



WALES CANCER BIOBANK
BIOFANC CANCER CYMRU

Strategy

2025 – 2030

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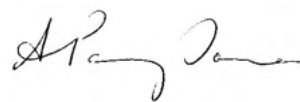
For further information on the Wales Cancer Biobank please visit our website (www.walescancerbank.com) and we'd be pleased to welcome you to our Facebook and X (Twitter) 'family'.



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Mission statement:

“To promote cancer research through leadership in the supply of biosamples, data and expertise to the international research community to drive innovation in Wales for the benefit of cancer patients globally.”

Part 1: The Wales Cancer Biobank 2005-2025

Our core role as a cancer biobank

Patient donation of tumour samples is an essential component of a strong and vibrant cancer research infrastructure, bridging the gap between pre-clinical and clinical research. The availability of biosamples for researchers in Wales and the UK is fraught with logistical and regulatory challenges that hinder free and ready access of this important translational material.

The Wales Cancer Biobank (WCB) provides the infrastructure and expertise to overcome these challenges. It delivers consented and clinically annotated material in the form of fresh, frozen and fixed tissues and fluids from Welsh cancer patients to researchers within Wales and across the globe¹. WCB has accumulated nineteen years' worth of experience, gaining an international reputation as a leader in the field of biobanking². Its infrastructure provides unparalleled sourcing, processing and provision of cancer tissues to support cancer researchers in Wales.



Over 17,000 patients have consented to WCB collecting their samples and data since 2005 and just over half of these patient consents have been used in at least one research project, with one donation used in 11 different projects, spanning 11 years. 170 research groups across 10 countries have so far accessed samples, data and/or pathological images from its archive¹. Additionally, WCB provides support to clinical trials collecting bio-samples for translational research by hosting samples and providing expert knowledge.

Our place in UK biobanking and the cancer research infrastructure within Wales

A recent survey undertaken by a group of international biobanks, which was led by WCB, revealed that WCB rates within the top 30% of participating cancer biobanks in the UK on the basis of the number of samples held and the number of research projects supported annually.

The benefits to the UK research community of dedicated cancer biobanks are many:

- Immediate access to NHS clinics and large volumes of quality assured samples and associated clinical data under one application/ethical process - Leading to reduced time and resource implications for researchers
- Consolidation of specialist expertise in sample handling, sample processing, data linkage, regulatory and ethical compliance
- Well established links with NHS teams (cancer clinics) and related services (eg.genetics, histology, informatics) - Leading to quality assured processes that reduces research bias and increases confidence (of funders) in project outcomes and reproducibility
- Standardised biobanking practices ensuring services are fit for purpose and cutting edge - Providing researchers with access to wider resources, training, expertise and sample availability
- Established links with funders and regulators - Offering the ability to influence national and international biosample related agendas

¹ For further details on WCB see our website: <https://walescancerbank.com>

² WCB was awarded UK Biobank of the Year 2020

WCB occupies an important place across the whole network of cancer research stakeholders in the UK and plays a key role in Wales (Figure 1), contributing to innovation in new cancer diagnostics and treatments that align with the **Wales Cancer Research Strategy (CReSt)**³. With its activity spanning NHS and academia, **WCB provides an important link between clinical and pre-clinical researchers acting as a conduit for knowledge transfer, samples and data and thus promoting translational research**. WCB also provides an additional route for industry engagement and inward investment in cancer research in Wales.

WCB is independent of individual academic research groups, commercial interests and NHS Trusts, and so provides impartial access to clinical samples and offers expertise in sample collection and processing without favour. **A dedicated biobank infrastructure with the associated approvals and specialist staff allows researchers to focus on the science and not spend valuable time and resource on regulatory requirements, ethics approvals and sample and data collection**. Funders and other stakeholders, especially patients, have the assurance that a professional biobank maintains the highest standards and, that the samples and data will be well curated, fit for the intended purpose and made widely available for cutting edge cancer research, wherever that takes place.

A changing working model of biobanking

With its activity spanning NHS and academia, **WCB provides an important link between clinical and pre-clinical researchers acting as a conduit for knowledge transfer, samples and data and thus promoting translational research**. WCB also provides an additional route for industry engagement and inward investment in cancer research in Wales. WCB's core principle are to remain agile and responsive to researcher needs, being willing to change its working practices to accommodate the changing research landscape and requirements of stakeholders. This is reflected in its transition from a 'savings bank' in its first decade, where researcher requests dictated the focus on archiving samples from the 'big four' solid tumour types across Wales, to a 'lending bank' in its second decade, where the maturity of the archive permitted a refocussed effort on issuing samples to the research community.

