Imaging repositories:

Identifying challenges and solutions for the coordinated collection, storage and use of images in cancer research

NCRI Partners

NCRI is a UK-wide partnership between research funders working together to maximise the value and benefits of cancer research for the benefit of patients and the public. A key strength of the NCRI is our broad membership with representation across both charity and government funders as well as across all four nations in the United Kingdom.

Executive summary

The use of imaging in cancer research is widespread; from the imaging of cells in the lab (biological imaging), to images of stained tissue sections of tumour biopsies and normal tissue (digital pathology pathology) and images of body scans such as Magnetic Resonance Imaging scans and X-Rays (medical imaging). Imaging biomarkers are extensively used in both cancer clinical management and cancer research, and images are frequently collected as part of clinical trials. There are currently several small imaging repositories across the UK however there is no comprehensive list of these repositories nor the data held by them. There is a danger that there is no joint coordination across the UK on how or when to collect, store and share imaging data.

Importantly, recent advances in artificial intelligence have shown that machine learning approaches can be adapted for image analysis, automating processes and dramatically reducing the time it takes to reach an evidenced-based clinical or research decision. Currently, however the large and well-annotated image datasets that are needed for this don't exist. More joined up approaches need to be developed to allow the collection of large, well annotated imaging datasets to support the generation of high quality cancer research studies.

Coordination across this broad and complex area is a challenge. As a partnership organisation with links and insights across the spectrum of cancer research, NCRI is well placed to tackle such a challenge. Listening to the research community we knew there was a need to scope this out further and for a national strategy for the coordination of imaging repositories to be developed. As a first step. we held a workshop on 22 February 2018, inviting imaging experts from biological imaging, digital pathology and medical imaging, to identify key challenges and solutions for the coordinated collection, storage and sharing of images in cancer research. This report details the discussions and next steps agreed at this workshop.

In summary, the workshop unpicked several challenges including governance, deidentification and a lack of standards for the quality and format of images; as well as challenges in the research environment and the required UK expertise to deliver high quality imaging studies and collections. We recommend that standards, processes and guidelines be created for patient consent related to imaging, image deidentification (particularly for medical imaging), data format and quality and material transfer agreements. We welcome new national initiatives in the landscape such as HDR-UK and the Innovate UK network of digital pathology, imaging and AI centres, as part of phase I of the Life Sciences Sector Deal (LSSD). We will work with these new initiatives to ensure the challenges identified in this workshop are tackled by the relevant organisations.

Background

In March 2017, Professor Fiona Gilbert presented at the NCRI's Strategy Advisory Group, outlining the need for an exercise to scope out with the relevant stakeholders a strategy to develop a national research imaging repository. The NCRI carried out a scoping exercise and found that at present, there are several small imaging repositories across the UK. There is no common agreed format on how information is collected, held nor the type of information that is collected. There is no comprehensive list of where these are, or information on the data held in these repositories. The lack of coordination on how to collect data means that best practice and lessons learned are not being shared, there is duplication of effort and researchers have little idea of what is currently available for analysis. Additionally, Phase I of the LSSD that was announced in December 2017 has a focus on imaging; "Digital diagnostics and artificial intelligence: Use of AI in pathology and radiology diagnostics, demonstrating these technologies at scale within the NHS."

This report outlines a workshop held by the NCRI on February 22nd, which aimed to bring relevant stakeholders together to identify the key challenges in building imaging repositories for research and to identify how the cancer research community can overcome these challenges to allow for a coordinated approach for the collection, storage and sharing of images for research. The day brought together radiologists, pathologists, physicists, computer scientists, representatives from NCRI Partner organisations and representatives involved in delivering the LSSD. The day was organised around an information sharing session, followed by breakout discussions to identify the key challenges for the collection, storage and sharing of images for research, and recommendations of solutions. Professor Peter Johnson, the Chair of the NCRI's Strategy Advisory Group, chaired the workshop.

Workshop presentations

Radiology imaging repositories: successes, challenges and future needs

Professor Fiona Gilbert outlined the current unmet need in radiology imaging; clinical trials with images and imaging-led studies have inconsistent standardisation and quality assurance. Most images are not collected or are held in individual repositories and are not available for re-analysis, which represents a huge missed opportunity.

