Velindre NHS Trust Strategic Outline Programme

Transforming Cancer Services in South-East Wales

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PREFACE

Cancer is one of the main causes of death in Wales. It is estimated that in Wales 49 people learn that they have cancer every day. This has a fundamental impact on all parts of society from personal relationships, communities, the economy and the social fabric that underpins the way of life in Wales. Despite significant improvements in Wales, the outcomes for patients with cancer fail to match those achieved by the best performing, or even the average performing countries.

Looking to the future, the ageing population, increasing incidence of cancer and poor lifestyles suggest that this pattern is likely to accelerate if we don't take clear and decisive action.

Velindre Cancer Centre is a centre of excellence in the non-surgical treatment of cancer. It serves the 1.5m people who live in South East Wales, providing services at Velindre Hospital in Cardiff and at a number of other sites in its catchment area and in patients' own homes. Velindre Hospital, which is at the centre of our current service provision, was built in 1956. Over the years it has been extended as more capacity was required. The hospital is fast approaching the point where our skilled and dedicated staff will be unable to meet the needs of our patients. As with all sites which have developed in this way the buildings are cramped, some areas are in poor condition, with poor functional relationships. In many respects they do not meet modern building standards; this presents risks for example in relation to preventing infections or providing dignified care.

There is no room for the necessary expansion on the current site, even allowing for increased activity by our teams in other hospitals. There is no space to build the additional Linear Accelerators we will need to treat increasing numbers of patients. It is now critical that we embark on a plan to rebuild the hospital so that we can continue to be a centre of excellence for the people we serve, to extend our service offering and technological progress.

Notwithstanding this, we have gone further than examining the need for a new hospital. The case we have developed has been done so from a systems perspective and attempted to answer a fundamental question '*what does a high performing cancer system which delivers outcomes comparable with the best look like?*'

This has led us to evaluate the wider role of the system and identify a series of improvements that could be implemented in partnership with our NHS colleagues and the wider public and voluntary sectors over the coming years. We have undertaken this across the system from detection and diagnosis, treatment, Living with the Impact of Cancer and also identified the potential role of Velindre as a specialist cancer service, and the wider role that it could play in partnership with others to drive up standards and deliver excellence in South-East Wales and across the whole country in a sustainable manner.

Time is not on our side. The number of patients rises inexorably year on year, despite the efforts of the NHS to promote good health and prevent illness. We urgently need to make important decisions to secure the future. The status quo is not an option as the affects of increasing demand, pace of technological advance and the ambition to improve outcomes continue to put pressure on the delivery of services. If we sought to do the minimum required, we estimate that at least £100m investment will be required at Velindre Cancer Centre alone over the next ten years just to replace our complex and expensive equipment. However, this will not be sufficient to meet future needs and will not enable fundamental step change to be achieved.

We therefore have an opportunity to plan for the long term, and to ensure that the decisions we must make now are in the best interests of the people we serve for the next 50 years.

This Strategic Outline Programme sets out our vision of a future in which South East Wales, and Wales as a nation, continues to receive the high quality services it has a right to expect, delivered in excellent facilities with access to up-to-date technology and highly skilled, motivated staff able to fulfil their vocation to deliver the best care for their patients.

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Chairman

Velindre NHS Trust

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CONTENTS

LIST OF APPENDICIES

Appendix N°	Appendix Description
2(a)	Current Services Provided by Velindre Cancer Centre
2(b)	Programme Level Benefits
2(c)	Programme Level Risk Register
3(a)	Detailed Descriptions of Long-Listed Options
3(b)	Option 1 –Do Minimum - Capital Cost Forms and Supporting Notes
3(c)	Option 2 – Capital Cost Forms and Supporting Notes
3(d)	Option 3(a) - Capital Cost Forms and Supporting Notes
3(e)	Option 4 – Capital Cost Forms and Supporting Notes
3(f)	Option 6 - Capital Cost Forms and Supporting Notes
3(g)	Option 7(a) – Capital Cost Forms and Supporting Notes
3(h)	PPP NPD Financial Modelling Results
3(i)	Welsh Government Capital Funding – Net Present Value (downside, upside, midpoint)
3(j)	PPP NPD Financial Assumptions Book
3(k)	PPP NPD Funding Method – Net Present Value
5(a)	Option 6 – Unitary Charge Cash Flows
6(a)	Programme Plan

1.0 EXECUTIVE SUMMARY

ES1 Background - Delivering Excellence in Cancer Care

Cancer is one of the key challenges facing health services today. Velindre NHS Trust has developed a vision for cancer services in response to this challenge. A new relationship with citizens and patients is at the heart of realising this vision by working in partnership to better understand what patients identify as realistic goals and supporting them to achieve it. We wish to bring prudent health care and co-production to life in cancer services. This will enable us to provide the best cancer services for our patients, combining first class clinical care with ground-breaking research to achieve quality of service, patient experience and clinical outcomes that are comparable with the best in Europe and the rest of the world.

People with cancer already have a battle to face. We want to make patients treatment journeys as straight forward and stress-free as possible. In order to achieve this we intend to redesign the way we do things with a real focus on supporting patients to manage their conditions within their homes and local communities wherever possible. This will see a new type of relationship develop where the factors that cause cancer are targeted with collective action and high quality care and continuous improvement are pursued relentlessly across within Velindre NHS Trust, South East Wales and the nation.

The models of care we design and deliver to achieve this will confirm the Trusts reputation for excellence and place the quality of care, patient experience, and clinical outcomes at its centre. It will provide patients with the more choice about where and when they receive their care, the best equipment and technology and a better experience within environments designed specifically for cancer services at home, in a Velindre Village@ or at the Velindre Specialist Cancer Centre.

We also wish to bring together a multidisciplinary team of researchers and clinicians from across South East Wales, potentially in one location at the Velindre Cancer Research Institute, to maximise the benefits of collaboration and knowledge sharing to accelerate *'bench to bedside'* developments in innovative research and technologies. We believe that this exciting opportunity offers the best chance of allowing researchers to accelerate the application of the latest technologies in imaging, genetics and biology in order to discover the fundamental mechanisms underlying different tumour types and to apply this knowledge to improve patient care and outcomes. Patients will benefit by having access to innovative research and development opportunities which were not available previously and represent some of the leading programmes across the world.

The opportunity to embed research teams into clinical teams and develop a culture of innovation and excellence is one which will attract the best clinicians and researchers to Velindre and South East Wales. It will also assist in establishing South East Wales on the national and international stage as the place where the most talented people want to work and live.

This Strategic Outline Programme brings together a number of pieces of work over the past five years. In 2010, the Trust submitted a Strategic Outline Case for the development of a new cancer centre costing approximately £250million. In 2012, a Strategic Outline Case for a radiotherapy satellite centre was submitted to the Welsh Government costing £22million. The work undertaken during this period has provided the foundation for the service model set out within this case, bringing together the concept of a Specialist Cancer Centre, radiotherapy satellite centre and a systematic approach to providing outreach services within each Local Health through the development of Velindre Villages@. The history of these developments is also helpful in understanding the context of the costs, with previous cases submitted to a value of £272million at 2009 prices.

ES2 Transforming Cancer Services in South-East Wales: Our Vision for the Future

Vision for Services - We Will:

- Create a new set of integrated services which better meet the needs of patients, families and carers and provide a seamless and integrated network of support, treatment and care, with support in living with the impact of cancer throughout all the stages of the patient journey.
- Create a *'centre of excellence'* for South East Wales, raising the quality of treatment and ultimately outcomes throughout the region.
- Secure Velindres Cancer Centres' ability to compete as a leading international cancer centre and hub for cutting edge research and development, attracting and retaining leading clinicians and researchers.
- Develop Velindre's status as a leading centre of excellence nationally and internationally.

Vision for Patients – We Will:

- Improve patient outcomes from current levels which compare unfavourably within the United Kingdom and other western world countries by transforming the cancer service pathway and providing timely access to effective treatment and care.
- Work with partners to develop a system which better supports the detection and prevention of first and secondary cancers, leading to improved patient outcomes which enables people to remain

economically active and benefit from the highest quality of life possible to them.

- Improve access to treatments and care locally, with greater flexibility and choice of where and when patients receive services.
- Provide a set of cancer facilities and a hospital that is fit for purpose for 21st century healthcare, provides a truly world class patient experience and supports healing and well-being.
- Radically upgrade and streamline patient systems care which are designed around patient need and deliver holistic care.
- Ensure the availability of sufficient radiotherapy capacity, improving patient access, reducing waiting times and achieving the required clinical and professional standards in a sustainable manner.
- Integrate support for patients living with the impact of cancer throughout all stages of the patient journey. This will ensure that patients are supported at all times in managing not only the clinical implications of cancer, but the physical, financial, psychological, nutritional, spiritual, practical, informational and social impact that cancer can have.

Vision for Research and Development – We Will:

- Lead and deliver high quality clinical research and development programmes to support the improvement in health of the population.
- Develop strategic partnerships and collaborative ways of working within South East Wales, Wales and internationally to achieve excellence.
- Accelerate *'bench to bedisde'* development of innovative treatments through the co-location of clinical and research teams to improve patient care and clinical outcomes.
- Provide state-of-the-art facilities to attract, retain and develop world-leading clinical researchers and academics.
- Create a vibrant cancer research hub, the Velindre Cancer Research Institute, with scale, credibility and world class outputs attracting substantial research, charitable and philanthropic grants.
- Generate wider economic and social benefits for South East Wales and partner organisations.

Vision for Education – We Will:

- Attract the highest quality learners by establishing Velindre as a leading cancer centre and the South East Wales area an attractive place in which to live, study, and work.
- Provide an environment and opportunities in which clinicians from Wales and the wider world can flourish in and add significant value to the knowledge economy and the challenge presented by cancer.

- Build a team of high profile academics and clinicians, researchers and academics committed to the Velindre and South East Wales vision of excellence.
- Strengthen our reputation as an excellent provider of education and training and expand our reach across the United Kingdom and internationally.

ES3 Purpose of the Strategic Outline Programme

The Strategic Outline Programme looks at options for the future provision of tertiary/wider cancer services in South East Wales, in the context of the Welsh Governments' aims in its cancer and public sector delivery strategies. It does this from a systems perspective, setting out a range of options for the provision of tertiary services together with a number of potential opportunities for improvements across the whole system, from primary care through to Living with the Impact of Cancer and palliative care.

The purpose of the Strategic Outline Programme is to inform Ministerial decisions on future investment in cancer services in Velindre Cancer Centre and South East Wales.

ES4 Options

In this Strategic Outline Programme we concluded that there is a substantive and overwhelming case for change which supports a different set of services in Velindre NHS Trust and across South East Wales if clinical outcomes are to be improved and keep pace with the best elsewhere.

At the 'long list' stage we considered the scope (the extent to which functions need to be delivered), service delivery methods (public sector or privately funded), organisational options, timescales and funding arrangements. We concluded that:

- An integrated delivery model with public sector leadership, in-house capability, and the ability to bring in strategic partners and commercial investors, where beneficial, provides the flexibility required to achieve the levels of quality and excellence required.
- There is unlikely to be sufficient capital resources available within Wales to deliver the programme in a traditional way i.e. public capital funding. Therefore, the emerging way forward will be delivered through the Public Private Partnership route. The buildings will be delivered via the Non-profit Distributing model and the remainder of the programme, such as equipment, will be funded by the Welsh Government capital programme. This is in accordance with the announcement by the Cabinet and Minister for Finance in 2014 which stated that the programme would be progressed through an Innovative Funding route.

- The Trust will also require external support from the Welsh Government and NHS Wales with regard to the recurrent revenue funding for the delivery model. This in turn will increases the capacity of the NHS to respond to the growing demand for cancer services.

ES5 Assessment Approach

The approach we have adopted in assessing these options follows the Treasury Guidance (the five case model). The analysis comprises:

- The Strategic Case: an analysis of the options against the strategic aims and investment objectives.
- The Economic Case: which looks at the quantitative benefits and costs (calculated net present value) and identifies and score qualitative benefits and risks.
- The Financial Case: [redacted]
- The Commercial Case: [redacted]
- The Management Case: [redacted]

ES6 What are the Main Factors Driving the Need for Change?

Cancer is one of the main causes of death in Wales and accounts for one in four of all deaths within the United Kingdom. In Wales, an average of 8,400 people died each year between 1995 and 2009. The incidence of cancer is increasing by approximately 1.5% annually as a result of a number of factors which include an ageing population with increasing life expectacy; lifestyle factors such as smoking, alcohol consumption and obesity, and socio-economic factors such as social deprivation and poverty.

The Welsh Government has identified cancer as one of the priorities in Wales and has set out a clear strategic direction and set of outcomes in Together for Health (2012) and Together for Health: Cancer Delivery Plan 2012 – 2016. Despite recent and sustained improvements in Wales, the clinical outcomes for cancer patients compare unfavourably with other countries. For example, Wales has the lowest one and five year survival rates in the United Kingdom for lung, colorectal and breast cancer and is ranked approximately 17th in Europe overall.

The causes of the current level of performance are numerous and complex, both within the health and social care setting and outside of it. Whilst it is not possible to link cause and effect precisely, there are a number of themes

which are widely agreed across Wales as being important in securing improvement.

- The culture of the population needs to change to address some of the deep-seated public health/lifestyle issues.
- Early detection and diagnosis of cancer must improve significantly if fundamental improvements are to be achieved in improving clinical outcomes.
- A new relationship between patients and the NHS must cultivated to support patients to identifying realistic goals and be supported to achieve them.
- The current system needs to be better integrated and support the efficient and effective support and care of patients.
- There needs to be a greater sense of common purpose across the system, with reduced levels of inter-organisational complexity.
- The acquisition and implementation of new clinical practice and technology is needs to keep pace with the best elsewhere and deliver the best possible outcomes.
- Research and development must be fully optimised to achieve fundamental step-change.

Turning to Velindre, there are a number of additional factors driving the need for change:

- The desire to provide the best quality, experience and possible outcomes for patients.
- The predicted increase in incidence of cancer will result in service demands outstripping supply.
- The current service model will need to change to meet patient needs in the 21st Century with more care and support provided at home and continuously improving clinical outcomes being delivered.
- The current facilities and environment are not considered to be fit-for-purpose for 21st Century care and will deteriorate rapidly over the coming years.
- Unless we keep pace with clinical developments and technological advances globally, Velindre Cancer Centre will lose reputational credibility and struggle to attract and retain the best staff to work in Wales.

Finally, we believe that the expertise, energy and enthusiasm within the Trust could help support the wider development and improvements of the system, working in partnership with Local Health Boards, voluntary sector and the wider community.

ES7 Investment Objectives and Success Criteria

To provide a clear and consistent framework for assessing the options, the following Investment Objectives have been identified:

Investment Objective 1: To provide patients with high quality services that deliver optimal clinical outcomes

Investment Objective 2: To continuously improve clinical outcomes by being a leader in research, development and innovation

Investment Objective 3: To achieve all national cancer and clinical standards and practice which are considered to be best in class internationally

Investment Objective 4: To deliver cancer services to the population in most cost effective, efficient and productive manner

Investment Objective 5: To deliver a high quality and sustainable service

ES8 The Economic Case – Non Financial Analysis

A long-list of options was identified as potential solutions in addressing the challenges identified within the Strategic Case for Change. These were evaluated against the Investment Objectives and Critical Success Factors to arrive at a short-list of potential options.

The following options were short-listed and considered in greater detail.

Option 1: Major capital assets replaced at end of asset life and Increased investment in estate to address backlog maintenance.

This option did not achieve all of the Investment Objectives and was the worst scoring option with regard to the critical success factors. It would not significantly improve the quality of care, patient experience or clinical outcomes.

Option 2: A new Specialist Cancer Centre built on a brownfield site under Trust ownership supported by the Velindre Cancer Research Institute.

This option achieves the Investment Objectives but does not fully achieve the Critical Success Factors. Whilst this option is likely to improve the quality of care, patient experience and clinical outcomes through the provision of 21st Century facilities and equipment it is unlikely to achieve the transformation required across the system and is not strategically aligned to the direction of

travel i.e. providing support and care as close to home wherever possible and economically effective.

Option 3(a) – Centralised: A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust supported by a Velindre Cancer Research Institute.

This option achieves the Investment Objectives but does not fully achieve the critical success factors. Whilst this option is likely to improve the quality of care, patient experience and clinical outcomes through the provision of 21st Century facilities and equipment it is unlikely to achieve the transformation required across the system and is not strategically aligned to the direction of travel i.e. providing support and care close to home wherever possible and economically effective. The use of a split-site also offers a number of potential benefits e.g. increased space to provide high-class facilities in keeping with world class cancer centres. However, the split-site location also has a number of potential dis-benefits e.g. distance between clinical service and research and development; co-location of staff and potential difference in culture.

Option 4: Partial Integration: A new Specialist Cancer Centre built on a brownfield site which is under Trust ownership with a 2 bunker Radiotherapy Satellite Unit within one of the LHBs supported by the Velindre Cancer Research Institute.

This option achieves the Investment Objectives but does not fully achieve the critical success factors. Whilst this option is likely to improve the quality of care, patient experience and clinical outcomes through the provision of 21st Century facilities and equipment it is unlikely to achieve the full transformation required across the system and is not fully aligned to the direction of travel i.e. providing support and care to close to home wherever possible and economically effective.

Option 6 – Fully Integrated Community Model and Specialist Cancer Centre: A new Specialist Cancer Centre built on a brownfield site under Trust ownership, supported by 3 new build Velindre Villages@ (one of which will have radiotherapy capability) developed across South East Wales and a Velindre Cancer Research Institute.

This option achieves the Investment Objectives and all of the critical success factors. The development of a range of services which can be delivered at home, in the community or at a specialist cancer centre offers the greatest potential for system transformation in South East Wales in respect of tertiary service provision and the wider cancer system. It aligns closely with the national strategic direction of travel, should improve equity of access and

support patients to receive high quality services within their Local Health Board setting as well as under the care of Velindre NHS Trust. This option would enable a better integrated system of care and support to be developed across the Local Health Board's, voluntary sector and other public services and enable additional focus and expertise to be shared across South East Wales; incorporating the complete system from detection and diagnosis to Living with the Impact of Cancer and palliative care.

Option 7a – Fully Integrated Community model and Specialist Cancer Centre: A new specialist cancer centre, split over two sites, built on land under the ownership of the Trust, supported by 3 new build Velindre Villages@ (one of which will have radiotherapy capability) developed across South East Wales Trust supported by a Velindre Cancer Research Institute.

This option achieves the Investment Objectives and all of the Critical Success Factors. The development of a range of services which can be delivered at home, in the community or at the specialist cancer centre offers the greatest potential for system transformation in South East Wales in respect of tertiary service provision and wider cancer system. It also aligns to the national strategic direction of travel, should improve equity of access and support patients to receive high quality services within their Local Health Board setting as well as under the care of Velindre NHS Trust. This option would also enable a better integrated system of care and support to be developed across the Local Health Board's, voluntary sector and other public services and enable additional focus and expertise to be shared across South East Wales; incorporating the complete system from detection and diagnosis to Living with the Impact of Cancer and palliative care.

The use of a split site also offers a number of potential benefits e.g. increased space to provide high-class facilities in keeping with world class cancer centres. However, the split-site location also has a number of potential dis-benefits e.g. distance between clinical service and research and development; co-location of staff and potential difference in culture.

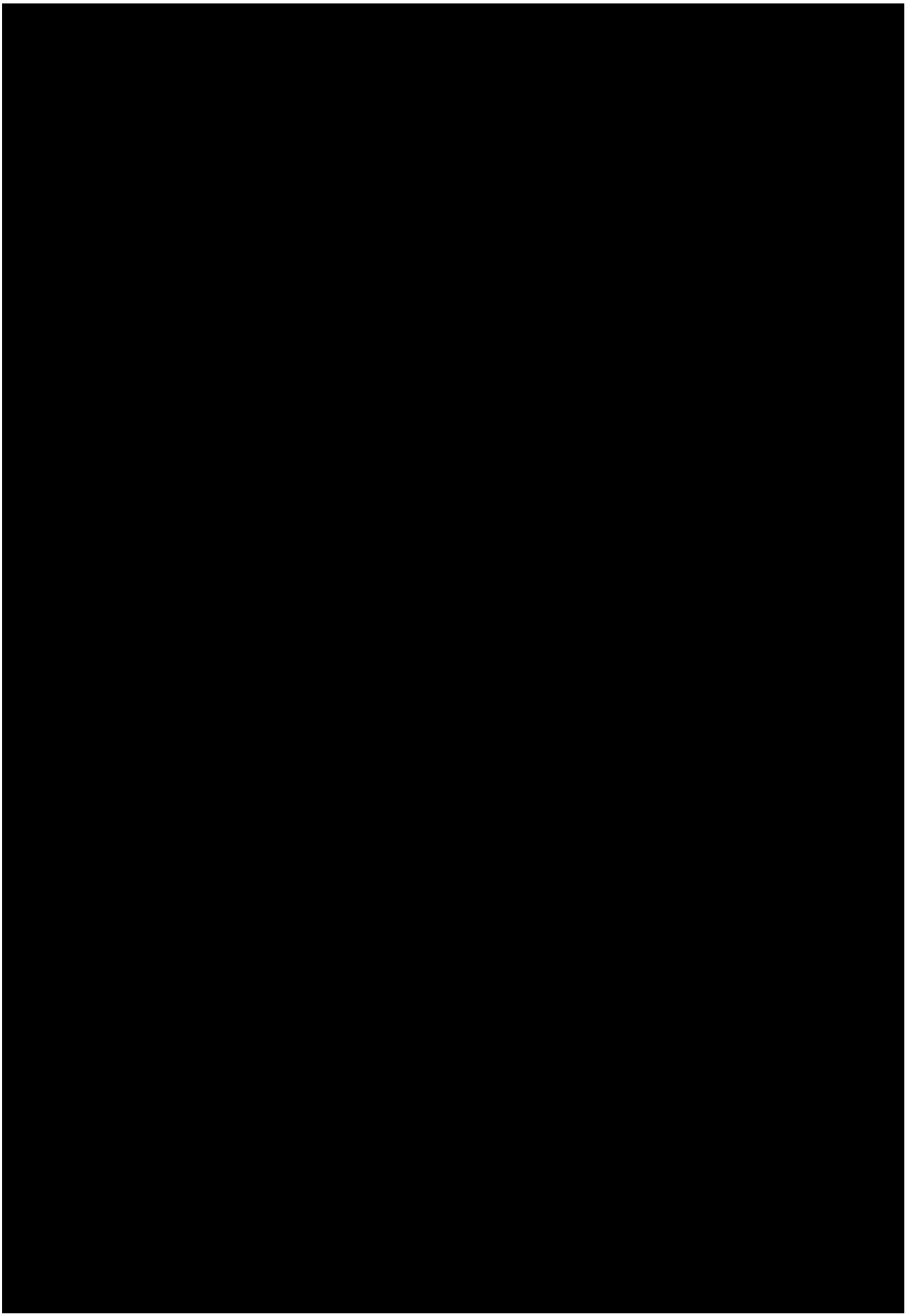
ES9 The Economic Case – Economic Analysis

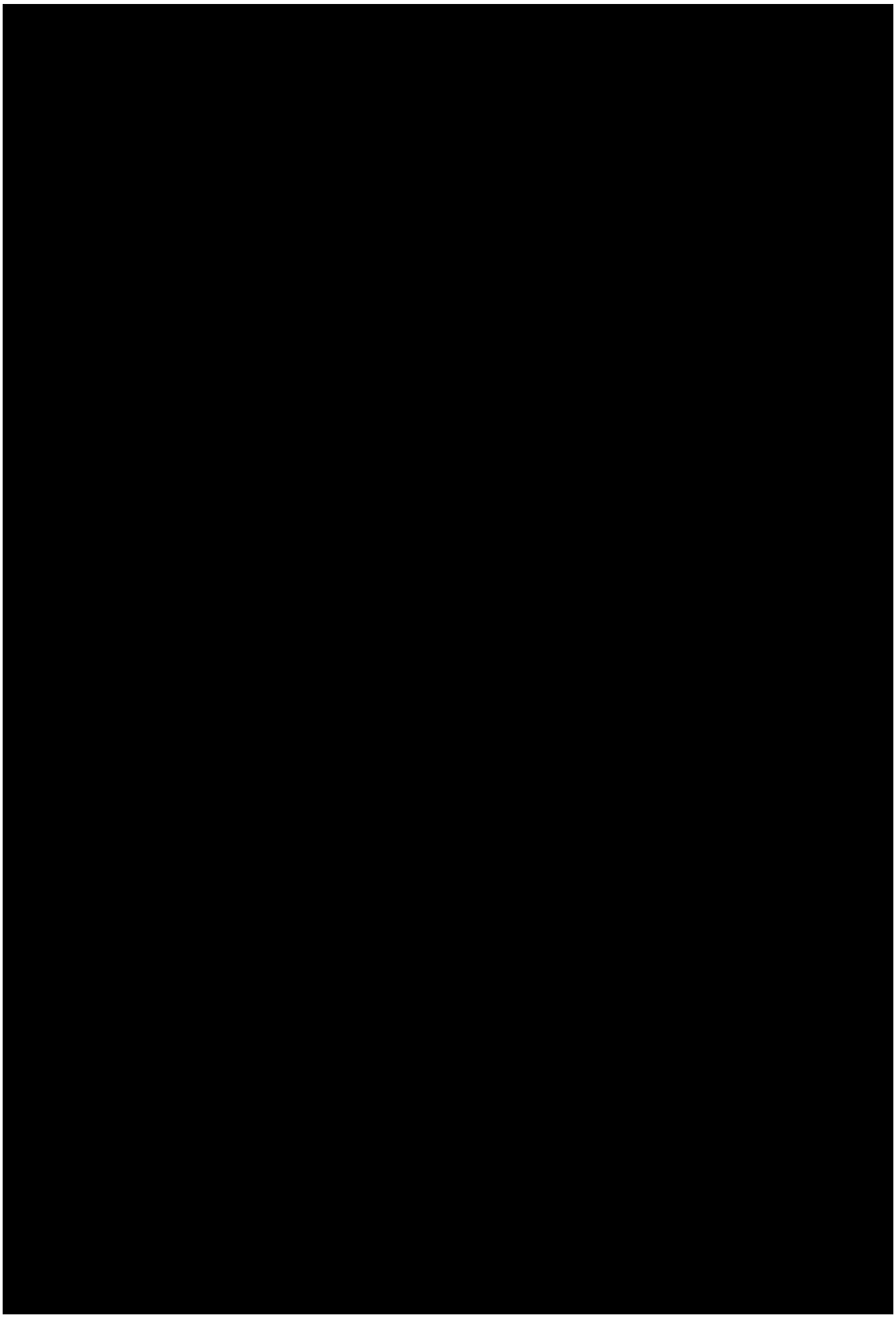
[redacted]

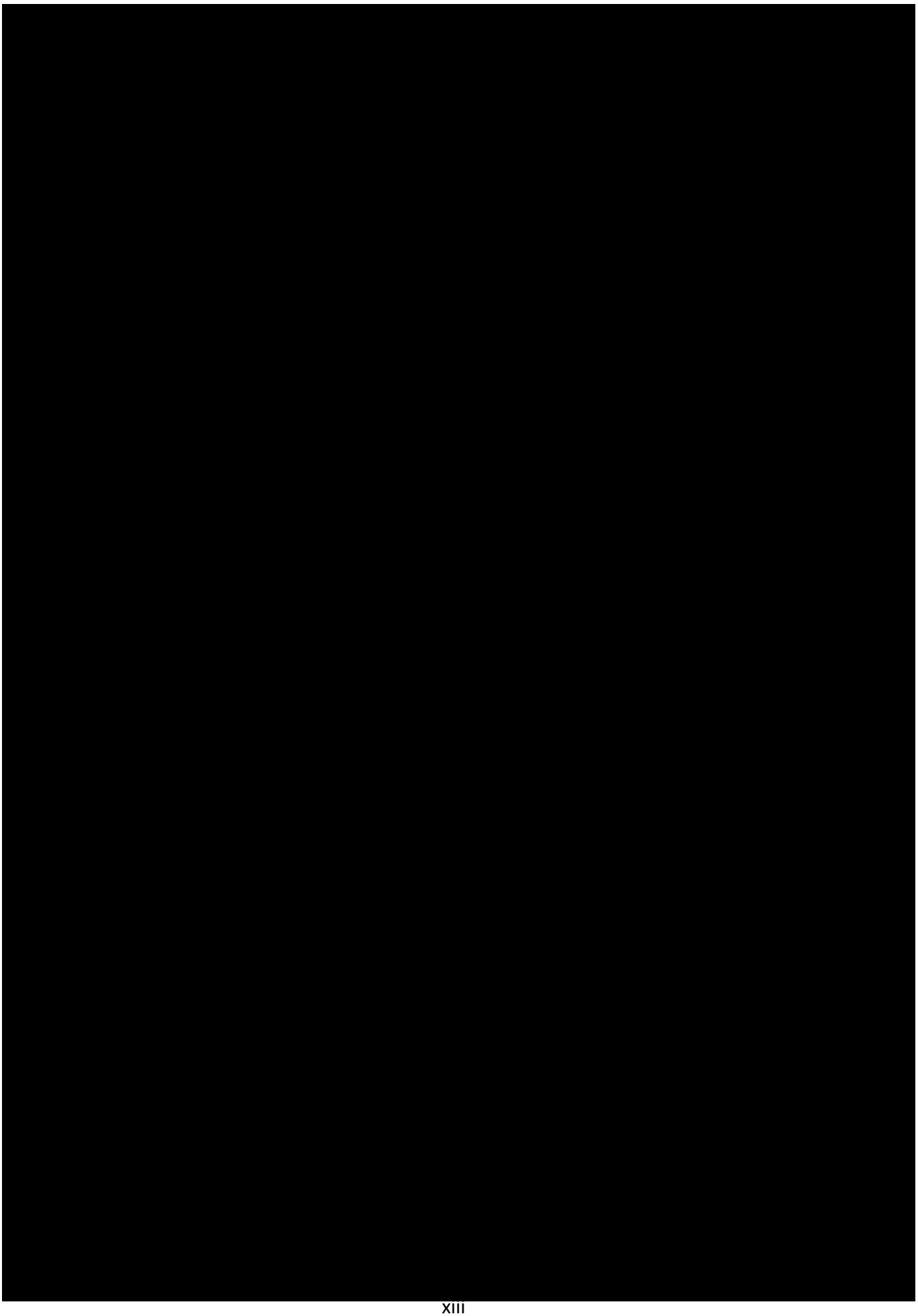
ES10 Economic Case Conclusion

A non-financial and financial appraisal of the short-listed options has been undertaken at this stage in the Programme but will be undertaken following the approval of the SOP. Therefore, all of the shortlisted options will be taken forward to the next stage in the development of the Programme.

The option that best meets the Investment Objectives and Critical Success Factors at this stage of the business case process is **Option 6: Fully Integrated Community model and Specialist Cancer Centre.** This option is therefore considered to be the 'emerging preferred way forward' and has been fully considered within the Financial Case for the purpose of this document.







ES13 Recommendation

Velindre NHS Trust is submitting the Strategic Outline Programme to the Welsh Government seeking approval to progress to the next stage of the business case process.

2.0 THE STRATEGIC CASE

2.1 Introduction

2.1.1 The purpose of this section is to describe how the scope of the proposed Programme fits within the existing national and local strategies of NHS Wales to deliver a high quality service to patients. This section sets out:

- Key national, regional and local strategies and how these influence the Programme development.
- A summary of the needs of the local population.
- An analysis of the current position of the Trust in terms of services and the estate.
- The drivers for change, clearly demonstrating a requirement to improve service provision for the Trust, the region and Wales.
- The proposed scope and objectives of the Programme and how these complement strategy are based upon service need and take into account external influences.
- Potential opportunities for the Trust, including future service and associated models.
- The key benefits and risks of the Programme as currently envisaged.

2.2 Cancer Services in Wales

2.2.1 The responsibility for providing cancer services in Wales lies with the 7 Local Health Boards as part of their statutory obligation to meet the health needs of the populations they serve. These Local Health Boards are:

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

2.2.2 The Local Health Boards (LHB's) are supported by the Welsh Health Specialist Services Committee (WHSSC) which commissions specialist cancer services on their behalf.

Figure 2.1 – Local Health Boards in Wales

2.3 Current Structures for Planning and Delivery

2.3.1 The planning and delivery of cancer services is the responsibility of the Local Health Boards. They are supported by two cancer networks; one in North Wales and one in South Wales (*see figure 2.2*). They work on behalf of the Local Health Boards, Welsh Health Specialist Services Committee, Velindre and other cross-border service providers, the third sector and Public Health Wales to plan and deliver cancer services.

2.3.2 The South Wales Cancer Network covers 75% of the land mass of Wales with a population of approximately 2.3 million and, consequently, the incidence of cancer (number of new cases diagnosed) within the South Wales network is significantly higher than in North Wales.

NORTH WALES CANCER NETWORK	
Code	Local Authority
00NA	Anglesey
00NC	Gwynedd
00NE	Conwy
00NG	Denbighshire
00NJ	Flintshire
00NL	Wrexham

SOUTH WALES CANCER NETWORK	
Code	Local Authority
00NN	Powys
00NQ	Ceredigion
00NS	Pembrokeshire
00NU	Carmarthenshire
00NX	Swansea
00NZ	Neath and Port Talbot
00PB	Bridgend
00PD	Vale of Glamorgan
00PF	Rhondda Cynon Taff
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00PL	Blaenau Gwent
00PM	Torfaen
00PP	Monmouthshire
00PR	Newport
00PT	Cardiff

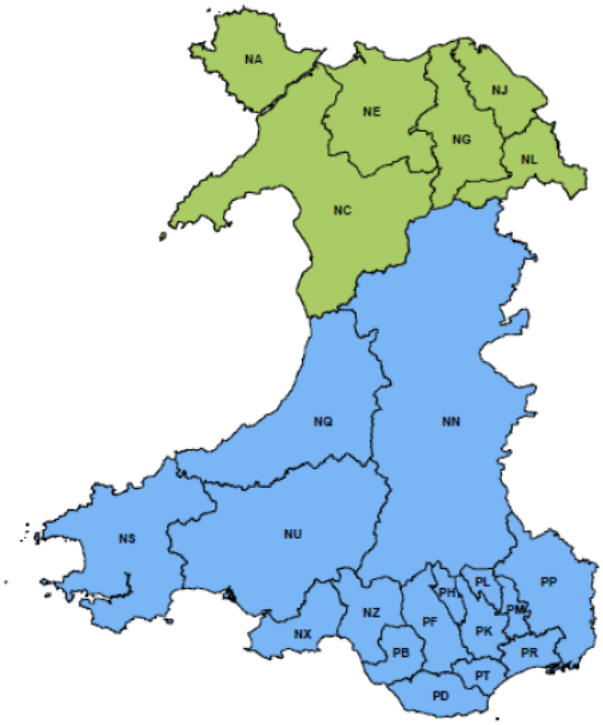


Figure 2.2 - Welsh Cancer Networks

2.4 Velindre NHS Trust

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

- Velindre Cancer Centre.
- Welsh Blood Service.

2.4.2 Velindre NHS Trust is also responsible for hosting a number of organisations on behalf of other agencies including:

- NHS Wales Shared Services Partnership.
- The NHS Wales Informatics Service.
- The NICE National Collaborating Centre for Cancer (NCC-C).
- The National Institute for Social Care and Health Research Clinical Research Centre (NISCHR CRC).
- The Cardiac Networks Co-ordinating Group of Wales.

2.5 Velindre Cancer Centre

2.5.1 Velindre Cancer Centre (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.

2.5.2 Velindre is the only 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. Velindre employs around 700 members of staff and has approximately 50 volunteers who provide a range of '*added value*' roles across the centre.

Overview: Scope of Current Services:

2.5.3 Velindre Cancer Centre (VCC) is a specialist cancer treatment centre and provides:

- **Treatment with '*radical*' or '*curative*' intent:** patients will undergo a treatment plan with the intention to cure the cancer or significantly prolong survival.
- **Treatment to control the cancer:** if a cure is not realistic it is often possible to limit the growth or spread of the cancer so that it progresses less rapidly and treatment may keep patients free of symptoms for some time.
- **Treatment to ease symptoms:** if a cure is not possible, and the treatment intent is therefore '*palliative*' a course of radiotherapy or other techniques may be used to reduce the size of a cancer, which may ease symptoms such as pain. If a cancer is advanced then patients may require treatments such as nutritional supplements, painkillers, or other techniques to help keep them free of pain or other symptoms.

Referral Route for Patients to Velindre Cancer Centre:

2.5.4 Initial diagnostic services are provided by the LHB's. Once a patient has been diagnosed with cancer, their case is referred to the relevant tumour site specific Multi-disciplinary Team (MDT) where clinicians discuss and agree the best treatment and holistic cancer care plan.

2.5.5 Depending on the tumour type, tumour site and stage of disease, some patients may be offered surgery as their first definitive treatment, which is delivered by the relevant LHB, and patients may be required to undergo further lines of specialist treatment under the care of Velindre Cancer Centre. Other patients may access their first definitive treatment, which is usually chemotherapy, radiotherapy or hormone therapy, under the care of Velindre Cancer Centre.

Current services provided by Velindre Cancer Centre:

2.5.6 Velindre Cancer Centre, as a specialist tertiary centre, provides the following range of patient services (please see *appendix 2(a)* for a complete description of the services provided by Velindre Cancer Centre):

- Systemic Anti-Cancer Therapy
- Radiotherapy
- Clinical Trials and Research
- Nuclear Medicine
- Outpatients
- Inpatients
- Palliative Care
- Acute Oncology Services
- Pharmacy
- Radiology

2.5.7 The majority of these services are located and delivered within the centre itself, however, Velindre does operate a hub and spoke model for both SACT treatments and Outpatient based consultations, in which around 60% of services are delivered at Velindre Cancer Centre and the remainder within outreach settings located within the LHB's.

2.6 Patient Activity at Velindre Cancer Centre

2.6.1 Patient activity at Velindre has continued to increase over recent years and during 2012 / 2013 there were approximately:

- 71,000 outpatient attendances (over 50,000 attendances took place at Velindre Cancer Centre and the remainder within outreach settings).
- 2,000 inpatient admissions at Velindre Cancer Centre.
- 50,000 radiotherapy attendances at Velindre Cancer Centre.
- Around 20,000 chemotherapy attendances (over 16,000 attendances at Velindre Cancer Centre and the remainder within outreach settings).

2.6.2 Over the last decade the number of new referrals to Velindre Cancer Centre has increased by around 15%. However, these attendance figures only partially explain the demand for services at Velindre Cancer Centre. For example, it has been evidenced that the majority of non-surgical cancer treatments are becoming increasingly complex. Although the complexity of treatments does not directly affect patient attendances it does have a considerable impact on the time taken to treat each patient as more complex treatments invariably take longer to prepare, plan and to deliver.

2.6.3 A summary of a number of the major challenges facing service delivery at Velindre Cancer Centre are set out below. These are not exhaustive.

- Clinical outcomes in South-East Wales currently compare unfavourably with those from other parts of the United Kingdom and western world.
- Increasing cancer incidence across South-East Wales.
- A significant pattern in changing demographics which sees people living longer, in areas of high social deprivation with poor lifestyle factors such as high levels of obesity, alcohol consumption and smoking; all of which are linked to increased cancer incidence.
- Increasing complexity of treatments and technologies resulting in insufficient capacity to meet future demand.
- A set of services which do not enable the highest quality of care and patient experience to be delivered.
- A cancer centre which is not fit-for-purpose for 21st Century cancer care.
- Arrangements for outreach clinics are '*ad-hoc*' and are held within accommodation that does not always provide the required level of quality or patient experience.
- Constraints which limit the expansion of the research and development agenda, including a lack of technology and appropriate facilities.
- A financial climate which has reduced the resources available for healthcare in real terms.

2.6.4 A summary of the major opportunities available to Velindre and South-East Wales are set out below which would enable the Trust to achieve/deliver:

- Improved clinical outcomes that compare with the best elsewhere.
- Reduced cancer related mortality in South-East Wales.
- Improved levels of safety.
- Patient experience which is comparable with the best elsewhere.
- Development, in partnership with a range of organisations, of a set of integrated and sustainable cancer services in South-East Wales which provide benefits across the whole of the country.
- Development of improved capacity and competence to care for cancer patients across the whole system in South-East Wales.
- Better support for patients living with the impact of cancer to enable them to achieve their individual goals.
- Access to treatments equal to the best provided elsewhere.
- A set of integrated services which provide patients with the highest quality of care at home or close to home.
- A set of facilities and environment that is designed and delivered around patients needs.