This working model has relied on core infrastructure funding from Welsh Government (and initially Cancer Research Wales charity support) to establish a stand-alone bioarchive and clinical database administered under its own research licence under the UK Human Tissue Act 2004, and consent ethics. This has involved direct access to the Welsh NHS clinical portal and a working relationship with the SAIL research database, **providing researchers with access to anonymised clinical data under its own ethics with associated digital histology**. This model has allowed WCB to remain independent of individual academic research groups, commercial interests and NHS Trusts, and so provides impartial access to quality assured clinical samples and offers expertise in sample collection and processing without favour. **A dedicated biobank infrastructure with the associated approvals and specialist staff allows researchers to focus on the science and not spend valuable time and resource on regulatory requirements, ethics approvals and sample and data collection**. Funders and other stakeholders, especially patients, have the assurance that a professional biobank maintains the highest standards and, that the samples and data will be well curated, fit for the intended purpose and made widely available for cutting edge cancer research, wherever that takes place.

It is essential that WCB remains relevant and able to operate in an increasingly complex data-rich landscape and a challenging funding environment that necessitates self-sustainability. Over the past three years we have undertaken a number of reviews of our operating structures and cost recovery model. The outcome of these have demonstrated the need to seek working

³ <https://walescancerresearchcentre.org/crest/>

practices that are able to accommodate the needs of researchers for multi-parametric data associated with clinical samples and for a mixed-model approach of partnership/integration with cost-recovery to provide sustainability.

In Part 5 of this Strategy document we summarise our plans to adapt our infrastructure model over the next five years to meet these challenges and provide a vision for cancer biobanking post-2030.

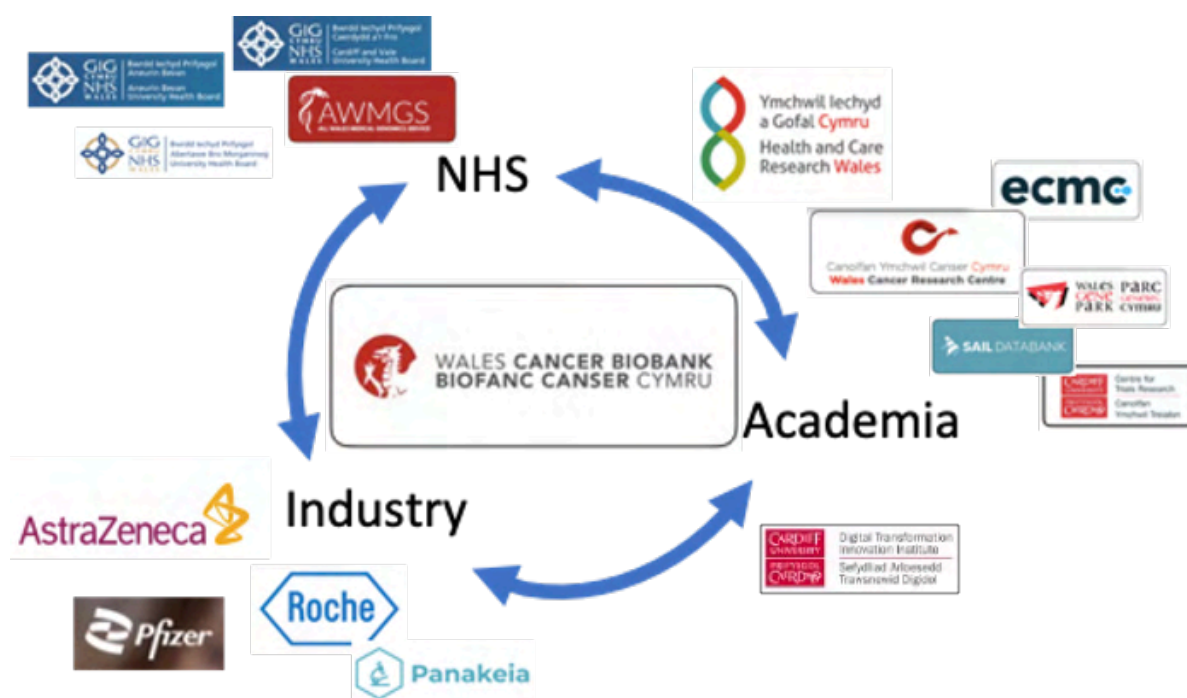


Figure 1: WCB's core activity of moving samples and data from the clinic to researchers means that it acts as a conduit between the NHS, academia and industry, supporting and promoting collaboration between cancer researchers in a variety of professional organisations and infrastructures

Part 2: Our Core Values

WCB's strategy for delivering impact in cancer research in the next 5 years will be based on the following updated version of our existing four core pillars. In each case we will seek clear metrics to audit progress and ensure delivery of our objectives.