A large amount of data can be extracted from images and can be used as surrogate or trial endpoints, however large datasets need to be created to validate biomarkers or produce other imaging tools such as the use of machine learning. Challenges that need to be addressed in radiology imaging include:

- Permission to collect and use anonymized patient images from trials for research purposes and link to patient record and outcomes from trial.
- Permission to collect and use anonymized patient images from NHS for research purposes and link to patient record and outcomes.
- Standardized acquisition of images so these can be pooled for meta-analysis.
- Central or distributed repository with easily searchable links to images – common ontology to find images in the store.
- Mechanism for commercial companies or academics to easily access images with agreement to then freely license software back to NHS.

If a national imaging repository for research use could be realised, it would allow the creation of better informatics, for the benefit of people affected by cancer.

Digital pathology imaging repositories: successes, challenges and future needs

Dr Darren Treanor spoke about imaging repositories for digital pathology images. The use of artificial intelligence represents a huge opportunity for disease diagnosis and research, however to develop artificial intelligence approaches, large datasets are required. The NHS is the perfect environment in which to develop these systems because it has:

- Over 50 million patients, with an estimate of 6 million cases and therefore 12 petabytes of data per year.
- A well organised pathology hub-and-spoke model.
- Standardised reporting of cancer according to national minimum datasets.
- High standards of pathology sample preparation, pathologist training and continuing professional development.

Several imaging repositories for digital pathology already exist and include Camelyon[1], the Cancer Genome Atlas [2]and Virtual Pathology[3]. However, significant challenges in the creation of such imaging repositories exist and include:

- Creating the databases is difficult and costly.
- There are no generally accepted standards or ontologies.
- Access rights are a concern; who has access and who controls it?
- Data protecting and data privacy need to be considered.
- The research environment prioritises competition; unique discoveries are more valued by the Research Evaluation Framework (REF), rather than sharing of datasets.

Public archives for biological imaging

Similarly to the medical and digital pathology imaging domains, the biological imaging domain would value the creation of a national archive for research purposes and is facing similar issues. The need and importance for this kind of resource has recently been published in the BBSRC's Strategic Review of BioImaging[4]. Professor Jason Swedlow and Alvis Brazma suggested that these different domains needed to coordinate better and learn from each other, and in particular adopt lessons and experience derived from several decades of construction and operation of genomic and structural resources that are the foundations for modern biological and biomedical research.

An image archive serves the purpose of storing images for public use, however the value of an imaging archive can only be realised if it is part of an ecosystem containing linked data-- Jason and Alvis refer to this as an "added-value database". Such image archives may be centralised, however databases can be stored separately, ideally with data from each new analysis being made available in these databases to further enrich the archive. Scientists at the University of Dundee, EMBL-EBI, the University of Bristol and the University of Cambridge have launched a prototype added value database for imaging data: the Image Data Resource (IDR)[5]. This free

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[1] Diagnostic Assessment of Deep Learning Algorithms for Detection of Lymph Node Metastases in Women With Breast Cancer. JAMA. 2017 Dec 12;318(22):2199-2210. doi: 10.1001/jama.2017.14585

[2] https://cancergenome.nih.gov/

[3] www.virtualpathology.leeds.ac.uk

[4] https://bbsrc.ukri.org/documents/1805-bbsrc-strategic-review-of-bioimaging-pdf

[5] https://idr.openmicroscopy.org/about/

resource curates, integrates and adds value to cellular and tissue imaging from multiple imaging modalities and laboratories. This includes a growing number of consented clinical pathology datasets that have been properly anonymised.

To catalyse the creation of an imaging archive, the European Bioinformatics Institute (EMBL-EBI) convened a meeting with participation of scientists representing different imaging modalities, several existing biological data archives and funding agencies. A white paper describing the conclusions of the meeting and arguing for the need to establish a Biological Image Archive was published[6].

Data imaging repositories in practice: successes and challenges for the PET Core lab

Lucy Pike introduced the UK PET Core lab[7], which has been based at St Thomas' PET Centre since 2002 and has developed and implemented standards for PET in multicentre trials. The PET Core lab provides an accreditation process for centres scanning in PET trials, develops PET imaging manuals for multi-centre trials and collates and quality controls all PET imaging data.

Medical imaging data can be transferred in several ways:

- NHS secure file transfer (NHS Digital) – Allows anonymised data exported from scanner/picture archiving and communication system (PACS) in DICOM format to be transferred to an NHS user, but has a maximum size of 1GB.
- SFTP server – Allows anonymised data exported from scanner/PACS in DICOM format to be transferred to Universities. Larger data transfers are possible but are limited to the local network transfer speed and require freely available software to be installed locally. This method of transfer is not available to NHS sites.
- "IEP with Anyone"[8] – Allows data to be transferred directly from a hospital PACS and can be sent to any email address once it is registered, as long as the site is connected to N3 NHS network. Only one scan can be sent at a time. This is an expensive option.
- Direct link – files can be sent from PACS to PACS or with the help of local IT support, depending on network security requirements.