- Improved access rates for radiotherapy treatment which compares favourably with those nationally and internationally.
- Creation of a research and development community which attracts the best researchers and clinicians and accelerates '*bench to bed*' times and improves patient outcomes.
- Sustainable services which contribute significantly to the social and economic development of South-East Wales.

2.7 National and Local Strategies

2.7.1 The focus and direction of the Trust's strategic development is guided by a range of drivers which bring together national policy, LHB's health needs assessment (in their capacity as commissioners of services) and the need to comply with statutory requirements for organisational delivery. There are a wide range of national and local strategies which influence the development of the Trust and the services it provides.

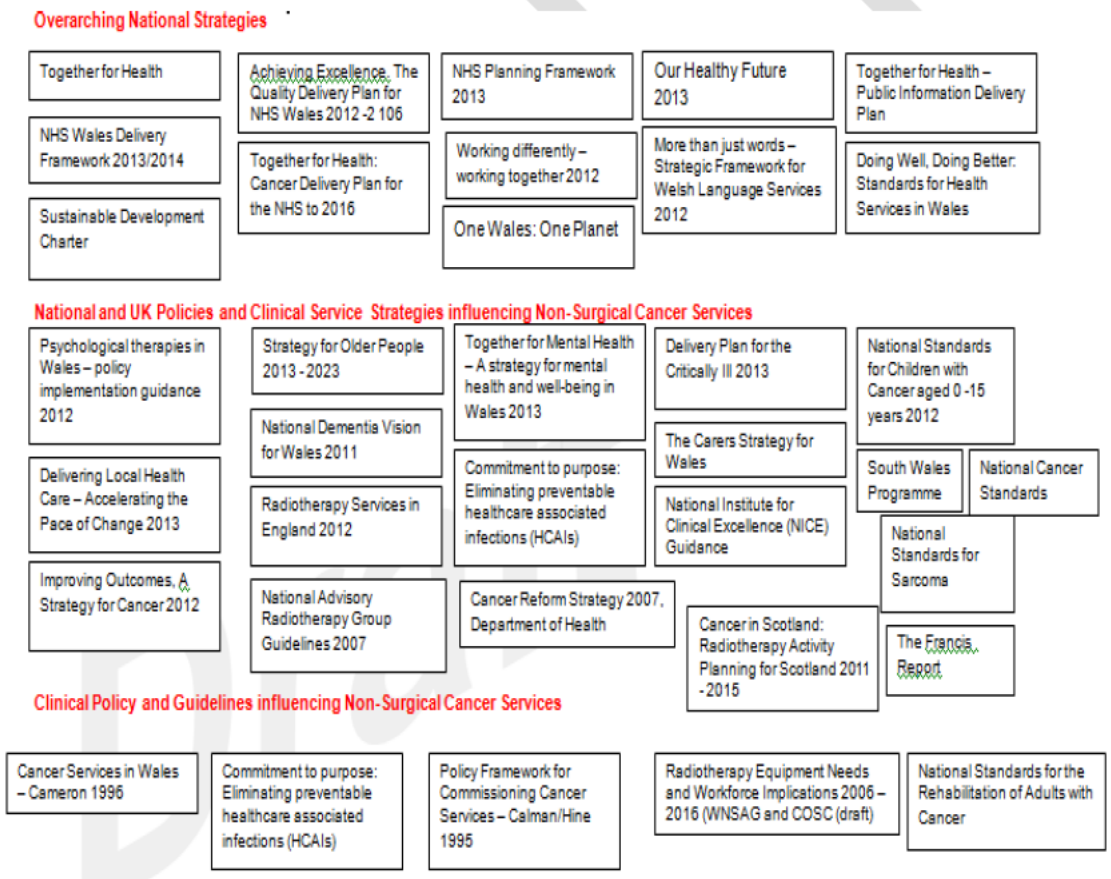


Figure 2.3 – Key National and Local Strategies

2.8 Together for Health: Cancer Delivery Plan 2012 – 2016

2.8.1 The Cancer Delivery Plan is the key driver of service development for cancer care in Wales. Launched in 2012, it highlights the need for collaborative working between and across primary, secondary and tertiary care, alongside

the third sector, in order to achieve the following objectives for the Welsh population:

- People of all ages to have a minimised risk of developing cancer and, where it does occur, an excellent chance of surviving, wherever they live in Wales.
- Wales to have cancer incidence, mortality and survival rates comparable with the best in Europe.

2.8.2 The achievement of these objectives will be measured by:

- Cancer incidence rates (European Age Standardized Rates).
- Cancer mortality rates (European Age Standardized Rates).
- 1 and 5 year cancer survival rates.

2.8.3 The Delivery Plan sets out the key drivers for improvement between now and 2016:

- **Preventing cancer**: people to live a healthy lifestyle, make healthy choices and to minimise risk of cancer.
- **Detecting cancer quickly**: cancer is detected quickly 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.
- **Targeting research**: to support improvements in cancer treatment.

2.8.4 The strategy is underpinned by a set of LHB delivery plans which detail how the aims and objectives will be translated into tangible service improvements across Wales. Velindre Cancer Centre also has a cancer delivery plan which reflects commissioners' needs together with a series of specific issues and developments related to the Trust.

2.9 Summary of National Strategies

2.9.1 The development of this SOP is aligned with the strategic direction of health care and public service delivery in Wales and takes account of the wider strategic developments within the United Kingdom, Europe and beyond.

2.9.2 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. 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 on 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.
- Providing a first class experience for everyone who uses services.

2.10 Organisational Strategies

2.10.1 Velindre NHS Trust set out an ambitious vision for services within its strategic framework *'Delivering Quality, Care and Excellence 2011 – 2016'* which identified five strategic goals:

- High quality outcomes: providing the best possible outcome for patients and donors that are comparable with the best around the world.
- Improved well-being and quality of life for our patients, donors and staff.
- Excellent care for our patients and donors.
- World-class Research and Development.
- Organisational excellence.

2.10.2 The Trust has translated the 5 year vision into a 3 year strategic framework '*Delivering Quality, Care and Excellence: Our Three Year Plan 2013/2014 – 2016/2017*'. It sets out the Trusts strategic objectives for this period:

- **Equitable and timely services**: providing patients and donors with access to services according to their clinical needs in a fair way.
- **Safe and reliable services:** preventing all avoidable harm to patients and donors.

- **Providing evidence based care and research which is clinically effective:** identifying and using the most effective treatment, drugs and technology to get the best outcome.
- **First class patient /donor experience**: providing care to patients and donors that we would want for our family and friends.
- **Supporting our staff to excel:** providing our staff with the support, encouragement and environment to achieve their potential.
- **Spending every pound well:** ensuring everything we do adds value for patients, donors and partners.

2.10.3 It also sets out the range of priorities and actions required to achieve the stated ambitions together with capital, ICT, workforce and financial plans required to deliver them. The Trust has developed a series of key strategies and plans which support the delivery of the strategic goals and objectives. These include:

- Annual Delivery Plan 2014/2015.
- Workforce strategy and plan.
- Information, communications and technology strategy and plan.
- 10 year capital development plan.
- Financial strategy and 2014/2015 financial plan.
- Risk management strategy and framework.
- Environmental sustainability strategy.
- Carbon reduction strategy.
- Quality and service improvement plan.
- Radiotherapy service development plan.
- Chemotherapy service development plan.
- Mental health action plan.
- Improving patient experience strategy.
- Organisational development strategy.
- Research and development strategy.
- Homecare medicines and delivery policy.

2.11 Summary

2.11.1 The strategic objectives outlined within this Strategic Outline Programme are consistent with the national, regional and local strategic frameworks and priorities, together with the strategic direction of travel within Velindre NHS Trust. They also support the future service model proposed in this strategic outline programme.

2.12 The Case for Change

2.12.1 This section outlines the reasons why change is essential if cancer services are to meet the needs of our patients in the future.

Significant progress made but the need for step-change is clear.....

- Cancer remains one of the main causes of death in Wales despite the significant progress made in recent years.
- Clinical outcomes for cancer patients in Wales compare less favourably with other countries.
- The incidence of cancer is increasing by approximately 1.5% per year.
- The population of South East Wales is rapidly ageing, lives in some of the most socially deprived areas in Wales, and the United Kingdom, and display some of the highest risk factors associated with cancer incidence.
- The detection and diagnosis of cancer is still not as timely as it should be and the rate of variation for referral from primary care to secondary care is too great.
- Too many patients receive their first diagnosis of cancer in an emergency department which reduces the potential for securing the best clinical outcome.
- Access rates for radiotherapy are lower than clinical evidence suggests would benefit patients receiving treatment for cancer.
- The system for cancer support and care is too fragmented and does not always support fast, efficient and effective care for patients.
- System leadership, roles and responsibilities and are not always clear amongst partner organisations and this reduces the effectiveness of the system.
- Increased levels of knowledge and capability across the health care system would benefit all organisations in improving care for patients.
- Referrals to the Velindre Cancer Centre are expected to increase by 18% and linear accelerator machine time by 48% by 2025.
- Without change, Velindre Cancer Centre will be unable to meet the forecast levels of demand from 2014/2015 onwards.
- The majority of the patient environment at Velindre Cancer Centre is not fit for purpose and does not support optimal recovery and well-being.
- Research and development opportunities need to be fully exploited to improve the quality of care and attract and retain the best clinicians and researchers.
- The current service is not sustainable.
- The current service model will need to change if care is to move closer to home, the national requirements are to be achieved and a step change in clinical outcomes is to be delivered.
- The costs of cancer are significant to Wales at an individual, community and economic level.

Transformation is vital..... Taking the Next Steps:

- The service model needs to reflect 21st Century cancer care. It must be designed around patients, families and carers needs using the latest technology and enable world class research and development to drive clinical practice.
- The future service model proposed by Velindre will see:
    - A new relationship developed with citizens and patients based on the principles of prudent health and co-production.
    - A collective focus on the whole system from detection and diagnosis, to treatment to living with the impact of cancer and palliative care.
    - The majority of chemotherapy treatments provided at home or close to home.
    - The latest technology used to deliver radiotherapy treatments from the radiotherapy satellite site and the specialist cancer centre. This will assist in improving access and reducing the distance that patients travel.
    - Increased hours of service through 7 day working. This will enable patients and their families to better manage their treatment and care around their lives.
    - A '*hub and spoke*' network of acute oncology services which will assist in identifying patients' needs quickly and providing the most effective treatment and care without unnecessary delay.
    - A rapid assessment service provided at the Velindre Specialist Cancer Centre to enable better management of unscheduled episodes of illness for cancer patients across South East Wales.
    - Step-up facilities provided at Velindre Specialist Cancer Centre to enable acutely unwell patients to be supported safely for longer periods prior to transfer to critical care services.
    - The increasing use of information, communication and technology to support patients in managing their condition including tele-health and telemedicine.
    - More patients supported to live independently in the community with services moving to them.
    - The development of a more comprehensive and consistent set of services which support patients in living with the impact of cancer.
- World class research and development in South-East Wales with an iconic focal point at the Velindre Cancer Research Institute.
- A wide range of clinical trials available to patients from Phase 1 to 4.
- Rapid '*clinic to* bed' translation of research in a coherent way.

Closing the gap and leading the way:

Improving the service will provide a wide range of benefits including:

- Clinical outcomes which are comparable with the best in Europe. Initially closing the gap with other countries and then forging ahead.
- A long-term reduction in the number of avoidable deaths from cancer.
- Transformation of cancer care based on the principles of co-production, prudent health and a more patient led approach .
- Improved levels of safety and patient experience that are comparable with the best elsewhere.
- Better integration across the system with a network of local public and voluntary sector services that better support patients to achieve their goals and remain living well within their local community.
- Improved detection and diagnosis rates for.
- Improved levels of clinical and professional competence, knowledge and capability across the whole health care system to support patients with cancer.
- Clearly understood roles, responsibilities and delivery mechanisms.
- Provision of care at home or closer to home for more patients, improving access to services and equity across the population.
- Shorter travel times to treatment and care for patients across South-East Wales.
- A more efficient and cost effective system and service
- The development of a strong clinical leadership and oncological capacity across South East Wales.
- An iconic research and development institute which has the potential to become world class
- The growth of world class research and development which provides patients access to a greater number of trials and earlier access to new therapies.
- A high quality environment for education, training and learning in respect of cancer across South East Wales.
- A service and brand which is nationally and internationally recognised for excellence.
- A more productive and vibrant population with the costs arising from cancer and related economic costs reducing.
- An increased ability to attract the best talent to work and live in South Wales.
- Reduced environmental impact.
- A sustainable and cost effective service.

'Excellence is achievable if we are clear in our thinking, bold in our decision making and precise in our implementation'

The Strategic Case in Detail

2.13 The incidence of cancer is increasing in Wales.

2.13.1 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. 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 1 in 7 chance of being diagnosed with cancer before his 65th birthday, which increases to 1 in 3 before his 75th birthday. Every woman in Wales has a 1 in 6 chance of being diagnosed with cancer before her 65th birthday, which increases to 1 in 3 before her 75th birthday. [1]

2.13.2 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[2].

Table 2.1 - MacMillan Projections of people getting cancer in the United Kingdom

1992	2010	2020
32%	44%	47%

2.13.3 In Wales, it is likely that incidence of cancer will increase by approximately 1.5% annually.

2.14 The population is ageing and life expectancy is increasing.

2.14.1 Wales has a growing population which 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. [3] Life expectancy continues to improve with 78.0

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

[2] *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.

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

years for men and 82.2 years for women between 2009 – 2011.[4] The South East Wales population that Velindre serves mirrors the national picture. This is set out in Table 2.2.

Table 2.2 - Cardiff and Vale Population Projections

Local Health Board	Population Projections 2015	Population Projections 2035	65 – 85 plus in 2015	65 – 85 plus in 2035	Life expectancy 2005-2009	
					Males	Females
Cardiff and Vale	490,838	587,769	75808	113,3562	77.3	81.8

Source: Annual report of Director of Public Health for Cardiff and Vale University Local Health Board 2012

Table 2.3 - Aneurin Bevan Population Projections

Local Health Board	Population Projections 2015	Population Projections 2035	65 – 85 plus in 2015	65 – 85 plus in 2035	Life expectancy 2005-2009	
					Males	Females
Aneurin Bevan	560,400	588,900	98,700	173, 500	77	81

Sources: Annual report of Director of Public Health for Aneurin Bevan Local Health Board 2011

Table 2.4 - Cwm Taf Population Projections

Local Health Board	Population Projections 2015	Population Projections 2035	65 – 85 plus in 2015	65 – 85 plus in 2035	Life expectancy 2005-2009	
					Males	Females
Cwm Taf	294,900	304,000	55,100	72,300	75.1	79

Sources: http://www.wales.nhs.uk/sitesplus/922/page/49937#Life_expectancy
Older people indicators 2012, Cwm Taf Health Board, Public Health Wales Observatory

2.14.2 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 from 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. [5]

[4] Chief Medical Officer for Wales Annual Report 2012-2013; '*Healthier, Happier, Fairer*'; Welsh Government.
[5] Cancer Statistics – Key Facts: Cancer Research UK, April 2013.

2.15 The factors contributing to the increased incidence of cancer are on the increase.

2.15.1 There are many causes of cancer with a range of health and non-health related determinants including:

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

2.15.2 Within the United Kingdom 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 Research UK has identified the following factors as causing cancer within the United Kingdom: [6]

- More than 40% of all cancers in the UK are linked to tobacco, alcohol, diet, being overweight, inactivity, infection, radiation, occupation, post-menopausal hormones or breastfeeding.
- 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 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.
- Excessive exposure to UV radiation (from the sun or sun beds) is the most important modifiable risk factor for skin cancers.

2.15.3 The picture in Wales is concerning given the relationship between cancer incidence and a number of the determinant factors. This is confirmed by the Welsh Health Survey, 2012 which identified:

- By 2033, 26% of the population is expected to be over 65 as compared to 18% in 2008.[7]
- Life expectancy continues to improve; in 2009 – 2011 it was 78.0 years for men and 82.2 years for women.
- 48% of men and 36% of women regularly consumed more alcohol than the recommended daily amount.
- 25% of men and 21% of women were regular smokers.

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

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

- Only 32% of men and 34% of women consumed 5 portions of fruit and vegetables per day.
- 57% of adults were overweight and 22% of those considered to be obese.
- Wales had the highest alcohol consumption rate amongst teenagers in the UK, although this is decreasing.
- Only 36% of men and 23% of women were physically active 5 days per week. [8]

2.15.4 The concerning determinant factors identified at a national level in Wales are common to the South-East Wales population served by Velindre.

Cardiff and Vale Local Health Board: [9]

- 23% of the population smoke.
- 46% of the population consume more alcohol than the daily recommended amount and 28% binge drink.
- Average of 27% of adults take exercise or physical activity that meets guidelines.
- 54% of adults are classed as being obese.

Cwm Taf Local Health Board:

- 24% of the population smoke.
- 63% of adults are overweight or obese (the highest level of any of the Local Health Boards in Wales).
- Has the lowest life expectancy of any Local Health Board in Wales.
- Is the most deprived Local Health Board area in Wales.

Aneurin Bevan Local Health Board: [10]

- 24% adults smoke.
- 45% of adults consume more alcohol than the daily recommended amount.
- 59% of adults are classed as being obese.
- An average of 28% of adults take exercise or physical activity that meets guidelines.

2.15.5 Poverty and social deprivation also significantly increases the incidence of cancer and negatively influences the potential clinical outcomes for patients.

[8] Welsh Health Survey, 2012.
[9] Annual Report of the Director of Public Health, Cardiff and Vale University Local Health Board 2012.
[10] Our Health Future, Annual Report of the Director of Public Health, Aneurin Bevan Local Health Board, 2011.

This is an issue of great concern for the South-East Wales population served by Velindre as it contains some of the highest levels of social deprivation within Wales and the United Kingdom. This is illustrated in *figure 2.4*.

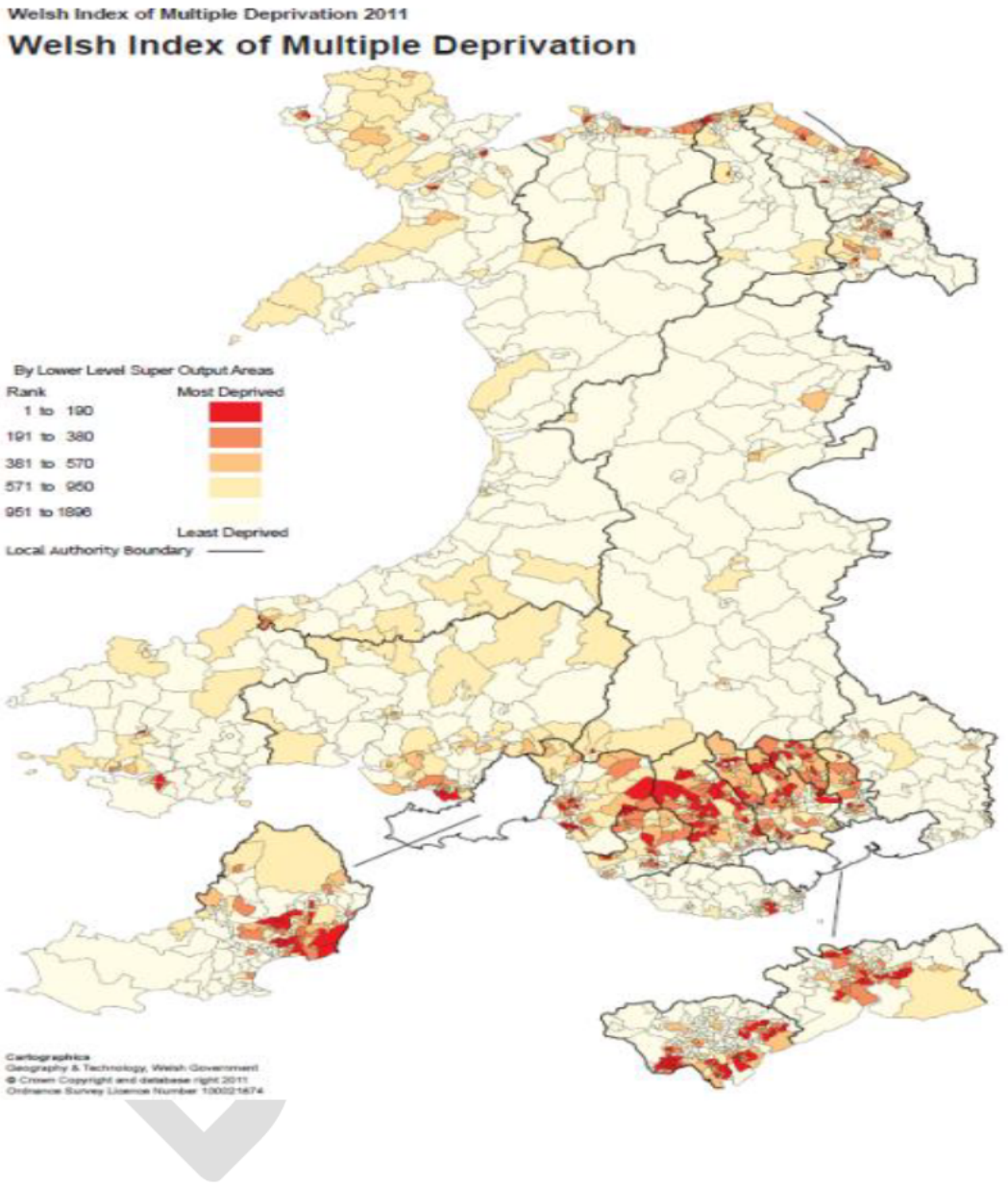


Figure 2.4 – Welsh Index of Multiple Deprivation

2.15.6 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.

2.16 Cancer continues to account for a large number of overall deaths in the United Kingdom and Wales despite advances in prevention and treatment.

2.16.1 Cancer has been a priority for the respective governments and health care systems within the United Kingdom for the last two decades. Despite the significant progress made in preventing and treating the disease, the number of deaths 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.[11] In 2010, there were 493,242 deaths registered in England and Wales in 2010, a rise of 0.4 per cent compared with 2009. Of these deaths, the highest standardised mortality rate by grouped cause of death for males and females was cancer. Furthermore, deaths from cancer now have the highest age-standardised mortality rates for both males and females, whereas in 2000 the highest rates were for circulatory diseases.[12]

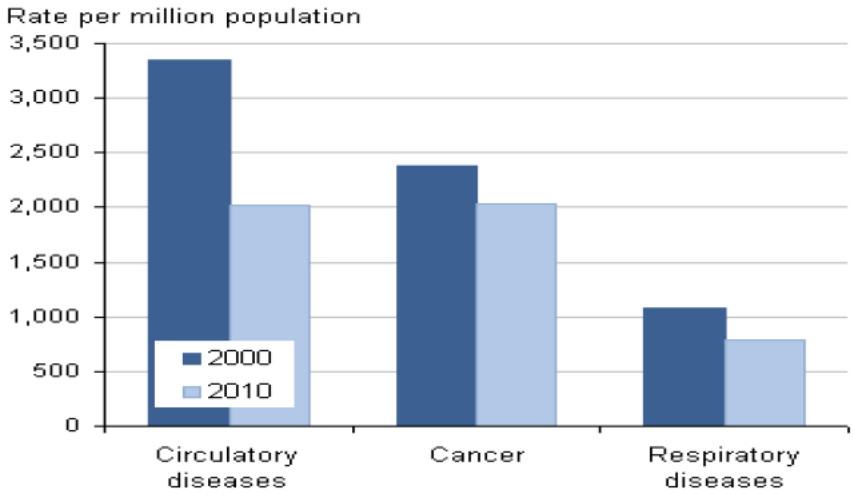


Figure 2.5 - Male Age-standardised Mortality Rates, for Three Major Categories of Cause of Death: England and Wales, 2000 and 2010

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

[12] Deaths Registered in England and Wales in 2010, by Cause Coverage: England and Wales Date: 28 October 2011 Geographical Area: Region.
Theme: Population Key Findings.

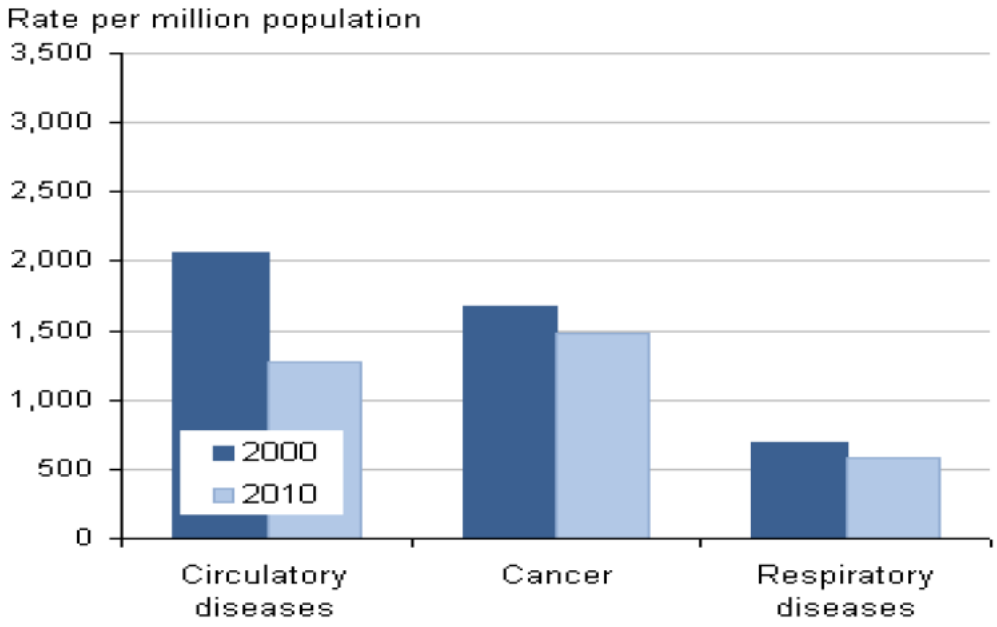


Figure 2.6 - Female Age-standardised Mortality Rates, for Three Major Categories of Cause of Death: England and Wales, 2000 and 2010

2.16.2 In Wales, an average of 8,400 people died from cancer each year between 1995 and 2009. MacMillan Cancer Support estimate that every day 49 people learn that they have cancer, and 24 people die from the illness. This has a devastating effect on individuals, families, communities and the economic and social fabric and well-being of the country. [13]

2.17 Outcomes in Wales compare unfavourably with other countries

2.17.1 The Welsh Governments '*Together for Health – Cancer Delivery Plan*' identified the improvement of clinical outcomes as being one of the primary aims of NHS Wales in relation to cancer. It identifies the following desired outcomes:

- Reduction in cancer incidence (European Age Standardised Rates)
- Reduction in cancer mortality rates (European Age Standardised Rates).
- An increase in 1 and 5 year cancer survival rates.

2.17.2 This ambition will assist Wales in addressing a key opportunity; closing the gap between Wales and other countries with regard to clinical outcomes. Since 1996 Wales has achieved significant improvements in 1 and 5 year survival rates for cancer in men and women. In 15 years Wales achieved a faster rate of change than the rest of the UK. However, there remains some significant variation between performance in Wales and that of other United Kingdom countries.

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

2.17.3 The following tables are taken from the *Cancer Delivery Plan 2012*, (Technical Report) and illustrate the current gap between Wales and other countries. They are summarised as:

- The lowest of 1 and 5 year survival rates for colorectal cancer in the UK.
- The lowest of 1 and 5 year survival rates for lung cancer in the UK.
- The lowest of 1 and 5 year survival rates for breast cancer in the UK.
- The lowest 1 and 5 year survival rates for colorectal, lung and breast cancer when compared with Australia, Canada, Denmark and Sweden.

Table 2.5 - Colorectal Cancer Survival Rates

Colorectal Cancer	UK	England	Northern Ireland	Wales
1 year survival				
1995 - 1999	70.2%	70.2%	74.3%	68.3%
2000 - 2002	73.0%	72.9%	76.8%	72.3%
2005 - 2007	74.7%	72.9%	76.8%	72.3%
5 year survival				
1995 - 1999	47.8%	47.8%	51.1%	45.9%
2000 - 2002	51.3%	51.2%	54.3%	50.3%
2005 - 2007	53.6%	53.7%	55.2%	52.3%

Table 2.6 - Lung Cancer Survival Rates

Lung cancer	UK	England	Northern Ireland	Wales
1 year survival				
1995 - 1999	24.3%	24.3%	27.4%	23.0%
2000 - 2002	27.5%	27.5%	28.3%	25.9%
2005 - 2007	29.7%	29.7%	30.6%	28.5%
5 year survival				
1995 - 1999	7.0%	6.9%	9.7%	7.5%
2000 - 2002	8.1%	8.0%	9.7%	7.6%
2005 - 2007	8.8%	8.7%	11.0%	9.0%

Table 2.7 - Breast Cancer Survival Rates

Breast cancer	UK	England	Northern Ireland	Wales
1 year survival				
1995 - 1999	90.4%	90.5%	92.6%	88.6%
2000 - 2002	92.4%	92.5%	95.0%	89.8%
2005 - 2007	94.2%	94.3%	95.0%	93.4%
5 year survival				
1995 - 1999	74.8%	74.8%	77.5%	73.5%
2000 - 2002	78.8%	78.8%	81.6%	76.7%
2005 - 2007	81.6%	81.6%	84.1%	81.0%

Table 2.8 - Ovarian Cancer Survival Rates

Ovarian cancer	UK	England	Northern Ireland	Wales
1 year survival				
1995 - 1999	59.6%	59.8%	62.8%	56.6%
2000 - 2002	62.4%	62.6%	64.9%	60.0%
2005 - 2007	65.0%	65.4%	63.9%	60.5%
5 year survival				
1995 - 1999	32.6%	32.5%	39.0%	31.5%
2000 - 2002	34.3%	34.3%	37.8%	33.8%
2005 - 2007	36.4%	36.4%	36.5%	36.3%

2.17.4 The difference is even starker when comparing outcomes with other countries within the wider western world.

Table 2.9 - Colorectal Cancer Survival Rates, International Comparison

Colorectal Cancer	Australia	Canada	Denmark	Norway	Sweden	Wales
1 year survival						
1995 - 1999	80.3%	79.1%	71.7%	78.6%	81.8%	68.3%
2000 - 2002	82.5%	81.5%	73.9%	78.7%	82.8%	72.3%

Colorectal Cancer	Australia	Canada	Denmark	Norway	Sweden	Wales
2005 - 2007	84.9%	83.5%	77.7%	82.4%	83.8%	73.6%
5 year survival						
1995 – 1999	60.0%	58.1%	48.2%	56.9%	58.5%	45.9%
2000 – 2002	63.4%	60.9%	51.7%	58.8%	60.6%	50.3%
2005 - 2007	65.9%	63.7%	55.8%	62.0%	62.6%	52.3%

Table 2.10 - Lung Cancer Survival Rates, International Comparison

Lung Cancer	Australia	Canada	Denmark	Norway	Sweden	Wales
1 year survival						
1995 - 1999	38.2%	38.7%	26.4%	32.3%	35.7%	23.0%
2000 - 2002	40.9%	39.7%	31.3%	32.2%	36.6%	25.9%
2005 - 2007	42.8%	43.1%	34.9%	39.2%	43.6%	28.5%
5 year survival						
1995 – 1999	13.9%	15.7%	8.0%	11.0%	12.7%	7.5%
2000 – 2002	15.1%	15.9%	9.6%	11.0%	11.6%	7.6%
2005 - 2007	17.0%	18.4%	10.9%	14.4%	16.3%	9.0%

Table 2.11 - Breast Cancer Survival Rates, International Comparison

Breast Cancer	Australia	Canada	Denmark	Norway	Sweden	Wales
1 year survival						
1995 - 1999	95.8%	95.9%	93.0%	95.4%	97.6%	88.6%
2000 - 2002	96.3%	96.2%	94.3%	95.8%	98.4%	89.8%
2005 - 2007	96.7%	96.3%	95.0%	96.6%	98.0%	93.4%
5 year survival						
1995 – 1999	85.0%	85.3%	76.9%	81.8%	86.7%	73.5%
2000 – 2002	87.0%	86.4%	81.5%	83.8%	89.3%	76.7%
2005 - 2007	88.1%	86.3%	82.4%	85.5%	88.5%	81.0%

Table 2.12 - Ovarian Cancer Survival Rates, International Comparison

Ovarian Cancer	Australia	Canada	Denmark	Norway	Sweden	Wales
1 year survival						
1995 - 1999	70.4%	71.8%	63.4%	70.4%		56.6%
2000 - 2002	71.1%	73.3%	67.9%	74.3%		60.0%
2005 - 2007	73.5%	75.2%	70.6%	75.2%		60.5%
5 year survival						
1995 – 1999	36.1%	38.2%	31.5%	37.2%		31.5%
2000 – 2002	37.1%	38.4%	33.7%	40.2%		33.8%
2005 - 2007	37.5%	41.9%	36.1%	39.7%		36.3%

2.17.5 There are a multitude of reasons for the variation in outcomes across countries such as Canada and Australia when compared to the United Kingdom and Wales. These include things considered to be outside of the control of systems e.g. epidemiology, together with factors which can be influenced. For example, the International Cancer Benchmarking Partnership identify a number if contributory factors to the poorer performance of the UK when compared to the better performing countries:

- Later diagnosis in the UK with cancers diagnosed at a later stage than comparator countries.
- Unequal access to optimum treatment in the UK as suggested by variation in survival by stage when compared to other countries and lower survival for advanced stage disease in the UK.

2.17.6 Velindre Cancer Centre plays an important role in improving outcomes both at a population level and at a service level (definitive care provided by Velindre).

2.17.7 In order to improve clinical outcomes for the population, it will be important for primary, secondary care 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 is delivered quickly and effectively, in order to ensure the best possible clinical outcomes.

2.17.8 At a service level, the clinical outcome measure considered to most appropriately reflect the impact and effectiveness of treatment at Velindre is 5-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.

2.17.9 It is also important to analyse outcomes by tumour type as no single summary statistic can encompass outcomes for cancer in a meaningful way, as all clinical outcome measures are greatly affected by the tumour type and stage, and therefore clinical end points that are measured also vary according to the tumour type.

2.17.10 With regard to the clinical outcomes derived from definitive treatment provided at Velindre, current performance is considered to be good. However, there are still some cancer sites where there is room for improvement in achieving the desire of gold standard / best in class. This is illustrated in *table 2.13.*

Table 2.13 - Outcome Measurement and Benchmarks

Outcomes	Measure	VCC Baseline	Benchmark/ gold standard survival rate	Source of benchmark/ gold Standard	Velindre ambition
% PSA* relapse-free survival for patients with **prostate cancer** treated with Low Dose Rate Brachytherapy for low risk and low-intermediate risk disease. *Prostate-specific Antigen.	5 year PSA relapse-free survival	**89%** (3 year data- service has not yet been running long enough for 5 year data)	**88%** (5 year)	No universally accepted gold standard- data used from Zelefsky et al *International Journal of Radiation Oncology*, 2000	5 year PSA relapse-free survival comparable with the best in the literature.
% survival for patients with **oesophageal cancer** treated with definitive chemoradiotherapy	2 year overall survival	**43.6%** (1995-2009)	**56%**	SCOPE 1 trial	Improve survival to similar levels to the SCOPE1 outcomes (although any trial data will generally be better than real life as inclusion criteria are more restrictive).
	5 year overall survival	**19.5%** (1995-2009)	N/A	No recognised gold standard	Continuously improve survival
% survival for patients with **anal cancer** treated with chemoradiotherapy	2 year overall survival	**79%** (2003-2008)	N/A	No recognised gold standard.	Continuously improve survival
	5 year overall survival	**62 %** (2003-2008)	**74%**	ACT 11 Trial	Improve survival to similar levels to the ACT 11 trial, bearing in mind 10% of patients die of non cancer or cancer related causes.

Outcomes	Measure	VCC Baseline	Benchmark/gold standard survival rate	Source of benchmark/gold Standard	Velindre ambition
% survival for patients with **cervical cancer** treated with chemoradiotherapy	2 year overall survival	**72%** (1999-2004)	N/A	No recognised gold standard	Continuously improve survival
	5 year overall survival	**55%** (1999-2004)	**55%**	UK National data published by Royal College of Radiologists in 2010	Improve survival above gold standard
	2 year local control	**76%** (1999-2004)	**95%** 3 years 2001-2008	Vienna	Since 1997, Vienna have implemented image guided Brachytherapy and their local control has increased steadily over 15 years of implementation and experience- it is our expectation with the implementation of IGBT to increase our local control to a similar level.
	5 year local control	**67%** (1999-2004)			
% survival patients with cancer of the **oropharynx** treated with Radiotherapy and Chemoradiotherapy	2 year overall survival	**73.2%** (2006-2013)	**70.3%**	National Head and Neck Cancer audit (DAHNNO) 2012.	Continuously improve survival
% survival for patients with **limited disease small cell lung cancer** treated with radical intent	2 year overall survival	**28%** (2010-2012)	**32%**	Laskin et al. Lung Cancer. 2004 Jan;43(1):7-16)	Improve survival to gold standard

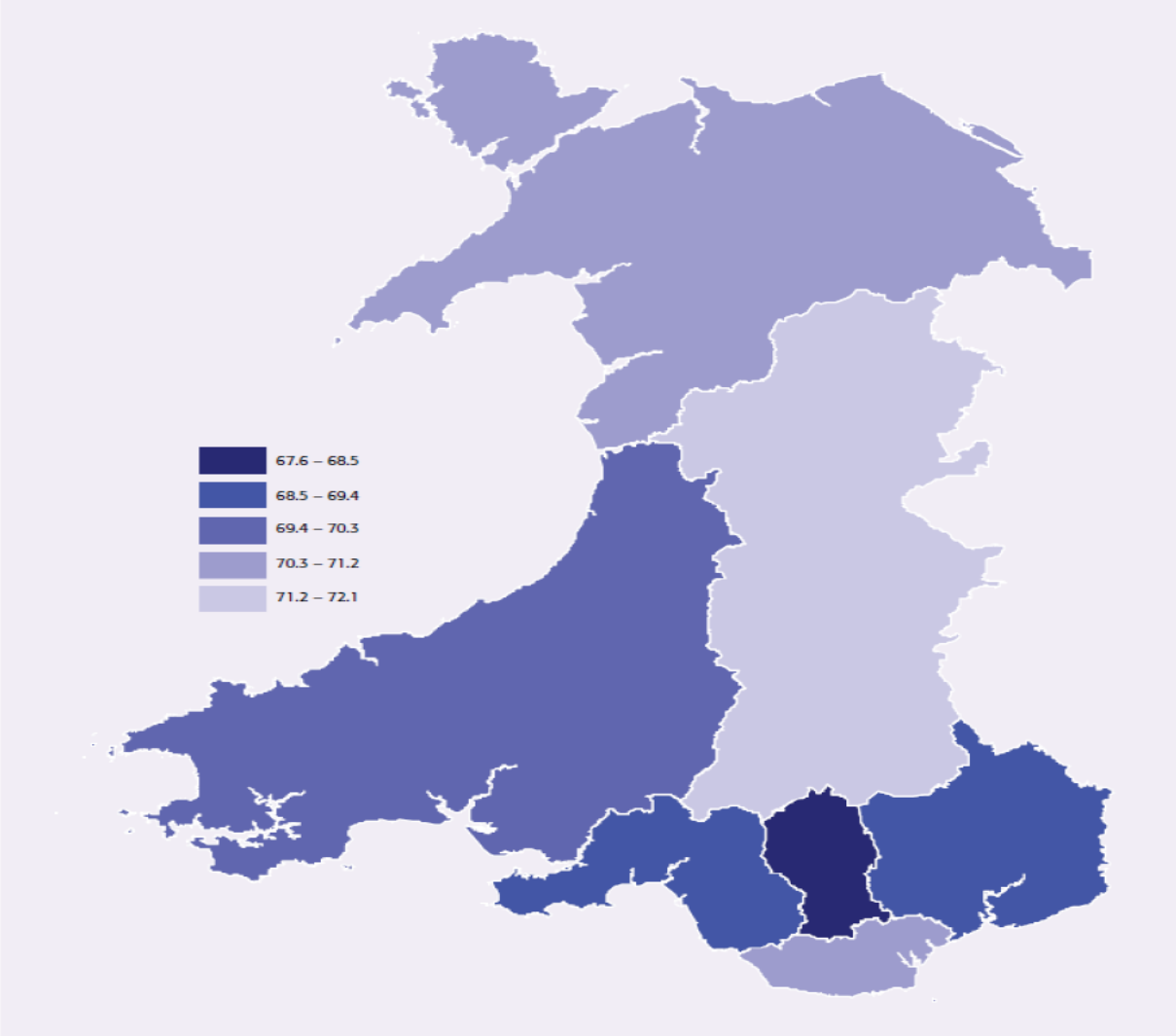
2.18 There continues to be variation in survival rates between Local Health Board populations

2.18.1 One of the fundamental aims of Welsh Government is the provision of equitable services which deliver the best outcomes. The population outcomes for cancer demonstrates variation across Wales which results in a reduced chance of survival for a range of cancers if you live in one part of the country compared to another. This is illustrated by the Cancer in Wales, *Welsh Cancer Intelligence and Surveillance Report* (2014).[14]

2.18.2 The report identifies a small but significant variation across Wales in 1 and 5 year survival. For example, the one year survival rate in Powys Local Health Board is approximately 4 percentage points above that in Cwm Taf Local Health Board. Similarly, the variation across Wales is small in relation to five year survival. However, the difference between the average Wales figure of 53% and three of the Local Health Boards is greater than can be expected by chance. Cwm Taf is 4 percentage points below and Powys and Cardiff and the Vale are approximately 4 and 2.5 percentage points above.