Performance

We aim to ensure our core biobanking activity⁴ meets the changing needs of cancer research and aligns with CReSt priority areas



People

We seek to increase patients' opportunities to be involved in cancer research and to foster the development of the next generation of cancer researchers in Wales



Partnership

We plan to use our expertise through collaboration and leadership to accelerate innovation in cancer research, diagnosis and treatment



Promotion

We aspire to maximise the potential of WCB resources and expertise by expanding our network of stakeholders and partners in Wales and internationally

⁴ We define our core biobanking activity as the provision of unfettered access to patient samples and data to the research community

Part 3: Our Vision for Cancer Biobanking in Wales

“A new model for biobanking to meet the changing needs of cancer research globally and to promote innovation in Wales”

The cancer research landscape is constantly evolving. With the advent and rapid expansion of single cell and spatial genomics in cancer research, we project an increasing need for physical samples with associated clinical data from cancer researchers. With this increasing demand for relevant tissues, plus the huge potential of digital image analysis of cancer for diagnostics and prognostics, the basic principle of WCB’s operating model is more relevant today than ever.

Wales needs an agile biosample resourcing infrastructure that underpins the Cancer Research Strategy for Wales (CReSt)⁵ as well as enabling wider UK and international cancer research networks. The Biobank must be able to respond rapidly to changing researcher needs and play a role as a pro-active research partner to inform on new innovations in cancer treatment and diagnosis.

However, this must be done sustainably. Accessing samples from a biobank provides an economy of effort that manifests into a significant time saving for researchers, yet in almost all cases of biobanks that issue samples to researchers (unlike some national biobanks that only issue data) there is a strong reliance on core infrastructure funding to support their operation. With increasing pressures on all sectors for efficiency savings, the challenge for biobanking generally is to identify new sustainable operational models that still provide efficient, unfettered access to bio-samples for researchers.

Here we propose a new vision for cancer biobanking in Wales, one in which biobanking processes are embedded within NHS and academic infrastructures, engage directly with research projects and funders and maximises its cost recovery activity through lean working.

WCB will build on its strengths of quality assurance, leadership, reputation, collaborations and resources to ensure that the biobank remains at the heart of the evolving cancer research landscape, while it undergoes a fundamental restructuring of its operational model to deliver growing impact in cancer research for the benefit of patients in Wales while also expanding its reach to the cancer research community across the UK and internationally.

Our vision for the Wales Cancer Biobank is that by 2030 it will no longer be a stand-alone biorepository with its own biosample archive and clinical database; instead, it will be an integrated, financially independent bioarchive infrastructure able to access anonymised patient data directly from the NHS Wales clinical portal. It will transition from a ‘passive’ service provider to a pro-active research partner, leading on innovation and research delivery in the cancer space.

Our longer-term ambition, which we will be planning over the next 5 years, for implementation after 2030, is to further simplify the sample delivery pipeline by coordinating direct sample access from central pathology and NHS clinics to the researchers – thus reducing a proportion of the labour-intensive biobanking practices associated with physical tissue archives.

The culmination of these changes will be a new working model of biobanking that truncates the pipeline between patient and researcher, whilst offering a portfolio of state-of-art information to accompany the biological samples.

⁵ <https://walescancerresearchcentre.org/crest/>

Part 4: Our Strategic Aims and Objectives

Our strategic aims, which are predicated on the Core Values described above, will focus on:

- *Increasing **Engagement** with our research stakeholders*
- ***Embedding** WCB activity within new and existing cancer infrastructures in Wales*
- ***Expanding** the reach and impact of WCB on cancer research across the UK and beyond*

These aims will be achieved with the following important outcomes in mind:

Sustainability. WCB recognises the importance of maintaining a lean and efficient operating infrastructure that provides both impact and value for money – whilst also remaining relevant to the needs of the research community. Ethical biobanking is a matter of national and scientific infrastructure and is not a purely commercial model anywhere in the world. Nonetheless we are committed to identifying a more sustainable funding model, which includes: divesting operating costs through partnerships and additional income based on fees for service; joint/collaborative research grant income; new infrastructure partnerships; and WCB-led research. This approach is built into our strategic objectives described below.

Research outputs. Research publications in the form of experimental and trials research articles form the primary academic metric for high quality research outputs, by which infrastructures such as WCB are measured. While WCB has published biobanking articles in the recent past, it is reliant on the researchers themselves for publication outputs. Historically the rate of return per project has been low. By the beginning of 2024, WCB had provided samples to more than 170 projects locally and internationally, resulting in just 41 publications and 19 higher degree theses. One reason for this low output may be that WCB receives a higher proportion of applications from local, small-scale research activity and early career / PhD level projects. Thus, it will be a focus of the WCB strategy to address this by directly targeting major cancer institutions (initially predominantly UK-based) and internationally renowned research-leads in translational cancer research) to increase the completion rate and impact of its research publications. This will also have obvious benefits for future funding opportunities.

Research impact has also been achieved by WCB in other ways in the recent past, for example through the support of industry spin-outs; new commercial pre-IND diagnostics or therapeutics; industry and Innovate UK grant applications and REF Impact Cases. We will ensure that we maximise the potential for industry and trials research collaborations through our new Research Strategy Group and engagement with our partner infrastructure WCRC's Commercial Strategy Group – which together will coordinate our academic and industrial engagement.

