GIG CYMRU NHS WALES

Ymddiriedolaeth GIG Felindre

Velindre NHS Trust

Transforming Cancer Services In South East Wales

Programme Business Case

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TCS Programme Business Case

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Introduction

The Programme Business Case (PBC) presents the strategic context for the Transforming Cancer Services (TCS) Programme as well as providing a framework for ensuring the sustained delivery of high quality non-surgical cancer services in South East Wales. As such it lays out the case for investment in cancer services for the resident and visiting populations of South East Wales.

A short summary of each of the five cases explored in this business case is included below.

1   THE STRATEGIC CASE

1.1   Strategic context: A vision for Wales

1.1.1   The Welsh Government's '*Together for Health – Cancer Delivery Plan*' recognises the rate of progress made in cancer services over the past ten years and the excellence that exists in Wales. Notwithstanding this, the outcomes for cancer patients in Wales still compare unfavourably with those across Europe and the developed world in a number of tumour sites. In response, the Welsh Government has clearly stated that the NHS must accelerate the rate of improvement if Wales is to achieve the excellence it so desires.Therefore,   the NHS Wales and its partners are required to work to achieve:

- A reduction in cancer incidence;
- An increase in cancer survival rates; and
- The provision of excellent services which provide people living with and beyond cancer a high quality of life.

1.2   Velindre's Role in Delivering the National Vision for Cancer Services

1.2   VCC, as a specialist treatment centre, has a track record of delivering very good outcomes following treatment. However, and whilst the centre plays an important role in improving patient outcomes, through delivering fast and effective, evidence based treatment and care, the centre contributes to only a relatively small part of the system and patient pathway. In response, the Trust has an ambition to do more to integrate and support the public, patients and colleagues elsewhere in the patient pathway, including in the areas of prevention and early diagnosis, to improve outcomes for the population.

1.3   In order to do this in a systemic way, the Trust has been actively engaging with patients, families and carers, staff, LHBs and a wide range of partner organisations involved in the delivery of cancer services to better understand how to more fully contribute to the wider patient pathway. This has resulted in the development of a Velindre cancer strategy - '*Shaping our Future Together'.* The strategy sets a vision for cancer services for the next ten years.

> **Our Vision:**
> *We want to lead in the delivery and development of compassionate, individualised and effective cancer care to achieve outcomes comparable with the best in the world*
> **Our Mission:**
> *Providing the best care, with you, when you need us*

1.4   The strategy provides us with a clear direction and a desired future state which enables us to plan effectively over the coming years. The strategy will be implemented through two primary mechanisms. Firstly, through our Integrated Medium Term Plan (IMTP). Secondly, through the TCS Programme. Whilst we have established the Programme we are clear that it will simply support the planning and delivery of services through the IMTP and not replace it. This is for one very simple reason; the challenges and opportunities in front of us are the same. Consequently, the establishment of the TCS Programme will support us in accelerating the planned improvements within Velindre Cancer services and more generally across the healthcare system in partnership with Local Health Boards and the third sector.

2.1   **Transforming Cancer Services Programme: Scope**

2.2   Delivery of the TCS Programme has been separated into two distinct phases:

- **Phase 1:** Improving non-surgical tertiary oncology services. This will include the provision of more care and treatment at home or within the local community, the development of a Radiotherapy Satellite Centre@, the provision of consultant oncologists working in local hospitals with multi-disciplinary teams on a planned daily basis and the development of a comprehensive acute oncology service across South East Wales; and

- **Phase 2:** Seeking to add further value across the whole pathway of services in relation to cancer. These include public health and prevention, early diagnosis and detection and the management of patients in acute settings. These are areas of work where VCC currently has some involvement in, working with partners, but where the Trust believes, subject to support from our partners, that we could support the system to improve further. For example, increasing awareness of healthy lifestyles and positive role-modelling, providing support to General Practitioners (GPs) to develop enhanced skills to detect cancer at the earliest opportunity and the provision of fast track diagnostic tests to aid early diagnosis.

The scope of this Programme Business Case relates to Phase 1 of the Programme only; improving non-surgical tertiary service oncology services in South East Wales.

2.3 Programme Aim and Objectives

2.3.1 A set of Programme Spending Objectives (PSOs) were developed at stakeholder workshops, which were attended by representatives with a broad range of service views. The spending objectives are summarised in Table 1-1.

Table 1-1: Programme Spending Objectives

Spending objective
PSO1: To provide patients and carers with quality services that deliver optimal clinical outcomes.
PSO2: To deliver sustainable cancer services to the population in the most effective way.
PSO3: To be a leader in education, research, development and innovation.
PSO4: To comply with all relevant standards.

2.4 The Case for Change: Is there a need to do things differently?

2.4.1 We have spent a significant amount of time reviewing the current system and the outcomes it delivers. Whilst there are a wide range of factors to consider, there are a small number which need to be given prominence. These are set out below.

2.4.2 The PBC for Transforming Cancer Services in South East Wales sets out a compelling case for change based upon a number of key national and local strategic drivers.

2.4.3 The **national strategic drivers** set out the key factors influencing the need to drive step change through this Programme. The national strategic drivers can be summarised through the following themes:

- Improving patient outcomes;
- Increasing demand for cancer services; and
- Improving the quality of services we deliver.

2.4.4 The local strategic drivers identify the current service limitations and how they adversely affect the Trusts ability to deliver the required changes in service. The local strategic drivers can be summarised through the following themes:

- Need to meet forecast future demand;
- Limitations of the existing service model; and
- Deficiencies in the current infrastructure.

2.5 National strategic drivers

Outcomes in Wales are relatively poor when compared to developed countries

2.5.1 Despite the significant progress made in preventing and treating cancer, the number of deaths associated with cancer continues to rise. Cancer causes 1 in 4 of all deaths within the United Kingdom and in 2015 was the most common cause of death, accounting for 28% of all deaths registered.

2.5.2 In Wales, MacMillan Cancer Support estimated that approximately 9,000 people died from cancer in 2013.[1] This has a devastating effect on individuals, families, communities and the economic and social fabric and well-being of the country.[2]

Table 1-2: Number of people who died from cancer in Wales during 2013

Every Day	Every Week	Every Month	Every Year
25	170	750	9,000

2.5.3 Moreover, and despite recent and sustained improvements in Wales, the clinical outcomes for cancer patients compare unfavourably with other countries. In short a patient who is diagnosed with cancer in Wales is less likely to survive than if they were diagnosed with cancer in either England, Scotland or Ireland.

2.5.4 For example, Wales has:

- The lowest one and five year survival rates in the United Kingdom for lung cancer;
- The lowest one and five year survival rates in the United Kingdom for breast cancer; and
- The lowest one and five year survival rates in the United Kingdom for colorectal cancer.

2.5.5 The difference is even starker when comparing outcomes with other countries within the wider western world. Wales has the lowest 1 and 5 year survival rates for colorectal, lung, breast and ovarian cancers compared with those in Australia, Canada, Denmark, Norway, and Sweden.

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[1] http://www.macmillan.org.uk/documents/aboutus/research/keystats/statisticsfactsheet.pdf

[2] http://www.macmillan.org.uk/Fundraising/Inyourarea/Wales/Wales.aspx#DynamicJumpMenuManager_2_Anchor_2.

2.5.6   The number of people who are diagnosed with cancer has increased by a third over the past 20 years. By 2020, MacMillan estimate that almost 50% of the population will be diagnosed with cancer in their lifetime. [3]

Table 1-3: Macmillan projections of people diagnosed with cancer in the UK

	1992	2010	2020
Proportion of people diagnosed with cancer in the UK	32%	44%	47%

2.5.7   In Wales, over 19,000 people are diagnosed with cancer every year, and the WCISU has forecast that the incidence of cancer will increase by 2% per annum up to 2031.[4] This means that by 2031, the number of new cancer cases within the VCC catchment population is expected to be 12,677 per year compared with an average of 9,393 cases per year during 2011-2013. This equates to a 35% increase in new cancer cases.

2.5.8   The increase in cancer incidence is as a result of a number of factors which include an ageing population with increasing life expectancy, lifestyle factors such as smoking, alcohol consumption and obesity, and socio-economic factors such as social deprivation and poverty. In parallel to the increase in cancer, there has been a consistent and sustained increase in the complexity of planning and delivering cancer treatments.

2.5.9   Another contributing factor to an increase in demand for cancer services is associated with the ever increasing complexity of cancer treatments. As a specialist cancer service provider the impact for VCC is significant and contributes to the increasing demands being placed upon the delivery of services. For example, the increasing complexity of Radiotherapy planning and treatments has resulted in a requirement to increase the routine appointment slot duration for Radiotherapy attendances. During 2007 / 2008 over 80% of referrals were allocated a 10 minute slot.   By 2015 / 2016 this had reduced to only 20% of attendances because average appointment times had increased.

2.5.10 Increasing complexity is also having a considerable impact on Velindre's ability to deliver Systemic Anti-Cancer Therapies (SACT) services. For example, there has been a significant growth in the proportion of SACTs which are being developed with novel ways of working, e.g. by targeting the specific pathways that cause cancer or supporting the body's immune system in fighting the disease. Unlike the conventional chemotherapy agents which are used for a specific number of cycles, these new agents are typically used for longer

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[3] *By 2020 almost half of Britons will get cancer in their lifetime – but 38% will not die from the disease,* MacMillan Trust http://www.macmillan.org.uk/Aboutus/News/Latest.aspx.

[4] WCISU phase 2 report

periods of time as their withdrawal often results in the cancer causing pathway being turned back on or the body's immune system being switched off.

2.5.11 In addition to an increase in the number of cycles administered to each patient, these new SACTs have different side-effects to conventional chemotherapy agents. These need careful monitoring and patient follow up for longer periods of time after the treatment has been discontinued.

Improving the quality of services we deliver

2.5.12 The Trust has undertaken an extensive engagement process with stakeholders in order to gain a better understanding of patient expectations and what it is they want from the service. A number of key themes emerged in terms of the improvements that are important to service users. These include:

- **Care closer to home:** Patients want more care at home or locally, if we can guarantee it is of the same quality irrespective of where it is delivered;

- **More integrated care:** patients should have consistency of care and treatment with services linking up both within and outside of VCC. Patients identified the need for a single point of contact and a single electronic care record;

- **Better utilisation of technology to deliver care in different ways:** patients users should have the choice to make use of technology for receiving appointments and communication and for appropriate outpatient appointments;

- **More access to services in extended hours:** patients should have access to services, support and facilities at extended times;

- **Better information:** information should be evidence-based and guided by professionals and should include access to treatment timelines, as well as information packs and education sessions to better prepare for appointments;

- **Partnership approach:** patients and carers should be involved in multi-disciplinary team meetings and the development of their Care Plan;

- **Holistic approach:** support should be provided in the context of patient, carer and family and should serve both physical and emotional needs;

- **Improved facilities:** patients should have access to a pleasant environment that is calm, quiet, clean, colourful, bright, and inviting. In practical terms patients and service users would like more privacy, better parking, increased toilets and changing facilities as well as access to quiet areas;

- **Choice:** patients want more choice about what treatment and services they use, including where and how they access them;

- **Control:** patients want more control of their treatment decisions and to ensure we focus on the things they value most in life;

- **Communication and information:** patients and service users want information about their diagnosis and treatment, together with uncomplicated and effective communication about the options they have. They also want the communication between the providers of services to be seamless and support their care;

- **Independence:** patients want to be supported to achieve their aims and the things they value most from the services they need. They wish to retain their independence as they live with and through cancer; and
- **Highest quality of life.** Patients want to receive the services and support that enables them to achieve the highest quality of life and delivers the things they value the most.

2.5.13 A key objective of the TCS Programme is to improve the quality of service delivery in line with what is important to our stakeholders.

Need to meet future forecast demand

2.5.14 It is anticipated that there will be accelerated growth in demand for cancer services in relation to
- The increasing incidence of cancer;
- Increasing complexity of cancer services; and
- Improvements in access to cancer services.

2.5.15 In response the Trust has established a long-term strategic approach to forecasting future activity and has developed, in partnership with clinical colleagues across South East Wales, a set of clinical growth assumptions up to and including 2031/32 and as summarised Table 1-4.

2.5.16 The activity growth assumptions are set across two time frames. The first time frame is from 2016/17 - 2022/23 where the Trust believes it has a fair degree of certainty in terms of forecasting future activity. The second timeframe is from 2023/24 - 2031/32 where there is less certainty when forecasting future demand (*e.g. stratified approach for SACT versus greater incidence of cancer*) and the Trust has therefore opted to revert to the forecast incidence of cancer (2%) as provided by WCISU. The Trust has chosen to take this long-term approach to forecasting activity to try and ensure that there is sufficient service capacity to meet future demand.

2.5.17 These assumptions, following the availability and validation of 2016/17 activity data, have recently been reviewed by the VCC Senior Management Team and by VCC service and clinical leads respectively. The main output of this review was a reduction in assumed growth rate for radiotherapy from 4% to 2% between 2016/17 and 2022/23. However, it should be noted that through this review concerns were raised by VCC clinicians as to why the previously assumed growth rate of 4% has not presented over the last two financial years as the cause is unclear. In response the TCS Programme clinical lead has commissioned further analysis through the VCC Radiotherapy Development Group.

Table 1-4: VCC core service clinical growth assumptions

Service	Annual growth assumption/years	
	2016/17 - 2022/23	2023/24 – 2031/32
Radiotherapy	2%	2%
SACT	5%	2%

Service	Annual growth assumption/years	
	2016/17 - 2022/23	2023/24 – 2031/32
Inpatients	2%	2%
Outpatients and Ambulatory Care	2%	2%
Radiology (CT & MRI) and Nuclear Medicine	9%	2%

2.5.18 The impact of the forecast increases in service activity will be significant as Velindre, without additional investment, will be unable to meet patient demand from within existing capacity in the future.

There are significant limitations within the existing Service Model

2.5.19 Achieving the best possible clinical outcomes for the population of South East Wales will require primary, secondary and Velindre, as a specialist centre, to work together to ensure cancer is prevented where possible or detected and diagnosed early, and the best treatment delivered quickly and effectively. The existing Service Model presents a challenge to fully optimising the healthcare system outcomes it delivers. These include the following factors:

- Detection, diagnosis and referral for urgent suspected cancers is inconsistent across the region. Whilst VCC does not have a direct role in this vital aspect of cancer care, there are a number of ways it could assist in improving performance such as routinely sharing staging data with Local Health Boards and GP clusters;

- Insufficient information sharing occurs regarding patient information e.g. patient records between primary, secondary and tertiary care and planning information e.g. staging data captured in tertiary care which would add significant value to the planning process in primary and secondary care;

- Greater information, education and support would improve co-production of health services between patients and healthcare professionals;

- Variation in the availability of tertiary cancer across South East Wales and their quality. For example, Outreach services are provided at numerous locations and at varying times of the day/week which are not beneficial to patients. There remains variation in the support provided for these services with some having cancer nurse specialists and allied health professionals available consistently, whilst others do not;

- A comprehensive Acute Oncology Service (AOS) is not in place across South East Wales;

- Access to and uptake of new technologies is limited by the current capacity of the service. The provision of advanced techniques such as Stereotactic Body Radiotherapy (SBRT), Intensity Modulated Radiotherapy (IMRT) and Image Guided Bracytherapy (IGBT) is currently limited by the capacity pressures at the Velindre Cancer Centre. This is often compounded by the lack of capacity to undertake research and development, reducing the potential for innovation in clinical practice and patient care;

- Access to clinical trials and research is not available at all locations for patients. The large majority of Velindre led clinical trials and research are

only available at VCC in Cardiff. This is largely due to either a lack of available capacity locally, unsuitable facilities being available locally or a shortage of specialist staff e.g. specialist nurses, being available locally. Therefore, patients who receive their care and treatment at Velindre Outreach facilities in

2.5.20 Local Health Boards do not always receive the same opportunity to take part in clinical trials and research; and

There are significant deficiencies across the Velindre Cancer Centre estate

2.5.21 VCC was built in 1956 and has been extensively developed in an incremental fashion without a 'development control plan'. The hospital is widely acknowledged as having a culture where patients are at the centre of everything with a compassionate and caring environment where staff consistently go the 'extra mile' to meet the needs of patients. Nevertheless, there are a number of limitations and challenges related to the current facilities including:
- There is no space for expansion on the existing Velindre estate. This limits the Trust's ability to expand its capacity to meet growing demand, especially in relation to Radiotherapy services;
- High risk and significant risk backlog maintenance requirements continue to increase year after year due to the age of the building;
- The current VCC infrastructure and accommodation is not fit-for-purpose for a number of reasons including:
    o Poor clinical adjacencies which impacts patient care and efficiency of service delivery;
    o 75% of the existing estate does not comply with current space standards;
    o Majority of the site accommodation does not comply with current Health Building Notes (HBN) guidance;
    o Inpatient rooms on the first floor are very small, well below National standards, and this makes it more difficult for nurses to assist patients in and out of bed in hoists, for example;
    o Inappropriate locations of services and poor adjacencies between departments;
    o Unacceptable standards of privacy, confidentiality and dignity across patient areas;
    o Little separation between patients, visitors, staff and external workers across the hospital; and
    o The majority of circulation routes are too narrow.
- There are inadequate car parking facilities; and
- In-built inefficiency as there is a significant amount of wasted movement of staff and a wide range of 'work-arounds' as a direct result of the outdated nature of the hospital.

2.5.22 It is no coincidence that when constructing new buildings within the public sector, the HM Treasury Green Book requires organisations to depreciate their value, or essentially consider their useful lifecycle, over period of sixty years.

Consequently, Velindre Cancer Centre reached the end of its useful lifecycle in 2016.

Velindre has used the resources available efficiently and delivers high quality services

2.5.23 One of the key challenges for the healthcare system, and the organisations within it, is to ensure that it uses resources efficiently and effectively to deliver healthcare that is valued by patients. It is therefore, important that Velindre is able to demonstrate that it performs efficiently and effectively before seeking any additional investment in services.

2.5.24 A significant amount of work was undertaken to compare VCC's performance with a range of organisations that provide cancer services. This was not easy to achieve as there is no national or United Kingdom benchmarking club or resource available for cancer services or, specifically, non-surgical tertiary service oncology, unlike those available for secondary care.

2.5.25 Nevertheless, a focused exercise was undertaken to create a benchmarking club which consisted of peers who were able to take part and were also recognised as centres of excellence nationally and internationally - these included The Royal Marsden and Clatterbridge Cancer Centre.

2.5.26 The outcome of this was positive and demonstrated that Velindre Cancer Centre provides high quality services which compare well with those of its peers.

2.5.27 Work was also undertaken to determine the unit cost of providing services at VCC and how they compared to reference costs in England.

Table 1-5: Benchmarking unit costs with peer organisations

Service area	2015/16 Cancer Centres (Lower Quartile)	2015/16 Cancer Centres (Upper Quartile)	2016/17 (Before 3rd Party Income)	2016/17 (After 3rd Party Income)
Radiotherapy	£119	£305	£158	£119
SACT	£262	£410	£479	£361
Inpatients	£505	£1530	£513	£387
Outpatients	£116	£209	£127	£96

2.5.28 The above analysis clearly indicates that the unit costs for key services within the Trust are in the lower quartile range when compared to other cancer centres apart from for SACT services.

What does this tell us?

- Cancer causes 1 in 4 of all deaths within the United Kingdom and in 2015 was the most common cause of death accounting for 28% of all deaths registered;
- Clinical outcomes for cancer patients in Wales compare unfavourably with other developed countries;
- Wales has the lowest one and five year survival rates in the United Kingdom for lung, breast and colorectal cancers;
- There will be accelerated growth in demand for cancer services over the next five years as a result of increasing cancer incidence and increasing complexity of treatments;
- There is no space for expansion on the on the VCC estate and therefore without additional investment will be unable to meet patient demand in the future;
- The quality of services provided to patients by Velindre Cancer Centre compare well with other leading cancer centres; and
- VCC can demonstrate good levels of efficiency and productivity in delivering core services.

So what does this mean?

Without improvements across Wales and at VCC the following is likely to occur in the future:
- Velindre will be unable to provide adequate care and treatment for the number of patients expected;
- Patient waiting times will increase;
- The quality of care will reduce;
- The outcomes for patients and their experience of the service is unlikely to improve. In reality, there is a very real risk that they will deteriorate;
- It will become more difficult to attract and retain the best clinicians and staff into South Wales;
- The cost of providing treatment will rise as the functionality of Velindre Cancer Centre continues to recede; and
- Investment is required to enable the Systemic planning and deliver high quality cancer services for the long-term.

The case for change is compelling. It is not a question of whether we need to do something different. This is proven. It is now a matter of what we do, how we do it, when and what difference will it make for the people of Wales.

2.5.29 In response to the challenges and opportunities likely to occur in the future, Velindre has taken a long-term strategic approach to designing a clinical model and services which are prudent, respond to the things that people and patients have told us they value highly in healthcare, will be capable of meeting the forecast levels activity and will improve the quality of care and outcomes. The future Service Model has been developed following an extensive Programme of engagement with patients, their families and carers, Velindre staff, Local Health Boards, voluntary sector and other partners.

2.5.30 The engagement to date has largely focused around a small number of uncomplicated questions:
- What is good about the existing Service Model?
- What elements of the existing Service Model could be improved?
- What do you need in the future from healthcare services?
- What are the things you value most from healthcare?
- How can we work together to achieve these improvements?

2.6   The Service Model

2.6.1 The Service Model we have developed moves us away from the traditional NHS and wider Public Services Model of service development and delivery which was often based upon what the service thought was best for patients. The Service Model does not think about '*fitting*' people into pre-determined services but seeks a new relationship to emerge which works in partnership with people to identify realistic goals, to design and deliver services around patients' needs and to achieve this in a truly sustainable way.

2.6.2 The achievement of this requires the whole system of public and voluntary sector services to work together better, across traditional boundaries within the resources available. There will need to be integration (from public health to primary and community to hospital and social care), whether working as public employees, independent practitioners or not-for-profit organisations to achieve the best possible outcomes aligned with patients' values and priorities.

2.6.3 To do this will require us to empower and enable patients and equip and support our staff to continually improve and to work in new and different ways. We wish to move the services people receive from us from '*good*' to '*great*'; this will require a fundamental change in the way in which the whole system operates and the optimisation of the enabling infrastructure, such as information technology, in order to achieve high levels of service quality in a sustainable way.

2.6.4 The patient will be at the centre, within an integrated network of services organised around them. The organising principle seeks to 'pull' high quality

care towards the patient that is accessible in their preferred place to support them achieving their personal goals during treatment and when living with the impact of cancer. This includes all aspects of clinical care and support and also appropriate research opportunities that patients may wish to participate in.

2.6.5 The model builds on our current provision of services both at VCC and within the South East Wales region. It is based on a range of evidenced based pathways and the provision of seamless care which will require all organisations to work together to provide patients withall the care, support and information they require at the earliest opportunity in their journey.

2.6.6 Through implementation of the Service Model care will be provided in the following locations:

- **Home/Local Care:** patients will be able to receive elements of care at their place of residence or in their local community;
- **Velindre@:** these facilities will provide SACT / Outpatients and ambulatory care within Local Health Boards;
- **Health Boards:** Velindre senior clinical staff will deliver planned support to Local Health Board inpatient services and Acute Oncology Services (AOS);
- **Velindre Radiotherapy Satellite Centre@:** this facility will provide Radiotherapy treatment and other related services; and
- **Velindre Cancer Centre:** the Cancer Centre will provide specialist and complex cancer treatment including SACT, Radiotherapy and specialist palliative care, inpatient facilities and outpatient services.

Figure 2-1TCS Programme clinical service model
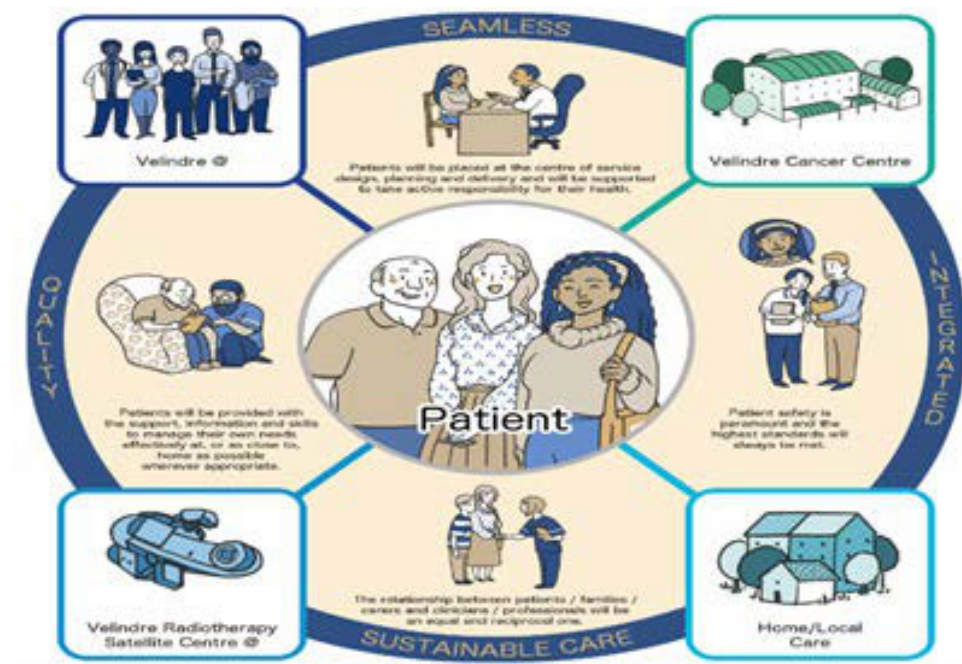
2.7 What benefits do we expect to be realised from the futureS e r v i c e Model?

2.7.1 Implementation of the Service Model will deliver a wide range of benefits to all of our key stakeholders and partners. A summary of some of these is set out below:

- Improved survival rates;
- Improved quality of care and patient experience;
- Quicker access to care for patients;
- Reduction in waiting times for treatment;
- More patients treated annually;
- An increase in the number of patients choosing to access Radiotherapy where it will benefit them;
- More patients able receive care at home or close to home;
- A large number of patients avoiding the need to attend Accident and Emergency for care and treatment;
- Patients able to receive care and treatment without needing to stay in hospital;
- Reduced travelling times for patients, their families and carers;
- More patients taking part in clinical trials and research;
- Excellent facilities and services available for patients, families and carers including car parking;
- Reduction in unit cost of treatment;
- Reduction in the required level of investment from commissioners; and
- Increased number of Palliative patients dying in 'preferred' place.

> *Our response will improve the quality of care and the clinical outcomes for patients; provide sustainable tertiary cancer services; and reduce the unit cost of treatment over the next 15 years.*

3 THE ECONOMIC CASE

3.1 The purpose of the economic case is to identify and appraise the potential options for the delivery of the TCS Programme and to recommend the option that is likely to offer best value for money.

3.2 Critical Success Factors

3.2.1 As a starting point for exploring potential options to deliver the TCS Programme, Critical Success Factors (CSFs) were identified. These describe the main attributes essential for the successful delivery of the project and provide a basis for assessing the long list of options. They are summarised in the table below:

Critical success factor	The option will be assessed in relation to how well it:
Strategic fit	• Meets agreed spending objectives, related business needs and service requirements; and • Provides holistic fit and synergy with other strategies, programmes and projects
Potential value for money	• Optimises public value (social, economic, environmental) in terms of potential costs, benefits, and risks.
Supplier capacity and capability	• Matches the ability and capacity of potential suppliers to deliver the required services; and • Is likely to be attractive to potential suppliers.
Potential affordability	• Can be funded from available sources of finance; and • Aligns with sourcing constraints.
Potential achievability	• Is likely to be delivered given the Trust's and partner organisations' ability to respond to the changes required; • Matches level of available skills required for successful delivery; • Facilitates the continued delivery of services throughout the duration of the project; and • Can be delivered by the end of 2022/23.

3.3   Identifying the preferred way forward

3.3.1   A rigorous process was undertaken to identify and appraise a broad range of options in relation to the CSFs and spending objectives. In addition, the advantages and disadvantages of each option were explored.

3.3.2   The TCS Programme Management Board used the outputs of this assessment to identify the preferred way forward for the Programme together with a short list of possible options against which the preferred way forward will be appraised. The resulting shortlist of options is provided in Table 6.
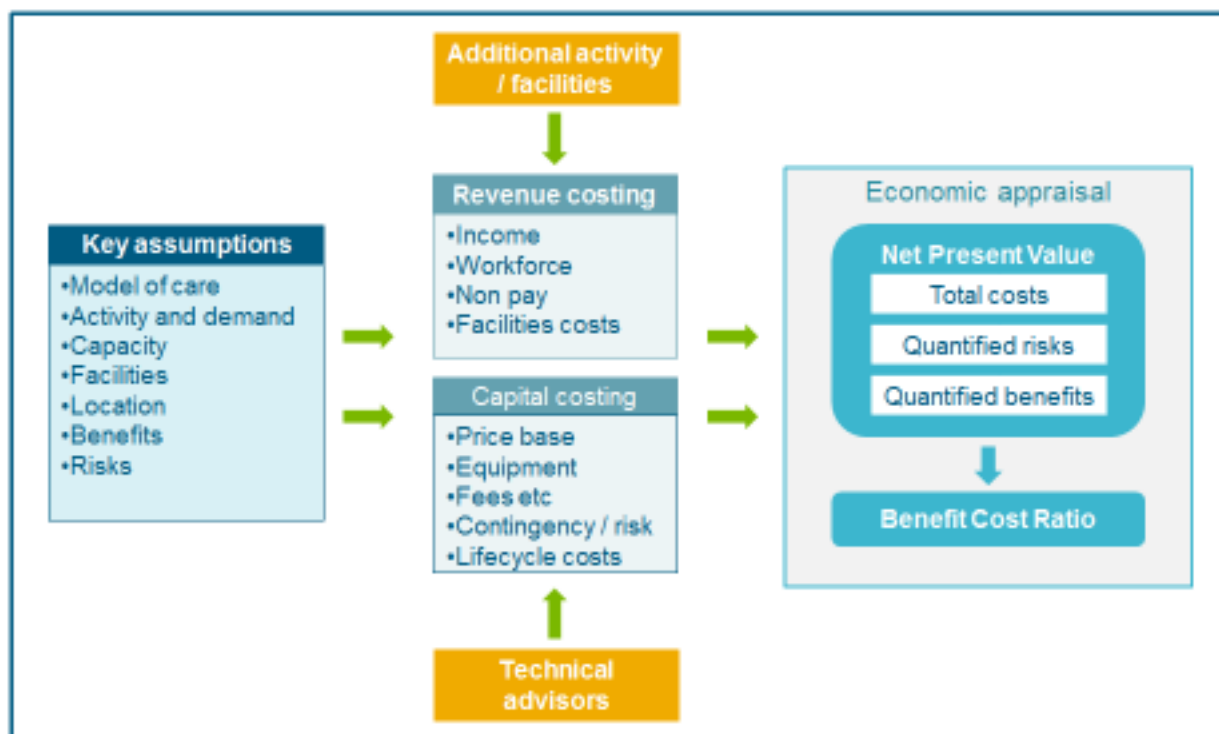
Table 3-1: The shortlist list of options

Programme		Status quo	Do minimum	Preferred way forward	More ambitious preferred way forward
Service scope		Optimise existing arrangements	Improved clinical model that meets future demand	Improved clinical model that meets future demand + enhanced access to education and research + access to PET CT service	Improved clinical model that meets future demand + enhanced access to education and research + access to PET CT and other additional specialist services
Solution	Cancer Centre	Existing estates: invest in backlog maintenance	• New cancer centre • Expansion zone for advanced tech	• New cancer centre • PET CT • New research/ education facilities • Management Centre • Expansion zone for advanced tech	• New cancer centre • PET CT • New research/ education facilities • Management Centre • Advanced Technology: one proton beam unit; one platform specific stereotactic treatments; one additional MRI scanner; one Cyclotron unit
	Outreach	Maintain current arrangements	Up to four x refurbished Outreach centres delivering SACT and Outpatients services	Up to four x new Outreach centres delivering SACT and Outpatients services	Up to four x new Outreach centres delivering SACT and Outpatients services
	Satellite Radio- therapy Outreach	-	One x new Satellite Radiotherapy Unit	One x new Satellite Radiotherapy centre	One x new Satellite Radiotherapy centre
Service delivery		Continue with existing service providers	Continue with existing service providers	Continue with existing service providers	Continue with existing service providers
Implementation		Phased status quo	Phased: IM&T and new ways of working Outreach arrangements Cancer centre	Phased: IM&T and new ways of working Outreach arrangement Cancer centre	Phased: IM&T and new ways of working Outreach arrangement Cancer centre
Funding		Public funding	Mix of public and private funding	Mix of public and private funding	Mix of public and private funding

3.4 Economic appraisal

3.4.1 An appraisal of the economic costs, benefits and risks for the shortlisted options has been undertaken in order to identify the preferred option for delivering the programme.

3.4.2 The economic appraisal process utilises a number of key outputs from other parts of the PBC process, such as workforce planning, capacity planning, and design, in establishing the capital and revenue (recurring and non-recurring) implications of each option.

3.4.3 The general approach to the economic appraisal is summarised in Figure 2.

Figure 3-1: Methodology to economic appraisal

Additional activity / facilities

Key assumptions
- Model of care
- Activity and demand
- Capacity
- Facilities
- Location
- Benefits
- Risks

Revenue costing
- Income
- Workforce
- Non pay
- Facilities costs

Capital costing
- Price base
- Equipment
- Fees etc
- Contingency / risk
- Lifecycle costs

Economic appraisal

Net Present Value
- Total costs
- Quantified risks
- Quantified benefits

Benefit Cost Ratio

Technical advisors

3.4.4 Tables 3-2 and 3-3 outline the differing capital and revenue requirements for the options.

Table 3-2: Capital requirements

		Status quo	Do minimum	Preferred way forward	More ambitious
Existing VCC	• Backlog maintenance • Essential capital projects • Replacement of existing equipment	☐			
	• Enabling works • Site demolition and disposal		☐	☐	☐
nVCC	• New build VCC		☐	☐	☐
	• Research and Development (enhanced service provision provided within Centre for Learning)			☐	☐
	• Training and Education (enhanced service provision provided within Centre for Learning)			☐	☐

		Status quo	Do minimum	Preferred way forward	More ambitious
	• PET CT service			☐	☐
	• Proton Beam service				☐
Velindre Radiotherapy Satellite Centre	• New build Radiotherapy Satellite Centre		☐	☐	☐
Velindre@ Outreach Centres providing SACT and Outpatient services	• Two – four refurbished outreach centres		☐		
	• Two – four new build outreach centres			☐	☐

Table 3-3: Revenue requirements

	Status quo	Do minimum	Preferred way forward	More ambitious
Recurring revenue (pay and non-pay) costs associated with delivering forecast activity	☐	☐	☐	☐
Additional costs to deliver capacity shortfall	☐			
Benefits of new clinical model (net of investment in additional capacity) • Reduced admissions • Reduced length of stay • Improved utilisation		☐	☐	☐
Impact of new cancer centre facilities (costs and benefits)		☐	☐	☐
Impact of Centre for Learning and Innovation (costs and benefits)			☐	☐
Impact of PET CT (costs)			☐	☐
Impact of advanced technologies (costs)				☐

3.4.5   A robust approach was adopted to estimate monetary values for the following for each of the shortlisted options:

- Initial capital costs for the programme;

- Lifecycle capital costs associated with replacement, refurbishment or upgrading of assets over the lifetime of the appraisal period;

- Transitional costs associated with the implementation of the programme including the implementation team and dual running costs;

- Recurring revenue costs relating to the annual service running costs based on future demand and the impact of proposed clinical service model;

- A range of benefits have been identified, some of which can be quantified and a financial value determined; and

- A range of risks have been identified, some of which can be quantified and a financial value determined including capital contingencies and optimism bias, as well as revenue risks.

3.4.6 Following the identification and measurement of the costs, benefits and risks for each option, a discounted cash flow was prepared to calculate the Net Present Value of each option. This is based on the assumptions below.

Table 3-4: Discounted cash flow assumptions

- Year 0 is 2015/16.
- Costs and benefits use real base year prices – all costs are expressed at 2016/17 prices in line with the baseline Trust costs.
- The following costs are excluded from the economic appraisal:
  - Exchequer 'transfer' payments, such as VAT;
  - General inflation;
  - Sunk costs; and
  - Non-cash items such as depreciation and impairments.
- A discount rate of 3.5% is applied to the economic appraisal for years 1-30 and 3.0% for years 31 onwards.

The outcome of the economic appraisal is summarised in Table 5.
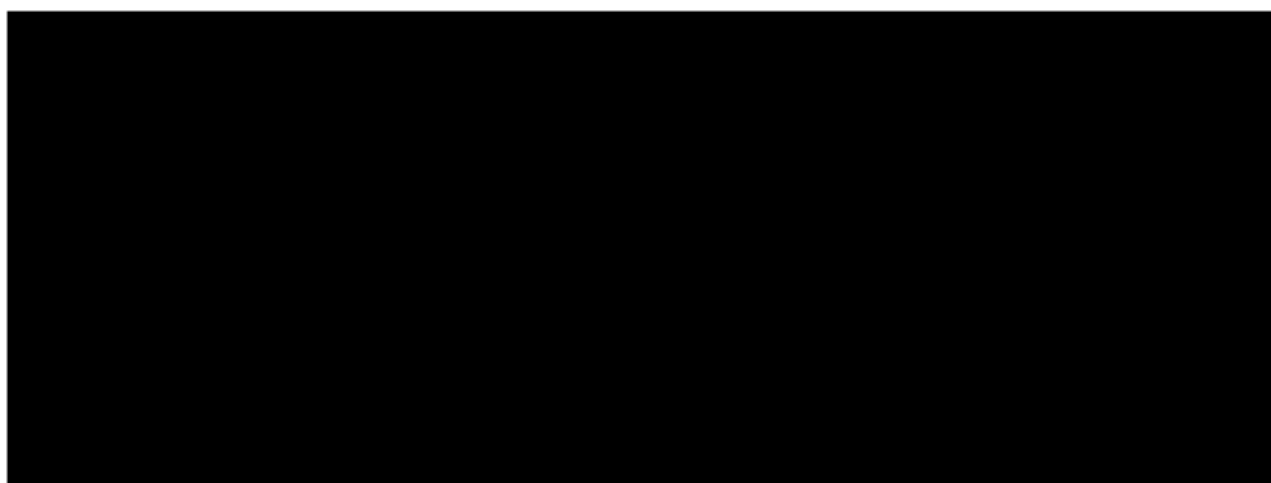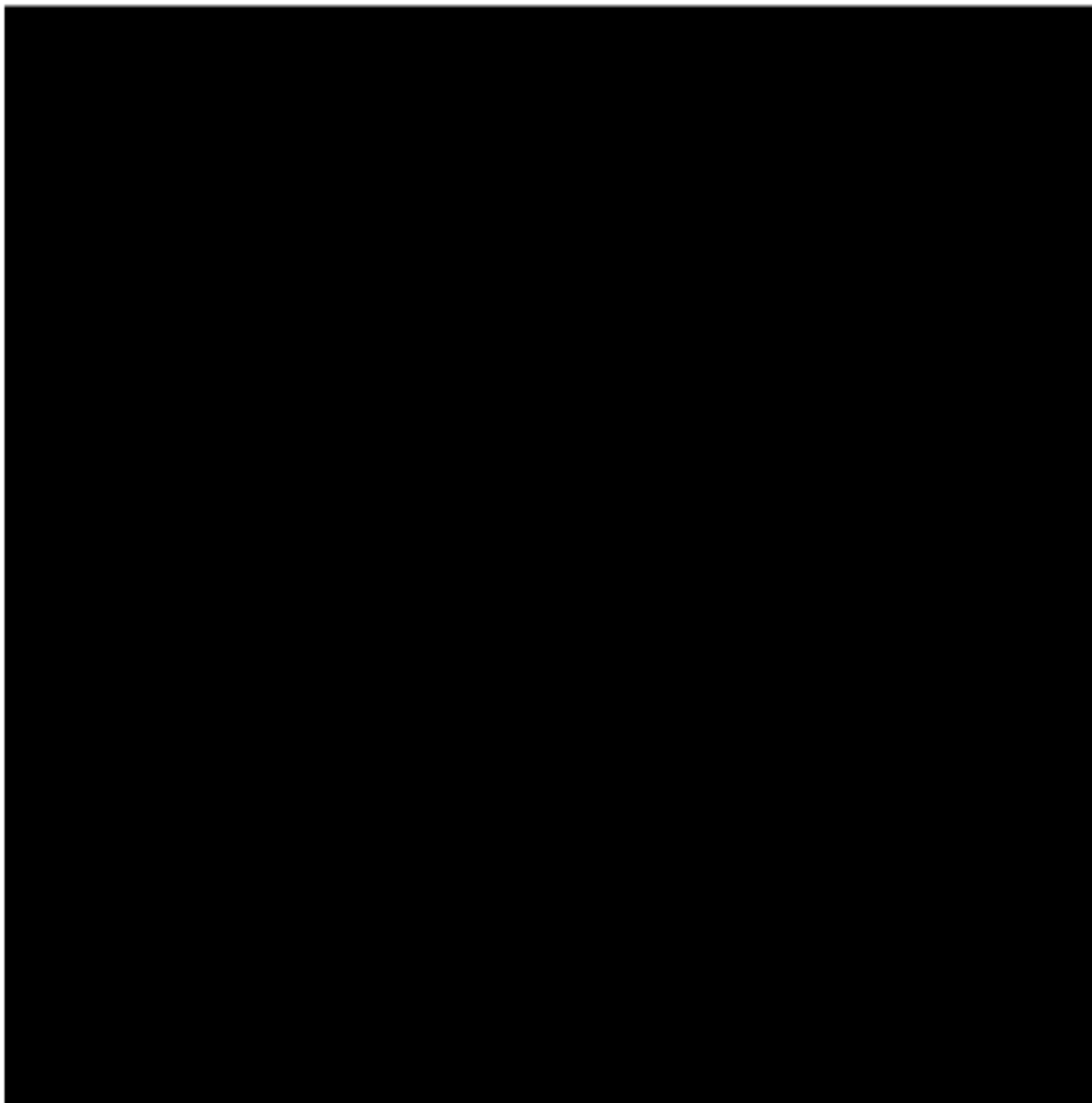
3.5 Identifying the preferred option

3.5.1 The results of the economic appraisal demonstrate that although the Preferred Way Forward (PWF) offers the lowest NPV of all four options, suggesting that it is the lowest cost option over the 60 year appraisal period. ███████████ ███████████████████████

3.5.2 The benefit cost ratio demonstrates the relationship between the cost and benefits of the programme. The Preferred Way Forward offers the best value for money over a 60 year period on both a discounted and undiscounted basis.

3.6 The preferred option

3.6.1 The preferred option for delivering the nVCC project contains the following features and delivers a wide range of benefits to patients, staff and other stakeholders.

Figure 3-2: Features and benefits of the preferred option

- The introduction of an improved clinical model which supports the delivery of high quality and sustainable services that will meet the future requirements and aspirations for cancer care across South East Wales.
- Service capacity which is able to respond to anticipated increases in demand for non-surgical cancer services including additional linear accelerators at both the new Cancer Centre along with increased provision of care within outreach settings and in people's homes.
- Access to new services which contribute to improved patient outcomes.
- Enhancement of existing Training, Education Research and Development services supported by the establishment of a Centre for Learning and Innovation.
- In terms of infrastructure the preferred option provides:
  - A new purpose-built VCC;
  - Introduction of PET CT facilities at VCC (subject to approval of a separate business case);
  - Development of a Trust management centre at VCC;
  - A new build Velindre Radiotherapy Satellite Centre; and
  - Between two and four new build Velindre@ Outreach Centres providing SACT and Outpatient services.
- A phased approach to implementation of the programme culminating in the delivery of a new cancer centre by 2022/23.

4   THE COMMERCIAL CASE

4.1   The procurement strategy has been developed in conjunction with the Welsh Government and includes input from the Trust's Technical Advisors, Legal Advisors and Financial Advisors. The proposed process for procuring the different components of the programme are summarised below:

Figure 4-1
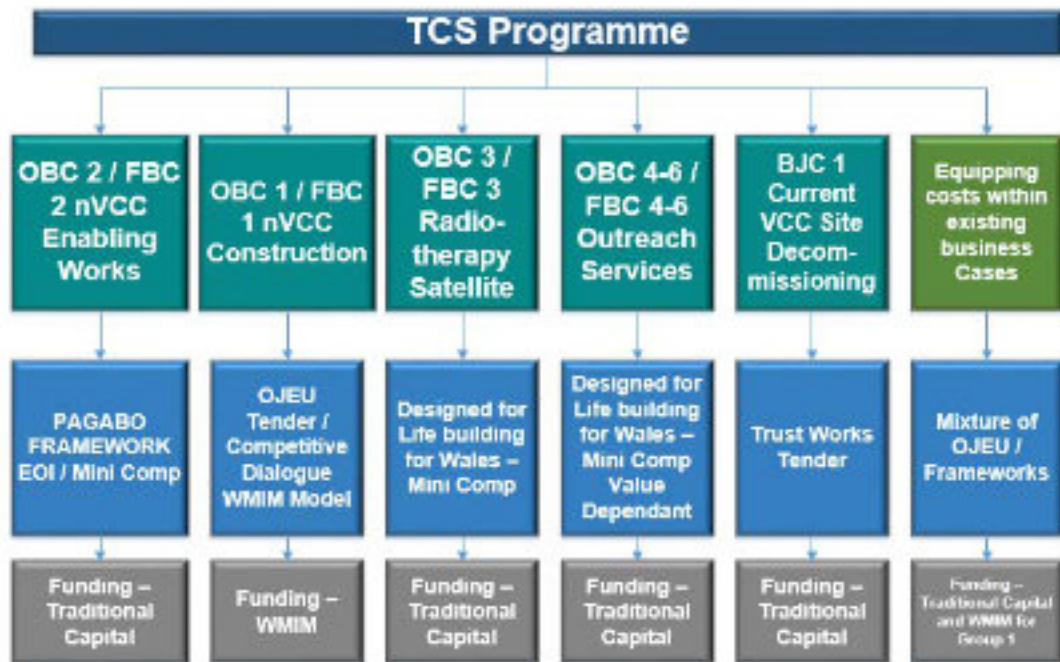
4.2   Within the overall framework of the TCS programme procurement plans have been developed covering the equipping needs of the programme.

5   THE FINANCIAL CASE

5.1   The aim of the financial case is to establish the financial and funding requirements of the preferred option in order to demonstrate the affordability of the project.

5.2   A financial framework has been developed to support the financial case which outlines the sources of inputs which include the additional costs associated with the programme and the proposed sources of funding.
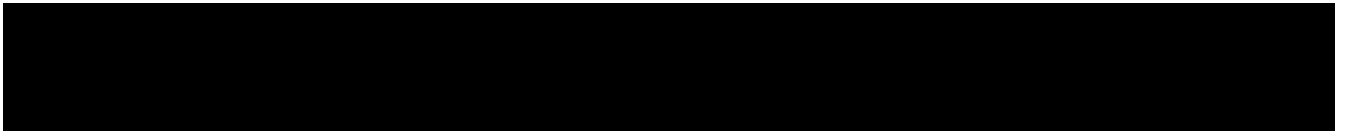
Figure 5-1: Financial Framework
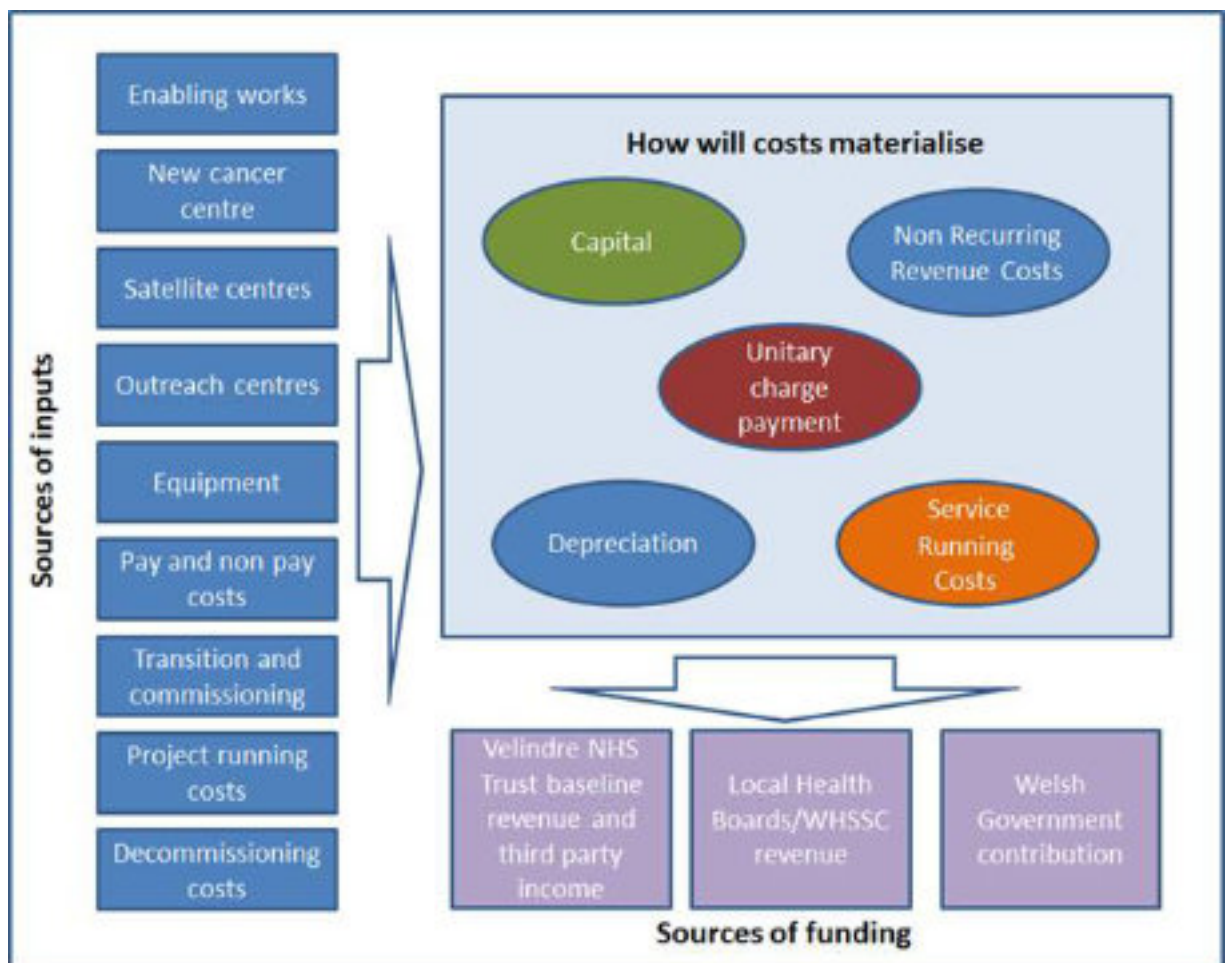
5.3   **Capital costs**
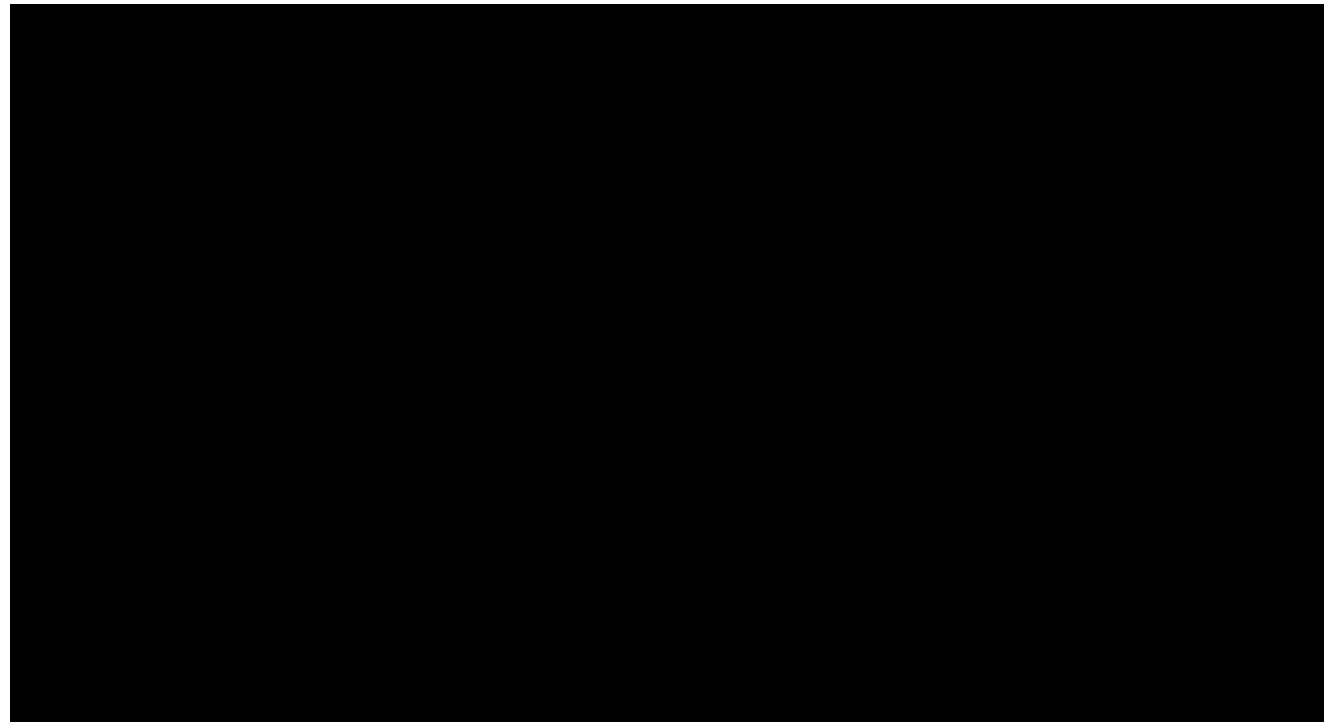
5.3.2 In additional the TCS Programme receives an annual capital allocation from Welsh Government to ensure the delivery of the Project. The costs relate to the following:

- Programme Management and Work streams;
- GI Works; and,
- Technical and Professional Advisers.

5.4 Revenue costs
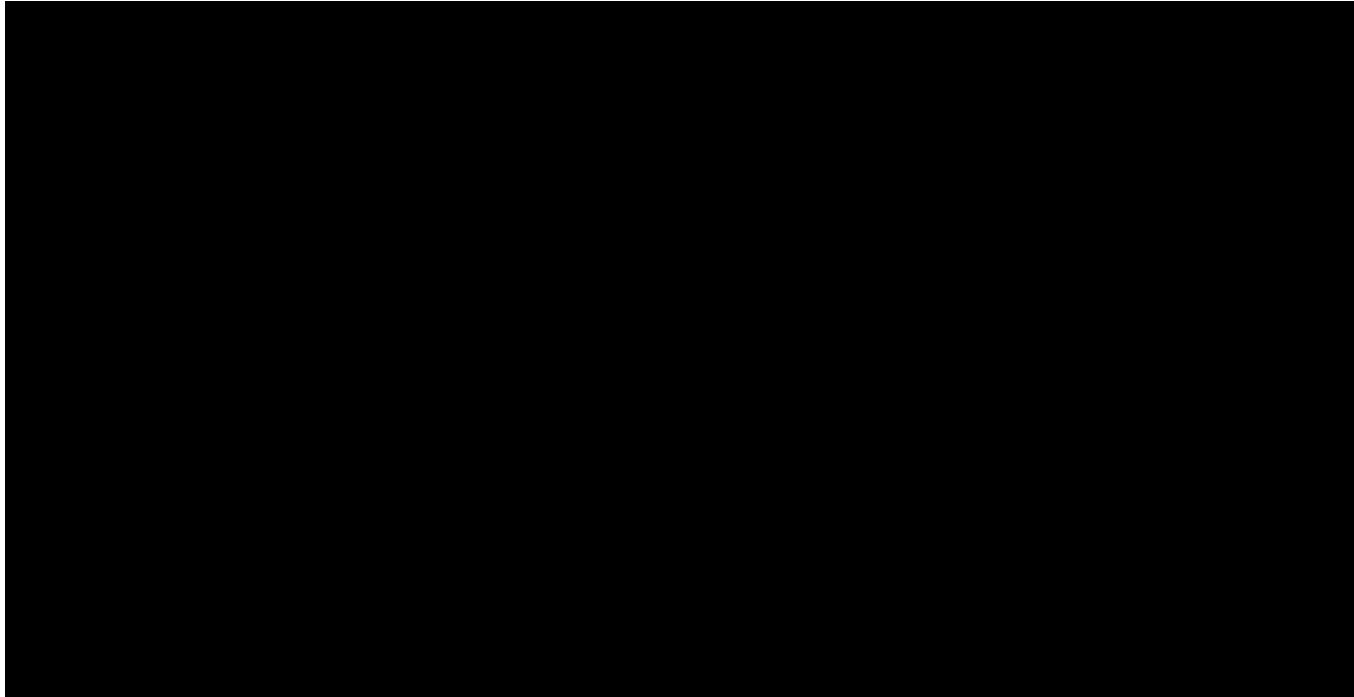
5.4.1 Revenue costs cover all of the relevant programme elements including the proposed model of care, anticipated demand and capacity requirements as well as the impact of the proposed new infrastructure projects.
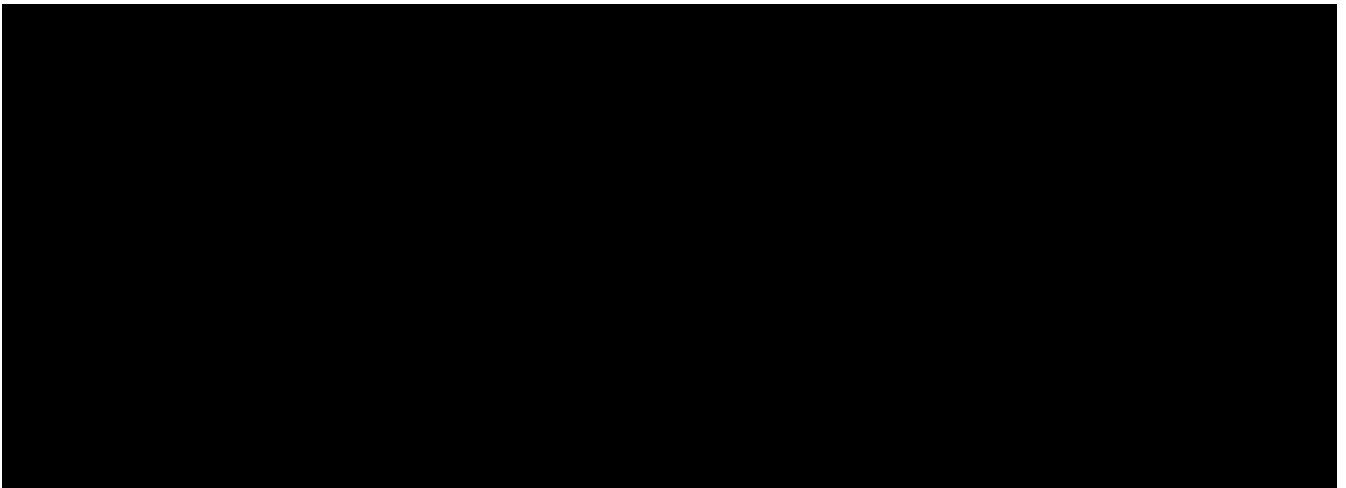
5.4.3 In addition, non-recurring revenue costs reflect expenditure which the Trust will incur in order to deliver the Programme but will not recur over time, they are largely one off up-front costs.
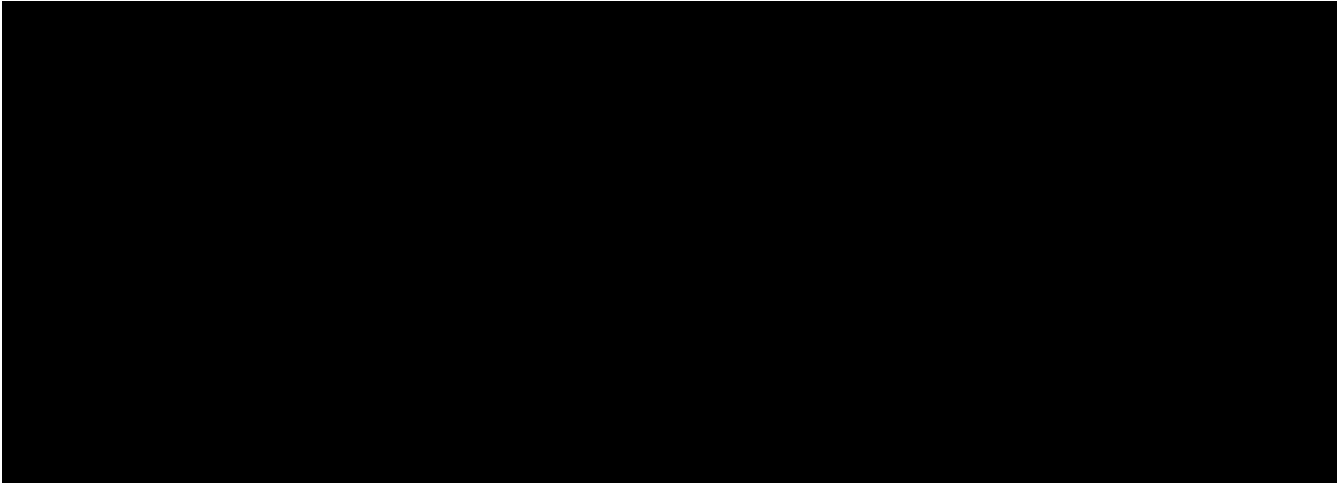
5.4.4 The non-recurring costs would typically be incurred in the following areas:

- Write down in value of existing assets (accelerated depreciation); and
- Transitional costs.

6   THE MANAGEMENT CASE

6.1   The Management Case outlines plans for the effective implementation, transition and full benefits realisation of the Programme. The programme consists of seven projects as set out in Figure 5-2
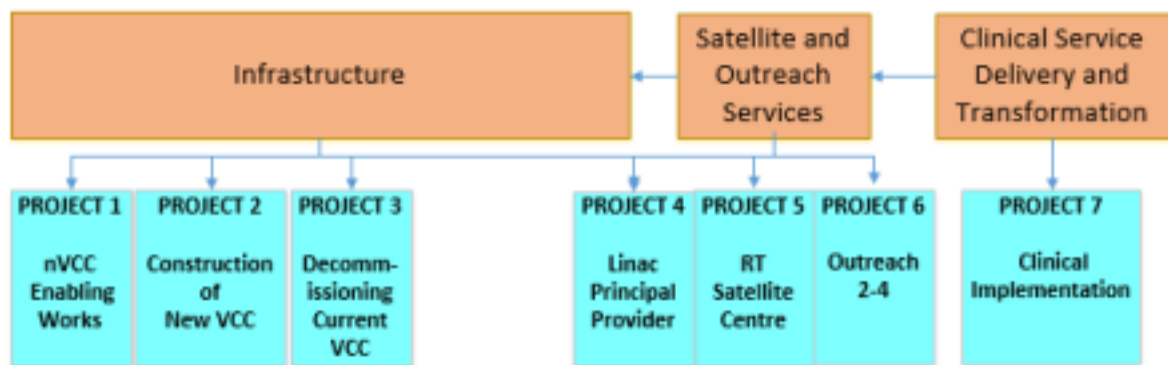
6.2 Roles and responsibilities

6.3 Programme governance

6.3.1 A range of internal and external governance arrangements have been outlined for the effective management of the programme. In summary, the wider programme governance structure is provided below.

6.3.2 The structure of the Programme has been developed to closely align with the Business Case strategy, and is fully integrated into the Trusts business and governance arrangements.

6.3.3 The programme and project arrangements are set out in Figure 6-1.

Figure 6-1: Programme and project arrangements
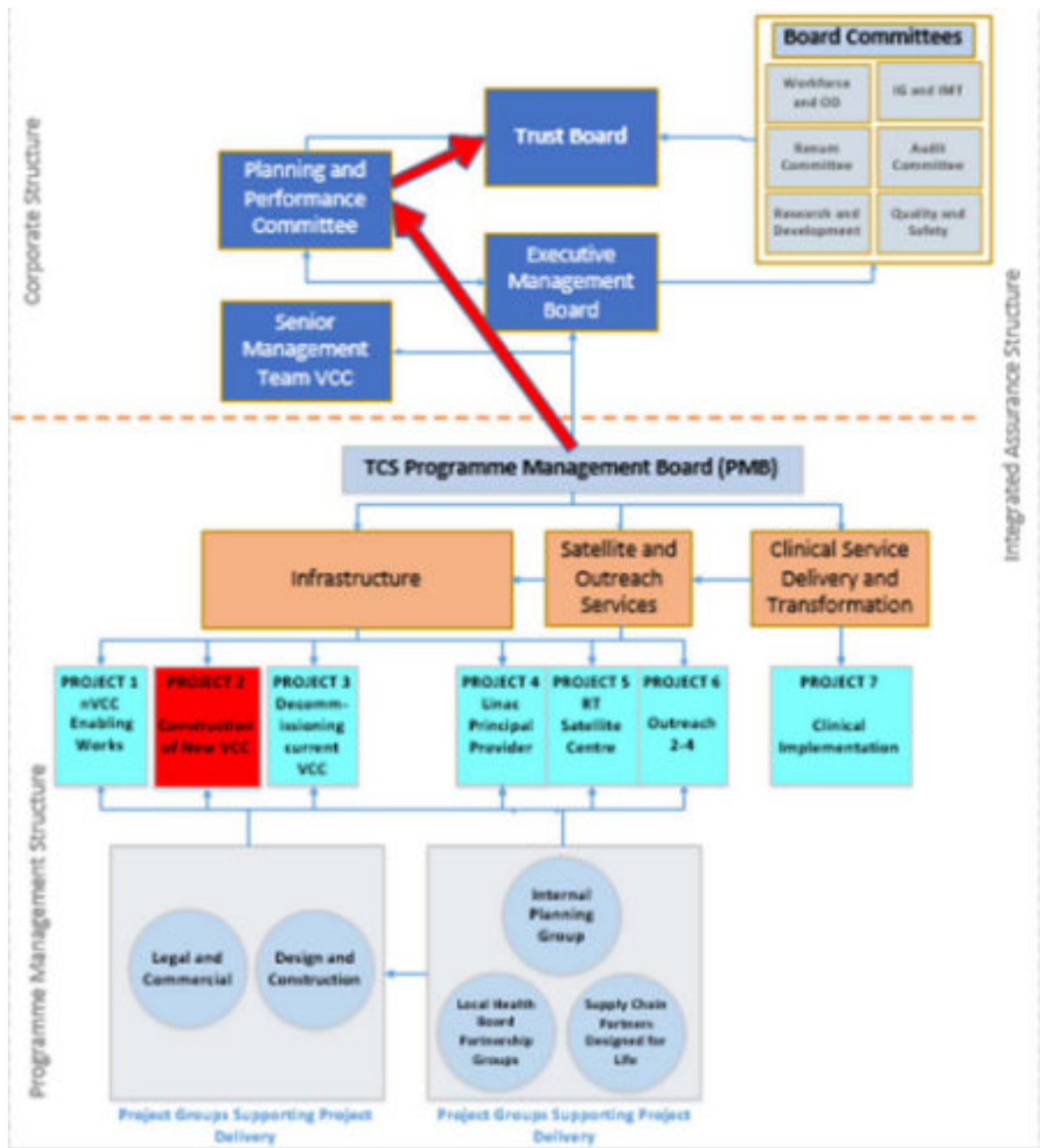
Programme assurance

6.3.4 The OGC Gateway Review Process examines Programmes and Projects at key decision points in their lifecycle. It is carried out by an independent expert team that assesses the delivery confidence of a Project or Programme. The process is mandated by Welsh Government for all major

Capital Projects or Programmes in the Public Sector in Wales. It applies fully to the nVCC project.

