Immunology Clinical Service Strategy.pdf
- Histopathology Clinical Service Strategy.pdf
- BTE-STW-XX-00-DR-A-CEA-0003_Ver 1.pdf
- BTE-STW-XX-01-DR-A-CEA-0004_Ver 1.pdf
- Final Draft MMcC.pdf
- Lab Workload 090419.xlsx
- 12 December 18 GUH Monthly Accounts.xlsx
- 20161019 UHG ED CBA Draft Final Report Extract
- 20190408Elective Hospital.pdf
- GUH Strategic Plan Rep English Version.pdf
- Options Appraisal signed.pdf
- 2014.05.01 cover letter to J Browner Re UHG Labs BT.pdf
- 2040501 Final BTE Stem Cell IMLS Facility Project Planning Brief.pdf

Saolta University Healthcare Groups
An Options Appraisal for Saolta Model 4 Hospital Services in Galway
August 2019

- Q Cost Option 1 BT and IMLS (Shell).pdf
- Q Cost Option 2 BT Only.pdf

A.17 Cancer Ambulatory Care - Indicative Schedule of Accommodation

Functional Flow	Service Description	Infrastructural Requirement
1. Ambulatory Care Centre Main Foyer **Reception/ Waiting & General Administration**		
• All registrations for OPD Clinics & HODW & Acute Assessment occurs at main reception (3 +receptionists). It is not envisaged that patients will remain long in this area, Patients will be directed to appropriate setting once registered, family member will possibly remain in this area/overflow for entire centre. • Requirement **Waiting Area** in main Foyer to accommodate 35+ patients/visitors • Once registered patient directed to: Phlebotomy Suite waiting area Outpatient Clinic waiting area HODW waiting area AAU waiting area • Booking review appointments (as patients leave the unit) • Self Registration Booths • Public & Staff Toilets • Chart Preparation/Storage for both OPD & HODW at rear of reception. Once patient registers medical records accompanies the patient to: OPD Clinic/Haematology Oncology Day Ward/Acute Assessment Unit.(AAU) (can be given to patient to bring to appropriate area) • Informal coffee area with information/communication hub similar to Daffodil Centre • Access to courtyard space		
1. Patient Treatment Areas		
2.1 Ambulatory Care Centre Phlebotomy Suite Once registered, a cohort of patients will attend phlebotomy for bloods/cannulation etc		

	Haemato - oncology phlebotomist. providing cannulation and blood sampling for the Ambulatory Day Care Centre. Patients may go home or continue to OPD or HODW after bloods/cannulation	3/4 seated waiting area 3/4 chaired area for taking bloods
	Patient directed to OPD/HODW from phlebotomy	
Formal Research/Lab Space within Phlebotomy suite	Small bx performed here, liquid biopsies/bio banking/small freezer unit/short storage	1 x research lab type structure

2.2 Ambulatory Care Centre Outpatient Clinic Suite

Registration will occur at the main reception area at entrance to ACC

Patient bloods have been taken in the phlebotomy suite if appropriate prior to entering OPD

There will be shared waiting area for all OPD attendees.

Nursing staff will call patients from this area to either Medical Oncology or Haematology OPD Clinic

Projected Haematology Oncology Clinics x 5 days a week (AM & PM Clinics) (10 clinics)

Projected Medical Oncology Clinics x 5 days a week (AM & PM Clinics) (10 clinics)

Projected 2 ANP Clinic x 5 days (AM/PM)

Projected 2 CNS Clinic x 5 days (AM/PM)

Projected 1 x Clinical Trials x 5 days (AM/PM)

Therapeutic Space for HSCP: physiotherapy/dietitcian etc with exercise bike

OPD area required to facilitate: new and review patients on treatment; surveillance follow up clinics for both Medical Oncology & Haematology.

- Pt discharged/referred to RANP
- Capacity to urgently book pts into consultant clinics from HODW or Acute Assessment Area.