Medical imaging data can be stored in different ways:

- Local PET centre PACS on NHS network, for clinical data storage, this results in a more difficult and complex access as data has to be exported.
- Dedicated research PACS on University network, hardware for this purpose is relatively cheap but requires a backup server offsite.
- Cloud storage combined with local storage, which means that data can be available offsite providing access to collaborators, however data governance is complex for this storage type.

Challenges for the PET Core lab include:

- Access to and standards of image data; these are variable across sites and result in anonymization issues.
- Clinical data collected in a clinical research facility; this is completed by recruiting sites and collated in a database by the clinical trial unit. Clinical data is not stored with image data so a lot of time is spent verifying data from multiple sources as the imaging site is often different to the recruiting site.

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[6] https://arxiv.org/abs/1801.10189
[7] See Appendix 2
[8] www.sectra.com

- Governance, especially with the new regulations that will be introduced in May 2018. There are challenges around ethics and patient consent, compliance with regulations, audit of pseudo-anonymisation processing, data sharing agreements and storage issues such as data retention policies.

Imaging repositories in practice: successes and challenges for the Institute of Cancer Research's XNAT platform

Dr Simon Doran introduced the Institute of Cancer Research's (ICR) XNAT[9] platform, a repository for multicentre trials for DICOM data, in a way that is open, vender neutral and extensible. XNAT is used by many sites and is quickly gaining traction for clinical imaging archives. Dr Doran and colleagues have established the principles required to allow XNAT to use metadata linked to images. In the future, the group:

- Envision that all data files will be linked to the relevant metadata.
- Would eventually like to be able to use machine learning to perform image recognition and content-based image searching.
- Store all results of their data processing back into the database, together with their provenance.

Challenges to the creation of a national repository mostly relate to a lack of funding. Existing achievements by the ICR were funded in the context of the Cancer Research UK imaging centres networking agenda without funded staff or capital resources. Like the example at the ICR, other examples of successful imaging repositories have been community-driven evolutions from bottom up and progress has been made as systems fulfil internal needs within institutions. However, as the requirement for imaging repositories becomes more complex with transitions from phase I to phase II/III trials, more funding will be required. Such funding is required to:

- Purchase hardware infrastructure.
- Establish legal/regulatory framework, standard operating procedures and an authentication framework.
- Reimburse staff resource to provide:
  - System operation with defined service level agreement.
  - Helpdesk and user support.
- Provide user training.

The ICR's XNAT platform is likely to be one of many peer repositories within the UK and internationally. As these independent repositories continue to arise without coordination, there is likely to be a gradual movement towards interoperability and ability to issue queries over different domains. Additionally, the software platform will vary between peers and the degree of federation between databases will vary. It is therefore timely to provide coordination in the imaging repository landscape.

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[9] eXtensible Neuroimaging Archive Toolkit, https://www.xnat.org/

Lessons learnt from commercial interactions with artificial intelligence powered medical image analysis software companies

Dr Sabin Llona-Minguez spoke about his experience working with medical image analysis software companies to commercialise a mammography dataset. The Cancer Research UK funded Optimam[10] mammography image database and viewing software has led to the formation of a flexible imaging repository for mammograms in which collection, annotation and storage of images is fully automated. Optimam has achieved ethical approval, allowing data to be shared with Google Deepmind, who are currently using the imaging archive to develop deep learning approaches for disease diagnosis.

Dr Sabin Llona-Minguez shared his recommendations on what is required by an imaging repository to develop artificial intelligence approaches:

- An outstanding imaging repository.
- Health Research Authority approval to allow sharing of images.
- Standard operating procedures.
- Relevant imaging modalities are collected.
- Images are processed appropriately.
- Images are annotated appropriately.
- Many disease stages are collected.
- Longitudinal data is collected.
- Associated clinical data is collected.
- Data sharing is allowed.

Life science industrial strategy and sector deal

The government's ambitious, modern industrial strategy sets out a long-term plan to boost the productivity and earning power of people throughout the UK. The launch of sector-led Life Sciences Industrial Strategy (LSIS) published in August formed the basis of LSSD discussions. Announcement of first phase of LSSD was made as part of Industrial Strategy White paper followed by publication in full on 6th Dec 2017. Launched by Prof Sir John Bell and Secretaries of State for Health & Business - the transformative LSSD provides a strong commitment from the Government and the sector to both delivering Phase I and continuing the partnership for future phases.