6.3.5 The TCS Programme has been subject to two Gate 0 reviews the most recent being in January 2017 which can be found in appendix PBC/MC/MC4. The Delivery Confidence Assessment for the TCS Programme was Amber/Green

6.3.6 The nVCC project 2 has also been subject to a Gate 2 review in January 2017, the delivery confidence assessment being Amber.

6.4 Project plan
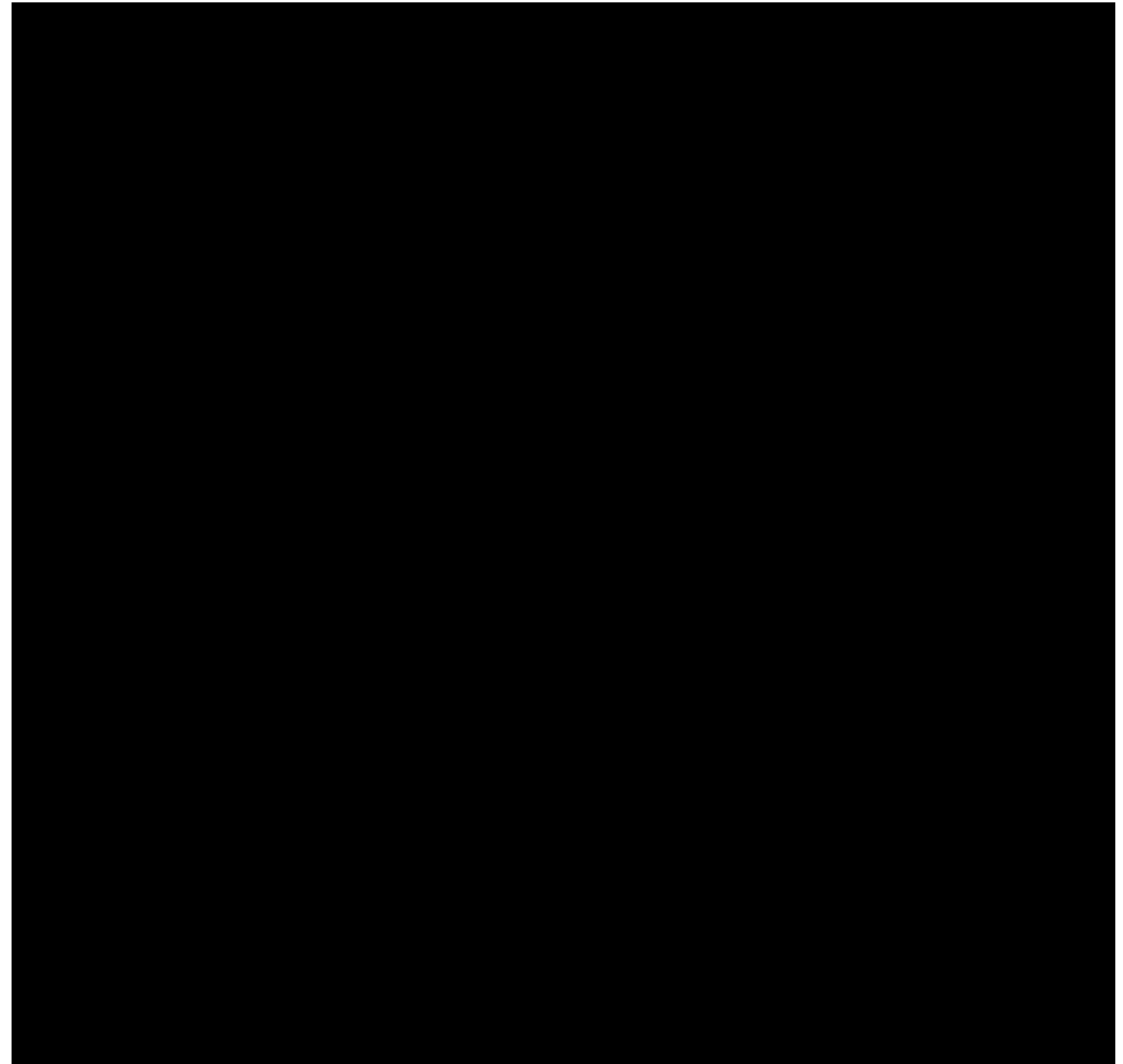
Transforming Cancer Services In South East Wales

Programme Business Case:

Strategic Case Section

STRATEGIC CASE

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1 ORGANISATIONAL OVERVIEW

Introduction

1.1.1 The purpose of this section is to:

- Provide an overview of Velindre NHS Trust and Velindre Cancer Centre (VCC);
- Outline VCC's role in delivering non-surgical specialist cancer services to the population of South East Wales;
- Summarise the performance of the Trust against key performance indicators; and to
- Analyse and benchmark the financial cost of service delivery.

Velindre NHS Trust

1.1.2 Velindre NHS Trust has evolved significantly since its establishment in 1994 and is operationally responsible for the management of the following two divisions:

- VCC; and
- Welsh Blood Service.

1.1.3 The Trust is also responsible for hosting the following organisations on behalf of the Welsh Government and NHS Wales:

- NHS Wales Informatics Service (NWIS);
- NHS Wales Shared Services Partnership (NWSSP); and
- The Technology Hub.

Velindre Cancer Centre

1.1.4 VCC is located in Whitchurch on the North-West edge of Cardiff and is one of the ten largest regional clinical oncology centres in the United Kingdom (UK Radiotherapy Equipment Survey, 2008) and the largest of the three centres in Wales.

1.1.5 Velindre is the sole provider of non-surgical specialist cancer services to the catchment population of 1.5 million across South East Wales, from Chepstow to Bridgend and from Cardiff to Brecon. VCC employs around 700 members of staff and has approximately 70 volunteers who provide a range of 'added value' roles across the centre.

1.1.6 VCC also works in partnership with a wide range of third sector and charity organisations to deliver high quality cancer care and undertake clinical research. Partners include:

- Voluntary sector;
- Third sector;
- Higher Education Institutions (HEIs); and
- Industry/Commercial Partners.

Cancer Services in Wales

1.1.7   The planning and delivery of cancer services in Wales is the responsibility of the seven Local Health Boards (LHBs) as part of their statutory responsibility to meet the health needs of the populations they serve. The LHBs are supported by the Welsh Health Specialist Services Committee (WHSSC) which commissions specialist cancer services on their behalf.

The seven Local Health Boards in Wales are:

- Aneurin Bevan University Health Board;
- Abertawe Bro Morgannwg University Health Board;
- Cardiff and Vale University Health Board;
- Hywel Dda University Health Board;
- Cwm Taf University Health Board;
- Betsi Cadwalader University Health Board; and
- Powys Teaching Health Board.

1.1.8   The LHBs also work in partnership with the All Wales Cancer Network, NHS Trusts, Community Health Councils, Voluntary Organisations and Public Health Wales.

Figure 1-1 – Map of Local Health Boards across Wales

The Cancer Pathway

1.1.9   The delivery of cancer services across Wales generally conforms to a well-defined pathway of care which includes the following five key stages:

Cancer Prevention: Enhancing public awareness and education to make informed decisions about lifestyle choices that promote a healthy, cancer free population.
Cancer Diagnosis: Cancer can be identified through a National Screening Programme or where cancer symptoms are identified by the patient/health care professional. If cancer is suspected the patient is assessed by a multi-disciplinary team in the Health Board (often supported by VCC staff) and cancer may be diagnosed.
Treatment: The treatment options for every patient are discussed and considered by multi-disciplinary teams (MDTs). The treatment options include surgery, non-surgical treatment e.g. radiotherapy or systemic anti-cancer therapy (SACT), a combination of these or supportive care alone. Care often straddles organisational boundaries. The best treatment for the patient needs to reflect their priorities, wishes and fitness.
Recovery/Follow Up: Regular follow up appointments are important to monitor recovery, manage and reduce the after effects of treatment and to ensure any signs of cancer relapse/recurrence are identified at their earliest stage.
End of Life Care: Sadly, not all patients survive cancer – openness about the need to plan end of life care is essential. A focus on living and dying well, early identification of needs and access to fast, effective palliation are important to reduce distress for both the patient and their family.

1.1.10 Supporting patients to be independent, to be actively involved in decisions and to look after their health are essential at all stages. Clinical needs can vary between different patients and for the same patient at different stages of their illness. Communication skills for staff are essential in supporting patient care. Quality and safety are critical at all stages and in all locations. The planned care pathway needs to be supported by access to high quality and safe unscheduled care i.e. at times of acute complications of cancer, its treatment or management of previously undiagnosed cancer, wherever and whenever these occur.

Scope of Service Provision

1.1.11 VCC is responsible for the delivery of non-surgical treatment, recovery, follow-up and end of life care. Following specialist cancer treatment VCC supports patients during their recovery and through follow up appointments. A significant proportion of outpatient activity and systemic anti-cancer therapy are already delivered in LHB settings by VCC staff. All radiotherapy activity is performed at VCC. VCC also provides specialist palliative care services for patients requiring palliative and end of life care.

Services Provided by VCC

1.1.12 Specialist teams provide care using a well-established network multi-disciplinary team (MDT) model of service for oncology and palliative care, working closely with local partners and ensuring services are offered in appropriate locations in line with best practice standards of care.

1.1.13 The range of services delivered by VCC includes:

- Radiotherapy;
- Systemic Anti-Cancer Therapies (SACTs);
- Inpatients;
- Ambulatory care
- Outpatient services;
- Pharmacy;
- Diagnostics (specialist radiology);
- Radiology and Nuclear Medicine
- Specialist palliative care;
- Acute Oncology Service (AOS);
- Living with the impact of cancer;
- Education and Learning; and
- Research, Development and Innovation.

1.1.14 Of these the following patient services are delivered away from VCC in LHB settings:

- SACT delivery;
- Outpatient reviews;
- Inpatient reviews;
- Health Board MDTs; and
- Research and Education.

Referral route for patients to the VCC

Cancer Diagnosis: Cancer can be identified through a National Screening Programme or where cancer symptoms are identified by the patient/health care professional. If cancer is suspected the patient is assessed by a multi-disciplinary team in the Health Board (often supported by VCC staff) and cancer may be diagnosed.

Supporting patients to be independent, to be actively involved in decisions and to look after their health are essential at all stages. Clinical needs can vary between different patients and for the same patient at different stages of their illness. Communication skills for staff are essential in supporting patient care. Quality and safety are critical at all stages and in all locations. The planned care pathway needs to be supported by access to high quality and safe unscheduled care i.e. at times of acute complications of cancer, its treatment or management of previously undiagnosed cancer, wherever and whenever these occur.

Patient activity at the VCC

1.1.15 Patient activity has continued to increase over recent years and during 2016/17 there were approximately:

- 60,000 outpatient attendances;
- 2,000 inpatient admissions;
- 60,000 radiotherapy attendances; and
- 25,000 SACT attendances.

Current performance of VCC

1.1.16 The Trust has developed a wide range of measures which are routinely used to monitor the quality and performance of core services provided by VCC. Table 1-1 summarises the Trust's performance over the last four years.

Table 1-1: *Trust performance*

Performance metric		Target	13/14	14/15	15/16	16/17
Radiotherapy	% of patients commencing radical Radiotherapy within 28 days	98%	98%	95%	98.5%	98%
	% of patient commencing palliative Radiotherapy within 14 days	98%	97.5%	95%	98.5%	99%
	% of patient commencing emergency Radiotherapy within 2 days	100%	100%	99%	100%	100%
	Linac Up-time	95%	n/a	96%	95%	98%
SACT	% of patients commencing non-emergency chemotherapy within 21 days	98%	95%	98%	99%	99%
	% of patients commencing emergency chemotherapy within 5 days	100%	99%	95%	100%	100%
	Death within 30 days of Chemotherapy rates	<2%	N/A	N/A	1.5%	2%
Outpatient	% of Outpatients seen within 20 mins	n/a	n/a	43.5%	49%	50.2%
	% of Outpatients seen within 60 mins	n/a	n/a	79%	88%	87.2%
	% of Outpatients seen within 90 mins	n/a	n/a	87%	96%	96%
Workforce	VCC Sickness absence rate	3.5%	3.4%	3.6%	4.1%	3.7%
Infection, Prevention & Control	No. of Velindre acquired infections – MRSA	0	2	0	0	0
	No. of Velindre acquired infections – MSSA	0	6	2	5	2

	No. of Velindre acquired infections – C.Difficile	0	14	8	3	1
	No. of Velindre acquired Pressure Ulcers	0	13	12	19	30
	Hand hygiene compliance – Inpatient areas	95%	98%	93%	81%	82%
	Hand hygiene compliance – Non-inpatient areas	95%	82%	77%	88%	85%
Patient Experience	% of patients overall experience rated 9 or above	>80%	N/A	N/A	85%	85%

1.1.17 The data demonstrates that the Trust performs well against the majority of core performance targets. In summary during 2016/17:

- The Trust achieved its target of seeing 100% of people referred for emergency Radiotherapy within two days;
- The Trust achieved its waiting time targets for people referred for radical and palliative Radiotherapy;
- The Trust achieved its waiting time targets for emergency and non-emergency SACT;
- The Trust reported zero cases of MRSA; and
- 85% of patients rated their overall experience of services as being nine out of ten and above.

Benchmarking of VCC performance

1.1.18 The Trust, during 2016, benchmarked the performance of core services delivered by VCC with a number of leading cancer service providers from across the United Kingdom (UK). Whilst benchmarking data is routinely captured for many sectors of the health service, there is a lack of easily accessible data for tertiary cancer services. The Trust therefore had to develop and adopt a varied approach using the following sources:

1. CHKS 'Icompare' benchmarking framework; and
2. VCC cancer services comparison framework.

1.1.19 **1 - CHKS 'Icompare' benchmarking framework:** This externally hosted and validated benchmarking service provided the Trust with access to performance data from Abertawe Bro Morgannwg University Health Board, Betsi Cadwaladr University Health Board, The Christie NHS Foundation Trust, The Clatterbridge NHS Foundation Trust and The Royal Marsden NHS Foundation Trust. The outputs from this analysis are summarised in Table 1-2:

Table 1-2: Benchmarking of Inpatient and Outpatient Services

Icompare Benchmarking Data Reporting Range Inpatient data: 2013/14 Outpatient data: 2014/15		VCC	Peer Site 1	Peer Site 2	Peer Site 3	Peer Site 4	Peer Site 5
Inpatient	Mortality Rate (%)	3.2%	3.1%	2.8%	4.3%	6.5%	5.4%
	Average Length of Stay (days)	5.9	5.0	7.3	6.3	7.2	7.8
Outpatient	Outpatient DNA Rates (%)	5.5%	2.8%	4.1%	2.1%	4.5%	5.0%

Note: To comply with data confidentiality agreements all of the benchmarking data has been anonymised and each organisation is referred to as a 'peer site'.

1.1.20 The results demonstrate that VCC performs well against the identified peer sites. In summary:

- Velindre inpatient mortality rate (3.2%) was lower than recorded by three of the five peer sites and comparable with peer site 1 (3.1%) and peer site 2 (2.8%).

- Velindre inpatient average length of stay (5.9 days) was lower than recorded by four of the five peer sites.

- Velindre outpatient DNA rates (5.5%) were higher than recorded by all five peer sites. However, due to the method of data collection, Velindre DNA rate includes patient cancellations which distort and inflate the Velindre DNA rate. Velindre is therefore currently working to refine the method of data collection so that a more accurate figure can be provided.

1.1.21 **2 – VCC cancer services Comparison Framework:** Developed by VCC the framework captured a range of Radiotherapy and SACT performance data from four leading cancer service providers, the four providers being:

- The Beatson West of Scotland Cancer Centre;
- The Clatterbridge Cancer Centre NHS Foundation Trust;
- Leeds Teaching Hospital NHS Trust; and
- The Royal Marsden NHS Foundation Trust.

The outputs from this analysis are summarised in Table 1-3.

Table 1-3: Radiotherapy and SACT Benchmarking Data

Cancer Services Comparison Toolkit Data Range – 2015/16 (unless stated)		VCC	Peer Site A	Peer Site B	Peer Site C	Peer Site D
Radiotherapy	Access to Radical RT treatment within 28 days (%)	95%	92%	100%	N/A	80%
	Access to Palliative RT within 14 days (%)	95%	65%	100%	N/A	87%
	Access to Emergency RT within 2 days (%)	99%	61%	100%	N/A	N/A
	Average number of patients per hour	3.7	4	3.5 – 4	4	4
SACT	Death within 30 days of Chemotherapy (%)	1.5 – 2%	n/a	N/A	N/A	N/A
	On the day waiting times (within 30 mins) (%)	73% - 88%	71.5%	N/A	N/A	N/A
	On the day waiting times (within 45 mins) (%)	87% - 99%	88.2%	N/A	N/A	N/A

Note: N/A – data was not available.
Note: To comply with data confidentiality agreements all of the benchmarking data has been anonymised and each organisation is referred to as a 'peer site'.

1.1.22 The results above demonstrate that VCC performs well against the identified peer sites. An example of this is the Trust's strong performance against Radiotherapy waiting times. This is despite the fact that the majority of peer sites have access to dedicated Linac resilience capacity which enables them to 'flex' their service capacity in line with demand and to mitigate machine breakdowns and/or servicing requirements. VCC does not currently have access to a Radiotherapy service resilience machine.

Financial cost of delivering services

1.1.23 Alongside performance benchmarking the Trust has also benchmarked the financial cost of VCC service delivery against other comparable service providers in order to evaluate the relative efficiency of current Trust service delivery. The benchmarking costing exercise has been undertaken using the Trust's integrated activity, workforce and finance model, which has current and projected activity linked to fully absorbed costs.

1.1.24 The benchmarking costing exercise focussed on analysis of the following:

1. Unit cost benchmarking by core service; and
2. Total financial cost of service delivery by core service.

1.1.25 1 - **Unit cost benchmarking**: This benchmarking exercise included pay and non-pay costs before and after off-setting any third party income (c.£11m). All direct costs were identified by service area, following which all indirect and overhead costs were fully absorbed to arrive at a unit cost. Table 1-4 outlines the fully absorbed unit costs for four key service areas: Radiotherapy, SACT, Inpatients and Outpatients.

Table 1-4: Unit cost baseline analysis 2016/17

Service area	Unit	2016/17 (Before 3rd Party Income)	2016/17 (After 3rd Party Income)
Radiotherapy	Fractions	£158.63	£119.79
SACT	Attendances	£479.17	£361.84
Inpatients	Bed Days	£513.64	£387.87
Outpatients	Appointments	£127.73	£96.45

1.1.26 The derived unit costs above, both before and after adjusting for offsetting income has subsequently been compared to other peer group cancer centres, using NHS England Reference Costs for 2016/17. The comparisons are outlined in Table 1-5.

Table 1-5: Unit cost benchmarking 2016/17

Service area	2015/16 Cancer Centres (Lower Quartile)	2015/16 Cancer Centres (Upper Quartile)	2016/17 (Before 3rd Party Income)	2016/17 (After 3rd Party Income)
Radiotherapy	£119.68	£305.43	£158.63	£119.79
SACT	£262.91	£410.06	£479.17	£361.84
Inpatients	£505.31	£1530.80	£513.64	£387.87
Outpatients	£116.76	£209.98	£127.73	£96.45

1.1.27 The above analysis clearly indicates that the unit costs for key services within the Trust are in the lower quartile range when compared to other cancer centres apart from for SACT services.

1.1.28 **2 – Total financial cost of service delivery**: This analysis was undertaken to compare the actual total cost of VCC services with the other leading cancer centres from across the UK. The cancer peer group used in this analysis is outlined in Table 1-6.

Table 1-6: Cancer centre peer group

RA7	University Hospitals Bristol NHS Trust
RBV	The Christie NHS Foundation Trust
REN	The Clatterbridge Cancer Centre NHS Foundation Trust
RGT	Cambridge University Hospitals NHS Foundation Trust
RHM	University Hospital Southampton NHS Foundation Trust
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
RJE	University Hospital of North Staffordshire NHS Trust
RNJ	Barts and the London NHS Trust
RPY	The Royal Marsden NHS Foundation Trust
RYJ	Imperial College Healthcare NHS Trust
RR8	Leeds Teaching Hospital NHS Trust
RRK	University Hospitals Birmingham NHS Foundation Trust
RRV	University College London Hospitals NHS Foundation Trust
RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
RTH	Oxford University Hospitals NHS Trust
RWG	West Hertfordshire Hospitals NHS Trust

1.1.29 As part of this analysis an 'average' peer group unit cost was calculated and this average unit cost was then used to derive a total cost for each of the four services based upon VCC activity levels.

Table 1-7: Peer group average unit costs 2016/17

Service area	2015/16 Cancer Centres Average Costs	2016/17 Cancer Centres Average Costs
Radiotherapy	£212.55	£158.63
SACT	£336.48	£479.17
Inpatients	£1,018.06	£513.64
Outpatients	£163.37	£127.73

1.1.30 Applying the 2016/17 activity levels at VCC results in the following total comparative costs.

Table 1-8: Comparative total costs 2016/17

Service area	Unit	Activity Costed at Average Peer Group Costs 2015/16 (£000)	VCC Activity 2016/17 (Before 3rd Party Income)	VCC Activity 2016/17 (After 3rd Party Income)
Radiotherapy	Fractions	12,094	9,387	7,089
SACT	Attendances	7,656	11,448	8,645
Inpatients	Bed Days	12,501	6,505	4,912
Outpatients	Appointments	11,973	9,199	6,946
TOTAL		**44,224**	**36,539**	**27,592**

1.1.31 The above analysis highlights that VCC delivers its core services at a significantly lower total cost than the average peer group cost.

Chapter Summary:

- The planning and delivery of cancer services in Wales is the responsibility of the seven Local Health Boards.
- Velindre NHS Trust is responsible for the management of the VCC and the Welsh Blood Service.
- VCC is the sole provider of non-surgical specialist cancer services to the catchment population of 1.5 million across South East Wales.
- VCC performs well against the majority of core performance targets and when benchmarked against other cancer centres.
- The unit cost of service delivery by VCC is in the lower quartile compared to other cancer centres apart from for SACT services.
- VCC delivers its core services at a significantly lower total cost compared to other cancer centres.

2   STRATEGIC CONTEXT

Introduction

2.1.1   The purpose of this section is to:

- Outline the national context for healthcare developments in Wales;
- Provide an overview of how the Programme aligns with national strategies;
- Provide a description of the Trust's medium and long-term strategies; and to;
- Describe how the Programme will support delivery of both national and local strategies.

Strategic context in Wales

2.1.2   The Welsh Government has published a wide range of national strategies which provide the framework for the planning and delivery of public services in Wales. These are supported by a range of policies, frameworks and guidance which relate more specifically to health and social care.

Table 2-1: Figure Relevant National and UK Policies, Clinical Strategies and Guidelines

Social Services and Wellbeing (Wales) Act 2014 (consequential amendments) Regulations 2016	NHS Planning Framework 2017 to 2020	Doing Well Doing Better 2011	Well-Being of Future Generations (Wales) Act 2015	Working differently Working together 2017	The Francis Report
National Standards for the Rehabilitation of Adults with Cancer	Sustainable Development Charter	One Wales' One Planet 2009	The Andrews Report	Informed Health and Care – A Health and Care Strategy for Wales 2015	Delivery Plan for the Critically Ill
Together for Health	Social Services and Wellbeing (Wales) Act 2016	Cancer Delivery Plan 2016 to 2020	Delivering local Healthcare – Accelerating the Pace of Change	Carers Strategy for Wales	NICE Guidance

				NHS Wales Outcomes Framework and Measures Guidance 2016 to 2019	National Standards for Children with Cancer 2012
Prudent Healthcare	The South Wales Programme	Strategy for Older People	Radiotherapy Services in England 2012		
Cancer in Scotland: Radiotherapy Activity Planning 2011 to 2015	National Dementia Plan	Local Health Board Cancer Plans	National Advisory Radiotherapy Group Guidelines: 2012	Doing Well, Doing Better. Standards for Health Services	Radiotherapy Equipment Needs & Workforce Implications 2006 to 2016
Public Health Outcomes Framework for Wales 2016	Strategic Framework for Welsh Language in Health Social Care 2016 to 2019				

2.1.3   The core themes running through the strategic framework within NHS Wales are summarised as:

- Sustainability as the fundamental principle of public services;
- Putting citizens and patients at the centre of service design and delivery;
- Developing a new relationship with citizens and patients based upon the principles of prudent health and co-production;
- Providing services of the highest quality which meet the needs of individuals consistently;
- Improving the quality of services;
- Delivering outcomes which are comparable with the best elsewhere;
- Reducing all avoidable waste, harm and variation;
- Providing care at home or within the local community wherever and whenever possible;
- Using resources in a sustainable way;
- Treating people individually with dignity and respect;
- Ensuring that every Welsh pound is spent efficiently and effectively; and
- Providing a first class experience for everyone who uses services.

Strategic context in Wales

2.1.4   The following section will outline in detail how the TCS Programme is aligned to the following three National initiatives which are considered to be particularly relevant to the TCS Programme.

- Prudent Healthcare;
- Well-being of Future Generations (Wales) Act 2015; and
- Cancer Delivery Plan.

Prudent Healthcare

2.1.5 The principles of prudent healthcare provide a powerful framework to challenge and improve how healthcare is provided across NHS Wales. *Prudent Healthcare: Securing Health and Well-being for Future Generations* aims to address the challenges faced by rising costs and increasing demand, getting greater value for healthcare systems for patients by delivering healthcare that fits the needs and circumstances of patients and avoids wasteful care.

Figure 2-1 Principles of prudent healthcare

2.1.6 The Trust has ensured that the TCS Programme remains aligned with the '*prudent healthcare principles*' as summarised below.

Table 2-2: Prudent Healthcare: TCS Programme requirements

Prudent Healthcare Principle	To support this the TCS Programme will ensure that:
Public and professionals are equal partners through co-production	• An extensive engagement process is at the heart of the Programme enabling the future clinical service model to be designed around patient, public, and partner needs and the views and choices of patients are the organised principle for the delivery of care; • The relationship between patients, families, carers and clinicians and healthcare professionals is an equal and reciprocal one; and • The future clinical service model enables patients to be supported and empowered to take responsibility for their own health.
Care for those with the greatest health need first	• Patients have access to treatment in the most appropriate environments, ensuring that sufficient capacity is available to prioritise care for those with the greatest need; and • There is sufficient capacity, both in terms of physical infrastructure and through innovative ways of working within the future clinical service model, to enable the Trust to meet demand for services.
Do only what is needed and do no harm	• Patient safety is paramount and fundamental minimum standards of care will always be met; and • Patients have access to the most appropriate treatments at the earliest possible stage.

Prudent Healthcare Principle	To support this the TCS Programme will ensure that:
Reduce inappropriate variation through evidence-based approach	• VCC is part of an integrated network of services organised around a range of evidence-based pathways; and • There is equitable access to services for the population of South East Wales.

Well-being of Future Generations (Wales) Act 2015

2.1.7 The Well-being of Future Generations (Wales) Act 2015 sets out a range of overarching well-being goals and sustainable development principles to ensure that all public bodies act in a manner that the needs of the future generations are not compromised by the needs of the present. In particular it:

- Places a statutory duty on Public Service Boards and certain Public Bodies to improve the social, economic, environmental and cultural well-being of Wales; and
- Sets out a range of overarching well-being goals and sustainable development principles to ensure that all public bodies act in a manner that the needs of the future generations are not compromised by the needs of the present.

Figure 2-2 Overview of the Well-being of Future Generations (Wales) Act 2015

2.1.8 The duties set out in the act are integrated within the Trust's strategic priorities. This covers areas across all aspects of the Trust such as planning, risk management, workforce planning, performance management, financial planning and service delivery. An overview of the alignment between key VCC strategic priorities and how they support the Trust in making progress to achieve the Well-being goals is provided in the analysis below.

Figure 2-3 Well-being of Future Generations (Wales) Act alignment with TCS Programme priorities

2.1.9 As a critical strategic priority of the medium and long term strategies of VCC, the TCS Programme is underpinned by and supports the achievement of the Well-being of Future Generations goals.

Together for Health – Cancer Delivery Plan 2016 – 2020

2.1.10 The Welsh Government's '*Together for Health – Cancer Delivery Plan*' provides a clear strategy for cancer care in Wales and sets out the key drivers for improvement between 2016 and 2020:

- **Preventing cancer**: people to live a healthy lifestyle, make healthy choices and to minimise risk of cancer;
- **Detecting cancer earlier**: cancer is detected earlier where it does occur or recur;
- **Delivering fast, effective treatment and care**: people receive fast, effective treatment and care so they have the best chance of cure;

- **Meeting people's needs**: people are placed at the heart of cancer care with their individual needs identified and met so they feel well supported and informed, able to manage the effects of cancer;
- **Caring at the end of life**: people approaching the end of life feel well cared for and pain and symptom free;
- **Improving information**: providing improved analysis and information which is available at the right time to the right person; and
- **Targeting research**: to support improvements in cancer treatment.

2.1.11 The Cancer Delivery Plan sets out the key drivers for improvement between 2016 and 2020. It recognises the rate of progress made in cancer services over the past ten years and the excellence that exists in Wales. Notwithstanding this, the outcomes for cancer patients in Wales still fall short of those across Europe and the developed world in a number of tumour sites. In response, the Welsh Government has clearly stated that the NHS must accelerate the rate of improvement if Wales is to achieve the excellence it desires. Therefore, the NHS Wales and its partners are required to work to achieve:

- A reduction in cancer incidence;
- An improvement in patient outcomes; and
- The provision of high quality services which provide people living with and beyond cancer with a high quality of life.

Local context - Velindre's role in delivering the national vision for cancer services

2.1.12 VCC, as a specialist treatment centre, has a track record of delivering very good outcomes following treatment. However, and whilst the centre plays an important role in improving patient outcomes, through delivering fast and effective, evidence based treatment and care, the centre contributes to only a relatively small part of the system and patient pathway. In response, the Trust has an ambition to do more to integrate and support the public, patients and colleagues elsewhere in the patient pathway, including in the areas of prevention and early diagnosis, to improve outcomes for the population.

2.1.13 In order to do this in a systemic way, the Trust has been actively engaging with patients, families and carers, staff, LHBs and a wide range of partner organisations involved in the delivery of cancer services to better understand how to more fully contribute to the wider patient pathway. This has resulted in the development of a Velindre cancer strategy - '*Shaping our Future Together*'

(see Appendix OBC/SC/S1). The strategy sets a vision for cancer services for the next ten years.

> **Our Vision:**
>
> *We want to lead in the delivery and development of compassionate, individualised and effective cancer care to achieve outcomes comparable with the best in the world*
>
> **Our Mission:**
>
> *Providing the best care, with you, when you need us*

2.1.14 The Velindre cancer strategy and the TCS Programme both seek to place people at the centre of the conversation, identify what they value most from the services we provide now and how that may change in the future, and deliver it in the most efficient and effective manner.

2.1.15 The strategy identifies a number of strategic aims which will form the focus for the Trust over the coming years and which provides a clear direction and a desired future state which enables VCC to plan effectively over the coming years.

- **Strategic Aim 1:** Equitable and consistent care, no matter where;
- **Strategic Aim 2:** Access to state of the art, world-class evidence based treatment;
- **Strategic Aim 3:** Improving care and support for patients to live well through and beyond cancer;
- **Strategic Aim 4:** To be an international leader in research, development, innovation and education; and
- **Strategic Aim 5:** To work in partnership with stakeholders to improve prevention and early detection of cancer.

2.1.16 The strategy sets out a transformative path for the Trust and VCC which has two distinct elements. Firstly, the development and delivery of world class non-surgical tertiary oncology services in South East Wales. Secondly, the potential for adding value further upstream in the cancer pathway in the following areas:

- Public health: assisting to improve the health of the population and preventative elements of work; and
- Primary care: assisting in improving the accurate and timely detection, diagnosis and referral of patients.

Delivery of the Velindre Cancer service strategy

2.1.17 The Trust will actively pursue the delivery of the Velindre cancer strategy as part of its daily business and the strategy will be implemented through two primary mechanisms. Firstly, through the Trust's Integrated Medium Term

Plan (IMTP) (*See Appendix PBC/SC/S2*) and secondly through the TCS Programme.

2.1.18 Importantly, and whilst the Trust has established the Programme, it is clear that the TCS Programme must support the planning and delivery of services through the IMTP and not replace it. This is for one very simple reason; the challenges and opportunities facing the Trust are the same. However, the establishment of the TCS Programme will support the Trust in accelerating improvements within VCC and across the healthcare system more generally through partnerships with LHBs and the third sector.

2.1.19 In terms of the Programme of delivery is has been separated into two distinct phases:

- **Phase 1:** Improving non-surgical tertiary oncology services.This will include the provision of more care and treatment at home or within the local community, the development of a Radiotherapy Satellite Centre@, the provision of consultant oncologists working in local hospitals with multi-disciplinary teams on a planned daily basis and the development of a comprehensive acute oncology service across South East Wales; and

- **Phase 2:** Seeking to add further value across the whole pathway of services in relation to cancer. These include public health and prevention, early diagnosis and detection and the management of patients in acute settings. These are areas of work where VCC currently has some involvement in, working with partners, but where the Trust believes, subject to support from our partners, that we could support the system to improve further. For example, increasing awareness of healthy lifestyles and positive role-modelling, providing support to General Practitioners (GPs) to develop enhanced skills to detect cancer at the earliest opportunity and the provision of fast track diagnostic tests to aid early diagnosis.

  Important Note: The scope of the Programme Business Case relates to Phase 1 of the Programme only.

Conclusion

2.1.20 The TCS Programme is at the heart of the Trust's plans for the continued delivery of effective and efficient non-surgical specialist cancer services to the population of South East Wales and in achieving our mission to *'deliver the best quality of patient care, world class education and research which improves lives'*.

2.1.21 It is listed as a key strategic priority in both the Trust's Integrated Medium Term Plan (2017/18–2019/20) and within the Velindre cancer strategy. Furthermore the Trust's strategy and aims are underpinned by a number of other national strategies, in particular Prudent Healthcare, Well-being of Future Generations (Wales) Act 2015 and the Welsh Cancer Delivery Plan. The alignment of the TCS Programme to the national strategic context and direction of travel in

Wales will assist in the realisation of a wide range of benefits in the short, medium and long-term.

Figure 2-4 Strategic Context for the TCS Programme
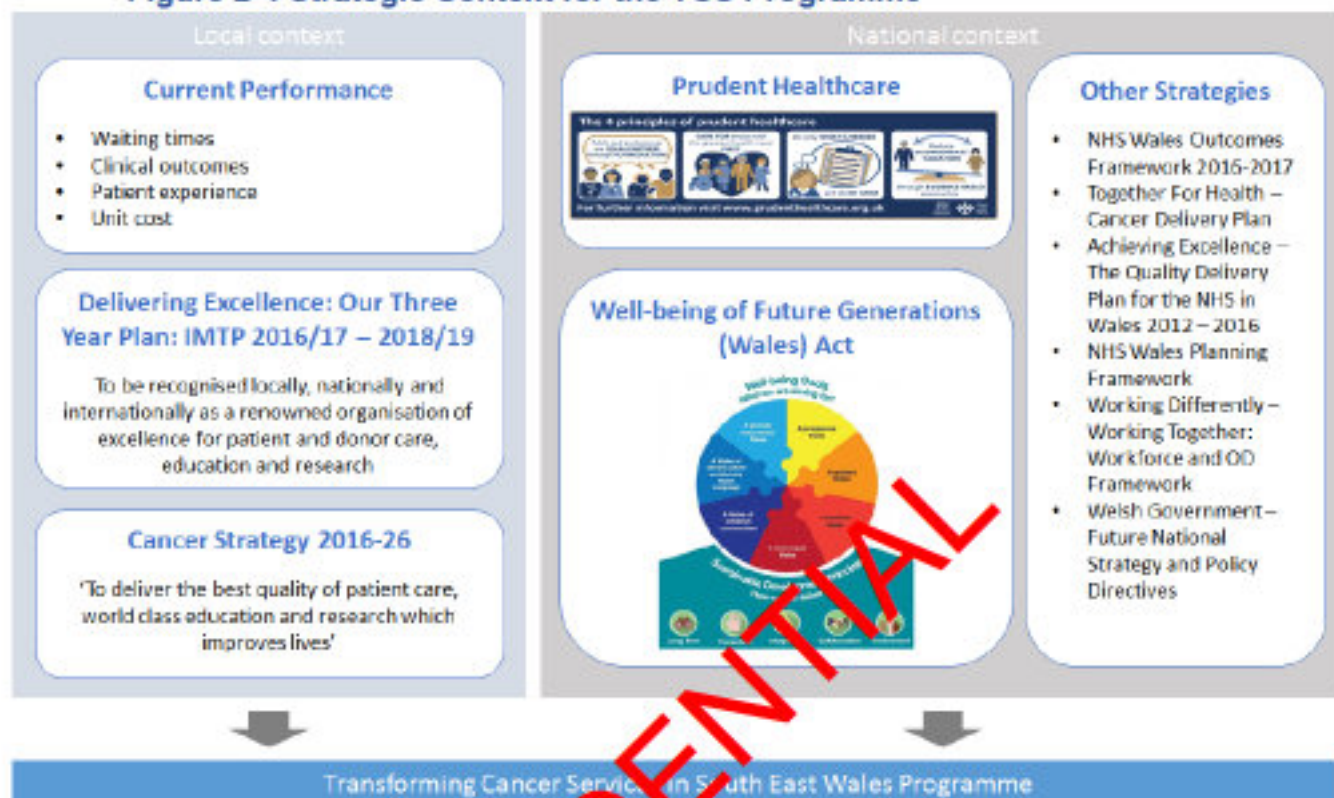
Chapter Summary:

- The TCS Programme is aligned to National healthcare strategies in Wales, including:
  - Prudent Healthcare;
  - Well-being of Future Generations (Wales) Act 2015; and
  - Cancer Delivery Plan.
- The Trust has developed a Velindre Cancer strategy which sets out a vision for cancer services over the next ten years.
- The Trust will implement the strategy through the Trust's IMTP and through the TCS Programme.
- The TCS Programme has been split into two distinct phases:
  - Phase 1: Improving non-surgical tertiary oncology services
  - Phase 2: Seeking to add further value across the whole pathway of services in relation to cancer
- **The scope of this Programme Business Case relates to Phase 1 of the overall TCS Programme only.**

3   EXISTING ARRANGEMENTS

Introduction

3.1.1   The purpose of this section of the business case is to:

- Describe the current service delivery arrangements for the services covered within the scope of the TCS Programme;
- Summarise existing service activity levels;
- Provide an overview of the existing workforce at VCC;
- Outline the cost of delivering services by VCC; and to
- Provide a description of the existing VCC estate.

3.1.2   Providing a summary of the current model of service delivery provides the baseline for identifying business needs and for measuring future improvements. The difficulties associated with existing arrangements are explored further in the Business Needs analysis in *Section 5*.

Current service delivery arrangements

3.1.3   The Trust delivers specialist non-surgical cancer services to a catchment population of 1.5million people using a hub and spoke service model. Services are currently provided across South East Wales from one of two main treatment locations:

- **VCC:** The hub of the Trust's specialist cancer services is a specialist treatment, training, research and development centre for non-surgical oncology; and

- **Outreach Centres:** Some services are delivered on an outreach basis within facilities across South East Wales, including District General Hospitals and from patients own homes.

3.1.4   Patients are referred to VCC for treatment by the following routes:

- Following referral by a GP to the relevant LHB; or
- Following presentation as an emergency at an A&E department.

3.1.5   Prior to referral to VCC, all patients will have been investigated and diagnosed with a solid tumour. Some patients may have already undergone surgery. VCC's role is to deliver specialist and tertiary cancer treatment until the patient can be referred back to their host LHB for ongoing treatment, management, and follow-up.

3.1.6   An overview of the core services delivered by the Trust and a summary of how they are currently organised between the VCC hub and on an outreach basis is provided in the table below.   A comprehensive description of services provided by VCC is provided within the Proposed Clinical Service Model in Section 6.

Table 3-1: Core services delivered by VCC

Service	Overview	VCC	Outreach
Outpatients	• Outpatient services include consultation, examination, follow-up, SACT assessment, phlebotomy, psychology, clinical trials, therapy services and specialist palliative care. • The laboratory service provides biochemistry, haematology/cross-matching and tumour marker services. It also supports clinical trials.	• The Outpatient department has 24 consultation rooms. • Outpatient clinics are held five days a week. • Outpatient clinics are distributed across morning and afternoon sessions.	• VCC delivers 17 outreach clinics per week across South East Wales in 10 locations. • Clinics are predominantly led by VCC clinicians with additional support provided by clinical nurse specialists and non-medical prescribers. • Many support services are provided by the hosting LHB.
Radiotherapy	• Radiotherapy services include radical, palliative and emergency planning and treatment, brachytherapy, chemo-radiotherapy and radiotherapy research. • Radiotherapy involves the delivery of carefully measured and distributed doses of radiation to treat cancer. The most common type of Radiotherapy uses beams of high-energy rays, usually x-rays. • Radiotherapy can be given as the sole modality or used as part of a treatment regime which may include other modalities such as surgery, hormone therapy or chemotherapy.	• The Radiotherapy department has 7 linear accelerators. • The Radiotherapy service is funded to provide services for 9.5 hours per day, 5 days per week. • The service provides an emergency service at weekends.	• There is currently no outreach provision of Radiotherapy.

Service	Overview	VCC	Outreach

SACT	• SACT service covers a range of biological therapies and cytotoxic chemotherapies, including number of ambulatory care procedures related to SACT.
	• SACT services include:
	  o Intravenous, oral and subcutaneous treatments;
	  o Research including early and late phase trials; and
	  o Stratified, targeted and personalised treatments and vaccine therapies.
		• SACT treatments are delivered from 18 chairs across two units.
		• The SACT service operates Monday to Friday between 09:00–17:00 hrs.
			• VCC delivers outreach SACT clinics from various locations, including homecare, across South East Wales.
			• There are various operating hours across the week.

Inpatients	• Inpatient services cover elective and non-elective admissions including:
	  o Elective SACT admissions;
	  o Toxicity management of SACT;
	  o Outpatients requiring hydration prior to treatment; and
	  o Patients receiving Radiotherapy and SACT treatments.
		• VCC has access to 47 inpatient beds.
		• The inpatient service operates a 7 day/24 hour service.
			• There is currently no outreach provision of Inpatient care.

Current activity levels

3.1.7 An analysis of current activity levels for core services is provided below. This is based on activity levels during 2016/17 which is the most recent data available at the time of Business Case submission.

Table 3-2: Activity levels (2016/17)

Service	Type of activity	VCC	Outreach	Home	Total
Radiotherapy	Courses	3,815	-	-	3,815
	Fractions	51,915	-	-	51,915
SACT	Attendances	14,659	7,893	-	22,552
Inpatients	Admissions	2,008	-	-	2,008
	Bed days	10,391	-	-	10,391
Outpatients	Attendances	53,277	15,967	-	69,244

Current VCC workforce

3.1.8 The VCC workforce is largely based at the cancer centre, in addition to which some deliver services from outreach locations and in patients' own homes. In total, VCC currently employs around 700 members of staff. An analysis of 2016/17 staff establishment is provided in the table below.

Table 3-3: Staff establishment (2016/17)

Staff Group	2016/17
Administration and Trust-wide services	201.1
Allied Health Professionals	25.2
Medical	67.4
Medical Physics	55.3
Nursing	167.9
Pharmacy	45.5
Radiography	108.9
Total	671.3

3.1.9 The majority of the workforce is female (79%), approximately 37% of whom work part time. The age profile of the workforce is increasing in line with other NHS Wales organisations. In 2015 the average age of the workforce was 42.6 compared to the NHS Wales average of 44.0.

3.1.10 During 2016/17, staff turnover was around 9% and traditionally, VCC has experienced few recruitment challenges. However, there are a number of highly specialised posts where future recruitment could become more challenging. This includes the following professions:

- Medical and clinical oncology;
- Medical physics; and
- Pharmacy.

Current cost of delivering services

3.1.11 The cost of delivering service delivery during 2016/17 was approximately £30m. A summary analysis of this is provided in the table below.

Table 3-4: Cost of delivering services 2016/17 (£'000)

Cost category	2016/17
	£000
Pay	28,000
Non Pay	12,600
Gross service running costs	**40,500**
Offsetting income	-11,000
Net Service Running Costs	**29,600**

Current assets

3.1.12 VCC was built in 1956 and in the intervening period has been subject to extension and redevelopment. It consists of traditional build, single and two storey accommodation. The current site plan is provided below.

Figure 3-1 Current site plan

Velindre Cancer Centre
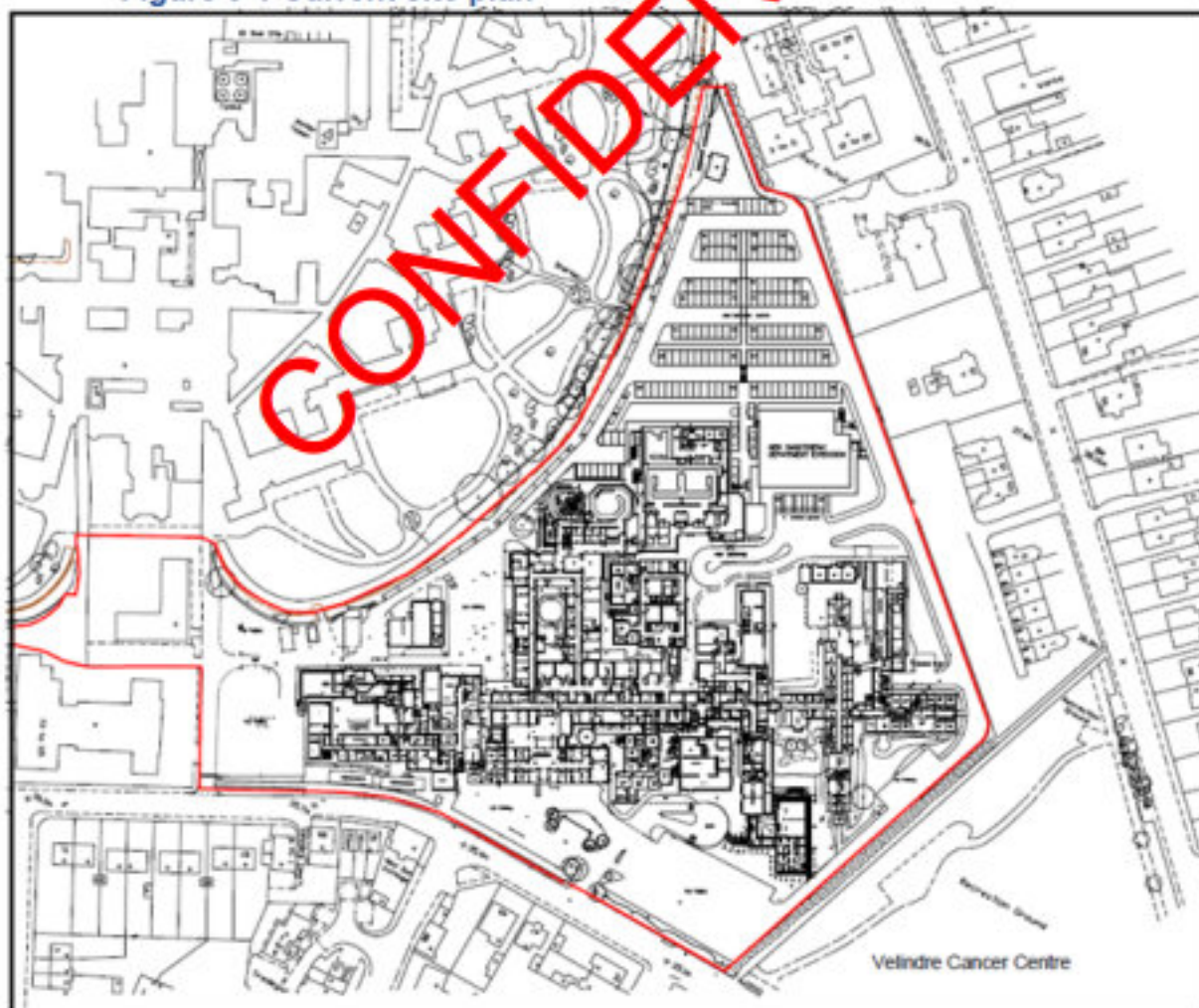
3.1.13 Approximately 30% of the estate pre-dates 1964 in terms of its construction. This is evident in the value of current backlog maintenance recently recorded in the all Wales Estate Facilities Performance Management System (EFPMS). The definition of condition in terms of backlog can be identified as:

- **Condition A:** as new and can be expected to perform adequately to its full normal life;
- **Condition B:** sound, operationally safe and exhibits only minor deterioration;
- **Condition C:** operational but major repair or replacement is currently needed to bring up to condition B;
- **Condition D:** operationally unsound and in imminent danger of breakdown; and
- **Condition X:** supplementary rating added to C or D to indicate that it is impossible to improve without replacement.

Table 3-5: Backlog maintenance position (as at July 2016)

Measure	Unit	Cost (£)
Cost to eradicate High Risk Backlog	£	22,500
Cost to eradicate Significant Risk Backlog	£	921,194
Cost to eradicate Moderate Risk Backlog	£	467,891
Cost to eradicate Low Risk Backlog	£	1,014,830
Risk Adjusted Backlog Cost	£	970,900
Cost to achieve Physical Condition B	£	2,503,953
Percentage of total occupied floor area in physical condition C plus D	%	10.70
Cost to achieve Statutory Health and Safety Compliance Standard B	£	302,119
Cost to achieve Fire Safety Compliance Standard B	£	345,220
Percentage of patient occupied floor area not in Statutory Health and Safety compliance	%	8.50
Percentage of patient occupied floor area not in Statutory Fire Safety compliance	%	9.50
Property Cost to achieve compliance with disability discrimination standards	£	207,410

3.1.14 From the previous EFPMS submission, the cost to eradicate high risk and significant risk backlog has increased. This is due to the moderate risk backlog costs reducing, but slipping into the higher risk category. Over 90% of the Estate fire safety is being managed within category B and is in a very similar position as the previous year. However, Risk Adjusted Backlog has risen by 32% from the previous year due to updated condition surveys recently completed.

3.1.15 In general terms the estimated cost to achieve overall Physical Condition B has increased to £2.5m from £735k in 2012/13, representing a 240% increase.

Conclusion

3.1.16 This section of the PBC has provided an overview of the existing arrangements for the provision of specialist non-surgical cancer services across South East Wales. This provides a baseline against which the business needs can be compared and informs the spending objectives which provide the basis for establishing the areas requiring improvement.

Chapter Summary:

- The Trust delivers specialist non-surgical cancer services to a catchment population of 1.5million people using a hub and spoke service model.
- Velindre delivers services at the VCC, from outreach locations and in patients' own homes.
- In total, VCC currently employs around 700 members of staff.
- The cost of delivering service delivery during 2016/17 was £30m.
- Approximately 30% of the estate pre-dates 1964 in terms of its construction.
- The cost to eradicate high risk and significant risk backlog across the VCC estate has increased significantly over recent years.

4 BUSINESS NEEDS

Introduction

4.1.1 The purpose of this section is to:

- Describe why change at scale (i.e. at system level and taking a Programme approach) is required if cancer services are to meet the future needs of our patients in South East Wales; and to
- Set out the strategic and local drivers that shape the rationale for transforming VCC cancer services.

The case for change

4.1.2 The case for change is shaped around both national and local strategic drivers.

4.1.3 The **national strategic drivers** set out the key factors influencing the need to drive step change through this Programme. The national strategic drivers can be summarised through the following themes:

- Improving patient outcomes;
- Increasing demand for cancer services; and
- Improving the quality of services we deliver.

4.1.4 The **local strategic drivers** identify the current service limitations and how they adversely affect the Trusts ability to deliver the required changes in service. The local strategic drivers can be summarised through the following themes:

- Need to meet forecast future demand;
- Limitations of the existing service model; and
- Deficiencies in the current infrastructure.

4.1.5 Each of the national and local strategic drivers are explored in detail over the following sections.

Improving patient outcomes

Overview

4.1.6 There are a number of national and regional factors driving the need to continue to improve clinical outcomes for patients in Wales. These factors are explored in detail in the subsequent three sections and include:

- Cancer is a major cause of deaths in Wales;
- Cancer outcomes in Wales are relatively poor; and
- There are variations in cancer survival rates across Wales.

Cancer is a major cause of death in Wales

4.1.7   Despite the significant progress made in preventing and treating the cancer, the number of deaths associated with continues to rise. Cancer causes 1 in 4 of all deaths within the United Kingdom with more than 75% of deaths occurring in people aged 65 and over.[1]

4.1.8   There were 529,655 deaths registered in England and Wales in 2015, an increase of 5.6% compared with 2014.[2] Cancer was the most common broad cause of death (28% of all deaths registered) followed by circulatory diseases, such as heart disease and strokes (26%).

Figure 4-1 Number of deaths and total population, England and Wales, 1995 to 2015[3]

4.1.9   In Wales, Macmillan Cancer Support estimated that approximately 9,000 people died from cancer in 2013.[4] This has a devastating effect on individuals, families, communities and the economic and social fabric and well-being of the country. [5]

Table 4-1: Number of people who die from cancer in Wales (2013)

Every Day	Every Week	Every Month	Every Year
25	170	750	9,000

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[1] All Cancers Combined, Cancer Research UK, April 2013.

[2] http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsregistrationsummarytables/2015.

[3] https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/provisionalanalysisofdeathregistrations/2015.

[4] http://www.macmillan.org.uk/documents/aboutus/research/keystats/statisticsfactsheet.pdf.

[5] http://www.macmillan.org.uk/Fundraising/Inyourarea/Wales/Wales.aspx#DynamicJumpMenuManager_2_Anchor_2.

Cancer outcomes in Wales are relatively poor

4.1.10 Despite recent and sustained improvements in Wales, the clinical outcomes for cancer patients compare unfavourably with other countries. In short a patient who is diagnosed within cancer in Wales is less likely to survive than if they were diagnosed with cancer in England, Scotland or Ireland. For   example, Wales has:

- The lowest one and five year survival rates in the United Kingdom (UK) for lung cancer;
- The lowest one and five year survival rates in the UK for breast cancer; and
- The lowest one and five year survival rates in the UK for colorectal cancer.

4.1.11 The difference is even starker when comparing outcomes with other countries within the wider western world. Wales has the lowest one and five year survival rates for colorectal, lung, breast and ovarian cancers compared with those in Australia, Canada, Denmark, Norway, and Sweden.   Further   analysis   of international survival rates are provided in Table 4-2.

Table 4-2: One and five year cancer survival rates by nation

Breast Cancer: 1 year survival rates

Breast Cancer: 5 year survival rates

Ovarian Cancer: 1 year survival rates

Ovarian Cancer: 5 year survival rates
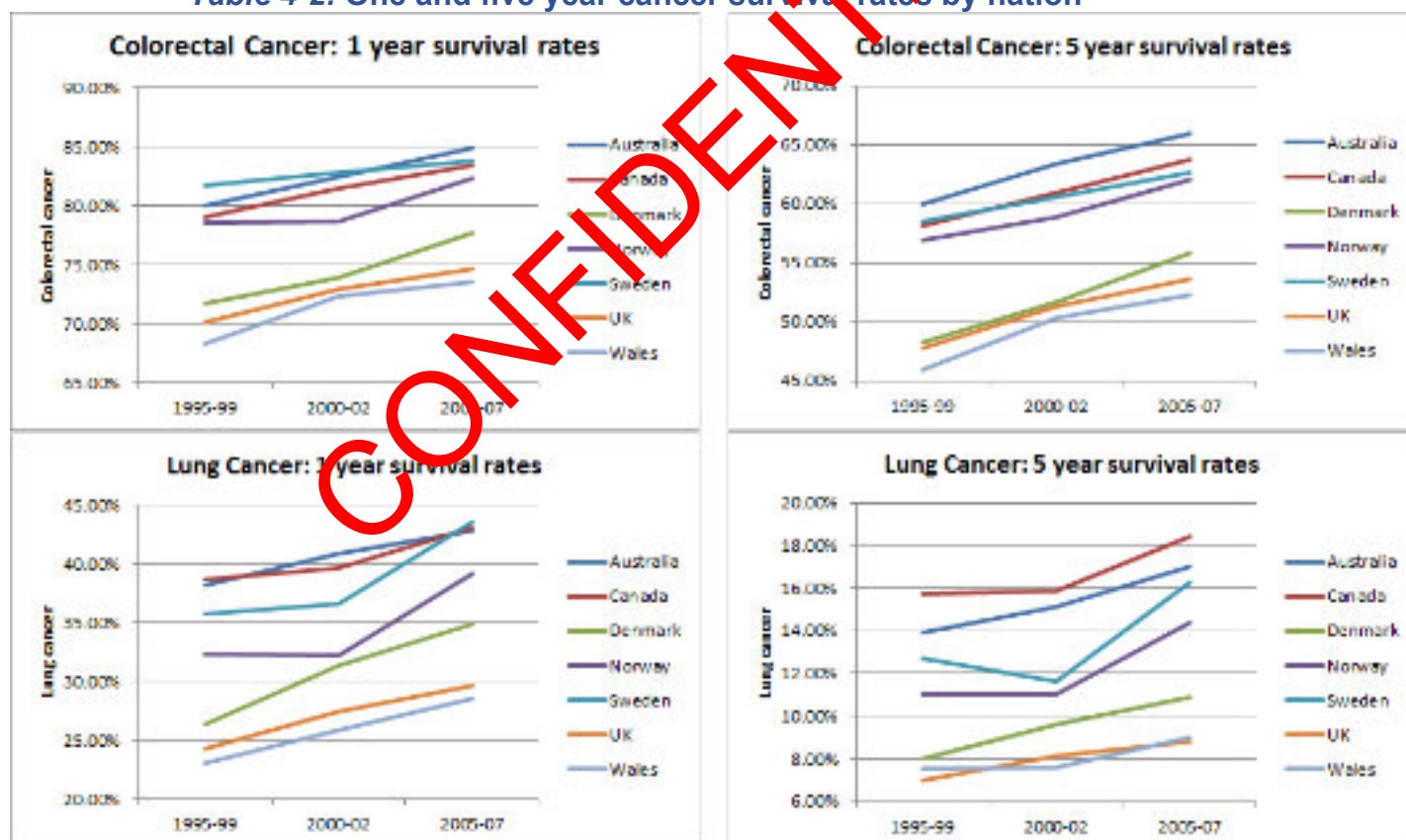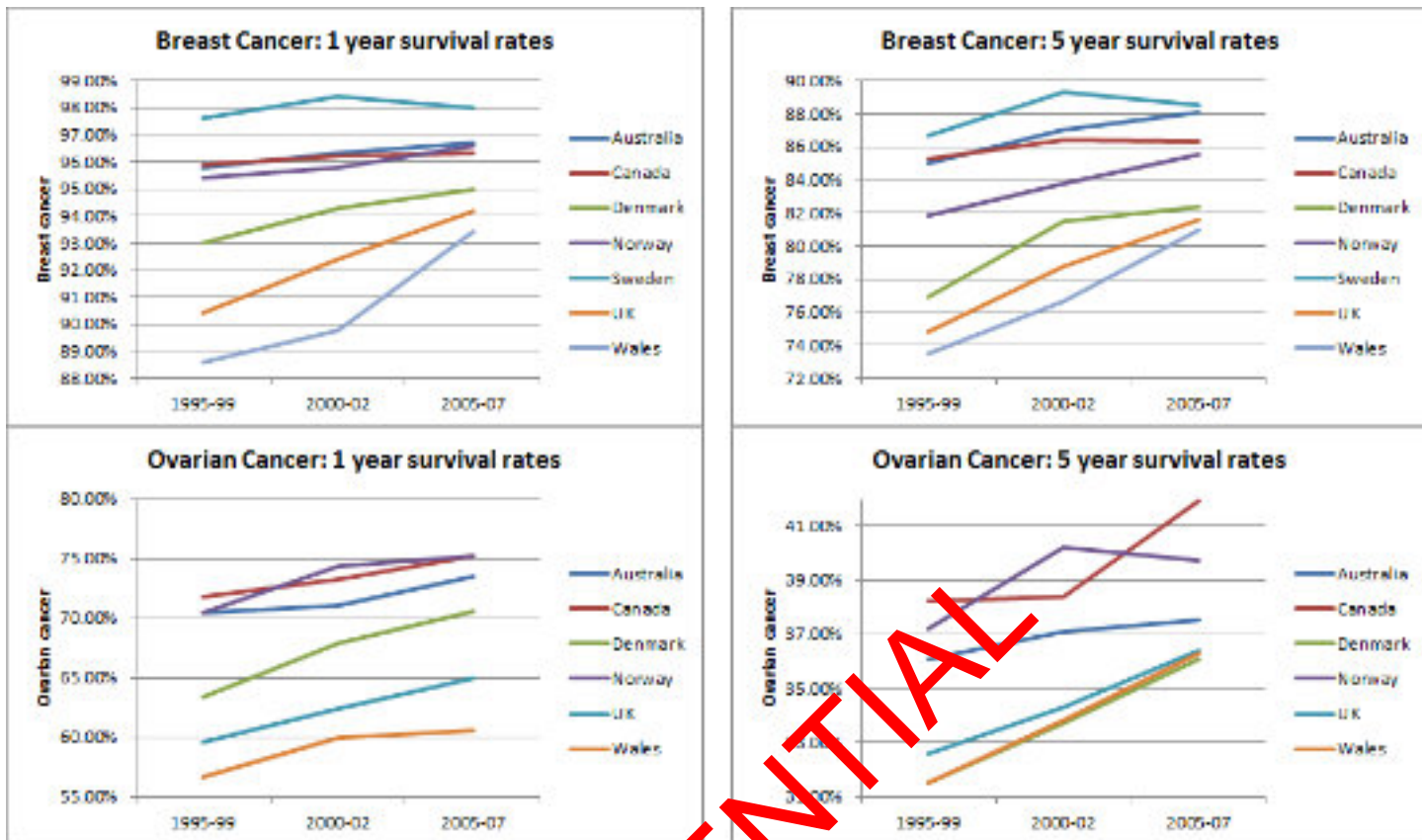
4.1.12 There are a multitude of reasons for the variation in outcomes across countries. These include factors which are considered to be outside of the system's control such as epidemiology. However, there are a number of factors that can be directly influenced by the system. The International Cancer Benchmarking Partnership identifies several factors that impact on the UK's performance when compared to better performing countries including:

- Cancers are typically diagnosed at a later stage in the UK than in comparator countries, and
- The variation in survival by stage and the lower survival for advanced stage disease when compared to other countries suggests that there is inequality in access to optimum treatment in the UK.

There are variations in cancer survival rates across Wales

4.1.13 At a service level, the clinical outcome measure considered to most appropriately reflect the impact and effectiveness of treatment is five-year survival post treatment, although this does vary by tumour site. This measure reflects the effectiveness of definitive treatment with the aim of improving survival or to control the progression of cancer.

4.1.14 Table 4-2 and Figure 4-3 demonstrate that while survival rates have improved, there continues to be a variation in survival rates between Local Health Board (LHB) populations.

Table 4-3: All cancers survival rates local comparison

All Cancers	Cwm Taf	Aneurin Bevan	Cardiff & Vale	Powys	ABM	Hywel Dda	Betsi Cadwa'dr
5 year survival							
1994-1998	37.4%	40.9%	43.2%	47.0%	43.0%	44.5%	43.1%
2004-2008	49.1%	52.9%	55.2%	55.9%	51.8%	54.1%	54.0%
2005-2009	50.4%	53.9%	56.1%	57.5%	52.9%	55.2%	55.0%

4.1.15 Of particular concern is the fact that between 2001 and 2014[6] the gap in incidence and mortality between the least and most deprived socio-economic groups is widening in Wales.

- The gap in one and five-year-year survival between the least and most deprived areas of Wales has increased;
- Cwm Taf has the lowest one-year and five-year survival of all health boards and Powys has the best one-year and five-year survival;
- The gap in five-year survival between the least and most deprived areas has widened for bowel cancer; and
- The gap between high lung cancer incidence rates in the most deprived areas and lower incidence in the least deprived widened.