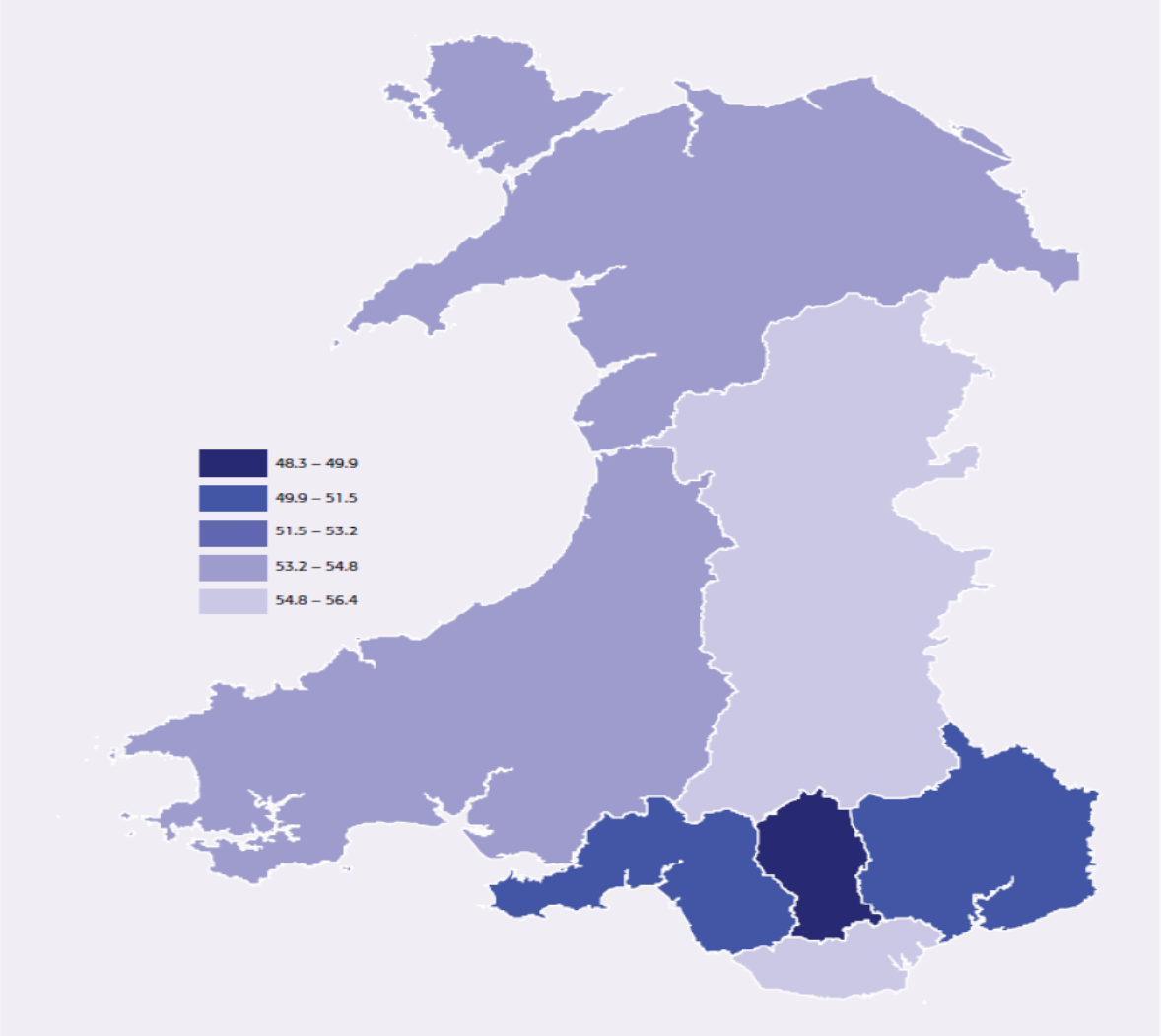
2.18.3 There are a wide range of causes which drive variation, both health and non-health determinants. For example, the link between poverty and health is well established [15] [16] [17] with more deprived areas having higher mortality rates than the less deprived. [18] [19] [20]

[14] Cancer in Wales. A A summary report of population cancer incidence, mortality and survival – includes new 2012 data released as Official Statistics on 9 April 2014.
[15] Department of Health (2004) *Choosing Health*, TSO: London.
[16] Acheson D (1998) *Independent Inquiry into Inequalities in Health*, TSO: London.
[17] Townsend P, Davidson N and Whitehead M (1992) I*nequalities in Health: The Black Report; The Health Divide*, Penguin Books: London.
[18] Carstairs V and Morris R (1989) Deprivation and mortality: an alternative to social class? *Community Medicine* **11**(3).
[19] Raleigh V S and Kiri V A (1997) Life expectancy in England: variations and trends by gender, health authority, and level ofdeprivation. *Journal of Epidemiology and Community Health.*
[20] Woods LM, Rachet B, Riga M, Stone N, Shah A and ColemanM P (2005) Geographical variation in life expectancy at birth inEngland and Wales is largely explained by deprivation. *Journal of Epidemiology and Community Health.*



Source: Welsh Cancer Intelligence and Surveillance Unit's Cancer Registry

Figure 2.7 - 1 Year relative survival by Local Health Board in Wales, 2007 - 2011



Source: Welsh Cancer Intelligence and Surveillance Unit's Cancer Registry www.wcisu.wales.nhs.uk

Figure 2.8 - 5 Year Relative Survival by Local Health Board in Wales, 2003 - 2007

2.18.4 There are a wide range of potential causes of the variation in cancer survival which are well documented in academia and visible in health systems across the world. One of the strongest drivers appears to be social-economic variation and the effects this has on the population, individual behaviour and the availability and quality of public services. This is highlighted by Cancer Research UK (2013) who identify a number of possible explanations for lower survival in people living in deprived areas including the differences in:

- diagnosis (delays, advanced stage of disease).
- treatment (delays, poorer access to optimal care and lower compliance).
- Worse general health (worse in more deprived) and type of disease (histological type or more aggressive disease.

2.18.5 Turning to South-East Wales, there are a number of areas within each of the Cardiff and Vale, Cwm Taf and Aneurin Bevan Local Health Boards that have some of the most complex social problems and highest levels of poverty and social deprivation within the United Kingdom. This is mirrored across Wales as a nation and is also reflected clinically, for example, with significant variation in access rates for radiotherapy across Local Health Boards. It is therefore clear that continuous action is required to better understand the causes of variation and how these can be addressed in a sustainable way. Within the healthcare setting, this will involve organisations and agencies which span public health, primary and community care, secondary and tertiary care and the voluntary sector thinking innovatively to find solutions.

2.19 Early detection and diagnosis of cancer is not as effective as it needs to be to make a step change in improving outcomes

2.19.1 The early detection and diagnosis of cancer is one of the most fundamental drivers of improving clinical outcomes for patients. This is a well known factor and 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, which significantly limits the treatment options available and potential clinical outcome.[21] This is exemplified in breast cancer where, if detected and treated early, the 5-year relative survival for localised breast cancer is 99%. For regional disease, it is 84%. If the cancer has spread to distant organs, 5-year survival drops to 24%.[22]

2.19.2 *Together for Health – Cancer Delivery Plan (2012)* identifies the fact that over 90% of people diagnosed with cancer initially present with symptoms to their GP. However, GPs typically see less than 10 new patients per year, and rarer cancers maybe only once in a lifetime. This is often compounded by the lack of diagnostic tools within primary care and availability of expert oncology support to help guide GPs through an often complex and difficult process.

2.19.3 *Together for Health – Cancer Delivery Plan* also highlights a number of other areas of weakness/areas for improvement within the current system. These include:

- The inconsistent use of national profiling data of cancer prevalence and of mortality and survival rates to inform targeted action of particular cancers and communities.
- Variations in public awareness of cancer symptoms needing prompt GP assessment.

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

[22] 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.

- A cultural reluctance to present to the GP due to fear of wasting time and embarrassment.
- Lack of support for GPs to introduce evidence based risk assessment tools to help identify those most at risk of having cancer.
- The limited development of acute oncology services to support the needs of people admitted to hospital as emergencies.

2.19.4 Macmillan (2014) have also been active in Wales in this area, identifying the fact 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.

2.19.5 They go on to conclude that (i). whilst there are 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. There is no overall comprehensive framework sets out what resources exist and provides a benchmark for care of cancer (and potential cancer) patients. (ii). 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.

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

2.20 Too many patients receive their diagnosis in an A & E department which reduces the potential outcome and can provide a poor patient experience

2.20.1 The sub-optimal nature of the current cancer care system in relation to early diagnosis and detection is seen in the significant number of patients who receive their primary diagnosis of cancer within the emergency department setting. This is evidenced by work undertaken by the *National Cancer Intelligence Network* (2012) which undertook a study of 740,000 patients diagnosed with cancer in England to determine where they received their diagnosis. This is illustrated that 24% of patients received their first diagnosis in an emergency department. The proportion is even higher for the over 70s age group with (n = 31%). [23]

2.20.2 Some of the 24% of patients in the study whose cancer was identified at A&E ended up there because they showed symptoms of the disease, but others

[23] Routes to Diagnosis, 2006 – 2008 NCIN information supplement, National Cancer Intelligence Network (2012).

only had their cancer detected after seeking treatment for other problems, such as broken hips, or being sent there by their GP on account of their cancer symptoms.

2.20.3 Among all age groups cancers of the brain and central nervous system were the most likely to be diagnosed after a patient presented at A&E (62%), followed by pancreatic cancer (50%) and lung cancer (39%) – two of the forms of cancer with the worst prospects of survival. Only 3% of skin cancers, 5% of breast cancers and 5% of cases of melanoma were diagnosed this way, which suggests that GPs and hospital doctors are much better at identifying them after symptoms occur.

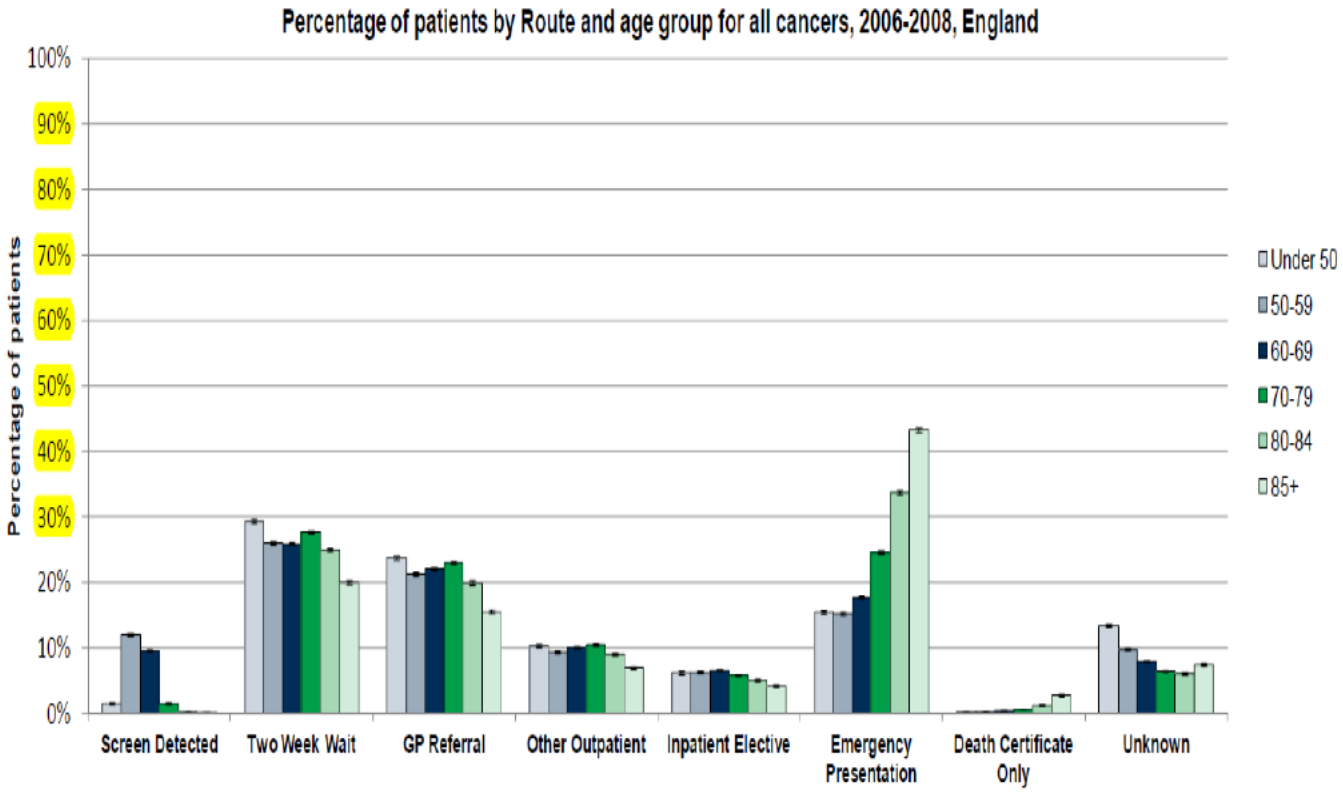


Figure 2.9 - % of Patients Diagnosed with Cancer in England 2006-2008 by Route and Age Group for all Cancer

2.20.4 The change in treatment patterns and regimens has also increased the potential risk to patients across the acute care pathway as a result of the variation in the treatment and management of cancer patients presenting with acute symptoms (Cancer Patients in Crisis, 2012).[24]

[24] *Cancer patients in crisis:* responding to urgent needs. Report of a working party. Royal College of Physicians and Royal College of Radiologists (2012).

2.20.5 There has been a 60 % increase in Systemic Anti Cancer Therapies (SACT) during the 2004 – 2008 period in England which increased the risk of toxicities. This led to an increase in the number of patients who presented with complications of treatment, together with death rates which were considered to be unacceptable by the National Confidentiality Enquiry into Patient Outcome and Death (NCEPOD).[25]

2.20.6 The report also identified an increase in the number of patients living with metastatic cancer which translated into increasing numbers of patients presenting to their local A+E Department with acute symptoms. The report concluded that these patients frequently received a poor prognosis and often spent long time in hospital undergoing a number of investigations, many of which were avoidable and consumed extended periods of time. As a result of the prolonged period of diagnosis, the treatment choices available to these patients were often limited to palliative care.

2.20.7 This data is not available for Wales, but there is no reason to believe that the general trends are markedly different to those in England. There is a significant weight of evidence to suggest that diagnosis after an emergency presentation can seriously reduce the chance of survival or an optimum clinical outcome and provides a poor patient experience.

2.21 The current service model in South East Wales could be strengthened to support the delivery of the highest quality of care possible for patients in a sustainable way

2.21.1 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. 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 is a characteristic of systems across the western world and not unique to Wales. 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:

- 24% of newly diagnosed cancer patients in UK present as an emergency.[26]

[25] National Confidentiality Enquiry into Patient Outcome & Death (NCEPOD) 'For Better For Worse, 2008.

[26] Routes to Diagnosis – National Cancer Intelligence Briefing (2010), National Cancer Intelligence Network.

- For most common cancers diagnosis as an emergency is associated with worse survival. [27]

2.21.2 There are also occasions when patients become unwell at Velindre whilst receiving highly toxic treatments and suffering sepsis as an example. Typically, these patients are treated at Velindre 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.

2.21.3 There are occasions when patients experience unnecessary waits for treatment as their needs as a cancer patient are not sufficiently understood or they are 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 increase 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.

2.21.4 A significant amount of work has been undertaken by the Local Health Boards, Velindre 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. Velindre has worked with Aneurin Bevan Local Health Board to introduce an acute oncology service for cancer patients. This service enables Velindre to provide expert advice and support to specialist acute oncology nurses located within the Local Health Board in identifying and effectively managing patients who present with oncological symptoms.

2.21.5 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.
- Seen 281 patients and provided telephone advice to 36 patients with over 85% of patients being seen within 48 hours of admission.

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

- 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.
- 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.

2.21.6 The patients' experience of the service has also been significantly improved. This is illustrated by patients with Cancer of Unknown Primary. Prior to the acute oncology service 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.

2.21.7 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 (Ex Nursing Sister) called 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 Velindre Cancer Centre 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'*

2.21.8 Further support is provided by Velindre Cancer Centre to the Aneurin Bevan, Cardiff and Vale and Cwm Taf Local Health Boards to optimise the quality of the current network of services, with Velindre 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.

2.21.9 Velindre views the implementation of the acute oncology service model

across South East Wales as being a key enabler for improving the system in sustainable way.

2.22 There is significant variation in the referral and conversion rates for urgent suspected cancers across primary care and this may have a detrimental effect on patient outcomes

2.22.1 Achieving earlier diagnosis of cancer has been part of the strategy for improving cancer outcomes in Wales for the past decades. This was formalised with the introduction of the urgent suspected and non-urgent suspected cancer targets within Wales. A similar approach has been taken in England with the introduction of the 2-week wait for patients with suspected cancer. Implicit in the approach in both Wales and England is the intention that the majority of cancer should be diagnosed by this route. However, as more detailed data and information has become available across the United Kingdom, it is apparent that a significant proportion of cancers reach a diagnosis by other routes. For example, in England during 2007 only 25% of cancers were diagnosed through the 2-Week Wait pathway. [28]

2.22.2 Data available in England has identified a significant variation in the use of the 2 week wait pathways between GP practices and primary care Trusts (which have since been abolished) which was a cause for concern for both the National Audit Office [29] and the Public Accounts Committee. [30]

2.2.3 Work has recently commenced in Wales examining the variation in referral and conversion rates for non-urgent suspected and urgent suspected cancers across primary care. The intention is to design and deliver a system that delivers a high detection rate with a high conversion rate, which is widely believed to be an indicator of good practice. This would see a high detection rate, which implies that fewer patients are being diagnosed by routes that are slower, such as emergency department diagnoses, which is associated with poorer outcomes; [31] and a high conversion rate which implies that the pathways are being used efficiently.

2.22.4 Whilst the work is at an embryonic stage, there is sufficient management and qualitative information available to suggest that there is significant variation across Local Health Board areas and significant room for improvement in the identification and referral processes. There are a number of elements that would assist in supporting the required improvements which include the

[28] National Cancer Intelligence Network. Routes to diagnosis — NCIN data briefing. London: NCIN. http://www.ncin.org.uk/publications/data (accessed 19 Jul 2012).

[29] National Audit Office. Delivering the cancer reform strategy. The Stationery Office, 2010.

[30] Public Accounts Committee. 24th Report: delivering the cancer reform strategy. London: House of Commons, 2011.

[31] McArdle CS, Hole DJ. Emergency presentation of colorectal cancer is associated with poor 5-year survival. Br J Surg 2004; **91(5):** 605–609.

availability of routine and robust data and information, effective diagnostic tools within primary care, an effective training and education programme and access to support within secondary and tertiary care. The evidence available suggests that a more effective system, characterised by early detection and referral, would significantly improve patient outcomes.

2.23 The clinical outcomes and experience for patients will improve if they have faster access to treatment

2.23.1 Access to fast and effective treatment and care are key determinants of clinical outcome. 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 chemotherapy the waiting times for adjuvant are 7 days up to 21 days for non-emergency chemotherapy and a target of 48 hours for emergency chemotherapy.

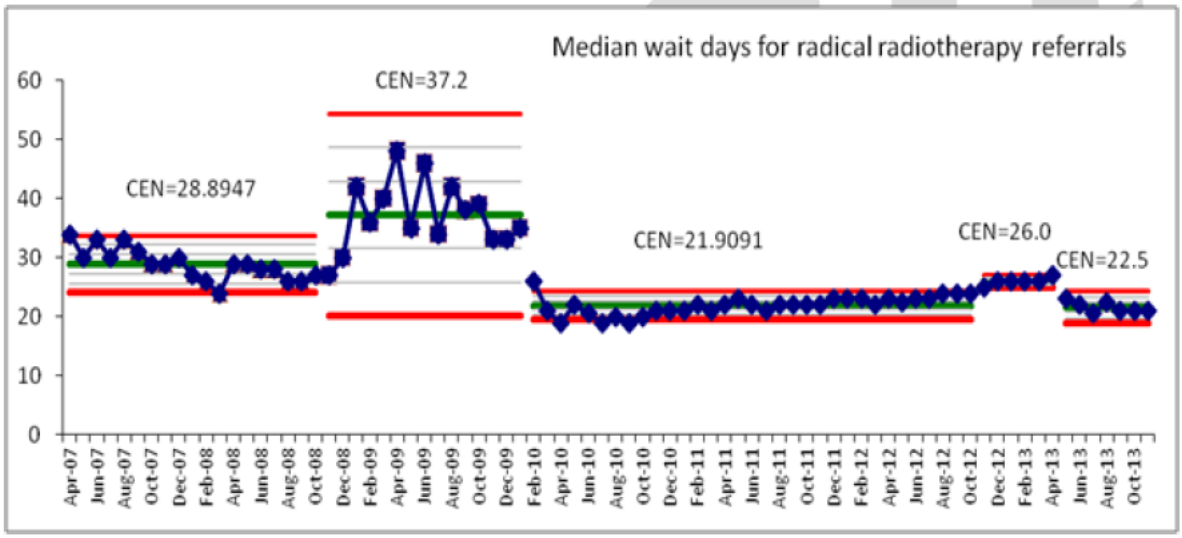


Figure 2.10 - Median Waiting Time for Radiotherapy

2.23.2 In October 2013 the median wait for radical radiotherapy was 22.5 days. This is as a result of the work that has been undertaken to redesign systems and processes to reduce waiting times. This is exemplified by the reduction in waiting times for head and neck radiotherapy from 28 days to 14 as illustrated in Fig.2.18. This drive for continuous improvement will continue through the implementation of a new service model which is supported by the latest technology to drive improvement across all services and all sites in a sustainable manner.

2.23.3 However, it is evident that from 2014 / 2015 the demand for radiotherapy will 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.

2.23.4 Performance against the 21 day target for chemotherapy is also good with 93% of patients commencing their treatment within 13 days as illustrated in *figure 2.11*. 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. In the immediate, Velindre is currently 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.

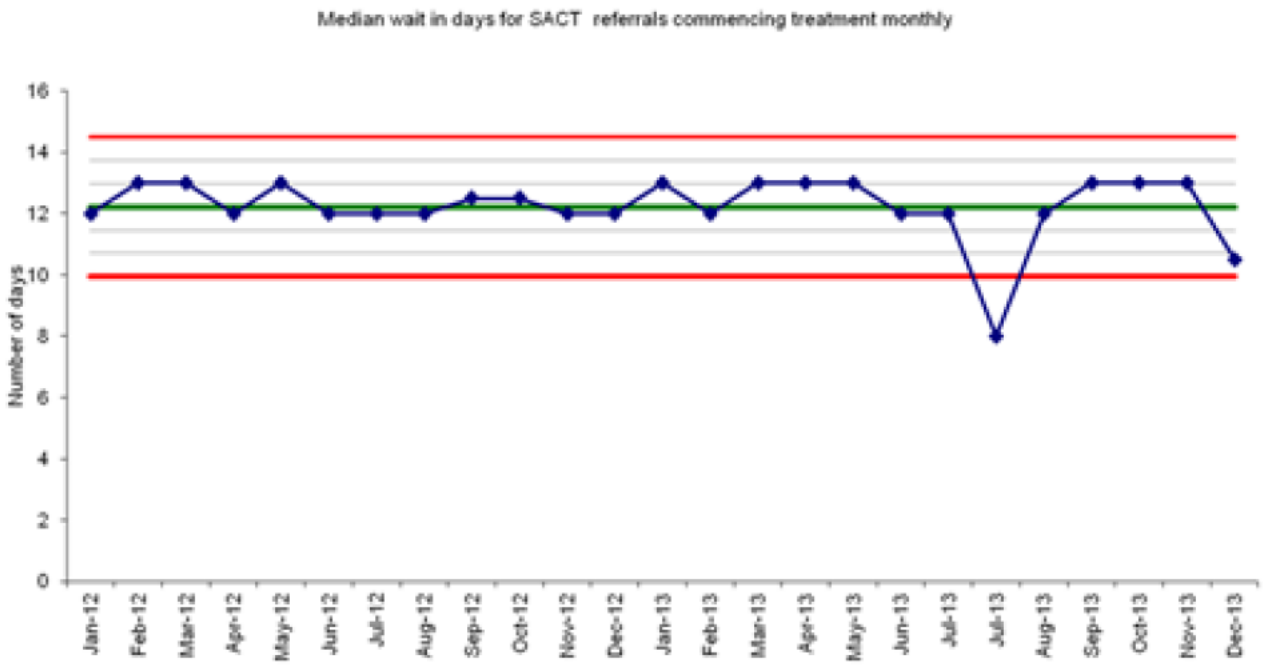


Figure 2.11 - Median Waiting Time Chemotherapy

2.23.5 In the medium term, whilst Velindre performs well against these targets it should be acknowledged that they are not considered to be good practice, as identified by the JCCO which stated that these were the maximum acceptable waits. The JCCO identified a set of good practice waiting times which are predominantly 50% lower than the maximum standard. The good practice waiting times standard are fully supported by the clinical body within Velindre Cancer Centre, with a strong ambition to significantly reduce waiting times if a step change in clinical outcomes is to be achieved.

2.24 There is a great opportunity to increase the uptake of new technology and the pace of implementation

2.24.1 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 less attendances at Velindre.

2.24.2 Developments in radiotherapy are perhaps the most dynamic and Velindre Cancer Centre, 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.

2.24.3 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.

2.24.4 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.
- 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.

2.24.5 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, Velindre 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.

2.24.6 The benefits of adopting and implementing new technology, and its impacts on outcomes, are demonstrated in a case study of patients with cervical cancer treated with chemoradiotherapy. Velindre Cancer Centre's for patient cohort, 1999-2004, had 2-year local control rate of 76% and the 5- year local control was 57%. This is similar to 3 year local control data from Vienna for patients treated between 1993 and 1997 which was 77.6%.

2.24.7 However, in 1997 Vienna implemented Image Guided Brachytherapy Treatment (IGBT) and their local control has increased steadily from 77.6% to 95% over the past 15 years following implementation as shown in table 2.14. This illustrates the importance of utilising the latest technology to make a step change in outcomes for patients.

Table 2.14 – Pelvic: local control at 3 years (Vienna)

Year	1993-1997	1998-2000	2001-2003	2001-2008
%	77.6%	82%	89%	95%

2.24.8 It is anticipated that with the implementation of IGBT, local control can increase South-East Wales outcomes to a similar level. The implementation of new technology presents a major opportunity or risk with regard to the development of world class research and development and the attraction and retention of the highest quality clinical, research and professional staff. Leading edge technology is one of the key drivers of cancer care and attracts the best people to a cancer centre. Without the ability to identify, secure and implement technology quickly, the progress required to achieve the step change in outcomes will be difficult to achieve.

2.25 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

2.25.1 The good news in Wales is that the number of people surviving cancer has increased. 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. [32] 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. [33]

[32] Together for Health – Cancer Delivery Plan, Welsh Government 2012.
[33] Cancer Rehabilitation Standards, 2010.

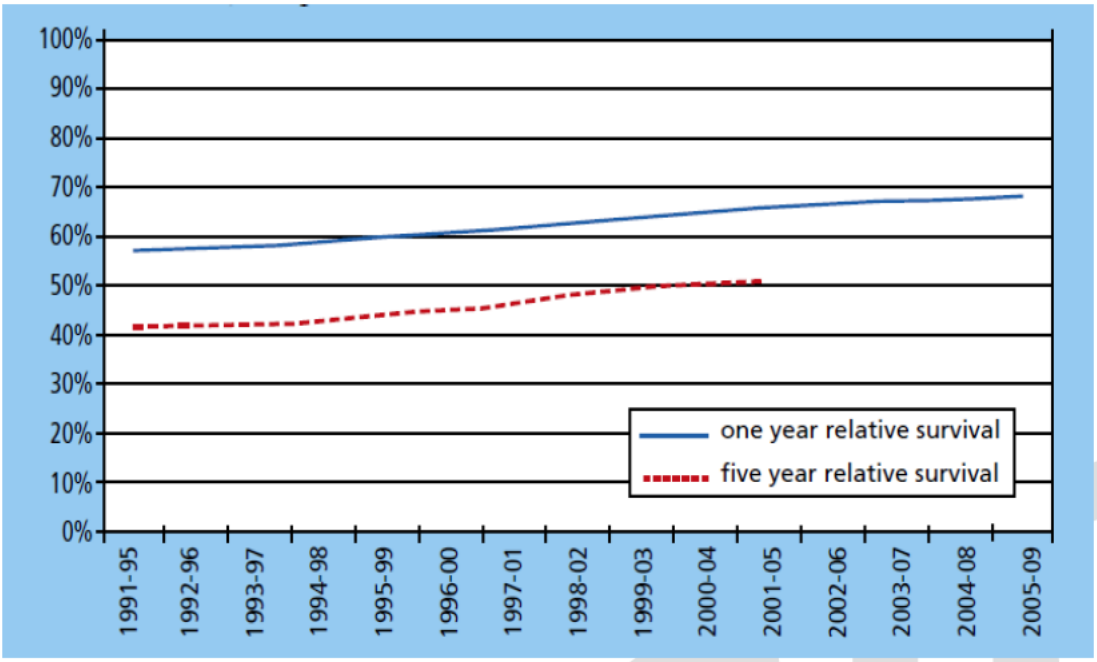


Figure 2.12 – Percentage of Patients Surviving all Cancers (excluding non melanoma skin cancer)

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

2.25.3 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 and reduce the economic burden of cancer. Evidence shows that many cancer patients have unmet needs from diagnosis through to the end of their treatment whilst others are struggling with the consequences of treatment that could be either avoided or managed better. [34] It is important that the current range of services is further developed in accordance with the vision set out by the *National Cancer Survivorship Initiative* (2010). The future Velindre service will take a holistic approach to cancer and provide the following key elements:

- Information and support from the point of diagnosis.
- Promoting and sustaining recovery.

[34] Living with and Beyond Cancer: Taking Action to Improve Outcomes. National Cancer Survivorship Initiative. Department for Health, MacMillan Cancer Support and NHS Improvement (2013).

- Managing the consequences of treatment.
- Supporting people with active and advanced disease.

2.25.4 This will enable a holistic service to be provided to patients by Velindre Cancer Centre and its partners across South East Wales which is sensitive to patient's ongoing needs whether they be acute, psychological or simply friendship and support.

2.26 Referrals will increase by 1.5% annually and there is insufficient radiotherapy capacity at Velindre Cancer Centre to meet future needs.

2.26.1 Cancer incidence is forecast to increase at approximately 1.5% annually. The modelling work undertaken on radiotherapy services at Velindre Cancer Centre in respect of South-East Wales suggests that in real terms this will result in an increase of approximately 18% in referrals between 2013/2014 and 2024/2025.

2.26.2 When calculating the capacity required to support the number of referrals and time taken to treat patients it is important to be aware of the risks associated with the use of average times. Averages are simple because we are familiar with them. However, if the average is used to determine the capacity requirement, 50% of the time the demand will exceed the capacity and a queue will develop.

2.26.3 Improvement organisations in healthcare have found that as a general rule, capacity should be set at the 80-85 percentile of the daily demand value in order to allow the service to manage fluctuations in demand without developing a queue of people waiting. This is the approach used by Velindre Cancer Centre to determine future capacity requirements.

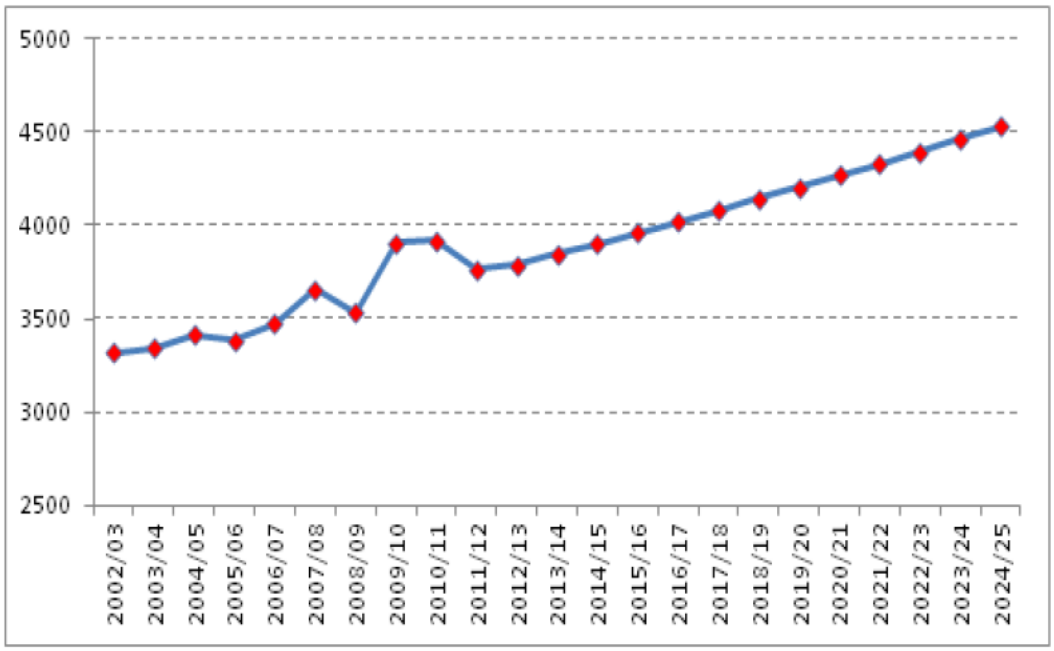


Figure 2.13 - Predicted Number of Annual Referrals for Radiotherapy

2.26.4 The expected level of increase in referrals will result in a significant gap developing between capacity and demand with the initial impact first being felt in 2014 / 2015 and the gap widening thereafter. This is illustrated in *figures 2.13 and 2.14* with shows the gap between the current and predicted daily linac machine time, representing patients who would not be treated within the 28 day target for radical radiotherapy if no action was taken.

2.26.5 Velindre is currently 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.

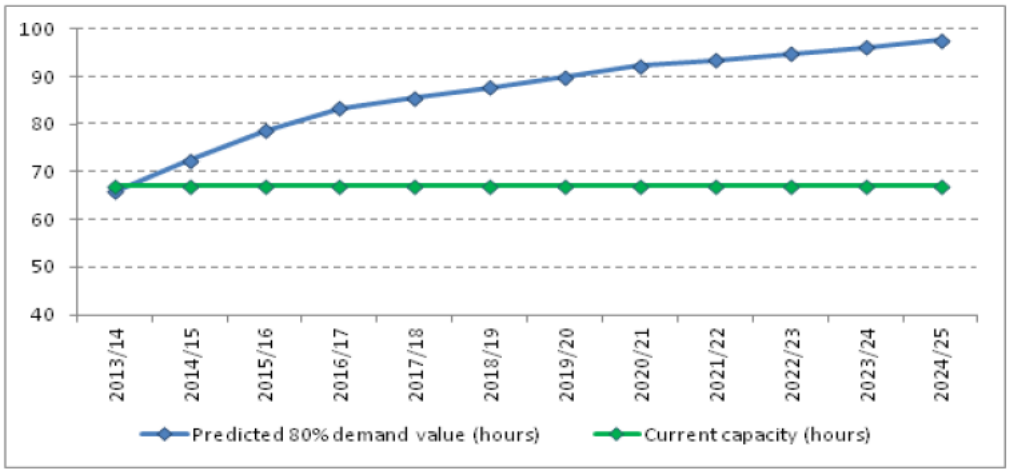


Figure 2.14 - Available Linac Machine Time and Required Machine Time

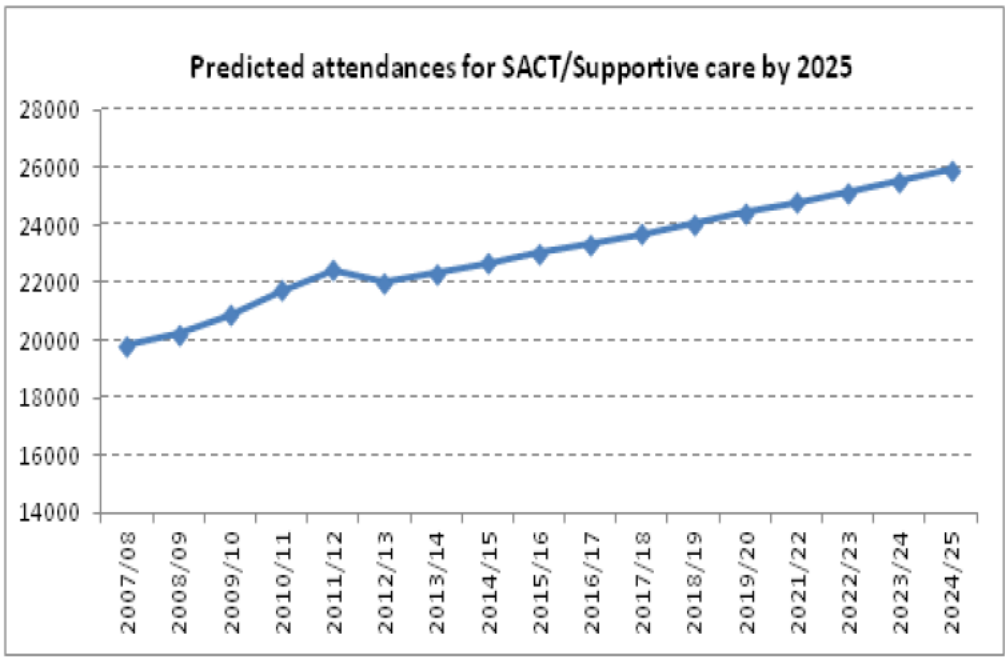


Figure 2.15 - Predicted Attendances for SACT/Supportive Care by 2025

2.26.6 The picture is similar for chemotherapy treatment with a steady increase in referrals over the next decade. However, in real terms this will require an additional increase in activity of 16%. This is illustrated in Figure 2.15.

2.27 The demand and complexity of treatment is rising at a significant pace and is often not accounted for in future service planning.

2.27.1 The pace of clinical and technological change and innovation in cancer services is rapid and this can often lead to misunderstanding when trying to plan services. Traditionally, current and future referrals and activity levels are used to assess whether a service has sufficient capacity and capability to achieve the required standards and outcomes. However, whilst useful in broad terms, this does not provide a comprehensive picture with regard to cancer services as it does not take account of the increasing level of complexity being used in cancer treatments. With regard to radiotherapy services a better currency is the time taken to provide the service.

2.27.2 Over the past decade there has been a shift from '*conventional*' to '*technical*' radiotherapy. This will continue over the following decades and represents a step-change in the way that radiotherapy is planned and delivered. For example, in 2013 radiotherapy is mainly 3D, computer-aided, and digital. It is vastly more sophisticated and complex than just 10 years ago. The majority of radiotherapy planning is done using imaging information from a 3D CT scanner. The oncologist, using computer treatment planning software, manually contours the tumour and the treatment volumes on the planning CT scans, a process that may take 3 hours for a particularly complex case,

compared to perhaps 15 minutes a decade ago. A physicist may require a day to produce an acceptable plan. Treatment itself commonly involves multiple bespoke radiation beams, and requires rigorous QA. This can significantly extend the standard 15 minute treatment delivery slot.