OPD Waiting Area	Patients directed to OPD after registration in main foyer and will wait until called to relevant OPD Clinic	20+ seater
	Patient/Visitor Toilet	Toilet 4 x unisex/wheelchair accessible
Nurses Station	Chart Storage & Reception	Patient will bring chart from reception to nurses station for clinic

		where it will be stored until patient is called to consultancy rooms
	Nurse led BP & Weight station	1 x space
OPD Consulting Rooms Medical Oncology	Multiple Clinical work stations	10 x single consultation rooms
Isolation facility Med Onc OPD	As per IPC & HIQA guidelines	2 x isolation room
OPD Consulting Room Haematology	Multiple Clinical work stations	10 x single consultation rooms
Isolation facility Haem Onc OPD	As per IPC & HIQA guidelines	2 x isolation room
ANP/CNS/Clinical Trials	ANP/CNS/Clinical Trials to meet patients	3 x ANP/CNS/Clinical Trials rooms
HSCP Space (AHP's)	HSCP consultations to fit exercise bike etc	Therapeutic space
OPD Staff Toilets	As per IPC & HIQA guidelines	2 x unisex /wheelchair accessible
Dirty Utility	As per HIQA/IPC guidelines	Dirty utility x 1
Clean Utility	As per IPC & HIQA guidelines	Clean utility x 1
Stores Room/Linen Store	Equipment & supplies (disposables)	As per requirements
Cleaners Store	This will act as the Cleaners store for the entire ACC.	

2.3 Haematology Oncology Day Ward

Projected 150+ patient treatments a day x 5 days

Patients attending HODW will be registered at the main reception area in the Foyer of ACC

Patient will have bloods taken in the phlebotomy suite prior to entering HODW

Appointments scheduled to time slots on chairs with AM & PM Clinics

Patient charts available at Nurses Station: with the advent of NCIS/Evolve the requirement for paper medical records will reduce over time.

HODW capacity to accept OPD referrals on day of referral

HODW Waiting Area	Patients directed to HODW after registration in main foyer and will wait until called for treatment. Minimum	10/15+ seater maximum

	delays expected but relatives may choose to wait in this area	
	Patient/Visitor Toilet	Toilet 2 x unisex/wheelchair accessible
Scheduler(s) Office	Adjacent to Nurses Station	1 office x 2 workstations
HODW Nurses Station	Medical records held at nurses' station, Nurse meets patient in the waiting area & brings patient to the treatment area	2 x workstations
Clinical Pharmacy Space	Clinical Pharmacist on HODW	1 x workstation
Nurse Assessment Suite	Daily nurse pre assessment clinics for HODW and inpatient treatments. ANP Assessment for supportive therapies/treatment	3 chairs 1 chair
Nursing set up room	For drawing up pre medications, fluid flushes etc. Temporary storage of chemotherapy agents dispensed from pharmacy. Nursing tasks involved in preparation and delivery of treatment	Adjacent to open treatment area Fridge requirement x 2
Haematology Supportive therapy Suite	This area will see and treat up to 12,000 + patients per annum Nurse led with standard protocols Treatments: • IVIG • Blood product transfusions • ITP treatments eg ritux, nplate, HD steroids, trombopoietin agonists • Iron infusions • Bloods and review • Bisphosphonates • Haemophillia reviews + treatment • Clinical Trials reviews • IV A/B	10 chaired area