Figure 4-2 Change in one year relative survival by health board in Wales
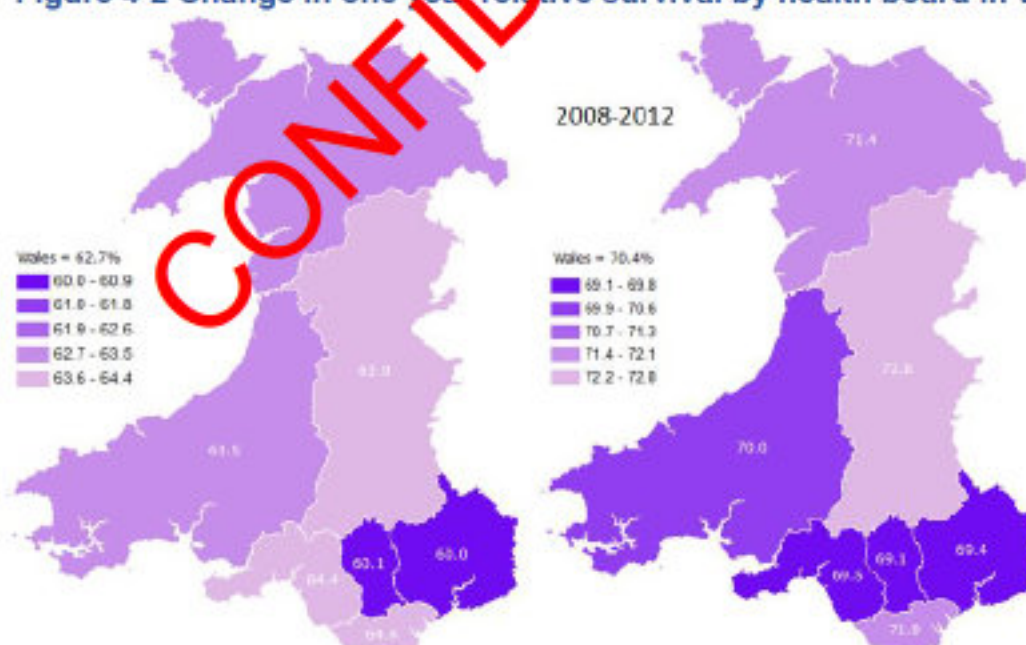
Welsh Cancer Intelligence and Surveillance Unit – Population cancer incidence, prevalence, survival and mortality in Wales and the catchment population of VCC (August 2015)

4.1.16 The variations in survival rates between LHBs suggest that there are variations across Wales in terms of the impact and effectiveness of cancer treatments.

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[6] WCISU (2016) Population cancer incidence, mortality and survival with latest 2014 update data.

This is likely to be related to inequalities in the speed of diagnosis, access to optimal treatments and individuals' take up of treatments. One possible explanation is the variable provision of local services across LHBs as there is a range of evidence which indicates that distance and travel time required to attend appointments are key factors affecting patients' ability to access optimum treatments, particularly in relation to Radiotherapy services.[7]

Summary – Improving patient outcomes:

- Cancer causes one in four of all deaths within the UK and in 2015 was the most common cause of death accounting for 28% of all deaths registered;
- Clinical outcomes for cancer patients in Wales compare unfavourably with other countries;
- Wales has the lowest one and five year survival rates in the UK for lung, breast and colorectal cancers;
- Wales has the lowest one and five year survival rates compared to Australia, Canada, Denmark, Norway, and Sweden for colorectal, lung, breast and ovarian cancers; and
- There is significant variation in survival rates between LHB populations.

Increasing demand for cancer services

Overview

4.1.17 Growing demand for cancer services and changes to the way in which services are delivered has increased pressure on services. The Trust has largely mitigated this by maximising utilisation and exploring new ways of working, including extending opening hours and implementing different staffing models. This meant that in 2016/17 the Trust achieved or exceeded waiting time targets for cancer patients.

4.1.18 However, demand is continuing to grow at an accelerated rate. There are a number of factors influencing this including:

- Increasing incidence of cancer;
- Health and non-health determinant factors;
- Increasing complexity and demand for Radiotherapy services;
- Increasing complexity and demand for Systemic Anti-Cancer Therapies;
- Improving access to Radiotherapy services;
- More people are living with cancer; and
- Co-morbidities of patients.

4.1.19 Each of these drivers is explored in the following sections.

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[7] Mackillop WJ et al J Clin Onc 1997 15 (3) 1261-1271 Does a centralised Radiotherapy system provide adequate access to care?; Rinaa S et al in J Rad Onc Biol Phys 2006 66 (1) 56-63 Effect of distance to radiation treatment facility on use of radiation therapy after mastectomy in elderly women ; Jones AP et al Europ J Cancer 2008 992-999 Travel time to hospital and treatment for breast, colon, rectum, lung, ovary and prostate cancer; Tyldesey S and McGahan C Clin Onc 2010 22 (7) 526-532 Utilisation of Radiotherapy in rural and urban areas in British Columbia compared with evidence based estimates of Radiotherapy needs for patients with breast, prostate and lung. Cancer.

Increasing incidence of cancer

4.1.20 The proportion of people in the UK who have been diagnosed with cancer has increased by a third over the past 20 years and by 2020, MacMillan estimate that almost one in two people will be diagnosed with cancer in their lifetime[8].

Table 4-4: MacMillan projections of people diagnosed with cancer

	1992	2010	2020
Proportion of people diagnosed with cancer in the UK	32%	44%	47%

4.1.21 This trend has also been evidenced in Wales with cancer incidence increasing from 16,921 newly diagnosed cases of cancer in 2004 to 19,026 in 2013 - an increase of 12%. For the VCC catchment population there was an increase in incidence of 15% between 2004 and 2013.

4.1.22 The unitary authorities of Rhondda Cynon Taf and Monmouthshire show the largest increases in terms of numbers (increases of 174 and 154 respectively), but Monmouthshire and Merthyr Tydfil show the largest relative increases (at 30.2% and 29.4% respectively).[9]

Figure 4-3 Number of new cancer cases diagnosed at unitary authority and health board level in Wales between 2004 and 2013
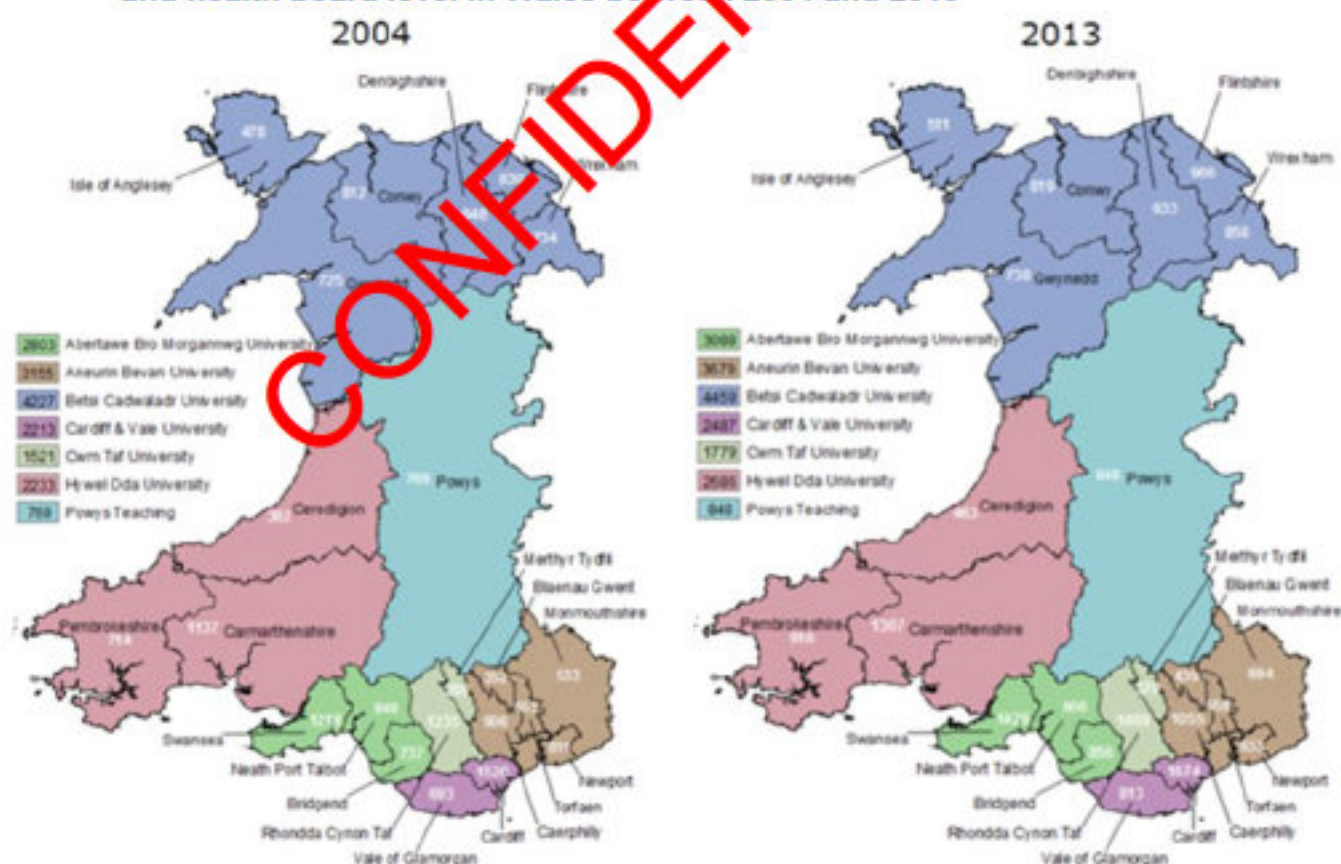
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[8] By 2020 almost half of Britons will get cancer in their lifetime – but 38% will not die from the disease, MacMillan Trust http://www.macmillan.org.uk/Aboutus/News/Latest.aspx.

[9] Information collated from WCISU Phase 2 (August 2015 report)

4.1.23 The number of cases of cancer in Wales (*all malignancies excluding non-melanoma skin cancer*) diagnosed over the 1995 – 2009 period shows an increasing trend for both sexes of 23% for males and 20% for females.

4.1.24 If age standardisation is taken into account, the European Age Standardised Rate (EASR) per 100,000 population increase is 2.5% and 10% respectively. In real terms, this means that every man in Wales has a one in seven chance of being diagnosed with cancer before his 65th birthday, which increases to one in three before his 75th birthday. Every woman in Wales has a one in six chance of being diagnosed with cancer before her 65th birthday, which increases to 1 in 3 before her 75th birthday. [10]

Figure 4-4 All cancers (excluding non-melanoma skin cancer) incidence projections up to 2031, by sex, Wales and VCC catchment population
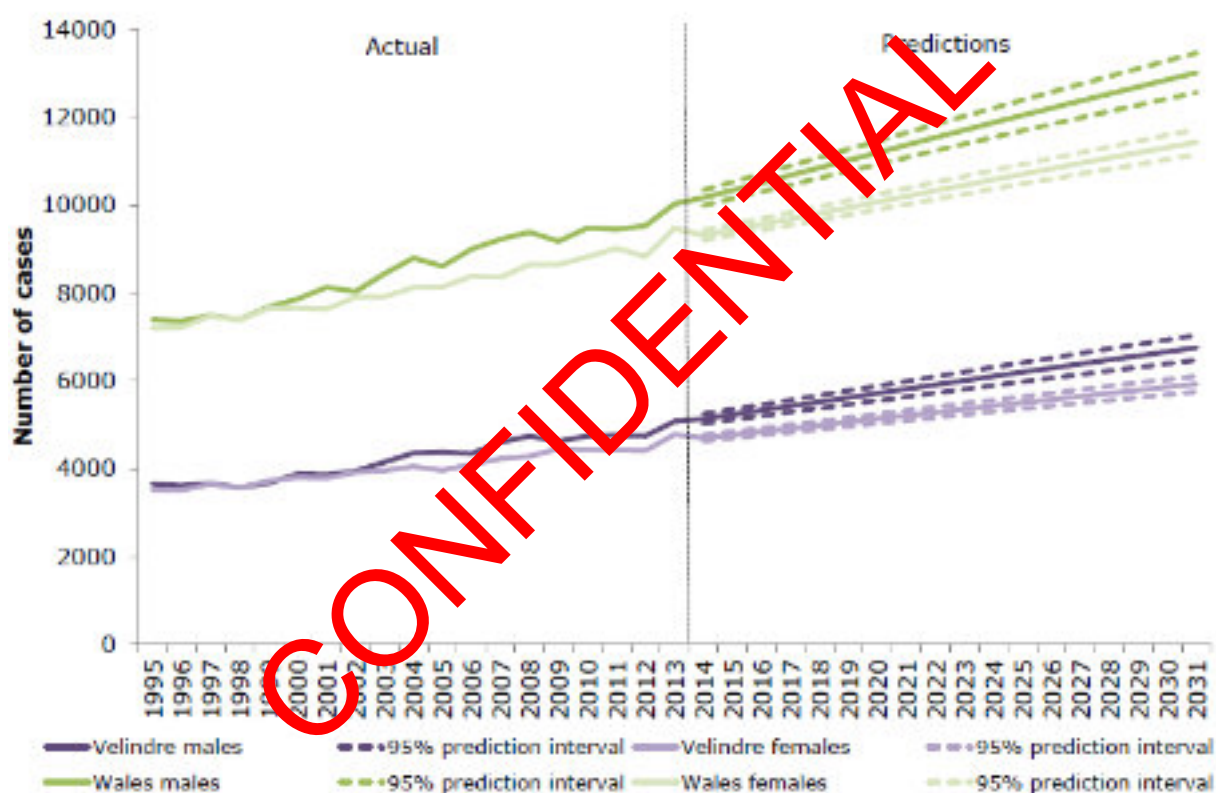
4.1.25 If the current trend continues[11], the incidence of all cancers (excluding non-melanoma skin cancer) is forecast to increase for both males and females. I t is predicted that cancer incidence within the VCC catchment area will increase by 15-20% for the male population and 9-15% for the female population between 2013/14 and 2021 and that that cancer incidence within the VCC catchment area will increase by 33-40% for the male population and 25-30% for the female population between 2013/14 and 2031.

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[10] Cancer in Wales, 1995 – 2009: A Comprehensive Report (Welsh Cancer Intelligence and Surveillance Unit), Sept 2011.

[11] Source document WCISU report (Sept 2015).

Health and non-health determinant factors

4.1.26 The forecast growth in cancer incidence is supported by population projections and an analysis of determinant factors in cancer incidence. Wales has a growing population that is ageing and has an increasing life expectancy. 26% of the population is expected to be over 65 as by 2033 compared to 18% in 2008.[12] Life expectancy continues to improve for men (78 years) and for women (82.2 years).[13] The South East Wales population that Velindre serves mirrors the national picture. This is set out in Table 4-5.

Table 4-5: Health Board Population Projections[14]

| LHB | Projected population 2015 | Projected population 2035 | 65 to 85 plus in 2015 | 65 to 85 plus in 2035 | Life expectancy 2005-2010 | |
					Male	Female
Cardiff and Vale	490,838	587,769	75,808	113,356	78.6	82.9
Aneurin Bevan	583,337	601,087	112,609	15_,_90	78.1	82.0
Cwm Taf	295,380	298,136	55,207	_4,_67	76.6	80.9
Abertawe Bro Morgannwg	526,997	562,020	103,_38	139,978	77.4	81.7
Powys	134,302	134,985	34,636	49,039	80.2	83.6

4.1.27 The increase in population size and life expectancy of residents within South East Wales will inevitably lead to an increase in referrals and demand on cancer services within Velindre given the correlation between age and cancer incidence. For example, more than 60% of cancers are diagnosed in people aged 65 years and over.[15]

4.1.28 There are a number of other factors that contribute to the increase in incidence of cancer:

- Age, genetic make-up, the immune system;
- Lifestyle e.g. smoking, alcohol consumption, body weight, exercise levels and exposure to the sun; and
- Poverty, social deprivation and socio-economic factors.

4.1.29 Within the UK there is a significant concern that a number of the determinant factors will align to create a 'perfect *storm*' over the next decade with exponential increases in the number of people diagnosed with cancer. Cancer

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[12] *The ageing population in Wales*, Article taken from Research Service Publication 'Key Issues for the Fourth Assembly' National Assembly for Wales, 2011.

[13] Chief Medical Officer for Wales Annual Report 2012-2013; *Healthier, Happier, Fairer*; Welsh Government.

[14] https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/Local-Authority/2011-Based/PopulationProjections-By-LocalAuthority-Year

https://statswales.gov.wales/Catalogue/Health-and-Social-Care/Life-Expectancy/lifeexpectancyandhealthylifeexpectancyatbirth-by-localhealthboard-localauthority.

[15] Cancer Statistics – Key Facts: Cancer Research UK, April 2013.

Research UK has identified the following factors as causing cancer within the United Kingdom: [16]

- More than 40% of all cancers in the UK are linked to tobacco, alcohol, diet, being overweight, inactivity, infection, radiation, occupation and post-menopausal hormones;
- Cigarette smoking is the single most important cause of preventable death in the UK and causes nearly a fifth of all cancers in the UK (including over 80% of lung cancers);
- Each year in the UK, around 17,000 cases of cancer are linked to being overweight or obese;
- Around 12,500 cancers in the UK each year are linked to increased consumption of alcohol;
- Increased risks associated with a low fibre diet, low consumption of fruit and vegetables, high consumption of red and processed meats and higher intake of salt or saturated fats; and
- Excessive exposure to UV radiation (from the sun or sun beds) is the most important modifiable risk factor for skin cancers.

4.1.30   This is supported by Public Health data specific to the LHBs summarised in Table 4-6.

Table 4-6: Summary public health data by Health Board

Cardiff and Vale UHB	Cwm Taf UHB	Aneurin Bevan UHB	Abertawe Bro Morgannwg UHB
23% of the population smoke	24% of the population smoke	24% of adults smoke	21% of adults smoke
46% of the population consume more alcohol than the daily recommended amount and 26% binge drink	63% of adults are overweight or obese (the highest level of any of the LHBs in Wales)	45% of adults consume more alcohol than the daily recommended amount.	46% of adults surveyed reported that they consume more alcohol than the daily recommended amount and 29% binge drink
27% of adults take exercise or physical activity that meets guidelines	Has the lowest life expectancy of any LHB in Wales.	59% of adults are classed as being obese	23% of adults are classed as being obese
54% of adults are classed as being obese	Is the most deprived Local Health Board area in Wales	28% of adults take exercise or physical activity that meets guidelines	Only 28% of adults eat more than five portions of fruit and vegetables per day

4.1.31   Poverty and social deprivation also significantly increases the incidence of cancer and negatively influences the potential clinical outcomes for patients. This is an issue of great concern for the South East Wales population served by VCC as it contains some of the highest levels of social deprivation within

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[16] Cancer Statistics – Key Facts: Cancer Research UK, April 2013.

Wales and the UK. A comparative analysis of deprivation across Wales is shown in Figure 4-5 which confirms that many of the most deprived population reside in South East Wales.

Figure 4-5 Welsh Index of Multiple Deprivation
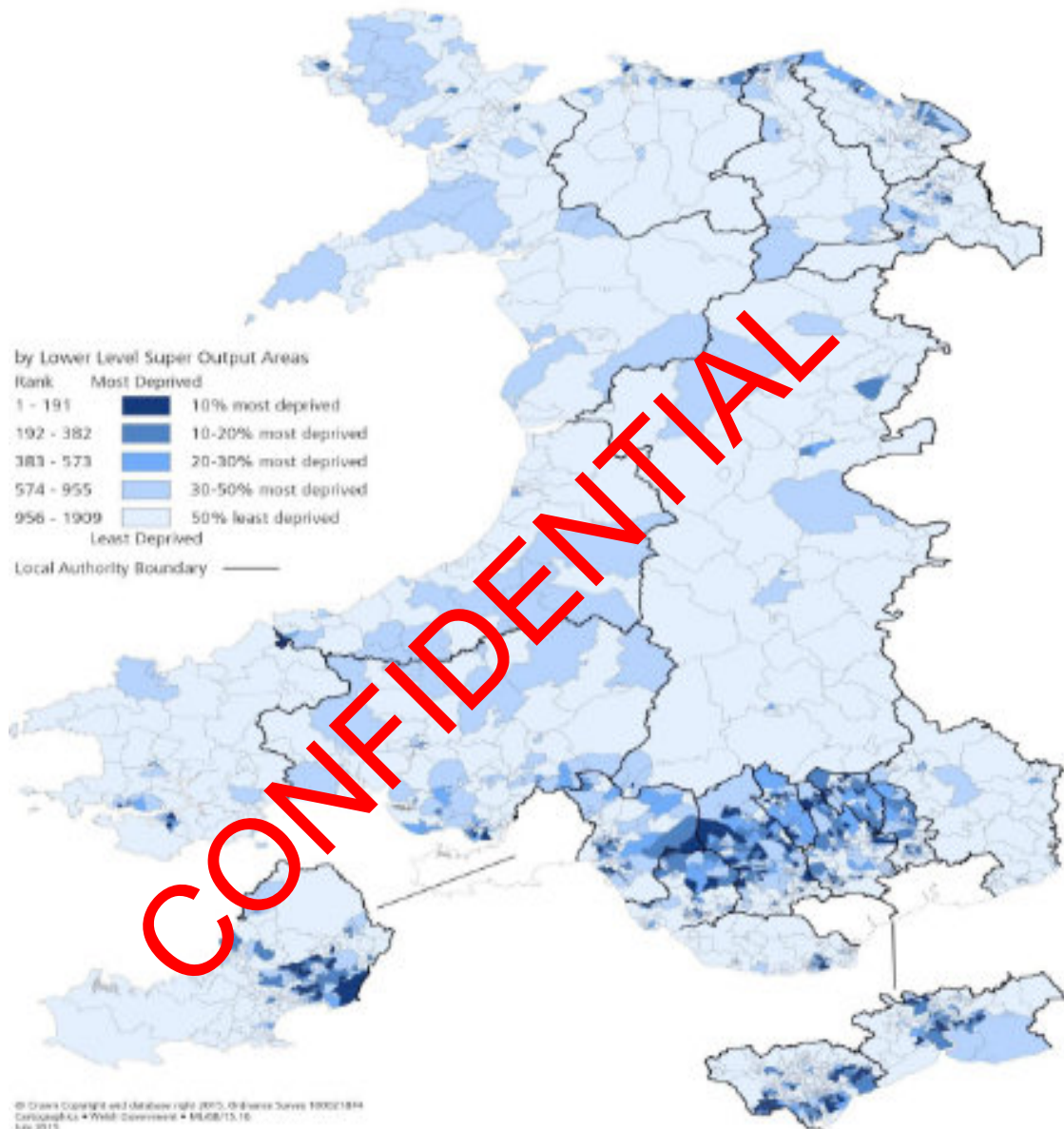
4.1.32 The Welsh Government and the full range of public services are taking significant action to address these issues and to try and change the culture and behaviour of the population. Whilst a great deal of success has been achieved in a number of areas over the past number of years, it is clear that the combination of an ageing population, living longer with relatively unhealthy lifestyles, together with some of the highest levels of social deprivation is likely to result in increased incidence of cancer in the South East Wales region and across Wales.

Increasing complexity

4.1.33 The pace of clinical and technological change in cancer services is rapid. As a specialist cancer centre, VCC is impacted by the increasing complexity in the planning and delivery of treatments, especially in relation to Radiotherapy and SACT services.

Increasing complexity and demand for Radiotherapy services

4.1.34 The planning and delivery of Radiotherapy services has increased in complexity for the following reasons:

- Treatment planning techniques are becoming more and more complex due to a need to conform to the dose constraints required by the latest clinical guidelines;
- Treatment delivery becoming more complex as it is delivered with increased accuracy in order to:
  - deliver higher dose levels conforming closely to tumour volumes; o result in improved outcomes;
  - provide a lower level of treatment side effects.
- Advanced Radiotherapy requires higher specification equipment than used previously, including the latest 'on treatment' imaging facilities which necessitate more time being spent per patient in order to fully realise the benefits of Image Guided Radiotherapy (IGRT).

4.1.35 These advances can create problems in capacity and demand planning because traditionally, current and projected referral and activity levels are used to assess whether a service will have sufficient capacity to achieve the required standards and outcomes. Whilst useful in broad terms, this approach does not provide a comprehensive picture in the context of cancer services as it does not take account of the increasing level of complexity involved in delivering modern cancer treatments. With regard to Radiotherapy a more representative currency is the '*end to end*' time taken to provide the service.

4.1.36 Furthermore, and over the last two decades, there has been a major shift from simple two dimensional (2D) planning (based on a single patient contour) and delivery to predominantly three dimensional (3D) planning, based on anatomical information derived from x-ray CT planning data.3D planning is highly computerised and a vastly more sophisticated and complex technique than that prevalent just a few years ago. The oncologists and planning team, using computer treatment planning software, delineate the tumour and other organs on the planning CT scans, a process that may take several hours for a particularly complex case, compared to fifteen minutes using 2D.

4.1.37 Figure 4-6 shows the increase in complexity and time taken to plan and deliver a breast cancer treatment. The 3D plan allows the shaping and evaluation of dose to both the tumour volume and organs at risk (in this case heart and lungs) whereas this was not possible with 2D planning.

Figure 4-6 Impact on time of technology advancements in treating breast cancer

Technology advancement in planning
more time, less harm, better outcomes

2D Plan for Breast cancer

2000
- Cons Mark up 5 mins
- Cons Prescribe 5 mins
- Radiographer contouring 10mins
- Physics calculate and check 45mins
- Radiographer Calculation 15mins
- Delivery time 10 mins

Total planning and delivery time 90 minutes

3D Plan for Breast Cancer

2016
- CT Scanning 15 mins
- Outlining 30 mins
- Physics planning and checking approximately 3.5 hrs
- Radiographer QA 10 mins
- Delivery 15 mins

Total planning and delivery time 300 minutes

4.1.38 The impact of this complexity growth on the duration of Radiotherapy attendances during the last six years is outlined in Table 4-7 which shows that total scheduled delivery time growing from 11,439 hours in 2010/11 to 15,128 hours in 2015/16. This represents an increase of 32.2% in total, an average of 5.4% each year.

4.1.39 The increasing complexity creates pressure on the system which may offset increasing efficiencies in terms of the number of attendances required for each episode of treatment.

Table 4-7: Growth in hours in Radiotherapy attendances (2010/11 to 2015/16)

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Average time per treatment	14.2	15.2	16.1	16.3	16.3	17.1
Total time scheduled (hrs)	11,439	11,892	12,640	13,810	14,601	15,128
Growth (hrs)	N/A	453	748	1,170	791	527
% growth in total times Sched.	N/A	4%	6.3%	9.3%	5.7%	3.6%

4.1.40 Work undertaken by the Trust indicates that the complexity of Radiotherapy treatment will continue to increase and hence the overall time taken to image, plan, deliver and verify treatments. There are several components to this complexity:

- **Target volume definition**: this will increasingly involve co-registering of diagnostic imaging information from MRI and PET-CT and multi-disciplinary input   into Radiotherapy planning from radiology;

- **Advanced treatment planning**: this will increasingly use computer algorithms to optimise planning and delivery to treat the target volume and spare normal tissues at risk. This allows higher dose delivery to the target to improve cure rates and/or reduce toxicities from Radiotherapy by sparing normal tissues. Planning may also take into account temporal changes in shape or movement of the patient anatomy and target volume in the form of adaptive '4D CT' planning, which requires more extensive imaging and delivery procedures to record and account for motion effects;

- **Treatment set up, verification and adaptive Radiotherapy delivery**: this will be affected by the complexity of beam arrangements, new technology to accurately image during treatment and by an ability to adapt treatment delivery to changes in target volume shape or position, either by resetting fixed treatment fields, 'tracking' in real time or 'adapting' to changes of tumour position or shape identified by repeated imaging during treatment; and

- **Stereotactic Radiotherapy and radiosurgery**: increasing numbers of patients are being treated with high precision stereotactic Radiotherapy and Radiosurgery, where treatment involves the delivery of relatively high radiation doses with high precision and a reduced number of treatment fractions compared to conventional Radiotherapy regimes.

4.1.41 The increasing complexity of Radiotherapy planning and treatments has resulted in a requirement to increase the routine appointment slot duration for Radiotherapy attendances. During 2007/08 over 80% of referrals were allocated a 10 minute slot.   By 2014/15 this had reduced to only 20% of attendances i.e. average appointment times have significantly increased.

Increasing complexity and demand for SACT services

Demand for SACT services has continued to increase due to:

4.1.42
- A continued increase in the complexity of SACT treatments; and
- An increase in the number of SACT treatment options.

4.1.43 Increasing complexity and volume of new agents to market is also having a considerable impact for the delivery of SACT services. As well as new SACTs being developed which have mechanisms of action similar to conventional chemotherapy agents, there is a growth in SACTs which are being developed

with novel ways of working, e.g. by targeting the specific pathways that cause cancer or supporting the body's immune system in fighting the disease.

4.1.44 Unlike the conventional chemotherapy agents which are used for a specific number of cycles, these new agents are typically used for longer periods of time as their withdrawal often results in the cancer causing pathway being turned back on or the body's immune system being switched off.

4.1.45 As well as an increase in the number of cycles administered to each patient, these new SACTs have different side-effects to conventional chemotherapy agents. These need careful monitoring and patient follow up for longer periods of time after the treatment has been discontinued.

4.1.46 In relation to increasing complexity Table 4-8 provides examples of how SACT treatments have become more complex over time. In terms of standard treatment therapies and how this has resulted in increased workload for Pharmacy technical services and nursing staff supporting day case activity.

Table 4-8: Examples of Increasing Complexity of SACTs

Cancer and line of therapy	Previous standard therapy	Current standard therapy	Additional capacity requirements to deliver current standard therapy
Melanoma: 1st line metastatic disease	Ipilimumab: Max of 4 cycles	"Induction" of Nivolumab and Ipilimumab: Max of 4 cycles	
	Pharmacy isolator time: 10 mins per cycle	Pharmacy isolator time: 20 mins per cycle	Pharmacy Isolator time: 40 mins
	SACT chair time: 3 hours per cycle	SACT chair time: 4 hours per cycle	SACT chair time: 4 hours
Pancreatic: 1st line metastatic	Gemcitabine: 4 cycles	Gemcitabine and Abraxane: 4 cycles	
	Pharmacy isolator time: 10 mins per cycle	Pharmacy isolator time: 50 mins per cycle	Pharmacy isolator time: 160mins
	SACT chair time: 1 hour per cycle	SACT chair time: 2 hours per cycle	SACT chair time: 4 hours
Colorectal: 1st line metastatic	Oxaliplatin and capecitabine: 4 cycles	Oxaliplatin MdG and cetuximab: 6 cycles	
	Pharmacy Isolator time: 10 mins per cycle	Pharmacy isolator time: 30 mins per cycle	Pharmacy isolator time: 140 mins
	SACT chair time: 3 hours	SACT chair time: 5 hours	SACT chair time: 18 hours
Renal: Advanced (2nd or 3rd line)	Everolimus/Axitinib	Nivolumab: 12 cycles	
	Pharmacy Isolator time: N/A	Pharmacy isolator time: 10 mins per cycle	Pharmacy isolator time: 120mins

Cancer and line of therapy	Previous standard therapy	Current standard therapy	Additional capacity requirements to deliver current standard therapy
	SACT chair time: N/A	SACT Chair time: 2 hours per cycle	SACT Chair time: 24 hours

4.1.47 The increase in complexity has a direct effect on nursing and pharmacy resource as each SACT regimen has more individual drugs which need to be delivered to each patient per cycle. Similarly, the increase in SACT regimen complexity, treatment options and number of cycles of treatment delivered per patient, has a direct effect on volume of activity undertaken by the Pharmacy department in terms of clinically overseeing, reconstituting and dispensing SACTs.

4.1.48 In addition to the increasing complexity of SACT treatments there has also been an increase in SACT treatment options. These new treatment options are increasingly becoming available for patient groups who historically would have had limited treatment options, which will in time contribute to improved patient outcomes (quality of life, patient experience and survival)[17].

4.1.49 For example, in 2016, there was a 186% increase in number of new SACT drugs available in comparison with the previous year. Whilst some of these new SACTs have acted as direct replacements to established standard therapies, many have been added to established treatment pathways as additional lines of therapies or as additional SACTs within an already established SACT therapy regimen.

Figure 4-7: The number of new SACT treatments available in Wales

4.1.50 This national work has also been supported by the Trust's Horizon Scanning process who evaluate the likelihood of new SACTs undergoing a successful

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[17] www.Nice.org.uk.

health technology appraisal within the near future. For example during 2017/2018 so far, 7 drugs have already been approved with a further 30 drugs on our 'watch list' (as of August 2017).

4.1.51 The growth in number of new SACTs available to NHS Wales continues to increase because:

- More cancers are now eligible for treatment with SACTs; in fact there are very few types of cancer considered to be SACT-resistant and this list continues to diminish;
- More SACT treatment regimens are available within each tumour site;
- There has been an expansion in the use of adjuvant therapy at earlier stages of the disease process and so patients are being treated earlier and hence for longer;
- There is greater use of palliative chemotherapy and this is resulting in patients now receiving a greater number of lines of treatment;
- There is an increase in the use of adjuvant and palliative treatments for elderly patients (step change);
- Public expectations are rising in terms of the types of treatment that should be available to them;
- Pharmaceutical companies continue to develop an increasing number of new SACTs; and
- There are a wider number of appraisal and funding routes in Wales which are set out in Table 4-9.

Table 4-9: Funding and appraisal routes

Funding routes	- Core i.e. commissioner funded - Individual Patient Fund Requests (IPFRs) - New Treatment Fund
Appraisal routes	- National Institute of Clinical Excellence (NICE) guidance - All Wales Medicine Strategy Group Guidance - Interim Pathways Commissioning Group - Individual Patient Funding Request route

Improving access to Radiotherapy services

4.1.52 The access rate for Radiotherapy identifies the proportion of cancer patients who should receive Radiotherapy as part of their treatment. The most recent recommendation is that 40.6% of patients in the UK would benefit from Radiotherapy as part of their curative (radical) cancer treatment, either used alone or combined with other modalities.[18]

4.1.53 A Royal College of Radiologists (RCR) report published in 2009 identified that the average access rate in Wales was only 36.6%. This is significantly below the recommended access rate of 40.6% and has the potential to negatively

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[18] Cancer Reform Strategy, Department of Health 2007.

affect outcomes for patients, both in terms of survival and in terms of quality of life.

4.1.54 It is therefore clear that further improvements are required to achieve these levels of access in Wales as a whole, including the South East Wales population.

More people are living with cancer

4.1.55 In Wales more people are surviving cancer and this will require increased capacity for treatment and a wider range of services to support people in living with the impact of cancer.

4.1.56 At the end of 2009, almost 85,000 people were living with a prior diagnosis of cancer during the previous 15 years. This equates to approximately 3% of the total population. [19] Indeed, for a vast number of people cancer is now recognised as a chronic condition which requires a new approach to longer term care with individuals requiring ongoing treatment and rehabilitation to ensure they are able to maximise their potential to enjoy the highest quality of life possible to them. [20]

Figure 4-8 Cancer one and five year relative survival

Figure 6   Cancer one and five year relative survival

4.1.57 The stark reality exists that a proportion of patients will experience a recurrence of cancer. The risk of recurrence for cancer survivors is different for each person depending on many factors including the type of cancer they had, the treatment received and the length of time elapsed since the treatment.   It is clear that as more people survive cancer and live with it, additional demands

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[19] Together for Health – Cancer Delivery Plan, Welsh Government 2012.
[20] Together for Health Annual Report 2015.

will be placed on the capacity and capability of Velindre to support the South East Wales population.

4.1.58 There is a need to develop a broader range of services which supports individuals and helps them engage fully in society, including employment, following their recovery. This will improve the quality of life for a large number of people across South East Wales.

Co-morbidities of patients

4.1.59 Patients are also managing increasing co-morbidities meaning that care is becoming more complex at times. The experience and quality of life and psychological well-being that patients have through and beyond diagnosis and treatment is equally as important as clinical effectiveness and safety.

4.1.60 The likelihood of co-morbidity varies by patient factors such as age or lifestyle factors such as obesity, lack of exercise and smoking. Like cancer itself, it increases with age, but older age and co-morbidity do not necessarily coexist, however the likelihood increases. Because the majority of cancer patients are over the age of 65, it is also the case that many may have multiple morbidities. It is estimated that 70% of cancer patients have at least one other long-term condition that needs managing and over a quarter have at least three other such conditions.

Table 4-10: Proportion of people with cancer in the UK living with other long-term conditions[21]

LTC status	%
With no other long-term conditions	30%
With 1 other long-term conditions	22%
With 2 other long-term conditions	18%
With 3+ other long-term conditions	29%

4.1.61 Co-morbidity of illness is a significant concern in patients with cancer as it can impact cancer treatments that can be offered to patients as well as affecting their rate of survival and rate of progress from receiving treatment. For example, patients with severe underlying chronic obstructive pulmonary disease are not good candidates for resection of a lung malignancy, and therefore their chance of cure is decreased. Similarly, a diagnosis of congestive heart failure precludes some cancer treatments. Comorbid disease is also a competing cause of death. This is particularly true for older patients with cancer, who comprise the majority of new cancers diagnosed.

4.1.62 It is important that the requirements of patients with co-morbidities are factored in to cancer care and the impact that it may have on patients and their quality of life. Therefore it is beneficial to offer services and treatments that are appropriate for patients.[22]

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[21] Velindre Cancer Strategy 2016.

[22] http://ascopubs.org/doi/full/10.1200/jco.2004.00.9753

Summary – Increasing demand for cancer services:

- In the UK, the proportion of people diagnosed with cancer has increased by one third over the past 20 years;
- It is estimated that by 2020 almost one in two people will be diagnosed with cancer in their lifetime;
- The incidence of cancer in Wales is forecast to increase by 2% per annum to 2031;
- The forecast increase is supported by catchment area population forecasts and an analysis of a number of determinant factors that are related to levels of cancer incidence;
- Increasing complexity in the planning and delivery of cancer treatments will continue to place further pressure on the delivery of cancer services;
- Access to Radiotherapy treatment is currently lower than clinical evidence suggests would benefit cancer patients;
- More people are surviving cancer and this will not only require increased capacity for treatment but also an increased provision of support services for people who are living with cancer; and
- 70% of cancer patients will have at least one other long-term condition that needs managing and over a quarter have at least three other such conditions. This results in the need for other services and treatments which will also put pressure on existing capacity.

Improving the quality of services we deliver

Overview

4.1.63 The TCS Programme provides a range of opportunities to embed innovation and improve the quality of services that we deliver. As part of this we have considered a number of opportunities including:

- Delivering services that patients value;
- Providing greater opportunities for Research and Development which improve patient care; and
- Making better use of technology to improve patient care.

Delivering services that patients value

4.1.64 Velindre has undertaken an extensive engagement process with stakeholders in order to gain a better understanding of patient expectations and what it is they want from the service (*see Appendix PBC/SC/S4*).

4.1.65 A number of key themes emerged in terms of the improvements that are important to service users (*see section 6 Clinical Service Model for additional detail*). These include:

- **Care closer to home:** Patients want more care at home or locally, if we can guarantee it is of the same quality irrespective of where it is delivered;

- **More integrated care:** patients should have consistency of care and treatment with services linking up both within and outside of VCC. Patients identified the need for a single point of contact and a single electronic care record;

- **Utilise technology to deliver care in different ways:** patients users should have the choice to make use of technology for receiving appointments and communication and for appropriate outpatient appointments;

- **More access to services in extended hours:** patients should have access to services, support and facilities at extended times;

- **Better information:** information should be evidence-based and guided by professionals and should include access to treatment timelines, as well as information packs and education sessions to better prepare for appointments;

- **Partnership approach:** patients and carers should be involved in multi-disciplinary team meetings and the development of their Care Plan;

- **Holistic approach**: support should be provided in the context of patient, carer and family and should serve both physical and emotional needs;

- **Improved facilities:** patients should have access to a pleasant environment that is calm, quiet, clean, colourful, bright, and inviting. In practical terms patients and service users would like more privacy, better parking, increased toilets and changing facilities as well as access to quiet areas;

- **Choice:** patients want more choice about what treatment and services they use, including where and how they access them;

- **Control:** patients want more control of their treatment decisions and to ensure we focus on the things they value most in life;

- **Communication and information:** patients and service users want information about their diagnosis and treatment, together with uncomplicated and effective communication about the options they have. They also want the communication between the providers of services to be seamless and support their care;

- **Independence:** patients want to be supported to achieve their aims and the things they value most from the services they need. They wish to retain their independence as they live with and through cancer; and

- **Highest quality of life.** Patients want to receive the services and support that enables them to achieve the highest quality of life and delivers the things they value the most.

Providing greater opportunities for Research and Development which improve patient care

4.1.66 The delivery and management of high quality research is a strategic priority within Wales. Through access to the latest, cutting edge drugs, therapies and technologies it is possible to improve the quality of care delivered to the population of Wales. Similarly leading and delivering a broad portfolio of research and development activity is a fundamental element of a high-performing cancer service which can achieve levels of quality and outcomes comparable with the best in the world, defining cancer care for future generations.

4.1.67 The Trust is committed to creating a world class research capability that is equal to the best elsewhere in the UK and Europe with the ability to rapidly translate innovation into practice, where participation in research is a core component of the clinical care delivered at VCC such that every patient and/or their families can discuss options for participation in research with their health care professional team.

4.1.68 VCC has an established reputation as a research centre of high standing. It has a wide range of highly talented and motivated clinicians who view research and development as integral to their practice with the primary aim of accelerating research and development that can be described as '*bench-to-bedside-and back again*' supporting continuous improvements in the quality of care and the outcomes it achieves for patients.

4.1.69 The opportunity is to go even further and develop a wider portfolio of research and development which would enable a step change in driving the clinical service forward and improving treatment opportunities for patients. The ambition is clearly outlined within the Trusts R&D strategy 'Research Now - Fit for the Future' (*see appendix PBC/SC/S5*) and as summarised below:

'VCC will perform and lead high quality clinical research Programmes and develop innovation to improve the health of the population and achieve a reputation for excellence nationally and internationally'

4.1.70 To achieve this ambition, a vibrant, dynamic research culture must be embedded across the organisation which supports the delivery, advancement and innovation of clinical care. This will help to ensure that patients will always receive the very best treatment at every stage of their journey, and researchers from all disciplines can engage in projects that will enhance care and enrich their professional careers. Through delivery of its strategy the Trust will:

- Deliver a wider range of research opportunities for patients, delivered by a broad range of health care professionals;

- Support the national priority to generate wider economic and social benefits for South East Wales through the development of strategic partnerships and collaborative working within South East Wales, Wales and internationally to achieve excellence;

- Play an active supporting role to partners but also fulfil the Trust's leadership role as a specialist non-surgical cancer centre;

- Continue to develop the areas of excellence in translational research, and develop new areas of expertise, in collaboration with scientists and others at LHBs and local universities;

- Enhance opportunities to integrate academic research and clinical teams, stimulating new ideas for research, creating opportunities for academic excellence through post graduate learning, Fellowships, and academic career pathways;

- Develop and deliver new technologies safely into routine clinical practice;

- Innovate new methods of delivering care and adopt these appropriately, gathering and sharing evidence of benefit;

- Align the wide range of expertise within and outside South East Wales around a coherent strategic research agenda that supports the triumvirate of highest quality clinical care, academic excellence, and evidence based innovation;

- Provide the resources (capacity and infrastructure) required for the consistent delivey of high quality innovative research;

- Horizon scan to maintain our position at the forefront of cutting edge research;

- Attract, develop and retain quality researchers across all disciplines and professions; and

- Further develop strategic and collaborative partnerships with local academic institutions such as Cardiff University, the University of South Wales and the Positron Emission Tomography Imaging Centre (PETIC).

4.1.71 Many of the ingredients are present in South East Wales with a large number of leading academics and researchers; a highly talented group of clinicians; a number of leading academic institutions; a wide number of research and development organisations and bodies; and a supportive government. The next phase requires a bold vision and clarity of thought to develop an internationally recognised cancer research institute which will bring significant benefits to South East Wales and indeed to the country as a whole.

Making better use of technology to improve patient care

4.1.72 The technology and techniques used to provide cancer services have become increasingly sophisticated over the past decade and this trend is likely to continue. The use of more complex technology in terms of diagnosis, planning and treatment, has offered the opportunity to provide patients with more focused treatment which is safer and more accurately targeted which can often be delivered at home, or close to home requiring fewer attendances at VCC.

4.1.73 Developments in Radiotherapy are perhaps the most dynamic and VCC, with the support of the Welsh Government, has been able to implement a number of new technologies to provide real benefits to patients. These include Stereotactic Body Radiotherapy (SBRT), Image Guided Radiotherapy (IGRT) and Intensity Modulated Radiotherapy (IMRT). It is this type of innovation which allows talented clinicians to achieve the best possible outcomes for patients and continue to drive forward service developments.

4.1.74 Notwithstanding these important developments, there is a real opportunity to go further and faster in South East Wales and further invest in a range of technology which is being used in centres across the UK and western world. Cancer centres such as The Royal Marsden NHS Foundation Trust, The Christie NHS Foundation Trust, and The Peter MacCallum Cancer Centre in Australia are routinely using SBRT, IMRT, Image Guided Brachytherapy (IGBT), on-line imaging PET scanning and organ motion control to name a few.

4.1.75 The uptake of pioneering technology and accelerated pace of implementation offers a number of advantages.

- Improved levels of safety for patients as treatment is more focused and healthy tissue is not damaged;
- Improved clinical outcomes;
- Improved opportunities to advance research and development;
- The development of a reputation and brand that is recognised internationally; and
- The ability to attract and retain clinicians, physicists, radiographers and support staff that are recognised as leaders in their field at a national and international level.

4.1.76 It is vital to acknowledge that cancer services are driven by technology and standing still is not an option as in real terms it means the service is going backwards. Currently, VCC is not able to keep pace with the organisations widely acknowledged as in the best in the UK and internationally in securing and implementing technology.

Summary – Improving the quality of cancer services:

- Stakeholder and patient engagement is at the heart of the TCS Programme. As part of an extensive engagement process the Trust has listened to what patients value and want. In summary, patients have told us that they want:
  - Improved access to services including extended opening hours, better information and more options for receiving care close to home;
  - Want to have more choice about what treatment and services they use;
  - Want to have more control of their treatment decisions;
  - Retain their independence as they live with and through cancer; and
  - Care to be delivered in improved facilities. In practical terms patients would like more privacy, better parking, increased toilets and changing facilities as well as access to quiet areas; and
  - More integrated care which involves patients and clinicians working in partnership to deliver holistic care.

- The development of leading international cancer research is a fundamental element of a high performing cancer service which can achieve levels of quality and outcomes comparable with the best in the world; and

- The development of increasingly sophisticated technology continues to drive advancements in cancer services, presents opportunities for VCC to improve clinical outcomes by providing patients with more focused treatment which is safer, more accurately targeted and increases access to care closer to home.

Need to meet future forecast demand

Forecast future demand will exceed capacity

4.1.77 Based on the evidence described previously it is anticipated that there will be accelerated growth in demand for cancer services in relation to

- The increasing incidence of cancer;
- Increasing complexity of cancer services; and
- Improvements in access to cancer services.

4.1.78 In response the Trust has established a long-term strategic approach to forecasting future activity and has developed, in partnership with clinical colleagues across South East Wales, a set of clinical growth assumptions up to and including 2031/32 and as summarised Table 4-11.

4.1.79 The activity growth assumptions are set across two time frames. The first time frame is from 2016/17 - 2022/23 where the Trust believes it has a fair degree of certainty in terms of forecasting future activity. The second timeframe is

from 2023/24 - 2031/32 where there is less certainty when forecasting future demand (*e.g. stratified approach for SACT versus greater incidence of cancer*) and the Trust has therefore opted to revert to the forecast incidence of cancer (2%) as provided by WCISU. The Trust has chosen to take this long-term approach to forecasting activity to try and ensure that there is sufficient service capacity to meet future demand.

4.1.80 These assumptions, following the availability and validation of 2016/17 activity data, have recently been reviewed by the VCC Senior Management Team and by VCC service and clinical leads respectively. The main output of this review was a reduction in assumed growth rate for radiotherapy from 4% to 2% between 2016/17 and 2022/23. However, it should be noted that through this review concerns were raised by VCC clinicians as to why the previously assumed growth rate of 4% has not presented over the last two financial years as the cause is unclear. In response the TCS Programme clinical lead has commissioned further analysis through the VCC Radiotherapy Development Group.

Table 4-11: Key growth assumptions

Service	Annual growth assumption/years	
	2016/17 - 2022/23	2023/24 – 2031/32
Radiotherapy	2%	2%
SACT	5%	2%
Inpatients	2%	2%
Outpatients and Ambulatory Care	2%	2%
Radiology (CT & MRI, and Nuclear Medicine	9%	2%

4.1.81 In addition a validation exercise has been undertaken to compare the Trust's clinical growth assumptions against those from other cancer centres across the UK. Data has been as obtained from the following organisations and the findings are summarised in the table below.

- The Beatson West of Scotland Cancer Centre;
- The Clatterbridge Cancer Centre NHS Foundation Trust;
- The Christie Cancer NHS Foundation Trust;
- Leeds Teaching Hospital NHS Trust; and
- The Royal Marsden NHS Foundation Trust.

Table 4-12: Key growth assumptions

Service	Annual growth assumption/years		Other cancer centres annual growth predictions
	2016/17 - 2022/23	2023/24- 2031/32	
Radiotherapy	2%	2%	Peer Site A – 3.8%** Peer Site B 1.5** Peer Site C – 3%* Peer Site D – N/A Peer Site E – 4.0%**
SACT	5%	2%	Peer Site A – 4 – 5%* Peer Site B -7-8%** Peer Site C – N/A Peer Site D – N/A Peer Site E – 5-6%**

Note: N/A – data was not available.

Note: It is important to recognise that clinical growth projections are not easily accessible. In recognition of this the Trust undertook a mixed methods approach to capture this data through the development of an in-house Cancer Services Comparison Toolkit and data available in corporate strategies/reports.

4.1.82 The validation exercise demonstrated that the Trust's clinical growth assumptions were in line with those from other cancer centres across the UK, where this data is available.

4.1.83 Applying these forecast growth rates to the Trust's baseline position provides activity projections to 2031/32 based upon existing arrangements for delivering services. A summary of this is provided in the table below.

Table 4-13: Forecast activity levels for core services as a result of increasing demand

Service	Type of activity	2016/17	2022/23	2031/32
Radiotherapy	Courses	3,815	4,296	5,134
	Fractions	51,915	58,464	69,870
SACT	Attendances	22,552	29,358	35,086
Inpatients	Admissions	2,008	2,482	2,967
	Bed days	10,391	12,640	15,106
Outpatients	Attendances	69,244	81,573	97,488

4.1.84 The impact of the forecast increases in service activity will be significant as Velindre, without additional investment, will be unable to meet patient demand from within existing capacity. Failure to provide sufficient capacity is likely to result in increased waiting times, reduction in available services and increased costs associated with outsourcing services. All of this is likely to result in reduction in service quality, patient experience and outcomes.

> **Summary – Forecast future demand exceeds capacity:**
>
> - It is anticipated that there will be accelerated growth for the core services delivered by VCC over the next five years.
> - Velindre will be unable to meet patient demand, in the medium-term, from within existing capacity and without investment.

Limitations of the existing Service Model

Overview

4.1.85 Cancer services in South East Wales provide the majority of patients with high quality care which achieves a good outcome. However, as is the case with any service, there is the opportunity to make further improvements which will benefit patients and their families and place services on a more sustainable footing.

5.21.1 Achieving the best possible clinical outcomes for the population of South East Wales will require primary, secondary care and VCC as a specialist centre, to work together to ensure cancer is prevented where possible or detected and diagnosed early and the best treatment is delivered quickly and effectively.

5.21.2 The existing Service Model presents a challenge to improving clinical outcomes because of the following factors:

- Earlier detection and diagnosis of cancer is a major factor in improving clinical outcomes but there are significant variations in the referral and conversion rates for urgent suspected cancers across primary care;
- Lack of a comprehensive AOS resulting in increased length of stay and delays in accessing treatment;
- The fact that all evidence suggests that faster access to services and treatment significantly improves patient outcomes;
- Variation in the availability of services at the VCC and across South East Wales;
- A lack of dedicated consultant oncology presence within Local Health Board services to support enhanced multi-disciplinary working;
- A palliative care service that is not always able to provide patients with the required care in the most appropriate setting; and
- Data and information sharing is not optimised to enable the right decisions at the right time.

The need for earlier detection and diagnosis: VCC could add additional value

4.1.86 The early detection and diagnosis of cancer is one of the most fundamental drivers for improving clinical outcomes. This well-known factor was highlighted by Professor Mike Richards in the National Awareness and Early Diagnosis Initiative Conference (2008) which concluded that between 50% and 75% of avoidable cancer deaths were due to people being diagnosed with cancer at

an advanced stage. This significantly limits the treatment options available and potential clinical outcome.[23] This is evident in breast cancer cases where, if detected and treated early, the five-year relative survival rate is 99% for localised cancer. For regional disease this reduces to 84% and where cancer has spread to distant organs to 24%.[24]

4.1.87 *The Cancer Delivery Plan for Wales 2016-2020 acknowledges that GPs in Wales refer in the region of 80,000 patients annually* on the basis of an instance of suspected cancer. Many symptoms are not specific to cancer and, currently, on average only approximately 10% of referrals for suspected cancer will subsequently result in a diagnosis of malignancy. Primary care practitioners require greater support in terms of the provision of effective risk assessment tools, training resources and access to specialist oncology advice

4.1.88 The Cancer Delivery Plan for Wales 2016-2020 also highlights a number of other areas of weakness or areas for improvement within the current system. These include:

- A lack of public awareness of red flag symptoms requiring prompt assessment by a GP;
- The perceived reluctance, on the part of certain individuals, to 'bother' GPs, and;
- The inconsistent application of key interventions such as holistic needs assessments, the allocation of key workers and the provision of on-going care plans.

4.1.89 Macmillan (2014) have been active in Wales in this area, identifying that primary care and linked community professionals are vital components in providing continuous and ongoing care for people affected by cancer throughout their diagnosis, treatment and beyond. Effective primary care input is vital as it has extensive knowledge of the support services that are available locally and can help to sign post people accordingly. They go on to conclude that:

- Whilst a number of tools, processes and guidance developed by, and for, GPs and their clinical colleagues in primary care to support their management of people affected by cancer are available, there is no overall comprehensive framework which describes what resources exist to provide a benchmark for the care of cancer/potential cancer patients; and
- There is no easily accessible single source of information on cancer for GPs in Wales to help them deliver the aims for primary care set out in the Cancer Delivery Plan.

4.1.90 It is clear therefore that immediate and decisive action is required to improve detection and diagnosis rates within primary care to increase the likelihood of the optimal clinical outcome being achieved for the patient.

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[23] http://scienceblog cancerresearchuk.org/2008/11/25/detecting-cancer-earlier.

[24] American Cancer Society (ACS). (2013). *Breast cancer facts & figures 2013-2014*. Accessed Jul. 8, 2014, from http://www.cancer.org/research/cancerfactsstatistics/breast-cancer-facts

4.1.91 Achieving earlier diagnosis of cancer has long been part of the strategy for improving cancer outcomes in Wales and is a key feature of the Velindre NHS Trust Cancer Strategy. This was formalised with the introduction of the urgent suspected and non-urgent suspected cancer targets within Wales.

Lack of a comprehensive Acute Oncology Service (AOS)

4.1.92 The current system within South East Wales often sees patients with a primary diagnosis of cancer presenting at an A&E department where there is less oncological clinical knowledge or expertise available to them given the acute focused nature of the A&E service. This can result in patients being admitted onto a general medical ward for a test and waiting longer for an accurate diagnosis. There is compelling evidence of poorer outcomes for patients presenting as emergencies, which is an indicator of a sub-optimal system. [25]

4.1.93 There are also occasions when patients become unwell at VCC whilst receiving highly toxic treatments and suffering sepsis as an example.Typically, these patients are treated at VCC, given their need for specialist oncology care, but on occasions it may be necessary for the patient to be transferred.Patients are then transferred via an emergency ambulance to the appropriate Local Health Board for critical care.

4.1.94 Patients can also experience unnecessary waits for treatment as their needs as a cancer patient are not sufficiently understood or they enter the health care system at a place which is not appropriate for the care they require such as A&E. This delay and sub-optimal care can have serious and adverse effects on the patients' outcomes and experience of the service and also increases the cost of that care for the NHS with patients often experiencing an increased length of stay in an acute setting. This is typically exacerbated by admission onto a general medical ward where patients do not always receive the required level of oncological expertise required to manage their condition.

4.1.95 A significant amount of work has been undertaken by LHBs, VCC and other partners in South East Wales in developing primary, acute and non-acute oncology services to improve the early detection of cancer and increase the likelihood of patients being managed on the most appropriate care pathway. For example VCC has worked in partnership with Aneurin Bevan LHB to introduce an AOS for cancer patients. This service enables VCC to provide expert advice and support to specialist acute oncology nurses located within the LHB in identifying and effectively managing patients who present with oncological symptoms.

4.1.96 The service has been running since October 2013 and has demonstrated the significant improvements that have resulted from the service and the very clear benefits in patient safety and outcomes that have been realised.To date the team has:

- Been directly or indirectly involved in the care of 729 patient admissions;

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[25] Improving Outcomes: A Strategy for Cancer *Second Annual Report 2012, Department for Health.*

- Seen 281 patients and provided telephone advice to 36 patients with over 85% of patients being seen within 48 hours of admission;
- Improved compliance with key measures in neutropaenic sepsis with an increase from 66% to 100% pts now receiving the correct antibiotics, an increase in compliance with the pathway from 50% to 86%;
- Improved compliance with metastatic spinal pathway e.g. an improvement in the compliance with patients having an MRI within 24 hours from 61% to 85% and the mean time to Radiotherapy treatment from 50 hours to 24 hours in line with best practice; and
- Achieved a reduction in length of stay for cancers of unknown primary from 11.5 days to 9.5 days after the AOS was established and reduced length of stay for spinal cord compression pts from 25.1 days to 5.2 days. In addition, junior doctor teams have been supported, through key decisions and protocols, for example with de-escalation of antibiotics.

4.1.97 The patients' experience of the service has also been significantly improved. This is illustrated by patients with Cancer of Unknown Primary. Prior to the AOS this patient group did not routinely have a named nurse. The team now ensures that patients have appropriate information and support whilst providing a point of liaison for primary and secondary care.

4.1.98 The clinical team experience has also improved markedly as illustrated by this real life story from a clinician (extract is the actual note provided by the clinician):

> ***Patient and relatives feedback on the service via VCC chemo support team.*** *'Receive a call-in over august bank holiday – patient had been admitted to RGH with neutropaenic sepsis and unwell – Wife of patient called (E Nursing Sister) on the Monday bank holiday stating that everything had been excellent on arrival to A&E on the previous Wednesday. Her husband had been seen swiftly in A&E – AOS nurse had met them on arrival as promised by the VCC chemo pager. Treatment was started immediately – "they already knew everything about my husband's case, I didn't have to explain anything – they were brilliant'*

4.1.99 Further support is provided by VCC to Aneurin Bevan, Cardiff and Vale and Cwm Taf UHBs to optimise the quality of the current network of services, with VCC consultant oncologists providing clinics at each of the acute sites. This is an example of an approach which has significantly improved the quality of care at Aneurin Bevan for patients and has been recognised as achieving a step-change in best practice in a sustainable way. This, together with a range of other developments being taken forward by the Local Health Boards, could be further developed to help further improve the system.

4.1.100 VCC views the implementation of the AOS model across South East Wales as being a key enabler for improving the system in sustainable way.

The need for faster access to treatment

4.1.101 Access to fast and effective treatment and care are key determinants of clinical outcomes. The current standards for Radiotherapy and chemotherapy waiting times are guided by the Joint Collegiate Council for Oncology (JCCO) (1993), which set a maximum 28 day target for radical Radiotherapy, a 14 day target for palliative care, and a maximum 48 hours target for emergency Radiotherapy. For SACT the waiting times for adjuvant treatment are 7 days up to 21 days for non-emergency SACT and a target of 48 hours for emergency SACT.

4.1.102 Within VCC there has been considerable work to redesign systems and processes in order to reduce waiting times. This is exemplified by the reduction in waiting times for head and neck Radiotherapy from 28 days to 14. This drive for continuous improvement will continue through the implementation of the enhance service model which is supported by the latest technology to drive improvement across all services and all sites in a sustainable manner.

4.1.103 However, it is evident that the demand for Radiotherapy will soon outstrip capacity and this will see a significant increase in median waits for patients. The pace of increase in median waits will initially be offset by process and system improvements but this will be for a limited period given the expected rate of increase in demand.

4.1.104 The Trust also performs well against the 21 day target for SACT with 93% of patients commencing their treatment within 13 days. However, the future picture is a similar one to Radiotherapy with increasing levels of demand likely to impact upon the service s ability to continually reduce waiting times. VCC is continuously exploring ways in which additional capacity can be created in the short-term to ensure patients continue to receive timely treatment.However, it is unlikely that this will provide a long-term sustainable solution.

Variation in availability of services at VCC and across South East Wales

4.1.105 The current service model has developed over time, providing a number of services across the region in response to demand. These services include outpatient clinics and SACT assessment clinics in LHB hospital facilities, and also SACT delivery sites in locations including hospitals, and others including mobile facilities.

4.1.106 In most, these are supported by staff from VCC. As a result Velindre teams are spread over a large geographical area and this affects the type and efficiency of service provided both at Velindre and within Health Boards as described in more detail below.

Outpatient Services:

4.1.107 There are different limitations within the outpatient departments across the region and this impacts the facilities provided, room availability, room size and the support services available e.g. phlebotomy & pathology. This impacts the flow of patients leading to longer waits in sometimes crowded waiting rooms

as well as the inability to provide clinics closer to where patients would prefer their care to be delivered. The availability of staff to run clinics impacts the level of efficiency of outpatient services in the cancer centre and varies by day of the week so services are less efficient. The lack of an e-scheduling system for outpatients also inhibits better usage of available rooms and spaces.

SACT:

4.1.108 In order to receive SACT, patients have to travel to a number of locations with some treatments only available at the specialist Cancer Centre e.g. some complex treatments and clinical trials. The vast majority of treatment is less complex and can be provided in locations closer to patient's homes. Some of these services have developed over time to meet various needs and have not been developed in such a way as to provide a full or comprehensive service. This means more could be done locally that currently happens still at the Cancer Centre.

4.1.109 Although there are currently 11 different sites delivering SACT across South East Wales which on the surface appear to offer a good distribution for the region, this is a sub-optimal, fragmented and inequitable service because of variation in the opening hours and the limitation of staff working at each site.

4.1.110 Currently some chemotherapy infusions take longer than a site may be open for therefore cannot be given at this location. Medical cover may not be available so some treatment options are not available when a doctor is not on site. There is a lack of opportunity to develop specialist care closer to patients' homes due to a lack of research, specialist allied health professionals and cancer specialist nurses

4.1.111 Only 38% of patients who participated in the National Cancer Patient Experience Survey (2014) stated that taking part in a clinical trial had been discussed with them compared to 29% in Wales as a whole.

4.1.112 For patients this only provides limited choice so many have to travel further than they would prefer in order to receive the treatment they need. A typical example of this is shown below where a patient who was being treated for breast cancer attended a number of sites as part of their pathway of care to be seen in the outpatients departments and to receive SACT. The flow shows that in this instance the majority of visits were to the Cancer Centre and not to the patients nearest location, resulting in extended travel time on multiple occasions.

Figure 4-9 A typical patient pathway
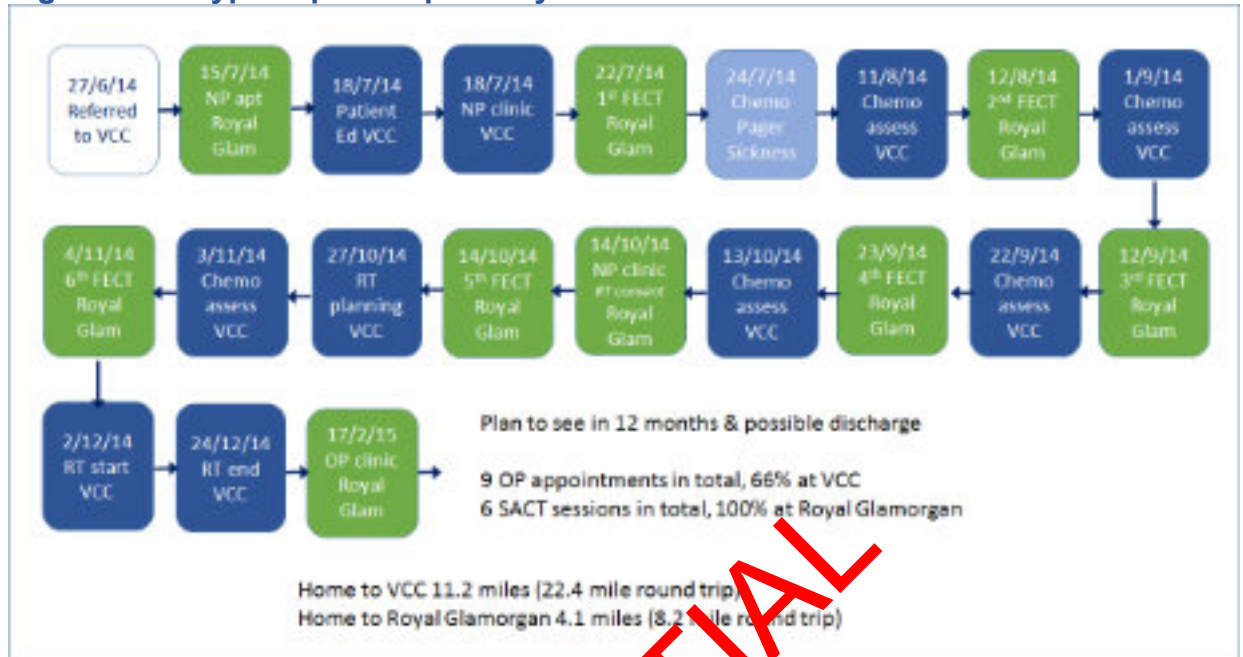
4.1.113 The lack of a regional unscheduled care pathway means that patient location and clinical expertise do not always align with patients often admitted to their local hospital while oncology expertise may be at VCC. This has an impact on various aspects of care increasing length of stay repeated investigations and use of resources.

4.1.114 The majority of VCC SACT outreach clinics have developed organically over a prolonged time period and it is recognised that improving the overall efficiencies associated with the outreach clinics is a key factor in increasing daycase capacity

4.1.115 Fundamentally, the capacity which is available to deliver SACT across each of the outreach clinics differs and VCC's ability to deliver efficient services at these clinics is dependent on the following variables:

- number of chairs available at each site;
- availability of medical cover required for certain treatment options;
- whether or not the clinic needs to be set up in advance of patient attendance;
- opening hours of host location;
- duration that daycase clinic may stay open for;
- nursing staff travel time to the outreach location;
- availability of Pharmacy Technical Services to support each outreach location;
- mode of delivery of SACT to the outreach location: nurse or other transport system; and
- patient willingness/ ability to attend certain outreach clinics and number of patients suitable to attend any given clinic on a given day due to needing

to have had a pre-SACT assessment within a certain time frame prior to their daycase appointment.