Commitments related to imaging in Phase I of the LSSD include the two following statements:

- Initial collaborations include the 'Data to early diagnostics and precision medicine' programme with up to £210m from the Industrial Strategy Challenge Fund including:
  - Genomics: Whole genome sequencing of UK Biobank and extension of the cancer genome pathway; and
  - Digital diagnostics and artificial intelligence: Use of AI in pathology and radiology diagnostics, demonstrating these technologies at scale within the NHS.
- Major companies including Philips, Roche Diagnostics and Leica are in discussion with the government and the NHS to develop a trail-blazing digital pathology programme using artificial intelligence. A similar programme is being explore with the sector in radiology where we have had interest from Philips, Siemens, GE Healthcare and Toshiba Medical Systems.

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[10] http://commercial.cancerresearchuk.org/optimam-mammography-image-database-and-viewing-software

Regarding Digital pathology, radiology and diagnostics centres of excellence for industry, academic and NHS partnership, there has been an initial commitment of approximately £45m to support large partnerships with industry in the NHS and academic centres most advanced in the field. There are three primary strands of activity:

- Digital pathology - driving novel AI tool development and new clinical insight through digitisation of pathology practice.
- Radiology/medical imaging – supporting common R&D platforms and clinical decision support tools across sites, enabling analysis at scale.
- Integrated diagnostic development – enabling development of novel tools combining biomarker development, novel technologies and analytics to generate innovative diagnostics products.

Funded centres will offer:

- Effective environments for innovative industry stakeholders to interact with research-active NHS infrastructure and world-leading clinical and research staff.
- A business-friendly discovery and data platform, allowing companies to access high-quality datasets, images and sample banks at scale at all stages of product development.
- A clear framework for clinical implementation and adoption of novel tools.
- A strong culture of interdisciplinary working to drive technology convergence.
- A network of linked investments aligned with UK infrastructure.

The Office for Life Sciences, Medical Research Council and Innovate UK would be interested to hear mature proposals that map to the key themes of the LSSD.

Key challenges for image collection, storage and sharing for research

Following on from the information sharing session, workshop participants attended breakout sessions, each with a mix of expertise. The groups were asked to identify the key challenges in collection, storage and sharing of all modalities of images (biological, digital pathology and medical) for research; these are summarised below.

1. Governance

Patient consent processes need to be more streamlined and consistent to ensure that data can be used for research, in line with the patient's wishes. This is relevant for digital pathology and medical images. This may require changes at a local trust-level or could require a policy-level national mandate. Additionally, clinicians and researchers need to be educated on what they can and can't do with the existing images they have; there may be a tendency amongst researchers not to use images in case the consent is not appropriate, without fully understanding what the patient has consented to. There is a vast resource of historic data and retrospective archives that could be of great benefit for research; can legislation be put in place for this historical data to be made available to researchers in a non-commercial setting?

Public communication and acceptability should also be considered to ensure that the public are fully aware of how their images may be used and the benefits that can be gained by using new machine learning approaches to develop diagnostic tools.

In addition, the creation of material transfer agreements, which are required to allow sharing of images between sites, is a lengthy process that can slow progress. In the future, standardised material transfer agreements could reduce workload and speed up data sharing.

2. Deidentification

Deidentification of images was also identified as a barrier to the collection, storage and use of images for research; it was noted that this is a greater challenge for medical images rather than digital pathology or biological images. Currently, the deidentification process in medical imaging is cumbersome as it has not been automated by vendors, in the experience of the Royal College of Radiologists, this could limit the number of images that would be uploaded to an imaging repository as radiologists lack the time required to manually deidentify images before upload.

3. Quality and format of data

Data collected by imaging repositories must be of adequate quality to ensure that it is suitable for downstream analysis. Currently, vendors do not have a set of minimum standards, which gives rise to a wide variation in the quality of images that are collected. A lack of minimum standards for vendors also gives rise to issues with interoperability, with some file formats not being shareable between vendor platforms. There was a discussion on who should set and own these standards, as they currently do not exist and as far as the group are aware, there are currently no plans to create such standards. The group noted that for PET imaging, the PET Core Lab achieved an excellent goal of setting standards for imaging.

Archives can be transformed into 'added-value databases' if images can be linked to relevant data sources. There is currently no guidance on what data should be linked to an image held in a repository for research use. An ideal scenario would be that datasets would automatically be updated with the Electronic Patient Record.