2.27.3 The increase in complexity, and related human resource requirements is particularly noticeable when radiotherapy departments start to use IMRT routinely. It is probable that this will be the biggest service change over the next 5 years. Other developments, such as those related to IGRT, SBRT and SRS, will be no less complex, but (allowing for the usual learning curves) are likely to be introduced more incrementally than will be the case with IMRT. It is probable that some of the time consuming work involved in planning complex radiotherapy will become more automated over the next few years. An example of this is the increasing sophistication of automatic segmentation software, which can, to a variable extent, automatically contour body organs in a planning CT scan. This is currently a manual procedure which can take hours per case. To date, the automatic segmentation systems on the market do not meet the aspiration of being fully automatic and operators are still required to review and edit contours generated by these systems.

2.27.4 The complexity of radiotherapy treatment will continue to increase and hence the time taken to image, plan and verify. There are three components to this complexity:

- **Target volume definition**: this will increasingly involve co-registering of diagnostic imaging such as MRI and PET-CT and multi-disciplinary input into radiotherapy planning from radiology.
- **Dosimetric treatment planning**: this will increasingly use computer software to sculpt radiation delivery to treat the target volume and spare normal tissues at risk. This allows higher dose delivery to the target and improve cure rates or reduce toxicities from radiotherapy by sparing normal tissues. Planning may also take into account temporal changes in shape or movement of the target volume in the form of '*4D CT*' planning, which requires more extensive imaging procedures to record and account for motion effects.
- **Treatment set up, verification and 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

2.27.5 The increasing complexity of radiotherapy treatment delivery has resulted in a requirement to increase the routine appointment slot duration for radiotherapy attendances. IMRT planning has also had an impact on the

demand for medical physics planners. Audits have demonstrated that a conventional conformal plan would take approximately 3.5 hours to produce. The IMRT planning process was recently mapped and demonstrated a time requirement of up to 11 hours to produce and check an IMRT plan. This is subsequently reflected in appointment times. During 2007 / 2008 over 80% of referrals were allocated a 10 minute slot. In contrast in 2012 / 2013 this had reduced to less than 22% of attendances i.e. appointment times had significantly increased.

2.27.6 When predicting the required daily linac machine time for radiotherapy in the future, known changes to the service have been considered and have been included as additional hours per working day. The impact of changes to be implemented in the coming three years is relatively well understood and has formed the basis of the modelling.

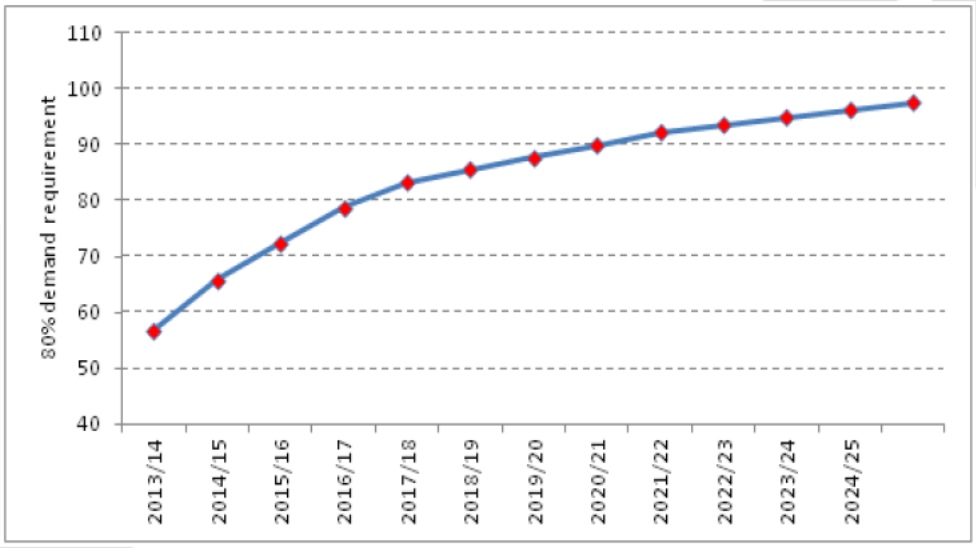


Figure 2.16 - Predicted Hours of Linac Daily Machine Time Required up to 2025

2.27.7 Initial forecasts suggest a 48% increase in linac machine time between 2013 / 2014 and 2024 / 2025, which equates to approximately 35 hours per day of linac machine time. It is expected that the linac machine time predictions set out in *figure 2.16* will be understated as new and increasingly complex technology is introduced into the service.

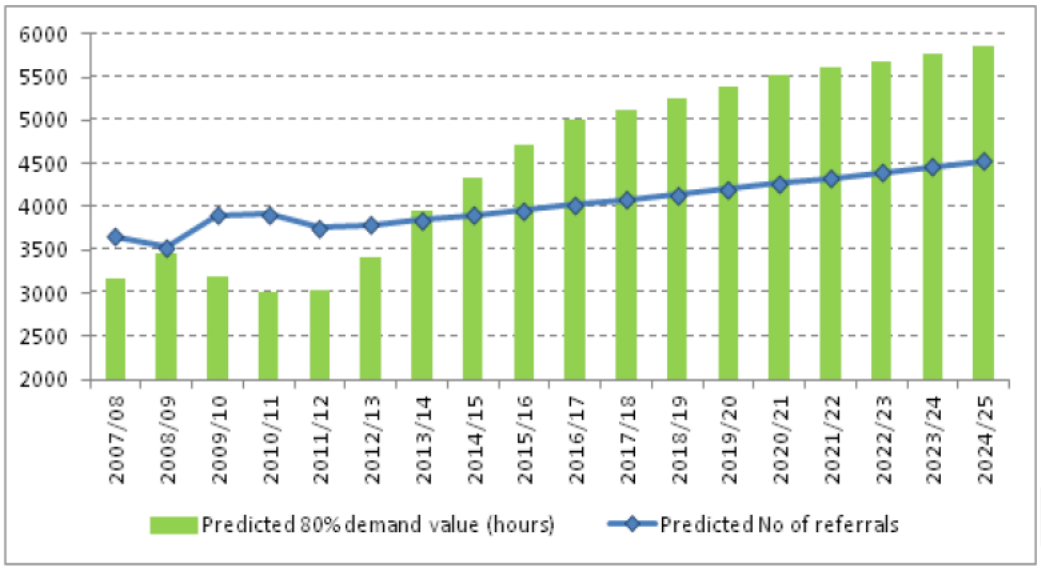


Figure 2.17 - Predicted referrals and Linac machine time required to treat them by 2025

2.27.8 Whilst a 1.5% annual increase may not seem significant, it represents a major challenge when converted into linac machine time hours required to treat patients. *Figure 2.17* illustrates this as whilst the predicted number of radiotherapy referrals increases steadily over the next 10 years, the amount of daily linac machine time required to meet the increase in referrals rises significantly as a result of the increase in complexity of treatments.

2.27.9 It is clear that the improvements to planning and treatment regimes will lead to significant increases in the amount of time it takes to treat each patient with more sophisticated clinical and technological procedures. This should be partially offset by a reduction in the number of episodes of treatment that patients receive, although the expected gains have not yet been fully evident in SBRT and IMRT. This additional element of complexity is often not understood sufficiently when planning service levels and is expected to grow exponentially.

2.28 Access rates for radiotherapy are lower than the clinical evidence suggests would benefit cancer patients.

2.28.1 National level planning for radiotherapy services is carried out in all countries of the UK. The access rate describes the proportion of cancer patients who should receive radiotherapy as part of their treatment. In 2006, the National Radiotherapy Advisory Group (NRAG) report recommended an overall access rate of 52% for radiotherapy. [35] The most recent recommendations on access rates for England are derived from detailed studies using the '*Malthus*'

[35] Radiotherapy: Developing a world class service. Report to Ministers from National Radiotherapy Advisory Group (2006).

modelling tool and involve an overall access rate of 40.6%. [36] The Malthus derived access rate is substantially lower than the international value but forms a stronger basis for planning projections as it is derived from more local data sources rather than the international literature. A Royal College of Radiologists (RCR) report, published in 2009 using data from 2007, noted that the average access rate for the UK was 37.1%, with the highest rate of 37.9% in England, 36.6% in Wales, 35.3% in Northern Ireland and 31.5% in Scotland. [37]

2.28.2 Whilst there is still discussion related to the definitive rate, there is a consensus across the UK on the continuing major role of radiotherapy in the treatment of cancer with a view that approximately 40% of patients would benefit from radiotherapy as part of their curative (radical) cancer treatment either used alone or combined with other modalities. This compares to about 50% for surgery and around 10% for chemotherapy and other systemic anti-cancer drug therapy.[38] It is clear that further improvements are required to achieve these levels of access in Wales as a whole, including the South East Wales population. The provision of a satellite radiotherapy site run by Velindre is likely to improve the level of access across South East Wales together with a range of other measures such as health care profession and patient information and education.

2.29 Cancer services at home or close to home: the need for a different set of services in South East Wales.

2.29.1 There is a clear ambition in Wales to place patients at the centre of service design and delivery with the starting principle being that care and treatment should be provided at home or as close to home as possible (*Designed for Life* 2005 and *Together for Health,* 2012). Whilst the current service model within South East Wales goes some way towards this, there is a need to make a fundamental strategic step-change in some areas of service design and delivery to maximise the potential benefits for patients, carers and their families. This is exemplified by the high proportion of patients who travel to Velindre for chemotherapy, approximately 65% of patients in 2012/2013. Many of these could have been safely treated at home with oral chemotherapy or close to home at an outreach clinic provided in a health care setting within their own Local Health Board if the facilities and infrastructure were available.

2.29.2 It is useful to note that during the same period, Clatterbridge NHS Foundation Trust provided 34% of patients with treatment at their main centre and 66% of patients with treatment at home or within an outreach setting close to

[36] Cancer Reform Strategy, Department of Health 2007.
[37] Achieving a world class radiotherapy service across the UK. A report for Cancer Research UK. 2009.
[38] Cancer Reform Strategy, Department of Health 2007.

their home. Whilst the services provided by Velindre and Clatterbridge are not directly comparable due to the different models and measurement e.g. Clatterbridge include the provision of oral chemotherapy in their data and Velindre does not, it provides a useful point of reference in relation to the type and scale of services that could be provided in the future by Velindre in collaboration with the Local Health Boards and its partners. This is demonstrated by the Velindre ambition for future provision of chemotherapy/SACT with 40% of patients attending the Cancer Centre and 60% of patients receiving their treatment at home or in an outreach clinic close to their home.

2.29.3 The picture is a similar one for radiotherapy services, with all patients requiring radiotherapy having to attend Velindre Cancer Centre at Whitchurch for planning and treatment. Whilst approximately 94% of the South East Wales population live within a 45 minute drive time of the centre, it is not always easy or convenient for patients to travel to appointments, which can often be in excess of thirty separate visits dependent on the particular treatment they receive. This difficulty can be further exacerbated if they need to rely on family members, carers or friends or have to use public transport which can often be sporadic and increase the travel time together with anxiety and stress.

2.29.4 The founding principle of the future service model for Velindre aligns directly with the strategic intent of care close to home:

'All care and treatment provided at home or close to home unless it is unsafe or does not provide the patient with the best outcome possible'.

2.29.5 To achieve this, a radical redesign of services is required based around a '*hub and spoke*' model which would enable approximately 60% of chemotherapy patients in South-East Wales to receive their care and support at home or close to home. Furthermore, a large proportion of radiotherapy patients could receive their initial consultation at an outreach clinic in the facilities of their Local Health Board and their treatment in locations closer to home through the provision of a Velindre Cancer Centre radiotherapy satellite site in the most appropriate location.

2.30 The current patient environment is poor and does not provide a high quality experience for patients, families and carers.

2.30.1 Velindre Cancer Centre was built in 1956 and has been extensively developed in an incremental fashion. The hospital is widely acknowledged as having a '*Velindre Way*' which is embodied by a culture where patients are at the centre of everything. The environment is a compassionate and caring one where staff consistently go the '*extra mile*' to meet the needs of patients, families and carers.

2.30.2 Notwithstanding this, there are large parts of the hospital which do not comply with statutory requirements such as Health Building Notes (HBN's). The site also presents a significant challenge with regard to energy and environmental management with the building design constraining the potential gains that could be made.

2.30.3 Of greater importance is the impact the environment has on patients and the service they receive. In general, the hospital is not fit-for-purpose to provide cancer services for a population of 1.5mllion people in the 21st century. This is illustrated in a number of ways:

Physical:

- 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 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.
- 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.

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.
- 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.

2.30.4 Whilst the quality of the service provided to patients is rated very highly, we fully recognise that the environment that it is provided in is not fit-for-purpose and does not provide patients, their families or our staff with the experience they deserve. This particular issue is perhaps the biggest risk to the reputation of Velindre Cancer Centre and will reduce its ability develop its reputation nationally and internationally and provide the highest quality patient care to which it aspires.

2.31 The current environment will make it increasingly difficult to maintain the high level of patient safety within Velindre Cancer Centre.

2.31.1 Velindre Cancer Centre 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 as they offer a number of major constraints:

- Infection control is made more 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 such as norovirus 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 this makes it more difficult for nurses to assist patients in and out of bed in hoists, for example.
    - 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 as it makes it more difficult to evacuate patients in the event of a fire.

2.31.2 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.

2.32 There is no capacity to site any additional linear accelerators on the Velindre Cancer Centre site.

2.32.1 The ability to sustain the current level of radiotherapy service is dependent upon the provision of the appropriate number of linear accelerators (linacs) and the timely and effective management of the replacement programme. The Velindre Cancer Centre currently has 7 linacs which are required to be replaced every 10 years in line with guidance issued by the National Radiotherapy Advisory Group (2007). [39]

2.32.2 However, the current site is fully developed and there is no obvious space available to accommodate any additional linacs given the requirement for new bunkers. The only potential location is the staff and patient car park which would address the service provision issue but would significantly worsen the poor parking facilities that exist already. This is considered to be an option which is not really achievable.

2.32.3 This represents a very immediate and high risk issue for Velindre given the current pressure in the system. This is compounded by the demographic data and the increasing incidence of cancer and the additional support that will be required by survivors. It is therefore imperative that a clear strategic direction is established as this will guide the planning of the next linacs. For example, if the service model and supporting facilities and buildings set out within this business case is supported it may be possible to place additional linacs on a new site or accelerate the development of the satellite sites. If the business case is not supported, a more practical and sub-optimal solution will need to be identified.

2.32.4 Planning work has commenced to determine what practical solution could be applied in the immediate term.

[39] Radiotherapy: developing a world class service for England. Report to Ministers from National Radiotherapy Advisory Group. (2007).

2.33 The current arrangements will not enable the Trust to achieve and sustain the requirements and standards set out within the national cancer delivery plan and other related policy requirements.

2.33.1 The Welsh Government has set a very clear ambition for cancer care in Wales within the *Cancer Delivery Plan* and is also very clear in relation to the quality, safety and experience of care that the population of South East Wales should receive. The Velindre Cancer Centre is currently at a tipping point in its ability to respond to these requirements in the face of increasing referrals into the service, increasing complexity of treatment which requires modern technology and clinical practice, a very poor environment for patients and their families and a set of services which will not address the future needs of the population it serves. It is abundantly clear that the Velindre Cancer Centre will be unable to continue to provide high quality care without significant changes to the services it provides, the way in which they are provided and the environment they are provided in. Put quite simply, the service will not be able to:

- Achieve the levels of safety and clinical outcomes.
- Provide fundamental services to all patients such as showers and toilet facilities.
- Sustain the current levels of prevention and control in respect of Health Care Associated Infections.
- Continue to achieve the current waiting times.
- Provide a high quality patient experience.
- Provide patients with car parking.

2.33.2 The consequence of this will be a reduced ability to attract and retain high quality clinicians and staff in the future, which will ultimately lead to a degradation of the quality of the service and the outcomes it produces for patients. This would have significant consequences for the patients we serve and their loved ones.

2.34 Improvements are required in the delivery of Palliative Care and supporting patients at the end of their life

2.34.1 It can be very shocking and upsetting to be told the news that your illness cannot be cured, and people may need help and support to cope with the news, to identify what their goals are, and to put in place the support they require.

2.34.2 The *Palliative Care Planning Report* (Sugar) (2008) was fundamental in identifying gaps in service provision, setting out core standards for palliative care and providing a focus for concerted effort in improving services. Since its publication, significant progress has been made in developing core and specialist palliative care services with the focus now being driven by the *Together for Health: Delivering End of Life Care*.

2.34.3 Notwithstanding this, there remains a great deal to do to provide a high quality and comprehensive palliative care service. There is a significant amount of evidence which points to a number of important issues:

- The majority of patients would prefer to be supported to remain at their home / usual place of residence for as long as possible.
- A significant number of patients clinical and emotional requirements change in the last few weeks of their lives as they seek the support and comfort offered by a more '*medical*' environment such as a hospice or a community hospital.
- Too many patients are dying in a location which is not their preferred place of death. [40]
- The health and social care system is too fragmented and does not make it easy to support patients to receive palliative care at home or to get back into the community following a stay in hospital.
- The greatest proportionate financial cost of a patient's care is in the last year of his / her life.
- High quality palliative care should not be seen as a '*last*' option when all medical treatment options have been exhausted. There is an increasing weight of evidence to suggest that palliative care can provide a better quality of life and can often extend the length of a patient's life for similar periods compared to standard medical treatments such as radiotherapy and chemotherapy. For example, a NEJM study showed that among patients with metastatic non–small-cell lung cancer, early palliative care led to significant improvements in both quality of life and mood. As compared with patients receiving standard care, patients receiving early palliative care had less aggressive care at the end of life and longer survival.[41]

2.34.4 The current system is believed to be fragmented, inconsistent and does not always meet the needs of palliative care patient, their families or carers. This is exemplified by the inconsistency in provision of core and specialist palliative care within South East Wales where Velindre Cancer Centre often provides palliative care for patients who could be considered to be '*non-specialist*'. However, the service is provided as a result of limited options elsewhere within the system.

[40] Higginson IJ, Sen-Gupta GJ . Place of care in advanced cancer: a qualitative systematic literature review of patient preferences. J Palliat Med 2000;3:287–300.

[41] Early Palliative Care for Patients with Metastatic Non–Small-Cell Lung Cancer. *The N*ew England Journal *o f M*edicine. Jennifer S. Temel, M.D., et al (2010).

2.35 Cancer consumes a significant percentage of health resource and this could be used more effectively to support patients with better care, assistance and outcomes.

2.35.1 Approximately £347.1million was spent on cancer services in Wales during 2010 / 2011. This represented approximately 7% of total NHS expenditure and was the fourth biggest spend area. This compares with France (7.7%), the USA (9.2%) and Germany (9.6%). [42] Given the future fiscal position of the NHS across the United Kingdom, it is vital that investment of this scale provides a significant return in terms of clinical outcomes and also economic benefits. This is illustrated by the work undertaken by the Policy Exchange in 2010 in England which estimated that cancer cost the English economy over £18billion in 2008, with nearly £5.5billion of this sum related to lost productivity of cancer survivors. [43] The research concluded that if survival rates in the UK could match the leading European rates by 2020, 71,500 lives would be saved and total cumulative costs could be reduced by £20bn. The savings would be realised through the reduction in societal costs brought about by earlier mortality and greater dependency during illnesses.

2.35.2 A study in Manchester, using theoretical modelling of patient data informed by expert clinical opinion, indicated that in Manchester, improving the co-ordination of services so that a small number of patients were moved to a less resource intensive cancer journey for breast and lung care could release in the region of 10% of measured costs for patients. It also found that a further savings in the region of £170,000 could be released annually to the wider economy through saved benefit payments and increases in tax contributions, if half of the sample of lung and breast cancer patients who currently return to work and then leave were more effectively supported through vocational rehabilitation. [44]

2.35.3 Despite no research being undertaken in Wales, it is clear that there is potential significant economic benefits to be derived in Wales if outcomes could be improved and people were able to return to a productive quality of life sooner than is currently the case.

2.35.4 There is arguably greater exponential scope in Wales given the higher rates of incidence and the poorer comparable outcomes achieved at present. Furthermore, the South-East Wales population served by Velindre contains some real polarised elements:

- It encompasses a large proportion of the Welsh population, is economically pivotal given its position as the heartland of the Welsh

[42] *Cancer Reform Strategy*, Department of Health, 2007.

[43] Featherstone, H. & Whitham, L. *The Cost of Cancer* (Policy Exchange, February 2010).

[44] Allirajah, D. *Demonstrating the Economic Value of Co-ordinated Cancer Services* (Macmillan Cancer Support, March 2010). http://www.macmillan.org.uk/MonitorResearchin Manchesterbriefing.pdf

economy.

- However, it contains some of the areas of highest social deprivation, ageing population and lifestyles factors which are likely to lead to an increased incidence of cancer. The opportunity to reverse the potential cost of cancer to the economy in South East Wales is perhaps of greater urgency and also offers massive potential here than anywhere else in Wales.

2.36 Research and development opportunities in Velindre and South East Wales must be fully exploited if we are to improve clinical services and improve patient outcomes.

2.36.1 The development of leading international cancer research and development 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.

2.36.2 Velindre Cancer Centre is recognised as a cancer centre of high standing in relation to its research and development activities with a particular strength in drug trials. 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 '*bench-to-clinic*' research to support continuous improvements in the quality of care and the outcomes it achieves for patients. The Trust has ambitions to significantly develop research activity, and the recent opening of the Phase 1 Clinical Trials Unit in 2013 has created a specialist environment for early phase trials.

2.36.3 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 clear:

> *'Velindre Cancer Centre will perform and lead high quality clinical research programmes to improve the health of the population and achieve a reputation for excellence nationally and internationally'*

2.36.4 To achieve this focus will be placed on:

- Improving access to patients to all trials including Phase 1, radiotherapy and rare cancers.
- Accelerating areas of research and development in areas which are currently under-developed including radiotherapy, nursing and medical physics;
- Continuing to develop areas of excellence in translational research including grant-winning research programmes in breast, prostate, GI, lung and head and neck cancers in collaboration with scientists and others at Local Health Boards and local universities.

- Building capacity and infrastructure with resources consolidated for pharmacy, radiology, nuclear medicine and radiotherapy.
- Developing the workforce with the creation of academic posts and more fellowship schemes.
- Further developing strategic and collaborative partnerships with local academic institutions such as Cardiff University, the University of South Wales and PETIC.

2.36.5 Research and development is a global and competitive environment. It is planned to further develop collaboration with universities, health boards, research and development bodies, government and a variety of other stakeholders to create a hub for research in state-of-the-art facilities which attract, retain and develop world-leading clinical academics. This will create a vibrant cancer research centre with the scale, credibility and facilities to attract substantial research, charitable and philanthropic grants.

2.36.6 Such a facility would complement the research and development infrastructure provided by academic institutions and other partners, and be a key part of a coherent network delivering integrated research and development strategies. The impact of this proposal should not be underestimated as it clearly demonstrates to staff, patients, referrers, commissioners, academic institutions, potential philanthropists and the wider community that South-East Wales is committed to the continuous improvement of care for people with cancer.

2.36.7 Such a focus for cancer research and development in South Wales will provide a number of benefits in addition to improving patient care and gaining important knowledge about cancer and its treatment. It would:

- Assist in the generation of a knowledge economy in South Wales.
- Attract additional investment and aid in forming strategic partnerships at a global level.
- Create high quality jobs in a sustainable manner.
- Support the development of South-East Wales as a global player in research and development.
- Significantly enhance the profile of the partner organisations including Velindre NHS Trust, Health Boards, the University of Cardiff and the University of South Wales and the various research and development organisations.
- Raise the profile of Wales and exploit the opportunities available.

2.36.8 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.

2.37 The development of a coherent approach to system planning and leadership is vital if the desired transformation is to occur.

2.37.1 The organisation of cancer services has been a source of debate over the past twenty years with the Calman-Hine (1995) report calling for the creation of a completely new kind of structure, a cancer network, covering the commissioning and delivery of all cancer services in one geographical area. One of the primary aims of this recommendation was to achieve more co-ordinated planning and delivery of cancer services across a country. This was enacted in Wales with the development of Cancer Networks, who work on behalf of each of the Local Health Boards, leading the strategic planning and delivery of services. This was supported by the All-Wales Cancer Implementation Group.

2.37.2 However, the outcomes in Wales continue to be less favourable when compared with other countries and the leadership and organisation of services is viewed as one of the potential inhibiting factors. The Welsh Government has commissioned a review of the existing structures which some view as being too large in number when compared to the size of the population, overly complex and often result in duplication. The expected benefits of the review are the development of a system which provides clarity in respect of roles, accountability and relationships; acts strategically in a co-ordinated manner; improves the quality and pace of decision making; eliminates inefficiency and unnecessary bureaucracy; and drives continuous improvement to services on the ground.

2.37.3 Whilst there is no definitive evidence base available at present, there is a widely held belief that the current system in Wales could be significantly strengthened in respect of system level leadership, strategic planning, co-ordination and delivery of services. There are a number of different systems and models used across the world to deliver cancer services with one of the most interesting being that adopted within British Columbia [45] which implemented a comprehensive and integrated approach to cancer care which contained a number of important characteristics including:

- A shared vision and common purpose.
- A strategic approach to planning, standards and delivery of services.
- A single system leadership role which, in partnership with others, was able to provide expertise, focus and energy on cancer services.

[45] The British Columbia Cancer Agency: A Comprehensive and Integrated System of Cancer Control. Healthcare Quarterly, 3(3) March 2000: 31-45.doi:10.12927/hcq..16755.

- An oversight role across the whole system of care.

2.37.4 The outcome of the Welsh Government review will provide an important roadmap for strengthening the system design and leadership of cancer services in Wales.

2.38 Investment Objectives

2.38.1 The Investment Objectives for the Programme are listed below.

Table 2.15 – Strategic Outline Programme Investment Objectives

Investment Objective	Desired Outcome
Investment Objective 1: To provide patients with high quality services that deliver optimal clinical outcomes	• Improve 1 year survival rates for all cancer sites in South East Wales (upper quartile Europe) • Improve 2 year survival rates for all cancer sites in South East Wales (upper quartile Europe) • Improve 5 year survival rates for all cancer sites in South East Wales (upper quartile Europe) • Improve 1 year survival rates for patients receiving definitive treatment at VCC Wales (upper quartile Europe) • Improve 2 year survival rates for patients receiving definitive treatment at VCC Wales (upper quartile Europe) • Improve 5 year survival rates for patients receiving definitive treatment at VCC Wales (upper quartile Europe) • Improve 30 day mortality post chemotherapy (upper quartile Europe) • Continuous improvement in the early detection and diagnosis rates (by stage) (upper quartile Europe) • Reduce variation in primary care in: ○ General practice detection rates for urgent suspected cancer ○ General practice conversion rates for urgent suspected cancer • Continuous reduction in the % of patients receiving their first diagnosis within an emergency / A & E setting (upper quartile Europe) • Increase in the % of patients accessing radiotherapy where it is clinically appropriate (upper quartile Europe) • Provide a high proportion of patient care and support care closer to patients' homes with: ○ 60% of chemotherapy treatments delivered at home or in the community ○ 98% of patients receiving radiotherapy treatment within 45 minutes travelling time of their home. • Improve patient safety by reducing harm and variation with: ○ No instances of Velindre acquired Health Care Associated Infections (upper quartile Europe)

Investment Objective	Desired Outcome
Investment Objective 1 (continued):	○ No instances of Velindre acquired pressure ulcers (upper quartile Europe) ○ No instances of Velindre acquired deep vein thrombosis (upper Quartile Europe) ○ No instances of medication errors (upper quartile Europe) ○ No instances of radiation errors (upper quartile Europe) • 99% of patients rating their experience as excellent (upper quartile Europe)
Investment Objective 2: To continuously improve clinical outcomes by being a leader in research, development and innovation	• 50% of Velindre Site Specific Teams (SSTs) to include national or international leaders • 7.5% of patients recruited into interventional clinical trials for each cancer site • 20% of patients for each cancer site entered into clinical trials each year • 20% of patients consenting to donate tissue to the Welsh Cancer Bank • 50% increase in the number of clinical trials sponsored by Velindre with the aim of achieving levels of other leading cancer centres (upper quartile Europe) • 100% of patients treated by Velindre to have the opportunity to participate in clinical research trials and activity • 10% of portfolio trials to have a Velindre chief investigator • 10% of Velindre consultants to be chief investigator • Velindre to open an international trial by 2022
Investment Objective 3: To achieve all national cancer and clinical standards and practice which are considered to be best in class internationally	• To support Local Health Boards in achieving the 31 day and 62 day National Cancer waiting time targets • To reduce radiotherapy waiting times from maximum targets to best practice: ○ radical radiotherapy from 28 days to 14 days ○ palliative radiotherapy from 14 days to 7 days ○ routine chemotherapy from 21 to 7 days ○ adjuvant chemotherapy from 21 days to 14 days • To achieve a continuous reduction in the % of patients who die in an acute hospital setting • To increase the % of patients dying in their preferred place

Investment Objective 4: To deliver cancer services to the population in most cost effective, efficient and productive manner	• To increase the resources available for cancer care by:
	  ○ achieve 7% of income as a % of turnover from commercial
	• To increase the resources that are applied to direct patient care by:
	  ○ reduce the cost per unit of comparable activity for clinical services delivered by VCC (upper quartile Europe)
	  ○ reduce back office costs (administration, facility management and operational estates) (upper quartile Europe)
	  ○ achieve optimal utilisation rates for all services and technology (upper quartile Europe)
	  ○ achieve optimal levels of efficiency and productivity (upper Quartile Europe)

Investment Objective 5: To deliver a high quality and sustainable service	• To provide sufficient capacity and flexibility to meet predicted demand (xxx number of radiotherapy fractions and xxx chemotherapy treatments annual increase)
	• Attract and retain a clinical workforce that is recognised as leaders in their field at a national and international level:-
	  ○ 50% of Velindre SSTs to include national or international leaders.
	  ○ % of staff with Chairs / Readers / Fellowships within academia
	  ○ staff turnover
	  ○ absence rates
	• Reduce of the environmental impact of the service through reducing the rate of energy consumption and carbon emissions:
	  ○ reduction in carbon emissions
	  ○ reduction in energy consumption
	  ○ achievement of BREEAM excellent

2.39 Main Programme Benefits

2.39.1 The Programme will realise the following benefits. A full Benefits Realisation Plan is provided as *appendix 2(b)*.

Table 2.16 - Summary of the Key Benefits

Patients, Families and Carers	Direct to Velindre, South East Wales and Local partners	Welsh government and wider society
Improved lifetime productivity • Reduced loss of earnings for patients(QB) • Reduced loss of earnings for carers and family members (QB) **Improved patient outcomes** • Improved access to care (QB) • Improved access to clinical trials (QB) • Quicker access to care (QB) • More patients having concurrent services (QB) • Improved coordination of care (NQB) • Increased ability to adapt to patient requirements (NQB) **Longer term improved outcomes** • Improvements in survival and late toxicities(QB)	**Increased income** • Increased income generation for Velindre (QB) **Effective management of resources** • No coordination with overseas centres (QB) • Increased ability to meet demand (NQB) • Greater asset utilisation (QB) **Job satisfaction** • Contribute to wider patient pathway (NQB) • Deliver the best available treatment (NQB) • Increased opportunities in research and development (QB) **Reputation of Cardiff** • Increased public recognition of Cardiff as	**Reduced cost of care** • Reduction in overseas treatment costs (QB) • Reduced cost of treatment (QB) • Reduction in treatment of secondary cancers and other late effects of treatment (QB) • Reduced indirect health care costs associated with sub optimal treatments (QB) • Reduced social care costs associated with sub optimal treatments (QB) **Effective management of resources** • No coordination with overseas centres (NQB) **Wider economy** • Increased employment in NHS/construction/service industries

Improved patient and carer experience • Reduction in travel time and costs(QB) • No need to travel abroad (NQB) • Improved access to local support network (NQB) • Integrated model of care (NQB) • Increased patient confidence in services in the knowledge that they are receiving world class treatment (NQB) • A safer and patient centred environment (QB) • Improved care due to improved education of clinical staff (NQB)	a host of excellent cancer services (NQB) • Improved reputation and recognition of VCC and Cardiff as world class leaders in cancer care and research (NQB) • Increased ability to attract world leading staff to VCC and Cardiff (NQB) • Increased ability to share and drive best practice nationally and internationally (NQB) • Increased employment opportunities for Cardiff (NQB) **Reduction of environmental impact** • Reduction in rate of energy consumption (QB) • Reduction in carbon emissions (QB) • Reduced traffic impact to local residents (NQB) **Local Economy** • Improved levels of productivity within local economy due to reduced staff absence (NQB) • Increased spend within the area (NQB)	(NQB) • Patients return to work and therefore contribute to the economy sooner (NQB) • Inward investment to Wales from National and International companies (NQB) **Improved reputation of Wales** • Improved reputation of Wales as a leader in cancer care and research (NQB) **Infrastructure** • Reduction of demand on the current infrastructure (NQB) **Political** • Implementation of key WG cancer priorities (QB)

2.40 Programme Level Risks

2.40.1 A Programme level risk register is provided as *appendix 2(c)*.

2.41 Programme Level Dependencies

2.41.1 A number of high level dependencies have been identified and are listed below. These will be developed in more detail at the next stage of the business case process. This will require close collaboration with a number of internal and external stakeholders.

- **Availability of capital funding**: The availability of capital funding through an accessible, affordable system will be crucial to enable estate aspirations, and therefore maximise benefits from service change.
- **Availability of revenue funding**: The availability of revenue funding, at appropriate timescales, will be essential to facilitate delivery of the preferred service model.
- **Service payment system**: Service change and new assets must be affordable and sustainable within the income and expenditure system.
- **Clinical acceptance**: The clinical service model must be accepted by the clinical body as they will be key in the implementation of the new model.
- **Workforce acceptance of change**: The transformation of cancer services across South-East Wales is dependent upon large scale service change and it is vital that the Velindre workforce is fully supportive of this change process.
- **Wider health strategy and governance**: It is essential that general health strategy and governance in Wales will remain broadly consistent over the period of change (to 2021).
- **Engagement with Local Heath Boards and other partners**: In order to deliver the preferred service model, and in order to provide more services locally, it is essential that space for service expansion is identified across the South-East Wales network.
- **Working with others**: The ability of the Trust, and the willingness of stakeholders in the health and social care economy, to work together will be essential to maximising benefits.
- **ICT strategy**: The Trust must work with existing health ICT structures and programmes to ensure integration with its plans.
- **Planning**: The various options for redeveloping the estate to accommodate non-surgical cancer services at VCC and beyond will require planning permission and thereby support local planning strategies and plans.

Clinical Service Model -The Service Proposal

2.42 Overview

2.42.1 The aim of the service proposal described in this Strategic Outline Programme is to develop a set of seamlessly integrated cancer services to support patients and families which remove the artificial boundaries between cancer detection and diagnosis, treatment, living with the impact of cancer and palliative care / end of life. The proposed service model has been developed in accordance with the principles of:

Co-production: which enables citizens and professionals to share power and work together in equal partnership, to create opportunities for people to access support when they need it and contribute to social change and transformation. In practice, co-production acknowledges that everyone is an expert in their own life and that enabling people to support each other builds strong and resilient communities which help to strengthen the relationship between citizens and service providers, improving outcomes for everyone.

Prudent healthcare: '*healthcare which is conceived, managed and delivered in a cautious and wise way characterised by forethought, vigilance and careful budgeting which achieve tangible benefits and quality outcomes for patients*' (Bevan Commission, 2013, *'Simply Prudent Healthcare').* At Velindre, the working ethos of prudent healthcare is '*healthcare that fits the needs and circumstances of patients and actively avoids wasteful care that is not to the patient's benefit*' (1000 Lives, 'Achieving prudent healthcare in NHS Wales, June 2014). The proposed service model will see services provided which strive to do no harm, carry out the minimum effective intervention which is consistent with the seriousness of the patient's illness and is appropriate to the patient's own goals, and supports equity of service across the population we serve.

2.42.2 The proposed service model is one of integration which focuses on improving the quality for individual patients, families and carers by ensuring that services are designed around their needs and that their views and choices are the organising principle for the delivery of care i.e. placing the patient at the centre of everything we do. It will allow an iterative conversation between the service and citizens and patients in relation to:

- What does a good life look like for you?
- What do you want from the service?
- What patient and service strengths can we build upon?
- How can we work in partnership with you to achieve your goals?
- How can we build trust and confidence in each other to allow us to achieve your goals?

2.42.3 This approach 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:

- What do you need?
- What are you eligible for?
- How do you fit into the system?

2.42.4 Whilst we do not believe Velindre Cancer Centre ever delivered services in this way, there is clearly further to go in enabling people to take responsibility for their health, empowering patients to manage their health care and delivering quality, experience and outcomes that compare favourably with the best elsewhere. The proposed service model therefore does not think about '*fitting*' people into pre-determined services but seeks a fundamental transformation to allow 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. The achievement of this requires the whole system of public and voluntary sector services to work together. With regard to the NHS, there will need to be true integration from public health to primary to community to hospital to social care, whether working as public employees, independent practitioners, or not-for-profit organisations. There will also need to be a recognition of the need to create a truly integrated system provides care for and support patients and their families to achieve the best possible outcomes within the resources available.

2.42.5 To do this will require us to equip and support our staff to continually improve and work in new and different ways. We wish to move the services people receive from us, cancer services across Wales, and the organisation itself from '*good*' to '*great*' and 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 optimum levels of service quality in a sustainable way.

2.42.6 *Figure 2.18* overleaf is a simple illustration of the model of ownership, support and care that Velindre NHS Trust is using to design, plan and deliver services which are fit for the future.

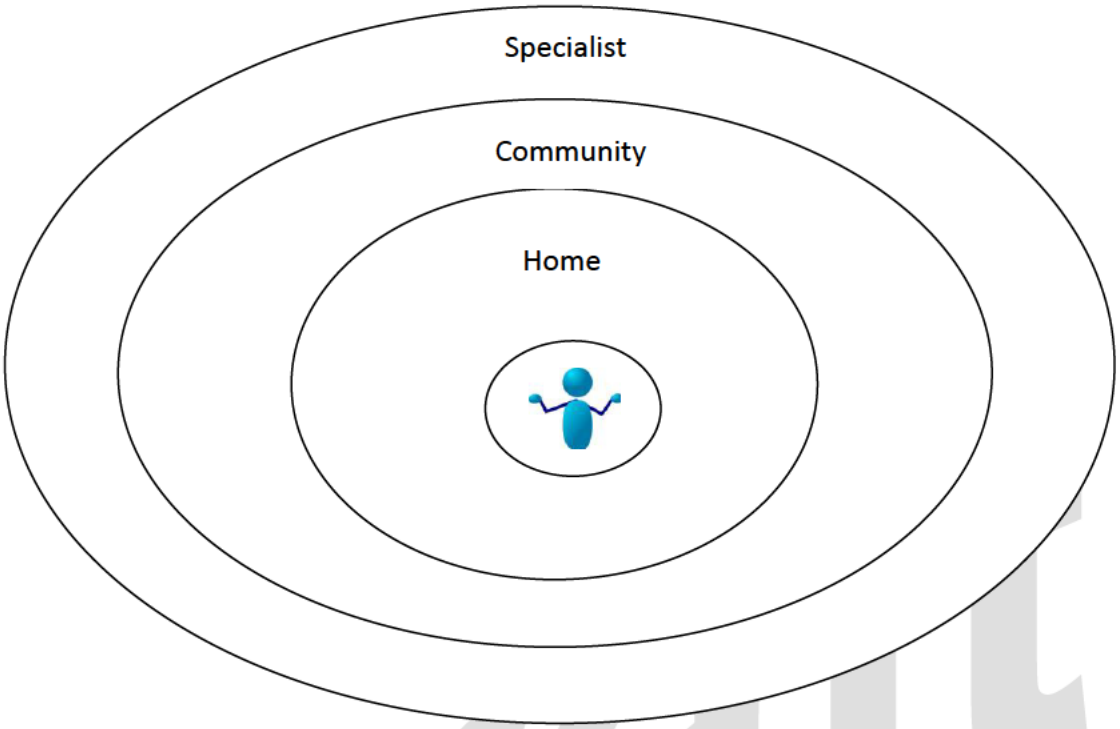


Figure 2.18 – Integrated Clinical Service Model

2.43 The Proposed Service Delivery Model – Key Principles

The proposed model will operate on a number of important principles:

- Delivering the highest quality of care, patient experience and outcomes will be placed at the centre of everything we do.
- Patients will be supported to take responsibility for their health and provided with the support, information and skills to manage their own needs effectively.
- The relationship between patients /families /carers and clinicians / professionals will an equal and reciprocal one and seek to identify realistic and achievable goals.
- Patients will be placed at the centre of service design, planning and delivery.
- Patient safety is paramount and fundamental standards of care will always be met.
- Services will be integrated, seamless and available 24/7 where there is a clear need with patients provided with care and support at home or as close to home as possible where this is appropriate.