4.1.116 Each outreach clinic has its individual challenges associated with the delivery of efficient services. This is demonstrated by significant variations in utilisation rates by clinic across the service.

4.1.117 A key aim of the TCS Programme is to improve the productivity of the SACTs service by:
- Consolidating outreach clinics to realise efficiencies;
- Increasing the use of mobile units for shorter infusions/injectable;
- Implementing e-scheduling (more effective scheduling and anticipated efficiency gains- to be quantified); and
- Expanding home care provision.

Inpatient services at VCC:

4.1.118 Flow of patients through the inpatients ward is limited by the lack of an assessment unit, where patients could be better managed to avoid unnecessary admissions and provide a potentially quicker intervention to manage symptoms and control their condition. Currently some patients are admitted to the inpatient unit that could be better managed in an ambulatory care setting as a day case, for example some brachytherapy patients are admitted overnight and some patients attend inpatients rather than ambulatory care for procedures like blood transfusions. Indeed some patients are admitted into VCC that possibly should be managed within the LHB as this is closer to home.

4.1.119 For some patients who have been admitted to VCC, packages of care and discharge processes can be protracted if patients require a home assessment. Limited availability of specialist Allied Health Professionals within LHBs can also result in patients not receiving the same level of support at within the outreach setting as that provided within VCC, given its sole focus on cancer services.

Radiotherapy Services:

4.1.120 Radiotherapy is currently only provided at VCC which means uptake of radiotherapy treatment might not appeal to patients who live quite far away from the centre. In some circumstances, patients may be admitted to a District General Hospital as an emergency but require Radiotherapy which is at VCC. This poses problems when Radiotherapy expertise is required but the clinical oncologist is not at routinely available at the District General Hospital to support the multi-disciplinary team in managing the care and treatment of the patient.

4.1.121 Radiotherapy services at VCC are currently available for five days a week for radical, palliative and emergency patients.   There is a weekend service for emergency patients but this is not provided as a funded service and is therefore considered fragile. The current level of service provision at weekend's results

in some routine patients having interruptions to their treatment plan. While this does not affect the overall outcome for the majority of patients, there are a small number of patients who would benefit biologically from uninterrupted treatment. Similarly, it significantly affects the flow of patients through the Radiotherapy service as a result of the scheduling requirements for patients who require uninterrupted treatments. This can often result in a reduced patient experience and increased length of stay for patients receiving their treatment as inpatients.

Lack of a dedicated consultant oncology presence within Local Health Board services to support enhanced multi-disciplinary working and better management of patients

4.1.122 There is insufficient oncology presence in secondary care which impacts the level of quality that is able to be provided to some cancer patients. This is specifically acute at Multi-Disciplinary Team (MDT) meetings where oncology input would significantly improve the team's ability to diagnose, plan and deliver the most appropriate care in a timely manner.

4.1.123 There are a number of primary causes of this. First, the location of where the MDT is held. For example, the MDT may be in a District General Hospital while the oncologist may be based or working at another site across the region at the same time. Second, there is also currently insufficient time built in consultant oncologist job plans to enable them to work within the MDT in a substantive manner, given the requirement to run outpatient clinics across the region and at the VCC. Third, there are insufficient oncologists working within the current funded workforce at VCC to effectively undertake the additional requirements.

4.1.124 The outcome of this is often delays in treatment planning for patients and agreement of their treatment options.

Information for patients to support joint decision making:

4.1.125 There are a significant number of data and information solutions which are currently considered to be sub-optimal and which do not facilitate joint decision making between clinicians and patients. Currently the NHS design of services does not support patient's access or patient electronic information sharing. The design was based on a healthcare centred view of services, with very tight controls of information sharing outside the organisations boundaries. This was in order to maintain privacy, security and the integrity of patient care.

4.1.126 To ensure in the future patients will be able to look after their own well-being and connect with health and social care services these are all required to be reengineered within the national designs for the benefit of the patient co-production and cross organisation collaboration. The maintenance of privacy, security and the integrity of patient care will still be retained but the patient will get increasingly improved access as each of the systems are reengineered to support this.

4.1.127 Currently patients will attend VCC or an Outreach location for consultations or treatments. These journeys can be quite arduous and stressful to patients. They can entail waiting times for collections and pickups by public transport or ambulance, travel times to and from the locations, queuing times in traffic, waiting time onsite with the potential of further delays due to service issues, sometimes also protracted periods of treatment. These all occur when the patient is physically and psychologically in a compromised position.

4.1.128 During this process the patient does not currently receive test results, treatment or diagnosis reports electronically. They are able to view their patient record onsite at their request. They are also able to provide consent for copies of their patient record be shared with other health professionals to support treatment decisions. Consent may also be provided for sharing the patient data for legal reasons.

4.1.129 Additional resource and development time is required to reengineer the existing services to meet all the future patient service requirements. Agreement on the best design to make this accessible to patients will also be required.

Supporting clinicians and healthcare professionals:

4.1.130 The most current NHS national design of services 'the national roadmap' was developed in order to allow rationalisation of systems in use within Wales and better cross organisation movement of staff. In the main the national systems still maintain organisational based silos of clinical information. The cross organisation data sharing is still a future ambition as these designs are improved e.g. national image sharing, national results and national documents.

4.1.131 Velindre are currently at the very initial stages of the 'national roadmap' of services and the main systems in use for Patient Administration System (PAS) and Electronic Patient Record (EPR) workflows do not integrate with newer national designs. Since their first inception over 20 years ago, the Velindre design of these has become very dated. Although they continue to provide an essential service and were very progressive for their time the out-dated software necessitates the replacement to a modern design and technology. In order that these can still be supported these will need to be replaced and existing data migrated as a first step.

4.1.132 The software supporting the national service PAS and EPR is also no longer supported by Microsoft; due to its age of design. This means no further development or changes can be undertaken without further risk to service stability being introduced. The age then introduces a whole raft of further issues/risks of supportability to maintain a service of this age in terms of: service stability how long this can be sustained; the server requirements and how long these can be maintained to support this age of design, the increasing risk of cybersecurity due to the age of design, the limited secondary use of data available from this design of service, the quality of the data against modern and ever increasing requirements, the lack of adherence to more modern national standards, the lack of integration capabilities with newer national designs and

the diminishing pool of skilled resource to manage and maintain the service of this age.

4.1.133 The lack of integration capabilities with newer national designs is now a barrier for the implementation of clinical IM&T service improvement, as VCC cannot progress full implementation of all national products and integration with local solutions. The next design of these services will however need to be engineered to include the latest version of the existing national PAS with the best of the EPR workflows, the national view of data collaboration with health and social care services, plus ensuring patients can connect with all of these for the benefit of the patient co-production and cross organisation collaboration working.

4.1.134 Clinical information is exchanged across the healthcare system but this is often at the expense of additional third party services or ad-hoc sharing arrangements rather than integrated national services e.g. radiology images are exchanged electronically by an NHS England initiative which health organisations subscribe to across the UK for data exchange. Clinicians also have to resort to using multiple logons to access multiple systems in order to access patient data which can become very time consuming, problematic and tiresome. This information can also need to be sourced from a number of locations; some often accessed via other organisations; rather than benefitting from access to a single system with access then to all patient data, readily available in one single place.

Summary:

A summary of the main limitations associated with service delivery is provided below

Table 4-14: Summary of VCC service limitations

Core Service		Current service – Limitations
Radiotherapy	***Patient Care/ Experience***	- Some patients travel long distances to receive treatment; - Uptake of Radiotherapy treatment (access rate) below best practise guidance.
	Operational Model	- Centralised delivery model (100% of Radiotherapy treatment delivered at VCC).
	Demand & Capacity	- Insufficient capacity to meet current and anticipated future demand; - Lack of operational resilience machine to limit service impacts of unplanned machine breakdowns; - Lack of ability to deliver research/service development due to operational pressures.
SACT	***Patient Care/ Experience***	- SACT facilities across South East Wales are sub-optimal; - Variable access/availability of outreach SACT facilities; - Limited opportunities for homecare delivery.
	Operational Model	- Largely centralised model of care (VCC 65% of activity / 35% activity at HB/<5% home); - Fragmented delivery model across outreach locations; - Low utilisation of chair capacity at some outreach locations.

Core Service		Current service – Limitations
Inpatients and AOS	*Demand & Capacity*	- Limited capacity to meet anticipated future demand; - Delays in being able to implement delivery of new systemic therapies; - Inefficiencies in SACT delivery as a result of the current delivery model.
	Patient Care/ Experience	- Patients may not be admitted to the most appropriate locations for treatment; - Some patients may stay in hospital longer than necessary due to delays in accessing specialist input; - Lack of assessment facilities means some patients admitted unnecessarily.
	Operational Model	- No clear operational delivery model in place across South East Wales for the provision of the AOS.
Outpatients	*Patient Care/ Experience*	- Poor patient experience as a result of sub-optimal outpatient facilities at VCC & Outreach locations.
	Operational Model	- Outpatient services are predominantly centralised with 65% of activity delivered at VCC despite 70% of patients living outside of Cardiff; - Lack of availability of support services (e.g. CNS/AHPs/ Research) in outreach settings; - Challenges associated with information sharing; - Limited scope for telemedicine to help meet demand in novel ways.
	Demand & Capacity	- Insufficient capacity to meet current and anticipated future demand; - Limited scope to increase physical capacity at VCC (e.g. additional Outpatient facilities); - Inefficiencies of outpatient clinics as a result of the current delivery model.
Radiology	*Patient Care/ Experience*	- Patients attend VCC for radiological investigation unnecessarily; - Patients wait too long for radiological investigations/results.
	Operational Model	- Lack of clear strategy for where patients are best investigated; - Inefficiencies: investigations repeated due to lack of information sharing.
	Demand & Capacity	- Insufficient capacity to meet anticipated future demand leading to lengthening waiting times.
Support services critical to high quality clinical care	*Patient Care/ Experience*	- Inability to set up and recruit to high quality research in LHBs; - Education is fragmented, inefficient and variable; - Informatics platform that is unsupported, fragile and unable to be developed.
	Operational Model	- Lack of opportunities for joint planning and service improvement work between organisations; - IT: different systems between different care providers hinders effective communication, information sharing and healthcare; - Research is fragmented which reduces patient access and uptake.

Core Service		Current service – Limitations
	Demand & Capacity	- Insufficient capacity to meet research activity targets and education opportunities.

Infrastructure deficiencies across the VCC estate

Overview

4.1.135 VCC was built in 1956 and has been extensively developed in an incremental fashion without a 'development control plan'. This has left the hospital with a number of 'add-ons' leading to deficiencies in circulation and service adjacencies.

4.1.136 The hospital is widely acknowledged as having a culture where patients are at the centre of everything with a compassionate and caring environment where staff consistently go the 'extra mile' to meet the needs of patients. Nevertheless there are a number of limitations and challenges related to current facilities including:

- There is no space on site to install any additional linear accelerator machines (Linacs), limiting the Trust's ability to expand its capacity to meet growing demand;
- The majority of the patient environment is not fit for purpose and does not support optimal recovery and well being; and
- Parts of the hospital do not comply with statutory requirements and create challenges in maintaining the high level of patient safety.

There is no space to increase capacity

4.1.137 VCC currently has eight Linacs which are required to be replaced every ten years in line with guidance issued by the National Radiotherapy Advisory Group. It is also evident from the analysis set out previously that investment in additional Linacs will be crucial to sustaining the current level of Radiotherapy service and meeting forecast growing demand.

4.1.138 However, options for accommodating additional Linacs on the current site are severely limited given the extent to which the site is land-locked and already fully developed and the space that would be required for new bunkers. The only suitable location available is the staff and patient car park. However, this would significantly worsen the poor parking facilities and so is not considered to be a feasible option.

4.1.139 This represents a risk for VCC given the current pressure on the system. This is compounded by the anticipated growth in demand for services. While planning is underway to mitigate capacity limitations in the short term, it is imperative that a long term solution is established.

Patient environment is not fit for purpose

4.1.140 Whilst the quality of the service provided to patients is highly rated, the Trust recognises that the physical environment is not fit-for-purpose and does not provide patients, their families or our staff with the experience they deserve. This particular issue presents a significant risk to the reputation of VCC and will reduce its ability develop its reputation nationally and internationally and provide the highest quality patient care to which it aspires.

4.1.141 In general, the hospital is not fit-for-purpose to provide cancer services for a population of 1.5 million people in the 21st century since the current environment has an adverse impact on patients and the service they receive.

4.1.142 Table 4-15 provides an overview of the asset profile demonstrating that there has been little modernisation in recent years. This has led to the reduction in standards of the patient environment and accommodation quality experience.

Table 4-15: Asset profile

Age and Asset Profile	%
Age Profile - 2005 to present	13.60
Age Profile - 1995 to 2004	18.20
Age Profile - 1985 to 1994	21.60
Age Profile - 1975 to 1984	5.50
Age Profile - 1965 to 1974	11.90
Age Profile - 1955 to 1964	29.20
Age Profile - 1948 to 1954	0.00
Age Profile - pre 1948	0.00

4.1.143 The current estate is clearly 'tired' and lacks key clinical adjacencies consistent to 21st century health care design standards and efficient means of patient care. With the ageing building structure, inadequate materials lead to unsuitable standards of privacy, confidentiality and dignity. It is not only the design and space that have their issues, but also the original construction methods/materials which are not suitable for today's health care environments.

4.1.144 Another major challenge for the Cancer Centre Site relates to car parking which is far from adequate and has led the Trust to acquire a license to utilise space for additional car parking with our neighbouring Trust, Cardiff & Vale. The anticipated growth of the cancer centre and patient throughput cannot be accommodated on the current site.

4.1.145 Overall the main physical challenges related to the patient environment include the following:

- Two out of the three inpatient wards are well below the required standard for modern healthcare;
- Space is cramped with the majority of inpatients having insufficient space;

- The majority of circulation routes are too narrow for the volume of traffic and patients and staff/families have to stand tight to the wall in the main corridor if a trolley or wheelchair is passing as there is insufficient room for two-way traffic;
- The outpatients department is too small to cope with current demand and in desperate need of modernisation;
- Patients, staff and services have to cover too much distance due to the poor adjacencies that have resulted from piecemeal design e.g. the pharmacy is at the furthest point away from the outpatients department;
- The main Outpatients reception area is located in direct visual line with a vast number of consultant rooms leading to privacy issues during consultation/ treatment. Distances from waiting areas in general and reception allow sensitive conversations between patients and clinicians to be overheard potentially leading to greater patient anxiety than necessary;
- The hot and cold water infrastructure is insufficient to support the showers and washing facilities on the first floor inpatient ward due to the incremental development of the building; and
- The existing working environment often causes staff to make compromises as they deliver care. For example, using smaller hoists in patient rooms due to the limited space.

4.1.146 The facilities also present a range of challenges for patients and families:

- The facilities do not always provide patients with their basic and fundamental needs. For example, there are frequent occasions when inpatients on the first floor ward are unable to have a shower as the pressure is insufficient to get water to the showers and it cannot be controlled safely; it is either very hot or very cold;
- Patients' dignity is compromised due to the lack of space and privacy for inpatients. For example, there is little space between beds on the first floor. There is a similar picture for outpatients where the design of the consulting rooms does not allow for total privacy;
- The majority of the inpatient, outpatient and therapies environment is not synonymous with a cancer centre that supports well-being and healing; and
- There is insufficient car parking available for patients and their families and they often have to spend too long waiting for a space or finding a car parking space outside the hospital in a built up and busy residential area which causes additional stress during what can already be a challenging time for patients and families.

Challenges complying with statutory requirements

4.1.147 VCC has a strong track record in providing safe services. This is at the forefront of everything we do, with a relentless focus on the continuous reduction of harm and unnecessary variation in clinical practice and care. One of the greatest risks to providing safe services is the current patient environment within the hospital and particularly the inpatient wards and facilities.

4.1.148 With the age, design and construction of the current Cancer Centre accommodation, the trend appears to be one of increasing challenges to

sustain a safe patient and staff environment given the limited Welsh Capital investment available.

4.1.149 Minimal upgrading of essential areas to ensure the management of statutory compliance has been carried out to reduce the risk to patients, staff and the Trust. However, due to restrictions of decanting and funding, there has been little modernisation to general infrastructure.

4.1.150 If the Centre is to maintain standards for the longer term, it will not only need the major arteries of infrastructure to be upgraded and/or replaced, but also the secondary, more localised infrastructure. There are many risks associated with these typical works. Phasing, decant and isolation issues will have a major impact on patient care and experience. Again in decanting terms, and with limited space, decant facilities are not guaranteed to be on the Cancer Centre Site. With this in mind, the practicality of this would need to be assessed. The practicalities are such that whatever space will be required to decant in terms of a, patient amenity, parking or the like will need to be removed off site, which will have a major impact to patient care, service efficiencies, and the patient experience.

4.1.151 The performance in functional suitability and space utilisation has generally been maintained at status quo over the last 3 years. However, this does not identify key areas of concern in relation to non compliance of HBN guidelines.

4.1.152 It is suggested that approximately 75% of the existing estate does not comply with current space standards. As an example it has been estimated that the footprint of the existing estate would increase from c16,000sqm to c28,000m2 if the Trust was to replace the existing VCC on a 'like for like' basis. In many cases there is poor quality accommodation, inadequate, non-compliant facilities and lack of basic patient amenities which seriously compromise patient confidentiality, privacy and dignity and very importantly the patient experience.

4.1.153 The issues of inadequacies have been clearly identified and in some cases been extracted and focused as urgent.

4.1.154 This current arrangements result in a number of major constraints:

- Infection control is made difficult due to the lack of space within the inpatient wards and the high bed utilisation rates. This is exacerbated by the lack of adequate showers and toilet facilities and their less than ideal locations;
- The fabric and materials contained within areas of high infection risk such as showers and toilets are often not in line with best practice;
- The isolation areas available to effectively manage and control outbreaks of infection as such are inadequate and not in line with best practice;
- The design of the inpatient wards is not ideal as it incorporates a large number of cubicles which are not easily visible to nursing staff when monitoring patients;

- The inpatient rooms on the first floor are very small, well below the requirements of Health Building Notes, and, for example, this makes it more difficult for nurses to assist patients in and out of bed in hoists;
- The corridors within the hospital are very narrow and it is not easy to move around the hospital, increasing the risk of slips and falls. This is increased by the lack of logical departmental adjacencies which results in patients having to travel further than is necessary;
- The narrow stairs to the first floor ward increases the fire risk;
- The vast majority of the site accommodation does not comply with current Health Building Notes (HBN) guidance; and
- Water quality and distribution within the hospital has major inadequacies and pose serious risk of increased legionella counts, which could have serious consequences for immuno-compromised patients.

4.1.155 Whilst there are arrangements in place to manage the risks identified above in a safe manner, it may not be possible to maintain the current high levels of safety as demand for services increase and the building and supporting infrastructure gets older and harder to maintain.

Summary – Infrastructure deficiencies across the VCC estate:

- There is no space for expansion on the existing Velindre site;
- The current VCC is not fit-for-purpose for a number of reasons including:
  - Poor clinical adjacencies which impacts patient care and efficiency of service deliver;
  - Unsuitable standards of privacy, confidentiality and dignity; and
  - Inadequate and insufficient car parking facilities.
- High risk and significant risk backlog maintenance requirements continue to increase year after year.

Business Needs: Case for change – summary and conclusion

Summary:

The case for change is shaped around both national and local strategic drivers.

The **national strategic drivers** set out the key factors influencing the need to drive step change through this Programme. The national strategic drivers can be summarised through the following themes:

- Improving patient outcomes;
- Increasing demand for cancer services; and
- Improving the quality of services we deliver.

The **local strategic drivers** identify the current service limitations and how they adversely affect the Trusts ability to deliver the required changes in service. The local strategic drivers can be summarised through the following themes:

- Future demand exceeding current capacity;
- Limitations of the existing Service Model; and
- Deficiencies in the current infrastructure.

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5   CLINICAL SERVICE MODEL

Introduction

5.1.1   The case for service change and redesign has been well made (see section 5). The purpose of this section is to set out the Trust's response through an integrated, prudent and patient centred service delivery model.

Summary of proposed Service Model

5.1.2   This section of the document will describe a vision of how non-surgical oncology services could be delivered for the current and future population of South East Wales, based on the values and principles developed from working with and listening to people affected by cancer, our staff and our partner organisations.

5.1.3   The scope of the service model largely reflects VCC's role in a broader system of care i.e. adult, non-surgical oncology. This includes scheduled aspects such as systemic anti-cancer therapy, radiotherapy, inpatient and outpatient care and all the essential services that wrap around and support these. A great deal of care is currently delivered outside of VCC in Health Board (HB) settings. This needs to continue with more care delivered locally to patients where safe and possible.Unscheduled care is an essential component; again, there are significant benefits to patients and the health care system if non-surgical oncology services better supports the wider healthcare system better across the region.   Health care is a complex system and it will improve through all partners continuing to work collaboratively.

5.1.4   Across the region, high quality care is regularly delivered by people who passionately believe in doing the very best they can and who maintain the service by 'going the extra mile', time and again. A great deal ofcare across the patient pathway is delivered to a high standard by colleagues outside Velindre and that some patients never need to access our services, but care also often straddles organisational boundaries. The development and delivery of   outreach services closer to patients' homes continues, but piece meal development has led to a fragmented, inefficient service on multiple locations. The people affected by cancer tell us very clearly that they want and expect teams to work together seamlessly, in a system that works for them, with their best interests at heart. Velindre is a centre of excellence.There is a need for excellence everywhere and the current clinical model has occasionally served to reduce collaboration with colleagues in local hospitals. Some patients travel unnecessarily for treatments. The lack of equality of access for all patients delivers a variable patient experience.

5.1.5   Doing nothing is not an option. Demand is growing due to rising incidence of cancer, an ageing population and both the number of available treatments and their complexity. Our current estate at VCC is not fit for purpose in size and function with no capacity to expand.

Without investment and change, the quality of care will fall, patient experience will worsen, outcomes will decline and costs will increase.There will be a greater move towards centralisation which will affect access and increase the impact/burden of treatment on patients, society, the economy and the environment. There is a risk that the staff who care so passionately about the way they look after patients may become demoralised, recruitment/retention will fall and the care we aspire to deliver and that our patients deserve will not be possible.

5.1.6 Rather than merely reacting to service pressures and problems, there is a need to redesign the regional service in a planned, strategic and purposeful manner which will deliver greater consistency and access to excellent care at the point of need. Patients and our clinical colleagues outside of Velindre have told us that the current service model leads to fragmented care, with particular problems of communication and support at transition points across the patient pathway.

5.1.7 This clinical service model provides a solution to a real and imminent problem, enabling high quality care, delivering best patient experience/outcomes within a sustainable framework. The model is very simple. It is designed to meet the inevitable and substantial growth in demand for cancer care and provide that care closer to where patients live It is designed to place the people affected by cancer at the centre of care: from information provision and support, decision making and treatment, through to involvement in service development.   It will support greater integration of Velindre's services and staff with those providing planned and unplanned care across the whole patient pathway.   It improves not only the way that care is delivered, but how people and organisations work together to plan and improve future services and how people affected by cancer can be at the centre of this.

5.1.8 To truly transform services in a meaningful way, it is not enough to make a step change in facilities and delivery. The Trust needs to develop new ways of working – including patient and staff involvement, service intelligence data, closer collaboration in service improvement, education, research and innovation. These functions are essential for high quality clinical care.   A s such, they are established as part of the current service and must be included in future plans.

5.1.9 Currently they are dispersed throughout the hospital site which creates limitations and inefficiencies. Our proposals will see a nVCC co-located with these services and functions within the planned Centre for Learning and Innovation, creating synergies and an openness for collaboration. Whilst this is focused on supporting and delivering high quality clinical care, regional working and regional benefits, it also creates exciting additional opportunities around areas such as research, innovation, technology and industry collaboration.It will support teams to work together across the region, allowing VCC to fulfil its role as a regional cancer centre.   Clinical services will have the knowledge, ability and agility to respond to future changes. It will support the long term delivery of high quality clinical care and create the research/evidence base to place South East Wales at the heart of how future oncology care is shaped,

improving patient care, experience and outcomes, and our reputation nationally and internationally.

5.1.10 The service model will be prudent with resources, focuses on what is important to people affected by cancer and which delivers care in novel ways, closer to patients' homes. Further benefits for patients and the health care system will be created, beyond the scope of the TCS project via the closer working between Velindre and Local Health Board staff through the Velindre@ facilities and the leadership and collaboration opportunities created by the Centre for Learning and Innovation. Working together, we can seize this opportunity to truly transform Cancer Services for the patients of South East Wales.

Scope of the Service Model

5.1.11 As discussed within the strategic context VCC has a long term strategy 'Shaping our Future Together' which sets out a clear vision for the delivery of specialist cancer services for the next 10 years.

> "To lead in the delivery and development of compassionate, individualised and effective cancer care to achieve outcomes comparable with the best in the world"

5.1.12 The TCS Programme seeks to deliver this strategy in two distinct phases, supporting the care we deliver and that of our partners:

- Phase 1: Improve regional non-surgical tertiary oncology services; and
- Phase 2: Adding further value across the whole pathway of services in relation to cancer.

5.1.13 This Service Model sits within the scope of Phase 1 of the TCS Programme and includes:

- Improved delivery of non-surgical specialist cancer services;
- Provision of more care and treatment closer to patients' homes;
- Development of a Velindre Radiotherapy Satellite Centre@ (RSC) and Velindre@ Outreach oncology services (including SACT/Outpatients and Ambulatory Care);
- Improved collaboration between VCC and other teams through the local provision of care supported by enhanced local facilities;
- Improvement of the AOS across South East Wales; and
- Improved education, research, service improvement and collaboration across South East Wales.

5.1.14 The Centre for Learning & Innovation (C4Li) underpins the clinical service through providing capacity to deliver core education and training for our staff to enable core services to be maintained. However, by definition, its scope is broader than that of the clinical service. It creates exciting additional

opportunities for the whole of the cancer community in South East Wales. This is described in more detail in section 3 of this clinical service model.

5.1.15   It is recognised that in conjunction with key partners and stakeholders VCC can support, contribute and add value to other elements of the cancer pathway in addition to the core services it is commissioned to provide. This will provide additional benefits to the population of South East Wales and to the health care system more broadly. This is included within Phase 2 of the TCS Programme. It is important to recognise that this is not included as part of the scope for this proposed Model but that the developments included support and facilitate these additional, future improvements.

Development of the Service Model

5.1.16   The Service Model has been developed following an extensive programme of engagement with patients, their families and carers, Velindre staff, local LHBs, voluntary sector and other partners. A summary of our engagement can be found at PBC/SC/SC4.

5.1.17   A range of engagement events and workshops have been undertaken with key stakeholders, including:

- **Accelerated Design Events** – over 200 key partners, stakeholders and staff attended a series of one day events to test the proposed Service Model.

- **Experience Based Design Workshops** – over 100 staff, patients and carers attended a series of events to map and discuss patient pathways and identify opportunities for improvement.   Further detail on these events and workshops can be found at appendix PBC/SC/SC6.

- **Health Board Engagement Workshops –** over 100 staff from across the LHBs in South East Wales have attended various engagement workshops.

- **Health Board meetings** – internal meetings with key HB leads (Including clinicians and service managers).

- Regular events to involve *Velindre staff* about the Service model.

- **Community *Health Council (CHC) meetings –*** attendance at Local Health Board CHC meetings.

- A series of detailed *Focus Group* meetings with patients and other people affected by cancer.

- Local **community** meetings**.**

5.1.18 Listening to our patients and stakeholders has allowed us to better understand the things that they value and what's important to them about the delivery and provision of Cancer Services (see Table 5-1).

Table 5-1: Key messages from our patients, stakeholders and key partner organisations

Quality of care/patient outcomes
• Many aspects of care are already good – we must not lose these strengths. • Care needs to be delivered closer to the patients' place of residence, to improve access to excellence and to avoid hospital admission unless necessary. • Patients and Velindre staff are keen that we maintain the quality, support and 'ethos' of Velindre when delivering more care closer to home. • The 'experience' of how a patient is cared for is really important. • Outcomes are important – not just length of life, but quality of life. • We should all aspire for excellence in the care we deliver. • Safety and quality of care are paramount. • 'Transition points' (e.g. between levels of care, different types of treatment or follow up are important as can lead to gaps in patient support/ communications). • Teams need to work seamlessly together across organisational boundaries.
Delivering Services
• Patients need to be actively involved in clinical decisions about them and in developing clinical pathways/models of care. • Patients expressed concerns that doing less at Velindre may threaten the perceived quality of care to be delivered. • Value to each attendance is important, with patients having control and choice where possible. • Services should work for patients, intuitively supporting care rather than feeling like another 'barrier' to contend with. • Patients stated that travelling to and parking at hospitals was often more stressful that the actual clinical attendance. • Education of patients and staff and information provision to patients are important to good clinical care. • Research opportunities for patients throughout the region need to be improved • Care needs to be sustainable – both in terms of financial costs and ability to develop and change in the future.

Wider health system

- Other parts of the system e.g. unscheduled care, workforce availability, IT) need to be enhanced in order to support the service model.
- Investment in workforce planning and modernisation is vital in order to ensure the availability of a skilled workforce to meet the future demands placed on the health care system.
- There needs to be more integration between care providers for both scheduled and unscheduled aspects of care between Velindre Cancer Services and local LHBs.
- There needs to be reduced fragmentation in the system by sharing clinical, diagnostic and treatment information between health care providers including primary care.
- Greater presence and visibility of Velindre teams in local LHBs is needed.
- Lessons learned in Transforming Cancer Services (TCS) could be applied across all of Wales.

Shaping Services that People Value

5.1.19 Increasing cancer incidence, complexity of treatment, survival and demands on non-surgical Cancer Services in South East Wales will make these services unsustainable in the near future. This will impact on care quality, patient experience/outcomes and the cost of delivering care will increase.

5.1.20 To address this the Trust needs to deliver services differently by placing patients at the centre of design and delivery of care, building upon the approach of 'value' based care that meets individual needs and health related goals. The Trust need to explore the locations from where care is delivered and how teams collaborate in this. It is important that resources are used efficiently and that every pound is spent effectively, adding the greatest benefit and value to the patient, organisations, wider health-system and society.

5.1.21 This requires a better understanding of:

- What is of value to people?
- Patients' goals for care and priorities, then determining in partnership a treatment plan that best meets these values;
- Treatment pathways (spanning different teams/organisations) and what skills/roles are needed to deliver care;
- The benefits, cost and impact of treatment;
- The outcomes that accurately reflect the quality of care we deliver, aligned with the needs of our patients; and
- Benchmarking performance against other similar services, nationally and internationally.

Our Core Principles

5.1.22 Velindre's core principles (see Figure 5-1) are framed around the key messages that emerged from listening to patients, their families and carers, Velindre staff, local LHBs, the voluntary sector and other partners.

5.1.23 The Service Model has been designed based on these core principles to ensure that the design and delivery of future Cancer Services meets the needs and expectations of our patients, healthcare partners and wider stakeholders.

Figure 5-1 TCS Core Principles
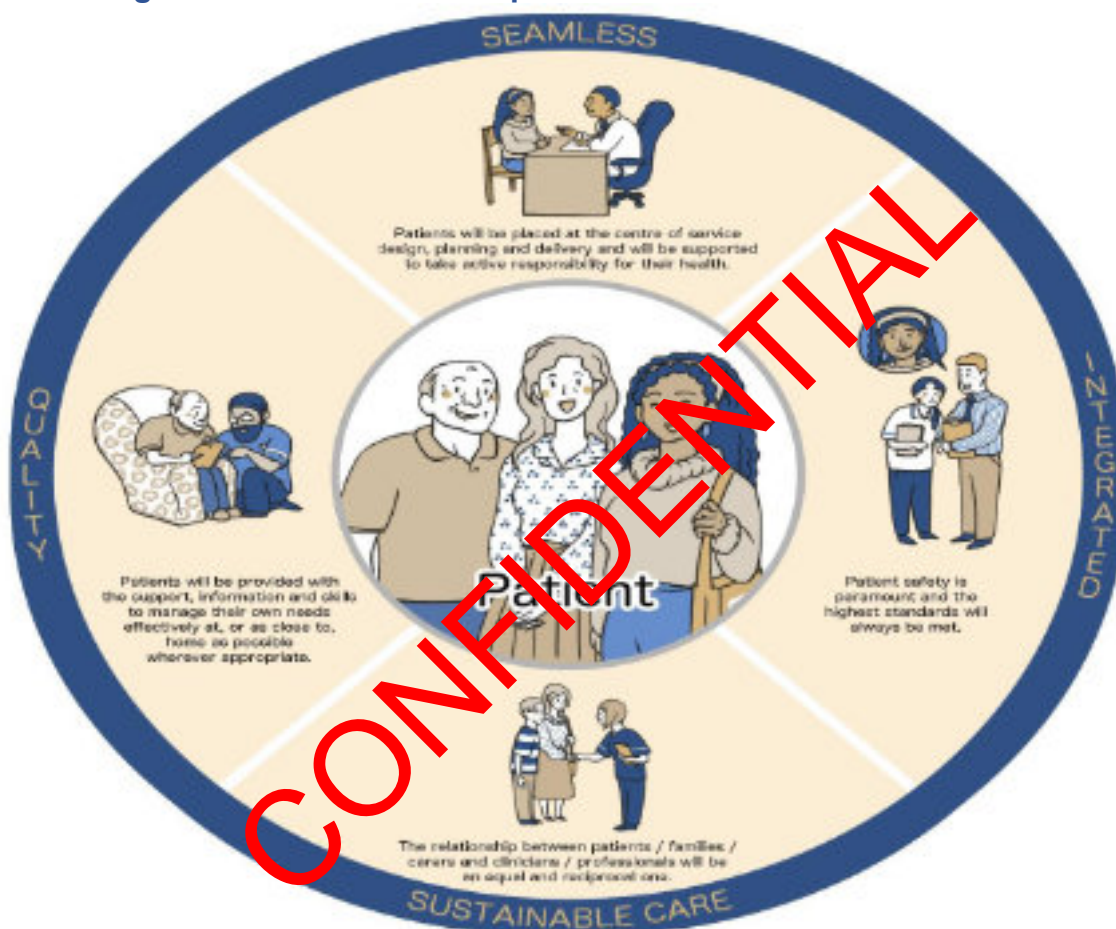
Our Service Model: How we will deliver Tertiary Cancer Services at home, closer to home and in a specialist Cancer Centre

5.1.24 The service model seeks to promote a new relationship which works in partnership with people to identify realistic goals, to design and deliver services around patients' needs and to achieve this in a truly sustainable way. This requires the whole system of public and voluntary sector services to work together better, across traditional boundaries within the resources available. There will need to be integration (from public health to primary and community to hospital and social care), whether working as public employees,

independent practitioners or not-for-profit organisations to achieve the best possible outcomes aligned with patients' values and priorities.

5.1.25 This will require patients to be empowered so that they can make informed decisions about their treatment and will necessitate staff working in new and different ways. It will require fundamental changes in the way in which the whole system operates. Optimising information technology, quality improvement systems, patient involvement, education and embracing innovative approaches to healthcare will all be essential to achieve high levels of service quality in a sustainable way.

5.1.26 The patient will be central, within an integrated network of services organised around them. The organising principle seeks to 'pull' high quality care towards the patient that is accessible in their preferred place to support them achieving their personal goals during treatment and when living with the impact of cancer. This includes all aspects of clinical care and support and also appropriate research opportunities that patients may wish to participate in.

5.1.27 The model builds on our current provision of services both at VCC and South East Wales, but improves this through strategic planning, design and delivery of this new clinical service model. It is based on a range of evidenced based pathways and the provision of seamless care which will require all organisations to work together to provide patients with all the care, support and information they require at the earliest opportunity in their journey.

5.1.28 To facilitate the successful implementation and delivery of the service model investment is required to support delivery from the following locations.

Figure 5-2: Service Model – potential locations where patients will access care
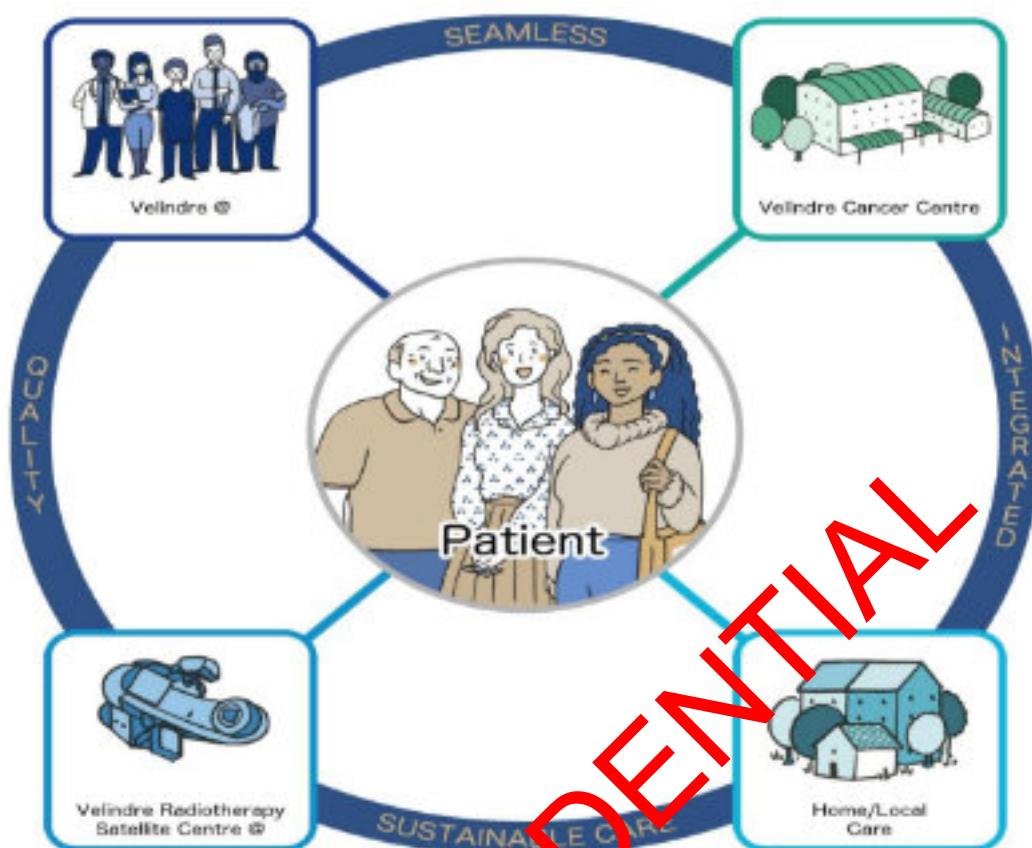
5.1.29 **Home/Local Care:** Patients will be able to receive care at their place of residence or in their local community (e.g. via primary care facilities, mobile services, 3rd sector services). Services delivered in this setting include outpatient reviews, some ambulatory care and some Systemic Anti-Cancer Therapy (SACT) chemotherapy delivery. Education and information provision will also be accessible locally. Technology and collaboration with local/community teams will be important in delivering these (e.g. telemedicine, web based information provision).

5.1.30 It aims to increase the provision of our services via home/local care to at least 10% of outpatient/SACT activity (from 5% currently). It is not known what the optimal proportion of home based care is for our patients. Once developed and evaluated, we would seek to increase this proportion beyond 10% where beneficial. Whilst more convenient for many patients and in some cases more efficient, some aspects of home/local care will be less efficient than hospital based services.

5.1.31 **Health Boards**: A range of cancer care occurs within the LHBs, with a significant proportion of patients having all their care delivered by the LHB team. This needs to be seamlessly planned with the non-surgical aspects of the pathway, as patient care can move from one team to another. The Velindre@ Outreach facilities and collaborative working will support this, but in addition to that, Velindre clinical staff will deliver planned support to L H B inpatients and local AOS.

5.1.32 It is expected that as more patients have their care delivered locally to them, acute problems will be managed increasingly within LHB settings. This already occurs, but the proportion of patients managed locally will increase. To support this, Velindre teams will be present in LHBs working closely with fellow clinicians and professionals, to see patients and guide investigations/treatment. Experience suggests that this can improve patient experience, quality of care and reduce length of stay, benefitting the people affected by cancer and LHB teams jointly.

5.1.33 **Velindre@:** These facilities will provide SACT, outpatient services, education and information provision and ambulatory care procedures within LHBs. They will not have inpatient beds – if admission is needed this will be via LHB teams/facilities, supported by oncology teams, or via VCC. They will be planned jointly with LHB teams, supporting collaborative working and helping to meet the needs of LHB and Velindre commissioned parts of the care pathway. This joint working will generate additional opportunities for benefits to patients beyond the scope of the clinical service model (for example, opportunities to support earlier diagnosis or links with surgical oncology or haematology teams within LHBs).

5.1.34 These local centres of excellence will improve efficiency, experience and access by collaboratively developing planned and delivered services within each LHB With planning, we can move from a variable, poorly planned service to a high quality, sustainable service to deliver care without the need for as many patients to travel to the main Cancer Centre in Whitchurch.

5.1.35 **Velindre Radiotherapy Satellite Centre@:** This will provide radiotherapy treatment for approximately 20% of our patients (provided by 2 new linear accelerators).This means better access for patients, reduced travel for patients and less use of transport services. It will mean that some patients from one LHB population may have access to their radiotherapy from within another LHB catchment population. This will mean that fewer patients need to travel to VCC for their radiotherapy. However, it should be noted that not all radiotherapy treatments will be available at the satellite facility at the day of opening, although it is envisaged that a full range of Radiotherapy treatments will be

introduced over time in a phased manner. Will be treated as quality and safety are paramount.

5.1.36 **VCC:** The Cancer Centre will provide specialist and complex cancer treatment including SACT, radiotherapy (including brachytherapy and unsealed sources) and specialist palliative care, inpatient facilities (being open for admission 24 hours/day, 7 days/week), a specialist oncology assessment unit and outpatient services, radiology and nuclear medicine. Due to its geographical location (i.e. within the Cardiff and Vale University

Velindre Cancer Centre

Health Board area) it will also form part of the system providing local care to patients for whom it forms the nearest non-surgical cancer facility. Patients will only have to travel to VCC if we cannot deliver their care more locally. It will also host the 'Centre for Learning and Innovation' – a system resource for VCC and the region, supporting clinical care throughout South East Wales via links with Velindre@ facilities.

5.1.37 The staff delivering care and the culture in which they work will be essential. This

is not just about physical facilities, although new facilities are needed to deliver world class care to the people of Wales. Through better ways of working together, linked with other aspects of the programme, the reputation of cancer care will improve, supporting staff recruitment, retention and career progression.

5.1.38 It is also critical to look at how unscheduled care is supported. This is included in the scope of the clinical model. By planning this alongside scheduled elements, we create the environment where both elective
and emergency care can be delivered well. The closer working relationships between Velindre staff and primary care/LHB staff through better integration of services will support both scheduled and unscheduled care, to the benefit of patients and the broader health care system.

5.1.39 Leadership: The locally delivered care across many settings will require strong leadership, governance and cross organisational collaboration. VCC has a key role in this, supporting LHB and other teams but also in leading developments in the parts of the pathway where we have responsibility. The additional resources and function that the Centre for Learning and Innovation (C4Li) provides will be important in supporting care across the region, including opportunities for service intelligence data, ongoing pathway work, patient involvement, and collaboration.

5.1.40 We have summarised the range of services which will be provided from which location in Fig. 5-3.

Figure 5-3: How the model will operate in practice: what services will be provided where

Service	Treatment Type:	Community		Secondary Care			Tertiary Care
		Home	Primary Care	Health Board	Velindre@	Radiotherapy Satellite Unit	VCC
Patient Information & Advice		✓	✓	✓	✓	✓	✓
Education		✓	✓	✓	✓	✓	✓
SACT	Oral/sub-cutaneous	✓	✓	✓	✓	✓	✓
	Simple Parenteral	✓	✓	✓	✓	✓	✓
	Complex						✓
	Chemo-radiation					✓	✓
Ambulatory Care Procedures		✓	✓	✓	✓	✓	✓
Outpatient Appointments:	New			✓	✓	✓	✓
	Chemotherapy assessment	✓	✓	✓		✓	✓
	Follow Up	✓	✓	✓	✓	✓	✓
Specialist Palliative, Allied Health Care and therapies		✓	✓	✓	✓	✓	✓
Research *Phase 1 research will continue to be provided by the C&V Clinical Research Facility	Qualitative Research	✓	✓	✓	✓	✓	✓
	Phase 1*						✓
	Phase 2				✓ (less complex)		✓
	Phase 3				✓	✓	✓
	Phase 4	✓	✓	✓	✓	✓	✓
	Radiotherapy Research					✓	✓
	Radiotherapy clinical trials					✓	✓
	Molecular therapy						✓
	Functional Imaging for Radiotherapy						✓
Radiology and Nuclear Medicine	MRI/CT			✓			✓
	Nuclear Medicine (diagnostic)			✓			✓
	Nuclear Medicine (non-imaging therapeutic)						✓
	PET-CT			✓			✓
Radiotherapy	Radical					✓	✓
	Palliative					✓	✓
	Emergency					✓	✓
	Brachytherapy						✓

Inpatient Services	Inpatient Beds			✓			✓
	Assessment Unit			✓			✓
	Surgery			✓			
Acute Oncology Services		✓	✓	✓	✓	✓	✓

How we will get there?

5.1.41 The journey to this improved service model has already begun. Many aspects do not need new facilities and we can start improving patient care/experience before these are developed. However these improvements will be limited without the addition of new facilities, so these are essential, alongside clinical teams working better together and in new ways.

5.1.42 The Trust will:

- Continue to deliver best practice, evidence based treatments, safely and robustly;
- Involve the people affected by cancer and all appropriate partner organisations in our planning;
- Benchmark with other similar cancer centres and where possible, contribute to the development of guidelines/the evidence base through research;
- Modernise all aspects of our care (scheduled and unscheduled), prior to the development of the new Cancer Centre, improving efficiency and quality;
- Develop opportunities for teams (including patients) to collaboratively review, improve and evaluate care pathways and justify those aspects that need to be delivered in secondary/tertiary care;
- Work collaboratively with each LHB team to develop care pathways that meet the needs of their patients and align with the principles of the TCS programme, including community based care to avoid attendance at a hospital unless necessary;
- Work collaboratively with each LHB team to understand how activity at the new Velindre@ facilities will support and align with cancer related activity within that LHB;
- Plan and develop the Velindre Radiotherapy Satellite@ Centre & Velindre@ facilities with LHBs;
- Review our distribution of clinical activity through the week and seek to even this flow and improve efficiency;
- Build our capacity to deliver more care away from VCC (for both scheduled and unscheduled care);
- Work collaboratively with primary care teams to understand and pilot safe ways of delivering care within the primary care setting;
- Work collaboratively with community/third sector teams to understand what additional care can be delivered locally, e.g. via mobile services;
- Work collaboratively with academia and industry partners to maintain and build relationships;

- Develop accessible education/information resources for people affected by cancer and staff to support local delivery of high quality care; and
- Explore, pilot and evaluate IT solutions to deliver more care locally e.g. via telemedicine.

Key Transformative changes of the Service Model

Table 5-2: Key Transformative Changes of the Clinical Model

Change:	Benefits:
A decentralised model including: Velindre Radiotherapy Satellite Centre@ Velindre@ (SACT & Outpatients) in Health Boards	• Increase in capacity/capability of cancer services across south east Wales; • Reduced patient waiting times, speedier access to treatment; • Improved patient experience with care provided closer to home; • Reduced travelling times for patients, their families and carers; • More efficient use of resources and a reduction in the unit cost of treatment; • Hospital admission avoidance unless appropriate; • Improved speciality input for patients admitted to LHB locations; • Radiotherapy treatment available in two locations; • Improved SACT capacity across the region; • Better access to core components of health care 7 days/week; • Wider access to clinical trials and research across the region; and • Increased number of palliative patients dying in 'preferred' place
A specialist Cancer Centre	• Capacity to meet future demand with more patients taking part in research; • Improved standards of privacy, confidentiality and dignity across patient areas, improved patient experience, quality of care and outcomes; • Ability to fully support its partners and to play an active, regional role; • Leadership in non-surgical cancer services and palliative medicine; • More rapid uptake of new technologies; and • Support clinical care throughout the south east wales region via the C4Li facilities/functions
Better team working between organisations	• Co-location of services supports both scheduled and unscheduled care and creates additional opportunities for further benefits; • Supports achieving the best possible clinical outcomes and the best treatment delivered quickly and effectively; • Patient information sharing will improve efficiency of healthcare; • Future 'agility' of clinical care is improved; and • Better specialist oncology support for patients in LHB locations
Enhanced AOS provision across South East Wales	• Cancer assessment unit at VCC that will operate an 'assess to admit' policy; • Enhanced oncology presence within each LHB; and

Change:	Benefits:
	• Strengthened network approach to AOS with VCC providing a Hub for AOS across the region.
Centre for Learning & Innovation	• Patient experience and involvement used to shape services; • Education and support will improve co-production of health services between patients and healthcare professionals; • Recruitment, retention and career progression for staff; • Data to understand services better; benchmarking; • Enhanced research across the region; • Enhanced quality improvement, innovation and cross organisational working; and • Enhanced co-operation with other cancer centres and professionals.

Key Messages

5.1.43 Putting together the key principles developed through listening to and engaging with the people affected by cancer and key partners, alongside the development of new facilities, we can create an exciting, regional care system that supports the long term sustainability of non-surgical oncology in South East Wales and creates opportunities beyond this.

5.1.44 People are central to the service model – by placing the people affected by cancer at the heart of changes and by supporting the staff that provide high quality care for patients, we can deliver truly person focused care.

Figure 5-4: Service Model & Core Principles
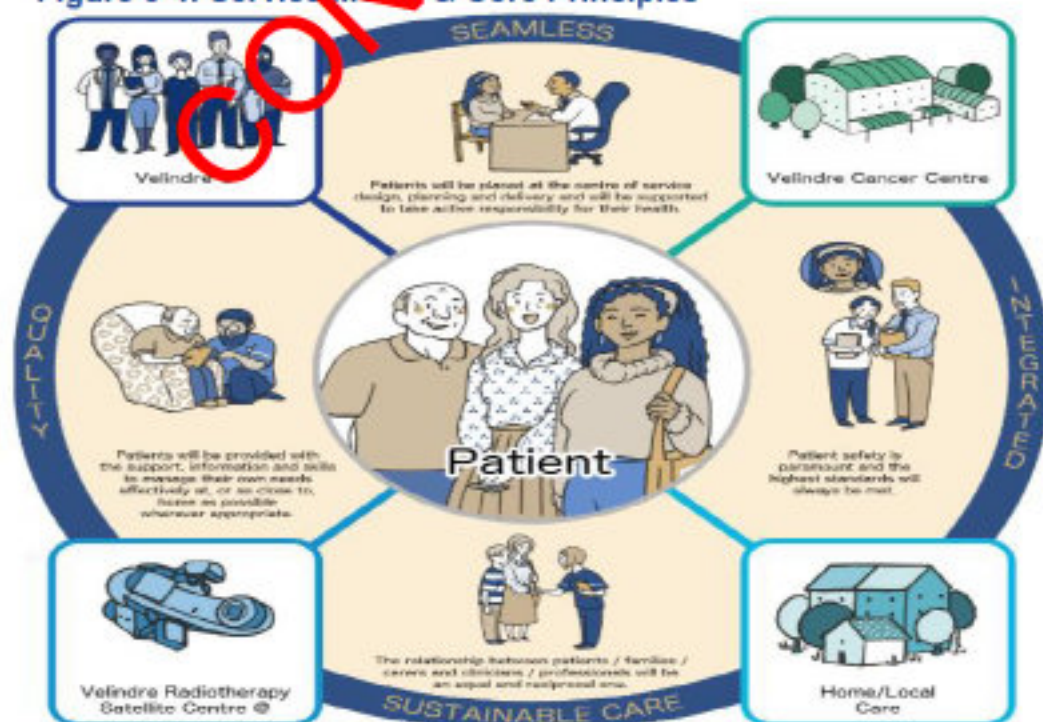
Patient Pathways and Clinical Services

5.1.45   Patients referred to Velindre Cancer Services for treatment may be at the start of their treatment journey or they may already have had surgery and be offered additional cancer treatment as part of their ongoing management plan.

5.1.46   There are many different tumour types/treatments and a huge variety of patient pathways related to them. Broadly these can be divided into two types of care pathways:

- Scheduled Care: refers to planned care provided after referral from a primary or secondary healthcare professional.

- Unscheduled Care Pathway: is by definition urgent, with a need to take action at the time of contact with services. Unscheduled care does not include the delivery of routine or non-urgent services.

5.1.47   The Trust have used a patient pathway approach based on the key principles described by our patients/stakeholders and our expert knowledge of how care is currently delivered, to develop the Service Model. This approach has enabled us to better understand what information, care, treatment and support our patients require in their journey; and where and how these can best be provided to ensure that patients and their families receive the things they value most from their care. It is, by design efficient and delivers the best possible quality of care and outcomes at the time and place of patient need. It will require more integration between teams and organisations to realise these benefits and has the potential to deliver further benefits through collaborative planning and working.

Scheduled Care Pathway

The scheduled care pathway encompasses all planned activities for patients, including outpatient attendances, chemotherapy and radiotherapy preparation and delivery, investigations and supportive treatments. It typically commences when a patient or their primary/secondary care team are concerned

5.1.48   that a cancer may be present – this may come after a referral from primary care, a direct presentation to secondary care or via screening

programmes. Diagnostic work and communication of results are performed in secondary care with initial input from Velindre staff via LHB multi-disciplinary team meetings, where a treatment plan is developed. Following this, care may be delivered locally to the patient (e.g. supportive care via community / hospice palliative care teams), within LHBs (e.g. surgery) or via a referral to Velindre teams, if SACT or radiotherapy are being considered. It is important to note that patients usually have care plans that involve more than one provider, that treatment can be arranged in different ways and in different sequences, as appropriate for each patient.

5.1.49   Patient involvement in decisions about them is crucial. Treatment and care needs to be seen in a broader context of the patient's overall needs – supported via electronic Holistic Need Assessment (HNA) completion and sharing of information between appropriate care providers.

5.1.50   Not all care is planned, and supporting the urgent, unplanned aspects of cancer care is equally important. Please see the unscheduled care section for more detail on this.

5.1.51   The scope of the TCS programme is centred on the services provided by the teams based at VCC, although these may be delivered away from the main cancer centre in collaboration with other teams/organisations as they often are already. The Trust recognises the huge amount of high quality cancer care is delivered without any input from Velindre staff. Through this programme, we aim to support these teams and to offer more integrated care across the region – the Trust is also keen to collaborate in areas beyond our scope to deliver additional benefits to patients whenever and wherever possible. The developments within the TCS programme will significantly improve patient care and experience and create the environment for further opportunities for additional improvements.

> **Key Transformative Changes:**
>
> - New and/or enhanced facilities to facilitate world class care, both within HBs and at VCC;
> - More planned care delivered closer to patients' places of residence;
> - Support for unscheduled aspects of care through co-location, planning and integration of teams;
> - High quality education/information provision for people affected by cancer and staff;
> - Improved information sharing between clinical teams; and
> - Regional service improvement, research delivery and innovation

Figure 5-5: Scheduled Care Pathway
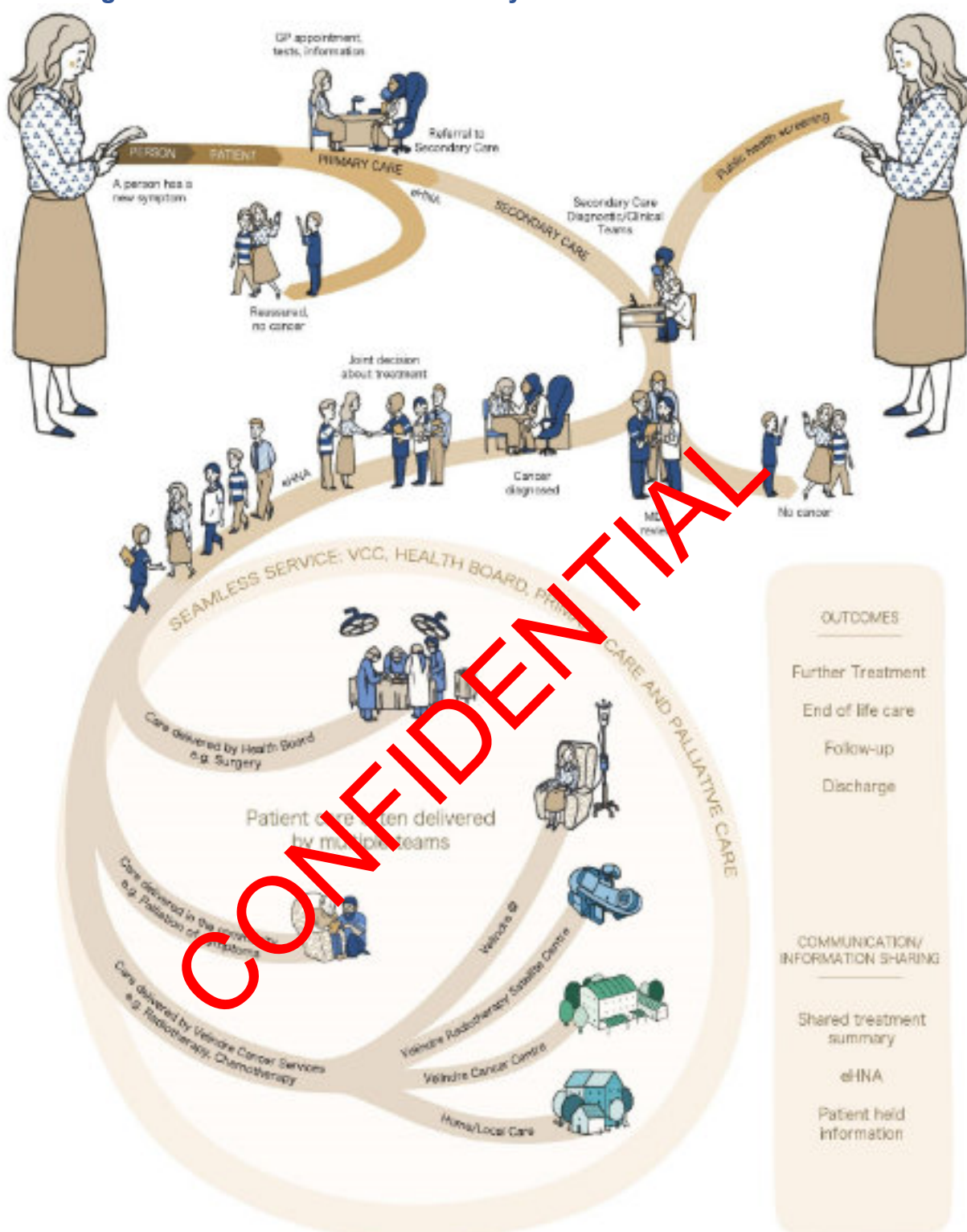
Scheduled Care Pathway: How it will work?

5.1.52 Alongside a referral to services provided by Velindre teams (if this is needed for an individual patient), the referring team and the primary care team will be supporting the patient and will complete a Holistic Needs Assessment. This will be available to the patient and all appropriate clinical teams. Education and information provision for the people affected by cancer and clinical staff will inform and improve patient experience at this stage. The patient will attend for an initial outpatient appointment to discuss their diagnosis, building on information, investigations and treatment they have already received.This will be planned to ensure all necessary information is available and that it meets the needs of the patient, including the opportunity to be seen by a variety of health care professionals. The opportunity to participate in research may be offered at this stage, or a later stage. Palliative Medicine Teams will form an important element of the care team, earlier in the pathway, when appropriate and beneficial to the patient.

5.1.53 Collaborative planning and information sharing between Velindre and LHB teams, including clinical information and service intelligence data, will optimise and enhance this early part of the pathway to improve patient experience, make best use of resources and ensure rapid sharing of information with patients and health care professionals.

5.1.54 The initial outpatient consultation will occur at one of two locations:-

- The **secondary care hospital** within the patient's local LHB.The Velindre Clinical Team will see the patient within the local secondary care hospital where they work closely with the clinicians and professionals within the hospital as part of a Multi-Disciplinary Team. In the future a far greater proportion of **planned activity will occur at purpose built, enhanced** Velindre@ facilities which will be located within the local LHB, closer to the patient's home.

- **VCC**: if this is closest to the patient's place of residence or when necessitated on clinical grounds, for example where they have a cancer that is relatively rare and services are provided on a regional or national basis.

5.1.55 **The proportion of activity delivered locally will increase in a planned way to enhance patient access and experience without impacting on LHB teams.**

5.1.56 During the first outpatient consultation the patient and health care professionals will discuss what the patient values most and clarify and understand what they wish to achieve from their care. Expertise will be available to ensure that the patient's needs are met and that they get maximum value from this attendance. Attendance will be planned to ensure that the required services are available to the patient and maximum value is

provided to the patient from each attendance. Following this, a treatment plan will be agreed and the HNA Assessment updated.

5.1.57 Appropriate information provision, communication skills and joint decision making will create an agreed treatment plan that will set out the range of treatment and support services that the patient will receive, together with a set of planned follow-up appointments in accordance with their treatment. This care plan will be shared with the patient and all appropriate clinical professionals.

5.1.58 A significant number of patients will be offered **SACT** as part of their treatment plan. If so, the patient will have a specific assessment and be provided with additional information/supportive education to prevent/minimise side effects and help self-management. Patients can receive their treatment in a number of locations:

- **Home/Local**: Patients could receive their treatment at home or within their local community (via mobile services or potentially via new services in primary care) if this best suits their personal circumstances and it is beneficial and safe. This may be self-administered (e.g. oral therapies) or provided by a Velindre managed service.

- **Velindre@**: Patients could receive their treatment within their local LHB if it is the location closest to their home and will usually be provided by Velindre staff. In some cases services may be integrated with existing LHB/ Haematology delivery facilities.

- **VCC**: Patients could receive their treatment at VCC if it is the location closest to their home or it necessitated on clinical grounds. Some patients will therefore have to travel further to receive complex SACT treatments which are only safe to provide at VCC.

5.1.59 Patients may also undergo a number of procedures (ambulatory care) related to their cancer or its treatment. These might include care of pumps, care of intravenous line sites, a blood transfusion or other simple procedures. These **Ambulatory Care** procedures will be planned and provided at the most convenient location, e.g. the patient's home, their GP surgery, mobile services, within their local LHB, (typically via the Velindre@ facility) or at VCC. This will be determined by the patient in consultation with the Clinical Team based on ease of access and clinical need.

5.1.60 **Radiotherapy treatment** will form part of treatment for many patients (approximately 40% of all cancer patients' curative treatments). If radiotherapy is offered as part of the patient's treatment plan they will attend an initial appointment with the Velindre team to discuss agree and plan their treatment. If a patient requires admission to hospital this will be to the hospital that is co-located with the Radiotherapy Satellite Centre@ or to VCC (whichever is most appropriate). Depending on the nature of the planned

radiotherapy treatment, patients could have their treatment at one of two locations:-

- **Velindre Radiotherapy Satellite Centre@:** A radiotherapy satellite centre will be developed which will provide radiotherapy treatment and support services within South East Wales.
- **VCC:** Patients will attend VCC if it is the nearest location to their place of residence or necessitated on clinical grounds e.g. radiotherapy treatment is considered to be complex or for research that can only be safely provided at VCC.

5.1.61 Patients will be provided with a wide range of **supportive care and therapies** during and after their treatment e.g. Speech and Language Therapies (SALT), Physiotherapy and Dietetics and Occupational Therapy and Palliative Care team support. Patients will receive these service at all locations as determined by their needs and will be provided in partnership between their LHB, community teams and VCC. Patients' needs will be anticipated so services are available to the patient when needed to minimise problems/identify early and treat rapidly, improving quality of life, care experiences and avoiding admission.

5.1.62 Patients who require planned admission to hospital for their treatment will use the Inpatient Services of their local hospital or VCC, dependant on clinical need. **Dedicated inpatient services** will not be available at any of the Velindre@ facilities.

5.1.63 Many patients will need **radiological investigations**. These will be arranged as part of a planned pathway, with the imaging test being done as local to the patient as possible. Image sharing will support rapid, expert reporting and will reduce duplication and improve efficiency.

5.1.64 Patients may wish to have the opportunity to enter a **clinical trial** or **research** studies which could include quantitative interventional studies or qualitative studies. These will be available at varying stages of the scheduled care pathway and in many locations. Some research may need to be delivered only from VCC if necessitated on clinical grounds or due to legislation e.g. ARSAC certification. Overall we aim to improve patient access and choice by supporting more research to be delivered locally to patients.

5.1.65 Patients requiring **follow-up appointments** during and after treatment will receive these appointments planned in advance by their clinical team. The frequency of appointments will be determined by the treatment they have received and their future needs and will only be provided if they add value to healthcare for patients. An additional Holistic Needs Assessment will be performed at the end of treatment and a care summary and ongoing care plan will be shared with the patient and all appropriate clinical professionals. Patients will be able to access follow-up appointments in a number of ways:

- Home/Local community through the use of telephone consultation or the use of digital technology. This will be available to all patients and will significantly reduce the need for them to travel for their consultation with the clinician.

- Within the patient's local LHB (Velindre@ or local hospital).

- VCC if this is closest to the patient's place of residence or necessitated on clinical grounds.

5.1.66 Appointments will be provided by a range of clinical staff appropriate to need, including with advanced nurse practitioners, allied health professionals and palliative care teams). Patients will also be offered control of the frequency and method of their follow-up appointments in accordance with the principles of co-production. They may wish to have contact via alternative means about a specific issue rather than attending an outpatient clinic.

5.1.67 Pre-planned attendances for scheduled follow-up will be supported **by urgent access clinics** to enable patients to be seen rapidly in the Outpatient setting, thereby reducing/preventing future acute presentations and utilisation of unscheduled care pathways.

5.1.68 Some patients will require **palliative and end of life care**. This will be provided at home, in a local hospital, hospice or VCC. Specialist palliative care and end of life care will be provided by Velindre. This will be networked with all other services and providers of palliative and end-of-life care. To provide seamless, high quality care, it is important that the Palliative Care Teams are involved in patient care earlier in their treatment. It is important that all patients are able to receive the things they value most and die in one of their preferred places. The diagram below explains how services will be different from a patient perspective when being treated through the proposed model as compared to the existing model.