4. The research environment

The research environment is a key barrier to sharing of images of all modalities. There is little incentive to share data as recognition is often only obtained by using datasets to publish novel results, rather than providing a data source for others. It is essential that funders and Universities recognise the value and cost of creating datasets, to allow for more research groups to receive adequate funding to set up imaging repositories.

Additionally, accessing appropriate datasets for research is often a challenge and personal relationships are frequently a key enabler for researchers to find and gain access to relevant data. To address this, a sharing platform could be created, similar to the UK Clinical Research Collaborative Tissue Directory and Coordination Centre (UKCRC TDCC). The UKCRC TDCC is the UK's only register of sample collections that covers multiple diseases and allows searching based on age, gender, disease classification, sample type and available datasets. The UK Ethics Committee Authority (UKECA) have now made registration in the TDCC a condition of the Research Ethics Committee (REC) favourable opinion for research tissue banks. A similar register can be envisioned for imaging sharing platforms, where clinical studies are mandated to register their imaging data. Such a directory could allow for annotations to be saved to provide an open source 'added-value' database.

5. Expertise

It is essential that the workforce gain the correct skills to allow the curation of high quality datasets and the use of the datasets, for example, to develop machine learning approaches. It is also important to ensure that all the required expertise is present in the multidisciplinary groups that are involved in the setup and development of imaging repositories; to include computer scientists, pathologists, radiologists, physicists, project managers and end users.

Workshop recommendations

Standards, processes or guidelines in the following areas are required to provide coordination in the imaging landscape and to ensure that imaging archives contain data of suitable quality for research:

- Patient consent.
- Deidentification of images (particularly for medical imaging).
- Data format and quality, including image linkage to metadata, ideally to the EPR.
- Material transfer agreements.

This could be achieved through a combination of the following activities:

- An NCRI-supported working group for both academics and vendors.
- Funding to provide time for experts in established imaging centres to initiate projects that will tackle some of these key issues, such as generating standard operating procedures for linking images to the EPR. It is likely that this will require a number of pilot sites to show proof of principle, before becoming a more national system.

Further activities that may be considered include:

- The generation of a directory for imaging data, similar to the UKCRC TDCC.
- Working with funders to ensure the value of imaging repositories is appreciated.
- Working with training providers to ensure appropriate training is available to provide expertise for imaging research.
- Working with the NCRI consumer forum to leverage public understanding for the use of images in cancer research, including by commercial companies.

Appendix 1 – delegate list

Luc Bidaut	Head of School of Computer Science, University of Lincoln
	NCRI CTRad Member
Jennifer Boon	Senior Policy Advisor, Office for Life Sciences
Alvis Brazma	Group Leader, the European Bioinformatics Institute (EMBL-EBI)
Carolyn Chan	Senior Radiotherapy Programme Manager, NCRI
Simon Doran	Senior Staff Scientist, Institute of Cancer Research
Neelam Dugar	Chair of Informatics Committee, Royal College of Radiologists
	Consultant radiologist, Doncaster and Bassetlaw Hospitals NHS Trust
Alessia Errico	Research Funding Manager, Cancer Research UK
Harriet Foden	CM-Path Programme Officer, NCRI
Fiona Giblert	Chair, NIHR CRN Imaging Steering Group
	Professor of Radiology, University of Cambridge
Peter Johnson	Professor of Medical Oncology, University of Southampton
	Crick Cancer Research Network Director, Francis Crick Institute
Nicola Keat	Head of Clinical Research Groups, NCRI
Martin Leach	Professor of Magnetic Resonance, Institute of Cancer Research
Jessica Lee	Strategy and Engagement Manager, NCRI
Ian Lewis	Head of Strategy and Initiatives, NCRI
Sabin Llona-Minguez	Business Manager, Cancer Research UK Commercial Partnerships
Claire Newland	Programme Manager, Medical Research Council
Rushil Patel	Lead SABR Physicist, RTTQA, Mount Vernon Cancer Centre
Lucy Pike	Senior Clinical Scientist, King's College London and Guys & St Thomas' PET Centre
Nasir Rajpoot	Professor in Computational Pathology, University of Warwick
Annette Rusling	Office of Life Sciences
Stephen Smye	NIHR Specialty Cluster Lead, King's College London
	Professor, School of Medicine, University of Leeds
David Snead	Consultant Histopathologist and Clinical Service Lead for Coventry and Warwickshire Pathology services and University Hospital of Coventry and Warwickshire NHS Trust
Karen Stalbow	Head of Policy, Knowledge & Impact, Prostate Cancer UK
Nicola Strickland	President, Royal College of Radiologists
Jason Swedlow	Professor of Quantitative Cell Biology, University of Dundee
Darren Treanor	Diagnostic Digital Pathology Lead, Royal College of Pathologists
	Honorary Clinical Associate Professor, University of Leeds
	Guest professor in Digital pathology, Linköping University Sweden
Clare Verrill	Associate Professor of Pathology, University of Oxford
	NCRI CM-Path Technology and Informatics Workstream Lead