Impact on patient health. In line with CReSt priorities, a key outcome for WCB is the impact its activities have on cancer patients. Provision of biosamples and data to research partners over the past 5 years have contributed directly to projects that have resulted in innovations in routine diagnostics and the development of new diagnostics approaches. These include the QuicDNA project which is shaping future early diagnostics for lung and prostate cancer, whilst provision of archival material to the All Wales Medical Genomics Service (AWMGS) has led directly to the optimisation of mutation tests implemented into routine clinical practice. Furthermore, provision of samples (Telenostix) and data (Panakeia, Owkin) has supported spin-outs in platform development for commercial healthcare outcomes in the commercial sector. Our ambition is to develop deeper partnerships within NHS and industry to promote future innovations and to work collaboratively with academic research partners to promote translation of novel therapeutics to the clinic.

Our **strategic objectives** are as follows:

- ***Meeting researcher needs for patient donated tissues.***
 - Transition from a stand-alone tissue archive to an integrated biobanking network with strategic partners within Wales and the UK to ensure sustainable quality-controlled biosampling for research internationally
 - Embed WCB practices within each of the CReSt priority areas to help achieve ground-breaking innovations in cancer research within Wales.
 - Drive forward state-of-art cancer research by ensuring WCB proactively plans for changing biosample and cancer data requirements.
- ***Informing and promoting new cancer research.***
 - Using our biosample expertise to partner on new proposals for cancer research – providing expertise, infrastructure, research capability and patient and public involvement in ground-breaking new research applications.
 - Embed biobanking into research programs and new infrastructures
 - Empower Wales-based researchers and clinicians to take part in translational research activity by promoting unfettered access to biosamples.
 - Underpin and enable translational and reverse-translational research in the six CReSt priority themes.
- ***Supporting the -omics data revolution in cancer research.***
 - Ensuring our clinical database and consenting expertise shapes collaborative work between data infrastructures from academia, NHS and Industry to promote digital pathology, AI and integrated ‘big cancer data’ projects.
 - Co-lead on the development of a Cancer Research SDE (Secure Data Environment) for multi-parametric cancer data with key research infrastructure partners (including CU-DTII, SAIL, WCRC, CCRH, CTR, WCP⁶) and cross-talk with NHS partners (AWMGS) and data infrastructure networks (DHCW-NDR).
- ***Investing in People.***
 - Investing in training and development of future leaders in cancer research and biobanking expertise in Wales.
 - Providing inclusive opportunities for patients to take part in research studies, through sample donation and cohort-based questionnaires - to increase equity of opportunity for patients to donate their samples/be involved in research.
- ***Leading the Biobanking agenda.***
 - to lead on international biobanking policy through senior representation on international biobanking bodies
 - Strengthening UK/International biobank networks to increase international research opportunities – to improve outreach and marketing to stakeholders, including industry
 - Harmonise biobanking processes nationally with a focus on streamlining access procedures across a core of interested biobank partners.
 - Supporting research and innovation activities across the NHS Wales Precision Medicine initiatives to deliver a new model of biobanking.

⁶ Cardiff University – Digital Transformation Innovation Institute, Secure Anonymised Information Linkage Databank (Swansea); Digital Health Care Wales; Wales Cancer Research Centre; Experimental Cancer Medicine Centre (Cardiff); Clinical Trials Research – Wales Cancer Partnership

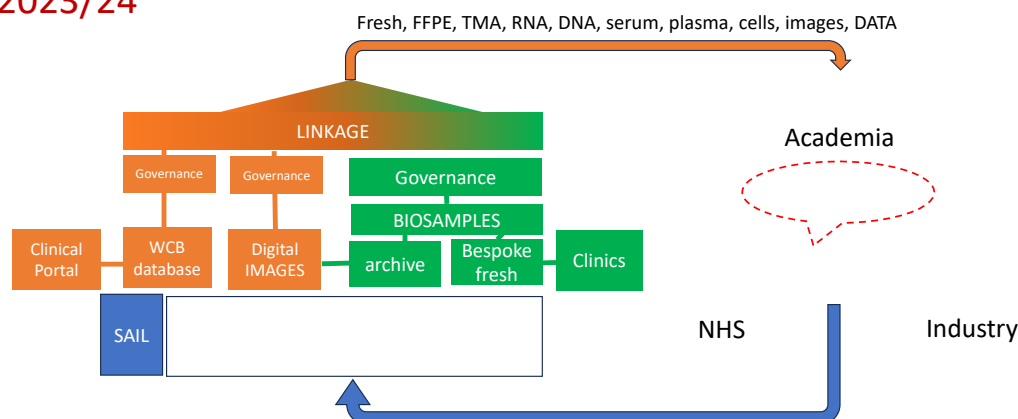
Part 5: Implementing our Strategic Vision

2025-2030: transitioning to a new model of sustainable biobanking

WCB is committed to a restructuring process over the period 2025-2030 that will provide the operational framework to increase its capacity and capability for delivery of high-quality bio-samples and data to researchers in a sustainable manner. Restructuring will be carried out in two transitional phases, during which the issue of samples and data will need to continue under the existing operational model so as not to impact detrimentally on cancer researchers' access to tissues in the short to mid-term.