Figure 5-6: Patient with Breast Cancer Treated with Radiotherapy and Chemotherapy

Current System:

"To have my radiotherapy I have to travel to Velindre Cancer Centre. I've been prescribed a course of 15 daily treatments. I find the journey on hospital transport quite tiring as the journey into hospital can take up to two hours. I declined the radiotherapy education as I was too weary."

"I couldn't attend my pre-chemotherapy education because of the distance from home so I didn't know what to do when I was sick after chemotherapy. I had to go to A+E to get seen."

"Following my chemotherapy I felt really tired and when I had my next tests at the clinic in Velindre my blood count was too low so I needed a blood transfusion and had to attend Velindre for this. I had to stop my treatment until I was feeling better."

Future System:

"My radiotherapy treatment can be given at a new satellite unit which is nearer to my home. It includes 15 daily visits but I can attend every day using public transport because I can plan my travel to coincide with the bus timetable. I also had the radiotherapy education at the same place because it is provided here. It really helped reduce my worry about treatment."

"I attended pre-chemotherapy education locally so I knew what to do if there were problems. When I was sick following treatment, I phoned the helpline who accessed my on-line health record. They organised a prescription that I collected from my local community pharmacy."

"My chemotherapy treatment has made me tired and I needed a blood transfusion when my blood count was low, which I received at my local hospital. My treatment was continued without delays because I felt better and able to continue with the plan."

(N.B please note: these are illustrative examples and not direct patient quotes).

Scheduled Care Pathways: How we will get there:

5.1.69 The Trust will:

- Review all aspects of our planned care pathway, collaboratively with other care providers, looking to modernise and deliver care locally wherever possible.
- Align this work with the principles given to us by our patients (closer to home, choice, control, quality and safety).
- Involve the people affected by cancer, our staff and our partners in this work.
- Support our workforce to develop, including reviewing advanced/extended roles.
- Create a better, more efficient care system through this.

- Understand the impact of changing care needs on other providers, sharing and working together to plan for this.
- Build capacity and improve facilities in LHBs through improved efficiency, the development of a Velindre Radiotherapy Satellite Centre@ and Velindre@ facilities.
- Build capacity and improve efficiency at VCC, including the development of a new specialist cancer centre in Whitchurch, Cardiff.
- Improve team working, service improvement and service intelligence data.
- Look to support other developments, e.g. haemato-oncology services, primary care, rapid diagnosis hubs.

5.1.70 In order to ensure that patients receive the highest quality of care in the right place at the right time, a significant amount of work has been undertaken on pathway redesign. We anticipate that the closer collaboration between Velindre and LHB staff created by joint working within Velindre@ facilities will deliver greater opportunities for improvement of patients' scheduled care pathways, beyond those described in this Service Model

Scheduled Pathway: Enabling Change

5.1.71 Patient involvement in developments will be essential to ensure the service reflects their needs and works for them. Staff involvement and engagement will support successful service redesign whilst data and business intelligence will be vital in helping us to understand current and future demand and the benefits of change and service modernisation.

5.1.72 Information Technology (IT) will be critical to support high quality clinical care and improve efficiency. Clinical information sharing (patient held records, treatment summaries, investigation results) will be the norm, reducing waste and duplication. It will also support communication and education, increasing access and giving staff more time to deliver clinical care.

5.1.73 Clinical governance across the pathway will be essential, especially as care is more dispersed and delivered by a broader range of health care professionals. This will require strong service intelligence data and collaboration. Patient experience and outcome data will also be a central element to this. Understanding the current service, knowing the future demands and regional service improvement programmes will support ongoing improvements. The principles of the C4Li will form the hub for this, supporting activities across the region before it is developed as a physical entity.

5.1.74 Patient/carer information and education will be critical to ensure active involvement in decision making and in supporting patients to manage their own health. These will be delivered in accordance with the principles of the Service Model i.e. high quality information/education, delivered close to the patient's place of residence.
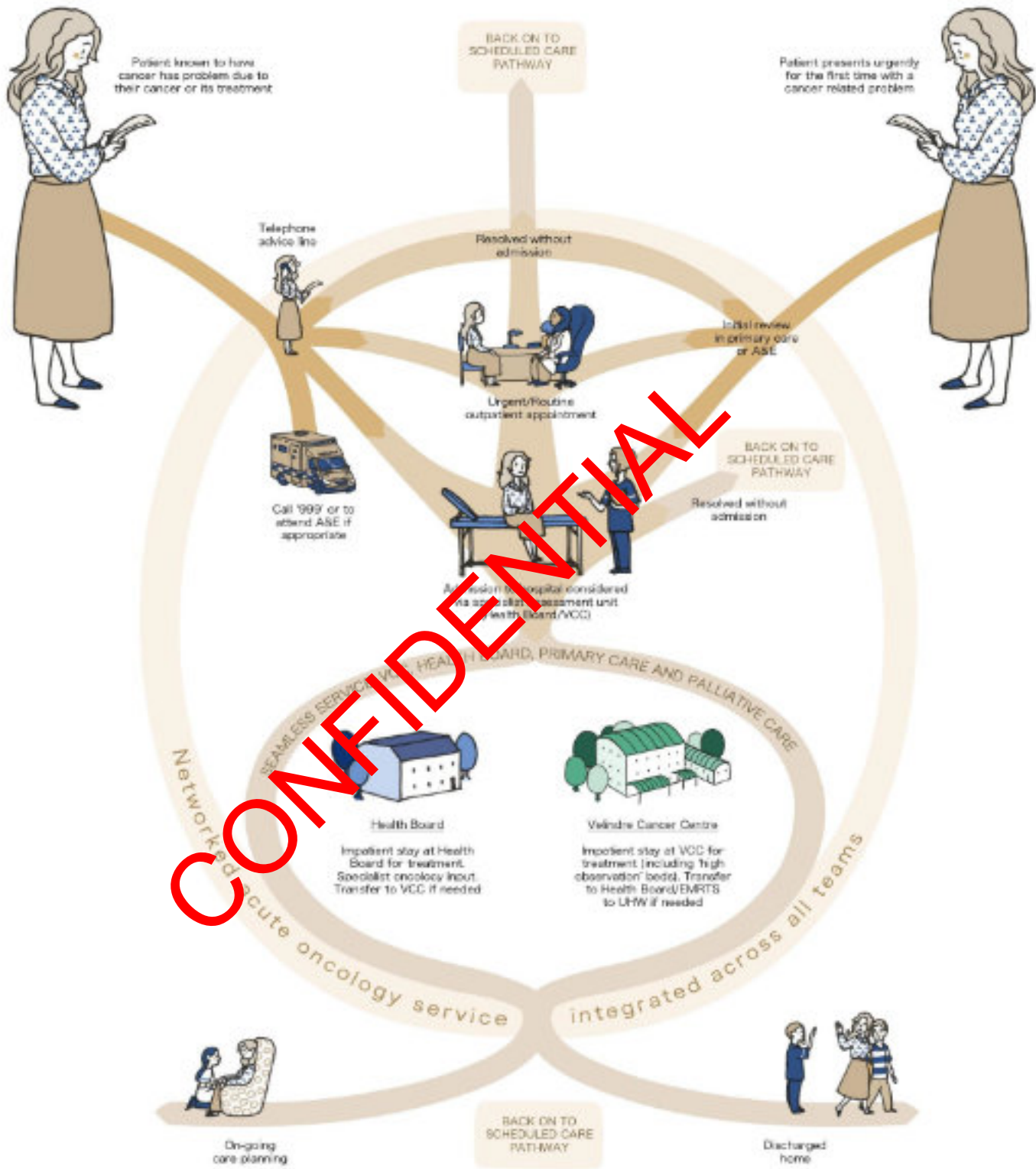
Unscheduled Care Pathway

5.1.75   High quality, coordinated services which are designed to meet the needs of patients requiring unscheduled care are essential. These will be planned and integrated seamlessly between care providers. A network wide information and alert system will be established to direct patients to the most appropriate team based on clinical need. Patient education, particularly around how to self-manage or seek help when their clinical condition changes will be important for those patients already known to have cancer. Triage, assessment, care close to home and admission only when necessary will be features. For those patients presenting acutely with a new cancer diagnosis, collaboration, information sharing and availability of expert clinicians locally when needed will be key. Whenever possible, patients on the unscheduled care pathway will move back onto the scheduled care pathway for ongoing care.

5.1.76   The scope relates to adults with solid tumour malignancies in South East Wales, but improving care for these patients creates opportunities to support and improve other aspects of cancer related health care too. The Trust has already seen benefits to patient care realised from AOS developments within the South East Wales region but there is more that can be done to maintain and further improve care as demand for and pressure on services increase.

> **Key Transformative Changes:**
>
> Admission only when necessary, local care when appropriate, shorter lengths of stay and better access to specialist advice/input through:
>
> - A dedicated oncology assessment unit at VCC;
> - Access to specialist adult solid tumour oncology input within LHBs;
> - Collaborative working ensures rapid review of inpatients in LHBs reducing length of stay;
> - Telephone triage for all patients known to Velindre Cancer Teams;
> - High quality education/information provision for people affected by cancer;
> - A network wide AOS team to co-ordinate, communicate and direct patients appropriately and to ensure teams work well, across the region;
> - Admission only when necessary and reduced length of stay reduces inpatient bed use;
> - More care delivered locally;
> - More pre-hospital care and appropriate admission avoidance;
> - A shift from inpatient to outpatient/ambulatory care through access to urgent outpatient appointments/ambulatory treatments;
> - Reduced burden on LHB Accident & Emergency/Medical Admissions Units;
> - Planned Emergency Medical Retrieval and Transfer Service (EMRTS) support to VCC;
> - Regional service improvement framework for AOS; and
> - Develop research/education in AOS.

Figure 5-7: Unscheduled Care Pathway

Figure 5-7: Unscheduled Care Pathway

Patient known to have cancer has problem due to their cancer or its treatment

Patient presents urgently for the first time with a cancer related problem

BACK ON TO SCHEDULED CARE PATHWAY

Telephone advice line

Resolved without admission

Initial review in primary care or A&E

Urgent/Routine outpatient appointment

Call '999' or to attend A&E if appropriate

BACK ON TO SCHEDULED CARE PATHWAY

Resolved without admission

Admission to hospital considered via specialist assessment unit (Health Board/VCC)

CONFIDENTIAL

SEAMLESS SERVICE VCC, HEALTH BOARD, PRIMARY CARE AND PALLIATIVE CARE

Networked acute oncology service

integrated across all teams

Health Board

Inpatient stay at Health Board for treatment. Specialist oncology input. Transfer to VCC if needed

Velindre Cancer Centre

Inpatient stay at VCC for treatment (including 'high observation' beds). Transfer to Health Board/EMRTS to UHW if needed

On-going care planning

BACK ON TO SCHEDULED CARE PATHWAY

Discharged home

Integrated working between all clinical teams: communication, information sharing.

Whole pathway supported by service/quality improvement, education, research/development and innovation via Centre for Learning and Innovation.

Unscheduled Care Pathway: How it will work

5.1.77 The nature of the Unscheduled Care Pathway dictates that there are a number of different routes into the system and end points; broadly this splits into two main patient groups:

- Patients known to have cancer, who present urgently with complications of that cancer or their treatment;

- Patients not known to have cancer, who present urgently for the first time with complications of that cancer.

5.1.78 All patients that are known to have cancer and are on active treatment and become unwell will contact the **VCC 24 hour clinical hotline** for an initial telephone assessment using a validated national assessment tool. This initial contact will determine what care and support is likely to be required and who can best provide this care for the patient. Prior education of patients/carers and information sharing between teams will support in care. The pathways available will include:

- **Self-care.** The patient will be advised that they can safely manage their condition without seeking further medical assistance. Novel technologies such as point of care testing for neutrophil counts and telemedicine will be explored to further refine triage and to support care away from hospital settings when safe to do so.

- **GP, Community Palliative Medicine team or a local service such as their Local Community Pharmacy.** The patient can manage their condition within their local community with assistance from primary care. Linking in with Local Authority and Social Care systems may be important here.

- **Planned outpatient appointment (urgent or elective) at their local hospital e.g. via enhanced local facilities in the Velindre@ unit, hospice or VCC.** The patient's condition can be safely managed but would benefit from a timely consultation with their supervising clinician. Avoiding admission by having the capacity to see/treat patients urgently as outpatients blurs the boundary between scheduled and unscheduled care and benefits patients and health care providers.

- **Attendance at a specialist Assessment Unit**. Patients will be directed to an appropriate assessment unit for a clinical assessment, either at VCC or within their LHB. This will be undertaken in a dedicated assessment unit for a period of no longer than 12 hours, supported by senior decision making by consultant oncologist and in line with UK acute care standards. At this point, the patient will be admitted to VCC, their LHB hospital or the appropriate care will be signposted and planned. For example, arranging an appointment with their GP, specialist or palliative care team.

- **Attendance at their local A&E/MAU or the patient may call an ambulance.** Whilst the above will encourage patients to access planned care pathways directly, it may be necessary for patients to be directed to an Emergency Department or to call an ambulance immediately. The AOS team will have contacted the relevant emergency department to ensure they are aware of the diagnosis and treatment plan for this patient.

5.1.79 The service will also provide vital support for patients who become unwell acutely as their first presentation of a previously undiagnosed cancer. These patients won't contact the telephone advice line, but will either be referred after a primary care consultation or after an urgent presentation to a local A+E/MAU. They will be identified by the local acute oncology teams with support from local specialist and Velindre staff. The current **AOS** will be enhanced across South East Wales including a planned presence of Velindre senior clinical staff within LHBs to support inpatient and AOS care locally. Clinical information will be readily available to all appropriate clinical teams through robust IT systems, including daily AOS MDT discussions hosted by VCC. Urgent radiotherapy will be available via VCC and the Radiotherapy Satellite Unit. Inpatient care and access to specialist advice will improve. Length of stay will be shortened. Education of staff and regional service intelligence data/service improvement will be essential**. Future opportunities for detection in primary care and referral for rapid diagnostic assessment without admission will be developed and evaluated.**

5.1.80 The service will provide dedicated oncology support from nurses (CNSs /Nurse Practitioners) and Velindre Oncologists to patients in each local LHB. There will also be AHP roles supporting metastatic spinal cord compression, other pathways and early discharge. **Palliative medicine** advice will also be central as many patients require symptom control and may not be fit enough or want radiotherapy or SACT.

5.1.81 Overall, it is anticipated that as more scheduled care is delivered locally and facilities and expert knowledge are more readily available within LHBs, more unscheduled care episodes will be managed locally but that these will be supported by additional oncology input within each LHB.There is further work required to fully define exactly what support this involves which will be undertaken collaboratively with LHB partners. The model currently identifies the need for one consultant per and two senior nurses per LHB. It is anticipated that these additional roles will be clarified and in place before the new Cancer Centre opens in 2022.

5.1.82 The proposed development of the **Radiotherapy Satellite Centre@** within Aneurin Bevan LHB (scheduled to open in 2021) will further enhance opportunities to deliver unscheduled care away from VCC as this creates opportunities for patients to have emergency radiotherapy locally, without the need for uncomfortable hospital transport or an inpatient transfer.The details of what emergency treatments may be available via the Radiotherapy Satellite Centre@ will continue to develop as the capability of the satellite services develops over time.

5.1.83 VCC will be **open to acute admissions 24 hours/day, 7 days/week** as it is now, but this service will be enhanced 7 days/week by an **assessment unit**. Supported by the telephone triage service to direct patients appropriately, a network AOS service and senior clinical decision makers on site, this will offer rapid assessment and treatment (e.g. ambulatory care procedures, urgent palliative radiotherapy) to patients in the region. It will improve patient access to urgent care, improve patient care and experience, will help avoid admission and will reduce the burden on LHB MAU/ A&E services. The diagram overleaf explains how services will be different from a patient perspective.

Figure 5-8: Cancer of Unknown Primary- Patient Perspective
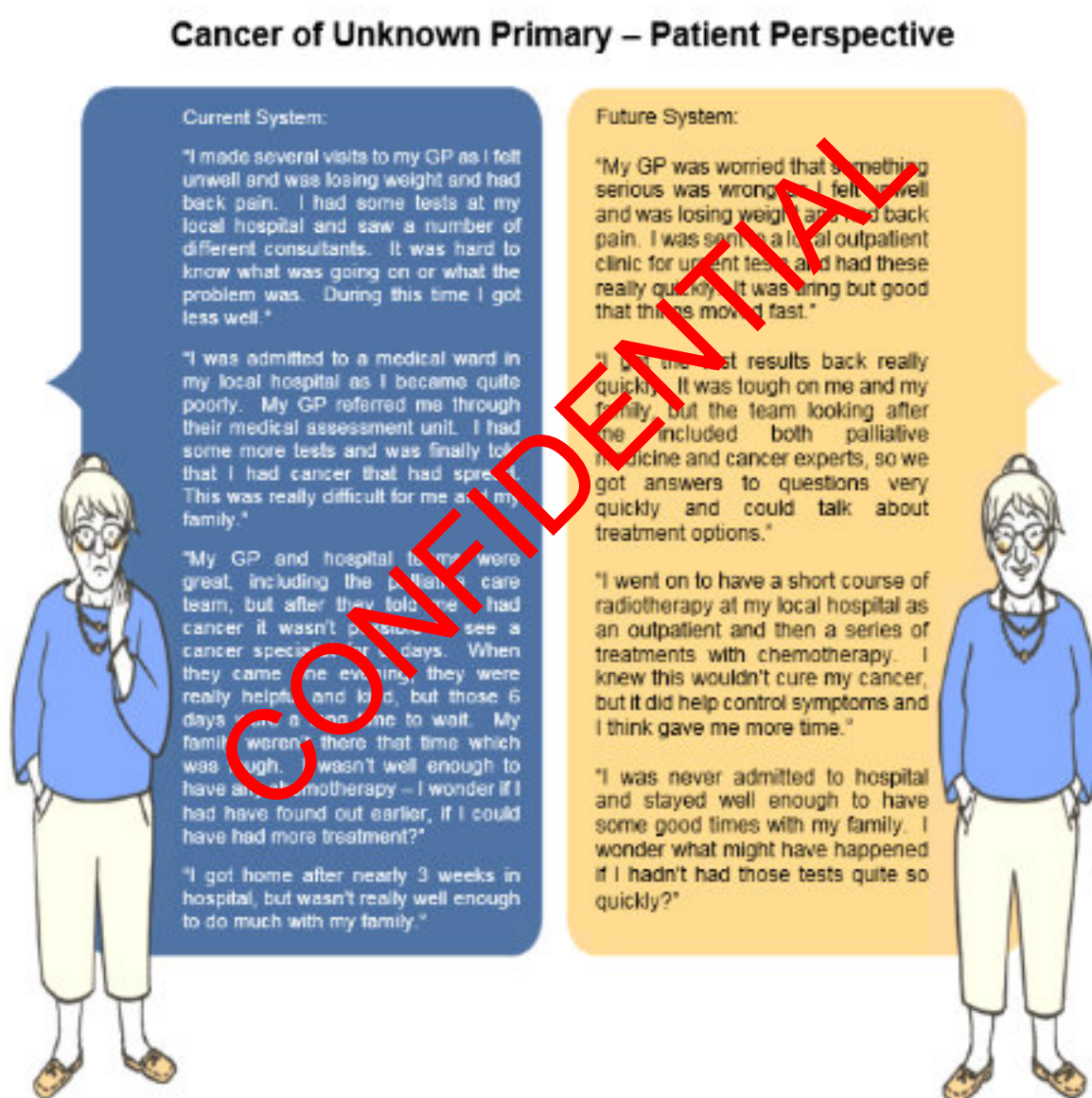
(N.B please note: these are illustrative examples and not direct patient quotes).

Unscheduled Care Pathway: How we will get there

5.1.84   The Trust will:

- Pilot a specialist oncology assessment unit at VCC, understanding the benefits of this to patients and to the health care system before implementing initially on a 5 day and subsequently on a 7 day basis.

- Work collaboratively with each LHB team to develop local care pathways that meet the needs of their patients and which align with the principles of the TCS programme, including local assessment units within LHBs and community based care to avoid admission unless necessary.

- Develop accessible education/information resources for people affected by cancer and staff.

- Develop an integrated electronic health record for cancer patients available to people affected by cancer and service providers at the point of need.

- Work collaboratively across the region and across organisational boundaries to improve the current AOS

- Understand the current and future needs of a regional AOS through service intelligence data, benchmarking and forecasting.

- Share best practice between teams.

Unscheduled Care Pathway: Enabling Change

5.1.85   Patient involvement in developments will be essential to ensure the service reflects their needs and works for them. Staff involvement and engagement will support successful service redesign whilst data and business intelligence will be vital in helping us to understand current and future demand and the benefits of change and service modernisation.

5.1.86   In order to deliver a transformative regional AOS, we will develop working groups that will collaborate between VCC, LHBs and the Wales Cancer Network to understand the current service (activity, limitations and strengths) and that will also work together, linking in with other aspects of scheduled/unscheduled care.

5.1.87   Service intelligence data will need to be gathered and shared, with organisations working together to create a sustainable plan that works for patients across organisational boundaries.   This will include understanding what oncology presence is needed within each LHB and detail around how the VCC assessment unit will support and benefit other parts of the service.   This will be an ongoing process, rather than a one-off, step change.This alone would offer significant changes to unscheduled care, but also creates

additional opportunities to further improve care in areas aligned to but outside of the scope of the TCS programme.

Core Clinical Services Described in Detail

Radiotherapy Services
Radiotherapy Services will be delivered at two locations to provide more comprehensive access to services across South East Wales and to reduce travel times for patients, families and carers: • at VCC in Whitchurch Cardiff • at a Radiotherapy Satellite Centre@ Wherever care is provided by Velindre staff, the standards and quality synonymous with the Velindre brand will be consistent. All radiotherapy accommodation at the new VCC and Satellite Centre will be purpose built and designed to optimise inter and intra departmental flows and to improve patient experience. Patients receiving radiotherapy at VCC will have access to the inpatient facilities at the hospital if the patient is unwell and admission is required after treatment or if receiving treatment that is complex in nature necessitating admission. The Radiotherapy Satellite Centre@ will not have inpatient facilities; however patients that require admission will have access to inpatient facilities at the local LHB or at VCC. Velindre has implemented intensity modulated, stereotactic and image guided radiotherapy to become a leading cancer centre in the UK. Such developments allow radiotherapy to be delivered more precisely increasing the chance of disease control or cure and reducing the chance of side effects. Velindre currently does not plan to deliver proton beam therapy but will keep this emerging treatment technology under close review. It will have access to PET-CT for radiotherapy planning purposes and will have the ability to implement MR-linac technology subject to a review of the effectiveness of this new technology. To support initial treatment and quality/safety at the Radiotherapy Satellite Centre@, initially treatment will be available for patients having palliative radiotherapy or radical breast/prostate radiotherapy. Over time, the scope of treatments will increase. A service efficiency machine will be in operation at the VCC to provide resilience and continuity of care during service planning (and in the event of machine breakdown), providing capacity to deal, for example, with unexpected peaks in workload without increasing waiting times for patients, minimising the need for cancellations or rescheduling while maintaining high quality of care and patient experience. There will be dedicated access for radiotherapy research at both the VCC and Radiotherapy Satellite Centre@ and provision for the development/safe implementation of new radiotherapy techniques.

Operating hours

Radiotherapy services will operate 9.5hrs a day 5 days a week at both the VCC and the Radiotherapy Satellite Centre@. Patients will be supported by an emergency palliative radiotherapy service (7 days a week) at VCC (and ideally at the Radiotherapy Satellite Centre@ too, pending discussions with the hosting LHB). This will also support some category 1 patients having treatment during weekends when clinically beneficial. (*category 1 defined as: patients which have rapidly growing tumours being treated with radical (curative) intent for whom any prolongation of the overall treatment course is not advised). Whilst it is recognised that there is a clinical benefit to having 7 day emergency radiotherapy provision at the Radiotherapy Satellite Centre@, this will require careful joint planning with the host LHB and consideration of appropriate staff to deliver this safely.

Where Services will be delivered

It is projected that 20% of radiotherapy activity will be provided at the Radiotherapy Satellite Centre@. This will be transformational for patients who currently spend up to 2-3 hours travelling to Velindre hospital for up to a 7 week course of treatment and for patients having short courses of palliative radiotherapy who will no longer have to travel for this at a time when they may be struggling with difficult symptoms. These patients will travel much shorter distances to receive treatment at the Radiotherapy Satellite Centre@. The Radiotherapy Satellite Centre@ will be delivered in partnership with Aneurin Bevan LHB, where there is access to appropriate clinical support and other services (e.g. pharmacy services/operational support services). It is possible that the Radiotherapy Satellite Centre@ will be co-located with an outreach SACT/Outpatient Service (Velindre@) – providing opportunities for delivering additional treatments such as chemo-radiotherapy at the Radiotherapy Satellite Centre@ in the future.

A phased introduction of tumour types treated at the Radiotherapy Satellite Centre@ will be initiated, enabling over time for the majority of tumour types to be treated there. Some tumour types which are highly specialised or managed on a regional or national basis will only be treated at VCC where dedicated equipment is located.

Health Board Impact

Unwell Patients: Patients may experience side effects during or following Radiotherapy treatment and may require hospital admission for monitoring and ongoing care. Aneurin Bevan LHB (supported by Velindre staff) will be expected to provide access to appropriate inpatient facilities should a patient become unwell before / during or after treatment and requires admission.
The vast majority of the admissions fall within the general/emergency palliative groups and is anticipated to be 1-2 per month

Spinal Cord Compression: It is anticipated that 20% of spinal cord compression patients will be cared for at the Radiotherapy Satellite Centre@. These patients often require access to inpatient facilities for treatment with input from a wide variety of clinical teams including nursing, palliative medicine, allied health care professionals and oncology teams. This equates to circa 40 patients per year or 3 patients per month that may require an inpatient admission.

Benefits

Improved local access and reduced travel times for patients, families and carers
Best in class facilities providing the best patient experience possible, better access to radiotherapy research and faster adoption of radiotherapy developments/techniques
Better integration of Velindre and LHB teams.

SACT, Pharmacy, Aseptic & Ambulatory Care Services

The SACT delivery model builds upon the principles of moving care closer to home by shifting a greater proportion of treatment into the community and local delivery via LHB based Velindre@ facilities. The complexity and safety of delivery, rather than the site of the primary tumour or the stage of the disease will influence delivery location. To further improve access, patients will receive SACT treatments at their nearest delivery site which might not be within their resident LHB.

There will be one system for electronic prescribing of chemotherapy across the whole of South East Wales for both solid tumour and haematological malignancies. In-line with this, SACT treatment will be delivered:

- At home/in the local community.
- In a Velindre@ facility or LHB location.
- At VCC.

SACT delivery at VCC

Patients will only attend VCC for SACT treatment if:

- Velindre is the closest facility providing SACT treatment
- If the patient's SACT regimen is not available at the Velindre@ facility (e.g. due to complexity/clinical safety).
- If the patient's SACT regimen necessitate an inpatient stay.
- If the patient is enrolled onto a Phase 1/complex clinical trial, where they will receive their trial treatment in designated clinical trial facilities, reflecting the increased level of complexity and acuity related to this activity.

SACT delivery via Velindre@

There will be a number of Velindre@ facilities located across South East Wales where they will have the greatest impact in improving access to services and reduce travel times for patients, families and carers.

The Velindre@ facilities consolidates current SACT provision and will provide an enhanced and equitable service across South East Wales. The facilities will be integrated with local cancer and voluntary sector services. This networked approach will enable patients to access a wide range of treatment, care and support services locally. Velindre currently uses the Tenovus Mobile Treatment Unit and will continue to integrate the use of these flexible delivery units alongside new, enhanced Velindre@ facilities.

There will be no inpatient facilities at the Velindre@ facilities. Patients requiring admission will have access to inpatient beds at their local hospital or at VCC. All planned inpatient SACT delivery will be at VCC.

Description of Service: Pharmacy & Aseptic Services

Pharmacy and aseptic services have a central role in supporting the delivery of SACT both at the VCC and in the wider community. The future model will require access to dedicated pharmacy and aseptic services at all appropriate locations across South East Wales, to ensure equity of service delivery and access.

VCC will work with LHBs to determine the optimal clinical and technical pharmacy services provision for patients treated across South East Wales within a Velindre @ facility.

SACT services will be co-located with ambulatory care services to improve patient experience, efficiency, flexibility and workforce skill mix. There will be capacity to deliver some simple ambulatory care procedures aligned with outpatient attendances when this best improves patient care and experience.

Operating Hours

SACT/ambulatory care services will operate for 12 hours a day five days a week at both VCC and at the Velindre@ facilities.

The pharmacy service will be available 7 days per week, 52 weeks per year as required to support optimal service delivery and patient need.

Where Services will be delivered

SACT Services

There will be an enhanced networked model with a number of SACT delivery sites as outline below:

- 45% of activity delivered at VCC.
- 45% of activity delivered at Velindre@ facilities.
- 10% of activity delivered locally at home/community.

SACT services at the Velindre@ facilities will be supplemented by a range of ambulatory care, supportive care and outpatient services.

Ambulatory care procedures/services may be provided by supporting community centres including local third sector providers and the new Maggie's Centre located alongside VCC.

Pharmacy will support VCC directly and will oversee Velindre@ services delivered on behalf of the Cancer Centre through Service Level Agreements with LHBs and other agencies as appropriate (dependent on (extended) pharmacy model).

Pharmacy & Aseptic Services

VCC pharmacy will work collaboratively with LHB partners to ensure that any processes surrounding the procurement of pharmaceuticals, specifically those of a specialised nature, e.g. Early Access Medicines Scheme/Patient Access Scheme does not preclude the use of such medicines at locations remote to VCC.

VCC will include an early phase clinical trials unit delivering where appropriate novel therapies.

The model of (pharmacy) provision of Investigational Medicinal Products as part of a clinical trial is being considered. This model will be dependent on accepted clinical trial governance procedures, staff resources and skill sets and local aseptic facilities and may vary between LHBs.

Health Board Impact
- Potential to co-locate with haematology services offers additional benefits.
- SACT units within LHBs would require support and unwell patients may require admission.
- More patients will be treated across LHB boundaries, at their closest SACT delivery facility.

Benefits
- More SACT/SACT procedures delivered within LHB/home/community setting
- Improved efficiency of SACT delivery
- More SACT related procedures delivered locally (e.g. PICC line insertion/maintenance)
- Enhanced opportunities for flexibility/treatment time choices

Inpatient Services

The delivery of Inpatient services is based upon four fundamental principles:

- Patients will be assessed for admission, rather than admitted for assessment.
- Patients will only be admitted where and when it is essential.
- Wherever possible procedures will be undertaken as a day case (e.g. paracentesis and blood transfusion).
- Expert clinical advice will be available at the place of admission, in a timely manner.

Therefore, care will shift from an inpatient to an outpatient setting. VCC will continue to manage patients with complex needs whether their LHB admission is scheduled or unscheduled and will better support admissions within LHBs. The improved system wide capability will allow some patient activity currently undertaken at VCC to be repatriated back to the LHBs, with local support from Velindre teams.

Scheduled admission includes patients receiving the following treatment:

- Highly complex SACT regimens that necessitate an inpatient stay.
- Complex Radiotherapy treatment that necessitates an inpatient stay.
- Novel therapies including radioisotopes.
- Planned AHP intervention, i.e. dietetic support for head and neck patients.

- Clinical Trials including Phase 1 and complex studies.

Unscheduled admission into VCC may be required if:

- The patient becomes unwell during treatment and VCC is the nearest hospital to the patients' place of residence.
- The patient becomes unwell in an acute setting and is referred by the AOS service.
- A patient requires urgent radiotherapy or ongoing radical radiotherapy that should not be interrupted and can only be delivered at VCC.
- A patient becomes unwell and requires specialist intervention from supportive palliative and allied health professionals.

There will be a high observation area for the supervision of patents that require level 1 care. If the patient becomes acutely un-well, arrangements will be in place with the LHB critical care teams for rapid retrieval, stabilization and transfer (via the EMRTS) to the most appropriate place of care.

Operating Hours

Inpatient services will be provided 24/7 and for 52 weeks a year. A telephone support hot line will provide a 24/7 service.

Velindre will be open for emergency admissions 24/7, with enhanced support from a specialist multidisciplinary Assessment Unit, open for 12 hours a day, 5 days a week until 2022 then for 7 days a week thereafter.

Where Services will be delivered

It is projected that VCC will need 50 beds by 2032. Of these, 4 will be assessment unit beds and two will be isolation cubicles for radio-isotope therapies.

A proportion of patients traditionally admitted as inpatients to VCC could be appropriately managed at the LHBs. This will necessitate greater involvement and support of Velindre teams within LHBs.

Aneurin Bevan LHB will host the Radiotherapy Satellite Centre and will need to offer inpatient care for additional patients (potentially from outside their LHB) who are accessing radiotherapy via the Satellite Centre.

An AOS will be in place at VCC and local LHB across South East Wales to ensure that patients presenting with acute new cancers, acute cancer related complications or toxicity from cancer treatment are identified at the earliest opportunity and directed to the most clinically appropriate pathway of care. This will include dedicated consultant oncology and Advanced Nurse Practitioners/Clinical Nurse Specialist presence at each LHB.

A rapid assessment service will be run from VCC by an acute oncology team, which is consultant/Advanced Nurse Practitioner led.

A four bedded assessment unit will be incorporated into the inpatient ward area at VCC. This will enable the 'assess to admit' model of care to be implemented. Alongside the application of an admission policy the assessment unit will play an important role in patient triage and where appropriate shifting inpatient treatment

towards ambulatory care. This will facilitate more timely diagnosis and treatment for patients that are unwell and where clinically safe and appropriate deliver a reduction in admission and length of stay.

Health Board Impact

Additional admissions to LHBs will equate to the following, spread between Health Boards as below:

Health Board	ABMUHB	Cwm Taf UHB	Aneurin Bevan UHB	Cardiff & Vale UHB
Inpatient bed Impact 2022	1.1	2.8	4.6	5.6
Inpatient bed Impact 2031	1.4	3.4	5.6	6.9

Additional specialist oncology input within LHBs will help offset this growth, via admission avoidance and reduction in length of stay. The exact distribution of these beds will vary dependent on the location of Velindre@ facilities. The presence of a Radiotherapy Satellite Centre in South East Wales will result in a small additional shift in admissions (see Radiotherapy section for details), e.g. patients needing inpatient radiotherapy for MESCC.

Benefits

Admission avoidance and reduced length of stay will reduce demand for inpatient services in both VCC and LHB facilities.
Better patient experience: more care delivered as day case, fewer admissions and when admitted, more likely to be local to place of residence.
Reduced impact of inpatient bed use by non-surgical oncology patients on other aspects of health care system.
More efficient use of inpatient beds.
Greater specialist oncology presence within LHBs.

Outpatient Services

The aim of outpatient services are to provide high quality, efficient outpatient care and attendances for new patients, patients currently having treatment (e.g. SACT and radiotherapy) and for those on follow-up, delivering this closer to patients' homes, utilising technology when beneficial and delivering best value to patients from each attendance. Greater capacity for urgent outpatient review and subsequent treatment will reduce the need for patients to access inpatient or other aspects of unscheduled care.

A range of services will be provided at VCC and Velindre@ facilities including:

- Specialist Oncology and Palliative care teams.
- Clinical Psychology/Occupational.
  Therapy/Physiotherapy/Dietetics/SALT/Complementary therapy.
- Welfare Rights/Relate/Relationship advice.
- Patient education/Cancer Information and Support Programme (CISP).
- Simple ambulatory procedures, aligned with outpatient attendance (e.g. phlebotomy).
- The majority of ambulatory care will be delivered alongside SACT delivery.

Pre-planned appointments will be supported by the ability to see patients urgently as outpatients, reducing need for patients to access care via emergency routes.

Multi-disciplinary outpatient teams will be present in both VCC and Velindre@ facilities. They will work from a central base (to support communication, team working and learning) with access to electronic patient records, and all necessary clinical information.

Operating Hours

Outpatient services will be available Monday to Friday 9am – 5pm.

Where Services will be delivered

There will be dedicated oncology outpatient facilities at both VCC and each Velindre@ facility. Use will also be made of telemedicine to deliver services via patients' home or locally when possible and appropriate.

The following regional services will remain at VCC (regarding OP attendances): Anal Cancer, CNS Cancer, Sarcoma, and Melanoma, NET, Thyroid and Testicular cancer, although future changes to align with other service developments will be explored. Lymphoma patients will continue to receive oncological support into the MDT as well as their radiotherapy planning and treatment at VCC however; in the future they will be seen in haematology outpatient clinics at their respective LHBs.

Health Board Impact

- Velindre@ facilities within LHB would require support/un-well patients may require admission.
- Better integration of Velindre/Health Board teams – more opportunities for joint clinics, new ways of working.
- Ability for Health Boards to shape and plan activity within Velindre@ facilities to support their needs.
- Through joint planning, scheduled care teams will be able to better support unscheduled care too.

Benefits

- More attendances delivered locally to the patient, or via telemedicine to improve access.
- Reduced impact on other service from increasing demand for non-surgical oncology services.
- More efficient outpatient service: extended roles and technology to support this
- Best value to patients created from each attendance through planning and communication.
- Shift from inpatient to outpatient care.

Specialist Palliative Care

The proposed model shifts the balance of care from the acute hospital environment towards the patient's place of residence and the local community. It is anticipated that there will be a shift from inpatient palliative care provision to outpatient and ambulatory care. The patient's goals and needs will be placed at the centre and they will have the option of receiving fast and effective palliative care and support at:

- The patients' home or usual place of residence.
- At a local hospice.
- As an inpatient within their local LHB or at VCC.

Palliative care services will be provided by local LHBs through an integrated approach across primary, community, secondary and tertiary services in seamless partnership with local authorities and the third sector. This will enable patients and their families to receive the medical, psychological and social support to remain at home, within a hospice in local communities or within a local hospital if their clinical and/or preference necessitates this. In order to support patients to remain at home and within the local community, Velindre provides a wide range of support, aiming to provide compassionate care in living and dying, and crucially reducing distress in the terminal phases of illness.

- Palliative care consultants will work in a networked arrangement across the community (home, hospice, clinics, and day care), local LHBs, local charities and VCC will provide expertise at the point of need.

- Palliative care hubs within local LHBs will be networked to the Velindre@ facilities and VCC. This will enable a systematic, consultant-led approach to be adopted in line with patient need and the 6 strategic aims of the Welsh End of Life Care Strategy.

An advice line provided by Velindre Palliative Care Services will be easily accessible to all clinicians, who will be able to speak to one of our specialists. This provides access to expertise, guidance and peer support, enables patients to move seamlessly across the system and transfers knowledge amongst professionals.

Operating Hours

Specialist Palliative Care Services will be provided for inpatients at VCC. Outpatient services, day hospital services etc. will benefit from early palliative care on site review and link-up with community services, day care centres and the hospices. There will be a dedicated out-of-hours palliative care contact line.

Where Services will be delivered

VCC will have a dedicated specialist palliative care team providing an advisory service, supporting other departments in the cancer centre. Palliative Care services will continue to be available in the community, local hospices and LHB settings.

Health Board Impact

The additional proportion of patients accessing care via Velindre@/Radiotherapy Satellite Centre@ will require support from local palliative care services.

Benefits

- Improved patient experience and reduced impact on LHB services by avoiding the use of unscheduled services e.g. A+E, MAU. Enhance delivery of the strategy of the End of Life Care Board for Wales:
- Supporting living and dying well;
- Detecting and identify patients early;
- Delivering fast, effective care in palliative illness;
- Reducing the distress of terminal illness for the patient and their family; and
- Support training and research in palliative and end of life care.

Radiology & Nuclear Medicine

VCC will continue to provide radiology and nuclear medicine diagnostic, non-imaging diagnostic and therapeutic services for cancer patients in South East Wales. These include:

- All inpatients at VCC.
- All day case attendees to VCC.
- All clinical trials undertaken at VCC.
- Radiotherapy patients attending VCC who develop complications.
- Therapeutic agents; e.g. Ra-223 dichloride.
- Nuclear medicine non-imaging diagnostic investigations (e.g. CR51 EDTA GFRs)
- Repatriation of patients receiving peptide receptor radionuclide therapy (PRRT) for neuro-endocrine tumours who currently travel to London for treatment.

VCC will work with other radiology providers to ensure patients undergo radiological investigations as close to their local residence as possible but attend Velindre where clinical need, convenience, safety and/or expertise necessitates. Image sharing will be essential and routine, wherever imaging is performed.

PET-CT (largely for research and radiotherapy planning rather than diagnostic needs) at VCC will being place , to allow patients in South East Wales to access modern planning techniques, equivalent to those at other tertiary cancer centres.

Operating Hours

The Radiology and Nuclear Medicine Service will be provided for 7.5 hours a day and for 5 days a week with an on call radiology service provided out of hours.

Inpatient beds (when needed for therapeutic nuclear medicine) will be available, supported by our inpatient services.

Where Services will be delivered

It is currently predicted that a proportion of the radiology investigations currently provided at VCC will be provided locally in the LHBs, as care shifts from a centralised to a locally delivered model. The type and volume of procedures by LHBs will include CT, MRI, plain film, ultrasound scans.
Radiological imaging undertaken locally (at LHBs or VCC) will be available at any other site due to the implementation of the Vendor Neutral Archiving PACS system which then enables examinations carried out locally to be reported centrally at Velindre if required.

Health Board Impact

Small increase in radiological investigations due to more care being delivered locally Improved image sharing and reporting will partially offset this.

Benefits

- Better patient experience.
- More efficient health care through less wasted resource/duplication.
- Greater capacity for radiology for people affected by cancer, reducing the impact on other radiology services across the region.

Clinical Aspects of Research

Research delivery will mirror the Service Model by taking the research to the patient wherever it is possible and safe to do so. There will be a Clinical Trials Facility at VCC with increasing numbers of patients recruited into Phase I, II, III and IV SACT trials at VCC.

Some late phase (III & IV) clinical trials and research will be undertaken within the home/local community and Velindre@ facilities subject to appropriate governance processes for each individual trial. We will continue to work closely with the Cardiff & Vale Clinical Research Facility to deliver early phase trial research collaboratively.

The regional network portfolio of clinical studies will be expanded and diversified to encompass a range of research utilising a variety of methodologies that will span the patient journey, including an increased focus on limiting toxicity and improving quality of life, palliative care and end-of-life care and improving outcomes.

A minimum target of 20% of the number of new patient referrals annually will be recruited into (observational or interventional) clinical research, which includes SACT, radiotherapy and qualitative research. This will be supplemented by the broader aspects of clinical research, with recruitment into clinical trials growing towards a target of between 10-15% of the number of new patient referrals annually entering interventional studies.

VCC will continue to provide a research infrastructure that supports partners' Academic Scientific Research Strategy.

Operating Hours

The Clinical Research Facility will operate from 8am until 8pm for five days per week, supported by 24/7 access to emergency clinical support via AOS services.

Where Services will be delivered

Studies that will be performed at Velindre only are:

- Velindre-led early phase SACT (collaborating with C+V CRF when appropriate).
- Some late phase (II III & IV) SACT clinical trials.
- Complex SACT trials.
- Complex radiotherapy trials where the technology is only available at VCC.
- SACT/Radiotherapy combinations.
- Radionuclide therapy research.

It is anticipated that a number of Phase III & IV SACT Trials will be undertaken at the Velindre@ facilities and/or VCC.

If patients require a planned inpatient stay as part of the trial, this will occur at VCC.

Telemedicine will be used wherever possible to limit unnecessary travel for patients and staff, and to use available resources efficiently and effectively.

Health Board Impact
Greater patient numbers entering trials locally will require support, dependant on the requirement of each trial. This will be planned in advance to avoid unnecessary and avoidable impacts.

Benefits
- Better access to research, locally, for patients.   - Improved trial portfolio for the region of South East Wales.   - Improved reputation of research in South East Wales.   - Better collaboration between academic and clinical teams.

Clinical Aspects of Education
Education will be focused around the needs of the people affected by cancer and health care professionals and will be delivered in line with the principles of the service model.

Education will be focused around the needs of the people affected by cancer and health care professionals and will be delivered in line with the principles of the service model.

High quality information/education will be available to patients/carers to support active involvement in decision making, self-management and cancer literacy.

Education will support the delivery of high quality clinical care, wherever it is delivered and to safely adapt to new treatments/technologies/clinical advances.

Education will support all elements of the care pathway, from early diagnosis, treatment decisions to living with the impact of cancer and palliative/end of life care. Education/training will support both scheduled and unscheduled care (for example, by ensuring patients/staff are aware of treatment developments and the potential complications of these).

Education/training will be planned regionally to support all of those involved in cancer care – clinical and non-clinical staff throughout South East Wales.

IT will be crucial in delivering individualised information/education to patients, carers and health care professionals, improving access and flexibility.

Operating Hours
The Education Service will operate 7:00am – 8:00pm 5 days a week with opportunities for evening and weekend events. Library access will be 24 hours a day for staff.

Where Services will be delivered
- Facilities will be provided both at VCC (Via the C4Li) and Velindre@ facilities to enable access locally.   - Virtual access will support delivery locally and flexibly to patients/staff.   - VCC will host a specialist library.

Health Board Impact
- LHB teams will have access to and be able to book facilities in the C4Li.   - Velindre@/Radiotherapy Satellite Centre@ facilities will have space for meetings/education – for use by patients and LHB teams.   - When appropriate, Velindre staff may wish to access LHB education events.

Benefits
- Improved ability for patients to be involved in clinical decisions and to self-manage – reduces demand on health care services.   - Safer patient care.

- Improved collaboration, reduced duplication, improved efficiency.
- Increased capacity in the region and ability to deliver education via technology.
- Improved access to education: can meet training standards more easily.
- Better staff career progression, retention and morale.
- Improved links between clinical and academic/training teams.

Key Messages Patient Pathways and Clinical Services

Core Support Services Described in Detail

5.1.88   It is not enough to merely have a clinical delivery service model. High quality clinical care relies on key support services such as governance structures, service data and improvement, education, research and development. Enabling patients to have a central role in developing, evaluating and shaping future service changes is also crucial – through use of patient feedback and structured patient involvement programmes. Staff and teams need to develop pathways that span organisational boundaries and to be able to adopt innovative approaches to delivering patient care.

5.1.89   Service intelligence data is essential and will be generated in a meaningful way to support clinical teams in understanding the strengths of the current service, areas for improvement, the value of planned changes and in anticipating new service needs.

5.1.90   These support services underpin the quality of care and enable teams to improve services further, in a safe and sustainable manner, thereby preventing a one off step change that rapidly becomes outdated. We therefore describe these in addition to the core clinical services in the previous section as it is equally important to look at transformation of these essential services.

Figure 5-9: Centre for Learning and Innovation (C4Li)

Clinical Governance/Service Improvement

5.1.91   Delivering high quality clinical care collaboratively in partnership between organisations will require strong clinical governance. Care will be delivered closer to patients' homes in a seamless manner between different professionals and organisations requiring stronger **cross organisational learning** and a hub from which to build these relationships. This begins with the ability to understand current activity and outcomes through **meaningful clinical data and patient experience** information, to understand what is important to our patients and to place them at the centre of service design and delivery. We will also **involve patients** directly in service review and design. **Benchmarking** with other similar Cancer Centres will be central to understanding how our services perform for our patients. These processes will support in forecasting future needs to give **service resilience** and sustainability in the long term.

5.1.92   The Service Model will deliver high quality care and continuous improvement of this. Small scale improvements within individual teams or services will be planned and translated into sustainable improvements **across the region**. Our strategic approach is influenced by national and local drivers including 1000 Lives +, Prudent Healthcare Principles, co-production with our patients, carers and the public and a desire to play our role supporting partner Organisations. Local strengths such as SCIF (Significant Clinical Incident Forum) will play a greater role across the region in an open, no blame learning environment.

5.1.93 Improved **connections** will be made between clinical teams, develop and use our data to support quality improvement, and to utilise the growing improvement science evidence base and good practice examples emerging from other parts of Wales, UK and internationally. We will contribute to the global health agenda through building on our international health partnerships with colleagues in sub-Saharan Africa and in other countries with developing health systems.

5.1.94 A culture of continuous service improvement will be integral to the delivery of clinical care, with creative thinking/innovative solutions underpinned by evidence based learning and research, linked through to education programmes to share best practice and deliver successful improvements where these need to be made. Visible leadership and staff engagement are fundamental to success – especially given the more dispersed nature of non- surgical Cancer Services in the future.

5.1.95 Key to these aims will be:

- Data (service intelligence) and audit (local and national).
- Patient involvement and patient experience data (e.g. Patient Reported Outcome Measures & Patient Reported Experience Measures).
- Benchmarking with similar cancer centres.
- Cross organisational learning/collaboration: sharing best practice and service improvement; pathway development between organisations.
- Horizon scanning and forecasting.
- Clinical Governance (with strong links to education).

Research & Development

5.1.96 The Trust will know how our clinical services are performing through strong service intelligence (including patient experience data) and clinical governance – this tells us about the 'now'. We need to develop and deliver excellence in clinical care for the future through research, development and innovation. This is a **strategic priority** for Velindre and for Wales.Through enhanced research and development (of novel drugs, therapies and development/implementation of new technologies) which will directly benefit our current patients and generate an evidence base to guide cancer care for future generations.

5.1.97 The opportunity to participate in research will be a core component of the clinical care delivered **across the region** such that patients can discuss options for participation in research with their health care professional team, wherever care is delivered.

5.1.98 The Trust will build on our already existing excellent national and international reputation in research to widen the scope of the research we offer to our patients throughout their care pathway and the region. VCC has many national/ international research leads and will broaden this with a multi-

professional research portfolio which supports current and future **research leaders** through the trajectory of their careers.

5.1.99 This will enhance the reputation of the Trust, attracting non-commercially sponsored projects and investment from the **commercial sector**, a competitive area that is driven by performance and proven track records.

5.1.100 The vital link between laboratory drug development and administration to patients will provide patients with opportunities to access experimental novel therapies when they have limited or often no other conventional treatment options left. This will also support strong links between **clinical and academic teams**. Early phase trial work will be delivered through VCC collaboratively with the Clinical Research Facility at UHW due to the clinical nature of these trials.

5.1.101 It is important to build upon Velindre's reputation for leading and participating in Phase II/III trials to deliver **regional access** for late phase SACT trials, when safe to do so. We will support all partners (academic and clinical) to meet national targets related to research, delivering benefits to patients across the region and to our partners.

5.1.102 **Radiotherapy and physics research** are also essential. This incorporates radiotherapy clinical trials, academic medical physics research, and nuclear medicine/molecular radiotherapy. We will deliver radiotherapy clinical trials, novel SACT and radiotherapy combination treatments and trial quality assurance. Radiotherapy research and development and safe introduction of new radiotherapy techniques and technology will both be available to patients at VCC and the Radiotherapy Satellite Centre@ to ensure equity of access to cutting edge treatments.

5.1.103 In conjunction with our partners, we will explore new research areas including improvement science, health economics, education and qualitative and quantitative research opportunities at other stages of the cancer pathway (e.g. epidemiology, prevention, early diagnosis, unscheduled care, end of life care).

5.1.104 Supporting researchers in all profession is a priority as we identify and develop **future talent.** PhD programmes will support nurses, radiographers and AHPs to undertake original clinical research within their areas of expertise, run in collaboration with academic partners.

5.1.105 A vibrant, dynamic **research culture** will be embedded across the region. Patients will receive the very best treatment at every stage of their journey, with opportunities for both interventional and qualitative research, and researchers from all disciplines can engage in projects that will enhance care and enrich their professional careers.

5.1.106 The Trust will:

- Deliver a wider range of research opportunities for patients, delivered by a broad range of health care professionals closer to patients' places of residence.

- Support the national priority to generate wider economic and social benefits through the development of strategic partnerships and collaborative working within South East Wales, Wales and internationally to achieve excellence.
- Play an active supporting role to our partners but also fulfil our leadership role as a specialist non-surgical cancer centre.
- Enhance opportunities to integrate academic research and clinical teams, stimulating new ideas for research.
- Develop and deliver new technologies safely into routine clinical practice
- Innovate new methods of delivering care and adopt these appropriately, gathering and sharing evidence of benefit.
- Align the wide range of expertise within and outside South East Wales around a coherent strategic research agenda that supports the highest quality clinical care, academic excellence, and evidence based innovation.
- Provide the resources required for the consistent delivery of high quality, innovative research.
- Horizon scan to maintain our position at the forefront of cutting edge research.
- Contribute to the global knowledge on cancer biology and treatment.
- Attract, develop and retain quality researchers across all disciplines and professions.

5.1.107 As research/technological developments translate into routine clinical practice and become new standards of care, service intelligence data will be gathered to evaluate the real world effectiveness/benefits, alongside patient reported outcomes and experience data to fully understand the impact of new treatments from a patient perspective.

Education

5.1.108 Education is **fundamental** to the sustainable delivery of high quality care and the best outcomes for patients, as captured in VCC's mission of delivering the best quality patient care, world class education and research which improves lives. Education is inextricably linked to the quality of patient care. It also supports in translating the knowledge gained from service improvement work and research/development as described above safely into everyday clinical practice.

5.1.109 Education includes education and information provision for **patients and families**; education and learning for **health care professionals** AND **non-clinical staff** and education as part of a broader network formed **of partnerships with stakeholders**.

5.1.110 The Trust's role is one of many partners in a complex care/ education system. It is vital that Velindre plays its part in this system, working with and learning with/from other organisations so education is planned and delivered prudently.

5.1.111 Velindre is committed to prioritising information provision, education and learning for patients and carers and embedding this in the **clinical model** as

this will support patient involvement in clinical decisions and will help equalise the patient/professional relationship.

5.1.112 Education delivery will align with the principles of the clinical model, including quality, delivery closer to home, supporting patient involvement and equalising the patient/professional relationship and in the use of technology to deliver education/learning more flexibly to improve access. As such, it will be delivered on a **regional basis**, utilising technology to improve access for patients, carers and staff.

5.1.113 Velindre is committed to prioritising education and learning for staff to maintain and develop the current and **next generation** of both healthcare professionals and non-clinical staff. This will maintain quality of clinical care, allow the safe adoption of new clinical practices and can reduce preventable harm and unnecessary variations in clinical practice. With new treatments always being developed, it is important that patients and staff (regardless of professional role or location, be it primary care, secondary care or tertiary care) have the knowledge to deliver **safe, high quality care** wherever and whenever it is needed.

5.1.114 Education programmes will support the delivery of clinical care (both scheduled and unscheduled) in an integrated manner across South East Wales, involving a more diverse number of clinical staff delivering care more locally to patients in a variety of locations.

5.1.115 Education helps us meet the projected increase in demand for non-surgical oncology services in South East Wales through **patient education/activation and self-management** and will support the long-term sustainability of clinical care through reputational benefit, staff recruitment and retention.

5.1.116 Technology is an important enabler for education/learning.   It can support patients accessing high quality information/education more locally and also helps staff especially as flexible working increases.

5.1.117 Education provision, both for Velindre staff and through partnership working with our **LHB colleagues** and with higher education institutions to deliver undergraduate and postgraduate education events and courses. We will meet all appropriate training standards to deliver a high quality training experience for a broad range of health care professionals.

5.1.118 Velindre will develop our **international role** – building on existing links and developing new ones – that support education in other countries with reciprocal

arrangements that our staff can benefit from too, bringing skills back that benefit patient care in South East Wales.

5.1.119 It will also explore opportunities and collaboratively develop our role in supporting/delivering education that helps with cancer prevention and early diagnosis – both for patients and professionals.

5.1.120 This stretches to a exploring and collaboratively developing our education role in society, supporting cancer/health related education in schools and in healthcare career promotion, supporting the economy of South East Wales. This also involves supporting cancer care in developing nations – building on the work the Trust already does via Wales in Africa.

The Centre for Learning and Innovation

5.1.121 Any health care provider needs facilities to deliver research and development, education, service improvement, innovation/technology and to support patient involvement as described in the previous sections - they are critical for both the short and long term quality of patient care and the long term sustainability of clinical care. Currently, VCC already delivers these functions, but teams are spread throughout the hospital which impacts on efficiency and outputs. The lack of physical facilities/space further limits our abilities in these areas and also limits our ability to work with/support partner organisations.

5.1.122 Within the future Clinical Model, essential functions will be co-located with the 'Centre for Learning and Innovation'. This creates efficiencies and synergies. It is not a separate entity – it is a core part of the specialist cancer centre and will support the regional delivery of care through an open approach, utilising technology and links with existing and new facilities such as the Velindre @ and Radiotherapy Satellite Centre@.

5.1.123 The C4Li will therefore offer the opportunity to form a **regional hub**, adding to the network across Wales to support patients and staff locally, to deliver benefits throughout the region, to all members of the Cancer Community in South East Wales and beyond. It will allow teams to **continuously improve services** and to realise their ambitions relating to quality of clinical care and will assist VCC in delivering its values of being accountable, bold, caring and dynamic.

5.1.124 This will have a strong **patient and carer focus**, placing them at the centre of health care decisions. It will be aligned with the principles of the Service Model and will underpin this. It will support national strategies such as prudency.   I t will very much be 'outward facing' allowing greater opportunities to integrate and collaborate across traditional boundaries.

5.1.125 The C4Li will **improve clinical care** via facilitating research, education & training, quality improvement and innovation across all partner agencies and create the hub for local, national and international learning networks with leadership from all professional disciplines and stakeholders involved in cancer services and care. It will help further improve the **reputation** of VCC and its

partners in cancer care and assist in attracting and retaining staff across the region.

5.1.126 The C4Li will be a physical space bringing together a range of clinical, professional, academic and managerial experts in patient involvement, research, innovation, education and service improvement. It will also form a **virtual hub** for collaboration, and communication across South East Wales. This will be the 'engine room' for continuous improvement and give opportunities for use by other service providers, partners and stakeholders with a common agenda of sustaining, improving and transforming cancer services. This will help the long-term sustainability of non-surgical cancer care in South East Wales.
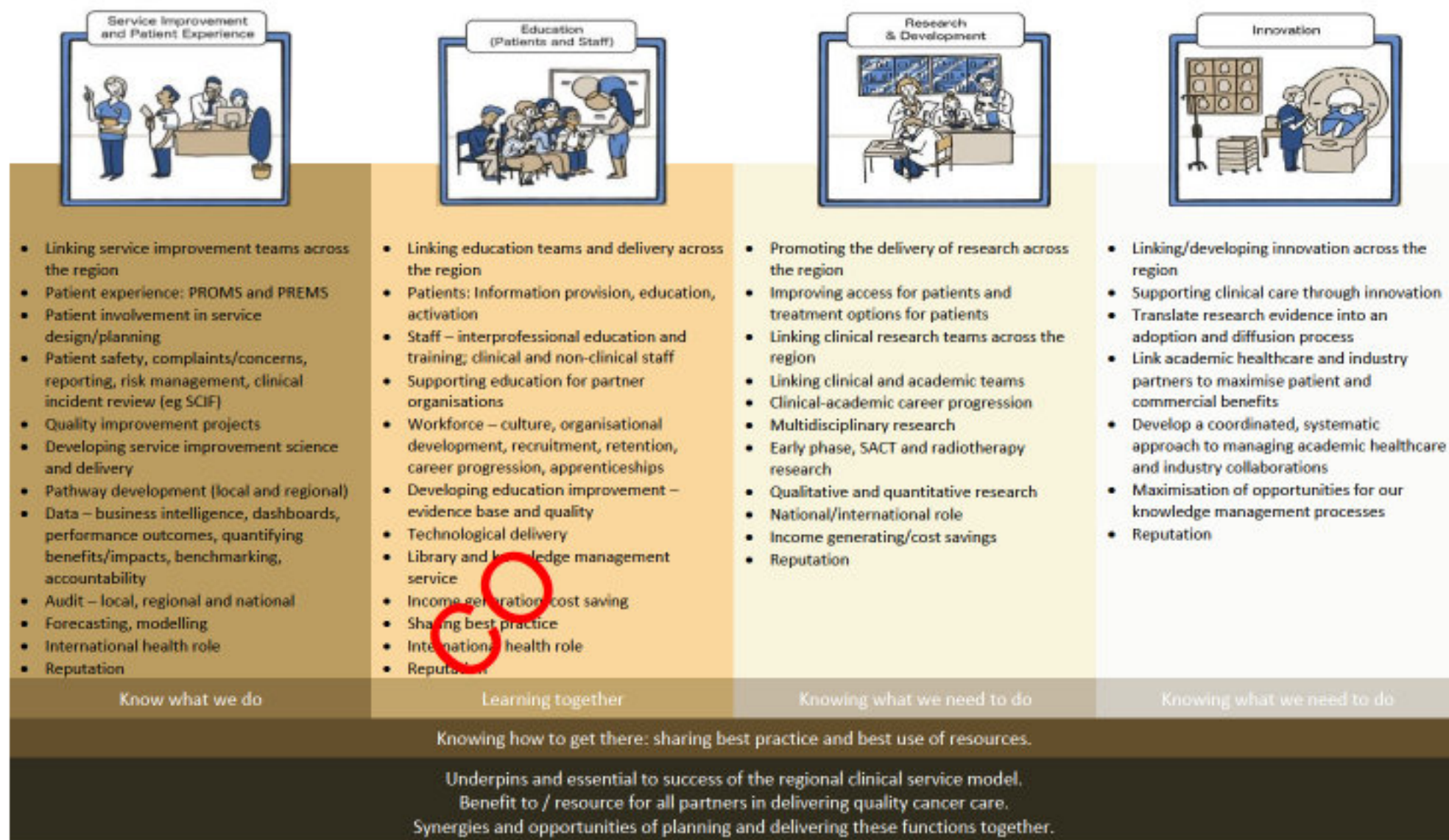
5.1.127 It will support all staff involved in caring for those affected by cancer – including those in clinical and non-clinical roles. Its scope will be broader than the clinical model as it will be available for use by all members of the cancer community in South East Wales with additional opportunities for supporting health care beyond this.

5.1.128 It forms arguably one of the most transformative and exciting elements of the TCS Programme and supports the ongoing clinical agility to continuously develop and improve clinical services – establishing the long term sustainability of non-surgical Cancer Services in South East Wales.

5.1.129 We will seek to promote the new C4Li to partners prior to its opening and actively engage with them, in order to involve others in the planning, maximize the benefits delivered and ensure best use once developed.

Figure 5-10: Core Function of the C4Li

Service Improvement and Patient Experience

- Linking service improvement teams across the region
- Patient experience: PROMS and PREMS
- Patient involvement in service design/planning
- Patient safety, complaints/concerns, reporting, risk management, clinical incident review (eg SCIF)
- Quality improvement projects
- Developing service improvement science and delivery
- Pathway development (local and regional)
- Data – business intelligence, dashboards, performance outcomes, quantifying benefits/impacts, benchmarking, accountability
- Audit – local, regional and national
- Forecasting, modelling
- International health role
- Reputation

Know what we do

Education (Patients and Staff)

- Linking education teams and delivery across the region
- Patients: Information provision, education, activation
- Staff – interprofessional education and training; clinical and non-clinical staff
- Supporting education for partner organisations
- Workforce – culture, organisational development, recruitment, retention, career progression, apprenticeships
- Developing education improvement – evidence base and quality
- Technological delivery
- Library and knowledge management service
- Income generation/cost saving
- Sharing best practice
- International health role
- Reputation

Learning together

Research & Development

- Promoting the delivery of research across the region
- Improving access for patients and treatment options for patients
- Linking clinical research teams across the region
- Linking clinical and academic teams
- Clinical-academic career progression
- Multidisciplinary research
- Early phase, SACT and radiotherapy research
- Qualitative and quantitative research
- National/international role
- Income generating/cost savings
- Reputation

Knowing what we need to do

Innovation

- Linking/developing innovation across the region
- Supporting clinical care through innovation
- Translate research evidence into an adoption and diffusion process
- Link academic healthcare and industry partners to maximise patient and commercial benefits
- Develop a coordinated, systematic approach to managing academic healthcare and industry collaborations
- Maximisation of opportunities for our knowledge management processes
- Reputation

Knowing what we need to do

Knowing how to get there: sharing best practice and best use of resources.

Underpins and essential to success of the regional clinical service model.
Benefit to / resource for all partners in delivering quality cancer care.
Synergies and opportunities of planning and delivering these functions together.

Summary & Conclusion

5.1.130 We have the opportunity to develop non-surgical cancer services in a way that supports and improves services for a generation or more, across the region. If we do not seize this, the increasing incidence of cancer and rising demand on services will have the opposite effect – reducing quality, worsening access and patient experience. Outcomes from treatment will be worse and the cost to healthcare, society and the population of South East Wales will increase.

5.1.131 We owe it to our patients to respond to this need in a planned, collaborative manner. The health care system looking after the people affected by cancer is complex, with teams interdependent on others. We are keen to play our part alongside partners – supporting them and when beneficial, playing a leading role.

5.1.132 Our service model describes a vision for non-surgical cancer services that maintains and improves quality, allows care to be delivered more locally in a way that copes with increasing demand prudently and efficiently. It transforms care from a system that is struggling and moving away from the principles that patients tell us are important to a patient focused, locally delivered care model.

5.1.133 It also supports the long term sustainability of care by placing those affected by cancer at the centre of planning and delivery and by focusing on service improvement, research, education and innovation to deliver an agile system that can respond and change as new treatment developments. Cutting edge cancer care will be delivered, in modern facilities with modern equipment with the ability to continuously develop the service and to contribute to the evidence base defining best standards of care for others to follow.

5.1.134 It will create a regional model of care that the people affected by cancer and the staff who care for them can be proud of. It will require teams and people to work differently, to be open to change and to collaborate, placing patients at the centre of decisions to deliver non-surgical cancercare that is shaped around their needs and priorities.

6 VELINDRE NHS TRUST INFORMATICS & DIGITAL EXCELLENCE

6.1.1 Velindre NHS Trust has been implementing significant developments in Information Management and Technology (IM&T) systems which have been a combination of national programmes, internationally used systems and bespoke local developments all of which have enabled the transformation of services for professionals, patients, and donors. The Trust however must continue to develop its IM&T to support the organisational and clinical priorities and to ensure that next generation IM&T is used to enhance service delivery.

6.1.2 At the heart of the informatics vision are the four principles from the "Informed Health and Care: A Digital Health and Social Care Strategy for Wales" (2015).