Appendix 2 – agenda

Time	Session	Speaker
12.00	Arrival and lunch	
12.30	**Welcome and introductions**	Peter Johnson
12.40	**About the NCRI and introduction to the meeting**	Ian Lewis
12.50	**Radiology imaging repositories: successes, challenges and future needs**	Fiona Gilbert
13.00	**Digital pathology imaging repositories: successes, challenges and future needs**	Darren Treanor
13.10	**Public archives for biological imaging**	Alvis Brazma & Professor Jason Swedlow
13.20	**Data imaging repositories in practice: successes and challenges for the PET Core lab**	Lucy Pike
13.30	**Imaging repositories in practice: successes and challenges for the PACS platform**	Simon Doran
13.40	**Lessons learnt from commercial interactions with artificial intelligence powered medical image analysis software companies**	Sabin Llona-Minguez
13.50	**Industrial Life Science Strategy Sector Deal**	Annette Rusling
14.00	**Breakout session** • What are the challenges in the collection, storage and use of imaging data for cancer research? • How could these challenges be overcome by a national coordinated approach?	All
14.30	**Reporting back and group discussion**	All
15.00	Coffee	
15.15	**Breakout session** • What are the potential benefits and research opportunities created by a national approach to collecting, storing and sharing images?	All
15.45	**Reporting back and group discussion**	All
16:00	**Group Discussion** • How can the cancer research community maximise the potential benefits of a national coordinated approach to imaging?	All
16.25	**Summary and next steps**	Peter Johnson
16:30	Close	

Appendix 3 - information on previous NCRI initiatives

NCRI informatics Initiative

The NCRI Informatics Initiative was launched in 2003 to support the development of data standards and promote a culture of data-sharing to help store and disseminate cancer research data for the benefit of science and patients. The informatics initiative worked to change the culture within the scientific community to aid data sharing and to develop the technology to do this. It developed a web-based tool, the NCRI Oncology Information Exchange (ONIX) that provided a single location through which researchers could access information describing the data, resources and standards being generated in all fields of cancer research.

The initiative closed in 2011 having achieved a number of important objectives including a strong influence in establishing a culture of data sharing among the cancer research community. Since its inception, other initiatives had been established that were also working in the area of information and data sharing such as the National Cancer Intelligence Network (NCIN) and the upcoming Clinical Practice Research Datalink (CPRD). It had been hoped that the work of the Informatics Initiative could be combined with one of these, however this proved not to be possible and so the NCRI Board decided that the unit was not viable on its own.

NCRI PET Core lab

Having been one of three strands of work within the NCRI PET Research Network that ran from 2008–2012, the PET Core Lab was funded for a second phase of activity from August 2012 to July 2015. This funding was provided by a consortium of NCRI partners: Cancer Research UK, the Department of Health, the Chief Scientist Office (Scotland), the National Institute of Social Care and Health Research (Wales) and the Medical Research Council.

St Thomas' PET centre initially set up scanning standards and an accreditation process for several multicentre PET studies being co-ordinated through the department as none existed previously. These procedures were formalised with the establishment of the NCRI PET Core Lab at St Thomas' Hospital in 2009, setting the standard for sites to participate in multicentre PET trials. Since its conception the NCRI PET Core Lab provided researchers with a single point of access to the expertise and resources required to conduct trials involving PET. The team worked with PET centres across the UK, accrediting those that meet commonly agreed standards to qualify them to participate in multicentre trials. For a given trial, the PET Core Lab then acted as a hub to perform centralised quality control on every scan. This verified that the scan adhered to the trial protocol and assesses image quality. The NCRI Core Lab also offered advice on the setup and running of multicentre trials to potential researchers.

The NCRI PET Core Lab was tasked by the NCRI Board to become self-sufficient and funding from the NCRI for the PET Core lab ended in 2015.

Partners in cancer research