Phase 1 (2025-2028) will focus on *integrating WCB's bioarchive with Cardiff University Biobank* whilst also completing its transition to *eConsenting* and *direct-access clinical data linkage*.

2023/24



2027/2028

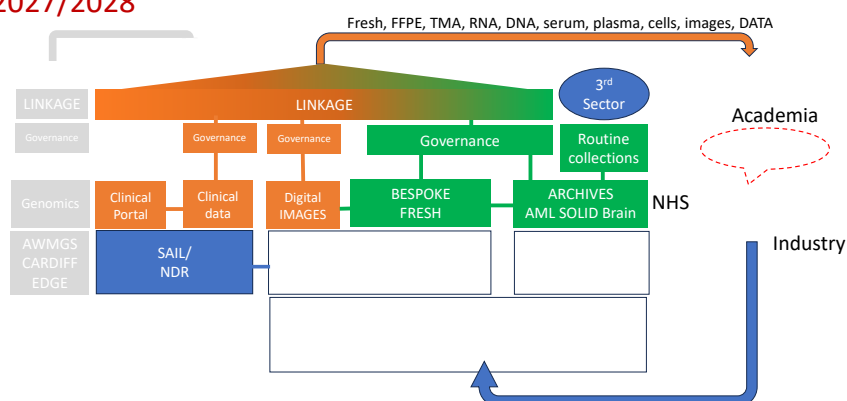


Figure 2: Phase 1 transition to an integrated bioarchive and data linkage model for WCB. By 2028 WCB will have transitioned from a stand-alone bioarchive and clinical database to an integrated infrastructure that no longer has sole responsibility for curating its own bioarchive and clinical database. Thus on the sample side, WCB's sample archive will be integrated with the Cardiff University Biobank infrastructure, alongside other cancer tissue collections such as AML and BRAIN. Routine collections of samples will be funded through 3rd Sector charity funding where the need is most recognised. WCB will retain its public/research profile and will remain the contact point for researchers looking for samples and data. On the data side, WCB will retain an image database for issue, but will rely on access to clinical data through the National Data Repository (NDR) or indirectly through SAIL. Meanwhile we will be engaging with other data handlers (eg. AWMGS) to future-proof access to other research-sensitive data such as genomics. **Green = samples. Orange = Data.**

Integration of the WCB bioarchive into Cardiff University Biobank (CUB). A key tenet of WCB's strategy for the next 5-years is to render its bioarchive infrastructure independent of core funding. This will be achieved in part through the direct support of Cardiff University following adoption of the WCB bioarchive into its existing Cardiff University Biobank infrastructure, complemented by use of WCB's external grant and cost recovery income to support cancer biobanking specialists to curate and issue the archival samples to researchers. Our previous experience has identified these specialists as being critical in helping cancer researchers design the best and most appropriate research questions linked to bio-sample need. Key to the success of this integration strategy is that cancer researchers continue to have clear line of sight to WCB for access to tissues. Thus, WCB will retain its online presence and interaction with researchers, acting as a specialism within CUB for cancer sample access.

Our strategy to integrate the WCB bioarchive with CUB has dual benefits: in addition to the cost efficiencies contributing to sustainability, it provides the opportunity for WCB to partner with other cancer collections and thus to offer a greater range of cancer tissues to the research community and unified signposting for access. Routine collection of samples to replenish the archive will rely upon specific grant funding (Charity, UKRI, Industry) for each tissue type, rather than non-targeted core funding, thus focussing on the active research need. A new WCB Research Strategy Group will be responsible for securing funding to support these routine collections.

Data Linkage and increasing digital maturity

We have taken the decision to disinvest over the longer-term in posts that are directly involved in WCB specific IT/data management. This has been one of our most significant ongoing costs and whilst this allows us to deliver highly curated data sets, the increasing complexity of digital datasets associated with a patient's tumour and clinical history, means that the cost benefit ratio will very soon become unsustainable.

As Electronic Health Records (EHRs) become more tightly curated, mineable and accessible, we will focus efforts on piloting data linkage projects promoting wider initiatives to support FAIR data management, data linkage and data integration for cancer research in Wales. Our goal is to ultimately remove the need to maintain the current dedicated WCB database – which relies on manualised, labour-intensive processes to link clinical and associated data through a pre-agreed extended data download, instead moving to a searchable linked data set for research in the EHR, with the use of trusted research environments through Cardiff University's Digital Transformation Innovation Institute (DTII) and DHCW/SAIL for more extended bespoke data sets (eg. genomics, imaging etc).