Figure 6-1: Informed Health and Care: A Digital Health and Social Care Strategy for Wales
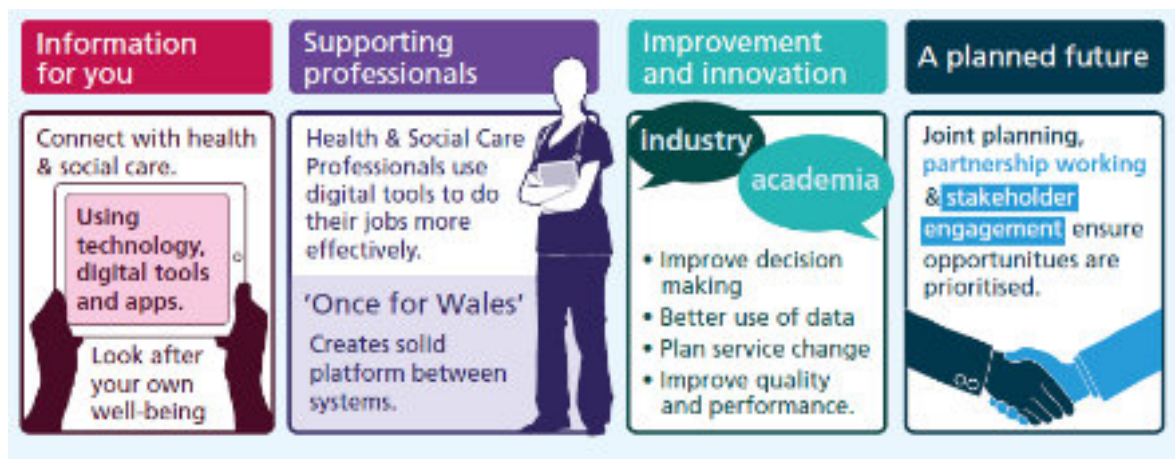
6.1.3 Velindre NHS Trust has produced an ambitious strategic programme, "**Digital Excellence**", which over the next five years, will implement a range of national technology solutions, while growing our capacity and capability to embrace innovative technologies. This is based on the fundamental premise that high quality healthcare in the 21st century cannot be delivered with out of date or obsolete legacy systems, and/or paper based information recording and delivery.

6.1.4 To this end, Velindre Cancer Centre aims to take a lead on building international partnerships and working in collaboration with NHS Wales Informatics Service (NWIS) and other Health Boards to develop robust, shared designs for modern health information systems delivered "Once for Wales".

6.1.5 Velindre continues to support the development and delivery of national products and services working in partnership with NWIS. In the short to medium term, the approach will be to identify opportunities that maximise the benefits of investment in existing information and technology in order to provide more joined-up service provision. This approach will support prioritised service

improvements and ensure the workforce becomes familiar with increased ways of digital working.

6.1.6 By utilising IM&T as a critical enabler to support service transformation, Velindre aims to fundamentally redesign administrative, operational and clinical processes to maintain high levels of data quality, and not only ensure information is accurate and up to date, but also embedding state of the art technologies to deliver exceptional services.

6.1.7 Our digital working is aligned to the Trust's organisational strategy, "**Building Excellence**", which once digitally enabled, will be more empowered, efficient and effective in realising the benefits intended from implementing digital systems. As shown below, people with access to digital technology are more empowered, people following digital processes are more effective and digital processes powered by digital technology are more efficient.

Figure 6-2: Joining People, Process & Technology
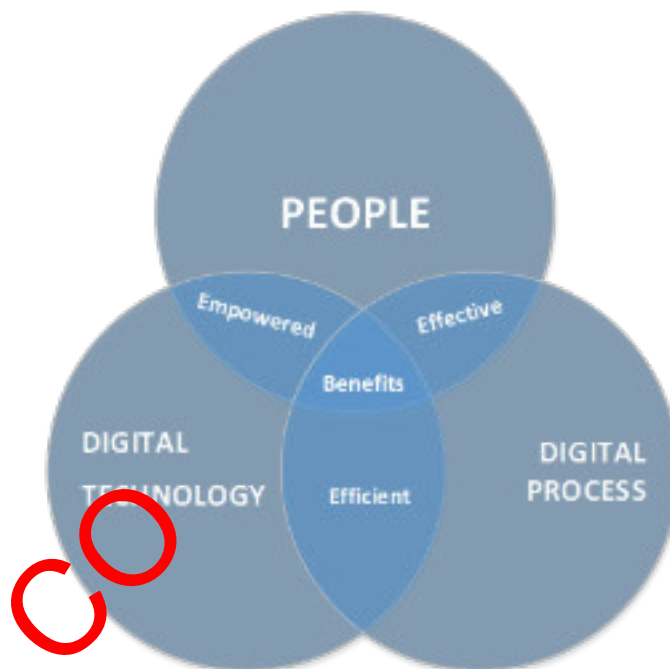
6.1.8 The Transforming Cancer Services Programme provides Velindre with the platform to showcase new technology and embed national standardised ways of working to deliver our core services. A key principal for our vision is:

To provide a modern, fully integrated, location independent, electronic view of information, in order to support high quality delivery of services

6.1.9 The refreshed *Cancer Delivery Plan for Wales 2016–2020*[26] highlights the need to set the strategic direction for cancer information and intelligence and align it to the overarching NHS Wales Informed Health and Care Strategy. In order to deliver, there is a clear need for the collection, retrieval, linkage and distribution

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[26] http://gov.wales/docs/dhss/publications/161114cancerplanen.pdf

of cancer data, information and health intelligence to be delivered through a robust and integrated approach.

6.1.10   By using technology to enable information about cancer services and outcomes to be more available to patients, it is our ambition that this will support them to make the right decisions about their care.

6.1.11   Clearly, this information needs to be up-to-date, accurate and available across organisational boundaries, wherever services are being delivered. Making this a practical reality for our staff and patients is a significant challenge in light of the continued reliance on the number and variation in applications in use across the organisation; across the whole of NHS Wales and the level of investment in technology required to enable and sustain change and modernisation.

"Digitally Enabled, Patient Centred Services"

6.1.12   The future vision for a Cancer patient in Wales is one that is informed and empowered across their complete treatment pathway.   Furthermore   by personalising the pathway, the patient will be able to make informed decisions regarding their planned care.

6.1.13   In linking the four strands of the digital health strategy, the following outlines how the Transforming Cancer Services programme utilises digital technology to provide Cancer services appropriate to the 21st Century.

Information for you

"People will be able to look after their own wellbeing and connect with health and social care more efficiently and effectively with online access to information and access own records. Organisational boundaries are not barriers to effective care as information is available electronically and joined up."

6.1.14   Velindre patients generally feel well supported and indeed describe an overwhelmingly positive experience of cancer services but modern technology enables us to create a new 'digital' 2 way relationship with people affected by cancer. We recognise that we need to develop this new relationship which will ensure patients, carers and healthcare professionals have appropriate access, expertise and support to use this new technology. This will require education, investment in new systems and a change in culture for people affected by cancer and healthcare professionals alike.

6.1.15   Through the use of digital technology Patients will be able to look after their own well-being and connect with health and social care more efficiently and effectively, with online access to information and their own records; undertaking a variety of health transactions directly, using technology, and using digital tools and apps to support self-care, health monitoring and maintain independent living.

6.1.16 The focus of the future clinical design will be patient centred rather than healthcare centred ensuring the patient has access to the service and data they require in the manner that is most appropriate to them; at that specific point in time of their treatment.

6.1.17 Furthermore we plan to empower the patient to book the service mode that suits them best. They may choose to book a skype call with a clinician either for video or audio, reducing the need for sometimes challenging commuting; yet still able to discuss on the call the contents of their test results and their treatment with full access to the information in the hands of the patient. The patient will also share this information with other health professionals of their choosing and at their own discretion. This will further reduce the burden on them to travel and queue and enable them to preserve their strength.

6.1.18 In addition to this, through enhance information services, the public will have access to support in order for them to lead healthy lives. Where cancer does occur, they and their carers will have access to understandable information in a form personal to them to ensure they can actively participate in their cancer care and make the right choices for them.

Figure 6-3: Future Patient Experience

Velindre Patients will:

- View their information through online access to their records, supporting them to make better decisions about their health and care and take more control of their well-being, in line with principles of prudent healthcare and sustainable social services. They should also be able to submit their own advance care plan(s) for inclusion into "their" health care record.

- Amend their records, feeding in details they may have gathered from other sources, such as apps and wearable devices, to play an active part in developing and improving the quality of the information held about them and their health and well-being.

- Routinely use digital apps, wearable devices and other online resources to be well- informed and active participants in their care, able to make informed decisions and lifestyle choices to maintain their well-being.

- Connect online with health and care services in the same way they do with other aspects of their life. They will be able to book appointments online, order repeat prescriptions and use the internet, email and video conferencing to connect with clinicians and care professionals in a way that suits them, potentially reducing delays and costs to the service and service users.

- Use digitally-enabled services to monitor long-term conditions and daily tasks to support independent living for those individuals and families where this is required.

Supporting professionals

"Health and social care professionals will use digital tools and have improved access to information to do their jobs more effectively with improvements in quality, safety and outcomes. Focus on cultural change, knowledge and skill development to enable "our people" to work well within a digital enabled environment and make the most of emerging opportunities."

6.1.19   Velindre professionals will use digital tools and have improved access to information to do their jobs more effectively with improvements in quality, safety and efficiency. A 'Once for Wales' approach will create a solid platform for common standards and interoperability between systems and access to structured electronic records in all care settings to join up and co-ordinate care for service users, patients and carers.

6.1.20   For the first time healthcare professionals will have access to a single health record which will contain all relevant previous information for that patient and allow them in turn to communicate regarding care plans and holistic needs assessments with the rest of the cancer community supporting the patient across their care pathway.

"Capture Once, Use Many Times"

6.1.21   As the cancer pathway is complex and crosses many interfaces between people and organisations the future design will remove the previous silos of information that existed between legacy systems and organisations. The focus of the future design will be patient centred rather than healthcare centred while

still ensuring the professional has access to all the services and data that they require.

6.1.22 The replacement for Patient Administration System (PAS) and Electronic Patient Record (EPR) workflows will capture the essence of the current design of IMT services at Velindre and integrate these into an improved national design to create a more patient centred and nationally data integrated modern and reliable system design.

6.1.23 Patient data such as results and reports will be accessed in a national design portal service which will be able to filter and retrieve data from all over Wales to present a clear picture to clinicians of the most relevant patient data for that point in time.

6.1.24 Furthermore, systems will be accessible via a number of different methods to suit the data and method available so for example test results could be viewable or requested on a handheld device for convenience but larger handheld devices would be used where better views of data were required such as in portals. Keyboards, voice dictation or laptops would be accessible for more detailed reporting requirements.

6.1.25 Velindre will be at the forefront of this technology roadmap designed to reduce organisational silos and to support patient coproduction for Wales.

Figure 6-4: Supporting Professionals across the TCS Model
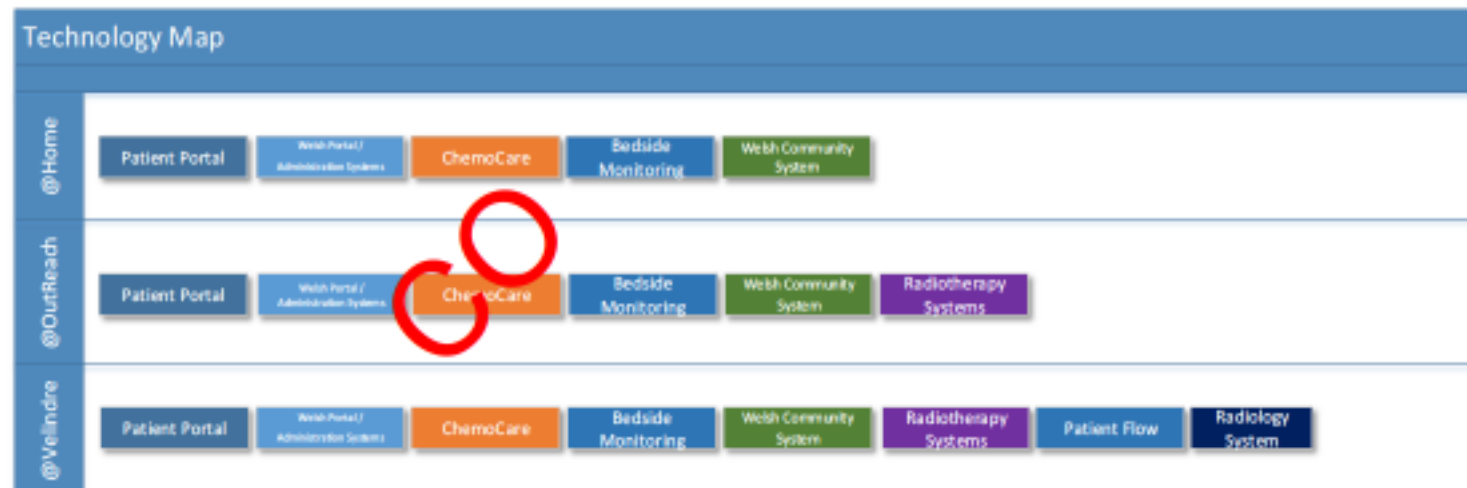
Velindre healthcare professionals will:

- Capture information electronically at the point of care delivery, in a structured format so it can be used to provide a common information base and integrated records across all health and social care settings.

- Use information and electronic care records to collaborate fully with citizens, ensuring options and decisions are co-produced and care is co-ordinated and joined-up around the personalised needs of the individual service user, patient and their carer.

- Use technology routinely in all care settings to support them to do their jobs effectively, with online decision support, electronic records and automated ways of working, to improve quality and safety and reduce risk.

- Be encouraged and supported to use digital tools that are available to those working in other sectors: email, internet and video conferencing.

- Use data and information to understand the outcomes they are achieving, to support research and carry out audit, learn from incidents and drive improvements in performance.

- Adopt a 'digital first' philosophy when designing and delivering new services, to promote mobile, flexible, digitally-enabled service and workforce models.

- Be skilled to work well within a digitally- enabled environment.

Improvement and Innovation

"Make better use of available national data sources and local information in combination with emerging new technologies, to support informed decision making and service planning, population health, research and development. Exploit opportunities for new innovation partnerships for innovative and complex analytics that linked "Big Data" will bring, by utilising new approaches of large scale linked dataset analysis as well as the more traditional methods of turning data into information."

6.1.26 Velindre will make better use of available data and information to improve decision making, plan service change and drive improvement in quality and performance. Collaboration across the whole system, and with partners in industry and academia, will ensure digital advances and innovation is harnessed and by opening up the 'once for Wales' technical platform allow greater flexibility and agility in the development of new services and applications.

6.1.27 Communication, information and intelligence will be the key enablers for NHS Wales to meet the rising demand for cancer care, to provide complex new treatments and support, to improve outcomes and reduce inequalities for people affected by cancer across Wales. We will use information to ensure that every healthcare professional and patient have access to the information they require at their time of need to enable them to plan and deliver the highest quality of care together. During this period of integration of informatics systems we will maintain the high level of experience that patients receive in Wales. Our plans for integrated systems of care will improve patient outcomes, particularly survival, through prevention and timely access to diagnosis and effective treatments. We must though also build in an 'engine' for innovation and

transformation if we want cancer services to be comparable with the best in the world.

6.1.28   Organisations, providers, practices and teams must know how well they are performing at individual, cohort and population levels. This will allow systems to share best practice and commissioners and providers to focus on those areas that are less than the best.

6.1.29   Such secure databases of   linked information automatically collected from source, and with appropriate information governance applied, are 'gold mines' to be exploited by research teams and commercial industry to understand the value of current treatments and systems of care and to develop new ones.

6.1.30   As technology and medicine continues to develop, the ambition in cancer care is personalised medicine or precision oncology. This will be delivered through information from the patient, their cancer, diagnostic tests and treatments determining the right treatment for that patient's disease at that time. Information systems will provide linked information, complex analysis and algorithmic continuous learning. Artificial intelligence will play an increasing role in healthcare diagnostics and therapeutics, and we will provide the information for these new systems in a timely and usable way.
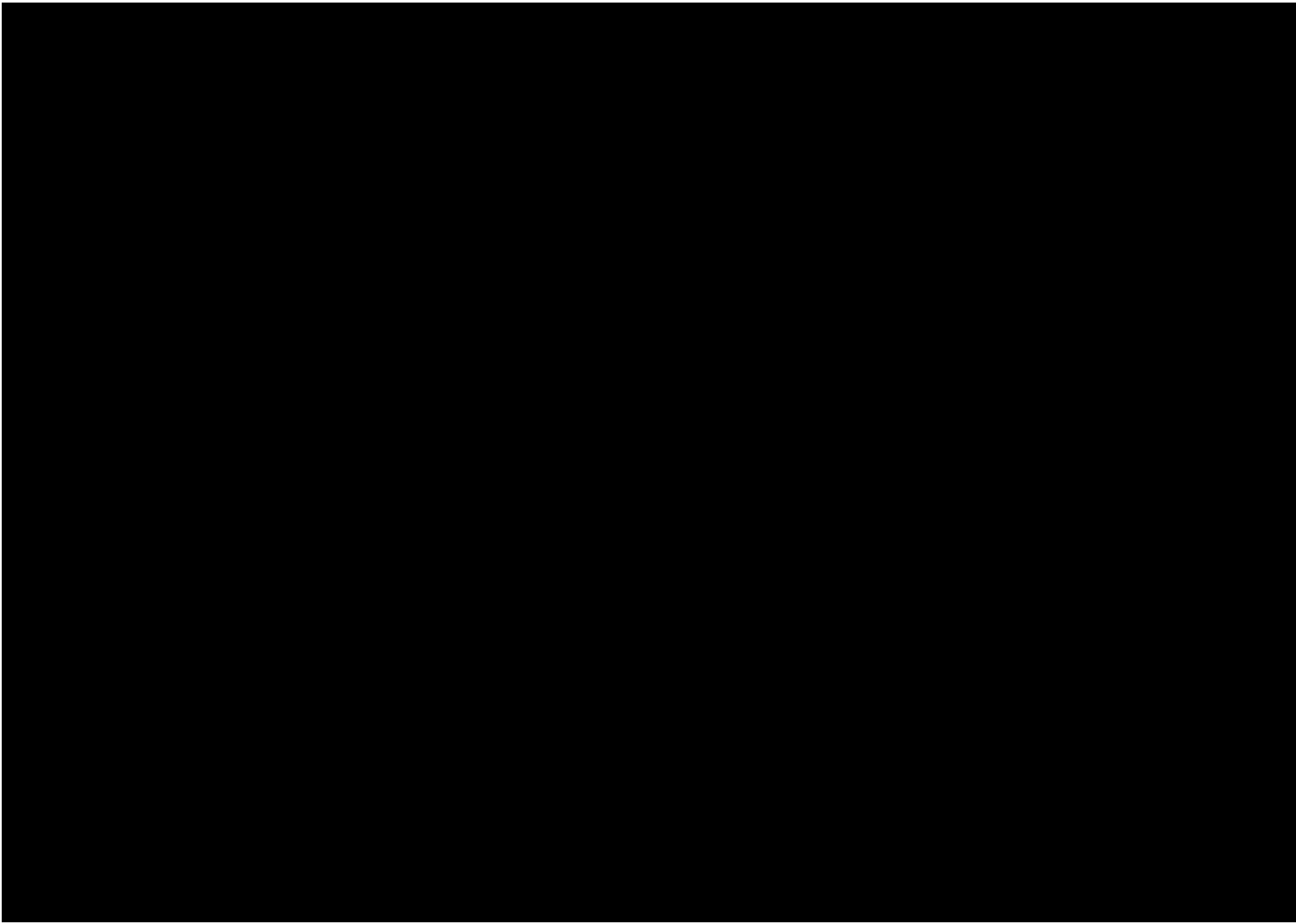
Velindre are committed to:

- Focusing on making better use of national data sources and local information to support informed decision making and improve cancer service planning, population health, research and development.

- Build a more 'open' technical platform to allow greater flexibility in the development of new applications based on clear national cancer standards and system interoperability.

- Engage with stakeholders in refreshing our plans and co-designing our digital future: frontline staff, citizens, third sector organisations, industry and university partners, nationally and internationally, to provide a new approach to harnessing innovation, learning from what works elsewhere and adopting these solutions in an agile, rapid and responsive way to realise the benefits and achieve better outcomes for the people of Wales.

A Planned Future

"Joint planning, partnership working and stakeholder engagement across NHS Wales involving the third sector and academia to ensure opportunities are prioritised and realisation of benefits."

Informed Health and Care will be a key enabler of transformed service across Wales. Joint planning, partnership working and stakeholder engagement at local, regional and national level will ensure that the opportunities and ambitions are prioritised, with planning guidance issued by Welsh Government.

6.1.31 Increasing use of technology and future cloud services supported by electronic authentication services for security such as swipe cards and biometrics will enable staff to work with less restriction of organisational boundaries.

6.1.32 Patient's accessibility to their own data and co-production with patients is predicted to increase as more systems become more capable of this. Collaboration with external partners will also be partly driven from this.

6.1.33 Although organizations have a statutory duty to provide healthcare for their resident population, they now have a duty of care to not let geographical or pathway boundaries get in the way of providing access to effective, efficient, excellent and equitable care to the people of Wales. This will be achieved through the strategic planning of services at a National, regional and local level, through bold and decisive leadership and a workforce committed to both deliver high quality and safe care and to continuously improve that care. Data, information and intelligence are key to underpinning both planning and continuous improvement in integrated healthcare services.

"If Velindre integrates patient information then they can integrate patient care"

7 KEY SERVICE REQUIREMENTS

7.1 Introduction

7.1.1 This purpose of this section is to outline the key service requirements in relation the proposed Service Model:

- Future capacity requirements; and
- Future workforce requirements.

7.2 Modelling future demand, capacity and workforce

7.2.1 The Trust has developed a comprehensive activity model to project future demand for cancer services in South East Wales.

7.2.2 2016/17 has been used as the baseline activity year for the model. The 2016/17 data set has been subject to rigorous review to ensure accuracy and completeness with an external data validation exercise being undertaken to assure a robust baseline position.

7.2.3 A blueprint for the demand, capacity, workforce and financial model has been produced and approved by the TCS Programme Management Board. The functionality of the model has been subjected to quality assurance tests by the Trust's advisory team GE Healthcare Finnamore and by the Trust Programme Team.

7.3 Structure of the activity and capacity model

7.3.1 Demand projections are based on the Trust's planning and principles document. This covers the period 2016/17 (the baseline year) to 2031/32.

7.3.2 The base data was subject to comprehensive review and further work was undertaken by the Trust to improve its accuracy and completeness, prior to commencing the modelling of projected future activity.

7.3.3 Projected capacity for all clinical areas which are activity driven within the model form the basis of the functional content and schedule of accommodation. Where improvements in utilisation and efficiency have been agreed, these were applied to the capacity outputs.

7.3.4 Future workforce requirements include the impact of service redesign as well as growth in activity and efficiency improvements within the demand and capacity elements of the model. This is a core part of the model and a considerable amount of time has been spent with clinical teams to ensure a comprehensive representation of the future workforce requirements.

7.3.5 A series of workshops have also been held with clinical teams to discuss and agree modelling units, drivers, utilisation and efficiency assumptions and to

consider modernisation opportunities, including potential extensions to the working day and working week.

7.3.6 Forecast expenditure requirements are expressed in real terms (i.e. net of inflation). The model allocates non-pay costs to workflows and pay costs by WTE (for the mid-point in each grade) by workflow for the baseline and subsequent years.

7.3.7 The steps within the model are summarised in the diagram below.

Figure 7-1 Steps in developing model
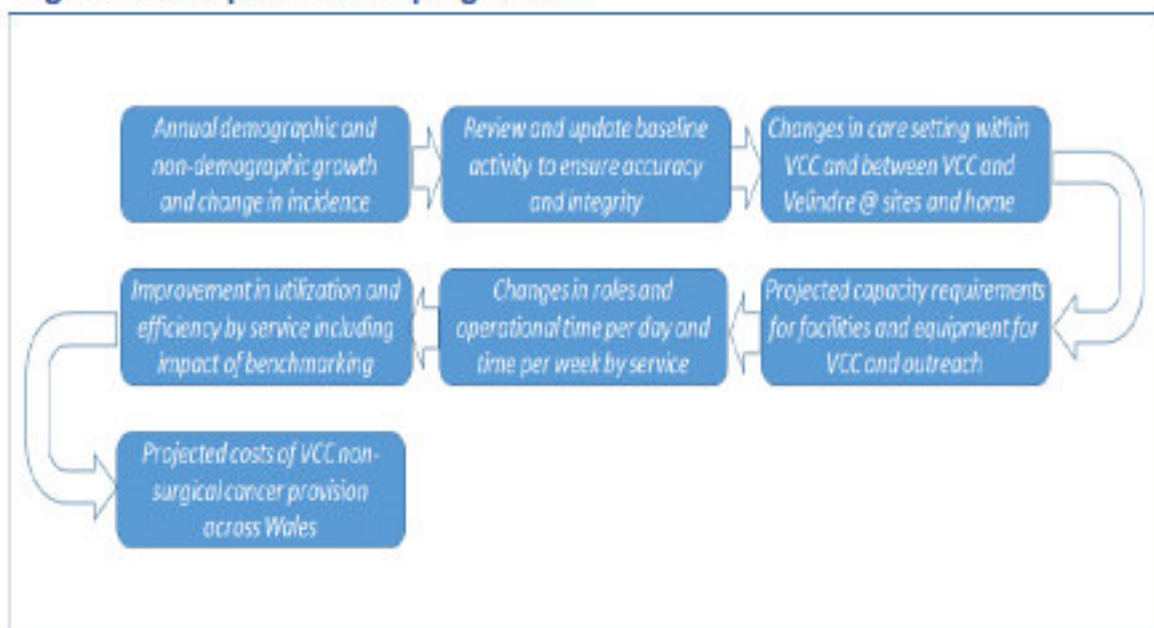
7.3.8 Each of the four elements of the model have been reviewed by the Trust's Informatics, Workforce & OD and Finance teams to test the logic and assumptions underpinning the model and changes were made to the model where these were deemed necessary.

7.4 Key modelling assumptions

7.4.1 The assumptions used to drive the model were developed by the Trust and approved by the TCS Programme Management Board. The key drivers are outlined below.

Table 7-1: Key growth assumptions

Service	Annual growth assumption/years	
	2016/17 - 2022/23	2023/24 – 2031/32
Radiotherapy	2%	2%
SACT	5%	2%
Inpatients	2%	2%
Outpatients and Ambulatory Care	2%	2%

Service	Annual growth assumption/years	
	2016/17 - 2022/23	2023/24 – 2031/32
Radiology (CT & MRI) and Nuclear Medicine	9%	2%

7.4.2   Forecast capacity requirements are outlined in the Table 7-2 (*see Appendix PBC/SC.S7 for individual LHB activity information packs*).

Figure 7-2: Projected capacity requirements to 2031/32

Capacity Requirements			Upadate with 2016/17		
			2016/17	2021/22	2031/32
Ambulatory Care (chairs)	Total		6.5	7.6	9.3
2016/17 data calculated from	VCC		4.6	4.2	5.1
warehouse - source CANISC	Outreach		2.0	3.4	4.2
Imaging (machines)	Total	CT	1.0	1.5	1.9
		Interventional	0.0	0.0	0.0
		MR	1.0	1.6	1.9
		Nuclear Medicine	0.0	0.0	0.0
		Plain Film	0.1	0.1	0.2
		Screening	0.0	0.0	0.0
		Ultrasound	0.2	0.2	0.3
2016/17 data calculated from	VCC	CT	1.0	1.3	1.6
warehouse - source RADIS		Interventional	0.0	0.0	0.0
		MR	1.0	1.3	1.6
(original baseline 2014/15 figures		Nuclear Medicine	0.0	0.0	0.0
included cancellations. This has		Plain Film	0.1	0.1	0.1
been removed for 2016/17		Screening	0.0	0.0	0.0
baseline)		Ultrasound	0.2	0.2	0.2
	Outreach	CT		0.2	0.3
		Interventional		0.0	0.0
		MR		0.2	0.3
		Nuclear Medicine		0.0	0.0
		Plain Film		0.0	0.0
		Screening		0.0	0.0
		Ultrasound		0.0	0.0
Inpatients (beds)	Total		40.2	56.9	668.6
2016/17 data calculated from	VCC		40.2	50.2	57.3
warehouse - source CANISC	Outreach			6.8	11.3
Outpatients (rooms)	Total		21.0	30.4	36.2
2016/17 data calculated from	VCC		17.8	23.7	22.6
warehouse - source	Outreach		3.2	6.7	13.6
RT prep (rooms)	Total		3.9	4.7	5.4
2016/17 data calculated from	VCC		3.9	3.5	4.3
warehouse - source CANISC	Outreach			1.1	1.1
RT (linac)	Total		7.7	9.1	9.7
2016/17 data calculated from	VCC		7.7	7.5	7.8
machine - source Aria/Mosaiq	Outreach			1.5	1.9
RT Non Linac	Total		0.1	0.1	0.1
2016/17 data calculated from	VCC		0.1	0.1	0.1
machine - source Aria/Mosaiq	Outreach				
SACT (chairs)	Total		25.5	27.0	32.9
2016/17 data calculated from	VCC		16.6	12.1	14.8
warehouse - Source ChemoCare &	Outreach		7.7	12.1	14.8
CANISC	Home		1.3	2.7	3.3

7.5 Operational scenarios

7.5.1 The Trust has tested a number of different operational models for the new service. The operating scenario assessment process was designed to validate the following:

- Ensure there is sufficient capacity to meet projected demand for cancer services provided by Velindre;
- Meet patients' needs and aspirations for the availability of treatment over extended operating time;
- Demonstrate to the health boards that the Trust is transforming the way in which it provides services to achieve optimum value for money; and
- ██████████████████████████████

7.5.2 All of the above were viewed in the context of the need to provide a safe and high quality service and to retain and recruit staff effectively. The scenarios were developed based on different assumptions in relation to:

- The need to extend the working day;
- The need to extend the working week, where services where not already provided on a 7 day basis; and
- Whether these changes should be applied consistently across all services or to individual services.

7.5.3 Eight operating scenarios, including the current model, were evaluated by a multidisciplinary group comprising the TCS Programme core team and clinical service leads and facilitated externally. The assessment was undertaken based on each scenario's:

- Non-financial assessment which included the extent of alignment with the PBC's investment objectives and Critical Success Factors; and
- Financial assessment as defined by the impact on the estimated unitary charge and Trust pay and non-pay.

7.5.4 The preferred operating scenario (Scenario 8) scored the highest based on a combined non-financial and financial score. This scenario included the following components:

- SACT/Pharmacy: 12 hours, Monday – Friday;
- Radiotherapy: 9.5 hours, Monday – Friday;
- Outpatients: 2 x 3.5 hour sessions, Monday – Friday;
- Acute Oncology Service: 7 days;
- Radiotherapy Urgent Care for Category 1: 7 days; and
- Acute Palliative Care: 7 days.

7.5.5 One of the key features of the preferred operating scenario is providing Category 1 Radiotherapy on a 7 day basis which is likely to afford biological advantages from extended treatment availability (see "The Timely Delivery of Radical Radiotherapy: Standards and Guidelines for the Management of

Unscheduled Treatment Interruptions", Board of Faculty of Clinical Oncology, Royal College of Radiologists, 2008). The Royal College of Radiologists has stated that "the data reviewed shows very strong evidence that prolongation of overall treatment time affects treatment outcome or local tumour control (cure rates)" for a defined list of tumours.

7.6 Workforce requirements

7.6.1 The projected workforce requirements are set out in Table 7-2.

Table 7-2: Projected workforce requirements to 2031/32

Staff Group	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2031/32
Admin & Trust Wide Services	201.1	210.5	218.9	218.0	221.7	222.3	225.6	265.8	268.0
Allied Health	25.2	22.1	13.8	13.8	19.8	19.8	19.8	19.8	19.8
Medical	67.4	79.6	81.6	82.9	85.6	88.6	93.8	95.2	106.7
Medical Physics	55.3	54.9	57.7	58.6	60.4	66.9	60.2	61.6	64.6
Nursing	167.9	199.5	204.6	191.3	202.8	208.1	223.6	227.1	251.5
Pharmacy	45.5	33.5	31.6	34.3	39.0	39.9	39.0	50.0	47.5
Radiography	108.9	107.4	105.4	107.4	109.5	116.6	116.4	118.9	134.5
Total	671.3	703.6	713.6	706.3	738.9	762.1	778.3	838.3	892.5

7.7 Conclusion

7.7.1 The Trust has set out a clear rationale for assessing its future service requirements which are closely aligned to the proposed model of care. It has used established tools and techniques to assess future demand for non-surgical cancer services across South East Wales. This has allowed the Trust to translate anticipated disease incidence into a set of future capacity and workforce requirements up to 2031/32. In doing so it has worked closely with staff groups in establishing what these changes mean for its future workforce which will be embedded within its future strategy.

8 SPENDING OBJECTIVES

Introduction

8.1.1 The purpose of this section is to outline the spending objectives for the Programme. The spending objectives provide a basis for appraising potential options and for post-project evaluation.

Spending objectives

8.1.2 The following TCS Programme spending objectives (PSOs) were developed at stakeholder workshops, which were attended by representatives with a broad range of service views:

Spending objective 1: To provide patients and carers with quality services that deliver optimal clinical outcomes;
Spending objective 2: To deliver sustainable cancer services to the population in the most effective way;
Spending objective 3: To be a leader in education, research, development and innovation; and
Spending objective 4: To comply with all relevant standards.

8.1.3 The spending objectives were approved by the TCS Programme Management Board who provided the Trust Board with assurance that they were:

- Aligned with the national context for healthcare developments in Wales

- Aligned with the Velindre cancer strategy and with the strategic context of the TCS Programme;

- Specific, measureable, achievable relevant and time-constrained (SMART); and

- Focused on business needs and vital outcomes rather than potential solutions.

8.1.4 The spending objectives were subsequently shared and agreed with Welsh Government.

Anticipated Outcomes

8.1.5 The four PSOs are shown in Table 8-1 along with anticipated outcomes.

Table 8-1: Spending objectives and outcomes

Spending objective	Anticipated outcomes
PSO1: To provide patients and carers with quality services that deliver optimal clinical outcomes	• Improved cancer survival rates. • Improved mortality rates. • Increase in care delivered closer to home. • Increased access to Radiotherapy. • Improved patient safety. • Recruitment and retention of workforce. • Enhanced patient and carer experience.
PSO2: To deliver sustainable cancer services to the population in the most effective way	• Reduced unit cost for all services. • Improved utilisation of equipment, building and staff resources. • Sufficient service capacity to meet demand. • Skilled, high calibre, motivated and patient focused workforce. • Reduced energy consumption and carbon emissions.
PSO3: To be a leader in education, research, development and innovation	• Increased number of clinical trials available for patients. • Increased percentage of patients recruited into interventional clinical trials for each cancer site. • Increased percentage of patients recruited into clinical trials for each cancer site. • Increased number of patients consenting to donate tissue. • Increased number of trials sponsored by Velindre. • Increased number of clinical trials with Velindre named chief investigators. • Improved patient education concerning condition, care and treatment.
PSO4: To comply with all relevant standards	• Attainment of national indicators for cancer care and meeting best practice standards. • Provision of support to LHBs in achieving waiting time targets. • Compliance with building regulations and standards. • Compliance with all recognised environmental standards.

Conclusion

8.1.6   In setting out the spending objectives for the Programme the Trust has sought to clearly describe what it and its partners are seeking to achieve. These have been used to inform the anticipated benefits that the Programme will deliver as well as set the basis for post-Programme evaluation which will assess the extent to which these objectives have been realised.

Chapter Summary:

- TCS Programme spending objectives developed at stakeholder workshops, which were attended by representatives with a broad range of service views;
- Spending objectives were approved by the TCS Programme Management Board; and
- Spending objectives shared and agreed with Welsh Government.

9 POTENTIAL SCOPE

Introduction

9.1.1 This purpose of this section is to identify the potential scope of the Programme in terms of the operational capabilities and the service changes that are required to satisfy the identified business needs.

Potential scope

9.1.2 By considering the range of business functions, areas and operations to be affected and the key services required to improve organisational capability, 'scope creep' can be avoided during the options appraisal stage of the Programme.

9.1.3 The potential Programme scope has been considered against a continuum of need ranging from:

- **Minimum scope:** Core and essential service requirements/outcomes which are currently provide by VCC;
- **Intermediate scope:** Core and desirable service requirements/outcomes which the Programme can potentially justify on a cost/benefit and thus value for money basis; and
- **Maximum scope:** Core, desirable and optional service requirements/outcomes which the Programme can potentially justify on a cost/benefit and thus value for money basis.

9.1.4 The outcome of this is outlined in Table 9-1 and is used as the starting point to develop the longlist of options within the Economic Case.

Table 9-1: Potential Programme scope

Service	Minimum	Intermediate	Maximum
Radiotherapy	✔	✔	✔
SACT	✔	✔	✔
Inpatients	✔	✔	✔
Specialist Palliative Care	✔	✔	✔
Outpatients	✔	✔	✔
Ambulatory Care	✔	✔	✔
Radiology and Nuclear Medicine	✔	✔	✔
Pharmacy	✔	✔	✔
Acute Oncology Service (existing arrangements)	✔	✔	✔
Research and Development (existing arrangements)	✔	✔	✔
Training and Education (existing arrangements)	✔	✔	✔

Service	Minimum	Intermediate	Maximum
Research and Development (enhanced scope)		✓	✓
Training, Education and Innovation (enhanced scope)		✓	✓
PET CT Service		✓	✓
Proton Beam Service			✓
Haemato-oncology Service			✓
Teenage Cancer Service			✓

Conclusion

9.1.5 The Programme scope will be been used to set the minimum and maximum range for the options established within the Economic Case.

Chapter Summary:

- The potential Programme scope has been considered against a continuum of need ranging from minimum/intermediate/maximum scope.
- In defining the scope of the Programme the Trust has sought to establish a clear set of parameters for the Programme which will ensure that 'scope creep' is avoided during the options appraisal stage of the Programme.

10   BENEFITS AND RISKS

Introduction

10.1.1   This section of the business case sets out:

- The main benefits that it is anticipated the Programme will deliver;
- The main risks associated with the Programme; and
- The key constraints and dependencies affecting the scope and delivery of the Programme.

Benefits

10.1.2   The Trust has placed significant emphasis on the identification, categorisation and qualification of Programme and Project Benefits. This has included a range of internal workshops involving clinical staff and feedback from patients. The Trust has been supported by the Welsh Governments Economics division and by Capita Healthcare in this work especially around the quantification of said benefits.

10.1.3   Central to this case of this investment is the broad range of benefits that the proposed changes to the clinical service model will deliver. These benefits have been identified as part of the development of this PBC and any direct benefits – specifically those that will deliver cash releasing savings to Velindre NHS Trust - were quantified as part of the economic appraisal in line with relevant guidance.

10.1.4   In addition to this are a number of indirect benefits that are quantifiable in monetary terms and further work has been undertaken to value these using an evidence based approach (*Please see Appendix PBC/SC/S8– TCS Programme Benefits Report*). Please see appended Benefits report.

10.1.5   Stakeholders have identified a range of benefits that the Transforming Cancer Services Programme is expected to deliver. These include benefits relating to the following areas:

- More people have access to a wider range of service at a preferred location;
- People receive earlier diagnosis and quicker access to appropriate care;
- More effective delivery of care which reduces pressure on the overall health system including reduction in avoidable admissions, reduced length of stay, and better utilisation of resources;
- Improved clinical outcomes that result in better survival rates;
- Improved clinical outcomes that result in better quality of life;
- Improved quality of care;
- Improved patient, carer, and family experience;
- Better productivity resulting from facilities with improved clinical adjacencies;
- More efficient use of resources;
- Increased income generation opportunities;

- Reduction in travel costs;
- Economic benefits of better survival rates;
- Increased opportunities to share and drive best practice through better partnership working;
- Modern care facilities that are safe, offer privacy and dignity, and support best practice;
- Improved infection control reducing incidence of hospital acquired infections;
- Reduced CO_2 emissions;
- Reputation as a world class leader in cancer care and research;
- Increased ability to recruit and retain appropriately skilled and high calibre staff;
- Improved staff morale;
- Reduced expenditure on variable staff costs;
- Investment in local and wider economy;
- Increased opportunities to support local and national strategy;
- Improved local infrastructure; and
- Increased opportunities to drive innovation.

10.1.6 An analysis of the main outcomes of the Programme and the associated benefits that have been identified by beneficiary are shown in the Table 10-1. Some of the benefits can be quantified in financial terms including those that are cash releasing – further details of these are set out in the Economic Case. A more detailed benefits realisation plan is provided within the Management Case.

Figure 10-1: Main benefits

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
Improved Survival	• Longer life for patient • More time with family for patient • More time with patient for family	• Clinical satisfaction • Enhanced reputation for high quality care • Additional clinical learning and knowledge gained by clinicians and researchers • Supports delivery of Velindre Trust strategy	• Population lives longer • Shared learning and knowledge	• Survivors of working age return to workforce earlier • Enhanced reputation for high quality care • Supports delivery of WG strategy
Improved Quality of Life	• Reduced pain for the patient • Reduced anxiety for the patient/family • Improved symptom and pain management	• Clinical satisfaction • Enhanced reputation for high quality care • Additional clinical learning and knowledge gained by clinicians and researchers		• Enhanced reputation for high quality care • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		• Supports delivery of Velindre Trust strategy • Improved patient experience ratings		
Reduction in A&E attendances	• No unnecessary waits for patients • Reduced unnecessary interventions • Reduced anxiety for patients/family • Less harm for patients	• Earlier presentation in the clinical pathway • Supports delivery of Velindre Trust strategy • Reduced Length of Stay	• More efficient use of resources • Reduced expenditure on unnecessary interventions • Reduced hospital admissions • Reduced secondary ambulance transfers	• Enhanced reputation for high quality care • Supports delivery of WG strategy • A more sustainable healthcare system (i.e. patients treated in the right place, first time)
Reduction in avoidable admissions	• Care delivered in most appropriate setting	• More efficient use of resources	• More efficient use of resources	• Improved reputation • A more sustainable healthcare system (i.e. patients treated in the right place, first time) • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Reduced unnecessary stays for patient • Reduction in unnecessary steps (non-valued adding) in patient pathway • Reduced delays • Patient is transferred home sooner • Reduced unnecessary carer/family visits • Reduced risk of hospital acquired infection • Quicker access to appropriate care • Improved patient experience	• Reduced service running costs • Reduced length of stay • Reduced delays in transfers of care • Reduced risk of hospital acquired infection • Enhanced clinical reputation • Supports delivery of Velindre Trust strategy	• Reduced service running costs • Reduced length of stay • Reduced delays in transfers of care • Reduced risk of hospital acquired infection • Enhanced clinical reputation • Supports delivery of Health Board strategy	
Reduction in length of stay	• Reduced unnecessary stays in hospital for patient • Reduced unnecessary carer/family visits	• More of the correct patients are admitted • More efficient use of resources	• More efficient use of resources • Reduced service running costs • Reduced risk of hospital	• Enhanced reputation • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Reduced risk of hospital acquired infection • Improved patient experience • Reduced system reliance and supports patient independence	• Reduced service running costs • Reduced risk of hospital acquired infection • Enhanced clinical reputation • Supports delivery of Velindre Trust strategy	acquired infection • Enhanced clinical reputation	
Better geographical location of hospital which improves access to it	• Easier to travel to the new hospital • Reduced travel time for patients, family and carers • Reduced travel costs for patients, families and carers • Improved patient experience • Reduced anxiety for patients	• Higher take up of treatments • Reduced clinic delays and overruns • Staff spend less time travelling to and from work • Supports delivery of Velindre Trust strategy	• Reduced cost of non-emergency patient transport	• Reduced CO2 emissions • Less congestion on roads • Reduced on-street parking within local community • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
Patients receive the right care in the right place in the health care system	• Increased patient choice • More patients choose to receive appropriate treatment • Improved symptom control and pain management • Improved patient experience • Reduced anxiety	• Higher take up of treatments • More efficient use of resources • Improved utilisation of workforce • Supports delivery of Velindre Trust strategy	• Better utilisation of third sector	• Higher take up of treatments • Increased spend in local community • Supports delivery of WG strategy
Extended clinical opening hours	• More patients are seen • More patients are treated • Increased patient choice • Care is delivered around the patients day to day life • Less disruption to normal routine • More people receive appropriate treatment • Improved patient experience	• More patients are seen • More patients are treated • Higher take up of treatments • Higher utilisation of capital assets • More flexible working for staff • Better work life balance • Supports delivery of	• Better utilisation of third sector	• Higher take up of treatments • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		Velindre Trust strategy		
Increased oncology presence in Local Health Boards	• Quicker access to appropriate treatment • Improved pain management • Better access to specialist information/ discussion (co-production) • Reduced number of unnecessary diagnostics/ treatments • Less avoidable harm to patients • Improved patient experience • Reduced anxiety for patients and families	• Reduced avoidable admissions • More appropriate patients treated quicker • Reduced length of stay • More appropriate use of resources • More patients receive specialist cancer care • Better knowledge sharing • Raise standards of care • Improved clinical decision making • Improved consistency of care	• Reduced avoidable admissions • More appropriate patients treated quicker • Reduced length of stay • More appropriate use of resources • More patients receive specialist cancer care • Better knowledge sharing • Raise standards of care • Improved clinical decision making • Improved consistency of care	• Enhanced reputation • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		• Less patient harm • Better supported clinical decision making • Supports delivery of Velindre Trust strategy	• Less patient harm • Better supported clinical decision making • Supports delivery of Health Board strategy	
More patients receive care at home or within their local community	• Easier for patients to access care • Less need for patients to travel • Less need for families or carers to support patients in travelling • Less time spent travelling • Reduced travel costs • Less disruption to normal routine • Patients will not have to travel as often/far when feeling unwell	• More patients will access the treatment they require • Reduced DNAs • Clinicians spend less time travelling as base is local • More staff work closer to home improving work/life balance • Clinicians have more patient facing time • Clinical satisfaction	• Reduced cost of non-emergency patient transport • More patients will access the treatment they require • Reduced DNAs • Clinicians spend less time travelling as base is local • Clinicians have more patient facing time • Clinical satisfaction • Less disruption to clinical/	• Reduced CO2 emissions • Supports social cohesion and inclusion • Supports local economy through additional expenditure locally • Creates employment opportunities • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Improved patient experience	• Less disruption to clinical/ professional time due to planned arrangements (as opposed to ad hoc) • Increases capacity to deliver clinical services • More complex clinical trials can be undertaken at the Cancer Centre • Better integration of care across the health setting • Reduced CO2 emissions • Supports delivery of Velindre strategy	professional time due to planned arrangements (as opposed to ad hoc) • Supports Health Board to deliver strategy • Increases capacity to deliver clinical services • Better integration of care across the health setting • Reduced CO2 emissions	

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
Improved take up of treatment and services	• More patients receive appropriate treatment • Improved patient experience • Reduced patient and family anxiety • Better symptom control and pain management	• Supports compliance with national clinical guidance/ advice • Clinicians treat more patients • Improves clinical job satisfaction • More efficient use of resources • Improved reputation • Supports delivery of Velindre Trust strategy	• Improved reputation • Better utilisation of third sector	• Enhances WG reputation • Supports delivery of WG strategy
Construction of new hospital (Construction phase)		• Enhanced reputation • Improved recruitment/ retention • Improved brand awareness nationally/ internationally	• Enhanced reputation • Improved recruitment/ retention • Increased strategic/ commercial partnership opportunities	• Supports delivery of the WG Innovative Finance PPP pipeline • Enhanced reputation • Improved recruitment/retention in SE Wales • Employment opportunities for local people/business (direct/indirect) • Boost to local economy • Increased Training/Apprenticeship opportunities • Investment in local community • Inward investment into Wales

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		• Increased strategic/ commercial partnership opportunities • Positive media stories • Supports delivery of Velindre Trust strategy		• Educational visits to schools to talk about career opportunities • Supports delivery of WG strategy
Compliance with standards	• Better patient experience • Improved patient dignity • Reduced patient anxiety • Less patient harm through safer environment • Reduced slips, trips and falls • Better patient/ family facilities/ amenities	• Compliance with BREEAM • Reduced unit energy costs • Reduced backlog maintenance • Less workplace incidents/ accidents • Reduced financial liabilities • Reduced HAIs • Reduced risk of regulatory enforcement	• Assurance for commissioners that services are delivered from facilities that are compliant with standards • Reduced risk/ premium to Welsh Risk Pool	• More capital available to spend on other schemes / requirements due to use of Innovative finance • Improved reputation • Reduced CO2 emissions • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		• Enhanced reputation • Enhanced working environment • Supports delivery of Velindre Trust strategy		
PPP allows flexible building design to meet future challenges	• Ability to adapt to meet changing patient needs and expectations • Ability to adapt to meet changing family/carer needs and expectation • Ability to adapt to meet clinical/technological advances in treatment and practice to ensure patient needs are met	• Improved ability to meet changes in service requirements e.g. future growth +/- forecast • Provide a level of future proofing which will minimise costs / future investment in building re-configuration • Supports delivery of Velindre Trust strategy	• Commissioners have assurance that future population requirements will be met	• Welsh Government have assurance that future population requirements will be met • Provide a level of future proofing which will minimise costs/future investment in building re-configuration from the All Wales Capital Programme • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
Improved car parking facilities	• Easier to park • Less time spent looking for car parking space • Reduced frequency of being late for appointments • Reduced anxiety for patients, carers and families • Improved patient experience for patients, carers and families • Less accidents	• Easier to park for staff • Fewer patients delayed allowing clinics to run on-time • Easier to park for staff • Less time spent looking for car parking space • Reduced frequency of being late for appointments • Reduced anxiety for staff • Fewer appointment delays • Improved staff morale • Less accidents • Supports delivery of Velindre Trust strategy	• Easier for partner clinicians to park when visiting MDTs/ appointments • Less accidents	• Less congestion on roads • Fewer people parking in local area • Residents able to park outside their own homes • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
Improved access to public transport	• Easier for patients to travel to appointments • Reduced dependence upon family and friends • Improved availability of car parking	• Easier for staff to travel to work • Improved availability of car parking • Reduced DNAs • Reduced spend on patient transport • Supports delivery of Velindre Trust strategy	• Increased number of people using public transport • Reduced use of Non-Emergency Patient Transport	• Increased number of people using public transport • Reduced CO2 emissions • Reduced congestion • Support delivery of WG strategy
Improved clinical and departmental adjacencies	• Improved patient dignity • Easier to navigate the hospital for patient, family and carers • Reduced patient movement between departments/ services Reduced anxiety for patients, families and carers	• Reduced staff movement between departments/ services • Increased patient facing time for clinicians and healthcare professionals • Improved productivity • Supports delivery of	• Improved integration and effectiveness of services in Outreach settings	• Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		Velindre Trust strategy		
Introduction of PET CT service	• More patients able to take part in Research/Clinical Trials • More patients receiving effective care • Improved patient experience	• More ground breaking/ leading clinical research and development • Improved recruitment and retention of staff • Enhanced opportunities to partner HEI/Research Programmes • More people receiving effective care • Improved staff morale • Training opportunities • Enhanced reputation as a leading cancer centre • Increased income	• More people receiving appropriate treatment • Knowledge transfer/sharing best practice	• More people receiving effective treatment • Enhanced reputation • Increased Inward investment in Wales • Enhanced job creation in research/knowledge economy • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
		• Supports delivery of Velindre Trust strategy		
Access to a Centre for Learning and Innovation	• Better educated/ more informed patient, family and carers • Patients, family and carers make better, more informed decisions about care • Better self-management • Improved range of treatments/ techniques/ information available to the patient • Patient, family and carers able to drive clinical practice and learning (co-production)	• Ability to deliver/ comply with statutory and mandatory training • Staff are able to enhance continuing professional development • Increased capacity to undertake research development and innovation • Better understanding of patient, family and care needs and values.	• Staff are able to enhance continuing professional development • Increased capacity to undertake research development and innovation • Better understanding of patient, family and care needs and values. • Better knowledge sharing and collaboration with Health	• Enhanced job creation in research / knowledge economy • Increased employment opportunities • Increased training and education opportunities • Opportunities to attract inward investment • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Improved patient experience	• Better knowledge sharing and collaboration with Health Boards/Partners and HEIs • Enhanced commercial opportunities • Income generation • Improved reputation • Supports delivery of Velindre Trust strategy	Boards/Partners and HEIs • Enhanced commercial opportunities • Income generation • Improved reputation	
Increased access for patients to clinical trials	• All patients able to access patient clinical trials • Improves patient confidence and outlook on life • Improves family and carer confidence and outlook on life • Increased treatment choices	• Improved reputation as leader in R&D • Increased income generation opportunities • Reduced drugs costs • Improved clinical practice	• Improved reputation as leader in R&D • Improved clinical practice • Better knowledge sharing • Improved clinical decision making	• Improved reputation as a leader in research • Inward investment into Wales • Better knowledge • Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Improved clinical outcomes • Improved quality of life • Improved patient experience	• Better knowledge sharing • Improved staff morale • Improved ability to attract and retain highly skilled staff • Increased opportunities with strategic/ commercial partners • Supports delivery of Velindre Trust strategy	• Improved staff morale • Improved ability to attract and retain highly skilled staff • Increased opportunities with strategic/ commercial partners	
Patient activation	• Improved decision making based on best practice • Improved psychological well-being • Improved psychological empowerment	• Better knowledge sharing and partnership working • Improved reputation • Increased opportunities for income generation	• Better knowledge sharing and partnership working	• Supports delivery of WG strategy

Outcome	Benefits by beneficiary			
	Patients, carers, families	VCC	LHBs and partners	WG and wider society
	• Improved psychological reassurance • Improved patient experience	• Supports delivery of Velindre Trust strategy		
Enhanced service improvement capability	• More people have access to appropriate care • Greater patient involvement in service redesign	• More people have access to appropriate care • Greater stakeholder involvement in service redesign • Supports delivery of Velindre Trust strategy	• Greater partner involvement in service redesign • Better knowledge sharing and partnership working	• Improved reputation of Wales as a leader in improvement • Supports delivery of WG strategy

Benefit Quantification

10.1.7 Following the identification of the Programme Benefits further work was undertaken to understand which benefits could be quantified.

10.1.8 This provided an analysis and quantification of all the direct and indirect benefits which are expected to be delivered as part of the TCS programme.

10.1.9 This included:

1. An overview of the wide range of benefits identified as part of the PBC;
2. An analysis of the direct benefits that deliver cash releasing benefits within the PBC; and
3. An analysis of the indirect benefits that are quantifiable in monetary terms including:

   - Benefits to patients and staff of reduced travel time;
   - Wider macro benefits associated with increased employment years arising from improved survival rates for individuals of working age and for individuals of retirement age including looking after grandchildren;
   - Wider macro benefits reflecting the social value of the life years gained by increased numbers of cancer survivors quantified by using the concept of Quality Adjusted Life Years (QALYs); and
   - Wider macro benefits of the specific employment opportunities related to investment in the local infrastructure.

Categories of benefits

10.1.10 There are a number of ways these benefits can be categorised. For the purposes of this PBC, benefits have been explored in the groups described in Figure 10-2.

Figure 10-2: Benefit categories

Benefits that can be quantified in monetary terms

Direct benefits

Indirect benefits

Cash releasing benefits
- Reduced length of stay
- Reduced admissions
- Improved utilisation
- Improved adjacencies
- Reduced variable pay costs
- Increased income

Reduced travel time

Wider macro benefits

Economic benefits of improved survival rates
- Additional years of employment for survivors of working age
- For those survivors of retirement age: care of grandchildren for working parents

| Additional earnings for survivors | Impact on wider economy |

Social benefits of improved survival rates (QALYs)

Economic benefits of increased employment opportunities from investment in infrastructure

Quantifiable and non quantifiable benefits that cannot be expressed in monetary terms

VCC → **Patients and staff** → **Wider society and economy**

Approach and methodology

10.1.11 A rigorous evidence-based approach has been used to identify, evaluate and quantify the benefits of the TCS programme. This approach and relevant calculations for each of the benefit categories is described in the appended benefits paper.

Table 10-1: Overview of approach and methodology

Section	Approach used
Section 2: Benefits overview	A wide range of benefits was identified by stakeholders as part of the development of the business cases.
Section 3: Direct cash releasing benefits	Direct benefits that are quantifiable in monetary terms were valued as part of estimating the costs and benefits for the economic appraisal. A robust methodology was adopted which involved undertaking a rigorous benchmarking exercise, extensive financial modelling, and a series of workshops to test and validate assumptions with a wide range of stakeholders.
Section 4: Travel time savings	The Trust have used an approach consistent with the Department for Transport's WebTAG to estimate the benefits to patients and staff of reduced travel time. This is based on the principle that travellers have a value of time (VOT), expressed in pounds per hour, which represents how much they would be willing to pay to reduce their travel time.

Section	Approach used
Section 5: Economic benefits of improved survival rates	The economic benefits of improved survival rates was calculated in relation to: • Increased employment years of survivors, based on a review of similar business cases and wider assessments of cancer services, for which we have attributed market values to some of the activities that cancer survivors would be able to participate in; and • The increased numbers of survivors of retirement age who can provide care of grandchildren for working parents allowing them to take up employment or increase hours worked. The economic benefits associated with these groups is two-fold including: • Direct earnings for individuals; and • The 'multiplier' effect of spending those earnings in the wider economy.
Section 6: Social benefits of improved survival rates	The wider societal benefits associated with the social value of the life years gained by cancer survivors as a result of the programme have been quantified by using the concept of Quality Adjusted Life Years (QALYs).
Section 7: Economic benefits of investment in infrastructure	For the benefits to the wider economy of investment in local infrastructure, specifically related to short and long term employment opportunities, we have calculated the increase in consumption from high employment using a fiscal multiplier.

10.1.12 The monetary value of each of these benefit types has been calculated for the options identified within this business case to ensure that a robust economic appraisal can be achieved.

10.1.13 The benefits quantification and subsequent monetarisation will be carried forward into the Economic Case of this PBC. The method in which the programme will oversee and manage the delivery of the benefits will be described in the management case.

Summary of results

10.1.14 A summary of the resulting values related to the overall programme for each option over a 60 year appraisal period is provided in the table below. The values are undiscounted at this stage.

Risks

10.1.15 Risk is the possibility of a "negative" event occurring, adversely impacting on the Programme.

10.1.16 Identifying, mitigating and managing the key risks is crucial to successful delivery, since the key risks are likely to be that the project will not deliver its intended outcomes and benefits within the anticipated timescales and spend.

10.1.17 Risks have been identified in relation to the following key categories:

- **Business risks:** Risks that remain 100% with Velindre NHS Trust and include political and reputational risks;
- **Service risks:** Risks associated with the design, build, financing and operational phases of the Programme and may be shared with other organisations; and
- **External Non System risks:** Risks that affect all society and are not connected directly with the proposal. They are inherently unpredictable and random in nature.

10.1.18 Service risks can often be quantified as they can manifest themselves in variations to costs (capital and revenue) and milestone delivery.

10.1.19 An analysis of the main risks that have been identified are shown Table 10-3 by category/type. They have also been classified in terms of the ability for them to be quantified and where this is possible where they will impact on costs - further details of these are set out in the Economic Case. A more detailed risk management plan, including an analysis of the mitigating factors is provided within the Management Case.
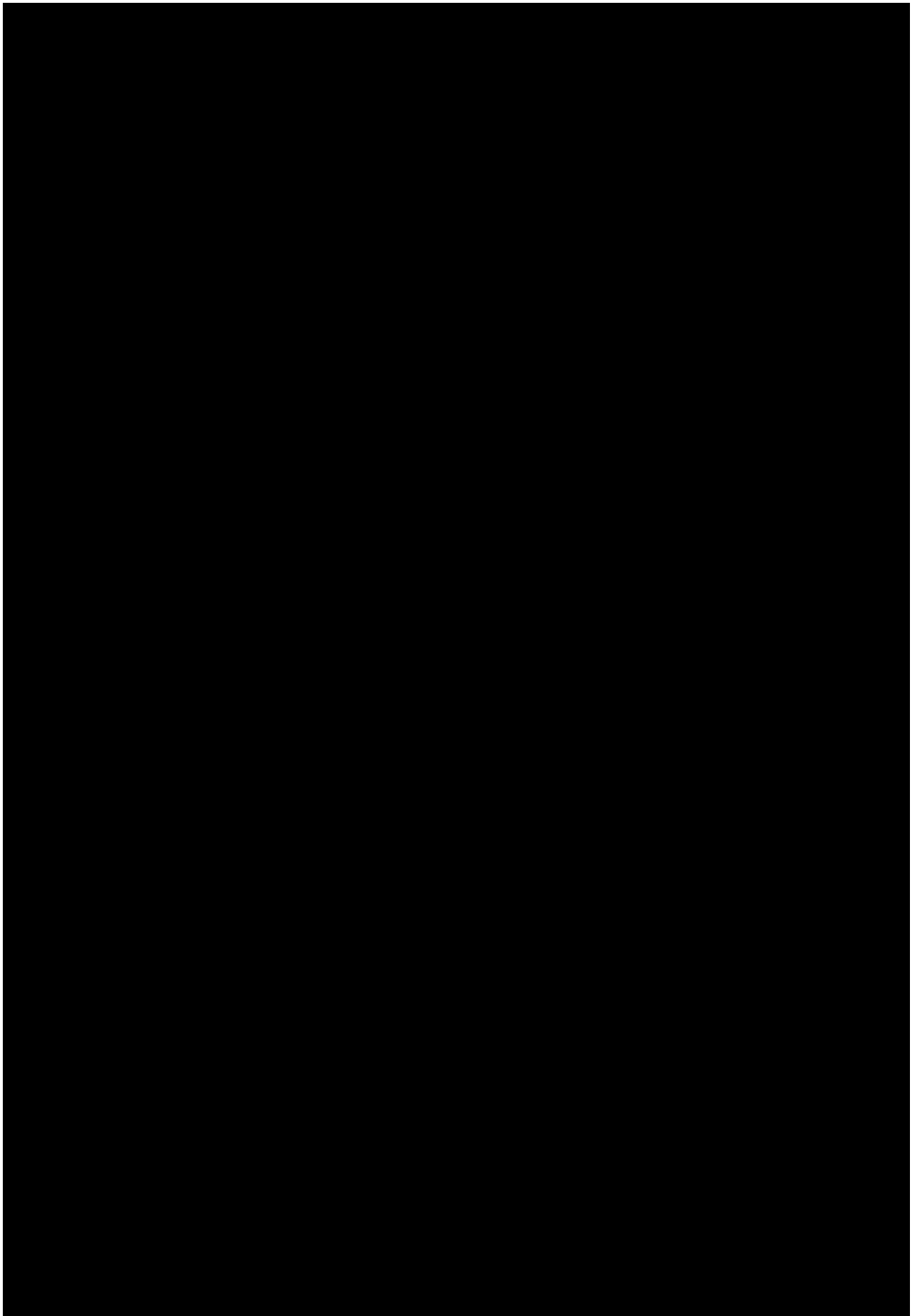
10.2

10.2.1 Constraints relate to the parameters that the Programme is working within and any restrictions or factors that might impact on the delivery of a Programme. These typically include limits on resources and compliance issues.

10.2.2 The main constraints are outlined below.

Table 10-4: Constraints

Constraint	Overview
Financial constraints	The infrastructure solution for the Velindre Cancer Centre must be deliverable within ▮▮▮▮▮ funding envelope agreed with Welsh Government at 2013/14 prices.
Timescale constraints	The Programme should be delivered within the agreed timescales to achieve planned completion by the end of 2022/23.
Service continuity	Services must be maintained during the period of change.
Compliance with statutory requirements	Compliance with statutory requirements must be maintained during the period of change. The preferred Service Model and estates solution should be compliant with future statutory requirements.

10.3 Dependencies

10.3.1 Dependencies include things that must be in place to enable the Programme or Programme phases and typically include links to other projects and funding requirements that are likely to be managed elsewhere.

10.3.2 A number of high level dependencies have been identified in relation to the Programme. These are provided below.

Table 10-5: Main dependencies

Dependency	Overview
Capital funding availability	Access to capital funding is critical to deliver the estates solutions that will enable the successful delivery of the Programme.
Revenue funding availability	Appropriate revenue funding is essential to facilitate delivery of the Service Model solution.
Commissioner support	The preferred solution must be accepted by Local Health Boards.
Clinical support	It is critical that the clinical Service Model is embraced by the clinical body within the Trust and partner organisations.
Workforce support	The transformation of cancer services across South East Wales is dependent upon large scale service change and it is vital that the workforce is engaged in and fully supportive of this change process.
Partnership working	Co-production in the design and implementation of the Programme that involves all stakeholders from across the health and social care economy is essential to the Programme's success.
Wider health strategy and governance	It is important that general health strategy and governance in Wales that underpins the clinical

Dependency	Overview
	service model remains broadly consistent over the period of change.
Site availability	In order to deliver the preferred estates solution that will enable the implementation of the clinical service model, it is essential that space for service expansion is identified across South East Wales.
Planning permission	In order to deliver the preferred estates solution that will enable the implementation of the clinical service model, it is essential that appropriate planning permission can be obtained.
ICT strategy	The Trust must work with existing health ICT structures and Programmes to ensure integration with its plans.

10.4 Conclusion

10.4.1 Stakeholders have identified the benefits, risks, constraints and dependencies in relation to the agreed scope and key service requirements of the Programme.