Supportive therapy Pentamidine nebuliser single room	Pentamidine Isolation room with hand basin only no WC Extraction required	1 x single isolation room Query negative pressure requirement
Apheresis Suite	Apheresis suite for work up for bone marrow harvest and transplant, education and post transplant care with stem cell collection and plasmapheresis. Plasma exchange may be done as an outpatient in suitable patients and ambulatory harvest and transplant will be an option in suitable patients in the future Combination of nurse led and doctor led treatments for: Post transplant care Pre education sessions Ambulatory Harvest & Transplant	2 chaired area
Apheresis single Room		1 x single room
Chemotherapy Suite area Nursing Bay	Adjacent to treatment area, chart storage and workstation	Nursing bay
Open treatment Bay	To treat 30,000+ patients p.a Appropriate and rapid turnover of chairs as per short/medium/long treatments. Projected 60- 80+ chemotherapy treatments daily & Combination of nurse led and doctor led treatments with AM & PM sessions	Open treatment bays with 30 treatment chairs in 3 areas with approx 10 chairs in each alcove. (3 x 10 chairs) Shamrock layout with nursing bay at the centre.

	Treatments to include: SC/IV push chemotherapies Long Chemo's: in excess of 6 hours Medium Chemo's: 2 to 6 hours Short Chemo's: 30 min – 2 hours	1 x ensuite room as per IPC
Oral treatment area (PO)	Review & labs: assessment area where PO Chemo's treatments 20 - 30+ oral chemotherapies daily	
Consultation Rooms x 6 within Chemotherapy suite	Doctor examination/consultation space	5 x consultation rooms: 4 x examination couches: 2 sided access 1 x Recliners one sided access Workstations & PC's 3 chairs per room
Day Procedure Suite within HODW	Elective Procedure suite to carry out: • Diagnostics: bone marrow biopsies, lung, liver & bone biopsies • Line Insertions: hickman, PICC, ports, vascaths • Lumbar punctures • Pleural/ascites Tap • LP: diagnostic/therapeutic: pending consultant approval • Urgent scan request and review	8 spaces x examination/trolley/bed area I x single room:
Youth Adolescent & Paeds Centre	Facilitate family members with child/adolescents doing exams etc (barretstown model)	1 x consultation/family space 1 x treatment space

ANP Nurse Led/Clinical Trials Suite	ANP/nurse led clinics with established protocols: Clinical Trials Space	4 x chaired shared space
Clinical Pharmacy space	Pharmacist attached to HODW	1 x room
Isolation Suite within HODW	Single rooms with WC & hand basin; no shower requirement	8 x single isolation rooms
HODW Patient Toilet(s)	Wheelchair accessible as per guidelines	Toilet x 2 (unisex)
HODW Staff Toilets	As per IPC & HIQA guidelines	2 x unisex /wheelchair accessible
HODW Dirty Utility	As per HIQA/IPC guidelines	Dirty utility x 1
HODW Clean Utility	As per IPC & HIQA guidelines	Clean utility x 1
HODW Stores Room/Linen Store	Equipment & supplies (disposables)	As per requirements
HODW Clinical Store	Top up facility with modular storage	
2.4 The Acute Assessment Area within Ambulatory Day Care Centre		
Urgent Review Suite including non emergencies	Urgent review area for patients experiencing complications who currently present to OPD/ED. Patients who become unwell on treatment chair will be transferred to this space for assessment and management to ensure high throughput in the treatment area. Non blue light admissions. Patients may be admitted following assessment, attend again the following day for supportive therapy or discharged home	6 bedded area with WC no shower:
Isolation Facility	As per IPC guidelines	1 x single room
Nurses Bay	For nursing administration.	Nursing bay with Workstation
Clinical Store	Drugs and Fluids store	
Cancer Clinical Trials Suite		
Clinical Trials Hub	Clinical trials are managed from this space and must be big enough to facilitate CT Nursing, data	1 x office CT Manager 1 x administrator