We will respond to the evolving data landscape and increase data and digital maturity to facilitate funder and researcher requirements for multimodal research in the future. Figure 3 below outlines the planned tiered approach for WCB in the next quinquennium to achieve digital maturity, underpinned by institutional investment and integration with national data environments. Thus, by working towards greater digital maturity, we can work more closely with Digital Health Care Wales (aligned to their Organisational 2024-2030 Strategy⁷ for research), building on the relationships already established by our Data Linkage team, and in partnership with both DHCW and SAIL ensuring researcher needs are met within these national Secure Data Environments. Direct access to clinical and other patient data removes the requirement to manually curate and maintain a clinical database, whereas integrated, extended data sets are in increasing demand from academic and industry researchers and provide an efficient and sustainable resource. Our new model will expand and integrate, novel efficient data approaches

⁷ <https://dhcw.nhs.wales/about-us/key-documents/dhcw-draft-organisational-strategy/>

alongside digital imaging data (radiological and histological). Together the Data Linkage team will receive the support of DTII to drive the technological component of this digital feature and attract joint external funding and deliver our data linkage strategy.

Figure 3. Digital and data maturity model, and associated risks to delivery of critical components which will guarantee future utility within the national and international research landscape.

Phase 2 (2028-2030) will focus on **embedding of WCB posts into large-scale research projects** while also working with NHS Pathology (as it restructures and centralises service delivery) to deliver **a new working model for cancer biobanking** that allows direct access to retrospective or bespoke prospective pathology samples as required in a sustainable fashion. **Access to multi-parametric datasets** will also be enhanced through the devolved data partnerships described above, providing researchers with state-of-art data-linkage to biological samples.

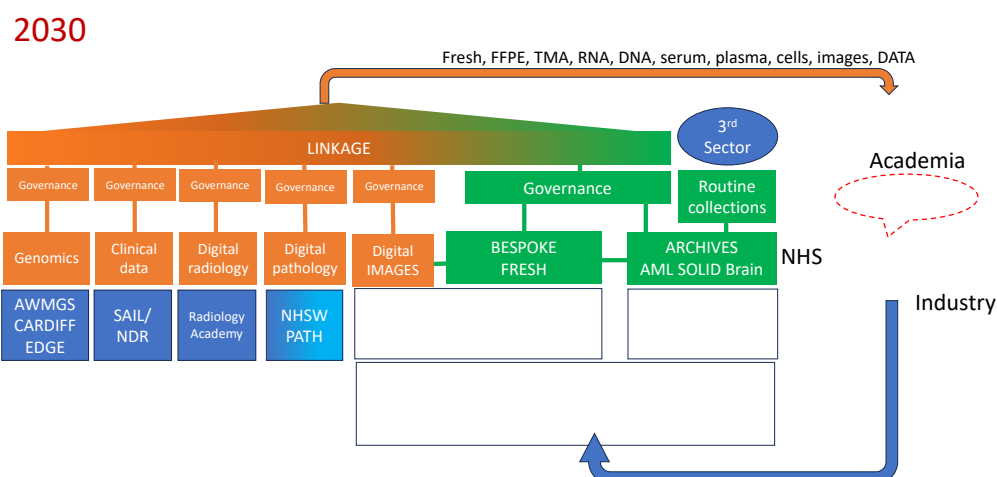


Figure 4: Phase 2 transition to incorporate multiparametric data linkage. By 2030 we predict a number of additional patient-associated datasets to become accessible through Secure Data Environments. WCB will be engaging with each of the data owners to help coordinate access to these data to link to samples. Simultaneously there will be a focus on developing our Bespoke Sample pipeline and Image databases through collaboration with large scale research projects and new infrastructures, which will promote external grant and cost recovery income. **Green = samples. Orange = Data.**

Embedding WCB into cancer research. Bespoke collections remain at the cutting edge of future researchers needs. These are fresh, or cultured material, often requiring longitudinal or matched normal samples from patients (requiring intensive tracking and follow-up) and are therefore distinct from the bioarchive operations. Prospective collection of fresh material is better suited to a project-led funding model where specific research funding for a particular purpose drives the tissue collection pipeline. This activity is by necessity agile and responsive, requiring engagement with researchers prior to funding applications to appropriately cost bio-sampling into their projects – with the associated issues of attrition and time to funding outcomes for each project.

Our future operational model includes co-leading on major cancer initiatives and research projects in order to include a higher percentage of biobanking costs/posts into the overall running costs of these platform/infrastructure type awards. This will necessitate combining roles into research posts embedded within these awards to ensure that the full labour costs of tissue collections are accommodated. Thus we propose a mixed funding model whereby the proportion of stand-alone biobanking posts working on multiple research projects is reduced and complemented by multi-tasked research roles embedded within specific research projects. In the latter case, training in biobanking procedures will be provided to the researcher posts, thus enhancing the experience and skills of the local research workforce in Wales.