10.4.2 The benefit and risk registers are developed throughout the PBC. Benefits and risks are quantified in relation to the appraisal of options within the Economic Case and plans to realise the benefits and manage the risks are outlined within the Management Case.
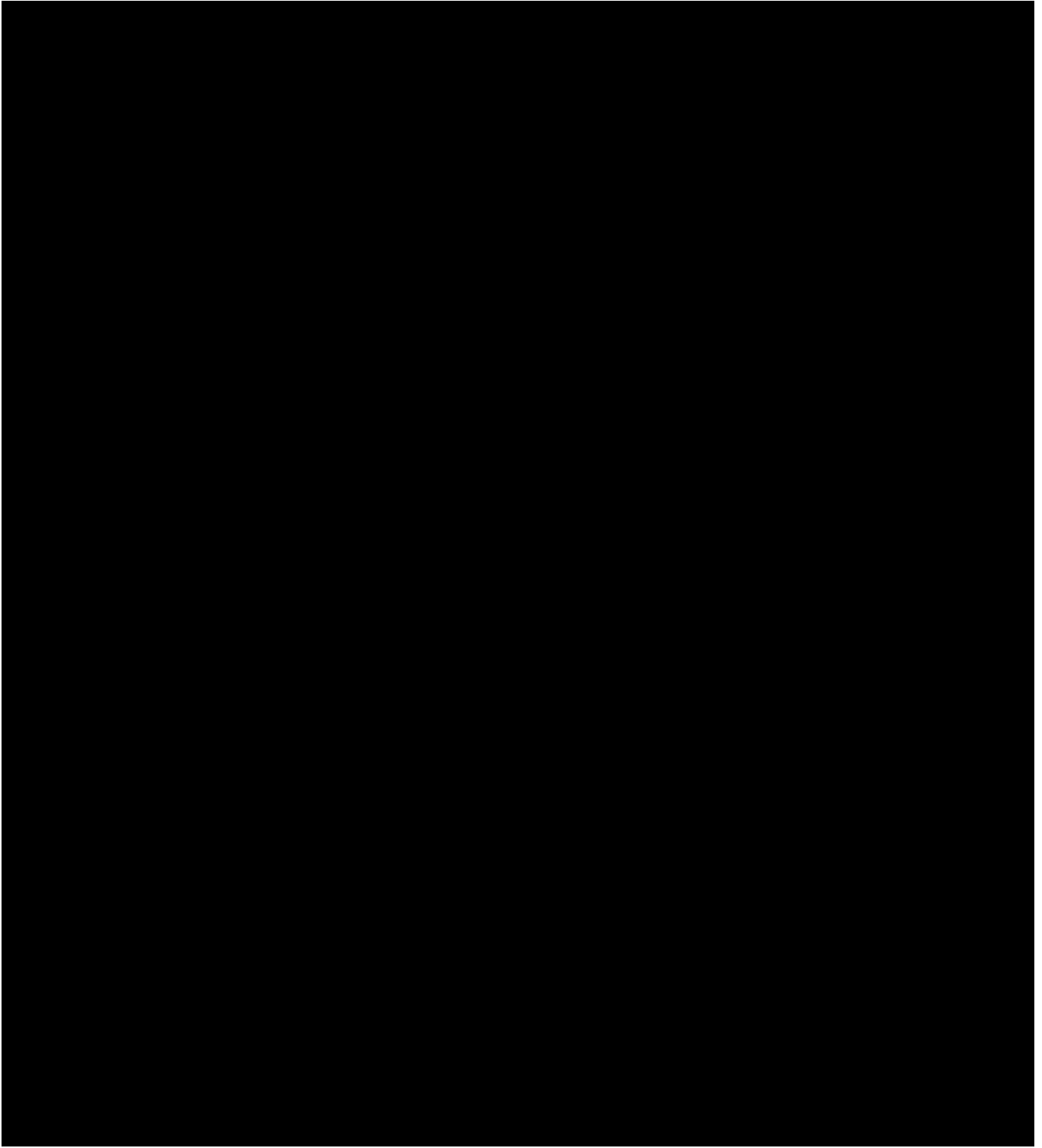
Transforming Cancer Services In South East Wales

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PBC ECONOMIC CASE

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1 IDENTIFYING THE PREFERRED WAY FORWARD

1.1 Introduction

1.1.1 The purpose of the economic case is to identify and appraise the potential options for the delivery of the Programme and to recommend the option that is likely to offer best value for money.

1.1.2 The first stage of the economic case explores the preferred way forward by undertaking the following actions:

- Identification of the Critical Success Factors (CSFs) for the Programme;
- Development of a long list of options in response to the case for change and the proposed clinical service model;
- Evaluation of the long list of options against the CSFs and the Spending Objectives for the Programme; and
- Recommendation of the Preferred Way Forward in the form of a shortlist of options.

1.2 Context

1.2.1 The Welsh Government, during 2015, approved the Trust's Strategic Outline Programme (SOP) for the delivery of Cancer Services in South East Wales. The approval of the SOP resulted in the establishment of the Transforming Cancer Services (TCS) Programme and subsequently the requirement to develop a TCS Programme Business Case, supported by an Outline Business Case for a new Velindre Cancer Centre (nVCC).

1.2.2 The funding award attached to the approval of the SOP also included a number of funding conditions as summarised below.
- The entre nVCC should be built in Whitchurch, Cardiff and on land under the ownership of the Trust;
- The nVCC should be clinically operational during 2022/23; and
The capital costs, set at 2013/14 prices, ███████████████████

1.2.3 The funding conditions set out above are important within the context of this Programme as they have restricted the range and scope of options which could be considered as part of the Economic Case.

1.3 Critical Success Factors (CSFs)

1.3.1 CSFs are the attributes essential for successful delivery of the Programme. The CSFs are used alongside the Programme spending objectives to evaluate possible options for the delivery of the Programme.

1.3.2 In developing the CSFs for this Programme, consideration was given to Welsh Government priorities. The CSFs are therefore aligned to the NHS Infrastructure investment Criteria that are set out in Figure 1-1.

Figure 1-1: NHS Infrastructure Investment Criteria

- **Health gain:** improving patient outcomes and meeting forecast changes in demand;
- **Affordability:** given the long term revenue assumptions, there should be an explicit reference to reducing revenue costs;
- **Clinical and skills sustainability:** reducing service and workforce vulnerabilities, and demonstrating solutions that are flexible and robust to a range of future scenarios;
- **Equity:** where people highest health need are targeted first; and
- **Value for money:** optimising public value by making the most economic, efficient and effective use of resources.

1.3.3 The CSFs identified for the Programme are outlined in the table below. Table 1-1 demonstrates how these align to the NHS Infrastructure Investment Criteria.

Table 1-1: Critical Success Factors

Critical success factor	The option will be assessed in relation to how well it:	Alignment to infrastructure investment criteria
Strategic fit	• Meets agreed spending objectives, related business needs and service requirements; and • Provides holistic fit and synergy with other strategies, Programmes and projects.	• Health gain
Potential value for money	• Optimises public value (social, economic, environmental) in terms of potential costs, benefits, and risks.	• Value for money • Equity
Supplier capacity and capability	• Matches the ability and capacity of potential suppliers to deliver the required services; and • Is likely to be attractive to potential suppliers.	• Value for money
Potential affordability	• Can be funded from available sources of finance; and • Aligns with sourcing constraints ▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮ .	• Affordability
Potential achievability	• Is likely to be delivered given the Trust's and partner organisations' ability to respond to the changes required; • Matches level of available skills required for successful delivery; • Facilitates the continued delivery of services throughout the duration of the Programme; and • Can be delivered by the end of 2022/23.	• Clinical and skills sustainability

1.4 The Options Framework

1.4.1 The options framework, as outlined in the Better Business Case guidance, provides a systemic approach to identifying and filtering a broad range of options for operational scope, service solutions, service delivery vehicles,

implementation timeframes and the funding mechanism for the Programme. An overview of these key dimensions is provided in table 1-2.
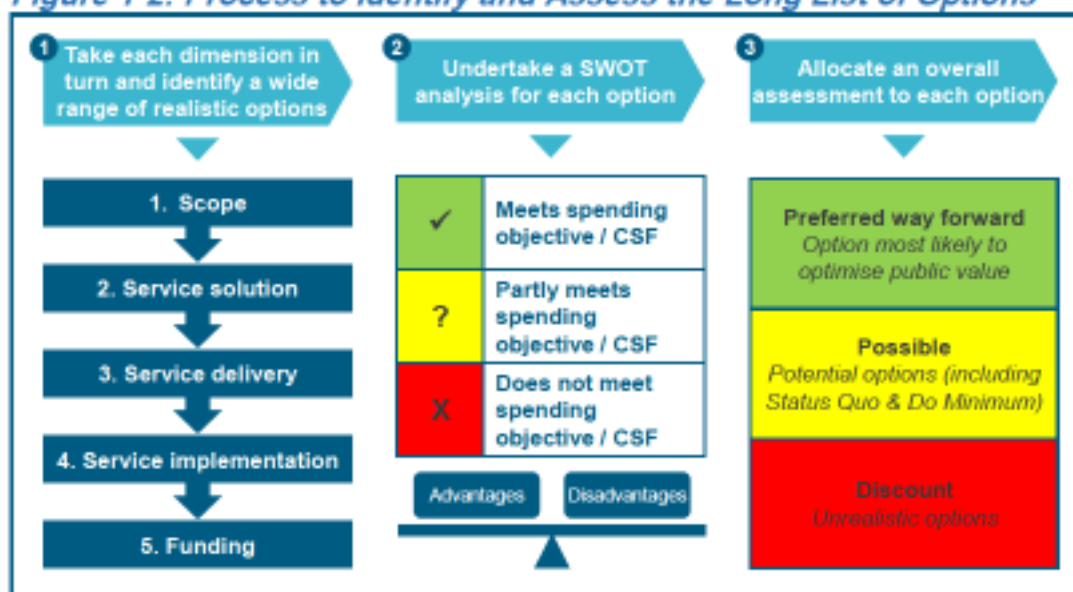
Table 1-2: Options Framework

Dimension	Description
Scope	What is the potential coverage of the Programme?
Service solution	How the preferred scope of the Programme can be delivered?
Service delivery	Who can deliver the preferred scope and service solution for the Programme?
Implementation	The timing and phasing of Programme delivery in relation to the preferred scope, service solution and delivery arrangements for the Programme.
Funding	The potential funding requirements for delivering the preferred scope, solution, service delivery and implementation arrangements for the Programme

1.4.2   The process for identifying and assessing options takes each of the key dimensions in turn and undertakes the following steps:

1. Identification of a wide range of realistic potential options within that dimension.

2. An analysis for each option to:

   a. Assess how well the option meets the Programmes spending objectives and CSFs; and to
   b. Identify the main advantages and disadvantages of the option.

3. Using the outputs of the analysis to determine whether the option will be carried forward as the preferred way forward, carried forward as a possible solution, or discounted at this stage.

Figure 1-2: Process to Identify and Assess the Long List of Options

1.5 Determining the Long List of Options

1.5.1 The Programme Management Board identified a wide range of realistic and possible options for the delivery of the Programme using the options framework outlined in table 1-3.

1.6 Programme Scope:

1.6.1 A range of potential options from "status quo" through to "do maximum" were identified in relation to the range of services that the Trust could deliver.

Table 1-3: Programme Scope Options

Ref	Option	Description
1.1	Status quo	*Optimise existing arrangements including:* • Maximise existing service capacity to respond to anticipated increases in demand for non-surgical cancer services i.e. no expansion of available capacity. • Continue with existing arrangements for training, education, research and development.
1.2	Do minimum	*Enhanced and improved clinical Service Model that will support the delivery of high quality and sustainable services including:* • Additional service capacity for core commissioned services which is able to respond to anticipated increases in demand. • Continue with existing arrangements for training, education, research and development.
1.3	Intermediate	*Enhanced and improved clinical Service Model that will support the delivery of high quality and sustainable services including:* • Additional service capacity for core commissioned services which is able to respond to anticipated increases in demand. • Increased and enhanced access to training, education, research and development. • Access to a PET CT service at VCC.
1.4	Intermediate +	*Enhanced and improved clinical Service Model that will support the delivery of high quality and sustainable services including:* • Additional service capacity for core commissioned services which is able to respond to anticipated increases in demand. • Increased and enhanced access to training, education, research and innovation. • Access to a PET CT service at VCC. • Introduction of a range of new specialist services which would be managed and delivered by VCC e.g. Proton beam therapy service.
1.5	Do maximum	*Enhanced and improved clinical Service Model that will support the delivery of high quality and sustainable services including:* • Additional service capacity for core services which is able to respond to anticipated increases in demand for non-surgical cancer services • Increased and enhanced access to training, education, research and innovation. • Access to a PET CT service at VCC. • Introduction of a range of specialist services which would be managed and delivered by VCC. • Extension in relation to the range and scope of services provided by Velindre e.g. haemato-oncology services, teenage cancer services, increased input into Public Health.

1.6.2 The advantages and disadvantages of each of the longlisted options were identified. A summary of this is provided in the table 1-4.

Table 1-4: Programme Scope - Advantages and Disadvantages of Options

Advantages	Disadvantages
1.1 Status quo: Optimise existing arrangements	
• Enables delivery of national cancer standards, but only in the short-term.	• Unable to meet forecast demand for services. • Unable to rectify some of the limitations of the current service delivery model. • Does not provide a range of services which are comparable with other leading national and international cancer service providers. • Does not offer increased patient access to research and clinical trials. • Fails to meet Trust strategic objectives in relation to research and development, and education and training. • Does not introduce some additional specialist services at Velindre e.g. proton beam therapy service.
1.2 Do minimum: Enhanced and improved clinical model that responds to anticipated increase in demand by providing additional capacity for core services	
• Sufficient capacity to meet demand for existing core services. • Enables delivery of national cancer standards.	• Unable to rectify some of the limitations of the current service delivery model. • Does not provide a range of services which are comparable with other leading national and international cancer service providers. • Does not offer increased patient access to research and clinical trials. • Fails to meet Trust strategic objectives in relation to research and development, and education and training. • Does not introduce some additional specialist services at Velindre e.g. proton beam therapy service.
1.3 Intermediate: Enhanced and improved clinical model that responds to anticipated increase in demand, provides increased and enhanced access to education and research and introduces a PET CT service at Velindre	
• Provides a range of services which are comparable with other leading national and international cancer service providers • Offers increased patient access to research and clinical trials • Meets Trust strategic objectives in relation to research and development and education and training • Introduces a PET CT service at Velindre	• Does not introduce some additional specialist services at Velindre e.g. proton beam therapy service.
1.4 Intermediate+: Enhanced and improved clinical model that responds to anticipated increase in demand, provides increased and enhanced access to education and research, introduces a PET CT service at Velindre and introduces some additional specialist services at Velindre e.g. proton beam therapy services	
• Provides a range of services which are comparable with other leading national and international cancer service providers. • Offers increased patient access to research and clinical trials. • Meets Trust strategic objectives in relation to research and development and education and training. • Introduces a PET CT service at Velindre	• Lack of a clear commissioning policy in relation to some of the additional specialist services e.g. proton beam. • Limited evidence of additional benefit associated with some of the additional specialist services identified. • Limited experience within NHS of using the equipment and technology associated with these new technologies.

Advantages	Disadvantages
• Introduces some additional specialist services at Velindre e.g. proton beam therapy service.	• Lack of certainty in terms of financial implications of new technologies/ services. • Requirement to change funding and commissioning model to facilitate changes in service provision. • Risk of being unable to recruit required workforce.

1.5 Do maximum: Enhanced and improved clinical model that responds to anticipated increase in demand, provides increased and enhanced access to education and research, introduces a PET CT service at Velindre, introduces some additional specialist services at Velindre e.g. proton beam therapy services and increases the range and scope of services provided by Velindre

Advantages	Disadvantages
• Provides a range of services which are comparable with other leading national and international cancer service providers. • Offers increased patient access to research and clinical trials • Meets Trust strategic objectives in relation to research and development and education and training. • Introduces a PET CT service at Velindre. • Introduces some additional specialist services at Velindre e.g. proton beam therapy service. • Increases the range and scope of services provided by Velindre.	• Lack of a clear commissioning policy in relation to some of the additional specialist services e.g. proton beam • Limited evidence of additional benefit associated with some of the additional specialist services identified. • Limited experience within NHS of using the equipment and technology associated with these new technologies. • Lack of certainty in terms of financial implications of new technologies/services. • Risk of being unable to recruit required workforce. • Requirement to change funding and commissioning model to facilitate changes in service provision. • Lack of understanding as to what role, if any, Velindre should have in terms of contributing to a wider scope of services.

1.6.3   Each option was assessed against spending objectives and CSF. The results of this, including the overall assessment of each option, are presented in table 1-5.

Table 1-5: Programme Scope - Assessment of Options

Option	1.1 Status quo	1.2 Do minimum	1.3 Inter	1.4 Inter +	1.5 Do maximum
Spending objectives					
1 To provide patients and carers with quality service that delivers optimal outcomes	?	✓	✓	✓	✓
2 To deliver sustainable cancer services to the population in the most cost effective way	?	✓	✓	✓	✓
3 To be a leader in education, research, development and innovation	X	X	✓	✓	✓
4 To comply with all relevant standards	?	✓	✓	✓	✓
CSFs					
Strategic fit	?	?	✓	✓	✓
Value for money	?	?	✓	?	?
Supply capacity and capability	✓	✓	✓	✓	?
Potential affordability	✓	✓	✓	?	?
Potential achievability	✓	✓	✓	?	?
Summary					

| Overall assessment | Carry forward | Carry forward | Preferred way forward | Carry forward | Carry forward |

1.6.4   Following the assessment of the five longlisted options associated with the scope of services to be delivered under the future clinical model, it was agreed that:

- Option 1.3 – Introduction of an enhanced and improved clinical model that responds to anticipated increase in demand, provides increased and enhanced access to training, education, research and innovation and introduces a PET CT service at Velindre – is identified as the **preferred way forward** since it best meets all of the spending objectives and Critical Success Factors; and

- All other options are carried forward as possible options at this stage.

1.7   Programme Solution:

1.7.1   The options focus on the main estates solutions in relation to the Programme.

1.7.2   A range of potential options were identified from maintaining the status quo through to the "do minimum" and "do maximum" as well as an intermediate option. These are described in table 1-6.

Table 1-6: Programme Solution Options

Ref	Option	Description
2.1	Status quo	*Cancer centre:* • Maintain existing arrangements with ongoing investment to address backlog maintenance to Cat B standard. • Replacement of existing equipment. **Velindre Outreach centres:** • Maintain current service provision using current operating model and facilities.
2.2	Do minimum	*Cancer centre:* • New purpose built specialist cancer centre with additional linear accelerators. • Expansion zones identified for the introduction of additional services e.g. PET CT service. **Velindre Outreach centres:** • Consolidate services for South East Wales within up to four Velindre-managed SACT and Outpatient Outreach Centres. • Refurbishment of existing accommodation. **Velindre Radiotherapy Satellite centre:** • One new Velindre Radiotherapy Satellite Centre.
2.3	Intermediate	*Cancer centre:* New purpose built specialist cancer centre with: • Additional linear accelerators. • A Centre for Learning and Innovation. • A Management centre. • A new PET CT service. • An Expansion zone for other additional services e.g. proton beam service. **Velindre Outreach centres:** • Consolidate services for South East Wales within up to four new build Outreach Centres.

Ref	Option	Description
		Velindre Radiotherapy Satellite centre: • One new Velindre Radiotherapy Satellite Centre.
2.4	**Do maximum**	*Cancer centre:* New purpose built specialist cancer centre: • Additional linear accelerators. • A Centre for Learning and Innovation. • A Management centre. • A new PET CT service. • Capacity to accommodate additional specialist services: one proton beam unit; one platform specific stereotactic treatments; one additional MRI scanner; one Cyclotron unit. **Velindre Outreach centres:** • Consolidate services for South East Wales within up to four new build Outreach Centres. **Velindre Radiotherapy centre:** • One new Velindre Radiotherapy Satellite Centre.

1.7.3   The advantages and disadvantages of each option were identified and these are outlined in *table 1-7*.

Table 1-7: Programme Solution - Advantages and Disadvantages of Options

Advantages	Disadvantages
2.1 Status quo: Maintain existing arrangements for cancer centre and Outreach centres with ongoing investment to address backlog maintenance to Cat B standard	
• Limited scale of change.	• Does not provide sufficient capacity to meet future demand. • Does not provide equitable access to services. • Does not facilitate optimal clinical outcomes. • Inefficient use of NHS estates and resources. • Insufficient capacity to deliver R&D strategic objectives. • Poor condition of existing estate results in poor patient experience.
2.2 Do minimum: New build specialist cancer centre + Refurbish up to 4 x Outreach Centres + 1 x new Satellite Radiotherapy Unit	
• Provides capacity to meet forecast future demand. • More equitable access to services for cancer centre/ Satellite Radiotherapy patients. • Facilitates optimal clinical outcomes for cancer centre/ Satellite Radiotherapy patients. • Fit for purpose cancer centre facilities resulting in improved patient experience.	• Does not provide equitable access to SACT/ambulatory care services. • Inefficient use of estates and resources in Outreach areas. • Insufficient capacity to deliver R&D strategic objectives. • Does not allow for delivery of advanced technology services.
2.3 Intermediate: New build specialist cancer centre with Centre for Learning and Innovation and PET CT + Up to 4 x new Outreach Centres + 1 x new Satellite Radiotherapy Unit	
• Provides capacity to meet forecast future demand. • Provides equitable access to services. • Facilitates optimal clinical outcomes. • Better use of NHS estates and resources.	• Does not allow for delivery of additional specialist services.

Advantages	Disadvantages
• Fit for purpose facilities resulting in improved patient experience. • Provides capacity to deliver R&D strategic objectives.	
2.4 Do Maximum: New build specialist cancer centre with Centre for Learning and Innovation and PET CT and other Advanced Technologies + Up to 4 x new Outreach Centres + 1 x new Satellite Radiotherapy Unit	
• Provides capacity to meet forecast future demand. • Provides equitable access to services. • Facilitates optimal clinical outcomes. • Better use of NHS estates and resources. • Fit for purpose facilities resulting in improved patient experience. • Provides capacity to deliver R&D strategic objectives. • Provides capacity to deliver advanced technologies.	• Insufficient evidence of the benefits of advanced technologies to test value for money of the option.

1.7.4 Each option was assessed against the spending objectives and CSFs. The results of this, including the overall assessment of each option, are presented in table 1-8.

Table 1-8: Programme Solution - Assessment of Options

Option	2.1 Status quo	2.2 Do minimum	2.3 Intermediate	2.4 Do maximum
Spending objectives				
1 To provide patients and carers with quality service that delivers optimal outcomes	?	✓	✓	✓
2 To deliver sustainable cancer services to the population in the most cost effective way	?	?	✓	?
3 To be a leader in education, research, development and innovation	X	X	✓	✓
4 To comply with all relevant standards	?	✓	✓	✓
CSFs				
Strategic fit	X	?	✓	✓
Value for money	?	?	✓	?
Supply capacity and capability	?	✓	✓	✓
Potential affordability	✓	✓	✓	✓
Potential achievability	✓	✓	✓	✓
Summary				
Overall assessment	Carry forward	Carry forward	Preferred way forward	Carry forward

1.7.5 Following the assessment of the four longlisted options associated with the Programme solution, it was agreed that:

- Option 2.3 – establishing a new cancer centre with research and education and PET CT facilities, as well as new Velindre Outreach centres and a new Velindre Radiotherapy Satellite centre – is identified as the **preferred way**

forward since it best meets all of the spending objectives and Critical Success Factors; and

- All other options are carried forward as possible options at this stage.

1.8 Service Delivery:

1.8.1 The options focus on potential service delivery options in terms of available resources, capacity and capability of both internal and external organisations for the delivery of services.

1.8.2 Potential options range from maintaining the status quo through to the "do minimum" and "do maximum" as well as an intermediate option. These are described in table 1-9.

Table 1-9: Service Delivery Options

Ref	Option	Description
3.1	Status quo	• Maintain existing arrangements for delivering services: Clinical services are predominately delivered by NHS providers; with some services delivered by private providers by exception.
3.2	Do minimum	• All services are delivered by in-house (NHS) providers only.
3.3	Intermediate	• Services are outsourced to an external provider.
3.4	Do maximum	• Services are delivered through a strategic partnership with an external organisation.

1.8.3 The advantages and disadvantages of each option were identified and these are outlined in table 1-10.

Table 1-10: Service Delivery - Advantages and Disadvantages of Options

Advantages	Disadvantages
3.1 Status quo: Existing Service Model	
• Aligned to national strategy. • Aligned to local strategy. • Flexibility for external providers to deliver services where NHS organisations do not have the capacity or capability.	• None identified.
3.2 Do minimum: In house (NHS) providers only	
• Aligned to national strategy. • Provides workforce security enabling Trust to better recruit and retain staff.	• Insufficient capacity to deliver all services.
3.3 Intermediate: Outsourcing	
• Potential to transfer risk to external organisations.	• Not aligned to national strategy. • Not aligned to local strategy. • Negative impact on Trust's ability to recruit and retain staff. • Insufficient supply side capacity to meet demand.
3.4 Do maximum: Strategic partnership	
• Flexibility for external providers to deliver services where NHS organisations do not have the capacity or capability.	• May have negative impact on Trust's ability to recruit and retain staff • Insufficient supply side capacity to meet demand.

1.8.4 Each option was assessed against spending objectives and CSFs. The results of this, including the overall assessment of each option, are presented in table 1-11.

Table 1-11: Service Delivery - Assessment of Options

Option	3.1 Status quo	3.2 Do minimum	3.3 Intermediate	3.4 Do maximum
Spending objectives				
1 To provide patients and carers with quality service that delivers optimal outcomes	✔	?	?	?
2 To deliver sustainable cancer services to the population in the most cost effective way	✔	?	?	?
3 To be a leader in education, research, development and innovation	✔	?	?	?
4 To comply with all relevant standards	✔	?	?	?
CSFs				
Strategic fit	✔	✔	X	?
Value for money	✔	✔	?	?
Supply capacity and capability	✔	?	X	?
Potential affordability	✔	✔	?	?
Potential achievability	✔	?	X	?
Summary				
Overall assessment	Preferred way forward	Discount	Discount	Discount

1.8.5 Following the assessment of the four longlisted service delivery options, it was agreed that:

- Option 3.1 – continuing with existing arrangements for delivering services – is identified as the **preferred way forward** since it best meets all of the spending objectives and CSFs; and

- All other options are discounted at this stage since they do not sufficiently meet the agreed spending objectives and Critical Success Factors. In particular, outsourcing solutions are not aligned with the national strategic direction and there is uncertainty around the affordability and value for money of such arrangements. Overall, there is too much uncertainty around the feasibility of all three options in relation to the capacity and capability of the supply side to deliver the solutions, making this likely to be unachievable within Programme timescale constraints.

1.9 Implementation:

1.9.1 The options focus on potential implementation options and considers the options that will best meet key milestones, address dependencies, as well as realising benefits and managing risks.

1.9.2 A range of options were identified ranging from two options for phased delivery to a single phase delivery of the preferred way forward. In addition an option

for the phased delivery of the status quo options (options 1.1, 2.1, and 3.1) was identified. The resulting four options are described in table 1-12.

Table 1-12: Programme Implementation Options

Ref	Option	Description
4.1	**Status quo**	• Phased delivery of status quo option.
4.2	**Phased A**	• 1st tranche: IM&T, workforce, training and education, service modernisation. • 2nd tranche: Outreach. • 3rd tranche: Cancer Centre.
4.3	**Phased B**	• 1st tranche: IM&T, workforce, training and education, service modernisation. • 2nd tranche: Cancer Centre. • 3rd tranche: Outreach.
4.4	**Do maximum**	• Single phase delivery of preferred way forward.

1.9.3 The advantages and disadvantages of each option were identified and these are outlined in table 1-13.

Table 1-13: Programme Implementation - Advantages and Disadvantages of Options

Advantages	Disadvantages
4.1 Status quo: Phased delivery of status quo option	
• Required for status quo option.	• Only appropriate for delivery of status quo option.
4.2 Phased A: IM&T and ways of working; Outreach centres; Cancer centre	
• Allows organisations to fully realise benefits of local service delivery. • Phased capital investment.	• None identified.
4.3 Phased B: IM&T and ways of working; Cancer centre; Outreach centres	
• Phased capital investment. • Allows service continuity.	• Not aligned to local strategy. • Outreach centre must be established in advance of the new cancer centre to fully realise the benefits of local delivery.
4.4 Single phase: 'Big bang' approach	
• None identified.	• High capital investment required over a short period. • Lack of Trust capital to deliver all projects in a 'big bang'. • High risk to service continuity.

1.9.4 Each option was assessed against the spending objectives and CSFs. The results of this, including the overall assessment of the option, are presented in table 1-14.

Table 1-14: Programme Implementation - Assessment of Options

Option	4.1 Status quo	4.2 Phased A	4.3 Phased B	4.4 Single phase
Spending objectives				
1 To provide patients and carers with quality service that delivers optimal outcomes	✓	✓	?	X
2 To deliver sustainable cancer services to the population in the most cost effective way	✓	✓	?	X

Option	4.1 Status quo	4.2 Phased A	4.3 Phased B	4.4 Single phase
3 To be a leader in education, research, development and innovation	X	✔	?	X
4 To comply with all relevant standards	?	✔	✔	X
CSFs				
Strategic fit	?	✔	X	?
Value for money	?	✔	?	?
Supply capacity and capability	?	✔	✔	?
Potential affordability	?	✔	✔	?
Potential achievability	?	✔	?	X
Summary				
Overall assessment	Carry forward	Preferred way forward	Discount	Discount

1.9.5 Following the assessment of the four longlisted implementation options, it was agreed that:

- Option 4.2 is identified as the **preferred way forward** as it is essential that the Outreach facilities are implemented in advance of the Cancer Centre;
- Option 4.1 is identified as a possible option to carry forward for the phasing of any status quo options; and
- All other options are discounted at this stage as they do not allow the agreed spending objectives and associated benefits to be realised within the Programme timescale constraints. A single phase delivery is not considered to be achievable.

Funding:

1.9.6 The funding options focus on the different ways in which the Programme's portfolio of projects and activities could be funded in terms of likely availability and value for money of each solution.

Table 1-16: Funding - Advantages and Disadvantages of Options

Advantages	Disadvantages
5.1 Public funding	
• Traditional funding route supported by clear policies and procedures.	• Risk that there is insufficient capital available.
5.2 Private funding	
• Increased range of potential funders.	• Complex contractual arrangements.
5.3 Mix of public and private funding	
• Provides flexibility. • Allows for risk share arrangements.	• Complex contractual arrangements.

1.9.9 Each option was assessed against spending objectives and CSFs. The results of this, including the overall assessment of the option, are presented in table 1-17.

Table 1-17: Funding - Assessment of Options

Option	5.1 Public funding	5.2 Private funding	5.3 Mixed funding
Spending objectives			
1 To provide patients and carers with quality service that delivers optimal outcomes	✔	✔	✔
2 To deliver sustainable cancer services to the population in the most cost effective way	✔	?	✔
3 To be a leader in education, research, development and innovation	✔	✔	✔
4 To comply with all relevant standards	✔	✔	✔
CSFs			
Strategic fit	✔	X	✔
Value for money	✔	?	✔
Supply capacity and capability	?	✔	✔
Potential affordability	?	X	✔
Potential achievability	?	X	✔
Summary			
Overall assessment	Carry forward	Discount	Preferred way forward

1.9.10 Following the assessment of the three longlisted funding options, it was agreed that:

- Option 5.3 – mix of public and private funding is identified as the **preferred way forward** since it best meets the Critical Success Factors for a Programme of this scale, providing access to the level of funding required to develop the cancer centre;
- Option 5.1 – public funding – is carried forward as a possible option in order to provide a comparator for the preferred way forward; and
- Option 5.2 is discounted at this stage as private funding of all elements of the Programme is unlikely to be feasible.

1.10 Assessing the Long List of Options

1.10.1 A summary of the results of the assessment undertaken in section 9.5 is provided in table 1-18.

Table 1-18: Outputs of the Long List Assessment

Programme	Status quo	Do minimum	Intermediate option	Intermediate option	Do maximum
1. Service scope	**1.1** Optimise existing arrangements	**1.2** Enhanced clinical model that meets future demand	**1.3** Enhanced clinical model that meets future demand + enhanced access to education and research + access to PET CT service	**1.4** Enhanced clinical model that meets future demand + enhanced access to education and research + access to PET CT and other additional specialist services	**1.5** Improved clinical model that meets future demand + enhanced access to education and research + access to PET CT and other additional specialist services + expansion in the scope of services provided
	Carry forward	**Carry forward**	**Preferred way forward**	**Carry forward**	**Discount**
2. Estates solution	**2.1** Address backlog maintenance in existing estates	**2.2** New build cancer centre + Refurb Outreach facilities + New Satellite Radiotherapy Unit	**2.3** New build cancer centre including Centre for Learning and Innovation and PET CT unit + New build Outreach facilities + New Satellite Radiotherapy Unit	**2.4** New build cancer centre including Centre for Learning and Innovation and PET CT unit and other advanced technologies + New build Outreach facilities + New Satellite Radiotherapy Unit	
	Carry forward	**Carry forward**	**Preferred way forward**	**Carry forward**	
3. Service delivery	**3.1** Maintain existing arrangements for delivering clinical services	**3.2** All clinical services delivered by NHS providers only	**3.3** All clinical services outsourced to third party provider(s)	**3.4** Clinical services delivered through a strategic partnership with third party provider(s)	
	Preferred way forward	**Discount**	**Discount**	**Discount**	
4. Programme implementation	**4.1** Status quo phased implementation	**4.2** Phased A: IM&T and new ways of working, Outreach	**4.3** Phased B: IM&T and new ways of working, Cancer centre, Outreach centres	**4.4** Single phase implementation	

Programme	Status quo	Do minimum	Intermediate option	Intermediate option	Do maximum
		centres, Cancer centre			
	Carry forward	Preferred way forward	Discount	Discount	

1.11 Identifying the Preferred Way Forward

1.11.1 The Programme Board used the outputs to identify the preferred way forward for the Programme together with a short list of possible options against which the preferred way forward will be appraised. The resulting shortlist of options is provided in table 1-19.

Table 1-19: Shortlist of Options

Programme		Status quo	Do minimum	Preferred way forward	More ambitious preferred way forward
Service scope		Optimise existing arrangements	Improved clinical model that meets future demand	Improved clinical model that meets future demand + enhanced access to education and research + access to PET CT service	Improved clinical model that meets future demand + enhanced access to education and research + access to PET CT and other additional specialist services
Solution	Cancer Centre	Existing estates: invest in backlog maintenance	• New cancer centre • Expansion zone for advanced tech	• New cancer centre • PET CT • New research/ education facilities • Management Centre • Expansion zone for advanced tech	• New cancer centre • PET CT • New research/ education facilities • Management Centre • Advanced Technology: one proton beam unit; one platform specific stereotactic treatments; one additional MRI scanner; one Cyclotron unit
	Outreach	Maintain current arrangements	Up to four x refurbished Outreach centres delivering SACT and Outpatients services	Up to four x new Outreach centres delivering SACT and Outpatients services	Up to four x new Outreach centres delivering SACT and Outpatients services
	Satellite Radio-therapy Outreach	-	One x new Satellite Radiotherapy Unit	One x new Satellite Radiotherapy centre	One x new Satellite Radiotherapy centre
Service delivery		Continue with existing service providers	Continue with existing service providers	Continue with existing service providers	Continue with existing service providers
Implementation		Phased status quo	Phased: IM&T and new ways of working Outreach arrangements	Phased: IM&T and new ways of working Outreach arrangement	Phased: IM&T and new ways of working Outreach arrangement Cancer centre

		Cancer centre	Cancer centre	
Funding	Public funding	Mix of public and private funding	Mix of public and private funding	Mix of public and private funding

1.12 Review of the Shortlist

1.12.1 The TCS Programme Management Board reviewed the shortlist of options by testing the following:

- Was the option likely to deliver the spending objectives and CSFs of the project?
- Was the option likely to deliver sufficient benefits?
- Was the option practical and feasible?
- Was the option deliverable within the constraints of the project?
- Was the option deliverable without incurring an unacceptable degree of risk?

1.12.2 Following the review the shortlist of options was approved by the TCS Programme Management Board and subsequently by the Velindre NHS Trust Board.

1.13 Conclusion

1.13.1 The TCS Programme Management Board has identified and assessed a long list of options against the TCS Programme spending objectives and CSFs.

1.13.2 The resulting shortlist, as shown incorporates four options: the status quo, the do minimum, the preferred way forward and a more ambitious preferred way forward. An overall summary of these is outlined in figure 1-3.

Figure 1-3: Overview of the Final Shortlist of Options

Chapter Summary:

- **The status quo:** This option provides a benchmark for assessing the value for money of all options. It attempts to optimise existing arrangements as far as possible in order to improve the organisation's capability to meet current and some future demand for core services. It requires investment in backlog maintenance for the existing cancer centre through a phased implementation plan which will be funded through traditional public capital.

- **The do minimum option:** This option offers a realistic way forward to meet future demand for core services through the development of a purpose built nVCC, including an expansion zone for future introducing of additional specialist services. This will be supported by the provision of up to four Velindre managed Outreach centres to be provided through refurbishing existing accommodation, in addition to which a new build Velindre Radiotherapy Satellite centre will be introduced. This option requires a phased implementation which will be funded through a mix of private and public agreements.

- **The preferred way forward:** This is the recommended option at this stage, as it is considered to best meet the spending objectives and Critical Success Factors of the Programme. It requires the development of a purpose built nVCC centre with increased research and education facilities and a management centre. In addition to this it will provide facilities to deliver a PET CT research service at Velindre. This will be supported by the provision of up to four Velindre managed new build Outreach centres, in addition to which a new build Velindre Radiotherapy Satellite centre will be introduced. The option requires a phased implementation which will be funded through a mix of private and public agreements.

- **The more ambitious option:** This option offers the same solution as the preferred way forward with the added feature of incorporating additional specialist services including a proton beam service.

2   ECONOMIC APPRAISAL

2.1   Introduction

2.1.1   The purpose of this section of the Economic Case is to appraise the economic costs, benefits and risks for the short listed options and to identify the preferred option.

2.2   Estimating Costs for the Economic Appraisal

2.2.1   The treatment of costs and benefits within the economic appraisal is in line with current Welsh Government Better Business Case guidance.

2.2.2   The economic appraisal process utilises a number of key outputs from other parts of the PBC process, such as workforce planning, capacity planning, and design, in establishing the capital and revenue (recurring and non-recurring) implications of each option.

2.2.3   The general approach to the economic appraisal is summarised in figure 2-1.

Figure 2-1: Economic Appraisal Methodology
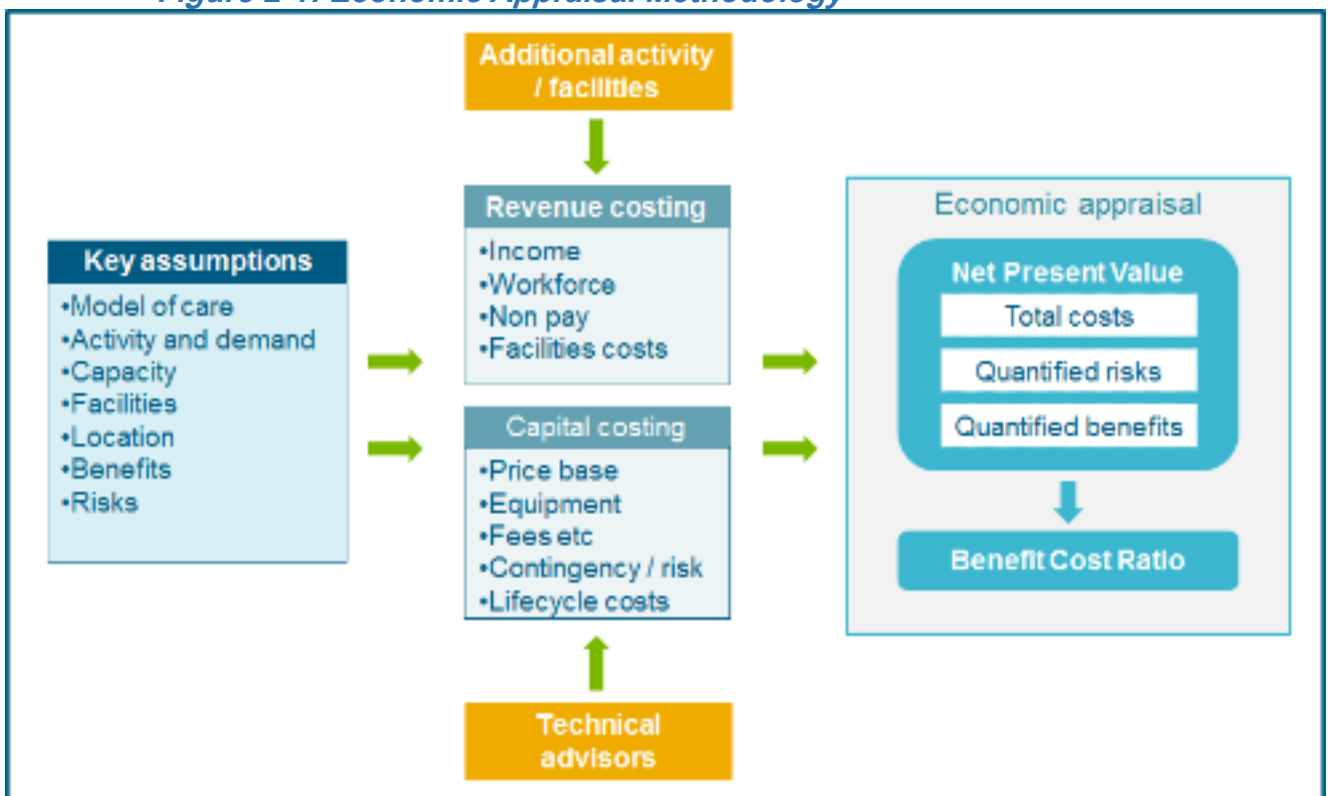
2.3 Capital costs

2.3.1 The Trust and its appointed cost advisors, in partnership with NHS Wales Shared Services (Shared Services), has prepared the capital costs based on an appraisal of the capital requirements of each option.

2.3.2 These are derived primarily from the Schedules of Accommodation (*see Appendix PBC/EC/E1*) with appropriate adjustments to reflect the costs of delivering the options to the time when new and / or refurbished facilities become operational.

2.3.3 The capital requirements differ for each of the four shortlisted options and include:

- **Status Quo option:**
  - Investment in existing facilities at VCC to address backlog maintenance;
  - Essential capital Projects that are required to maintain core service delivery at VCC; and
  - Replacement of existing equipment at VCC.

- **Do Minimum option:**
  - Construction of a new VCC to replace the existing VCC;
  - New VCC designed and sized in line with current service scope1;
  - Expansion zones identified through the designof the new VCC to facilitate the potential future introduction of new services2;
  - Construction of a new Velindre Radiotherapy Satellite Centre@ with two operational linear accelerators; and
  - Refurbishment of between two and four Velindre@ Outreach Centre's3.

    [1] See *Table 2-1* for a summary of the service scope for the Do Minimum option;
    [2] See *Table 2-1* for a summary of the list of services which are covered by expansion zones; and
    [3] For costing purposes a four centre option has been costed although this will be tested and potentially reduced through development of the Outline Business Cases for these centres.

- **Preferred Way Forward:**
  - Construction of a new VCC to replace the existing VCC;
  - New VCC designed and sized in line with enhanced service scope1;
  - Expansion zones identified through the design of the new VCC to facilitate the potential future introduction of new services2;
  - Construction of a new Velindre Radiotherapy Satellite Centre with two operational linear accelerators; and
  - Construction of between two and four four1 new build Velindre@ Outreach Centre's3.

^{1} See *Table 2-1* for a summary of the service scope for the Do Minimum option;

^{2} See *Table 2-1* for a summary of the list of services which are covered by expansion zones; and

^{3} For costing purposes a four centre option has been costed although this will be tested and potentially reduced through development of the Outline Business Cases for these centres.

- **More Ambitious option:**
  - Construction of a new VCC to replace the VCC;
  - New VCC designed and sized in line with enhanced service scope1;
  - Construction of a new Velindre Radiotherapy Satellite Centre@ with two operational linear accelerators; and
  - Construction of between two and four1 new build Velindre@ Outreach Centre's2.

  - 1 See Table x for a summary of the service scope for the Do Minimum option;
  - For costing purposes a four centre option has been costed although this will be tested and potentially reduced through development of the Outline Business Cases for these centres.

2.3.4   An overview of the capital requirements of the four options is provided in table 2-1.

Table 2-1: Capital Requirements for the Short-Listed Options

		Status quo	Do minimum	Preferred way forward	More ambitious
Existing VCC	• Backlog maintenance • Essential capital projects • Replacement of existing equipment	✓			
	• Enabling works • Site demolition and disposal		✓	✓	✓
nVCC	• New build VCC		✓	✓	✓
	• Research and Development (enhanced service provision provided within Centre for Learning)			✓	✓
	• Training and Education (enhanced service provision provided within Centre for Learning)			✓	✓
	• PET CT service			✓	✓
	• Proton Beam service				✓
Velindre Radiotherapy Satellite Centre	• New build Radiotherapy Satellite Centre		✓	✓	✓
Velindre@ Outreach Centres providing SACT and Outpatient services	• Two – four refurbished outreach centres		✓		
	• Two – four new build outreach centres			✓	✓

2.3.5   The capital cost calculations and assumptions have been developed by the Trust and its Technical and Professional Advisers, and have been shared and

agreed with NHS Wales Shared Services. For further details refer to the capital cost forms (*see Appendix PBC/EC/E2*).
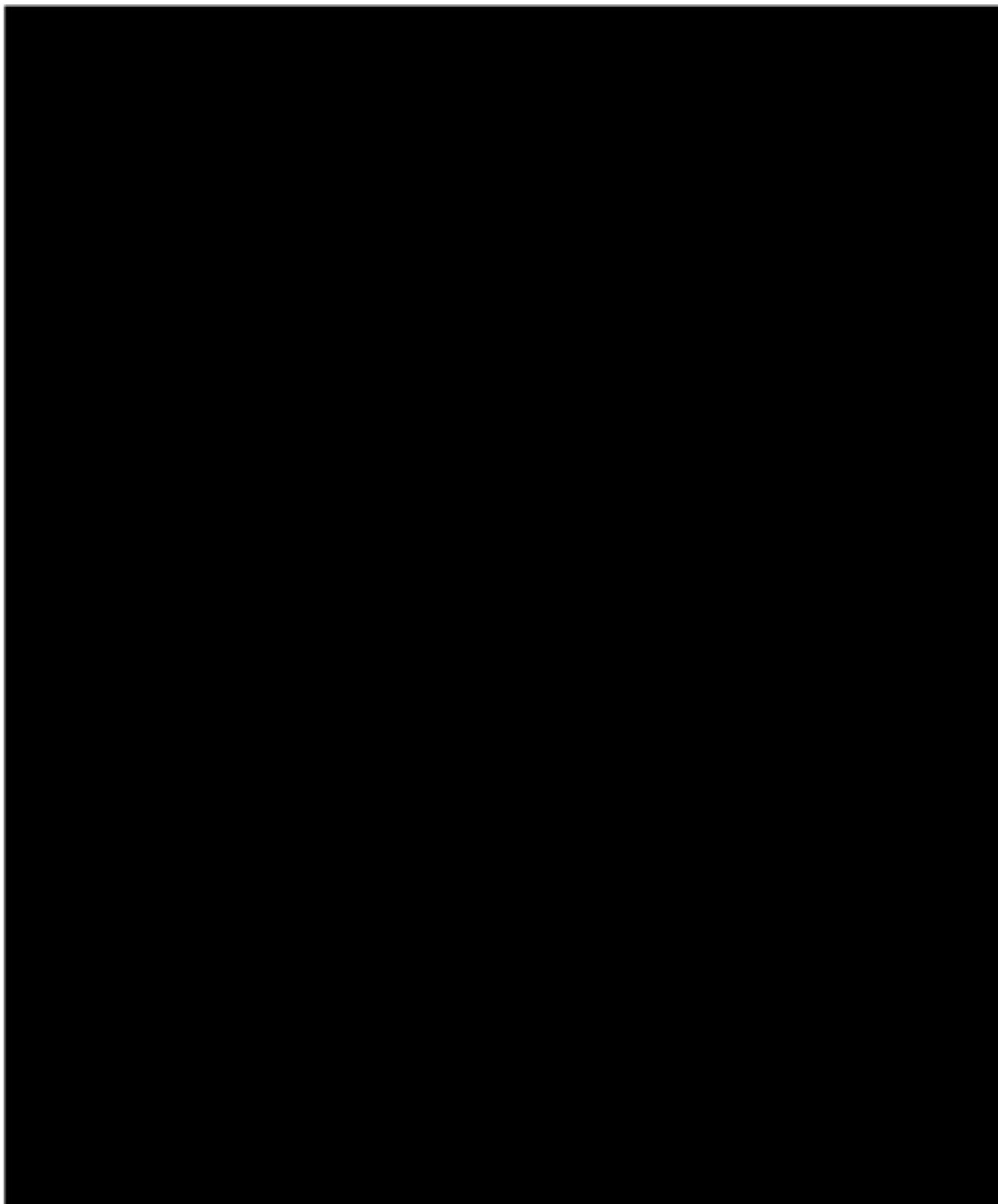
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Figure 2-3: Lifecycle Cost Assumptions

- Lifecycle costs are calculated over the full 60 year appraisal period in line with similar projects.

- The building lifecycle costs for the Status Quo is based on an assumed programme of works addressing backlog maintenance and investing in essential capital projects in order to maintain the buildings to a required standard.
- Equipment lifecycle costs are based on a replacement programme that is outlined in *Appendix PBC/EC/E4*.

prepared by the Trust's technical advisors (provided in *Appendix PBC/EC/E2*). For the purposes of the economic appraisal these will be adjusted to:

- Include an allowance for optimism bias;
- Exclude VAT; and
- Re-base to a consistent price base.

2.4   Transitional COSTS

Please Note: The Trust is currently in dialogue with the Welsh Government and with its commissioners in relation to transitional cost requirements and in relation to potential sources of funding. Therefore the transitional costs within this section will be updated following the conclusion of these discussions.

2.4.1   The Trust has received an annual capital and revenue allocation from the Welsh Government to ensure the delivery of the Programme and its associated Projects.

2.4.2   The transitional capital costs relate to the following:

- Programme Management and Programme workstreams;
- GI works; and
- Technical and Professional advisors.

2.4.3   The transitional revenue costs relate to the following:

- Programme Management and Programme workstreams;
- Clinical implementation; and

- Dual site running i.e. period immediately following the opening of the new VCC when the Trust will, for a period of approximately 16 weeks, be
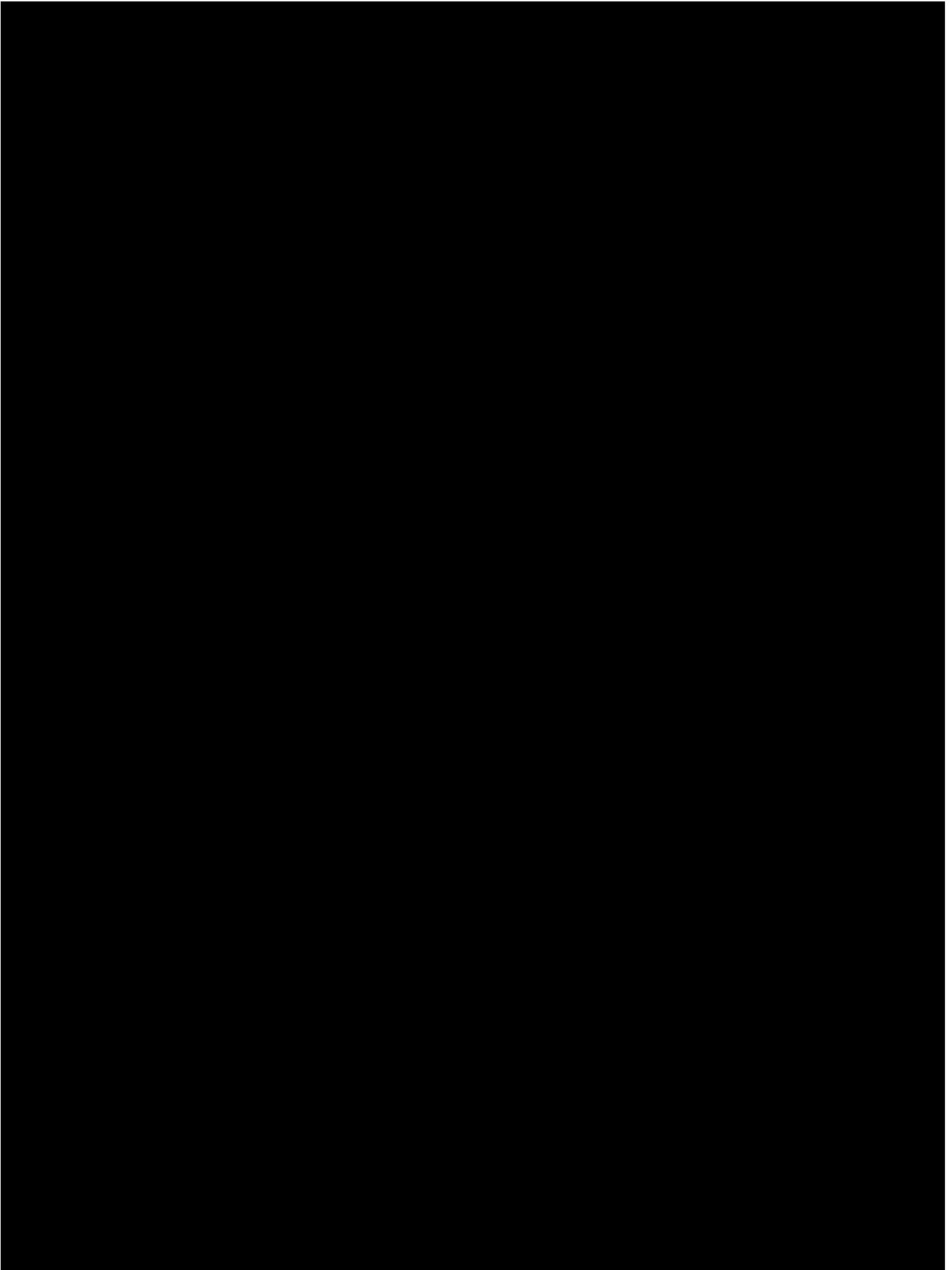
2.5   Baseline Recurring Revenue Costs

2.5.1   Baseline costs reflect the current annual costs of delivering the services affected by the proposed changes. This includes any current costs associated with delivering services within VCC and within outreach Centres.

2.5.2   The main assumptions used to calculate the baseline are outlined in Figure 2-5.

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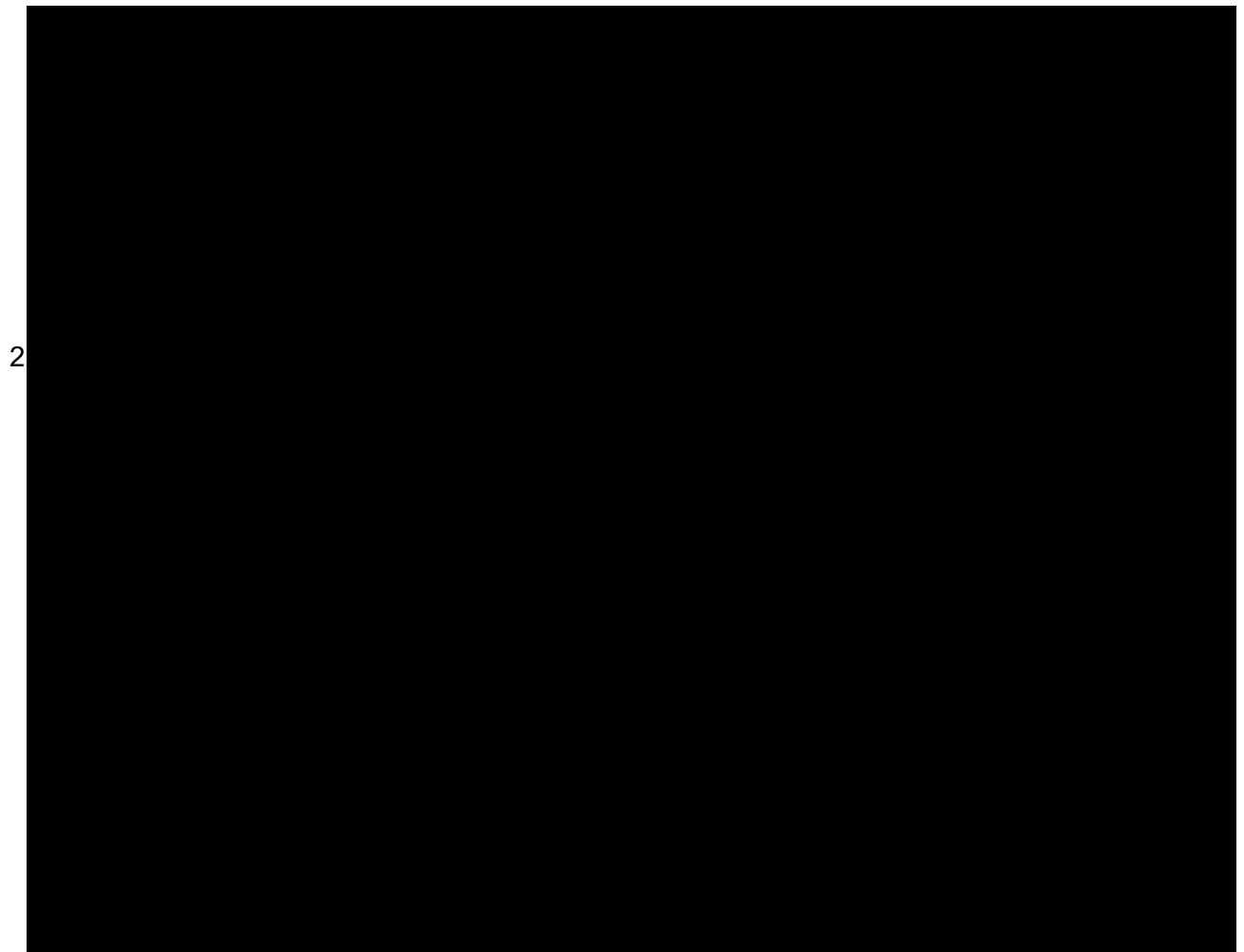
2.6   Future Recurring Revenue Costs

2.6.1   Recurring revenue costs reflect expenditure which the Trust will incur on an on-going basis to provide services and maintain its infrastructure. It is important to note that the forecast costs reflect the new service model requirements to meet the forecast level of activity and improve the delivery of cancer services.

2.6.2   Costs will differ for the four shortlisted options in relation to the operational requirements of each, the main elements of which are described below:

- **Status Quo option:** Includes the workforce and operating costs associated with delivering forecast activity for currently commissioned core services;

- **Do Minimum option:** Includes the workforce and operating costs associated with delivering forecast activity as well as the costs and benefits of delivering the proposed clinical service model. In addition, this option includes the costs and benefits of operating within a new build VCC;

- **Preferred Way Forward:** In addition to the Do Minimum costs, this option includes the revenue impact of introducing a PET CT service and enhanced service cope in relation to Research and Development and Training and Education; and

- **More Ambitious option:** In addition to the Preferred Way Forward costs, this option includes the revenue impact of introducing a Proton service and of introducing more advanced treatment technologies.

2.6.3 The main features related to revenue costs for each of the options are summarised in table 2-7.

Table 2-7: Recurring Revenue Costs Requirements

	Status quo	Do minimum	Preferred way forward	More ambitious
Recurring revenue (pay and non-pay) costs associated with delivering forecast activity	✔	✔	✔	✔
Additional costs to deliver capacity shortfall	✔			
Benefits of new clinical model (net of investment in additional capacity) • Reduced admissions • Reduced length of stay • Improved utilisation		✔	✔	✔
Impact of new cancer centre facilities (costs and benefits)		✔	✔	✔
Impact of Centre for Learning and Innovation (costs and benefits)			✔	✔
Impact of PET CT (costs)			✔	✔
Impact of advanced technologies (costs)				✔

2.7 Estimating the Value of Benefits

2.7.1 As outlined within the Strategic Case, the Programme delivers benefits in a variety of areas, some of which can be quantified and valued financially.

2.7.2 Direct cash releasing benefits are outlined in the recurring revenuecosts above and include:

- Financial benefits of the service model including reduced length of stay and improved utilisation; and
- Other financial benefits resulting from improved adjacencies, reduced variable pay costs, and additional income from the Centre for Learning and Innovation.

2.7.3   In addition to this, there are a range of indirect benefits that are quantifiable in monetary terms including:

- Benefits to patients and staff of reduced travel time;
- Wider macro benefits associated with better survival rates; and
- Wider macro benefits of the employment opportunities related to investment in the local infrastructure.
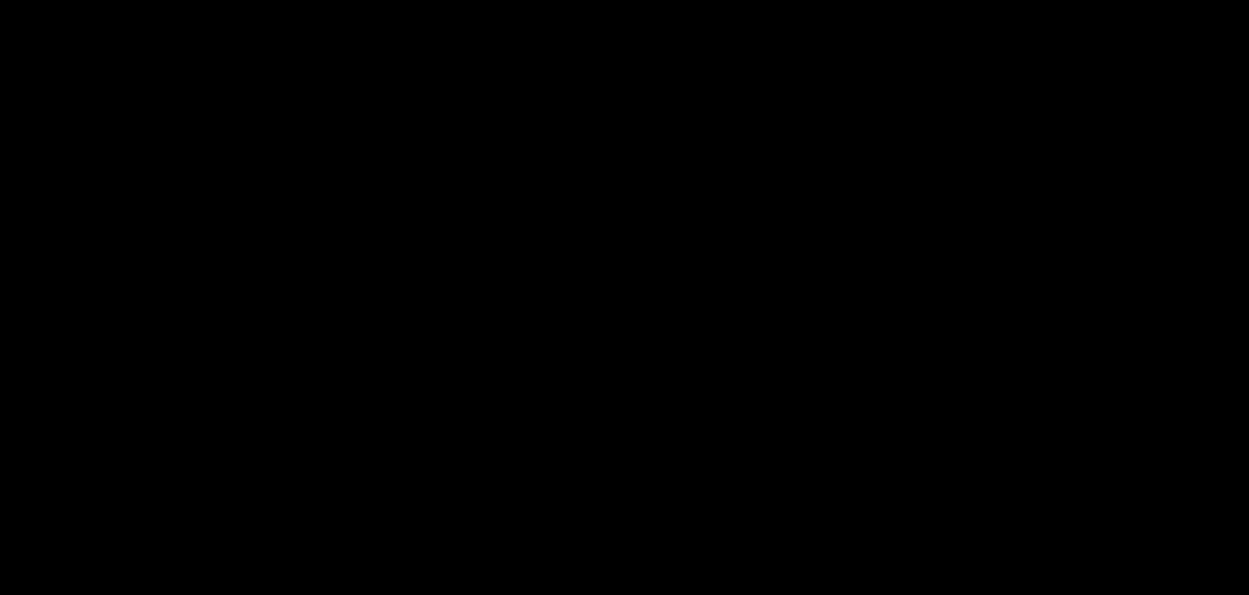
2.7.4   An overview of these benefits is shown in figure 2-7.

Figure 2-6: Types of Benefits
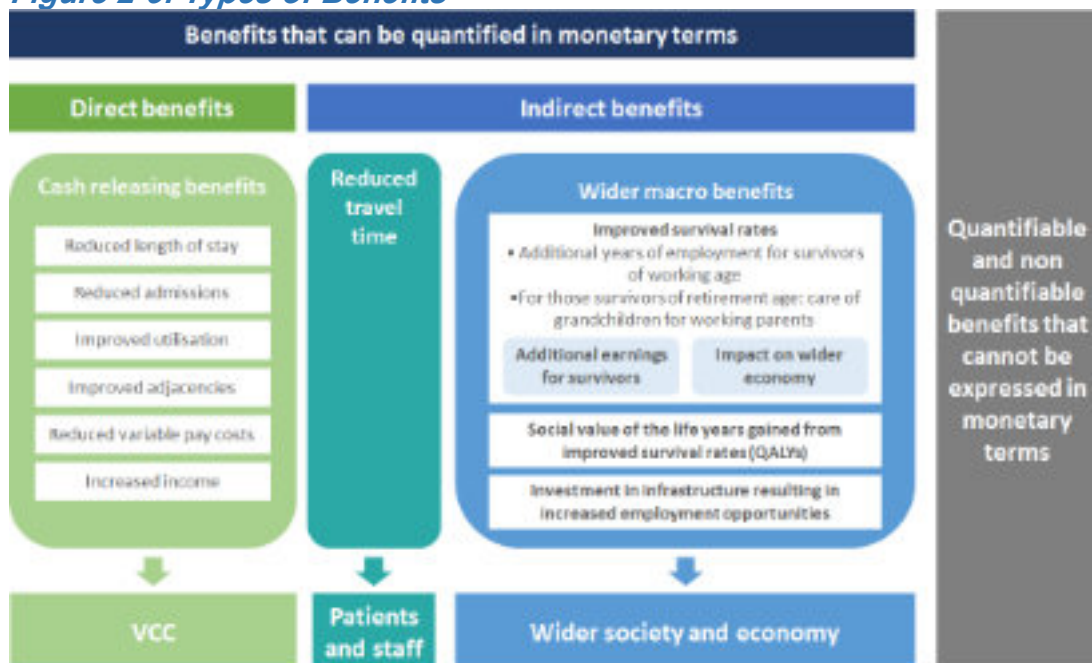
2.7.5   The approach and methodology (*see Appendix PBC/EC/E5*) used to estimate the monetary value these has been developed in partnership between the Trust, its Business Case advisor (Capita) and with the Welsh Government economic division.   Expert advice and supporting evidence has also been provided by Sheffield Hallam University.

2.7.6   The resulting values of the quantified benefits, expressed in cash terms is shown in Table 2-9 for each option.   These have been subsequently been incorporated within the Economic Appraisal over the 60 year appraisal period.

Please Note: Benefits have only included benefits within the economic case when the Trust has been able to quantify these benefits and where there has been supporting evidence and/or data to support this quantification. However, the Trust has agreed to continue working in partnership with the Welsh Government economic division to further develop and test the level of benefits which the Programme will deliver. Within this context it is believed that the level of quantified benefit across the Programme is understated at this stage and will be updated within the Full Business Case (FBC).

2.8 Assessing the Cost of Risk

2.8.1   As outlined in the Strategic Case a range of programme risks have been identified some of which can be quantified and a financial value determined. Other risks are either qualitative or cannot be attributed to specific aspects of the programme (e.g. optimism bias).

2.8.2   For the purposes of assessing the costs of risk for the programme the following analysis provides details of:

- **Capital risks** including:

  o Quantified capital risks: which are included in the capital cost contingencies; and
  o Optimism bias: the approach used to calculate this is outlined below.

- **Revenue risks**: the approach used to quantify these is outlined below.

2.8.3   A summary of the ways in which the various types of risk have been quantified is outlined below.

2.9 Optimism Bias:

2.9.1   The Trust and their cost advisors have calculated an adjustment for optimism bias. This is a requirement of HM Treasury guidance and is intended to

redress the demonstrated and systematic tendency for project appraisers to be optimistic when estimating costs, benefits and timings.

2.9.2   The optimism bias adjustment is in addition to the calculation for project specific risk and reflects the current level of uncertainty within the programme. Adjustments for optimism bias will be reduced as more reliable estimates of relevant costs are built up.