	managers, pharmacy space and large storage area to store trial file documentation securely	Pool type space to facilitate trial nurses & Data Manager Large Storage area 1 x pharmacy space
Office Suite	MDT Conference/meeting Room with videoconferencing facility/IT telemedicine	40 staff
	Consultant Offices x 15 med & haem on consultants	15
	NCHD Shared Space: teaching area /SPR's bays/computer site	Both Heam onc & med onc NCHD team
	Secretariat (open plan) including Med & Heam onc secretaries (15)	15
	Data Managers (5) & Clinical Co ordinators (3)	8 office workstations.
	ADON, CNMIII & CNMII's (all)	1 x ADON 1 x CNMIII 2 x CNMII
	CNS's/RANP's	15 x shared space
	HSCP (social work, physio, OT, dietetics)	2/3 x shared space
Psycho Social support	Counselling facility: Multifunctional space	2 x rooms
Family Meeting Room	Multifunctional space	4 x rooms
Other 1	Rest room/tea room	1 x large or 2 x smaller
Other 2	All staff; small lockers inbuilt /Staff Locker Area including WC & Shower	Number of lockers as per staff requirement
Other 3	Waste storage Clinical Waste, General & Confidential, recyclables	Large enough for ACC
	Garden Concourse Area	
Pharmacy Isolator Facility	New PASU facility located adjacent to HODW. The pharmacy of the future will be involved in oral dispensing, CT dispensing and dispensing as a shop	
General Storage/Linen store	Large storage area to facilitate ACC	Large enough to support ACC rather than as listed above??
Dirty Utility/sluice	Small bed pan washer facility	Large enough to support ACC

Lung Rapid Access

Reception Area of Ambulatory Care Centre	Patients will be registered at the main reception of the Ambulatory Care Centre and directed to the Rapid Access Lung Clinic
Nurses Station within the RAL facility	A small nurses' station will be required to facilitate charts and follow up appointments
Examination Rooms x 8 3 x Respiratory 3 x Oncology 1 x Radiation Oncology 1 x Surgery	Daily Rapid Access Lung Clinics & Follow up Clinics Patients have a clinical examination prior to imaging assisted by staff nurse. Joint Thoracic Clinics including consultant as well as Rapid Access Clinics
ANP/HSCP room x 2	ANP/HSCP clinics to be held every day to address surveillance and ongoing follow up. Smoking cessation, pulmonary nodule programmes will be run from his space.
Counselling Rooms x 2 areas	Private & Comfortable space where diagnoses can occur without interruptions Psychological & Emotional support given to patients in calm and comfortable environment
Imaging requirements	Rapid access to CT (daily access to CT slots), PET access, MRI
Bronchoscopy Suite Reception/wait area	Bronchoscopy Suite Reception/wait area with 8 x day beds
Bronchoscopy Suite x 3 procedure rooms to include Clean Scope In & Dirty Scope Out in design.	Where EBUS/Bronchoscopy/pleural/Interventional procedures are performed 1 to facilitate Hybrid procedure 1 to facilitate Fluoroscopy Bronchscopy 1 x smaller space where small procedures can be performed (Pleural US, aspirations, Neck US)
	Peripheral navigation system for peripheral non visible lesions/ radial US Conebeam CT
	Advanced management of pleural disease with diagnostic and therapeutic pleural procedures including aspiration, chest drain insertion, pleural ultrasound
	Thoracoscopy, TALC, instillation and Indwelling pleural catheter insertion
	Advanced airway management including rigid Bronchoscopy, argon plasma coagulation, metallic and silicone stent insertion
	Cardiopulmonary testing
	Lung function testing
Physiotherapy assessment	Advanced recovery programme 6MWT

Rapid Access Urology

Reception Area of Ambulatory Care Centre	Patients will be registered at the main reception of the Ambulatory Care Centre and directed to the Rapid Urology ACC