The principal role of the new WCB Research Strategy Group will be to promote engagement with new cancer research initiatives and projects at the early stages and subsequently to drive up external investment in biobanking practices as well as to align our sample collection with strategic strengths in Wales (e.g. CReSt).

Post - 2030 : A new working model for biobanking.

WCB intends to lead the agenda for a new model of cancer biobanking in Wales (and the UK) that seeks to streamline processes through partnership between NHS and academic institutions to remove, where possible, the need for an intermediary infrastructure for sample transfer between the clinic and the lab-bench. WCB will lead on a feasibility study of NHS Pathology sourced samples for research. This will aim to align with plans for greater pathology centralisation within Wales, potentially focusing on the Cardiff EDGE site to which AWMGS is transferring in 2024.

The model will aim to use the NHS sample archive for FFPE tissues, which will be extracted for tissue acquisition when required for research purposes. There is also a transition to digital imaging of diagnostic FFPE tissues which form a digital archive, held in the NHS but under the WCB consent model, accessible to researchers, through a SDE and preventing the need for duplicating huge data sets for research purposes. This approach will be trialled and if successful will be implemented post 2030. This will offer a completely new biobanking model which has the potential to be more agile and responsive to researcher needs while aligning with digital resources to provide a more seamless bioresource.

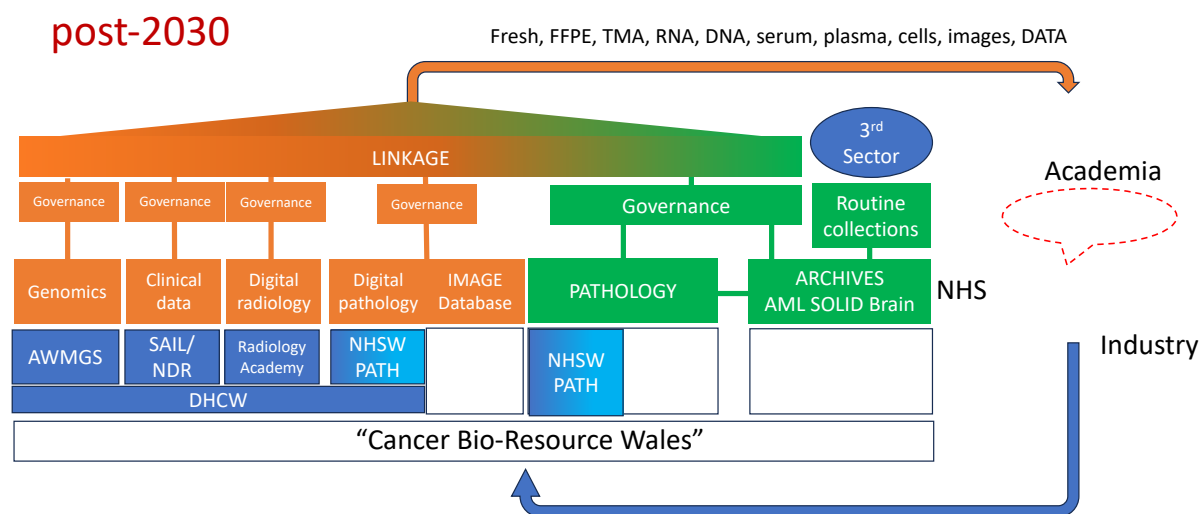


Figure 5. Our vision for a “Cancer Bio-Resource Wales” involves partnership with: Cardiff University Biobank to provide a sample archive infrastructure and regulatory governance; NHSW pathology services to provide new streamlined access to samples; and Digital Health Care Wales who propose to coordinate access to patient-related datasets for research. WCB will provide the regulatory knowhow and expertise in cancer sample access to link samples to clinical and molecular data and to feed this back to researchers at the bench. The next quinquennium (2025-2030) will be a period of engagement with these prospective partners to develop and to secure cross sector support for this new model.

Part 6: Delivering on CReSt priority themes.

Wales Cancer Research Strategy (CReSt), was launched in 2022 by Health and Care Research Wales, the Wales Cancer Network and key cancer research stakeholders in Wales to provide a unifying strategy around which the cancer community will focus its research activity in Wales. WCB is recognised as a key infrastructure partner in this endeavour and its implementation of a new vision for biobanking in Wales, outlined in this strategy document, is geared to deliver on each of the six CReSt priority themes, as summarised below.