2.43.1 The adherence to these principles within the service model will ensure patients, their families and carers are at the centre of the service and are able to make informed choices about the care and support they receive, where

they receive it and what support they require to achieve their desired outcome.

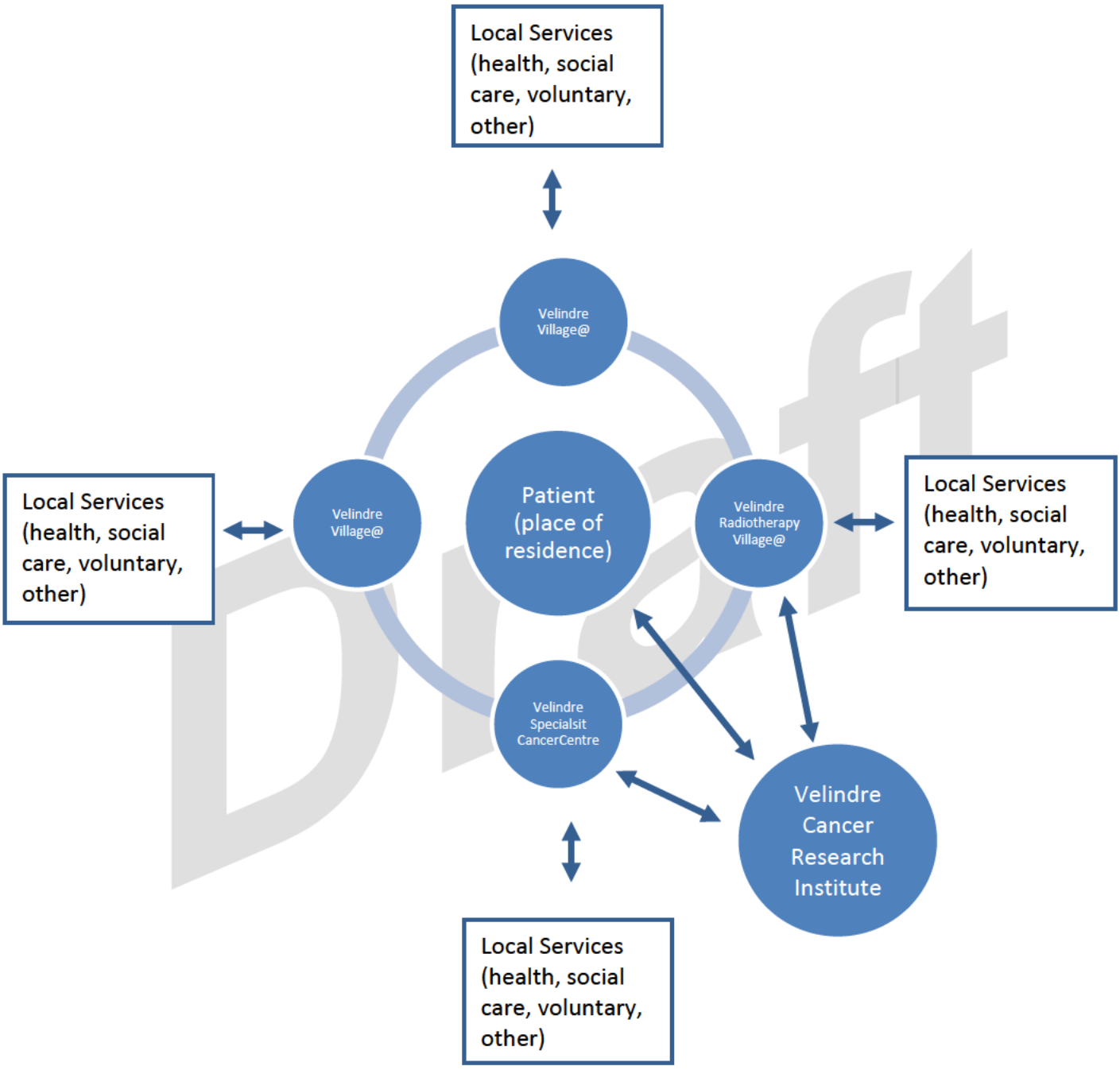


Figure 2.19 – Patient at the Centre of the Integrated Service Model

2.44 The Service Model Described - An Integrated Network of Services

2.44.1 The model will operate as an integrated network of services organised around a range of evidenced based pathways. The provision of seamless services will require all organisations to work together to develop a set of services which provide patients with all the care, support and information

they require at the earliest opportunity in their journey. The proposed service model operates on a '*hub and spoke*' principle.

Hub: Patient (The patient is seen as the '*hub*' and they could reside in one of a number of possible places e.g. own home, family members home, hospice etc).

Spokes: Velindre Village@

Velindre Radiotherapy Village@

Velindre Specialist Cancer Centre

Velindre Cancer Research Institute

2.44.2 The '*hub*' will be the patient who may reside in one of a number of possible places depending on their needs and circumstances. The intention is to provide everything a person needs at their preferred place to support them achieving their personal goals, during treatment and when living with the impact of cancer. It is important to acknowledge that the provision of services at home, for example, may not always be in the best interests of patients i.e. an 85 year old patient who is immobile and partially sighted may not choose to receive chemotherapy at home on their own. They may wish to attend a Velindre Village @ for personal reasons and to address their social needs.

2.44.3 The '*spokes*' ('Velindre Village@' and Velindre Radiotherapy Village@') will be fully integrated within the local community and sit within / alongside the wide range of public services available to people. It is envisaged that a high proportion of patients will be able to receive the full package of treatment, care and support within their '*spoke*' without needing to attend the Velindre Specialist Cancer Centre. Integration can happen, for instance with local GP practices, who have patients on their palliative care registers that need access to services like paracentesis (draining of fluid from the abdomen for patients with certain advanced cancers) or need a syringe-driver pump setting up for nausea and vomiting. Both of these procedures take time and usually need admissions to hospitals, but if the Village were to provide these then GPs could link in and refer as day-cases.

2.44.4 The development of Velindre Villages@ within the Local Health Board / Local Authority area will provide opportunities for better partnership working and allow patients to deal with people who they know, have existing relationships with and can support them throughout their journey. This will make it easier for local pathways of care to be developed and managed and will support more effective co-ordination of services due to their local nature.

2.44.5 The '*Velindre Specialist Cancer Centre*' will only be visited by patients whose clinical needs require more complex treatments and for patients within the

local population. The Specialist Cancer Centre would provide the location for the Velindre Cancer Research Institute, bringing together a range of clinical and desk based research professionals, academics and institutions into one place with a common agenda.

2.44.6 To support the building of a brand of excellence, the Villages would be known as '*Velindre@*'. This offers a number of benefits including a brand synonymous with excellence, the enhanced ability to attract and recruit high-quality staff and the enhanced ability to attract research and development opportunities.

2.45 The Service Model in Practice

2.45.1 The range of services provided by Velindre will be available in a variety of forms and at a number of places, subject to the patient's goals and needs. These are described in *figure 2.20*.

Figure 2.20 – Location of Service Provision

Patient (Hub)

- Chemotherapy
- Outpatient Follow-up via telephone or Skype
- Patient monitoring and self-management via telemedicine
- Living with the Impact of Cancer services (speech and language, dietetics , support and information, financial advice etc) *(* described in greater detail later on in this chapter)*
- Public health information and advice
- Co-ordination with other services agencies via Cancer Nurse Specialists
- Palliative care
- Research and development
- Clinical trials (Phase 4 e.g. low end trials and data collection)

Velindre Village@ (spoke)

- Chemotherapy (core) (Day Unit)
- Stratified medicine and gene therapy
- Outpatients (new and follow-ups)
- Clinical Assessment Unit
- Living with the Impact of Cancer services (speech and language, dietetics , support and information, financial advice etc) *(* described in greater detail later on in this chapter)*
- Social and welfare services (integration with Local Authority and third sector)
- Pathology (histopathology/microbiology etc)
- Blood transfusion / haematology
- Radiology
- Nuclear medicine
- Co-ordination with other services agencies via Cancer Nurse Specialists
- Public health information and advice
- Palliative care
- Research and development
- Clinical trials research and treatment (Phase 3 and 4)
- Social support using the facilities at the Village

Velindre Radiotherapy Village@ (spoke)

- Radiotherapy (core and some complex)
- Chemotherapy (core) (Day Unit)
- Chemo radiation
- Stratified medicine and gene therapy
- Outpatients (new and follow-ups)
- Living with the Impact of Cancer services (speech and language, dietetics , support and information, financial advice etc) *(* described in greater detail later on in this chapter)*
- Social and welfare services (integration with Local Authority and third sector)
- Pathology (histopathology/microbiology etc)
- Blood transfusion / haematology
- Radiology
- Nuclear medicine
- Public health information and advice
- Co-ordination with other services agencies via Cancer Nurse Specialists
- Research and development
- Clinical trials research and treatment (Phase 3 and 4)
- Palliative care
- Social support using the facilities at the Village

Specialist Cancer Centre

- Radiotherapy (core and complex)
- Chemotherapy (complex) (Day Unit) (complex)
- Chemo radiation
- Brachytherapy
- Inpatient beds (for complex patients, or unwell resulting from treatment)
- Outpatients (new and follow-ups)
- Clinical Assessment Unit
- Teenage and Young Adults Unit
- Higher Dependency Step-up beds
- Resuscitation services
- Stratified medicine and gene therapy
- Living with the Impact of Cancer services (speech and language, dietetics , support and information, financial advice etc)
- Full Pathology services (histopathology/microbiology etc)
- Blood transfusion / haematology
- Nuclear medicine
- Radiology
- Public health information and advice
- Co-ordination with other services agencies via Cancer
- Nurse Specialists
- Specialist Palliative Care
- Research and development
- Clinical trials research and treatment (Phase 1 and 2)

2.46 At the Patients Place of Residence

2.46.1 A significant number of patients will be able to receive treatment, care and support within their usual place of residence supported by services from their Local Health Board, local authority, third sector and Velindre. In the future, a large proportion of chemotherapy treatments will be delivered at home and active patient monitoring will be undertaken through a variety of approaches including the use of tele-medicine and follow-up consultations via telephone and Skype. A full range of Living with the Impact of Cancer services and palliative care will also be provided at home / place of residence to improve the quality and experience for patients. Patients receiving treatment at home will require an integrated and co-ordinated package of support and this can be developed via multi-agency working. A member of the multi-disciplinary team would be identified as the care co-ordinator e.g. a clinical nurse specialist who could lead this on behalf of the patient to ensure that the care and support package / services are co-ordinated to meet the assessed needs identified of the patients and their family.

2.47 Velindre Village@

2.47.1 The Velindre Village@ will be based within the Local Health Board area, where they will have the greatest impact in improving access to services and reducing travel times for patients, families and carers. They will provide ambulatory care services and provide clinical/medical treatment such as chemotherapy, outpatient services, services to support patients in living with the impact of cancer, day-care palliative care and support local services through undertaking simple medical procedures e.g. calcium level blood tests, replacing syringe drivers etc.

2.47.2 There will be no inpatient beds provided at the Velindre Village@ and patients requiring admission to hospital will be cared for at hospital within their Local Health Board area or at Velindre Specialist Cancer Centre.

2.47.3 The Velindre Villages@ will sit in/alongside the wider range of local services e.g. General Practice, local authority services such as welfare support, third sector cancer support services wherever possible. This networked approach will allow patients to get a broad range of treatment, care and support services on one visit to the Velindre Village@.

2.48 Velindre Radiotherapy Village@

2.48.1 The Velindre Radiotherapy Village@ will provide the same range of services as the Velindre Village@ with the additional capability of providing a wide range of radiotherapy and chemo-radiation services. The optimum location will be identified in South East Wales where a number of linear accelerators will be located within the Village. This will significantly improve access to radiotherapy services within South East Wales and reduce patient travelling times. There will be no inpatient beds provided at the Velindre Radiotherapy Village@ and patients requiring admission to

hospital will be cared for at hospital within their Local Health Board area or at Velindre Specialist Cancer Centre.

2.49 Velindre Specialist Cancer Centre

2.49.1 The Velindre Specialist Cancer Centre will be part of a well-defined pathway that begins with all patients being diagnosed and assessed at their local hospital by cancer teams. Velindre oncologists will form part of the specialist team through their work in providing outreach clinics and support to Local Health Boards through the various network MDTs. The specialist cancer centre will provide a full range of services for patients requiring more complex radiotherapy and chemotherapy treatments, together with a range of support services e.g. diagnostics, Living with the Impact of Cancer services and specialist palliative care services. Patients would only be asked to travel to the specialist cancer centre hospital if it is absolutely necessary for them to receive specialist care that is not available within their community.

2.49.2 In order to support the more complex range of services such as chemo-radiation and Phase 1 clinical trials, the Specialist Cancer Centre will have higher-dependency step-up bed capability and capacity (up to Level 2) and rapid transfer arrangements in place with Cardiff and Vale University Local Health Board to manage a range of acutely unwell patients at the Specialist Cancer Centre and transfer them to Cardiff and Vale University Local Health Board at the appropriate time. It may also contain a Teenage and Young Adults Unit which will provide specialist care and support for younger patients being treated with cancer; working in partnership with the current provision in South East Wales.

2.49.3 The Specialist Cancer Centre will also provide a focus for research and clinical trials and enable excellence in training and education. Improvements in treatments, and in advice that we are able to give patients on their treatment decision, rely on research and clinical trials. It is envisaged that a high proportion of patients will be offered the opportunity to participate in clinical research once the research and development hub is established at the Velindre Specialist Cancer Centre and local units are better able to identify patients for clinical trials.

2.50 A Velindre Village@ for the local population at the Specialist Cancer Centre

2.50.1 The Velindre Specialist Cancer Centre will also provide a range of core services for patients from the Cardiff area as it is likely that this will be the closest location for them to receive treatment and care following referral to Velindre. These services will be identical to those provided at the Velindre Village@ but will be discrete from the range of specialist services provided i.e. it may be a discrete part of the Specialist Cancer Centre or in an adjacent location. This will maximise the economies of scale and ensure that there are a critical mass of services clustered together in accessible locations. It will also ensure that '*core*' and '*specialist*' services do not merge which could result in a dilution of strengths and benefits of the service model and a reduced clarity of purpose and functionality within the health care system.

2.50.2 It is important to note that the design and delivery of the Velindre Village@ for the local population will ensure that there is no duplication of services, technology or infrastructure. This will be achieved through effective and appropriate process and system design which ensures core and specialist services remain distinct and the appropriate patients are being treated in each part of the service.

2.51 Living with the Impact of Cancer services: Supporting Patients to manage their needs

2.51.1 Being diagnosed with cancer can affect all areas of a person's life from dealing with side effects of treatment, juggling the financial impacts or trying to come to terms with the emotional and psychological aspects of the disease. The current system in South East Wales could be improved if a better co-ordinated approach to living with the impact of cancer was implemented which saw holistic support commence from the moment a person is first diagnosed with cancer; as opposed to the current system which predominantly provides services during / post-treatment.

2.51.2 The principle of Living with the Impact of Cancer is that of prudent health and co-production:

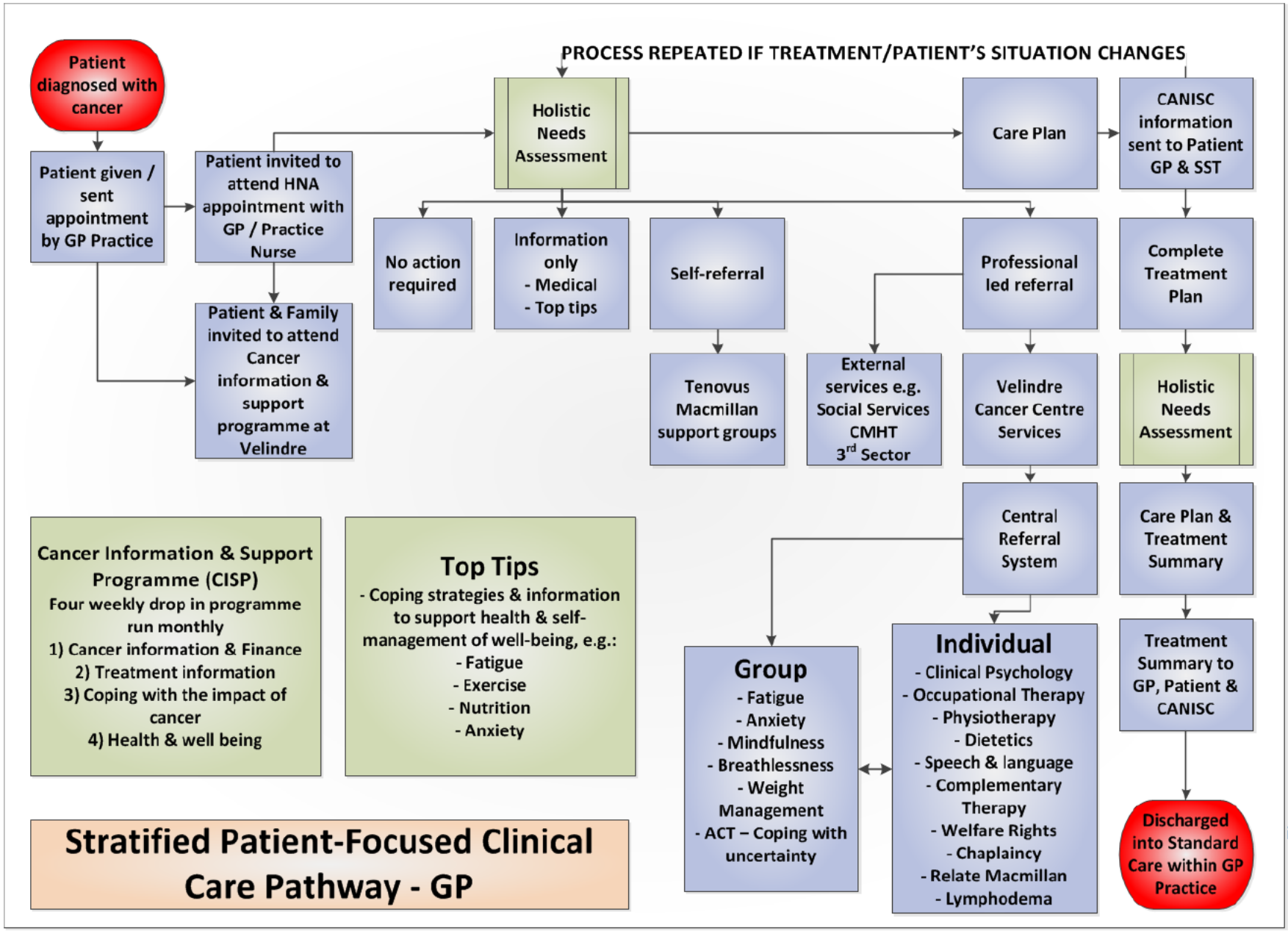
- What does good look like for you?
- How can we work in partnership with you to achieve your goals?

2.51.3 Patients are the best people to manage their care to achieve their own personal goals if they are provided with the right knowledge, information and support. The key enabling role for the NHS and public and voluntary services is to provide them with '*the right information, at the right time, with the support of people with the right skills*' and to ensure that this happens every time without fail.

2.51.4 The aim of the Living with the Impact of Cancer services will be the provision of advice, guidance and support to enable people to self-manage their condition and lives as they move through the stages of cancer from diagnosis, treatment and remission.

2.51.5 The service model for this element is set out in *figure 2.21*.

Figure 2.21 – Living With the Impact of Cancer



ic Case

2.52 The Model Described

2.52.1 General practice lies at the heart of the service model as it has the most comprehensive understanding of the people they serve at their local practice before, during and after a diagnosis of cancer. This knowledge includes their medical history e.g. if they have any other illnesses or mental health needs together with other important elements of their lives e.g. family circumstances, (children/other dependents), roles as carers, any history of violence and aggression etc. General practice is also the vital link to support patients in moving seamlessly between primary, community, secondary and tertiary care and can help support patients to actively manage the care, treatment and support they require to achieve their goals and outcomes.

2.52.2 It is imperative that patients' holistic needs are identified and supported in a planned and systematic way i.e. their physical, psychological and practical needs. To enable this, all patients diagnosed with cancer will receive a Holistic Needs Assessment (HNA) at their local GP surgery. This could be undertaken by a practice nurse or specialist practice nurse (in cancer or chronic conditions management) and will ensure that all patients have a care plan which sets out the care, treatment, support and information they can expect to receive over the following months in line with their desired goals and outcomes. It will address their physical, psychological and practical needs and be dynamic as these needs change through the patient's journey. The care plan will be managed by the patient in partnership with their GP practice and sent to the cancer team at their Local Health Board or the Specialist Cancer Centre, where appropriate.

2.52.3 The patient will commence the pathway set out on the Care Plan but will meet with the practice nurse or specialist nurse to review the plan approximately 4 – 6 weeks after its agreement to determine whether it is still appropriate for the needs of the patient. A significant number of patients will receive chemotherapy, radiotherapy or both as part of their care plan. Once the active treatment regimen has ended, all patients will meet with the GP and / or specialist practice nurse to review the care plan.

2.52.4 The HNA, which will need to be supported by a range of services within the Local Health Board and Velindre Specialist Cancer Centre, will enable the full spectrum of patients changing needs to be met from their initial diagnosis with cancer. The services will be available at a range of locations depending on the needs of the patient e.g. a middle aged man with prostate cancer who wishes to continue his life without disruption may chose active surveillance. The support required by this patient may be initial psychological support, appropriate monitoring of the disease, and information provided via the internet regarding diet and exercise. This contrasts with an elderly patient with lung cancer who smokes and drinks heavily and is of no fixed abode. The needs of this patient may be far more complex and require a range of

different services to help achieve the desired goal. In order for this to occur, there must be a clear understanding between the need for services within the community to support effective HNA and those provided by Velindre some of which will be delivered at Velindre Villages @ and the Specialist Cancer Centre. Given the proportion of patients requiring specialist cancer care from Velindre, the provision of a wide range of services within the Local Health Board area is a vital requirement for patients Living with the Impact of Cancer. This will be undertaken in partnership with a range of voluntary sector organisations such as Macmillan, Tenovus, Marie Curie, Maggies etc.

2.53 The role of Velindre in supporting the improvement of services for people Living with the Impact of Cancer.

2.53.1 Velindre Cancer Centre has developed a high quality set of holistic services for patients living with the impact of cancer. This is not the case across South East Wales and Wales as a whole, where the range of services is varied and the quality inconsistent. It is clear to see that a Holistic Needs Assessment identifies a set of patient needs. However, these needs can only be met if the range of required services, information and support are available, of the required quality and are accessible to people at home, within the community and at the specialist cancer centre.

2.53.2 Velindre Cancer Centre only comes into contact with a relatively small proportion of cancer patients who require specialist care and support. There is a temptation to further develop these services at Velindre, both within the Velindre Village@ and the Velindre Specialist Cancer Centre without addressing the wider need within the community. This would be wrong as the range of holistic services to support patients in living with the impact of cancer need to be available to all patients who are diagnosed with cancer within the Local Health Board area as this is where the majority of people diagnosed with cancer will receive services i.e. they will not come into contact with Velindre NHS Trust.

2.53.3 In order to improve the wider system and to make progress within Velindre, it is believed that the Trust will undertake a different role in the future in the proposed service model in relation to Living with the Impact of Cancer. This is set out below:

- **Leading the development of a comprehensive approach to Living with the Impact of Cancer:** The Trust will undertake a leadership role, working in partnership with the Local Health Boards, voluntary sector and other stakeholders to develop a comprehensive range of Living with the Impact of Cancer services across South-East Wales and potentially the whole of Wales. The Trust could achieve this in a number of ways using the existing relationships and Allied Health Professionals Cancer Networks.

- **Providing leadership in the development of a comprehensive set of Living with the Impact of Cancer Services:** The expertise and knowledge of service development in this area could provide the focus for the development of a set of services across Wales of high quality and consistent standards. This would enable a core set of services to be developed and supported by a set of supporting services specific to any particular local needs.
- **Lead the development of a range of national programmes and providing the ownership of the resources to ensure they are regularly updated and improved:** The development and management of a range of core programmes and supporting resources e.g. leaflets and online materials, could be undertaken by Velindre NHS Trust on a national basis to ensure that expertise and knowledge is spread widely; high quality service standards are established; information resources are shared; and effort is not duplicated. The updating of programmes and resources is also vital if there are to keep pace with the professional and technological developments and meet the changing needs of patients.
- **Provision of expert clinical support to Local Health Boards in designing and delivering Living with the Impact of Cancer services:** The experience and expertise held by the Trust could be used to provide professional advice, guidance and active support to Local Health Boards in designing and delivering services. This could be undertaken on a national basis connecting the various Allied Health Professionals' networks across the country.
- **Providing peer support and mentorship to a range of clinical and allied health professionals involved in delivering Living with the Impact of Cancer services:** The Trust could develop a support and mentorship role across Wales to support professionals and clinicians in developing services, achieving continuing professional development, managing a knowledge repository and database which could be shared between practitioners and offering psychological support where required.

Patients under the care of Velindre

The Trust will also continue to provide a range of services at the Velindre Village@ and the Specialist Cancer Centre including:

Services for Individuals:

- Palliative care
- Clinical psychology
- Occupational therapy
- Physiotherapy
- Dietetics
- Speech and language therapy

- Complementary therapy
- Welfare rights
- Relate / relationship advice and support
- Top Tips

Services in Group Settings:

- Cancer Information and Support Programme (CISP) e.g. cancer information and finance, treatment information, Coping with the Impact of Cancer.
- Group support e.g. fatigue, anxiety, mindfulness.

2.53.4 The rebalancing of the system will enable patients' holistic needs to be identified and met far more effectively.

2.54 Palliative Care

2.54.1 The proposed service model shifts the balance of care from the acute hospital environment towards the patients' place of residence and the local community. There are four levels of palliative care (community, day centre, acute hospital support teams and specialist inpatient unit / hospice) and in the proposed service model patients will have the option of receiving care and support at (i). home / usual place of residence (ii). at a local hospice (iii). as an inpatient within their Local Health Board or at the Specialist Cancer Centre depending on the particular needs. The model is set out in *figure 2.22*.

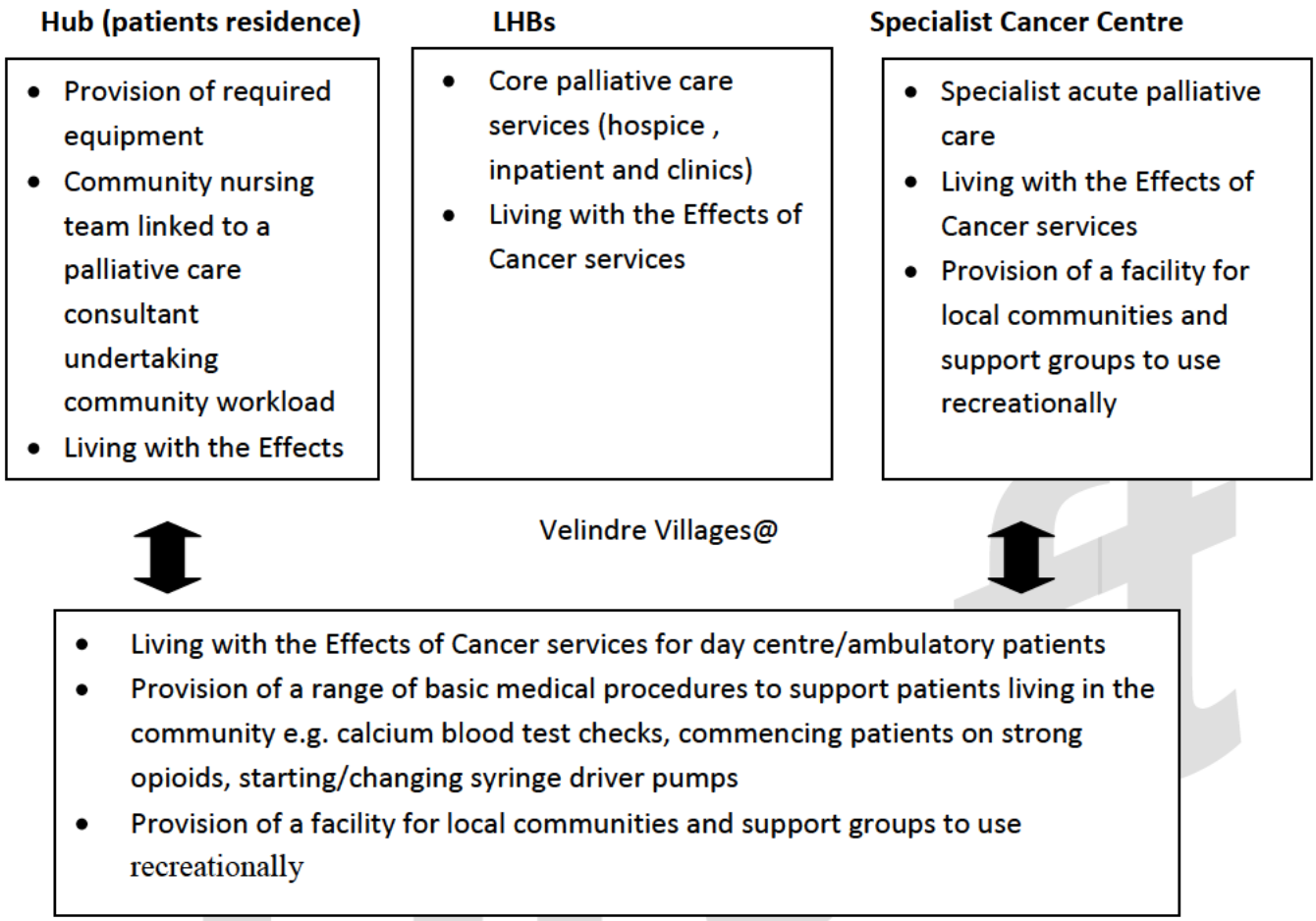


Figure 2.22 – Palliative Care Service Model

2.55 The Model Described

2.55.1 The patient's goals and needs will be placed at the centre and it is believed that a significant proportion of patients will wish to be supported at their home or place of residence. Core palliative care services will be provided by Local Health Boards 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 community 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 would provide a wide range of support:

- **Access to Palliative Care Consultants working within the community and Local Health Board:** Palliative care consultants will work in a networked arrangement across the community (home, hospice, clinics), Local Health Board and Specialist Cancer Centre to provide expertise at the point of need. Palliative care consultants and their teams who work in the community will link in with GP practices and their palliative care meetings and provide support, advice and reviews.

- **Development of a series of networked palliative care hubs and provision of overall leadership to ensure consistency of care**: a number of palliative care hubs could be developed within the Local Health Boards and networked to the Velindre Villages@ and Velindre Specialist Cancer Centre. This will enable a systematic, consultant-led approach to be adopted regarding the identification of need and management of care and support across the system. The specialist palliative care consultants employed by Velindre could provide the leadership and oversight of the hubs to ensure an integrated approach is taken and that quality of care is continuously improved. These palliative care hubs could link in seamlessly with oncology services, running in parallel with close communication and cross-referral. An example might be a lung cancer or a gynae-oncology service hub which has within its system not just chemotherapy provision but also a palliative and supportive care service that includes medical, nursing, social/financial care, physio and occupational therapy '*assessment stations*'.
- **Provision of a range of important clinical and wider support services within the Velindre Villages@:** A number of important clinical and support services would be provided at the Velindre Villages@ which would support patients to remain within their home and avoid unnecessary attendance or admission at an acute site. For example, the inability to access calcium blood tests, change syringe drivers or the administering of medication within the home / community setting are common causes of unnecessary attendance and / or admission to hospital. This often results in extended lengths of stay as once a patient is within an inpatient environment it becomes difficult to discharge them back into the community. These simple procedures could be undertaken within the Velindre Villages@ following referral by a GP / other professional. A wide range of services to support patients in living with the impact of cancer will also be available to support day-care palliative care patients together with the availability of the facilities for support groups and social activities e.g. yoga classes. It would complement the existing set of clinical, psychological and social support services available within the community. It would thus provide the essential cohesiveness of a '*village*' unit, where patients and their families/carers can get together and talk to others in a similar situation.
- **Provision of a palliative care clinical advice line:** An advice line would be provided by Velindre palliative care services which would be available to all clinicians. This would provide access to expert advice, guidance and peer support, enable patients to move seamlessly across the system and transfer knowledge amongst clinicians and professionals. This would be available both in-hours and out-of-hours.
- **Patient Preference and Flexibility:** Whilst there should be a strong focus on identifying patient preference for preferred place of care and preferred place of death, recent research has shown that patients and their families often state home as their preferred place of care at the

start of their disease journey, but can change their minds about this when they reach more advanced stages. This needs to be managed flexibly and we must be aware that this preference can change, with a patient wishing to be cared for in an inpatient unit with specialist palliative care support services. The requirement to provide specialist acute inpatient care will remain and this will be provided at Velindre Specialist Cancer Centre which will have a dedicated specialist palliative care team and unit. This will differ in nature to the non-specialist services provided within the hospice setting and will provide a focus on providing care and support as well as sign-posting for patients, carers and relatives:

- Whose clinical and / or psychological needs require inpatient care.
- In instances where the patient / family / carer unit are unable to cope
- Where community services are unable to support due to the complexity of needs.
- Where there are severe and complex emotional issues e.g. a young family unit with small children who are unable to cope emotionally with symptom-burden or the end of life process.
- Where culturally, socially or emotionally, dying at home is not acceptable to the patient and/or family unit.
- Where there are other dignity or safety issues not covered by the above.

- **Provision of a Teaching and Research rich environment**

  Velindre NHS Trust, and NHS Wales, have a unique opportunity to be one of the most forward thinking palliative care providers in the world, and already attracts many international fellows and students, not just because of its Diploma and MSc in Palliative Medicine. This environment creates many opportunities for teaching and research, not just in the inpatient setting but especially in the community, where much of palliative care happens. The day course for GPs is just one example of how specialist palliative care knowledge has been spread from Velindre to the wider community over the years.

2.56 Supporting Patients across the Pathway

2.56.1 It is vital that patients are effectively supported to access the appropriate service at the right time. To enable this to occur consistently 24 hours a day / 7 days a week, the following services will be further developed:

- **A rapid assessment service will be run from the Velindre Specialist Cancer Centre**: A nurse led service will provide a 24/7 clinical assessment service for patients being treated and supported by Velindre to receive advice, support and clinical assessment. This service will manage patients who have become unwell following treatment by Velindre and could be scaled up to support a wider cohort of cancer

patients across South Wales. Patients will be supported in choosing the right service for their care e.g. whether they require a GP appointment or an admission to the Velindre Specialist Cancer Centre Rapid Assessment Unit for a short period to assess their needs. This will help ensure that effective clinical assessment, e.g. '*decide to admit as opposed to admit to decide'*, is undertaken consistently within the clinical model and that patients are supported to remain at home or within their local community in a safe and clinically appropriate way. It is vital that that a range of pathways are developed where patients have rapid access to specialists with knowledge, expertise and confidence in cancer care. This will significantly reduce the current situation which sees approximately 35% of patients with cancer being diagnosed within unscheduled care pathways e.g. A & E departments.

- **An Acute Oncology service will be developed with Local Health Boards**: A nurse led acute oncology service will be further developed across South East Wales, building on the work already in place at Aneurin Bevan University Health Board. This will ensure that patients who are presenting with acute new cancers, acute cancer related complications or toxicity from cancer treatments are identified at the earliest opportunity and directed to the most clinically appropriate pathway of care.
- **Strengthening Outreach services and supporting Local Health Boards (primary, community and secondary care) to develop the capacity and capability to effectively manage patients with cancer locally:** The partnership with secondary care will continued to be strengthened with Velindre NHS Trust supporting the Local Health Boards in strengthening competence, knowledge and skills in managing patients with cancer in their local community. The transfer of knowledge into secondary care, as well as primary and community services, is vital as the effective management of patients with cancer must become a core skill of the NHS which operates across all boundaries as is not viewed as a service only provided by a specialist organisation. This approach would enable a more strategic view to be developed relating to elderly people and patients who often have co-morbidities and chronic needs, of which cancer is one. An outreach service is currently provided to patients who are being cared for within the Local Health Board by Velindre consultant oncologists. This is predominantly in instances where the primary condition is not cancer. Velindre will provide the specialist oncological expertise on behalf of the Local Health Board in managing the spectrum of care. The provision of this service will continue across the Local Health Boards and will further strengthen the integration of cancer services between secondary and tertiary care and also enable patients to remain close to, or within their local community.

2.57 Further Opportunities related to the Proposed Service Model

2.58 Development of a Teenage and Young Persons Unit

2.58.1 There is growing recognition that teenagers and young people with cancer have needs that differ from those of both children and adults. Staff caring for teenagers and young adults with cancer needs to be knowledgeable regarding developmental stages including social, emotional, psychological and physical development and be able to assess individual needs according to the developmental stage. A Teenage and Young Persons Unit will be developed at Velindre Specialist Cancer Centre in partnership with the existing arrangements sin South East Wales and offer:

- Expert medical care.
- An age-appropriate environment.
- Comprehensive psychological support.
- Co-ordinated support and care via a multi-disciplinary team with expertise in teenage and young person's cancer.
- A network of peers.
- Active recruitment and entry into clinical trials.

2.59 Primary Care Oncology: Integrating services within Primary and Community Care

2.59.1 Cancer is no longer simply an acute illness treated by clinical staff in hospitals. People living with the Impact of Cancer need to have access to good quality care in their local community often for many years. There are four main policy reports and strategies published by the Welsh Government which set out the expectation of developing primary, community and social care services, which relate to people affected by cancer. These are '*Together for Health Cancer Delivery Plan*' published in June 2012, '*Together for Health – Delivering End of Life Care*' published in April 2013, '*Delivering Local Health Care*' published in June 2013 and '*Social Services and Well being (Wales) Bill*' introduced in January 2013 and expected to be legislation by 2014.

2.59.2 The Cancer Implementation Group is currently working with Macmillan to develop a proposal for the implementation of a comprehensive framework for cancer in primary care. This will include:

- Processes, tools, guidance for each stage of the cancer journey e.g. from prevention and screening, early diagnosis to survivorship and or end of life.
- Education and training.
- Integration within the whole system of care.

2.59.3 Velindre NHS Trust will participate in this programme, if it is approved, to ensure that whole system transformation occurs and early detection and

diagnosis becomes the norm in cancer care. Notwithstanding this, Velindre NHS Trust is very keen to develop links and integrated services with primary and community care and will actively pursue this. Importantly, Velindre NHS Trust could actively lead this programme, utilising its critical mass of expertise and knowledge, and focus on cancer to support the transformation across the whole system.

2.59.4 The development of GP Clusters and 64 GP Networks of Practice across Wales, which creates community populations of approximately 50,000 – 60,000 people also offers an exciting opportunity to transform the design and delivery of cancer services in Wales. Local Health Boards, working in partnership with Public Health Wales NHS Trust and the Public Observatory are developing plans to improve health and clinical outcomes at a community level. In relation to cancer, this will undoubtedly include a focus on reducing the incidence of cancer, improving survival rates and the overall quality and outcomes for patients Living with the Impact of Cancer.

2.59.5 The potential for development is huge and Velindre NHS Trust sees a number of potential opportunities to work with the GP networks and specific GP clusters. These include:

- Provide data, information and intelligence to support a better understanding of the local position i.e. variation in access rates for radiotherapy or particular cancer sites or the presentation of patients with staging i.e. high proportion of patients presenting at Stage 4 in one community compared to Stage 1 in a neighbouring community for the same cancer.
- Developing a direct relationship to provide cancer and oncological knowledge and expertise in the identification of need and the planning of services e.g. assisting GP networks and clusters to understand the need and clinical outcomes in their area, the causes of any variation and/or poor performance, and support the development of plans.
- Providing a named local expert/resources to each GP network and / or GP clusters to strengthen the focus on cancer at a local level and support the planning and delivery of services. This could include oncologists, Cancer Nurse Specialists, Allied Health Professionals etc.
- Provide a range of educational information and resources e.g. on-line to support the cancer agenda from prevention through to end-of-life.
- Provide overall leadership and co-ordination to the development and implementation of an education and training programme for GPs, nurse practitioners and a range of other professionals within the primary and community care setting.