Clerical Reception/ Nurses Station within the RA Urology facility	required to facilitate charts and follow up appointments
Rapid Access Prostate	
Examination Consultancy Rooms	10 x 1
Trus Biopsy procedure room	1 x 1
GA (TP biopsy) procedure room	1 x 1
Recover Room post biopsy	1 x 1
Flexible Cystoscopy Procedure Room	1 x 1
Prep Room	1 x 1
Bladder	
Consultation rooms can also be used to do intravesical treatments eg mitomycin, BCG Flexible cystoscopy procedure room GA theatre/procedure – daycase cystosm TURBTS Staging CT access	
Renal	MDT Room Access
	Access to CT & US guided biopsies
TESH's	Access to US scans
	Access to CT scans
Patient Toilets	2 x 1 toilets
Staff Toilets	1 x 1
Staff Kitchenette	1 x 1

Rapid Access Gastrointestinal

Reception Area of Ambulatory Care Centre	Patients will be registered at the main reception of the Ambulatory Care Centre and directed to the Rapid Urology ACC
Nurses Station within GI facility	station will be required to facilitate charts and follow up appointments
Examination Consultancy Rooms	10 x 1
CNS/RANP treatment space	2 x 1
HSCP space	2 x 1
Procedure rooms	2 x 1
Counselling Room /family	2 x 1
Patient Toilets	2 x 1 toilets
Staff Toilets	1 x 1
Staff Kitchenette	1 x 1

Rapid Access Skin/melanoma

Reception Area of Ambulatory Care Centre	Patients will be registered at the main reception of the Ambulatory Care Centre and directed to the Rapid Urology ACC
Nurses Station within skin facility	station will be required to facilitate charts and follow up appointments
Examination Consultancy Rooms	10 x 1
Procedure rooms	2 x 1
ANP/CNS treatment space	2 x 1
HSCP space	2x 1
Family room/counselling space	2 x 1
Patient Toilets	2 x 1 toilets
Staff Toilets	1 x 1
Staff Kitchenette	1 x 1

A.18 Recommendation from National Cancer Strategy

Table 6: Recommendations as per the National Cancer Strategy 2017-2026

Ref. number	Area	Recommendation
8.	Rapid Access Clinics	The NCCP, working with the ICGP and the National Clinical Effectiveness Committee, will develop a three year plan to enhance the care pathways between primary and secondary care for specific cancers. The plan will set out criteria for referral to diagnostics and incorporate the requirements for additional Rapid Access Clinics.
11.	Ambulatory Care	The NCCP, working with the other Directorates in the HSE, will develop criteria by end-2018 for the referral of patients with suspected cancer, who fall outside of existing Rapid Access Clinics, for diagnostic tests. The NCCP will ensure, through these criteria, that GPs will have direct access to cancer diagnostics within agreed timelines.
12.	Rapid Access/Comprehensive Care Centre	The NCCP will further develop the model of care for cancer to achieve integration between primary care and hospital settings at all stages of the cancer continuum, from diagnosis to post treatment care.
13	MDT	Patients diagnosed with cancer will have their case formally discussed at a multi-disciplinary team meeting. The NCCP, working with the Hospital Groups, will oversee and support MDT composition, processes and reporting of outcomes
14.	Funding	The NCCP, working with the other Directorates in the HSE and with the Department of Health, will develop a rolling capital investment plan, to be reviewed annually, with the aim of ensuring that cancer facilities meet requirements.
15.	Comprehensive Care Centre	The Department of Health will ensure that investment in infrastructure, facilities, personnel and programmes in the designated cancer centres will have a goal of ultimately developing at least one comprehensive cancer care centre that will optimise cancer prevention, treatment, education and research during the Strategy period.
16.	Ambulatory Care	The NCCP will ensure that consultant appointments for radiology, endoscopy and histopathology, where necessary, are made in conjunction with appointments in other disciplines such as surgery and medical oncology.
23.	Ambulatory Care	The NCCP will examine the model of care for patients receiving oral anti-cancer medicines and recommend steps to ensure that all patients receive such medicines in a safe and effective manner, with appropriate and proportionate supports, both in the hospital and community setting.

24.	Ambulatory Care	The NCCP will develop appropriate MDT, centralisation and treatment arrangements to meet the diverse needs of patients with haematological cancers.

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