CReSt Theme 1:

Precision and mechanistic Oncology

Linking biosamples with -omics and clinical data has great potential for precision and mechanistic oncology research. Moreover, there is an increasing need for fresh and longitudinal patient material for pre-clinical and translational studies including organoids, circulating tumour cells and longitudinal samples collected during treatment. WCB is well placed to provide these resources in a way that removes the logistical obstacles for researchers and promotes engagement with industry partners. Precision medicine in Wales aims to achieve integrated diagnostics and advanced targeted therapeutics. A focus on cancer is a key part of achieving this vision, and WCB will act as a key enabler for many aspects including research and innovation. Thus, WCB will work with stakeholders across the following exemplar precision medicine initiatives and will engage with others across Wales where applicable to increase researcher access to clinical materials and to promote strategic partnerships. **The National Pathology Programme** led by the NHS Wales Health Collaborative is looking at the way that new technologies can be used to change the way that cellular pathology services are delivered. Digital pathology offers a national solution for cellular pathology in Wales and provides new opportunities for translational research into diseases such as cancer through the use of state-of-art technological advances including AI-based diagnostics. Wales Cancer Biobank will work with the NHS digital pathology programme to make images and associated tissues widely available to the research community enabling tumours not only to be accurately pin-pointed for study but also to be made available for more complex analyses consistent with the CReSt priority themes described above (for example, analysis of the tumour microenvironment). **Genomics Partnership Wales** is committed to 5000 extensive genomic testing profiles of patients with newly diagnosed cancer annually ensuring improved diagnosis in order to improve cancer outcomes. Linkage of genomics with biosamples provides a rich resource for future research and innovation which WCB is ideally placed to facilitate. **The Advanced Therapies Wales** programme involves adoption of ATMPs and Research, Development & Innovation across Advanced Therapeutics (eg. CAR-T services and gene therapy trial facilitation in Wales). Alongside service development and clinical trials, pre-clinical cancer research in Wales is advancing on all advanced therapy fronts, and access to patient tissue resources via WCB will be critical in many of these developments.

WCB will also work with its existing partner infrastructures in the NHS and academia (eg. AWMGS, WCRC) in the -omics space to deliver solutions for multiparametric data linkage and will help in developing new partnerships with pre-clinical and clinical researchers with complementary expertise, to exploit these new opportunities through joint ventures and external funding proposals.



CRcSt Theme 2:
Immuno-oncology

WCB will work with our Welsh academic research partners particularly in Welsh universities, to bridge the gap between expertise in basic immunology / cancer models and clinical research in immunotherapy through the provision of patient derived tumour and tumour-associated tissues. This will help support links between basic and clinical research projects, promoting the development of new models to test cellular and viral therapies and to source exosomes and other biomarkers for novel diagnostics. We will expand on existing WCB-associated research projects based at Velindre Cancer Centre and Cardiff University, focussing on longitudinal sampling of patients receiving existing and novel therapies to investigate mechanisms underlying treatment relapse, sensitivity and toxicity.



CRcSt Theme 3:
Radiotherapy

WCB will provide state-of-art biosampling (eg. longitudinal samples and ctDNAs from blood biopsies from patients undergoing radiotherapy) for cross-cutting research to inform new discoveries in radiotherapy prognostics and diagnostics. Moreover, there is emerging research strength within Wales in non-invasive imaging and biomarkers, with ongoing development of prognostic models through machine learning. WCB is helping to develop a Secure Data Environment (SDE) within Wales (see Objective 4 below) and is collaborating with AI-focused industry partners to aid the integration of different types of imaging data alongside clinical information on patients with the aim of informing treatment decisions in the future.



CRcSt Theme 4:
Cancer Clinical Trials

WCB has a strong history of supporting collection of trials samples which are ultimately required to improve predictive biomarkers to establish who gains benefit from specific treatments, drivers of resistance or the identification of preventative interventions. WCB provides a mechanism for samples collected under a clinical trial protocol to be made widely available at the end of the trial to maximise use. Trials can request WCB to adopt samples under the WCB Human Tissue Authority licence to take ongoing responsibility for future use (in line with original consent parameters). Since 2020, WCB has adopted samples from 8 clinical trials which has promoted interest in accessing these samples from research groups not allied to the trial. We aim to work directly with the Cardiff Centre for Trials Research (CTR), and other trials units around the UK, to ensure that these valuable resources continue to be maximised and through coordination with WCRC, to engage with researchers to access this material.



CRcSt Theme 5:
Palliative and supportive oncology

Access to samples with associated co-morbidity and related clinical data through the WCB clinical database has potential to support important research into several cancer related symptoms such as anorexia, sarcopenia etc. A range of linked anonymised clinical data including treatment history and co-morbidities is available for archived samples held by the bank from the past 17 years, through the Wales clinical portal. Alongside genomics and image analysis

data, this represents an untapped opportunity for palliative and supportive oncology and population health research which merits further exploration.



CReSt Theme 6:

Population health-based cancer prevention, early diagnosis, primary care & health services research

As part of its initiative to broaden the scope of its biological resource, WCB has recently obtained ethical approval to collect pre-invasive cancer material from patients attending routine diagnostics clinics. This provides the potential for researchers to access pre-cancerous material for the development of early diagnostics and opens up possibilities for future population-based research using tissues derived from NHS diagnostics clinics. We will seek new collaborations in this area through WCRC, Health Wise Wales and by advertising these new collections on our website and on-line networks.