2.60 Developing Personalised Oncology (Stratified Medicine Service)

2.60.1 The importance of stratified medicine or '*personalised oncology*' cannot be overstated when describing the future of cancer services in Wales in relation to prudent healthcare; namely the delivery of treatment to those that will benefit, and not unnecessarily causing harm to patients that will not. The establishment of Cardiff as one of the three UK Technology hubs for the CR-UK Stratified Medicine programme, and the strong range of partnerships that has enabled provides the foundation for future growth in this vital area.

2.60.2 The development of stratified medicine would sit at the heart of the proposed service model with Velindre, in partnership with a wide range of partners, driving its implementation. This would see Velindre:

- Taking a key leadership role in the strategic planning and commissioning of services.
- Identifying clinical / oncology capacity to support the development of the stratified medicine service.
- Developing clinical and professional expertise and capability.
- Actively targeting patients to participate in clinical trials related to stratified medicine.
- Delivering personalised oncology at home, in the Velindre Villages@ and the Specialist Cancer Centre.
- Delivering clinical trials at home / in the Velindre Villages@ (Phase 3 and 4) and the Specialist Cancer Centre (Phase 1 and 2).
- Providing stratified medicine in LHB outreach settings.

2.61 The Strategic Alignment of Haemato-Oncology

2.61.1 The current provision of haematology and oncology services in South East Wales is largely separate. This represents a fundamental opportunity to better align these two services for the best interests of patients across South East Wales. An integrated haemato-oncology service offering state-of-the-art diagnoses and treatment of all cancers of the blood and lymphatic system including myeloma, lymphomas, Hodgkin's disease, chronic lymphocytic leukaemia, and acute and chronic leukaemia's would significantly improve the treatment care for patients and the clinical outcomes that could be achieved.

2.61.2 Such a model could be developed service across South East Wales with clinical services leads in each of the Local Health Boards working with the Velindre Cancer Centre clinical oncologists to develop a broader range of services planned and delivered in partnership. It would mirror the '*hub*' and '*spoke*' principles of the proposed service model and place patients at the centre. It would also be delivered from various sites across South East Wales

using the various organisations, locations and infrastructure available e.g. Velindre Cancer Centre and South-East Wales Local Health Boards.

2.61.3 It would build on the relative expertise and strengths of each of the current services i.e. the haematology skills of the Local Health Boards and the oncology skills of Velindre and offer significant opportunities in the delivery of systemic anti-cancer therapy, the effective management of acutely unwell patients in unscheduled care and the delivery of critical care services. An integrated service would enable:

- Consistent policies to be developed for caring for acutely unwell (neutropaenic) patients.
- A consistent approach to providing chemotherapy in outreach settings with the use of shared venues in Local Health Boards and the Velindre Villages@.
- A significant increase in the proportion of patients receiving chemotherapy at home or within their local community.
- Acutely unwell patients at Velindre e.g. with low blood counts being cared for within the LHB inpatient wards.
- Removal of the organisational boundaries in the management of patients with solid tumours through partnership in the provision of treatment and care.
- A Velindre oncology / palliative care presence in Local Health Boards in managing acutely unwell patients appropriately
- Transfer of skills, knowledge and competence across organisations following the pathway of care.
- Provision of, and access to, acute oncology services.
- Greater resilience for cancer services across the health community.

2.62 Public Health

2.62.1 Velindre NHS Trust has an integral role to play in achieving the Welsh Government's vision of placing good health at the centre of the ambitions for Wales as a nation. Whilst the fundamental causes of poor health can often lie outside of the health service itself, addressing public health concerns, eliminating health inequalities and improving the health and well-being of the nation are issues which can be actively addressed by the NHS individually and wider public services collectively.

2.62.2 Velindre Cancer Centre is currently engaged in the public health agenda at a number of levels. For example, leading the construction and delivery of prudent healthcare and co-production; securing improved clinical outcomes; making every contact with patients, families and carers count, by providing information and advice on a range of issues including diet, lifestyle, smoking cessation and alcohol consumption; provision of holistic needs assessment

for patients and the provision of health and well-being support for our staff.

2.62.3 Velindre NHS Trust recognises that further discussion is required with a range of partners to fully understand its future strategic role, and how it can add maximum value. There are a number of areas which stand out as major opportunities in the proposed serviced model. Prior to this, it is important that we clearly understand our role in the system and do not attempt to simply become a delivery agent e.g. smoking cessation as the primary means of delivery should remain within local communities.

2.62.4 At this stage, there are a number of strategic areas which have been identified for further development within the Trust and during the construction and delivery of this programme. These include:

- System leadership role in supporting the planning of services within Local Health Boards and GP Clusters
- Provision of data, information, intelligence and knowledge across the system to inform public health discussion, debate and direction.
- Deriving benefit from the strong reputation and brand as a Trust and as a Specialist Cancer Centre.
- Strategic partnership in understanding and reducing inequalities.
- Integrating prevention, intervention and rehabilitation across the health care system.

2.63 Support Services

2.63.1 There are a range of enabling functions and services required to achieve the proposed service model. These are briefly described below.

2.64 Pathology Services

2.64.1 Pathology services will be provided via a networked approach with patients between the Local Health Boards, Velindre Villages@ and the Specialist Cancer Centre. This is likely to see pathology services provided locally within the patients respective Local Health Board for services received there and at the Velindre Village@ together with a full range of services at the Velindre Specialist Cancer Centre e.g.

- Biochemistry
- Histopathology/cytology
- Microbiology
- Haematology/blood transfusion

2.64.2 The provision of these services will be fully aligned to the national direction of travel being driven forward by the National Programme for Pathology.

2.65 Diagnostic and Radiology Services

2.65.1 Diagnostic and radiology services will be provided via a networked approach with patients between the Local Health Boards, Velindre Villages@ and the Velindre Specialist Cancer Centre. This is likely to see diagnostic and radiology services provided locally within the patients' respective Local Health Board for services received there and at the Velindre Village@ together with a full range of services at the Velindre Specialist Cancer Centre. Local needs will be examined to determine what the additional requirements are regarding research and service developments e.g. the integration of radiology into radiotherapy planning.

2.65.2 The advances in technology and the future ability to share images across locations easily, through the implementation of solutions such as Picture Archiving and Communication Systems (PACS), will revolutionise this service and enable system wide transformation. For example, it will remove the boundaries of locations within the community for patients care and support. The provision of these services will be fully aligned to the national direction of travel being driven forward by the National Programme for Imaging.

2.66 Making it Happen: Developing an Engine for Transformation

2.67 Velindre providing leadership for the transformation of cancer services: Velindre as an Engine for Change

2.67.1 Velindre NHS Trust contains specialist knowledge and expertise in cancer care and support which is recognised nationally and internationally. There are a number of oncologists who are recognised as the '*best in their field*' and the centre has a thriving and active research and development community which is progressing at pace. It also contains a strong and expert leadership capacity and capability at a Trust level which has a detailed understanding of cancer services. This is matched with ambition, capability and energy which could be utilised to lead the transformation of services in South-East Wales. Importantly, Velindre NHS Trust would bring focus to the cancer agenda ensuring pace and attention was increased.

2.67.2 Velindre NHS Trust is therefore in a unique position and, working in collaboration and partnership with Local Health Boards, fulfils a prominent leadership role in the transformation of cancer services across Wales, acting as the engine and catalyst for change. There are a number of opportunities which could be further explored as part of the development of this proposal including Velindre NHS Trust:-

- Assuming the strategic leadership for cancer services in a participative partnership with organisations in Wales.
- Assuming the national planning of cancer services in Wales.
- Overseeing strategic implementation of services.

- Developing and hosting a national faculty of learning and innovation in partnership with Local Health Boards and a range of wider partners.
- Leading the development of a range of national transformation programmes e.g. potential integration of haemato-oncology service.
- Leading and co-ordinating the partnerships between leaders and cancer focused groups e.g. Cancer Networks, National Specialist Advisory Groups, Information Framework, Service Improvement etc.
- Leading on the service improvement agenda for cancer services.
- Leading the development of a purpose built research and development hub in South-East Wales where the cancer research and development agenda could be accelerated through a world class centre and rich knowledge economy.

2.68 Quality Improvement and Staff Development

2.68.1 Transformation of cancer services will require clear, ambitious and sustained leadership over time. This needs to be underpinned by a shared set of explicit values and behaviours across the NHS and its partners which are manifest at all levels of the system.

2.68.2 All staff will be encouraged to recognise that they have two roles: to do their job and to improve their job. This builds on the national drive for quality and the development of quality improvement capacity and capability. The focus for delivery will be on what patients, families and carers want and need, rather than what professionals believe they should have.

2.68.3 To do this we will continue to implement a whole system approach to quality improvement that is based on the national approach of reducing waste, harm and variation together with co-production and prudent healthcare. This will include strengthening the quality improvement team, with all staff being provided with specific quality improvement training and skills (1000 Lives, Quality Improvement training etc). This will have a strong focus on clinical leadership, systems thinking and learning based knowledge.

2.69 Information and Communications Technology (ICT)

2.69.1 The vision for the Trust is based on the underlying principle that the purpose of ICT and information systems is to support people providing care with the information tools that they need to deliver better outcomes, more safely and more efficiently, whilst also considering the ICT/informatics requirements of the patient, families and carers.

2.69.2 Whilst treatment for cancer is increasingly successful, it is also becoming much more complex, both in terms of treatments being offered and patient pathways which may traverse primary, secondary, tertiary, community and

social care. The ICT requirements must be balanced between operational service, and the evolving needs of the patients and healthcare professionals across organisations as new pathways and treatment options become available.

2.69.3 Information Technology and Informatics will be critical to enabling the implementation of the proposed service model, and ensuring the realisation of benefits made possible through modern information services and communications technology. The ICT / informatics vision has been developed in line with key welsh strategies, including:

- The Welsh Information Systems Strategy.
- The National Infrastructure Strategy.
- The National Security Strategy.
- The Together for Health Strategy (2011).
- The Together for Health - Cancer Delivery Plan (2013).

2.69.4 The service proposal as described in the Strategic Outline Programme is:

'to develop a set of seamlessly integrated cancer services to support patients and families which remove the artificial boundaries between cancer detection and diagnosis, treatment, Living with the Impact of Cancer and palliative care / end of life'.

2.69.5 This approach aims to promote a new relationship between citizens and the providers of cancer services, which ensures that patients and their families are at the centre of the service, and are able to make informed choices about the care and support they receive, where they receive it and what support they require to achieve their desired outcome.

2.69.6 It is recognised that Informatics will have a key enabling role in ensuring that the full opportunities of technology are realised to fully deliver the future service delivery and change. A clear Informatics strategic direction is needed with accompanying investment which takes full advantage of the redesign opportunities enabled by / or dependent on infrastructure which includes the patient, Informatics records and decision support tools. The strategy will be developed in parallel with detailed work on service developments to underpin and support delivery of the clinical strategy. This will make use of the NHS Wales National Architecture and supporting systems and services.

2.69.7 Our values mean that by working as a team we will always put the patient's needs first, ensuring that each patient benefits from our collective skills and resources. There is a clear drive internationally, nationally and locally towards better integrated care. Our aim is to provide services that are better integrated both within and without our service locations, so that service users

can be assured that the continuation of their care will not be interrupted by transfers between services and that at each stage of the pathway those delivering care are fully aware of patients wishes, needs and medical history.

2.69.8 The provision of excellent care is based on good human communications, which are supported by excellent communication and information systems. The use of technology to automate aspects of care delivery provides an opportunity to improve the match between healthcare resources and patient needs, and the Village@ model will rely on integrated mobile technology as one of the key enablers allowing a view of patient information across both health and social care, and the delivery of care closer to and within the home. This will be achieved through a combination of existing national products, services and technologies such as:

2.69.9 **Telemedicine:** Citizens would like as much of their healthcare as possible to be delivered locally, and medical advances and innovations such as telemedicine help make this possible. The new service model lends itself to the use of telemedicine / telehealth enabling convenient and safe consultations between patients and clinicians or clinician to clinician, incorporating medical, imaging and health informatics data sharing between sites.

2.69.10 The Tenovus mobile unit is an excellent example of how patients can be offered local access to specialist services closer to home in a smaller, less clinical, informal environment while clinicians still have access to their electronic records. Through the use of information technologies and telecommunications, we can help to eliminate any distance barriers in health care, and improve access to medical services closer to home.

2.69.11 The exploitation of current and planned National infrastructure, will in the future, support this by providing citizens and staff access to Informatics Services from within NHS premises and across mobile and wireless networks via all appropriate platforms (e.g. Windows, IOS, etc) and devices (desktop, laptop, notebook, phone etc).

2.69.12 **National Systems:** The NHS Wales Informatics Services (NWIS) provides electronic services to citizens and clinicians and these will provide the technological framework to support the new service proposal, which currently includes:

- Canisc, the National oncology system.
- The Welsh Clinical Portal including electronic requesting and viewing of investigations, medicines management, e-documents and the Individual Health Record.

- Welsh Clinical Communications Gateway to support the sharing of e-referrals, clinic letters, discharges and other clinical correspondence.
- My Health Online which gives patients the opportunity to book GP appointments, order repeat prescriptions etc from their own devices.

2.69.13 **New systems and technologies:** The Velindre Villages@ will also benefit from exciting new systems and technologies, such as:

- Scheduling, including self-service.
- The new, integrated Community and Social Care system supporting integrated care across health and social care.
- The Welsh Care Record Service which will enable a single view of a patient or service user's record across organisations and services.
- Medicines management including transcribing, e-prescribing, dispensing and administration including chemotherapy.
- National mobile platform supporting mobile working and citizen access.
- Telemedicine and Telecare including videoconferencing via Lync / Skype.
- Citizens access to directory of service and engagement in co-producing their care plan.
- Improving citizen access to high quality information personalised to them using a variety of technology media channels.
- Mobile access to these new and existing services across the NHS (fixed, wireless) and mobile networks for staff and citizens as appropriate.
- Mobile access from a diversity of platforms.

2.69.14 The development of an innovative approach will be undertaken in partnership with NHS Wales Information Service who are leading NHS Wales through the digital age, and have an infrastructure in place that is able to support the future systems and network, as well as information technology tools and products to support improving healthcare.

2.69.15 The technology will underpin the multi-disciplinary approach to cancer services with state-of-the-art systems to enable multi-disciplinary treatment programmes, comprehensive patient supportive services, telehealth capabilities all supported through e-scheduling to meet the needs of the citizens and those providing care.

2.70 Putting patients in control of their own health and well-being needs

2.70.1 There is a need to ensure engagement and communication with patients, their families and carers so that they can have greater control over their treatment, care and support, and are able to live with Cancer in a way which maximises their quality of life. When developing the proposals, continuing to

involve patients, families, front line staff and partners organisations will be a priority.

2.71 Benefits of Future Service Model:

2.71.1 The main benefits associated with the future service model are as follows:

- Delivery of clinical outcomes which are comparable with the best elsewhere.
- Provision of services that provide the highest levels of safety and patient experience that are comparable with the best elsewhere.
- Provision of care at home or closer to home for more patients improving access to services and equity across the population.
- Improved access and shorter travel times for patients across South-East Wales.
- Helping to create a new relationship with citizens and patients based upon nth principles of prudent health and co-production.
- Provision of 24/7 services which offer patients and families greater choice and enable them to Live with Cancer and not work around it.
- Transformation of the approach to service design and delivery which is based on the principles of co-production, prudent health and a re-balancing of the relationship between services and citizens.
- Integration with a network of local public and voluntary sector services which will better support patients to achieve their goals and remain living within their local community.
- Provision of cancer services which are of high quality and sustainable for the future i.e. can be flexed in accordance with increased in demand.
- Improved levels of detection and diagnosis of cancer across the system.
- Improved rates of access rates for radiotherapy in line with national and international benchmarks.
- Access for clinicians to the most up-to-date equipment, supported by expert teams containing all of the right types of highly skilled staff
- Patients receiving a better co-ordinated pathway of care as doctors will work both in the local and specialist units.
- Multi-disciplinary teams based within local communities which will support patients more effectively at home or close to home.
- Improved management of acutely unwell patients with a network of integrated services across South-East Wales.
- Improved management, quality of service and outcomes for palliative care patients, their families and carers.
- Wide range of services for patients Living with the Impact of Cancer which support patients during and after treatment and improve their quality of life.
- Greater confidence in organisational excellence as it would enable us to

better attract national and international clinical staff to work in the cancer service and offer high quality clinical training to junior doctors and other health professionals.

- Improved levels of efficiency and productivity through the minimisation of duplication and waste.
- Services will be more resilient and better able to withstand the productivity gains expected throughout the NHS. Only through greater productivity will it possible to invest in additional patient activity, new technologies and treatments.
- Integrated cancer services within Local Health Boards by providing specialist networked facilities within local communities. This will support the development of knowledge and expertise in Local Health Board services enabling them to provide better services for patients who do not require specialist services from Velindre.
- Improved partnership and joint working arrangements with Local Health Boards, such as outreach clinics and shared care arrangements, which will deliver expert care and follow-up closer to where many patients live, both during and after treatment. These arrangements will also provide better continuity of care to patients.
- Concentrating specialist services at one site which is aligned with the Velindre Cancer Research Institute will make it easier to carry out research, clinical trials and service developments which are essential for finding the next treatments and therapies for cancer services.
- Patients will have access to a greater number of trials and earlier access to new therapies. Working together, the service will be able to attract more national and international research funding.
- Increased levels of economic productivity through an increase in people living with cancer returning to work and being economically active.
- Economic growth through attraction of inward investment through research and development.
- Job creation and employment through the enhancement of the knowledge economy in South Wales.
- Improved reputation for NHS Wales as a place of excellence.
- Increased ability to attract and retain the best clinicians in Wales.
- Positive development of the Wales brand across the world.

2.72 Future Proofing

2.72.1 Service sustainability is a vital element of any new service and this is particularly important in respect of this Strategic Outline Programme given the expected and continued growth in cancer incidence and life expectancy. Given that the case is still at the Strategic Outline Programme level, detailed modelling has not been undertaken in respect of future proofing as there are still too many unknown variables at this early stage. However, a review of

the key foundations of the proposed service model has been undertaken in respect of future proofing and sustainability, which is set out in the table below.

Table 2.17 - Programme Future Proofing

Element	Issue	Risk	Mitigation
Demand	Demand will outstrip capacity	The footprint of services will be too small	• The proposed service model is a community based one and can be flexed to further increase services at home/within the community as and when necessary. • Velindre NHS Trust has land capacity to increase the footprint of the specialist cancer centre if required. • The advances in clinical practice and technology e.g. radiotherapy (higher doses of treatment delivered and a smaller number of visits for patients) and chemotherapy (more treatments delivered at home or orally) will continue to reduce the size of the estate required. This will see an enhanced focus on new ways of delivering services through the use of technology and co-ordinated services which support patients and citizens to actively manage their own care and Living with Cancer.
Changing patterns of service / patient and citizen choice	The proposed service model will become outdated as patient/citizen choice changes over time	Parts of the service model will become under-utilised or will not achieve high-levels of patient/citizen satisfaction	• The proposed service model is a community based one and all of the available evidence suggests that this will continue to be the preferred model of choice for patients and the Governments' strategic direction of travel. There will be the ability to continually evolve the model as clinical and technological advances and breakthroughs are made.
Information, Communication and Technology	Technology will not keep pace with clinical practice	The quality and clinical outcome of the service will be reduced	• A comprehensive capital investment plan will be developed by the Trust and planned within the overall Welsh Government major capital programme.

Element	Issue	Risk	Mitigation
			• The service will seek to take advantage of the improvements and developments in information, communication and technology to increase the quality of the service and continually improve efficiency, productivity and reduce costs.
Workforce	Attracting and retaining a talented workforce	The quality and clinical outcome and the quality of research and development activities will be reduced	• The development of a new set of services and facilities which are truly world class will reduce the risk of losing or being unable to attract the best talent to South Wales.
Strategic and structural Change	Inability to flex the service model to meet any future structural developments in Wales	The proposed service model would not be able to flex to deal with any potential strategic or structural changes at an South Wales / All Wales level	• The proposed service model is based on a South-East Wales population. This does not stop any future strategic developments in relation to South Wales as the services in each region are in the correct locations for the populations they serve. In essence, the strategic developments would largely concern the leadership, management and co-ordination of cancer services and not a change in location of them.

2.72.2 In summary, the initial work suggests that the proposed service model and infrastructure set out within the Strategic Outline Programme is a sustainable one. The '*sustainability test*' will continue to be applied rigorously through each stage of the business case process.

Research and Development - The Service Proposal

2.73 Overview

2.73.1 The aim of the service proposal described in this Strategic Outline Programme is to develop a research and development capability that is equal to the best elsewhere in the world and has the ability to translate innovation into practice faster than existing systems. It seeks to achieve this by aligning the wide range of expertise within and outside South East Wales around a coherent strategic research and development agenda. The proposed service model is one of partnership, collaboration and knowledge sharing to achieve pioneering advances in the clinical and technological treatments for cancer.

The Vision:

Velindre Cancer Centre will perform and lead high quality clinical research programmes to improve the health of the population and achieve a reputation for excellence nationally and internationally.

2.73.2 The delivery and management of high quality research is a strategic priority within the Trust and Wales. The Velindre Cancer Centre has established an excellent national and international reputation built on the research and development (R&D) activities undertaken.

2.73.3 Velindre Cancer Centre has ambitions to provide world class cancer services, and a vibrant R&D service is an essential requirement of delivering the highest quality services to patients, and for recruiting and retaining the best people. To this end, a key enabler of our vision is the development of a Velindre Cancer Research Institute which will provide the focus for the development of excellence across South-East Wales and the nation as a whole.

Principles:

The proposed service model will operate on a number of important principles:

- All research and development activities will be moral, ethical and transparent.
- Improving patient outcomes will be placed at the centre of all research and development activities.
- Rapid translation of research to patient benefits will drive our activities.
- Partnership and collaboration will be fundamental in everything we do.
- The creation of an environment which attracts and encourages the brightest individuals to become involved in delivering our research and development agenda.

2.73.4 **Strategic Objectives**

Our vision for research and development is supported by six strategic objectives.

1. Improve patient access to safe, high quality care in clinical trials: We will provide cancer patients in South-East Wales with timely access to the latest anti-cancer treatments through Phase 1 and other clinical trials.

2. Supporting areas of research excellence: We will work in collaboration with research partners to expand research across four thematic areas that span the patient journey:

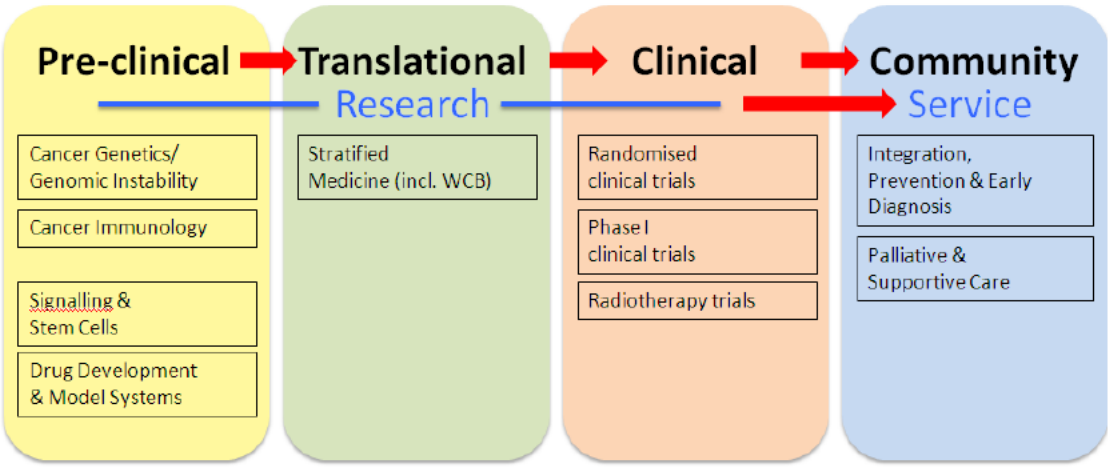


Figure 2.23 – Research Across the Patient Journey

2.73.5 There will be a prioritised approach to research and development with the areas of research focus being defined by three primary criteria:

- A clear patient/clinical need for an activity in that area.
- Expertise, competence and interest in the specific area required to lead the programme.
- The capacity, capability and intent to develop the required competence and expertise in any newly identified areas.

2.73.6 The research and development agenda will focus on consolidating existing areas of research strength, such as phase 2 and 3 randomised trials, radiotherapy trials and phase 1 clinical trials, and then seek to expand into other research areas that underpin pre-clinical and clinical cancer research and service development. This model will also foster and support the development of non-medically driven research and innovation aimed at understanding and improving quality of life for people affected by cancer, including carers.

3. Building research infrastructure and capacity: Research infrastructure and capacity is essential to support investigator-led high profile research Programmes.

Rapid set up and recruitment to early phase and portfolio studies will enhance our reputation and attract investment to support research costs and fund pre-portfolio studies.

2.73.7 The model will have a robust and transparent process for prioritisation of clinical trials to ensure efficient use of resources. The decision for approval will be based on:

- Scientific and clinical merits.
- Alignment with the Velindre Cancer Centre research strategy.
- Alignment with the wider research and development strategies of our partners.
- Fit with other competing trials.
- Resource and risk review.
- Potential income generation and commercial opportunities.

2.73.8 It is vital that research and development within Velindre Cancer Centre is integrated into core business, and receives support at all levels of the organisation. This is currently the case and will be further strengthened with the continuing development of a supportive multidisciplinary research culture which enables the development of research capacity and capability across all professional groups, such as pharmacy, nuclear medicine, radiotherapy, laboratories, radiology, medical physics and nursing, which will ensure that research and development can continue to thrive. This will be supported by excellent governance arrangements.

4. Developing our workforce capability and capacity: We are committed to providing a research-active environment which encourages researchers from all disciplines. Our clinicians are developing and leading national and international trials, and this is further enhancing the reputation of Velindre Cancer Centre. This will be achieved in a number of ways:

- Continued investment in our clinical and non-clinical research leaders by giving them time and capacity to lead.
- Development of multi-disciplinary capacity to support the expansion of various research programmes.
- Expanding academic medical physics led research.
- Establishment of clinical academic strategy for nurse and Allied Health Professional led research.
- Development of radiographer led research.
- Supporting junior researchers in all professional groups, including the pursuit of MDs / PhDs where possible.
- Strengthening of existing arrangement to ensure there is a clear pathway offering research opportunities for staff at all levels, including those pursuing a clinical academic career.
- Engaging all staff in the development and publication of research.

5. Developing strategic collaboration and engagement which adds value: Clinical-translational collaboration is critical if cancer research is to deliver better outcomes for patients. We will continue to build links with a wide range of partners to strengthen the research agenda, nationally and internationally.

6. Achieving financial strength and sustainability: Velindre Cancer Centre will develop a sustainable financial model that encourages activity and allows reinvestment in safe, excellent services and growth. We will pursue opportunities to generate commercial income, whilst still ensuring a fair and ethical service for our NHS patients.

2.74 Current Research Strengths and Priorities

2.74.1 Velindre Cancer Centre has a number of areas of research within which it excels, and which will be further expanded and strengthened, including:

- Systemic therapy clinical trials- early phase and phase II/III trials.
- Radiotherapy research and trials.

2.74.2 **Early Phase Trials:** Phase 1 trials provide the vital link between laboratory drug development and administration to patients. They provide patients with treatment opportunities when they have limited or often no other conventional treatment options left. The development of phase 1 trials has been a significant part of our research and development strategy over the last few years. Having opened the first ever solid tumour '*first in human*' trial 3 years ago, there are currently six phase 1 trials open, with a number of others currently in set up. Two of these trials have local Chief Investigators and some, such as FAKTION, have significant translational components aimed at further individualizing patient care.

2.74.3 Prior to the current Phase 1 initiative, Welsh patients were required to travel to English Centres such as Oxford and London to access such opportunities. Phase 1 trial activity has also significantly enhanced the reputation of clinical research at Velindre Cancer Centre. The phase 1 initiative has been significantly supported by Velindre Charitable Funds but has also had input from Cardiff University and NISCHR. The increased engagement of these organisations as well as others including CRUK, CRW, ECMC, together with Pharma, are seen as key components of a sustainable model for the future. The aim over the coming years is to further develop a balanced portfolio of commercial and academically led trials that will offer patients with multiple tumour types access to experimental novel therapies.

2.74.4 **Phase 2 and 3 Trials:** Velindre Cancer Centre has a reputation for leading and participating in multicentre Phase III trials, and this is a flagship area of activity for the future. The Trust excels in the provision of Phase III randomised trials, and has also expanded phase II trials over recent years. We intend to continue to maintain and develop this area, moving into new cancer sites outside of the current '*Big four*'

of breast, gastro intestinal, prostate and lung cancer. In particular, we are developing trials expertise in new areas including head and neck cancer, thyroid cancer, gynaecological cancer and lymphoma.

2.74.5 **Radiotherapy Research**: This is a broad area which incorporates radiotherapy clinical trials, academic medical physics research, treatment planning and nuclear medicine/molecular radiotherapy. The ambition is clear; to become a CTRad (Clinical and Translational Radiotherapy) recognised Centre of Excellence for Radiotherapy Research. This will provide confirmation of our research and development excellence, enhance our reputation and open us a number of future research and development / commercial opportunities. The key areas of development are focussed around:

- Radiotherapy clinical trials.
- Radiotherapy quality assurance for clinical trials.
- Molecular radiotherapy.
- Functional imaging for radiotherapy.

2.74.6 **Radiotherapy Clinical Trials:** Velindre Cancer Centre plays a nationally important leadership role in radiotherapy trials and both sponsors and has Chief Investigators in trials of oesophageal, pancreatic, lung and head and neck cancer. We also have radiotherapy leads in prostate, rectal and penile cancer trials. Currently, Velindre Cancer Centre recruits to a broad spectrum of clinical trials involving radiotherapy, from high-technology early–phase pathway-to-portfolio trials with palliative radiotherapy to trials of molecular radiotherapy, and recently we have been increasingly involved in a number of multi-centre early phase single-arm and randomised trials. These reflect both the expanding radiotherapy trials activity in the UK and our national leadership in that we are attracting complex trials. We are now faced with significant challenges in taking part in these trials as they often require an adaption to our current techniques, use of innovative treatments, trial specific equipment and significant use of clinical resources in terms of staff and equipment to develop and deliver. It is important that the developments are integrated in to the complex technology development plans that we are currently progressing.

2.74.7 **Radiotherapy Quality Assurance for Clinical Trials (RTTQA)**: The Trust plays a leading role in Radiotherapy Quality Assurance for clinical trials (RTTQA) throughout the UK. Also, Cardiff, alongside Mount Vernon, the Royal Marsden and Clatterbridge Cancer Centre, is involved in a very high profile group responsible for the high quality radiotherapy delivery across all NIHR/NISCHR radiotherapy trials in the UK.

2.74.8 **Molecular Radiotherapy:** Velindre Cancer Centre are currently one of the leading UK centres in the development of this complex field, and we have been involved in multi-centre phase II and phase III studies. A number of opportunities opening up in

the early phase, phase II and translational sector and in internal dosimetry / individualised prescribing.

2.74.9 **Functional Imaging for Radiotherapy:** This is a complex field of high technology imaging, highly conformal IMRT and highly targeted radiotherapy delivery (IGRT) which has been discussed for over a decade but has not been trialled elsewhere. Our clinicians have led trials within this area, focusing on Head and Neck and Prostate cancer.

2.74.10 As well as the established research themes within radiotherapy outlined above, there are a number of themes emerging within the area of radiotherapy research that we will focus on which include;

- Early phase Radiotherapy trials.
- Drug Radiotherapy trials.
- Tumour immunology during Radiotherapy.
- Use local skills in genetically engineered mouse models (GEMMs) and novel organoid models.
- Biological organisation of radiotherapy planning.
- Stem cell modelling.

2.75 Emerging Research Themes

2.75.1 There are also areas of research which can be considered emerging themes for Velindre Cancer Centre and which we will prioritise for further development. This includes research led in the following areas:

- Nursing and Allied Health.
- Radiographer led research.
- Imaging.
- Early Diagnosis and Screening.
- Living with the Effects of Cancer.

2.75.2 **Nursing and Allied Health Professions:** Our priority for this area of research is to develop the infrastructure to support staff in pursuing research or an academic career, with the aim to making a substantial contribution to the body of knowledge in cancer care. This includes defining a clearer career trajectory, and a research trajectory with a focus on applied and translational research through a planned programme of research inquiry. We have developed a partnership with University of South Wales to help us take this forward, and partnership opportunities with other local academic institutions are also been pursued.

2.75.3 In addition to exploring opportunities for designing qualitative inquiry aligned to clinical trials research activity, a number of thematic areas of research interest within Nursing and Allied Health Professions have been identified:

- Living with the Impact of Cancer.
- Rehabilitation.
- Health Promotion and wellbeing.
- Palliative care and interventions.
- Counselling and Bereavement support services.
- Cancer and co-morbid dementia patient experience.
- Clinical leadership in multi-professional teams.

2.75.4 We will seek opportunities to collaborate with the third sector on these above areas of potential shared interest.

2.75.5 **Radiographer Led Research**: Within radiographer led research, a number of themes have also been identified, including:

- Conclusion of the therapy radiographer led UK wide, industry collaboration into the effect of radiotherapy on implanted cardiac devices and RF interference work, leading to the publication of national standards.
- Development of conclusive evidence in the area of treatment preparation for patients with pelvic cancers.
- Development and co-ordination of new techniques for advanced Radiotherapy trials.
- The development of a fiducial marker service to facilitate ongoing trials in patients with prostate cancer.
- Developing the most appropriate use of the specialised technical equipment including adaptive RT.
- Investigating the best use of stereotactic radiotherapy and radiosurgery for oncology and non oncological applications.
- Leading the development of patient assessment programmes to ensure that patients receive the most appropriate package of care for their individual needs.

2.75.6 **Imaging:** Cancer imaging has a major role to play in both the service delivery and research programme at Velindre Cancer Centre. There are many aspects to this, but in particular developing a research agenda within the radiology department will support the expansion of the clinical trial service, and develop academic radiology within Velindre Cancer Centre and within the proposed Velindre Cancer Research Institute. There are a number of areas identified for future development:

- Early detection with imaging e.g. screening and improved access to diagnostic imaging can reduce cancer-specific mortality.
- Advanced imaging modalities including interventional techniques e.g. targeted biopsies, tumour embolisations, radiofrequency ablations, stent insertions can reduce the mortality and morbidity associated with treating cancer.
- Advances in cross-sectional and functional imaging modalities e.g. diffusion weighted MRI, choline PET, can improve the diagnosis, staging and treatment of cancer, including radiotherapy. These imaging modalities are also used for

assessment of response to treatment, and are essential components in clinical trial assessments.

- Informatics, including imaging data, can improve the evaluation of patients with cancer, thus leading to better and more effective treatments.

2.75.7 **Early Diagnosis and Screening Research:** Lifestyle factors that increase the risk of cancer include smoking, obesity, poor diet and lack of exercise and research into prevention is a priority area for funders such as Cancer Research UK. Late diagnosis is thought to be one reason for poorer cancer outcomes in the UK compared to the rest of Europe and is therefore is also a priority area for the Welsh Government. Velindre Cancer Centre will work with public health and primary care as well as research partners in this important area of health care need.

2.75.8 **Living with the Effects of Cancer Research:** A diagnosis of cancer and the treatment for it leaves significant numbers of people dealing with the consequences not just of having cancer, but also of the effects of the treatments they have received, with many unaware of late or long term consequences of treatment. Therefore, it is very important that people living with the impact of cancer, their carers and their families have the support and services they need to take an active and leading role in their recovery, rehabilitation or ongoing care. Thus this is a key area for research and development, and research projects have already started to be established in partnership with third sector organisations, particularly around supporting men with prostate cancer.

2.76 Horizon Scanning

2.76.1 The research landscape is changing, with some exciting and innovative new themes on the horizon. In the next decade, we envisage our involvement in the following key research themes:

- **Personalised oncology:** This will affect decision making for surgery, radiotherapy and systemic therapy based on tumour biology, functional imaging and normal tissue toxicity prediction.
- **Stratified medicine:** Sequential sampling of primary and metastatic tumours, use of molecular profiles in the context of clinical trials and their linkage with outcome data and applied cancer genetics in solid and haematological malignancy.

2.76.2 We will need to consider the impact of both enhanced screening programs and the aging population, with more patients being diagnosed with earlier stage disease who will opt for non-surgical radical treatment (i.e. radiotherapy).

2.77 Delivery of Research and Development

2.77.1 There are many exciting opportunities for expansion and development of cancer research in Velindre. However, not all of these are currently being realised. The limiting factors to achieving our vision at present are largely the facilities,

fragmented approach to research and development across South-East Wales, the current activity-based funding model and clinical time. This following section sets out the proposed service delivery model and the benefits it would generate, if implemented.

2.78 The Proposed Service Model Described

2.78.1 The model will operate as an integrated network of research and development services within the clinical service model descried previously. The provision of integrated and seamless clinical services together with research and development is integral to maximising the opportunities for rapid translation of potential ideas to patient benefits. In respect of this, the full range of research and development activities will be undertaken in either the Hub or one of the spokes.

Hub: Patient (The patient is seen as the '*hub*' and they could reside in one of a number of possible places e.g. own home, family members home, hospice etc)

Spokes: Velindre Village@

Velindre Radiotherapy Village@

Velindre Specialist Cancer Centre

Velindre Cancer Research Institute

Patient (Hub)	Velindre Village @ (spoke)	Velindre Radiotherapy Village @ (spoke)	Velindre Specialist Cancer Centre (spoke)	Velindre Cancer Research Institute (spoke)
• Phase 4 low end trials and data collection for all trials	• Clinical trials research and treatment (some less complex phase 2 trials and Phase 3 and 4 trials)	• Clinical trials research and treatment (Phase 3 and 4 and less complex radiotherapy trials)	• Clinical trials research and treatment (Complex phase 1, 2 and 3 trials and complex radiotherapy trials)	• Trial and research design and development • Central RTTQA processes • Trial and research management/ sponsorship etc • R&D training • Research supervision

Figure 2.24 - Location of Velindre Research and Development Activity

2.79 Ensuring Integration of Research into Clinical Care within the Clinical Service Delivery Model

2.79.1 The ability to deliver on the research and development agenda makes developing capability to integrate research into clinical care, as speedily as possible, an absolute priority for the Trust. As cancer is a leading area of research, this is fundamental and any investment in cancer services must enhance this capability.

2.79.2 Research requires a way of working that must be supported on the clinical side together with an integrated space within the Velindre Cancer Centre. This will significantly help these synergies to be maximised. The development of an integrated clinical and research and development model will allow this to occur and ensure that there is a coherent strategic approach taken and that these two agendas are consistent and complementary.

2.79.3 Research teams will be physically embedded with the clinical teams such that consenting and sampling of patients becomes routine practice and the infrastructure within the Velindre Villages@, Specialist Cancer Centre and Velindre Cancer Research Institute will enable us to extract ever more sophisticated molecular information about a patient's tumour from these samples. This will include the changes that have occurred at presentation and those that occur over time, for example at the relapse of the tumour.

2.79.4 The Velindre Specialist Cancer Centre will be the vehicle for evaluating new procedures and protocols that are developed as a consequence of collecting this more sophisticated molecular information. For example, it will answer questions such as will virtual biopsies through circulating DNA be informative for given tumour types. The development of changing practices (e.g. trials investigating the repositioning of drugs) and the development of new interventions will come through laboratory based translational science for speedy delivery back into the clinic through the Specialist Cancer Centre.

2.79.5 Key benefits will include enhanced entry into clinical trials, ability to attract more industry funding, to speed up the adoption of new treatments in the clinical area and to secure additional funding from grant giving bodies. International centres such as Johns Hopkins and MD Anderson have physical co-location of researchers and clinicians which they deem critical to delivering these benefits and the resultant impact on patient outcomes. In addition, this level of integration will, as shown in other leading centres, be a catalyst for the development of the future approaches to cancer care.