2.9.3   The optimism bias calculation has been prepared in accordance with current HM Treasury guidance following the steps below:

- **Step 1** decide which project type to use;
- **Step 2** start with the upper limit;
- **Step 3** consider whether the optimism bias factor can be reduced; and
- **Step 4** apply the optimism bias factor to the NPV calculation.

2.9.4   Given the degree of complexity associated with the construction elements of the programme, it was agreed that a 'non-standard' project type will be used.

2.9.5   In line with current guidance, the upper bound level for optimism bias for this type of construction project is 51%. This was therefore used as the starting point for the optimism bias calculation.

2.9.6   The upper bound level for optimism bias was reduced according to the extent to which it was assessed the contributory factors have been managed. An analysis is provided in table 2-10 of the main factors and how they contribute to the upper bound level before and after mitigation.

2.10   Quantified Revenue Risk

2.10.1   The quantifiable revenue risks have been assessed in four stages, namely:

- **Stage 1** assesses the likelihood of the risk occurring;
- **Stage 2** identifies the years in which the risk will occur;
- **Stage 3** assesses the minimum, most likely, and maximum impacts of the risk; and
- **Stage 4** assesses the expected differences between each option.

2.10.2 Risks have been quantified using multi point analysis incorporating a range of possible outcomes for each of the risks identified. The value of each possible outcome is multiplied by its probability and then aggregated to establish an expected value for each risk. An example of this is shown in figure 2-8.
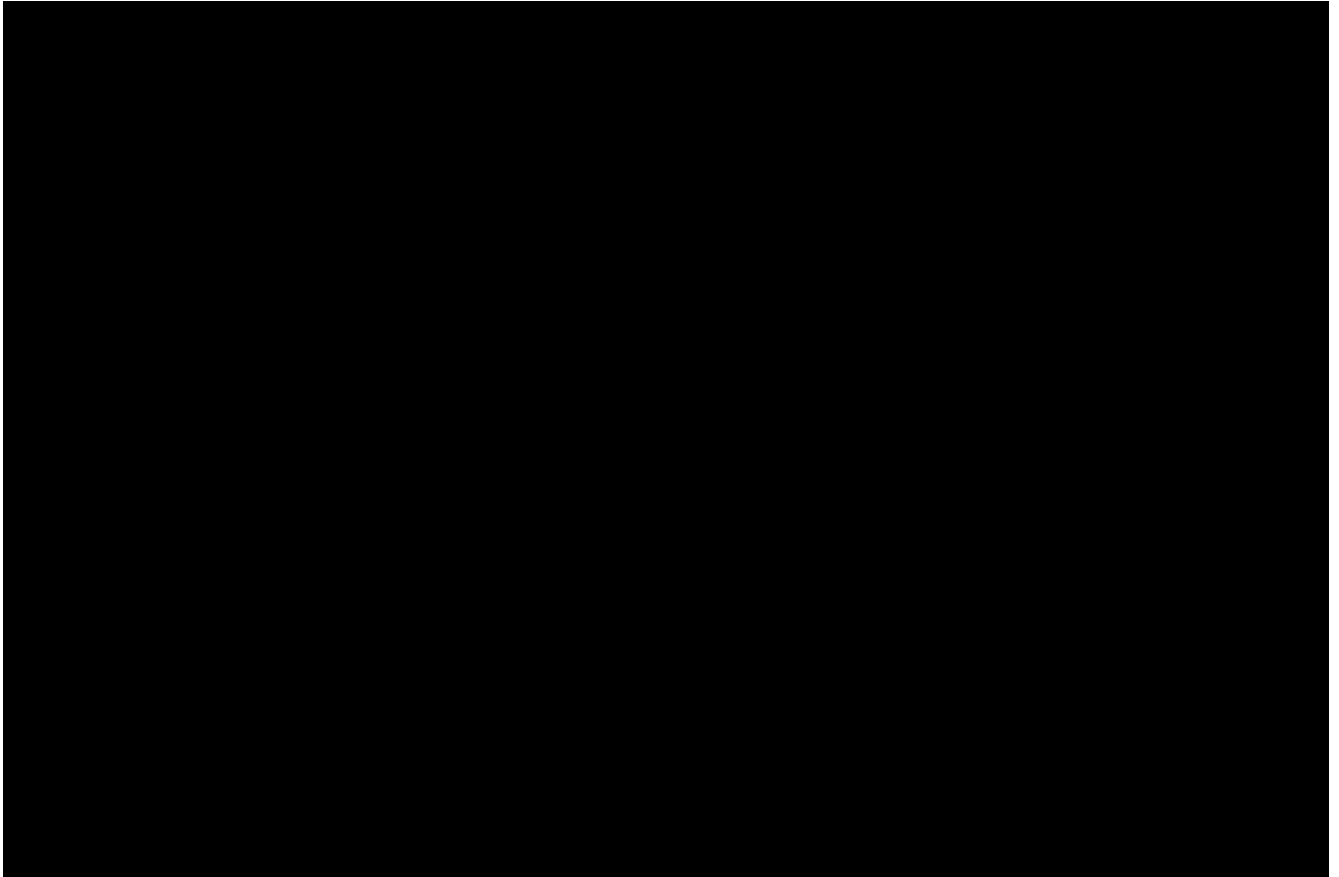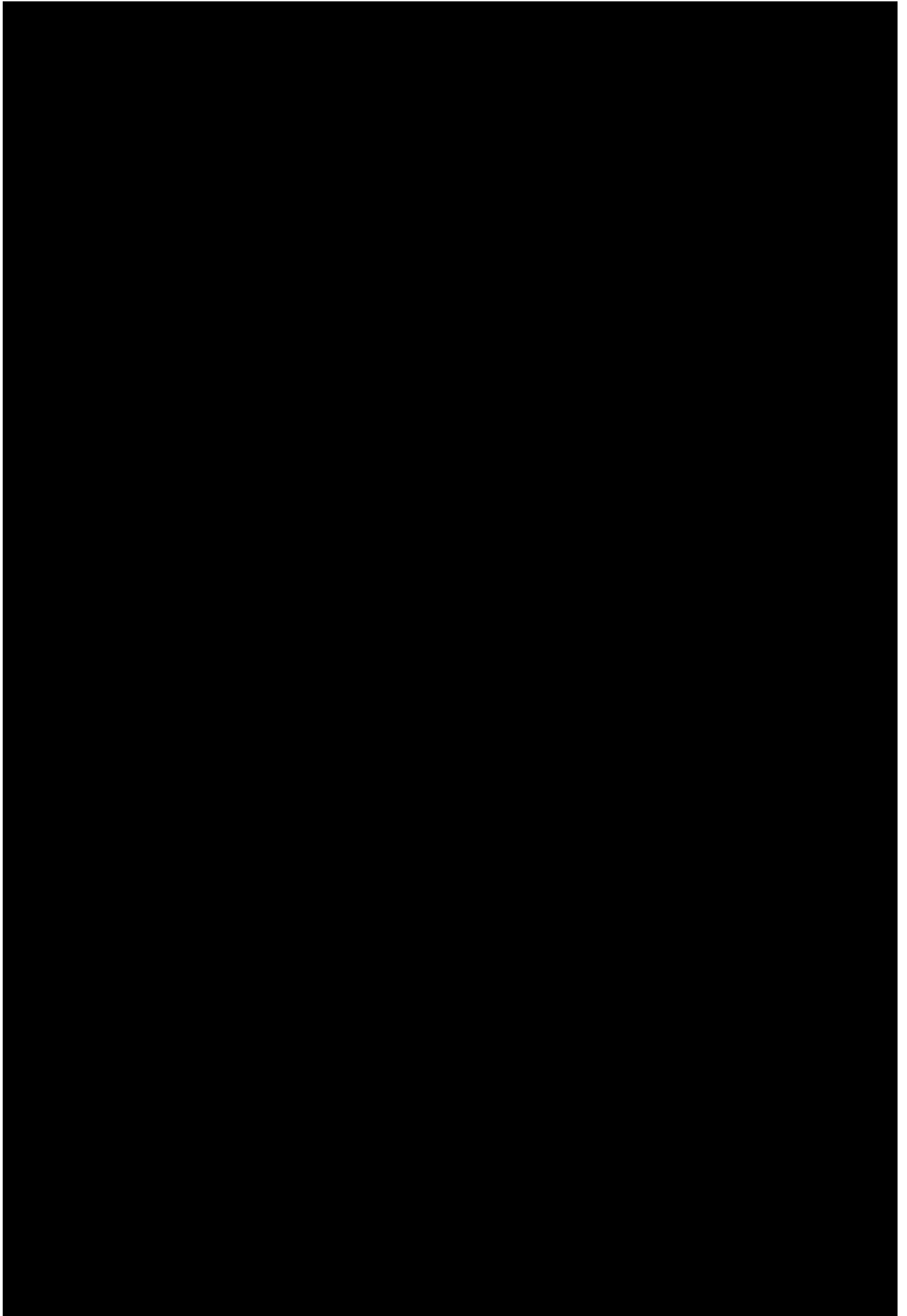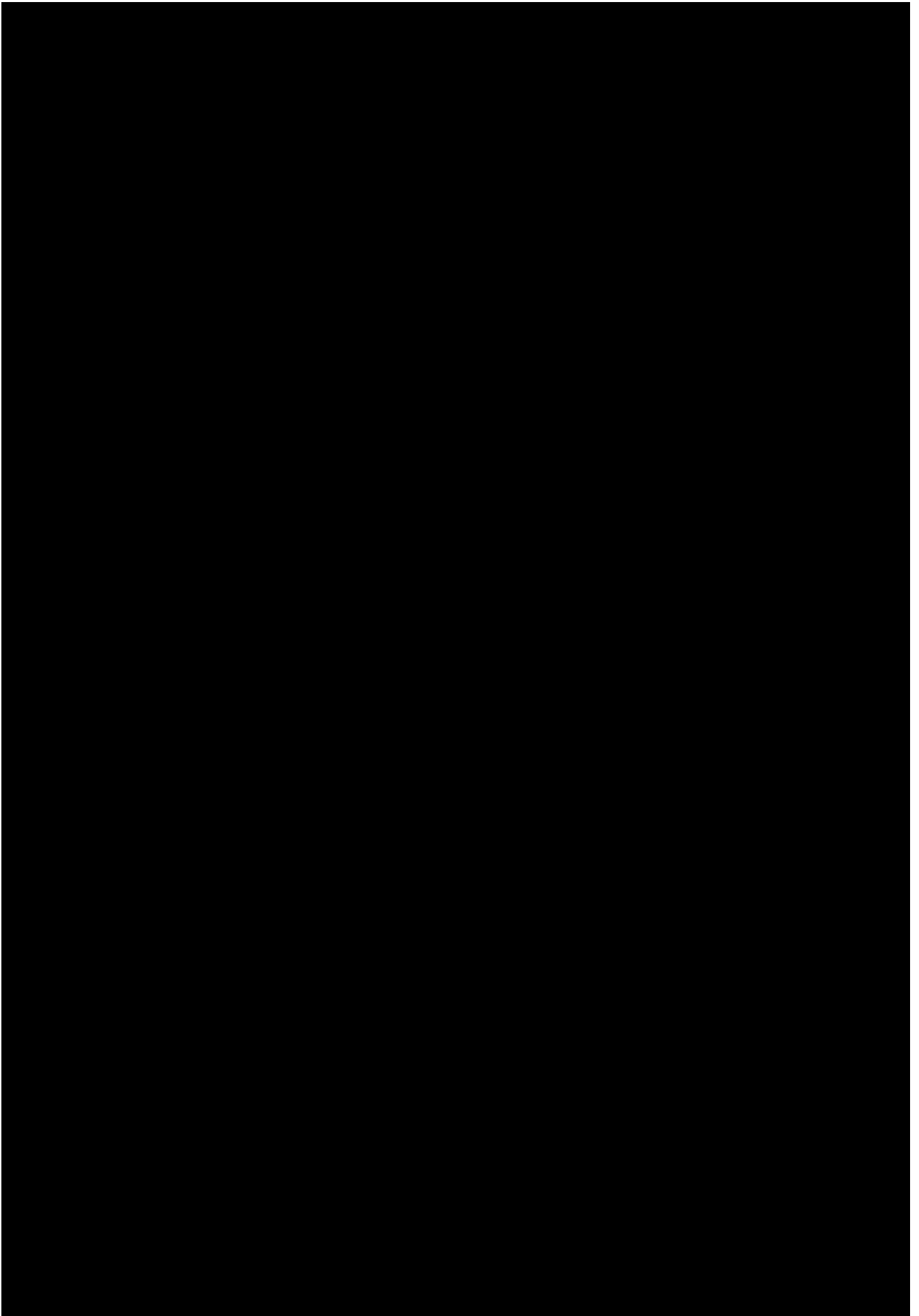
2.11.4 The Preferred Way Forward offers the lowest Net Present Value of the four options, suggesting that it is the lowest cost option over the 60 year appraisal period, offering a significantly better benefit cost ratio.

2.11.5 The benefit cost ratio demonstrates the relationship between the cost and benefits of the programme. The Preferred Way Forward therefore offers the best value for money over a 60 year period on both a discounted and undiscounted basis.

2.12 Sensitivity Analysis and Switching

2.12.1 The results of the economic appraisal above have been subject to a sensitivity analysis to examine the impact of movements in capital and revenue costs.

2.12.2 Switching value analysis has been applied to areas of material cash flows to identify the extent that costs must change in order for the benefit cost ratio to equal that of the Preferred Way Forward. The results of the analysis is presented in table 2-13.
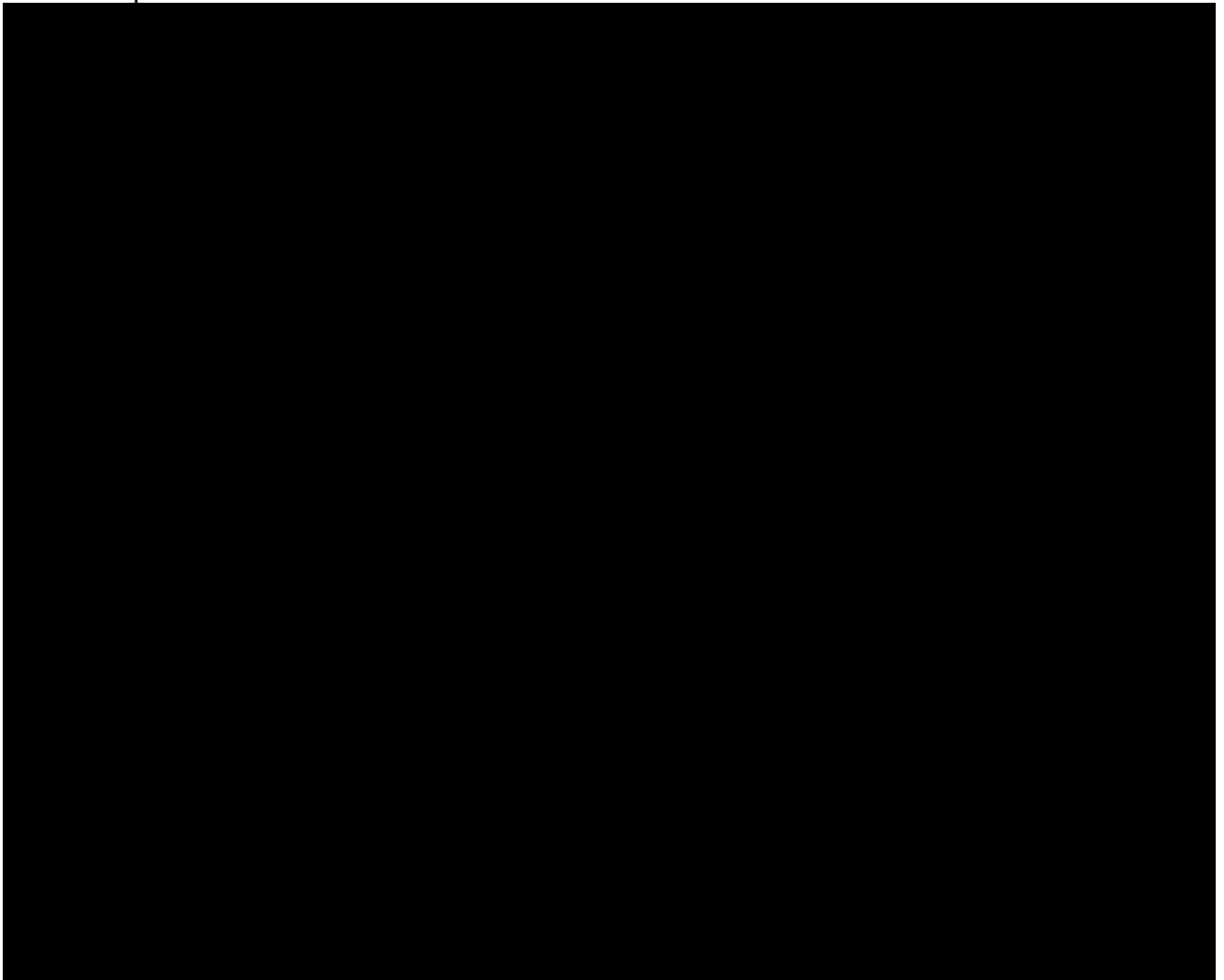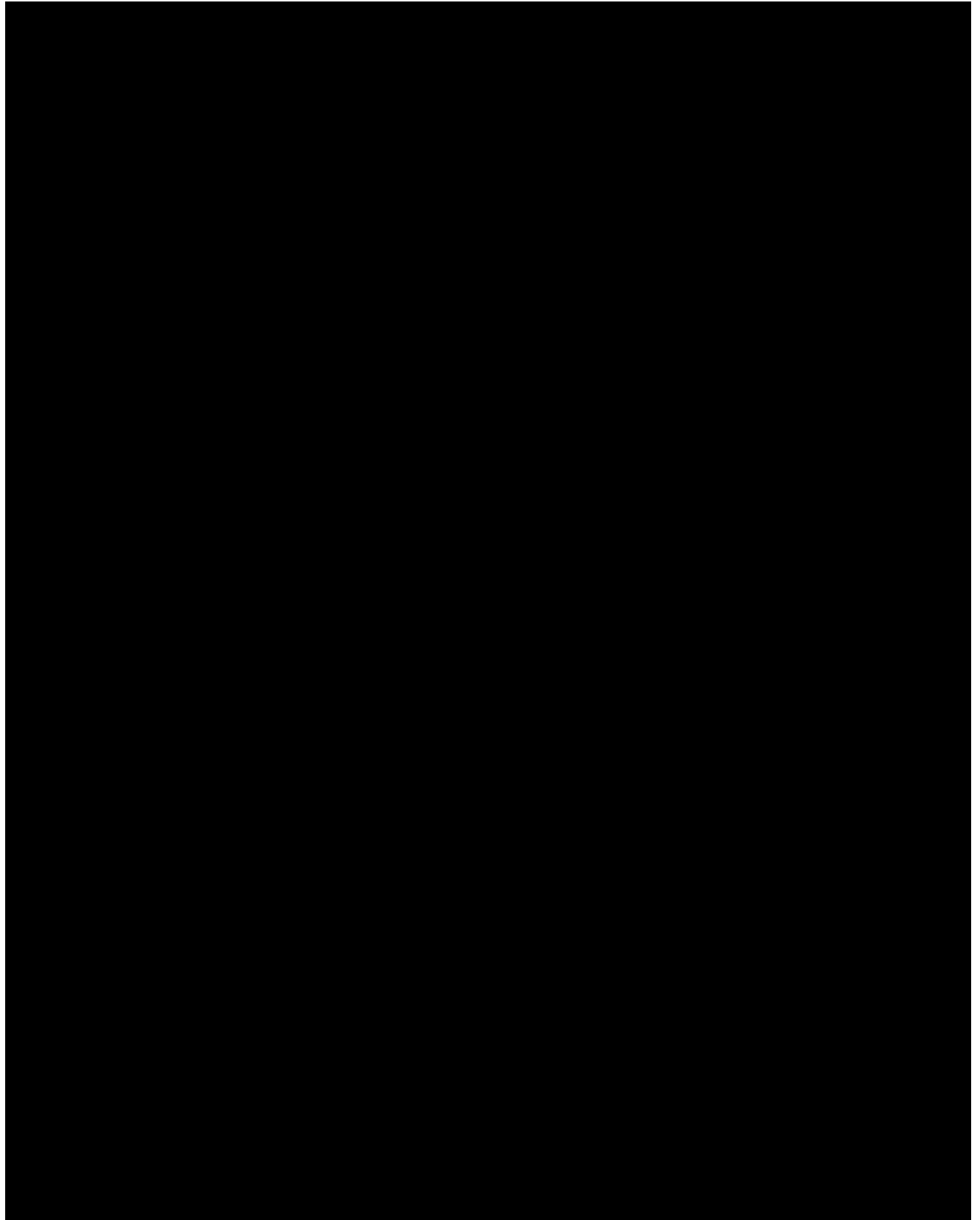
2.13   Selection of Preferred Option

2.13.1   The results of the economic appraisal are analysed below:
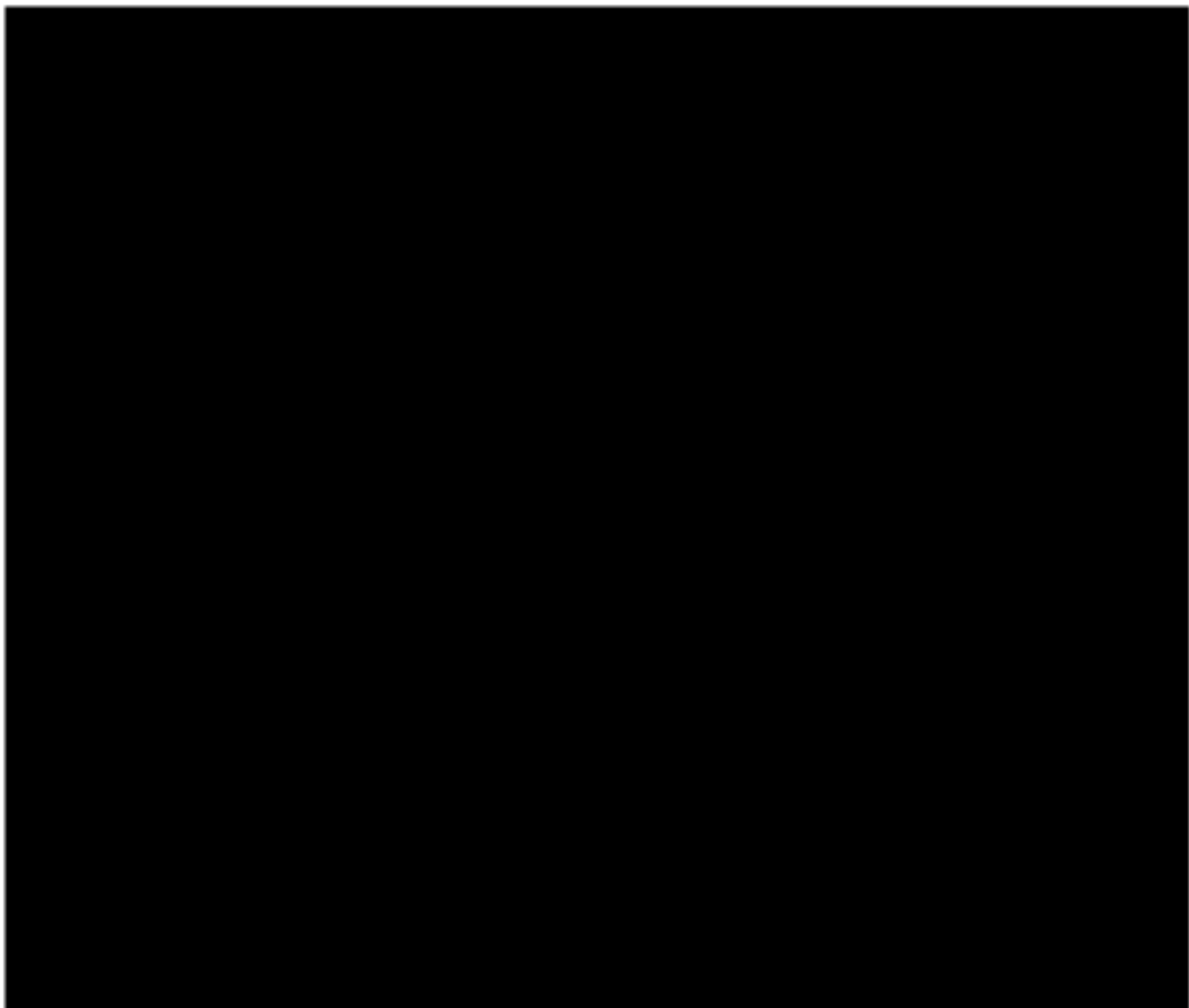
2.14 Summary of the Preferred Option

2.14.1 The preferred option for delivering the TCS programme contains the following features and delivers a wide range of benefits to patients, staff and other stakeholders.

Figure 2-10: Summary of the Preferred Option

- The introduction of an improved clinical model which supports the delivery of high quality and sustainable services that will meet the future requirements and aspirations for cancer care across South East Wales.

- Service capacity which is able to respond to anticipated increases in demand for non-surgical cancer services including additional linear accelerators at both the new Cancer Centre along with increased provision of care within outreach settings and in people's homes.

- Access to new services which contribute to improved patient outcomes.

- Enhancement of existing provision of Research and Development and of Training and Education capacity through the establishment of a Centre for Learning and Innovation.

- In terms of infrastructure the preferred option provides:

  - A new purpose-built VCC;
  - Introduction of PET CT facilities at VCC (subject to approval of a separate business case);
  - Development of a Trust management centre at VCC;
  - A new build Velindre Radiotherapy Satellite Centre; and
  - Between two and four new build Velindre@ Outreach Centres providing SACT and Outpatient services.

- A phased approach to implementation of the programme culminating in the delivery of a new cancer centre by 2022/23.

2.15 Conclusion

2.15.1 Following a robust option appraisal process involving a wide range of stakeholders, the Trust has identified its preferred option for delivering the transformation of cancer services across South East Wales.

2.15.2 The preferred option delivers a wide range of benefits which are complementary with local and national priorities as well as the delivery of a range of short and long term objectives in improving specialist non-surgical cancer service delivery across South East Wales.

2.15.3 Subsequent sections of the PBC will consider the optimal procurement route for the proposed programme, the financial implications as well as management of its successful delivery.

Chapter Summary:

- The short-listed options for the TCS Programme have been subjected to an economic appraisal over a 60 year appraisal period.

- The Preferred Way Forward offers the lowest Net Present Value of the four short listed options.

- The Preferred Way Forward offers the best value for money over a 60 year period on both a discounted and undiscounted basis.

- The Preferred Way Forward has been identified as the preferred option.

- The scope of the Preferred Way Forward includes the introduction of an improved clinical model which supports the delivery of high quality and

sustainable services that will meet the future requirements and aspirations for cancer care across South East Wales.

- In terms of infrastructure the preferred option provides:

  - A new purpose-built VCC;
  - Introduction of PET CT facilities at VCC (subject to approval of a separate business case);
  - Development of a Trust management centre at VCC;
  - A new build Velindre Radiotherapy Satellite Centre; and
  - Between two and four new build Velindre@ Outreach Centres providing SACT and Outpatient services.
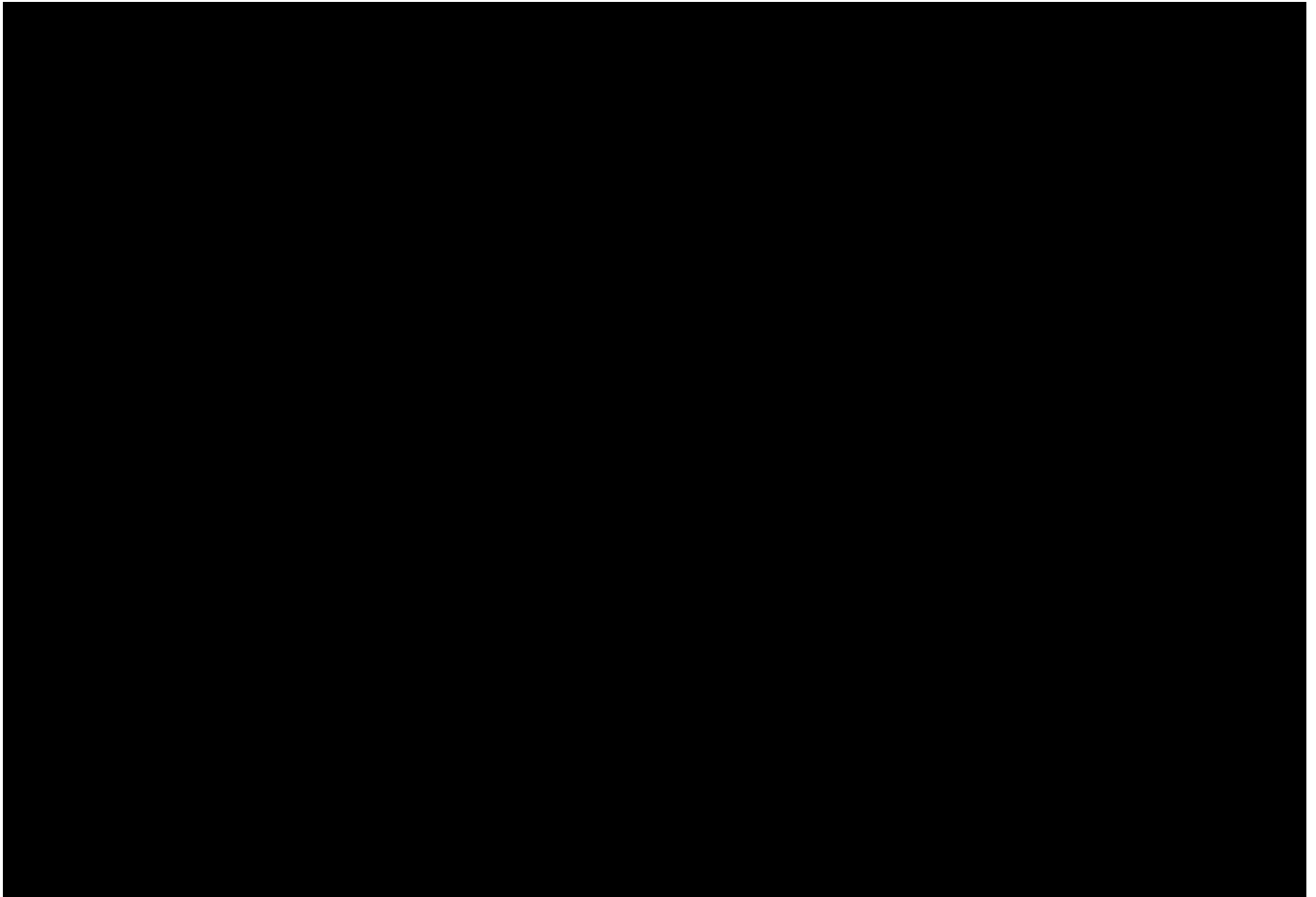
Transforming Cancer Services In South East Wales

Programme Business Case:

Commercial Case Section

COMMERCIAL CASE

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1 PROCUREMENT STRATEGY

1.1 Introduction

1.1.1 This section of the business case sets out the procurement strategy for the TCS Programme and assesses the potential procurement routes for the delivery of the projects associated with the TCS Programme as well as the supporting workstreams (e.g. equipment).

1.2 Service procurement strategy

1.2.1 The provision of cancer services to meet the need of the local population is the statutory responsibility of Local Health Boards. In South East Wales, Local Health Boards discharge this responsibility through the direct provision of a wide range of cancer services and the commissioning of non-surgical tertiary oncology services from Velindre NHS Trust.

1.2.2 Whilst the model of care for non-surgical tertiary oncology services will evolve in accordance with the improvements identified within the TCS Programme, the existing approach to service procurement will remain unchanged.

1.3 Procurement strategy approach and process

1.3.1 This procurement strategy has been developed in partnership with the Welsh Government and includes input from the Trust's Technical Advisors, Legal Advisors and Financial Advisors.

1.3.2 A number of public procurement decisions will need to be taken early in respect of the Programme procurement arrangements. These decisions will influence not only the structure of the procurement competition and the content of the associated tender documentation, but also market perception and the procurement timetable.

1.4 Procurement Scope and Routes

1.4.1 This section confirms the scope of the required procurement activities and the proposed procurement strategy to be employed.

1.4.2 Figure 1-1 summarises the procurement strategy for the TCS Programme including:

- The proposed procurement route for each TCS project;
- The proposed business case strategy for each TCS project; and
- The proposed funding source for each TCS project.

1.4.3 A key objective of the Trust's procurement strategy is to ensure that good competition is achieved within a given market, that all procurement activities are open and transparent and to ensure that best value for money for each project is achieved. The various procurement routes identified are influenced

by the value, market conditions, agreed funding mechanisms and Trust governance and legislative requirements.

Figure 1-1: Procurement strategy for the TCS Programme
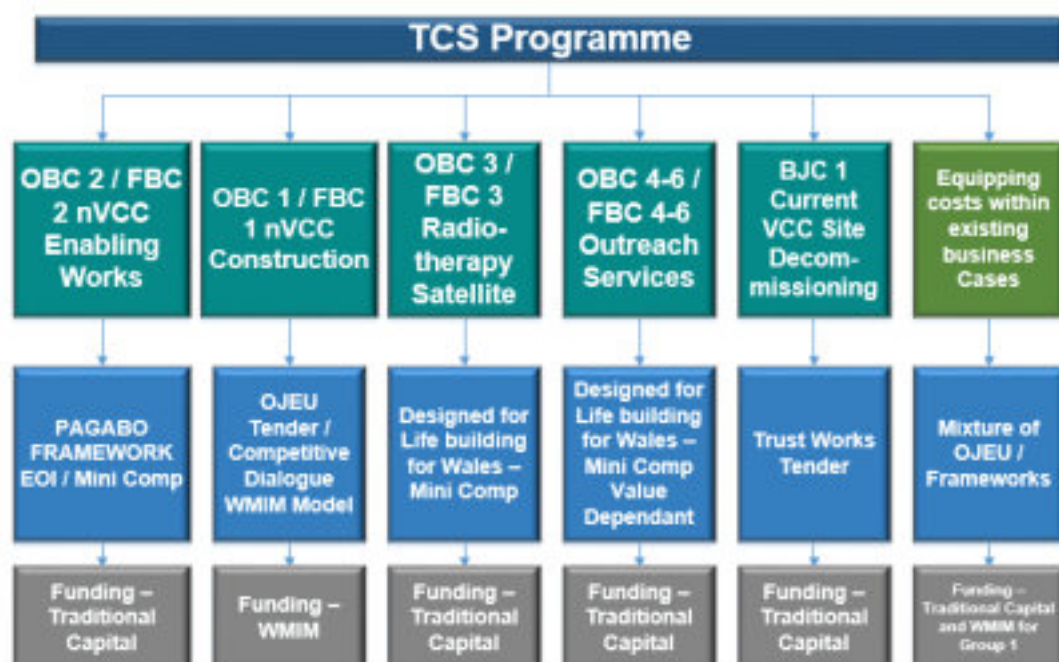
1.5 Procurement options and rules

1.5.1 It is essential that the procurement strategy for the Programme aligned and consistent with the Trust's Standing Financial Instructions. These set out the prescriptive requirements relating how the Trust achieves effective, ethical and legal procurements. There are a number of procurement routes available to the Trust Officers all of which must ensure that relevant legislation is adhered to.

1.5.2 Table 1-1 describes the available procurement routes.

Table 1-1: Available procurement routes

Procurement Route	Description	Application in Programme
OJEU Works and General	OJEU stands for the Official Journal of the European Union (previously called OJEC - the Official Journal of the European Community). This is the publication in which all tenders from the public sector which are valued above a certain financial threshold according to EU legislation, must be published.	• New Velindre Cancer Centre • Some major equipment purchases (mainly major clinical equipment)
Procurement Frameworks-General	A framework is an agreement with suppliers to establish terms governing contracts that may be awarded during the life of the agreement. In other	• Site Enabling Works if available • Site Decommissioning

Procurement Route	Description	Application in Programme
	words, it is a general term for agreements that set out terms and conditions for making specific purchases. These frameworks are pre competed and may have a number of potential suppliers. As a result it can be possible to procure in excess of OJEU limits given previous competition has been completed. Organisations, particularly in the public sector often open up frameworks to other organisations who become beneficiaries. In the event of multiple providers being on a framework it is likely a mini competition exercise is undertaken to maintain effective completion (the rules governing this will be included in the framework agreement).	• Some equipping where use of a framework over OJEU is advantageous (market conditions considered) • IMT Equipment
Frameworks- Designed for Life Buildings for Wales	The Designed for Life (Dfl): Building for Wales framework is the procurement framework which has been adopted in Wales for major capital projects with a forecast capital cost in excess of £4 million excluding VAT. The frameworks are based on the fundamental principles of collaborative working, integrated supply chains and continual improvement. The frameworks aim to deliver core objectives on behalf of the Welsh Government, including Best Value for Money and Development of Best Practice and Sustainability, amongst others. The use of the Dfl framework in NHS in Wales is mandated by Welsh Government in the Welsh Health Circular WHC (2006) 049. The framework is managed by NHS Wales Shared Services Partnership (NWSSP) - Specialised Estates Services. As frameworks have a finite lifecycle with Dfl 3 ceasing in October 201f it is	• Radiotherapy Satellite Centre • Outreach Services

Procurement Route	Description	Application in Programme
	not possible to articulate at this stage the exact procurement vehicle. Dfl 4 is currently being procured to. For schemes with a capital value of less than £4 million, excluding VAT, each Local Health Board/Trust are responsible for making their own arrangements as to procuring the works.	
Trust Tenders for Works	Competitive tenders shall be obtained and contracts entered into for all building and engineering Works estimated between £25,000 to £3,497,313 Works Value*. Tenders will be sought via the 'Sell2Wales' portal The number of firms invited to tender for works commissions shall be a minimum of 4. Where it proves problematic to establish a short list of 4 suitable tenderers, the Chief Executive's written approval to proceed with fewer must be obtained.	• Likely to be used for site decommissioning/ demolition
Quotations for Works	The Trust may invite companies to provide competitive quotations for capital projects with a value of less that £25K. A minimum of three competitive quotations shall be obtained in writing from firms from the relevant approved list. The process of determining forms of contract and project control procedures shall remain, irrespective of the procurement process. Documentation associated with competitive quotations will be retained on the relevant scheme file.	• Unlikely to be used with the TCS Programme due to scale

1.5.3   It is important to note that, in addition to these procurement routes described in Table 1-1, all procurements should be managed through the Trust's procurement system. Delegated budget holders have been identified for each project and they are responsible for complying with Trust SFIs and Trust's

scheme of delegation which applies prescriptive approval limits of financial authority to managers within the Trust. Regular training is provided to budget holders to support them in this regard and in ongoing contract management.

1.6   Works Contracts

1.6.1   The procurement process will culminate in the award of contract to the success bidder. The works contracts will be in the following forms.

1.7   Designed for Life:

1.7.1   Contracts awarded under DfL will utilise the NEC3 family of contracts. These contracts offer a complete end-to-end project management solution for the entire project life-cycle. They are common in today's construction market place. Velindre NHS Trust will benefit from the greater cost certainty provided through this procurement route. In respect of the TCS Programme Dfl will be used to support the delivery of the Velindre Radiotherapy Satellite Centre and the Velindre Outreach Centres, when forecast capital costs exceed £4m (exclusive of VAT).

1.8   MIM procurement of the New Velindre Cancer Centre:

1.8.1   Allied to the Project Agreement there will be a range of contracts that Project Co. will be required to sign relating to the management of the construction period and financing arrangements. The NEC3 contract *will not* apply in this instance. The Trust legal advisors in consultation with the Trust will be responsible for the development of these contracts.

1.9   Procurement Delivery:

1.9.1   The remainder of this Commercial Case will describe the TCS Programme procurement strategy in greater detail, major elements of procurement and the proposed route in greater detail and in chronological order where possible.
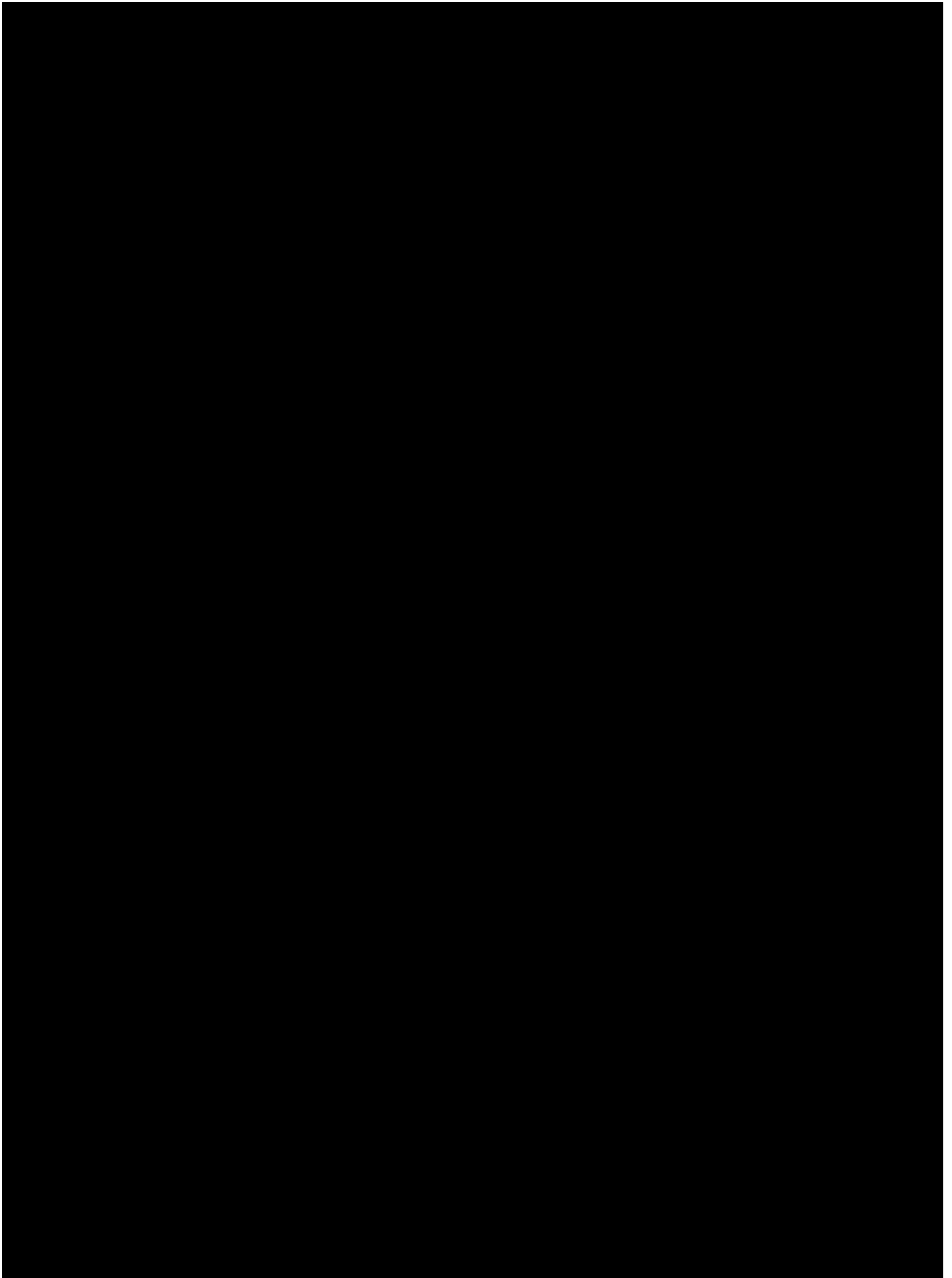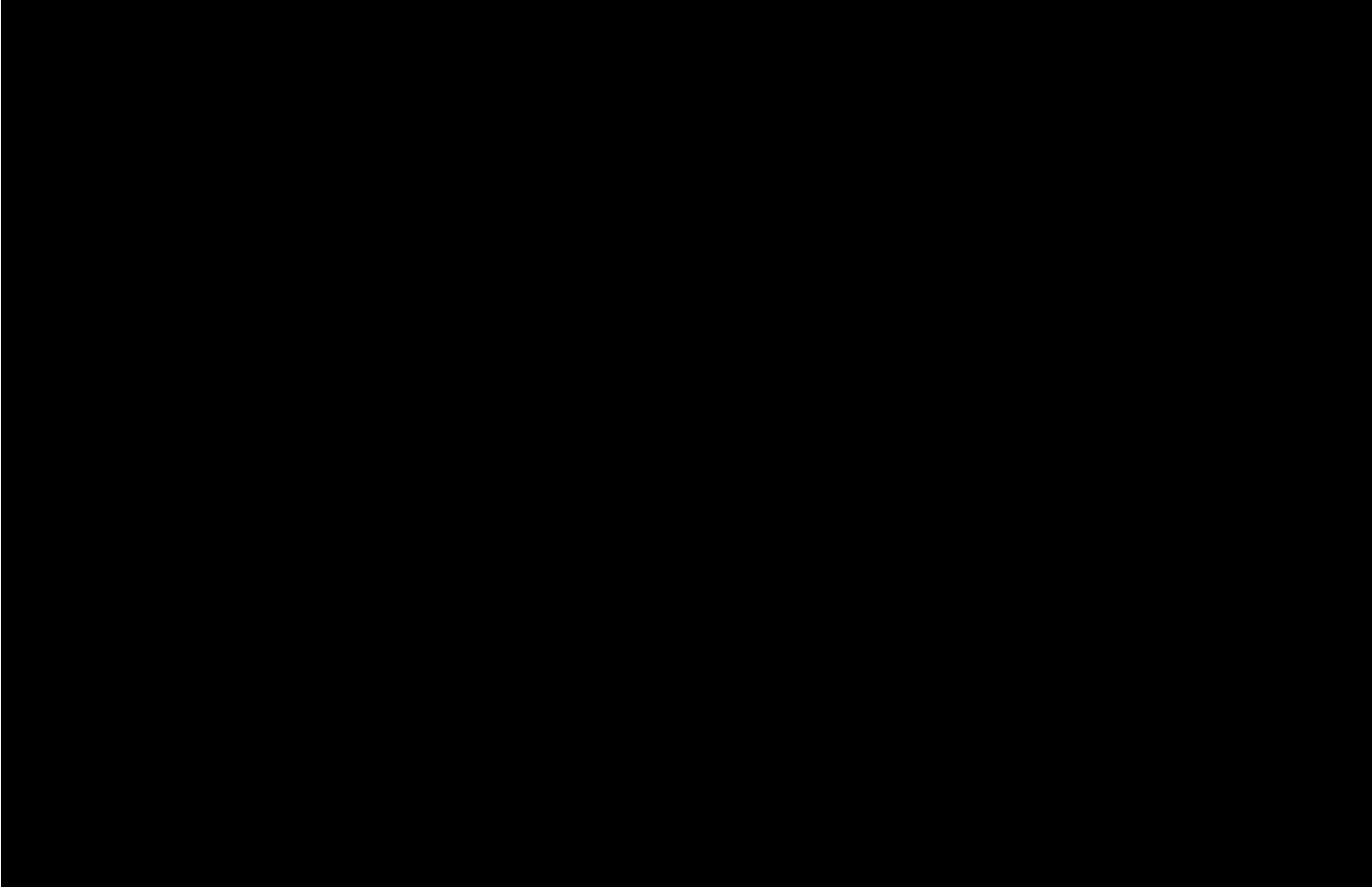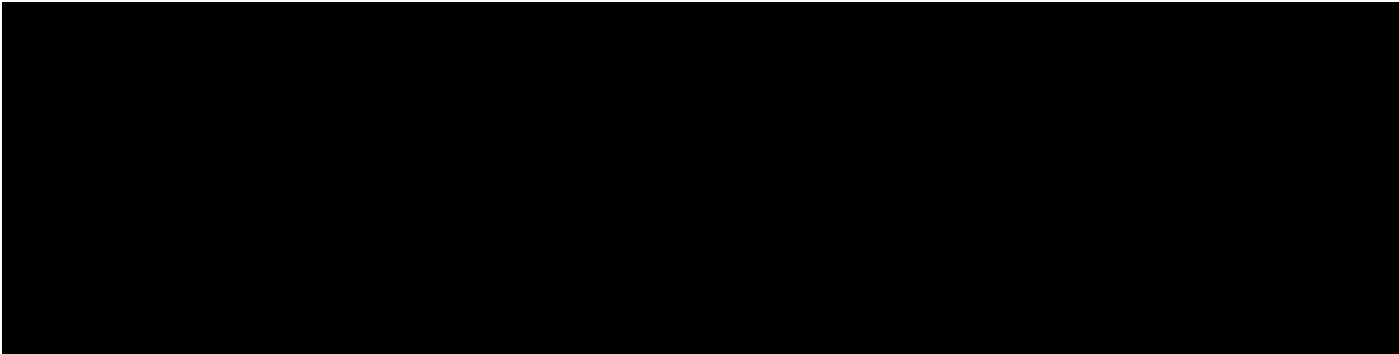
2.4 TCS Equipment Procurement Strategy

2.4.1 The TCS Programme has produced an equipment strategy (see Appendix PBC/CC/C1) which describes how the Programme's equipment will be replaced, procured, commissioned, serviced, maintained and replaced. This also forms an important element of the Project Agreements as it is essential that organisational responsibilities are made clear.

2.4.2 The Trust has appointed a TCS Programme equipment lead to lead on the delivery of the equipment strategy. The TCS Programme equipment lead will also be supported by the Trust equipment advisors (MTS). In addition, and due to both the complex and specialist nature of the equipment procurement, the Trust has also sought specialist advice a range of sources, these include:

- NHS Wales Shared Service Partnership – Specialist Estates Services who have provided advice on equipment costing methodologies, equipment maintenance options and on equipment technologies not currently used by the Trust e.g. PET CT;
- Specialist Radiation advice provided by Velindre NHS Trust relating to site decommissioning;
- Specialist advice from the Trust's Technical advisors (including Surveyors and Health Care Planners) who have supported other similar projects;
- Other leading cancer centres that have decanted major clinical and non-clinical equipment during site moves; and
- The VCC Advanced Technology Group.

2.5 Clinical Equipment

2.5.1 The Trust supported by its external advisors has been able to quantify its likely future equipment requirements based on activity modelling.

2.5.2 The Equipment work stream, has identified the future clinical equipment requirements in both the New Velindre Cancer Centre, Radiotherapy Satellite and Outreach centres, as set out in the Table 2-1.

2.5.3   One area of the Programme which presents a significant risk to successful
         deliver of the Programme is the procurement of linear accelerators. T h e s e
         machines are high value, have lengthy lead and installation times and require
         significant commissioning ahead of patient use.

2.6   Clinical Equipment Procurement (Linacs)

2.6.1   To achieve an effective procurement of Linacs the Trust have convened a Linac
         Project Group to manage this complex procurement. The procurement route for
         the Linac's based on market conditions will be via an OJEU Tender.

2.6.2   This procurement remains a key enabler for the TCS Programme.

2.6.3   As summarised in Table 2-2 the major equipment purchases required for TCS,
         as agreed by the Welsh Government, will not form part of the MIM financing
         arrangements and will be funded via the traditional capital route/allocation. This

therefore informs the need for the Trust to specify and manage the procurement.

2.7 Clinical Equipment Procurement (Other)

2.7.1 The Trust supported by NWSSP Procurement Services will procure other major pieces of clinical equipment via existing frameworks and mini competition tenders within these frameworks. There may be the need on rare occasions to utilise a Single Tender Waiver, these can only be authorised by the Director of Finance and have strict conditionality placed upon them.

2.8 Non Clinical Equipment Procurement (Not Part of MIM model)

2.8.1 The Trust will seek support from NWSSP Procurement in the procurement of standard and/or low capital items of equipment as they provide equipment procurement support for all major capital projects in Wales. They also have access to relevant guidance and supporting formation in relation to equipment procurement e.g. equipment specifications, and have vast experience in ensuring that all purchased deliver value for money.

2.8.2 To support this process and following the design of the buildings a detailed equipment schedule will be developed.

2.9 Information Management and Technology (IM&T)

2.9.1 The equipment workstream has also considered in detail the IM&T requirements to support the TCS Programme, its clinicians and staff as they transform services.

2.9.2 The IM&T Strategy for the New Cancer Centre is aligned with the recently published 2016, Welsh Government Informed Health and Care "A Digital Health & Social Care Strategy for Wales" and the corresponding NHS Wales Informatics Integrated Medium Term Plan 2016 to 2019.

2.9.3 The Welsh Government strategy outlines modern IM&T service for Wales streamlined and integrated between Health and Social Care and delivered "Once for Wales." This ensures that there is uniformity of services in Wales and savings are achieved by the reduction in cost of duplicate developments and delivery of new services.

2.9.4 The scope of the aims of the IMT function are to:

- Support the new clinical Service Model which is aligned the with national design;
- Effectively transition of existing clinical services and data from the existing site to the new site;
- Support new services to be commissioned at the new sites;
- Fit out of a modern Oncology service in advance of the site being available to treat patients; and

- Align with the preferred equipment transition phasing strategy.

Similarly to the Clinical Equipment planning approach the IM&T staff have looked at how best to replace, commission and maintain IM&T services.

2.10   Site Decommissioning

2.10.1   Following all services being transitioned from the current Velindre Cancer Centre to the new Velindre Cancer Centre there will be the need to decommission the existing VCC site. This will include the demolition and decontamination of the old site.

2.10.2   The following activities will need to be carried out:

- Decontamination of Linacs and associated areas;
- Capping of services;
- Drainage decontamination; and
- Demolition.

2.10.3   It is proposed that a Business Justification Case will be used to make the case for investment. Due to the value of these works, a Trust tender would be the most appropriate and efficient procurement method at this time.At this point in the Programme is not possible to determine the form of contract that will underpin this procurement as it will be market dependant.

3 PROCURING RADIOTHERAPY AND OUTREACH FACILITIES

3.1.1 The TCS Programme is far wider than just a cancer centre replacement it involves a new clinical model being delivered which is enabled by a modern estate and IMT services which are also integrated into Local Health Boards. To fully achieve this transformed model of care a number of treatment centres will be procured outside of the VCC procurement.
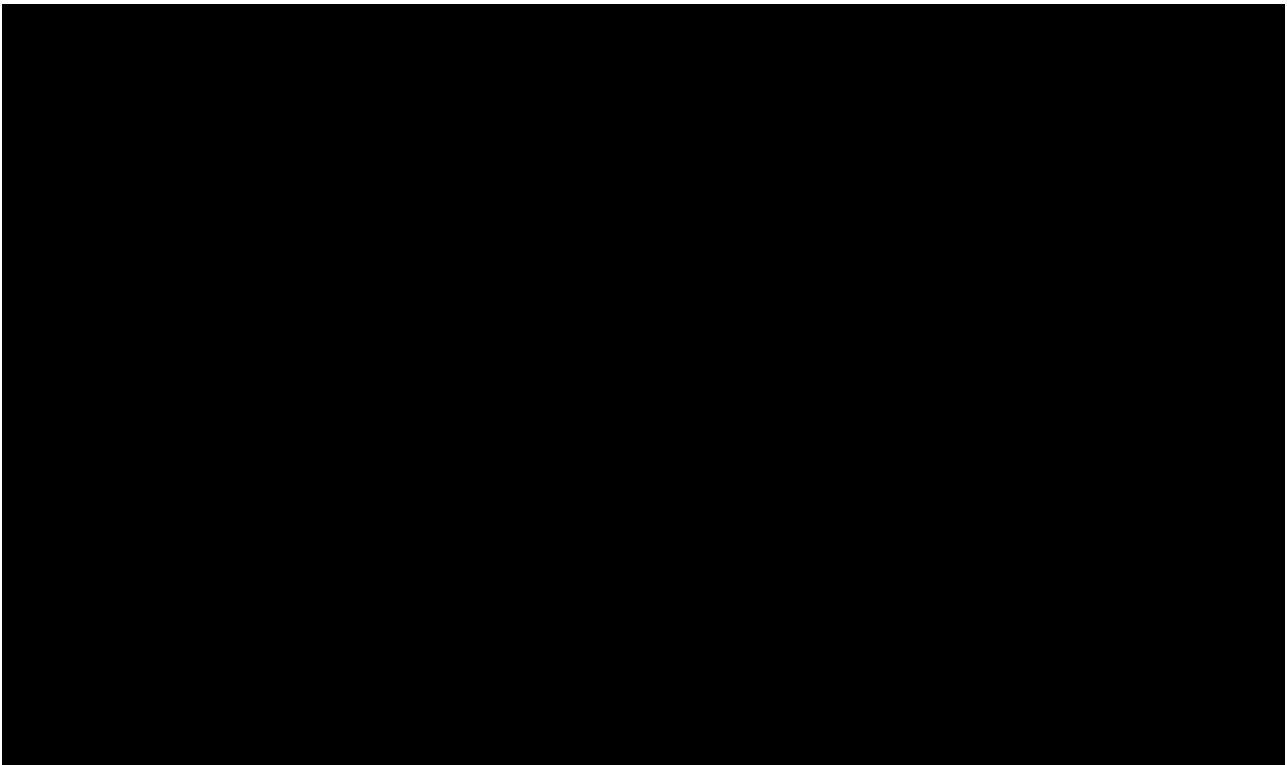
3.2 Velindre Radiotherapy Satellite Centre

3.2.1 This centre will house two Linacs and will be remote from the Velindre Cancer Centre. Public funding is via the traditional capital route.

3.2.2 Funding will be sought from the NHS Wales All-Wales Capital Programme. As the scheme outturn will be in excess of £20 million the procurement strategy will follow the Designed for Life 3 – Building for Wales's route whereby the Trust will engage with a Supply Chain Partner. A target cost will be agreed through a Designed for Life – Building for Wales Construction Agreement. This will then be underpinned by an NEC3 Option 3 form of contract.

3.2.3 The scope of the services would include a specialised contractor and design team and this will be procured through the Designed for Life – Building for Wales's framework.

3.3 Velindre Outreach Centres

3.3.1 These centres will be located within LHBs and will provide a range of local non-surgical cancer services. The number of outreach centres is yet to be determined and therefore no decision has been reached in terms of whether they will be new build facilities of refurbished accommodation. The method of procurement for the outreach centres will therefore be determined following the identification of locations and subsequently the preferred estate solution.

3.4 Risk apportionment

3.4.1 The MIM Project Agreement and User Guide require adoption of a standard risk allocation on a sector basis, with limited discrete project specific issues being open to assessment by the Trust.

3.4.3   Risks relating to site enabling works, Satellite Radiotherapy and Outreach centres will largely reside with the Trust, however, the contracts used (NEC 3 and Designed for Life) do allow some risks to be transferred to and managed by the contractor.

3.4.4   Equipping risks will largely reside with the Trust who will be responsible for the specification, procurement, commissioning, operation and maintenance of all Group 2, 3 and 4 items. There will however be a key interface with the Project Agreement in relation to the installation and commissioning of Group 2, 3 and 4 equipment.

3.5   Payment mechanisms (MIM)

3.5.1   For the purposes of the MIM arrangements the Payment Mechanism lies at the heart of the PA. It gives financial effect to the allocation of risk between the Trust and Project Co. It determines the payments to be made to Project Co and establishes the incentives for it to deliver the services required in a manner that provides value for money.

3.5.2   The Payment Mechanism calculates the amount payable to Project Co each period based on the agreed Annual Service Payment, less any performance or availability deductions. The Annual Service Payment for the new Project relates to performance and availability of assets agreed to be provided within the PA.

3.5.3   There are many variables in a Payment Mechanism that need to be considered, including:

- The level of payment should be linked to the level of service. For a mechanism based on availability with an overlay of performance deductions, this means linking payment to both the availability of assets and the quality of the service;

- The Payment Mechanism should adjust for sub-standard performance, and deductions should reflect the severity of any failure. Proportionality is key – minor failure leads to a minor deduction (except in the case of persistent or widespread failure), while major failures lead to a correspondingly substantial penalty;

- A balance should be struck among the variables in the Payment Mechanism, such as the initial weighting of deductions for failures, response periods and ratchets;

- The definitions of availability and performance standards (i.e. how demanding the requirements are) need to be clear, along with response and rectification periods (i.e. how quickly problems have to be addressed); and

- There may be caps on performance deductions so as not to impact ongoing viability of the new facility.

3.5.4   All other aspects of the Programme will have payment terms as specified within the standard NEC3 or Designed for Life contractual arrangements or, in the case of equipment, through the relevant framework agreement

3.6   Accountancy treatment

3.6.1   The accounting treatment in relation to the Trust balance sheet is outlined in the Financial Case. Programme components funded through the NHS Wales All-Wales Capital Programme will be on the organisations balance sheet and be depreciated over their economic life(s).

3.7   Personnel implications

3.7.1   It is anticipated that TUPE (Transfer of Undertaking and Protection of Employees) will not apply to the investment outlined in this PBC.

3.8   Conclusion

3.8.1   In developing the commercial case the Trust has clearly set out the proposed procurement arrangements for the Programme's projects and key activities. Whilst a range of contractual mechanisms and funding arrangements will be used to secure the delivery of these projects the inter-dependencies have been established and an overall timeline for delivery has been set out.

Transforming Cancer Services In South East Wales

Programme Business Case:

Finance Case Section

Transforming Cancer Services In South East Wales

Programme Business Case:

Management Case Section

Glossary of Terms

24/7	Twenty four hours a day/seven days a week
3D	Three-Dimensional
4D	Four- Dimensional
5D	Five-Dimensional
6D	Six-Dimensional
A&E	Accident and Emergency
ABUHB	Aneurin Bevan University Health Board
ACR	Authority's Construction Requirements
AHP	Allied Healthcare Professional
AOS	Acute Oncology Service
BAU	Business as Usual
BIM	Building Information Modelling
BJC	Business Justification Case
BRP	Benefits Realisation Plan
C Dif.	Clostridium difficile
CAFM	Computer Aided Facilities Management
CAP	Commercial Approval Point
CAPEX	Capital Expenditure
CHC	Community Health Council
CISP	Cancer Information and Support Programme
CNS	Cancer Nurse Specialist
COS	Clinical Output Specification
CPI	Consumer Price Index
CRUK	Cancer Research United Kingdom
CSF(s)	Critical Success Factor(s)
CT	Computerised Tomography
CVR	Client Variation Request
DCAG	Departmental Cost Allowance Guide
DGH	District General Hospital
DNA	Did Not Attend
DRP	Dispute Resolution Procedures
EASR	European Age Standardised Rate
EFPMS	Estate Facilities Performance Management System
EIB	European Investment Bank
EMB	Executive Management Board
EMRTS	Emergency Retrieval & Transfer Service
EPEC	European PPP Expertise Centre
EQIA	Equality Impact Assessment
ERP	Electronic Patient Record
ESG	Evaluation Steering Group
ESMO	European Society for Medical Oncology
EU	European Union
FBC	Final Business Case
FM	Facilities Management
FORVOP	Forecasted Variation of Price Index
GFR	Glomerular Filtration Rate
GIFA	Gross Internal Floor Area

GP	General Practitioner
HBN	Health Building Notes
HNA	Holistic Needs Assessment
HTM	Health Technical Memoranda
ICT	Information Communication Technology
IG and IM&T	Information Governance and Information Management& Technology
IGBT	Image Guided Brachytherapy
IGRT	Imaged Guided Radiotherapy
IM&T	Information Management & Technology
IMRT	Intensity Modulated Radiation Therapy
IMTP	Integrated Medium Term Plan
IP	Inpatient
IPR	Intellectual Property Rights
ITPD	Invitation to Participate in Dialogue
JCCO	Joint Collegiate Council for Oncology
LHB	Local Health Board
Linac	Linear Accelerator
LoS	Length of Stay
MDT	Multi-disciplinary Team
MGDD	Manual on Government Deficit and Debt
MIM	Mutual Investment Model
MIPS	Median Index of Public Sector Tender Prices
MRI	Magnetic Resonance Imaging
MRSA	Methicillin-resistant Staphylococcus aureus
MSP	Managing Successful Programmes
MSSA	Methicillin-sensitive Staphylococcus aureus
NEJM	New England Journal of Medicine
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NPV	Net Present Value
NRAG	National Radiotherapy Advisory Group
nVCC	New Velindre Cancer Centre
NWIS	NHS Wales Informatics Service
NWSSP	NHS Wales Shared Services Partnership
OBC	Outline Business Case
OJEU	Official Journal of the European Union
ONS	Office of National Statistics
OP	Outpatient
OPEX	Operational Expenditure
PA	Project Agreement
PACS	Picture Archiving and Communication System
PAS	Patient Admistration System
PBC	Programme Business Case
PET-CT	Positron emission tomography–computed tomography
PETICA	Wales Positron Emission Tomography Imaging Centre
PICC	Peripherally Inserted Central Catheter
PIN	Prior Information Notice
PMB	Programme Management Board
PMO	Programme Management Office

POE	Post Occupation Evaluation
PPE	Post Programme Evaluation
PPP NPD	Public Private Partnership Non Profit-Distributing
PPP	Public Private Partnership
PPP	Public-Private Partnerships
PRINCE2	Projects in Controlled Environments
PwC	Price Waterhouse Coopers
QA	Quality Assurance
R&D	Research and Development
RCR	Royal College Radiologists
RPI	Retail Price Index
RSC	Radiotherapy Satellite Centre
SACT	Systemic Anti-Cancer Therapy
SBRT	Stereotactic Body Radiation Therapy
SCIF	Significant Clinical Incident Forum
SMART	Specific Measurable Achievable Relevant Time-Bound
SO	Spending Objective
SOP	Strategic Outline Programme
SPECT	Single Photon Emission Computed Tomography
SPV	Special Purpose Vehicle
SRO	Senior Responsible Owner
SRS	Stereotactic Radiosurgery
SST	Site Specific Team
SWCN	South Wales Cancer Network
SWOT	Strength Weakness Opportunity Threat
TCS	Transforming Cancer Services
UHB	University Health Board
UK	United Kingdom
VAT	Value Added Tax
VCC	Velindre Cancer Centre
VFM	Value for Money
VMAT	Volumetric Modulated Arc Therapy
WCISU	Welsh Cancer Intelligence and Surveillance Unit
WEDS	Workforce Education and Development Service
WG	Welsh Government
WG	Welsh Government
WHSSC	Welsh Health Specialised Services Committee
WMIM	Welsh Mutual Investment Model
WTE	Whole Time Equivalent
PSC	Public Sector Comparator