2.80 Creating a Hub of Excellence in South Wales: The Velindre Cancer Research Institute

2.80.1 Wales does not have a focal geographic point for cancer research and development. Velindre Specialist Cancer Centre would be developed as a hub of excellence in respect of this with a purpose built facility located within or adjacent to the Velindre Specialist Cancer Centre in South-East Wales. It currently has a working title of the '*Velindre Cancer Research Institute*' which is intended to signify the world class research that will be undertaken and build on the strong Velindre brand.

2.80.2 It is envisioned that the hub provides a focal point for the 'joining up' of a wide range of organisations and partners with a research and development agenda in Wales. This would include NHS partners, universities, national research organisations, the voluntary sector and potential commercial partners.

2.80.3 The impact of this should not be underestimated as it clearly demonstrates to staff, patients, referrers, commissioners, potential philanthropists and the wider community that the organisation, and Wales as a nation, is committed to the continuous improvement of the care to our cancer patients. It will also be important in raising awareness of cancer in the local community by hosting meetings for general practitioners, opinion leaders and patient support groups. By creating a vibrant and inclusive hub, the Velindre Specialist Cancer Centre will be able to co-ordinate the clinical care, the research and the educational aspects of cancer medicine across the sector, nationally and internationally. This will include the delivery of care closer to home in district general hospitals, community settings and patients' homes. Clinicians believe this will greatly enhance diagnostic pathways across the sector resulting in earlier detection and ultimately improved outcomes. In addition, this will enable Velindre and South-East Wales to attract the talented individuals required to deliver our vision.

2.80.4 This is particularly important, as other leading players in the cancer/research and development field such as University College London, the Christie have already established Cancer Research Centres of their own.

2.81 Establishing the Radiotherapy Research Institute (VRRI): The 'Cutting Edge' Programme.

2.81.1 Central within the creation of world class radiotherapy research will be the establishment of the Radiotherapy Research Institute: Cutting Edge Programme. This will be embedded within the Velindre Specialist Cancer Centre and the Velindre Cancer Research Institute and will see a significant expansion in radiotherapy related research activity within Velindre, Cardiff and South East Wales. It will be pivotal in driving the recognition of Velindre

and Cardiff and as a Centre of Excellence for radiotherapy research and achieving CTRad status.

2.81.2 All radiotherapy related research activities under a single management group, providing a single source of access to external collaborators and a mechanism to ensure local collaboration, functioning as part of the wider South-East Wales / Wales Cancer Collaborative. The Cutting Edge Programme will aim to increase our current activity and support the development of new research themes, which will require funding from different research funding streams, towards a common agreed strategy.

2.81.3 The Cutting Edge Programme will supplement the planned radiotherapy research and development activities, with initial activities being focused in the field of technical radiotherapy. This will be followed by strategic development in the in novel drug-radiation combinations towards the second half of the programme.

2.82 Developing Collaboration and Partnership

2.82.1 Collaboration with research partners is key to the success of the proposed service model as it enables:

- The development of a common purpose and coherent and strategic approach to cancer research and development.
- Allows for improved strategic fit amongst organisations and alignment with the national and local priorities.
- Generates a critical mass of research and development knowledge, experience, capability and capacity.
- Generates additional income and funding and is attractive to potential donors.
- Attracts the best talent and allows it to optimise the benefits by working across organisational boundaries.
- The development of a fertile culture of innovation for research and development within South-East Wales and across the nation.

2.82.2 Velindre NHS Trust and Velindre Cancer Centre have well established partnerships with a wide range of organisations. These include, but are not limited to, the Local Health Boards, Cancer Networks, NISCHR CRC, Cardiff University/Higher Education Institutions, the Wales Cancer Trials Unit and various third sector partners, to name but few, in the conduct and management of portfolio studies. It has also established strong relationships with a number of organisations including Higher Education Institutions and the third sector.

2.82.3 It is an active partner in the Cancer Research-UK Centre in Cardiff, one of the first centres to be approved by CR-UK, and Wales PET Imaging Centre (PETIC), Wales Cancer Bank (WCB), Experimental Cancer Medicine Centre (ECMC) and the European Cancer Stem Cell Research Institute, and will focus on areas of research excellence and the emerging themes. For example, the Small Animal Radiation Research Platform (SARRP) may also allow the testing of novel PET biomarker imaging probes in genetically engineered mouse models of cancer and further drive the pursuit of molecular radiation in areas of unmet clinical need such as pancreatic and lung cancers.

2.82.4 Notwithstanding this, the proposed service model seeks to go far beyond this by enhancing existing partnerships, identifying and developing new ones (within the public and commercial sector), and developing a research and development network, infrastructure and facilities that compare to the best in the world.

2.82.5 This will be achieved within the proposed service model in a number of ways:

- **Vertical integration within Velindre:** a stronger focus will be provided on the development of effective organisational processes and structures that ensure research and development knowledge is optimised and shared.
- **Horizontal integration:** development of a collaborative framework which allows for strategic collaboration in areas of cancer which have a community interest.
- **Strategic Relationships:** Identifying and actively pursuing potential research partners and developing strong strategic relationships.
- **Partnership**: Working with partners to agree a coherent and strategic approach to research and development which articulates the collective and individual priorities, lead organisation(s), resource requirement and opportunities for grants/income generation.
- **Increased Focus:** Developing an iconic research and development facility in South-East Wales which provides a single place / focal point for a wide range of partners to come together, both physical and virtual.
- **System Leadership:** Velindre Cancer Research Institute will undertake a system leadership role in relation to the NHS Wales cancer research and development agenda.
- **Commercial Developments:** Developing a commercial strategy which seeks to take advantage of all commercial opportunities and develops a range of transformational strategic partnerships at a national / international level.

2.82.6 We will also continue to work with our Local Health Board partners to build research capacity to open and run cancer clinical trials and other research programmes close to patients' homes. We will ensure that patients and

carers receive high quality information about clinical trials and their results, and are given the opportunity to contribute to the development and review of research studies, through the Velindre Cancer Centre Patient Liaison Group and NISCHR Involving Peoples.

2.83 Benefits of the Research and Development Model

2.83.1 **Research benefits:** Delivery against the Research and Development Model will realise the following benefits specific to research:

- **Maximisation of patient benefit from cancer research** - by increasing access to clinical trial participation and by rapid adoption of novel technologies and treatments proven to be beneficial through research. This would include:
  - Increased recruitment to trials.
  - Improved clinical outcomes – survival and toxicity.
- **Increased patient participation in research** - through new processes, for example taking a consistent approach to obtaining patient consent and reduce bureaucracy by creating a single research approvals process. For example:
  - Involving all Consultants, all clinics and all sites in research – clinical trial recruitment to existing UK trials at the very least, and supporting staff to take on a more significant role such as leading a clinical trial.
  - Significantly increasing growth rate in number of active trials. The rate limiting factor associated with the number of trials undertaken at present is the availability of professional support staff to set up and run trials (including addressing compliance and contractual duties for example) and the lack of adequate facilities. Investment in facilities and greater strategic collaboration with partners would reduce the overhead associated with trial 'set-up' as governance requirements diminish.
- **Improved access to clinical data to fuel novel research** - which will improve the quality and reach of Velindre research. This research may include finding solutions to the problems of healthcare delivery through '*Improvement Science*'.
- **Better ability to provide a comprehensive, effective and efficient range of support services and infrastructure to improve research (for example, laboratories, IT, trial co-ordination, bioinformatics, data management and bio-banking)** - this would make it easier to conduct major clinical trials either for our own research or in conjunction with the pharmaceutical industry. Clinical trials are critical for NHS institutions to be leaders in cutting edge treatment. The benefits are, for example:
  - Significant further growth from a position of strength due to further scale, diversity of patient population, an engaged clinical community and smooth and efficient support services (together these elements suggest growth is a realistic ambition).

- **Improved ability to exploit novel research opportunities and increasing the reach of research at Velindre across all strategic priority areas** - bringing together academic and clinical specialist and tertiary services will encourage innovation and increase focus on translational research (e.g. Cancer and Transplantation).
- **Better ability to attract research talent and funding through closer links with LHBs, research organisations, research Institutes** - which would help Velindre demonstrate impact (*a critical factor in how university research is assessed*). For example:
  - Consolidating and aligning clinical and academic cancer services to support the creation of a well organised, highly collaborative and multi-disciplinary environment such that a significant percentage of the research portfolio is world-leading and about the same proportion is internationally competitive;
  - Attracting new funding partners whether commercial, not-for-profit or government who would find it more attractive and easier to do business with the new organisation;
  - Enhancing scale, performance, and reputation of the organisation would help attract the best talent and resources.
  - Reducing set-up times for trials which is important for both Wales and sponsor pharmaceutical companies. Velindre has already reduced average trial set-up times but with static resources no more could be achieved.
- **Improved ability to meet partner and commissioner standards** - to take a lead role in supporting the Welsh Government in developing policies and guidelines based on further research and insights into what those standards should be. For example, our Research and Development Manager has provided advice on research and development governance to NISCHR Permissions Coordinating Unit.

2.83.2 **Financial benefits:** Delivery against the Research and Development Model will realise the following financial benefits:

- **Significant opportunities for increasing research income including clinical trials and grants across all of the strategic priority areas** - the development of Velindre as a Research and Development Centre of Excellence will offer numerous commercial and non-commercial opportunities of major importance with regard to revenue streams and strategic partnerships.
- **Reduced duplication** - as a result of some specialist and tertiary services being consolidated and delivered at better scale, in part by creating clinical academic hubs or institutes for Cancer.

2.83.3 **Educational benefits:** Delivery against the Research and Development Model will realise the following educational benefits:

- **Improved, integrated and extended training and education for all employees and students, plus staff in the wider network, in line with the new models of care that will be required in the future**. For example:
  - Better cancer care management skills for local health providers in primary care including GPs due to development and delivery of an educational model which is supported by specialist cancer staff in the community enabled by Velindre as a system leader.
- **Enhanced educational and research opportunities for staff and students** - from co-location of research and clinical services which will strengthen Velindre Cancer Centre's reputation and help it to attract and retain the best people; attracting the best students will also strengthen the pool for future local clinical staff in the future. For example:
  - Developing and delivering new academic career opportunities for clinical academic trainees, nurses, allied health professionals, clinical and research scientists through the hub and its relationship with academia.
  - All staff should be given the opportunity for further development within their roles e.g. in research, new technology, education etc.
- **Opportunities to strengthen the range and scale of Velindre education portfolio**. For example:
  - Increasing the number of PhD students by forming a Cancer doctoral training centre in partnership with a range of bodies.

Education - The Service Proposal

2.84 Overview:

2.84.1 High quality education and training is essential in facilitating the provision of high quality care for patients. It is also critical for sustaining non-surgical oncology treatments for patients in Wales in the longer term. This places medical education at the centre of any service development plans and is therefore a key strategic priority for the Trust. This is reflected through an ambitious and challenging education service development proposal.

2.84.2 The education proposal, which is closely aligned to the research and development service proposal, aims to develop Velindres education and training capability so that it is equal to the best elsewhere in the world. In doing so this will improve Velindre's ability to translate research, learning and patient feedback into practice for the benefit of patients.

2.85 The Vision:

2.85.1 The most important factor in delivering high quality care is the quality of the workforce. It is vital that the Trust attracts, trains, and retains the best trainees possible and develops them into highly competent clinician leaders who can maintain and develop non-surgical oncology care in the future. Equally the education strategy must ensure that all staff involved in the delivery of cancer care has the right skills and knowledge to deliver high quality care which in turn will deliver clinical outcomes compatible with the best elsewhere.

2.85.2 Velindre NHS Trust already has a strong track record of education, ranging from undergraduate, specialty training and consultant education and Velindre regularly attracts delegates to training courses from local, national and international health care teams. However, the Trust has the ambition and more importantly the staff, the experience and the enthusiasm to do more and to do it better. This places medical education at the centre of the Strategic Outline Programme. The Trust has the opportunity, the skills and the energy to be national leaders in many aspects of oncology and palliative medicine education but this will take new resources and investment in order to build on current strengths. A key enabler of the vision outlined within the Strategic Outline Programme, and the accompanying clinical service model, will the development of the *Velindre School of Oncology and Palliative Medicine* and the implementation of the education service proposal. This will provide an increased focus and emphasis for the development of cancer education and training across South-East Wales.

Excellence in Care Through Excellence in Learning

2.86 Principles:

2.86.1 The education proposal will operate on a number of important principles:

- Improving patient outcomes will be placed at the centre of all education and training activities.
- All educational and training activities will be equitable, ethical and transparent.
- The importance of incorporating patient experience into education and training activities will be a fundamental foundation of the service proposal.
- Partnership and collaboration will be fundamental to the development and subsequent implementation of the education service proposal.

2.87 Objectives:

2.87.1 The key objective of the education proposal is to develop excellence in oncology-related education for internal and external delegates. This will provide the opportunity for cost-effective in-house development of the Velindre NHS Trust workforce, whilst also enhancing the reputation of Velindre Cancer Centre, by proving multi-disciplined professional education for health and social care staff and for patients and carers. A summary of other key objectives are listed below:

- To ensure the equitable provision of educating and training for everyone involved in cancer care across South-East Wales and Wales.
- To identify new cancer education Programmes which more closely reflect the needs of patients and of the workforce.
- To ensure that Velindre Caner Centre staff have the appropriate skills to deliver the clinical service model i.e. more services being delivered within the home or closer to home.
- To meet the education and training needs of a diverse and increasingly complex workforce.
- To develop a sustainable service by ensuring that the Trust workforce is flexible to change.
- To provide research-led education to clinical staff in order to facilitate the successful transition of research outcomes to improve patient care.
- To develop a learning culture across the Trust.
- To provide improved infrastructure, facilities an environment for education and learning.
- To provide education and training services across the United Kingdom and internationally.

2.88 Current Education Strengths and Priorities

2.89 Medical Education

2.89.1 Velindre Cancer Centre has a particularly strong track record and reputation within the field of medical education. This reputation underpins the high standards of patient care the Trust aspires to and as outlined within the Programmes Investment Objectives.

2.89.2 The Trust also plays an important role in providing medical education for external organisations and partners, specifically:

- Local Health Boards care for Trust patients in other hospitals in Wales. The Trust has a critical role, via acute oncology services, to help educate medical teams in the peripheral hospitals so that the same quality of oncological care can be delivered outside Velindre.
- Cardiff University through the student oncology project and through specific placements).
- Wales Deanery through recruitment and training of specialty / non-specialty trainees).
- NHS England via regional registrar study days.

2.89.3 **Medical Education - Pre Specialty level Medical Education:** To attract potential new trainees into oncology the Trust offers work experience to A level students, undergraduate placements for medical students, '*taster*' weeks for junior doctors (for which feedback has been excellent) and local education /oncology experience for core medical trainees as employees of the Trust.

2.89.4 The 'taster' weeks attract junior doctors from both Wales and other parts of the UK and help attract high quality trainees from outside Wales in the country. The Trust also holds, in partnership with the Wales Deanery, a regular focussed open day for potential oncology trainees. Subsequent to these efforts, the Trust now has excellent trainees applying to oncology, have no unfilled registrar level training posts and have been asked to write a report by the Wales Deanery about our successes. Velindre is keen to maintain this momentum regarding recruitment as the Trust is better able to deliver good quality patient care if we can recruit high quality trainees.

2.89.5 In addition the Trust collaborates closely with Cardiff University, helping to deliver key aspects of undergraduate education. The 3rd year student oncology project is a highly respected element of medical student education which is one of the stronger parts of their curriculum. We lead on the delivery of this project. The Trust also offers specific placements for other

medical students if they wish to select an oncology project to complete alongside gaining further clinical experience in oncology. This has resulted in completion of audit projects which benefit Velindre Cancer Centre and with results often presented at national and international meetings or published in peer reviewed journals. There are significant opportunities for Velindre to develop our collaborations with Cardiff University further and to play a more central role in undergraduate education provision.

2.89.6 **Medical Education - Specialty Training:** The Trust has a comprehensive medical education programme for current trainees. For example ward doctors have three weekly formal teaching sessions and there is also a once weekly local education programme for registrars. These are supplemented with regular guest speaker sessions that all staff can attend. The quality of this training was recognised by the Wales Deanery who presented Velindre with an innovation award for developments in radiotherapy training.

2.89.7 The Trust also collaborate closely with Singleton Oncology Centre in offering training to medical and clinical oncology trainees on the South Wales rotations and deliver training to doctors from the South-West of England in a reciprocal arrangement with training centres in that region. This improves trainees' access to training experiences and gives opportunities for networking and sharing of good practice across a large geographical region.

2.89.8 In addition Velindre Cancer Centre deliver focussed exam revision for the Part II FRCR exam through regular teaching to regional trainees and through an intensive FRCR revision course. This 5-day course attracts international oncology trainees and places Wales and Velindre firmly on the international map of key oncology training centres. Through this course Velindre have developed links with trainees across the UK, Hong Kong training centres and have written a prize winning oncology textbook. Velindre have also developed an FRCR exam revision website (www.oncopeadia.com) which has received very positive feedback.

2.90 Palliative Medicine

2.90.1 The following Cardiff University accredited courses are currently managed from the Velindre palliative medicine department:

- Postgraduate diploma in palliative medicine.
- Postgraduate diploma in palliative care.
- MSc in palliative medicine.
- MSc in palliative care.

2.90.2 The Postgraduate diploma celebrated its 25th anniversary in 2014 with an international conference in Cardiff. Annual residential teaching courses are also held in India and each year the Trust bid for approximately 15

Commonwealth Scholarships for Indian Students. Currently there are 86 postgraduate diploma students in year 1 (medicine and care), 91 in year 2 (medicine and care) and 60 on the MSc dissertation module. The course attracts international students and has strong links with India, Africa, Europe, USA, Canada, New Zealand and Hong Kong.

2.90.3 The Velindre palliative medicine department also delivers the Cardiff University short course in palliative care for GPs four times per year; this attracts GPS from all over the UK. In addition the Velindre palliative medicine department has:

- Developed a free online course on palliative care specifically for South Africa in partnership with e–cancer and there are plans for developing a similar programme for India. These would be seen a way of promoting and supporting palliative care in developing countries and as a way of recruiting potential students. The postgraduate office for medicine and dentistry are also looking to strengthen their international links and are developing MOOCS (massive online open access courses) which the palliative medicine department could be involved in.
- Involvement with validated undergraduate and post graduate study for staff on placement at Velindre. The palliative medicine team contributes to and provides tutorial support for the medical student's oncology project and ward based teaching support to student nurses from Cardiff University and the University of South Wales. The palliative SPR teaching programme is also held at Velindre
- The palliative medicine department delivers and contributes to the 2 day advanced communication skills study days, foundations in palliative care study days and staff induction programme.

2.91 Multi-Professional Education and Development

2.91.1 A key strength of Velindre is the multi-professional working environment within which patients are cared for. Velindre have developed many extended roles for allied health professionals that extend beyond traditional boundaries. However, despite these developments inter-professional learning is an area that could be further developed over time. This would improve mutual understanding, team work and communication with subsequent improvements in patient care.

2.92 Nurse Education

2.92.1 Velindre works closely and in collaboration with Cardiff and Vale Health Board to share and maximise learning opportunities for registered nurses and for health care support workers. This allows nurses from Velindre to access general skills and competence e.g. catheterisation, diabetes, RCN clinical leadership programme. In return Velindre offers Cardiff and Vale nurses the opportunity to access a range of specialist cancer programmes.

The aim of this partnership working is to ultimately develop a nursing workforce in South-East Wales and beyond that provides the highest standard of evidenced based care to cancer patients wherever they may be cared for. We have recently established an 'Acute Oncology Masterclass' – a free day of education/training for nurses, junior doctors and other allied health care professionals from outside the trust. This has been developed by our acute oncology team alongside the education/development department to help train colleagues from local health boards who acre for our patients as well.

2.92.2 Nurse education at VCC also has strong links with Cardiff University and with the University of South Wales, who provide further education for the VCC nurses. In return VCC supports placements for 3rd year nursing students.

2.93 Investigation of Clinical Incidents

2.93.1 Velindre Cancer Centre has robust processes for investigating clinical incidents through our award winning SCIF (Significant Clinical Incident Forum) team. Following review of clinical incidents systems are in place to ensure that learning is disseminated throughout the workforce in order to facilitate improved and safer patient care in the future. . We have excellent links between clinical governance teams and education teams, enabling us to focus education on incidents/events to help improve patient care.

2.94 Information

2.94.1 The education service at the Velindre Cancer Centre is supported by an excellent library, staffed by experience librarians with key skills in information literacy/critical appraisal of medical literature.

2.95 Future Opportunities for Education at Velindre:

2.95.1 The ability of Velindre Cancer Centre to deliver its strategic objectives for education are currently limited by a number of constraints. These include current limitations on space and facilities, a lack of development of specific educational resources, time constraints and clinical work pressures. Changes to the workforce e.g. more trainees are working less than full time, also place challenges on delivering against the education strategy.

2.95.2 The Strategic Outline Programme provides an opportunity to remove some of these constraints in a strategic and planned way and in turn will lead to a range of exciting opportunities across the following areas (*please note that this is not an exhaustive list*):

- Clinical / Medical oncology
- Palliative care
- Haematology

- Oncology pharmacy
- Chemotherapy nursing
- Cancer nurse specialists
- Radiotherapy
- Medical physics
- Psychological support
- Allied health
- Social care
- Library Services

2.95.3 A selection of opportunities taken from some of these areas are described below. These and other opportunities will be explored in detail at the next stage of the business case process.

2.95.4 **Palliative Medicine:** There is an opportunity to focus training on a more self directed blended learning approach, providing more flexibility access to training and assessment of knowledge skills through online learning activities and a reduction in face-to-face teaching.

2.95.5 **Opportunities for Joint Clinical / Academic Roles:** There is the potential to increase the scope and range of joint clinical / academic roles, particularly in the field of nursing. These roles will not only raise the profile of Velindre but will help to facilitate a culture of clinical and academic excellence.

2.95.6 **Increased Partnership Working:** The Programme offers the potential to further strengthen the existing partnerships and to foster new partnerships with local, national and international organisations.

2.95.7 **Research Projects:** Velindre undertake lots of excellent education and have a range of potential research projects / academic outputs that could be further developed or published. However, Velindre Cancer Centre currently lacks the infrastructure, resources and experience to develop these further. Stronger links with academic education departments would help focus on these activities, raise Velindre's profile and raise standards of work.

2.95.8 **Nursing:** There is an exciting opportunity within nursing for Velindre to take the lead in educating and training the cancer workforce both internally and externally as an '*integrated regional cancer education centre*'.

2.95.9 **Radiology:** Velindre does not currently have any radiology trainees. However, the SOP opens up the opportunity to start training radiology trainees in oncological radiology. This would be of huge benefit to both

trainees and patients as radiological knowledge is an important aspect of cancer care. There is an aim to link in/work closely with the newly proposed radiology academy to further improve education/training opportunities

2.95.10 **Consultant Level Training:** Consultants need support in their ongoing professional development whilst avoiding any impact of this on their ability to deliver patient care. This has become even more important recently secondary to appraisal/revalidation and with GMC plans for formalise educational / clinical supervision. However, this is an area that Velindre and Wales actively needs to focus on. For example investing in methods to access web based education could be of great benefit. Whilst it is critical to look outwards, to attend conferences and to share ideas / network at such events, utilising external web-based educational material locally could greatly improve access to educational activities without travel away from work, thereby having cost, environmental and time benefits.

2.95.11 **Clinical Governance:** Velindre has made significant progress in recent years in terms of linking clinical governance and medical education more closely. However, this is a very important area that should continue to be developed as education activities directly linked to clinical incidents mean we are teaching our medical staff in areas that directly impact upon our patients.

2.95.12 **Training of Trainers:** Velindre's consultant trainers also need training in how to support and train trainee doctors and how to maintain safe patient care whilst allowing juniors to develop. Feedback is also important so trainees know what is expected of them and can be informed when they are doing well / when they need to improve. Consultants with formal trainee supervisory roles will need to attend recognised training to ensure that they are delivering the best training possible.

2.95.13 **Conferences and Training Events:** The improved accommodation and quality of environment will open up the potential to host a range of national and international courses and conferences.

2.95.14 **Education and Support to the Wider System:** Velindre is beginning to have a more formal role in educating colleagues in LHBs and other health bodies and 3rd sector organisations about oncology care. Extending our role in this area would improve the care of cancer patients outside of Velindre, improve care pathways and referral processes while raising Velindre Centre's profile within each LHB.

2.95.15 **Income Generation:** There is the opportunity for Velindre to increase the amount of income it generates from medical education. For example, revision courses, formal teaching sessions, undergraduate and postgraduate

teaching could all generate income which could be reinvested back into patient care. In addition Velindre currently has to pay external providers (both NHS and outside the NHS) to hold many education sessions due to space limitations at the cancer centre. With vision and planning, not only could Velindre hold more teaching events, but there would be the potential to invite other providers to hold their teaching sessions in Velindre's facilities which could generate further income.

2.96 Proposed Service Model

2.96.1 In line with the new service proposal for clinical care, the patient will also be viewed as the '*hub*' for all education service developments. As such, education will be firmly based around what helps the Trust to better care for our patients.

Patient (Hub)	Velindre Village@ (spoke)	Velindre Radiotherapy Village	Velindre Specialist Cancer Centre
• Patient evaluation and feedback of services • Patient interviews • On-line training courses	• Patient focus groups • Patient evaluation and feedback of services • Patient and carer training courses • Education and training opportunities for all Velindre NHS Trust staff and trainees • Education and training opportunities for other NHS staff e.g. GP's, 3rd sector • Cross organisational meetings and training events • Virtual and on-line learning opportunities	• Patient focus groups • Patient evaluation and feedback of services • Patient and carer training courses • Education and training opportunities for all Velindre NHS Trust staff and trainees • Education and training opportunities for other NHS staff e.g. GP's, 3rd sector • Cross organisational meetings and training events • Virtual and on-line learning opportunities	• National and International training courses • National and International conferences and meetings • Patient focus groups • Patient evaluation and feedback of services • Patient and carer training courses • Education and training opportunities for all Velindre NHS Trust staff • Education and training opportunities for other NHS staff e.g. GP's, 3rd sector • Cross organisational meetings and training events • Virtual and on-line learning opportunities with Virtual University 'globally'

Figure 2.25 – Location of Velindre Education and Training Activity

2.97 Creating Educational Excellence in South-East Wales: *The Velindre School of Oncology and Palliative Medicine*:

2.97.1 The proposed service model places medical education as a central aspect of cancer care activities and as the central 'hub' of oncology education in Wales. Education services will be based within the '*School of Oncology and Palliative Medicine*', co-located with the Specialist Cancer Centre. This is significant, as in common with cancer research, Wales does not have a focal geographical point for cancer education and training. It is believed that the development of a '*School of Oncology and Palliative Medicine*' will promote educational excellence across South-East Wales and will lead to improved collaboration with various key stakeholders.

2.97.2 Alongside this exciting development at the Velindre Specialist Cancer Centre a key feature of the proposed education model is the development of a virtual education campus at each of the three Velindre Villages@. This will improve access to education for all staff and minimise the impact of education upon service delivery by reducing the need for staff to travel to the Specialist Cancer Centre for education wherever possible. Finally, the model will also look to increase patient involvement in education and will look to develop new ways of learning from the patient, including directly from their home or place of residence. The

Establishing a presence within the United Kingdom and Internationally with a 'virtual university' ethos and approach

2.97.3 The provision of education and training across the United Kingdom and internationally will also be actively pursued given the significant opportunities that are available as a result of Velindre's reputation for excellence and its strong brand. This will take the form of training and education delivered on-site within South Wales for national and international colleagues/organisations, the development of strategic relationships internationally with training and education delivered across the United Kingdom and internationally within these countries; and the development of a 'virtual' university approach which could provide on-line/Skype training and education globally. This would enhance cancer care globally, increase the reputation and brand of Velindre and generate income and further strategic opportunities for the Trust and Wales.

2.97.4 A summary of the key features of the proposed model are summarised below:

- The creation of a dedicated education and training facilities across South-East Wales that provide flexible space for a range of uses, including electronic and AV-based services, clinical skills laboratories, as well as more traditional lecture and conference rooms.

- The adoption of the latest technologies to develop new forms of education and training including distance and module learning, using video-conferencing and the internet to provide interactive sessions, and e-based courses to open new international and national markets.
- Within statutory and best practice requirements the Trust will provide effective and efficient research governance processes to enable a speedy mobilisation, delivery, and conclusion of clinical trials.
- The model will lead to an increased scope and range of education services in recognition of the ever growing use of multi-disciplinary teams and the involvement of a wider range of public and third sector organisations in health and social cancer care.
- Development of a publishing arm to ensure that the excellent materials and toolkits developed under the auspices of the Trust can be properly developed and licensed for use elsewhere.
- Strengthening of the secretariat to ensure a more cohesive approach to attracting and administering education and training and ensuring opportunities are appropriately exploited.

2.98 Key Characteristics of the Education Service Model

2.98.1 **Patient Centred:** Patients and cares will play an integral role in the proposed model and Velindre will explore possible options to learn from patients / carers and to use their experiences to help in the development of new educational opportunities. The involvement of patients will help the Trust to shape education better around their needs and to make the clinical service more patient centred.

2.98.2 **Empowerment:** Educating patients and carers will empower them to manage their own health, will reduce dependency on tertiary healthcare and would extend into Public Health prevention and survivorship.

2.98.3 **Flexibility:** The Trust anticipates that workforce requirements and expectations will change over time. This will necessitate a more flexible approach to education allowing staff to access materials at a time and place that suits them. This will also help minimise the impact of educational activities on care provision.

2.98.4 **Ambition and Innovation:** The model proposes a novel and ambitious approach to education. Although the model will continue to promote evidenced based learning it will challenge traditional learning and education methods e.g. books, lectures, tutorials with new innovative methods which will help put Wales undergraduate and post graduate oncology education as a world leader both in terms of standards, delivery and academic output.

2.98.5 **Partnership Working:** The model will promote stronger links with university departments. These strong academic partnerships will seek to drive improved quality of education and facilitate the development of innovative education processes, with the means to test, refine and develop them in an evidence based manner.

2.98.6 **Multi and Inter-disciplinary Learning:** Multi and inter-disciplinary learning opportunities will be developed where possible to enhance understanding and team working between different professional groups, to share best practice and to further improve patient care.

2.98.7 **Sharing of Expertise:** The model will promote the sharing of expertise and experience across the South-East Wales network to develop opportunities for cross-organisational working.

2.99 Benefits

2.99.1 Delivery of the education proposal will ensure that Velindre continues to be recognised as one of the top rated oncology educational and training centres on in the UK and will realise the following benefits:

- Education will be at the centre of the transformed service model and of development plans, reflecting its importance to the organisation.
- A strong, high quality clinical education programme, from induction through to ongoing educational programmes, will lead to improved quality of care for patients and reduce clinical incidents.
- Recruitment of higher calibre trainees and fewer junior doctor vacancies which will again contribute to improved patient care.
- The Trust will use education to help maintain its clinical audit programme whilst giving excellent learning opportunities for trainees.
- The Trust will look to further strengthen the national and international standing of NHS Wales and Velindre as both a provider of clinical services and of education and training.
- The Trust will continue its crucial role in organising and providing oncology training for LHBs, Cardiff University, Wales Deanery and NHS England and become the centre for oncology education in Wales.
- Building on its particular strength Velindre will continue to provide training that reflects the multi-professional working environment and service model employed, helping to develop extended roles for allied health professionals beyond traditional boundaries.
- Increased medical education opportunities e.g. undergraduate placements, junior doctors working in the Trust, will help maintain our clinical audit programme and local research whilst giving excellent learning opportunities for trainees.

- Increased attendance of national and international trainees for teaching events which will raise the profile of Velindre and Wales.
- The focus provided by the *Velindre School of Oncology and Palliative Medicine* will facilitate collaborative working across education and training organisations.
- Delivery of the service proposal will provide improved opportunities for learning through innovative methods e.g. virtual simulation.
- The education model will lead to improved IT supported web-based learning and distance learning through video-links and virtual learning environments such as Blackboard.
- The ability to host conferences and other education events and courses will lead to increased commercial income through increased capacity.
- Delivery of the education proposal will lead to an increased recognition of Velindre's unique position and knowledge, and increasing world-class status within the field of education.
- Strong links from the developments within SE Wales to other parts of Wales will have additional benefits of improving patient care beyond SE Wales and potentially helping with staff recruitment/retention in other geographical areas as well.
- Development of national, United Kingdom and international market for the provision of excellence in education and training.
- Development of strategic partnerships nationally and internationally in training and education.
- Increased generation of income from provision of education and training within the United Kingdom and internationally.

3.0 THE ECONOMIC CASE

3.1 Introduction

3.1.1 The main purpose of the economic case is to identify and appraise a wide range of options in response to the case for change set out within the Strategic Case and in relation to the Programme level Investment Objectives and Critical Success Factors.

3.2 Critical Success Factors

3.2.1 Critical Success Factors (CSFs) are those attributes that are essential to the successful delivery of the Programme. The CSFs are used alongside the Investment Objectives (IOs) for the Programme to evaluate the possible options. The CSFs which have been identified for the Programme are summarised within *table 3.1* below.

Table 3.1 – Critical Success Factors

CSF1: Strategic Fit
The option must: • Be consistent with relevant national strategies and policies • Provide holistic fit and synergy with other Trust strategies • Be aligned with the strategic direction of partner organisations and of the wider health community/public services • Provide a range of fully integrated services in line with patient need
CSF2: Accessibility (geographical) and Equity
The option must: • Improve access by providing services as close to the patient's home as possible when it is in the best interests of the patient to do so • Provide equitable service provision for the South-East Wales population
CSF3: Service Sustainability
The option must: • Ensure delivery against all National standards and quality requirements for cancer services • Promote flexibility so that service delivery can be adapted to reflect future changes in services and / or demand for services
CSF4: Value for Money
The option must: • Optimise the return on investment and provide overall value for money • Minimise associated risks

CSF5: Supply-side Capacity and Capability
The option must: • Match the ability and capacity of service providers and suppliers to deliver the required levels of service and functionality • Be attractive to potential suppliers
CSF6: Affordability
The option must: • Be affordable within the resources available • Be aligned with the potential sources of capital and revenue funding
CSF7: Achievability
The option must: • Be deliverable in terms of staffing, facilities and sites • Be able to be implemented safely and in line with the requirements of the Programme • Facilitate the continued delivery of services throughout the duration of the Programme

3.3 The Identification of a Long-list of Options

3.3.1 A sub-group of the Programme Board, including representatives with a broad range of service views, used an *options framework* approach (*see figure 3.1*) to identify a long-list of options for meeting the IOs and the CSFs of the SOP. The *options framework* is an effective approach for identifying and assessing a broad range of available options. It does so by systematically working through the available choices for what, how, who, when and funding. In completing this process, some options are discounted, others are carried forward, and some provide the recommended approach, which is to provide the preferred way forward. This is the basis for the Reference Project. The long-list of options was developed across a number of different dimensions, namely:

- Service scope
- Service model
- Estate solutions
- Service delivery
- Implementation strategies
- Funding methods

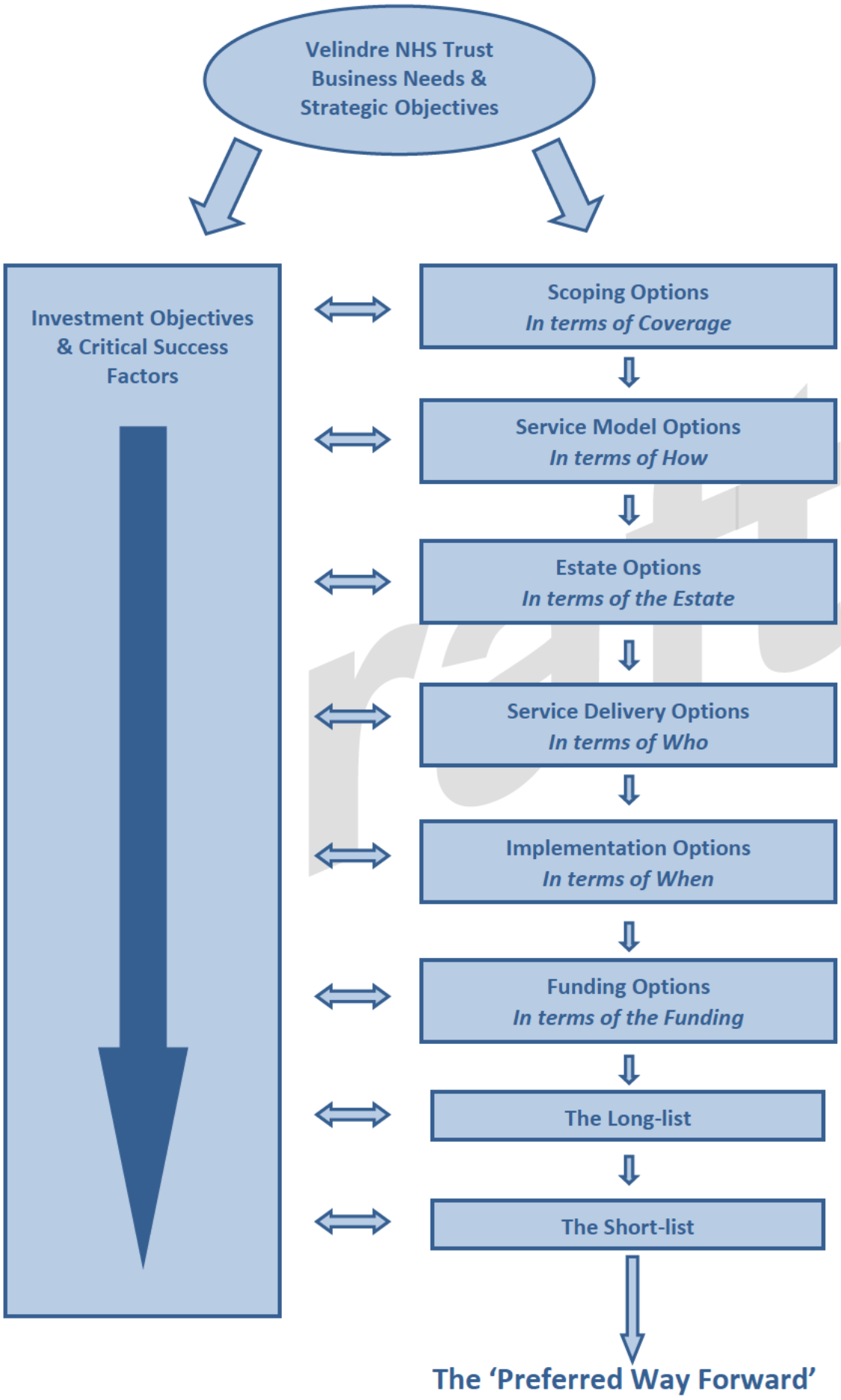


Figure 3.1 – Overview of the Options Framework Process

3.4 Scoping Options

3.4.1 The choices for potential scope are driven by the business needs and the strategic objectives at both a national and local level. In practice, these may range from business functionality to geographical and organisational coverage. The potential scoping options identified are summarised within *table 3.2* below.

Table 3.2 – Potential Scoping Options

	Do Nothing	Do Minimum	Intermediate	Maximum
Population	• South-East Wales	• South-East Wales	• South-East Wales	• All-Wales
Service Changes	• No service changes • No increase in service capacity	• Small, incremental service change • Services transferred where demand exceeds capacity	• Capacity levels increased to meet future demand • Changes to operations (7 days / 64 hrs a week)	
Research and Development	• Investment remains at current levels	• Investment remains at current levels	• Investment in priority areas for clinical trials and R&D • Proactive marketing of Velindre as a provider • Creation of private / academic partnerships	
Information and Technology	• Investment remains at current levels	• Investment remains at current levels	• Investment in Velindre and external infrastructure to ensure real time transfer of data and images across services • Development of software and apps to support service delivery • Creation of local technical and software support teams	
Conclusion	**Do Nothing: Discounted**	**Do Minimum: Retained in line with guidance**	**Intermediate: Preferred**	**Maximum: Discounted**

3.5 Discounted Scoping Options: Justification

3.5.1 **Do Nothing:** This option does not meet the IOs or the CSFs of the Programme. Of particular concern, it does not provide sufficient capacity to meet future demand for core clinical services. This option has therefore been discounted from further consideration and is not taken forward.

3.5.2 **Maximum:** This option differs from the '*intermediate*' option in that it proposes that the scope of the SOP covers cancer service provision for the whole of Wales. Whilst there is merit in considering this, it must be acknowledged that Velindre Cancer Centre is commissioned by the three Local Health Boards it serves (Cardiff and Vale University Health Board, Cwm Taf Local Health Board and Aneurin Bevan University Health Board) to provide services to the population they are responsible for. Consequently, any changes to this would require significant changes to the current commissioning arrangements and a corresponding increase in the capacity and capability of Velindre NHS Trust.

3.5.3 Therefore, this scope is not aligned to the Trust's strategic objectives (CSF1). Notwithstanding this, there is clearly an opportunity to identify service models and solutions that deliver excellent services and outcomes in South East Wales which improve the whole system of healthcare in Wales in respect of cancer. This could include increasing the scale / or reproducing the model described within the SOP in other parts of Wales, the sharing of learning and knowledge across Wales or the development of a more strategically collaborative approach through more effective partnership and collaboration.

3.6 Service Model Options

3.6.1 The choices are driven by the potential for new services, more effective working practices and innovative technologies. Key considerations range from *'what ways are there to do it'* to *'what processes could we use'*. The potential service models identified are summarised within *table 3.3* overleaf.

Table 3.3 - Service Model Options

	Do Nothing (status quo)	Centralised Model	Partially Integrated Service Model	Fully Integrated Service Model	Dispersed Service Model	Decommission Services
Service Model	• As per current service model • Outreach activity continues as per existing model	• Services delivered from Velindre Specialist Cancer Centre • Outreach activity continues as per existing model	• Majority of services delivered from Velindre Specialist Cancer Centre • Velindre Radiotherapy Satellite Unit to provide routine radiotherapy services • Outreach activity continues as per existing model	• Fully integrated model • *'Hub and spoke'* with the patient being the 'hub' • Treatment, care and support provided within patients place of residence • Velindre Villages providing a comprehensive range of services • Velindre Radiotherapy Village to provide radiotherapy services • Specialist Cancer Centre	• All services relocated to health facilities across South-East Wales • No central point / cancer centre for delivery of services	• Not applicable – South-East Wales would no longer support the delivery of non-surgical cancer services
Location of Services	• Velindre Cancer Centre • Existing outreach locations	• Specialist Cancer Centre • Existing outreach locations	• Velindre Specialist Cancer Centre • Velindre Radiotherapy Satellite Unit • Existing outreach locations	• Patients home • Velindre Villages within Local Health Boards • Velindre Specialist Cancer Centre	• Across South-East Wales	• Not applicable
Conclusion	**Possible**	**Possible**	**Possible**	**Preferred**	**Discounted**	**Discounted**

3.7 Discounted Service Model Options: Justification

3.7.1 **Dispersed Service Model:** This service model was discounted from further analysis as there were concerns regarding the deliverability and sustainability of this option. Analysis identified that this option was likely to reduce the quality of care, patient experience and clinical outcomes for patients by diluting specialist tertiary care across the region. This would increase the risk of losing high-quality clinical, research and professional staff from the region and reduce the ability of the region to attract high-calibre clinical, research and professional staff to the region in the future. Furthermore it was agreed that this option was not closely aligned with the IOs of the SOP. For example it would fail to promote Velindre as a leader in research and development.

3.7.2 **Decommission Services:** This service model does not meet any of the IOs or CSFs of the SOP and was therefore discounted from further analysis.

3.8 Potential Estate Options

3.8.1 These options consider how the estate of an organisation can support the delivery of the Programmes Investment Objectives. The potential options identified are shown below.

Table 3.4 – Potential Estate Options

Option	Summary	Conclusion
Do Nothing	• No investment	**Discounted**
Do Minimum	• Major capital assets replaced at end of asset life • Increased investment in estate to address backlog maintenance	**Possible**
Redevelop Existing Estate	• Redevelopment of existing Velindre Cancer Centre	**Discounted**
New Build (Trust Land)	• New build on brownfield site	**Preferred**
New Build (Greenfield)	• New build on greenfield/brownfield site	**Discounted**
New Build co-located with Acute Site	• New build on acute site	**Discounted**
New Build (NHS, publically)	• New build on NHS / publicly owned site	**Possible**
Split-Site (New Build)	• New build on Trust brownfield site • New build on existing Trust site	**Possible**
Split-Site (Part New Build / Part Redevelopment)	• New build on Trust brownfield site • Redevelopment on existing site	**Possible**

3.9 Discounted Estate Model Options: Justification

3.9.1 **Do Nothing:** This option does not meet the Investment Objectives or the Critical Success Factors of the SOP and is highly likely to result in demand for services outstripping supply; a continuous and sustained reduction in the quality of services and patient experience; the current facility becoming unfit-for-purpose; and worsening of the clinical outcomes and patient experience for cancer patients in South-East Wales.

3.9.2 **New Build (Greenfield/brownfield):** Despite delivering many of the Programme level IOs and CSF, initial analysis suggested that this option did not provide value for money in comparison to the options which cover developments on land owned by the Trust. This is partly because there are no land purchase costs associated with developing on the existing site. This option was explored at a practical level with a high level search of available and suitable land conducted by NHS Wales Shared Services Partnership, Facilities Services. This concluded that there was unlikely to be land available with a sufficient footprint and / or met the specific requirements of a specialist cancer centre within the required timeframes.

3.9.3 **New Build (co-located with an acute site):** The Trust held a number of clinical meetings and discussions before discounting this option. A summary of the main reasons for discounting this option are listed below:

- Qualitative feedback from patients indicates that they value the fact that the current service is provided from a non-acute setting and not part of a very busy acute DGH site. This provides them with a better, more personalised experience in a setting and environment more aligned to cancer care than is potentially available on a multi-purpose acute site.
- The acuity of patients receiving services from Velindre Cancer Centre can be managed safely and effectively without co-location on an acute site. The current critical care / transfer system provides the required levels of safety and responsiveness to manage patients. This is further supported by the fact that the specialist cancer centre, under all other options, will be located close to a main DGH.
- Velindre has well established clinical links within each LHB through the provision of outreach outpatient services and Velindre consultants undertaking in-patient clinics. This is considered to work well and provides the benefits of a specialist cancer centre in an environment which patients value highly, together with a clinical presence and relationship within each respective Local Health Board.
- The frequency of patients requiring transfer from Velindre Cancer Centre to an acute setting is relatively small. The current arrangements for managing acutely unwell patients are considered to be of high quality at Velindre Cancer Centre and there is no guarantee that these could be enhanced or maintained through co-location.

- The strategic ambitions of Velindre NHS Trust are clearly set out within the 5-year Plan 'Delivering Quality, Care and Excellence' and the 3-year plan '*Delivering Excellence*'. There are no strategic aims or objectives within these plans that cannot be delivered within the existing configuration of services.
- The size of DGH sites often means that there can often be little difference in time between a rapid transfer from the tertiary centre to a DGH and that if the tertiary centre was sited within the footprint of the DGH i.e. the tertiary centre could be sited at diametrically opposite ends of a very large and complex site.
- Velindre Cancer Centre is a specialist cancer centre for South East Wales. Therefore, the fact that it sits outside of any of the DGH sites is helpful in identifying it as a specialist centre that serves the regional population and not a single LHB population.
- There is a practical advantage of Velindre Cancer Centre not currently being co-located with an acute sire as it reduces the issue of repatriation of patients. For example, if it were located on an acute site there is a high likelihood a number of patients transferred from Velindre Cancer Centre to the acute site would not be from that Local Health Board population. This has a number of disadvantages. First, this would require the patients' family / carers to travel further to visit them when compared to the existing arrangements as many patients requiring secondary care are transferred to a facility in their own Local Health Board area. Secondly, this reduces the impact of out-of-area patients consuming the capacity of one particular acute site.
- Research and development activities currently are multi-organisational and dispersed across South-East Wales. It is therefore important that a networked approach is continued to ensure a breadth and depth of partnerships are developed in respect of clinical services and research and development activities. The mantra must be about *'relationships and not places'*
- Co-locating Velindre Cancer Centre on an acute site would potentially weaken the culture of the organisation, its values and beliefs and what sets it apart as a '*place of excellence*'. This could impact on the quality of services provided to patients. Furthermore, it could increase the risk of losing high quality clinical, research and professional staff and reduce the risk of attracting them. It is believed that the strong Velindre brand may be diluted or lost and this has significant value to NHS Wales.
- That culture and ethos i.e. what sets Velindre apart as '*excellent*' could be compromised if it is incorporated within a large acute setting.

3.9.4 In addition to the above reasons, and from a more practical perspective, the Trust received confirmation from NHS Wales Shared Services Partnership, Facilities Services that there was currently no land currently available, co-located to an acute site, with a sufficient footprint and / or met the specific

requirements of a world class cancer service within the required timeframes. Therefore the only way that this option could be pursued would be to-relocate major services away from an acute site elsewhere. In reality there would be major concerns regarding the deliverability and affordability of such an approach.

3.10 Service Delivery Options

3.10.1 The following section considers the range of options for service delivery in relation to the preferred scope and potential solution. The choices for service delivery are driven by the availability of service providers. The potential options identified are shown below.

Table 3.5 – Potential Service Delivery Options

Option	Summary	Conclusion
In-House (NHS)	• All services would continue to be provided by Velindre NHS Trust staff and other NHS staff via Service Level Agreements (SLAs)	**Preferred**
Outsource	• All services would be outsourced and delivered by non-NHS providers	**Discounted**
Strategic Partnership	• Under this option all services would be provided via a partnership arrangement between the Trust and external parties	**Discounted**

3.11 Discounted Service Delivery Options: Justification

3.11.1 **Outsource:** This option is inconsistent with local and National strategy therefore does not meet a number of the key IOs and CSFs identified within the SOP. It is likely to reduce the quality and sustainability of the NHS workforce in South East Wales e.g. the ability to attract and retain the best clinicians and professionals. It also represents a significant element of risk with regard to securing a private provider to provide specialist services to a major population. It does not align to the Governments' policy in respect of public services provided by public organisations wherever possible.

3.11.2 **Strategic Partnership:** This option does not meet the IOs or the CSFs of the SOP. It is likely to reduce the quality and sustainability of the NHS workforce in South East Wales e.g. the ability to attract and retain the best clinicians and professionals. It also represents a significant element of risk with regard to securing a private provider to provide specialist services to a major population. It does not align to the Governments' policy in respect of public services provided by public organisations wherever possible.

3.12 Implementation Options

3.12.1 The options for implementation relate to the timing and phasing of options in relation to the preferred scope, service model, estate solution and method of service delivery. The choices for implementation are driven by the ability of the supply side to produce the required products and services, value for money affordability and service need. In practice, these will range from a single phased solution to the phasing of the solution over time.

Table 3.6 – Potential Implementation Options

Option	Summary	Conclusion
Single-Phase Development ('*Big Bang*')	• Under this option the Programme would be delivered in one single and discrete phase (although, as with any construction Programme, some phasing would be necessary)	**Preferred**
Phased Development	• Under this option the Programme would be delivered over a number of phases	**Possible**

3.13 Discounted Implementation Options: Justification

3.13.1 Not applicable, all options taken forward.

3.14 Funding Options

3.14.1 The choices for financing are driven by the availability of capital and revenue funding sources. The options are considered in the context of the preferred:

- Service scope
- Service model
- Estate solution
- Method of service delivery
- Strategy for implementation

Table 3.7 – Potential Funding Options

Option	Summary	Conclusion
Welsh Government Capital Funding	• Under this option the Programme would be funded through Welsh Government capital funding	**Possible**
Charitable Funding	• Under this option the Programme would be funded through charitable funding	**Discounted**
Private Finance (100%)	• Under this option the Programme would be funded solely through private finance solutions e	**Discounted**

Public Private Partnership Funding Model	• Under this option the Programme would be funded through a Public Private Partnership (PPP) Funding Model which would require both Welsh Government capital funding and innovative private finance e.g. through the Non Profit Distributing funding model	**Preferred**

3.15 Discounted Funding Options: Justification

3.15.1 **Charitable Funding:** Although it is possible that charitable funding could make a small contribution to the delivery of the Programme it is not feasible for the whole Programme to be funded through charitable sources given the likely magnitude of investment required.

3.15.2 **Private Finance:** Following discussions with specialist NPD advisors, and the announcement by the Welsh Government of an Innovative Funding policy, it was decided to discount this option as the Trust were advised that only certain elements of the Programme, namely the construction elements, could realistically be funded through an innovative private finance model. Specialist advice provided to the Trust by KPMG indicated that there is unlikely to be a market for the funding of equipment etc for this programme due to the pace of technological changes and the resulting obsolescence of equipment. The advice also suggests that the risk of procuring the non-construction elements e.g. equipment, better lies with the NHS and in doing so funding these elements through traditional capital funding offers the NHS better value for money.

3.16 The Revised Long-list of Options

3.16.1 On the basis of the above analysis a revised long-list of 10 options were taken forward for non-financial appraisal (*Note: capital cost forms were also produced for all 10 options to facilitate the option appraisal process*). A synopsis of each of the long-listed options is provided below (*Note: more detailed descriptions are included within appendix 3(a)).*

Option 1 (Do Minimum) - Synopsis: Major capital assets replaced at end of asset life and Increased investment in estate to address backlog maintenance.
The Do Minimum option provides the least ambitious option and will act as the baseline in terms of value for money. Under this option services will continue to be delivered from existing locations, with services transferred to alternative service providers when and where demand exceeds capacity. From an estates perspective this option assumes that all major capital assets will be replaced at the end of their recommended asset life and that there will be works to address backlog maintenance on the existing estate.

In terms of funding it is assumed that this option would be delivered through Welsh Government capital funding.
Option 2 - Synopsis: Centralised Service Model - A new Specialist Cancer Centre built on a brownfield site under Trust ownership, supported by the development of a new Velindre Cancer Research Institute.
A new Specialist Cancer Centre will be built on a brownfield site which is under Trust ownership. Alongside the development of a new Specialist Cancer Centre Velindre will continue to deliver chemotherapy and outreach activity as per the current service model. In terms of funding it is assumed that this option would be delivered through a Public Private Partnership (PPP) funding model.
Option 3(a) - Synopsis: Centralised Service Model - A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust, supported by the development of a new Velindre Cancer Research Institute.
A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. • Site 1 – All clinical services located within new build accommodation on the brownfield site owned by the Trust • Site 2 – All non-clinical services located within new build accommodation on the existing VCC site Alongside the development of a new Specialist Cancer Centre Velindre will continue to deliver chemotherapy and outreach activity as per the current service model. In terms of funding it is assumed that this option would be delivered through a PPP funding model.
Option 3(b) - Synopsis: Centralised Service Model - A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust, supported by the development of a new Velindre Cancer Research Institute.
A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. • Site 1 – All clinical services located within **new build accommodation** on the brownfield site owned by the Trust • Site 2 – All non-clinical services located within **refurbished accommodation** on the existing VCC site Alongside the development of a new specialist cancer centre Velindre will continue to deliver chemotherapy and outreach activity as per the current service model. In terms of funding it is assumed that this option would be delivered through a PPP funding model.

Option 4 - Synopsis: Partially Integrated Service Model – A new Specialist Cancer Centre built on a brownfield site under Trust ownership, supported by the development of a new Velindre Cancer Research Institute. A 2 bunker Radiotherapy Satellite Unit will also be built within one of the Trusts LHBs.
A new cancer Specialist Cancer Centre will be built on a brownfield site which is under Trust ownership. Alongside the new Specialist Cancer Centre a 2 bunker Radiotherapy Satellite Unit will be built within one of the Trusts LHBs. In addition Velindre will continue to deliver chemotherapy and outreach activity as per the current service model. In terms of funding it is assumed that this option would be delivered through a PPP funding model.
Option 5(a) – Synopsis: Partially Integrated Service Model – A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust, supported by the development of a new Velindre Cancer Research Institute. A 2 bunker Radiotherapy Satellite Unit will also be built within one of the Trusts LHBs.
A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. • Site 1 – All clinical services located within new build accommodation on the brownfield site owned by the Trust • Site 2 – All non-clinical located within new build accommodation on the existing VCC site Alongside the new Specialist Cancer Centre a 2 bunker Radiotherapy Satellite Unit will be built within one of the Trusts LHBs. In addition Velindre will continue to deliver chemotherapy and outreach activity as per the current service model. In terms of funding it is assumed that this option would be delivered through a PPP funding model.
Option 5(b) - Synopsis: Partially Integrated Service Model – A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust, supported by the development of a new Velindre Cancer Research Institute. A 2 bunker Radiotherapy Satellite Unit will also be built within one of the Trusts LHBs.
A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. • Site 1 – All clinical services located within **new build accommodation** on the brownfield site owned by the Trust • Site 2 – All non-clinical services located within **refurbished accommodation** on the existing VCC site Alongside the new Specialist Cancer Centre a 2 bunker Radiotherapy Satellite

Unit will be built within one of the Trusts LHBs. In addition Velindre will continue to deliver chemotherapy and outreach activity as per the current service model.

In terms of funding it is assumed that this option would be delivered through a PPP funding model.

Option 6 - Synopsis: Fully Integrated Community Service Model – A new Specialist Cancer Centre and a new Velindre Cancer Research Institute built on a brownfield site under Trust ownership, supported by 3 new build Velindre Villages@ (one of which will be a Velindre Radiotherapy Village@) developed across South-East Wales.

A new Specialist Cancer Centre will be built on a brownfield site which is under Trust ownership. Alongside the new cancer campus 3 Velindre Villages will be developed across South-East Wales.

- New build Specialist Cancer Centre and a Velindre Cancer Research Institute on brownfield site owned by the Trust
- One Velindre Village@ (Velindre Radiotherapy Village@) with radiotherapy service provision (2 bunkers) built on public sector / NHS owned land
- Two Velindre Villages@ with no radiotherapy service provision built on public sector / NHS owned land

In terms of funding it is assumed that this option would be delivered through a PPP NPD funding model.

Option 7(a) - Synopsis: Fully Integrated Community Service Model – A new Specialist Cancer Centre and a new Velindre Cancer Research Institute, split over two sites, built on land under the ownership of the Trust, supported by 3 new build Velindre Villages@ (one of which will be a Velindre Radiotherapy Village@) developed across South-East Wales.

A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. Alongside the new cancer campus 3 Velindre Villages will be developed across South-East Wales.

- New build Specialist Cancer Centre and a Velindre Cancer Research split over two sites:
  - Site 1 – All clinical services located within new build accommodation on the brownfield site owned by the Trust
  - Site 2 – All non-clinical located within new build accommodation on the existing VCC site
- One Velindre Village@ (Velindre Radiotherapy Village@) with radiotherapy service provision (2 bunkers) built on public sector / NHS owned land
- Two Velindre Villages@ with no radiotherapy service provision built on public sector / NHS owned land

In terms of funding it is assumed that this option would be delivered through a

PPP funding model.
Option 7(b) - Synopsis: Fully Integrated Community Service Model – A new Specialist Cancer Centre and a new Velindre Cancer Research Institute, split over two sites, built on land under the ownership of the Trust, supported by 3 new build Velindre Villages@ (one of which will be a Velindre Radiotherapy Village@) developed across South-East Wales.

A new Specialist Cancer Centre, split over two sites, will be built on land under the ownership of the Trust. Alongside the new cancer campus 3 Velindre Villages will be developed across South-East Wales.
• New build Specialist Cancer Centre and a Velindre Cancer Research split over two sites:
  ○ Site 1 – All clinical services located within **new build accommodation** on the brownfield site owned by the Trust
  ○ Site 2 – All non-clinical services located within **refurbished accommodation** on the existing VCC site
• One Velindre Village@ (Velindre Radiotherapy Village@) with radiotherapy service provision (2 bunkers) located within **refurbished accommodation** on public sector / NHS owned land (Note - radiotherapy element will be new build accommodation)
• Two Velindre Villages@ with no radiotherapy service provision located within **refurbished accommodation** on public sector / NHS owned land
 	
In terms of funding it is assumed that this option would be delivered through a PPP funding model.

3.16.2 The key features of the long-list of options are summarised within *table 3.8* overleaf.

3.17 Non-Financial Appraisal of the Long-list of Options

The long-list options were evaluated by senior Trust stakeholders in order to identify an agreed short-list of options and an emerging preferred way forward. As part of this process each option was assessed against the Programmes Investment Objectives and Critical Success Factors to ensure that each option met the essential requirements. *Table 3.9* summarises how well each of the long-listed options matched the Investment Objectives and Critical Success Factors defined within the SOP.

Table 3.8 – Key Features of the Long-List of options

Summary of:	Option 1: Do Minimum	Option 2	Option 3(a)	Option 3(b)	Option 4	Option 5(a)	Option 5(b)	Option 6	Option 7(a)	Option 7 (b)
Service Scope	• South-East Wales • Small, incremental service change • Services transferred where demand exceeds capacity	• South-East Wales • Capacity levels are increased to meet future demand projections • Changes to operational times (7 days a week / 64 hrs a week) • Investment in all priority areas for clinical trials and research and development • Proactive marketing of Velindre as a provider • Creation of private / academic partnerships • Investment in VCC and external infrastructure to ensure real time transfer of data and images across services • Development of software and apps to support service model in respect of information sharing and management • Creation of local technical and software support teams								
Service Model	• As per existing	• Centralised (Outreach activity as per existing)	• Centralised (Outreach activity as per existing)	• Centralised (Outreach activity as per existing)	• Partially-Integrated (Outreach activity as per existing)	• Partially-Integrated (Outreach activity as per existing)	• Partially-Integrated (Outreach activity as per existing)	• Fully Integrated Community Model	• Fully Integrated Community Model	• Fully Integrated Community Model
Estate Solution	• Major capital assets replaced at end of asset life • Increased investment in estate to address backlog maintenance	• New build on Trust land (brownfield)	• Split-site (New build on Trust land (brownfield) and new build on existing) site	• Split-site (New build on Trust land (brownfield) and redevelopment on existing)	• New build on Trust land (brownfield) • New build RT satellite unit on NHS / public site	• Split-site (New build on Trust land (brownfield) and new build on existing) • New build RT satellite unit on NHS / public site	• Split-site (New build on Trust land (brownfield) and redevelopment on existing) • New build RT satellite unit on NHS / public site	• New build on Trust land (brownfield) • New build Velindre Villages on NHS / public site • New build RT satellite unit on NHS / public site	• Split-site (New build on Trust land (brownfield) and new build on existing) • New build Velindre Villages on NHS / public site • New build RT satellite unit on NHS / public site	• Split-site (New build on Trust land (brownfield) and redevelopment on existing) • Velindre villages within refurbished accommodation on NHS / public site (RT satellite unit will be new build)
Service Delivery Method	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)	• In-house (NHS staff)
Implementation Strategy	• Phased development	• Single-phase	• Phased development	• Phased development	• Single-phase	• Phased development	• Phased development	• Single-phase	• Phased development	• Phased development
Funding Method	• Public funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding	• PPP funding

Table 3.9 – Evaluation of the long-list of options against the Investment Objectives and Critical Success Factors

	Option 1: Do Minimum	Option 2	Option 3(a)	Option 3(b)	Option 4	Option 5(a)	Option 5(b)	Option 6	Option 7(a)	Option 7 (b)
IO1: Quality service delivering optimal outcomes	**X**	√√	√√	√√	√√	√√	√√	√√	√√	√√
IO2: Improved clinical outcomes though R&D & innovation	**X**	√√	√√	√√	√√	√√	√√	√√	√√	√√
IO3: Achievement of standards	√	√	√	√	√	√	√	√√	√√	√√
IO4: Deliver services in cost effective, efficient and productive manner	**X**	√√	√√	√√	√√	√√	√√	√√	√√	√√
IO5: High quality and sustainable service	**X**	√	√	√	√	√	√	√√	√√	√
CSF1: Strategic fit	**X**	√	√	√	√	√	√	√√	√√	√√
CSF2: Accessibility (geographical) and Equity	√	√	√	√	√	√	√	√√	√√	√√
CSF3: Service sustainability	**X**	√	√	√	√	√	√	√√	√√	√√
CSF4: Value for money	√	√	√	**X**	√	√	**X**	√√	√	**X**
CSF5: Supply-side capacity and capability	√√	√√	√√	√	√√	√√	√	√√	√√	√
CSF6: Affordability	√√	√√	√	**X**	√√	√	**X**	√√	√	**X**
CSF7: Achievability	√√	√√	√	√	√√	√	√	√√	√	√
Short-list (Yes / No)	**Yes (*in line with guidance*)**	**Yes**	**Yes**	**No – Discounted**	**Yes**	**No – Discounted**	**No – Discounted**	**Yes – Preferred Way Forward**	**Yes**	**No – Discounted**

Key:

X	Does not meet Investment Objective / Critical Success Factor
√	Partially meets Investment Objective / Critical Success Factor
√√	Fully meets Investment Objective / Critical Success Factor

3.18 Summary of the Non-Financial Appraisal

3.18.1 The following options were discounted at this stage of the evaluation process and not taken forward to the short-list.

3.18.2 **Option 3(b):** Despite providing similar outputs to *option 3(a)* it was agreed that this option should be discounted on the basis that it failed to provide value for money and was likely to be less viable for a Public Private Partnership (PPP) approach; thus making it unaffordable.

3.18.3 In terms of value for money this option failed to produce any capital savings in comparison to *option 3(a)* despite the fact that *option 3(b)* included elements of refurbishment of the existing estate. Given that the final estate solution would undoubtedly be of a lower quality than *option 3(a)* (*all new build*) it was agreed that this should be discounted from further analysis.

3.18.4 **Options 5(a) and 5(b):** Despite providing similar outputs to *option 4* it was agreed that these options should be discounted on the basis that they failed to provide value for money in comparison to *option 4*.

3.18.5 **Option 7(b):** Despite providing similar outputs to *option 7(a)* it was agreed that this option should be discounted on the basis that it failed to provide value for money and was likely to be less viable for a PPP approach; thus making it unaffordable.

3.18.6 In terms of value for money this option failed to produce any capital savings in comparison to *option 7(a)* despite the fact that *option 7(b)* included elements of refurbishment of the existing estate. Given that the final estate solution would undoubtedly be of a lower quality than *option 7(a)* (*all new build*) it was agreed that this should be discounted from further analysis.

3.19 The Short-listed Options

3.19.1 The following options have been carried forward into the short-list for economic analysis.

- Option 1 – Do Minimum
- Option 2
- Option 3(a)
- Option 4
- Option 6 – The Emerging Preferred Way Forward
- Option 7(a)

Please Note: A more detailed qualitative and financial appraisal of the short-listed options will be undertaken following the approval of the SOP.

3.19.2 The following tables provide detailed definitions of the short-listed options.

Table 3.10 – Option 1: Do Minimum Description

Synopsis:
The Do Minimum option provides the least ambitious option and will act as the baseline in terms of value for money.
Location(s):

• Existing service delivery locations only:
  ○ Velindre Cancer Centre
  ○ Existing outreach locations

Service Scope:
Population: • South-East Wales **Services:** • Small and incremental service change will continue up until the point where capacity and /or resources prevent any more change • Where local agreement can be reached extended opening hours will be implemented • Services will be transferred to alternative service providers when and where demand exceeds capacity **Research and Development:** • Investment in R&D services remains at current levels **Information Technology:** • Investment in IT services remains at current levels
Service Model:
• Centralised service delivery model
Estates Solution:
• All major capital assets replaced at the end of their recommended asset life e.g. linacs replaced every 10 years • Enabling and refurbishment works completed to facilitate replacement of capital assets • Increased investment in the existing estate to address backlog maintenance • No investment in existing outreach locations
Service Delivery Method:
• In-house through existing service delivery arrangements
Implementation Strategy:
• Phased development
Funding Method:
• Welsh Government funding

Table 3.11 – Option 2 Description

Synopsis:
A new Specialist Cancer Centre built on a brownfield site under Trust ownership, supported by the development of a new Velindre Cancer Research Institute. Alongside the development of a new Specialist Cancer Centre Velindre will continue to deliver chemotherapy and outreach activity as per the current service model.
Location(s):
• New build Specialist Cancer Centre and Velindre Cancer Research Institute on brownfield site owned by the Trust • Existing outreach locations but no increase in capacity
Service Scope:
Population: • South-East Wales **Services:** • Capacity levels are increased to meet future demand projections • Changes to operational times at the Specialist Cancer Centre implemented (7 days a week / 64 hrs a week) • New technologies are introduced at the Specialist Cancer Centre where it is economically viable and in the best interest of the patient • Service changes are implemented prior to the construction of the new specialist cancer centre where possible • Small and incremental service change will continue within the existing outreach locations up until the point where capacity and /or resources prevent any more change **Research and Development:** • Investment in all priority areas for clinical trials and research and development • Proactive marketing of Velindre as a provider of high quality Research and Development • Creation of private / academic partnerships **Information Technology:** • Investment in VCC and external infrastructure to ensure real time transfer of data and images across services • Development of software and apps to support service model in respect of information sharing and management • Creation of local technical and software support teams
Service Model:
• Centralised service delivery model
Estates Solution:
• New build Specialist Cancer Centre, will meet all clinical, statutory and operational standards and comply with current HTMs

• New build Specialist Cancer Centre will include costs to cover all equipment requirements e.g. linacs, at time of opening (‘*one cycle*’) • No investment in existing outreach locations
Service Delivery: Method
• In-house through existing service delivery arrangements
Implementation Strategy:
• Single phase development
Funding Method:
• PPP funding model

Table 3.12 – Option 3(a) Description

Synopsis:
A new Specialist Cancer Centre, split over two sites, built on land under the ownership of the Trust, supported by the development of a new Velindre Cancer Research Institute. Alongside the development of the new Specialist Cancer Centre Velindre will continue to deliver chemotherapy and outreach activity as per the current service model.
Location(s):

• New build Specialist Cancer Centre and a Velindre Cancer Research Institute split over two sites:
  ○ Site 1 – All clinical services located within new build accommodation on the brownfield site owned by the Trust
  ○ Site 2 – All non-clinical located within new build accommodation on the existing VCC site
• Existing outreach locations but no increase in capacity

Service Scope:
Population: • South-East Wales **Services:** • Capacity levels are increased to meet future demand projections • Changes to operational times at the Specialist Cancer Centre implemented (7 days a week / 64 hrs a week) • New technologies are introduced at the Specialist Cancer Centre where it is economically viable and in the best interest of the patient • Service changes are implemented prior to the construction of the new specialist cancer centre where possible • Small and incremental service change will continue within the existing outreach locations up until the point where capacity and /or resources prevent any more change **Research and Development:** • Investment in all priority areas for clinical trials and research and development

• Proactive marketing of Velindre as a provider of high quality Research and Development • Creation of private / academic partnerships **Information Technology:** • Investment in VCC and external infrastructure to ensure real time transfer of data and images across services • Development of software and apps to support service model in respect of information sharing and management • Creation of local technical and software support teams
Service Model:
• Centralised service delivery model
Estates Solution:
• New build Specialist Cancer Centre will meet all clinical, statutory and operational standards and comply with current HTMs • New build Specialist Cancer Centre will include costs to cover all equipment requirements e.g. linacs, at time of opening (‘*one cycle*’) • No investment in existing outreach locations
Service Delivery Method:
• In-house through existing service delivery arrangements
Implementation Strategy:
• Phased development
Funding Method:
• PPP funding model

Table 3.13 – Option 4 Description

Synopsis:
A new Specialist Cancer Centre built on a brownfield site under Trust ownership, supported by the development of a new Velindre Cancer Research Institute. A 2 bunker Radiotherapy Satellite Unit will also be built within one of the Trusts LHBs. In addition Velindre will continue to deliver chemotherapy and outreach activity as per the current service model.
Location(s):
• New build Specialist Cancer Centre and a Velindre Cancer Research Institute on brownfield site owned by the Trust • New build Radiotherapy Satellite Unit will be built on public sector / NHS owned land • Existing outreach locations but no increase in capacity
Service Scope:
Population: • South-East Wales

Services:

- Capacity levels are increased to meet future demand projections
- Changes to operational times at the Specialist Cancer Centre implemented (7 days a week / 64 hrs a week)
- Velindre Radiotherapy Village@ village open 7 days a week / 64 hrs a week
- New technologies are introduced at the Specialist Cancer Centre where it is economically viable and in the best interest of the patient
- Service changes are implemented prior to the construction of the new cancer campus where possible

Research and Development:

- Investment in all priority areas for clinical trials and research and development
- Proactive marketing of Velindre as a provider of high quality Research and Development
- Creation of private / academic partnerships

Information Technology:

- Investment in VCC and external infrastructure to ensure real time transfer of data and images across services
- Development of software and apps to support service model in respect of information sharing and management
- Creation of local technical and software support teams

Service Model:

- Partially integrated service delivery model

Estates Solution:

- New build Specialist Cancer Centre and new build Radiotherapy Satellite Unit will meet all clinical, statutory and operational standards and comply with current HTMs
- New build Specialist Cancer Centre and new build Radiotherapy Satellite Unit will include costs to cover all equipment requirements e.g. linacs, at time of opening (‘*one cycle*’)
- No investment in existing outreach locations

Service Delivery Method:

- In-house through existing service delivery arrangements

Implementation Strategy:

- Single phase development

Funding Method:

- PPP funding model

Table 3.14 – Option 6 Description: The Emerging Preferred Way Forward

Synopsis:
A new Specialist Cancer Centre and a new Velindre Cancer Research Institute built on a brownfield site under Trust ownership, supported by 3 new build Velindre Villages@ (one of which will be a Velindre Radiotherapy Village@) developed across South-East Wales.
Location(s):
• New build Specialist Cancer Centre and a Velindre Cancer Research Institute on brownfield site owned by the Trust • One Velindre Village@ (Velindre Radiotherapy Village@) with radiotherapy service provision (2 bunkers) built on public sector / NHS owned land • Two Velindre Villages@ without radiotherapy service provision built on public sector / NHS owned land
Service Scope:
Population: • South-East Wales **Services:** • Capacity levels are increased to meet future demand projections • Changes to operational times at the Specialist Cancer Centre implemented (7 days a week / 64 hrs a week) • Velindre Radiotherapy Village@ village open 7 days a week / 64 hrs a week • Velindre Villages@ open 7 days a week / 64 hrs a week • New technologies are introduced at the Specialist Cancer Centre and at the Velindre Villages@ where it is economically viable and in the best interest of the patient • Service changes are implemented prior to the construction of the new cancer campus where possible • All activity within the existing outreach locations is stopped and absorbed within the Velindre villages **Research and Development:** • Investment in all priority areas for clinical trials and research and development • Proactive marketing of Velindre as a provider of high quality Research and Development • Creation of private / academic partnerships **Information Technology:** • Investment in VCC and external infrastructure to ensure real time transfer

of data and images across services • Development of software and apps to support service model in respect of information sharing and management • Creation of local technical and software support teams
Service Model:
• Fully integrated community service model
Estates Solution:
• New build Specialist Cancer Centre and Velindre Villages@ will meet all clinical, statutory and operational standards and comply with current HTMs • New build Specialist Cancer Centre and Velindre Villages@ will include costs to cover all equipment requirements e.g. linacs, at time of opening (‘*one cycle*’) • No investment in existing outreach locations • Trust retains ownership of existing VCC site when it is vacated • Trust re-provides ABMU owned building which is currently located on site identified for the new build cancer campus
Service Delivery Method:
• In-house through existing service delivery arrangements
Implementation Strategy:
• Single phase development
Funding Method:
• PPP funding model

Table 3.15 – Option 7(a) Description

Synopsis:
A new Specialist Cancer Centre and a new Velindre Cancer Research Institute, split over two sites, built on land under the ownership of the Trust, supported by 3 new build Velindre Villages@ (one of which will be a Velindre Radiotherapy Village@) developed across South-East Wales.
Location(s):

• New build Specialist Cancer Centre and a Velindre Cancer Research split over two sites:
  ○ Site 1 – All clinical services located within new build accommodation on the brownfield site owned by the Trust
  ○ Site 2 – All non-clinical located within new build accommodation on the existing VCC site

- One Velindre Village@ (Velindre Radiotherapy Village@) with radiotherapy service provision (2 bunkers) built on public sector / NHS owned land
- Two Velindre Villages@ without radiotherapy service provision built on public sector / NHS owned land

Service Scope:

Population:

- South-East Wales

Services:

- Capacity levels are increased to meet future demand projections
- Changes to operational times at the Specialist Cancer Centre implemented (7 days a week / 64 hrs a week)
- Velindre Radiotherapy Village@ village open 7 days a week / 64 hrs a week
- Velindre Villages@ open 7 days a week / 64 hrs a week
- New technologies are introduced at the Specialist Cancer Centre and at the Velindre Villages@ where it is economically viable and in the best interest of the patient
- Service changes are implemented prior to the construction of the new cancer campus where possible
- All activity within the existing outreach locations is stopped and absorbed within the Velindre villages

Research and Development:

- Investment in all priority areas for clinical trials and research and development
- Proactive marketing of Velindre as a provider of high quality Research and Development
- Creation of private / academic partnerships

Information Technology:

- Investment in VCC and external infrastructure to ensure real time transfer of data and images across services
- Development of software and apps to support service model in respect of information sharing and management
- Creation of local technical and software support teams

Service Model:

- Fully Integrated Community Service Model

Estates Solution:

- New build Specialist Cancer Centre and Velindre Villages@ will meet all clinical, statutory and operational standards and comply with current HTMs

• New build Specialist Cancer Centre and Velindre Villages@ will include costs to cover all equipment requirements e.g. linacs, at time of opening (‘*one cycle*’) • No investment in existing outreach locations • Trust retains ownership of existing VCC site when it is vacated • Trust re-provides ABMU owned building which is currently located on site identified for the new build cancer campus
Service Delivery Method:
• In-house through existing service delivery arrangements
Implementation Strategy:
• Single phase development
Funding Method:
• PPP funding model

3.19.3 **Please Note:** Following discussions between the Trust and Welsh Government it has been agreed that a Public Private Partnership Non Profit Distributing funding model (PPP NPD) is the most appropriate funding approach for delivering all of the short-listed options with the exception of option 1, the *Do Minimum*.

7.0 GLOSSARY OF TERMS

24/7	Twenty four hours a day/ seven days a week
3D	Three-Dimensional
4D	Four- Dimensional
ABUHB	Aneurin Bevan University Health Board
A&E	Accident and Emergency
AOS	Acute Oncology Service
CHC	Community Health Council
CR-UK	Cancer Research-United Kingdom
CSF	Critical Success Factor
CT	Computerised Tomography
DCAG	Departmental Cost Allowance Guide
EASR	European Age Standardised Rate
FM	Facilities Management
GFR	Glomerular Filtration Rate
GP	General Practitioner
HBN	Health Building Notes
HTM	Health Technical Memoranda
HNA	Holistic Needs Assessment
ICT	Information Communication Technology
IGBT	Image Guided Brachytherapy
IGRT	Imaged Guided Radiotherapy
IMRT	Intensity Modulated Radiation Therapy
IO's	Investment Objectives
JCCO	Joint Collegiate Council for Oncology

LHB	Local Health Board
Linac	Linear Accelerator
MDT	Multi-disciplinary Team
MRI	Magnetic Resonance Imaging
MSP	Managing Successful Programmes
NEJM	New England Journal of Medicine
NHS	National Health Service
NPD	Non Profit Distributing
NPV	Net Present Value
NRAG	National Radiotherapy Advisory Group
NWIS	NHS Wales Informatics Service
OBC	Outline Business Case
PACS	Picture Archiving and Communication System
PET-CT	Positron emission tomography–computed tomography
PETIC	Wales Positron Emission Tomography Imaging Centre
PICC	Peripherally Inserted Central Catheter
PPE	Post Programme Evaluation
PPP	Public Private Partnership
PPP NPD	Public Private Partnership Non Profit Distributing
PRINCE2	Projects In Controlled Environments
RCR	Royal College Radiologists
R&D	Research and Development
SACT	Systemic Anti-Cancer Therapy
SBRT	Stereotactic Body Radiation Therapy
SOP	Strategic Outline Programme
SPECT	Single Photon Emission Computed Tomography

SRS	Stereotactic Radiosurgery
SST	Site Specific Team
SWCN	South Wales Cancer Network
UK	United Kingdom
QA	Quality Assurance
VCC	Velindre Cancer Centre
VMAT	Volumetric Modulated Arc Therapy
WG	Welsh Government
WHSSC	Welsh Health Specialised Services Committee