

Institution: Institute of Cancer Research (ICR)**1. Context and mission**

The **Institute of Cancer Research (ICR)** is one of 17 independent member institutions of the federal University of London and specialises in research and postgraduate education related to cancer. The ICR was founded in 1909 and has a longstanding track record in basic, translational and clinical research. In the 2020 U-Multirank report, the ICR was rated fourth in the world for the citation rate of our research and first in the UK for top-cited research publications.

The ICR has two London sites, in Chelsea and Sutton, co-located with our clinical partner, The Royal Marsden NHS Foundation Trust (RM). The ICR has an annual income of £131.8M and over 1,100 staff of whom over 70% are directly employed in research. During the 2019/20 academic year, there were 365 registered students.

The ICR's mission—Making the discoveries to defeat cancer—is delivered through three strands.

Research: Our ICR/RM Joint Research Strategy seeks to overcome the challenges posed by cancer's complexity, adaptability and evolution through scientific and clinical excellence, innovation and partnership.

Education: Our Learning and Teaching Strategy, in which we aim to educate and train the next generation of cancer researchers and clinicians.

Operations: Our Operational Strategy sets out what it takes to power the ambitions of our research, learning and teaching.

The ICR's aim is to achieve direct improvement of patient care and health outcomes through earlier diagnosis, more targeted and effective treatments, the reduction in side effects and improved quality of life. In pursuit of our mission, we deploy a comprehensive range of research disciplines to achieve a better understanding of how cancers develop and respond to therapy and to translate this knowledge into improvements in diagnosis and treatment. This range combines fundamental research into the biology and evolution of cancer (submitted to UOA5: Biological Sciences) and translational and clinical research (submitted to UOA1: Clinical Medicine). The ICR is organised into eight Scientific Divisions and, to enable cross-disciplinary scientific interaction, many Team Leaders (academic staff) hold joint appointments across Divisions.

2. Strategy**Research strategy**

ICR has an established track record in genetics, cancer biology, structural biology, discovery and development of cancer therapeutics (drugs and precision radiotherapy), clinical development of immunotherapies, clinical trials and magnetic resonance imaging. Research is led by a critical mass of experienced, internationally renowned clinicians and biomedical scientists (6 FRS, 11 FMedSci and 7 National Institute for Health Research (NIHR) Senior Investigators [3 holding Emeritus Senior Investigator status]).

We review our research focus frequently to ensure we respond rapidly to scientific and technological developments. We now know that a reason why cancer is so difficult to treat is that, not only is it enormously complex, but also evolves over time, adapting in response to its environment and to treatment. Whilst the promise of molecularly-targeted therapeutics in cancer has been realised with ground-breaking clinical advances, to which we have significantly contributed, their potential has been limited by almost universal emerging resistance to therapy. We therefore recognise that tumour heterogeneity, evolution and resistance are the major clinical challenges to realising durable patient benefit. We also recognise the potential offered by

modulation of the immune response in cancer patients. With these factors in mind, the ICR and RM Joint Research Strategy for the period 2016–2021 is to target the mechanisms driving tumour heterogeneity, to combat cancer adaptability and resistance to treatment. The strategy is structured into four pillars:



Interdisciplinary research

The ICR is a small, integrated organisation with an embedded team science approach running across all areas of research from fundamental biology, physics and chemistry through to translational and clinical research. We believe that many of the biggest challenges in cancer research will only be met by adopting an interdisciplinary ‘team science’ approach (see Future Plans). We have established structures, cultures and systems that recognise and promote interdisciplinary research and team science, for example by emphasising explicitly its importance in appraisals, holding a team science competition and through our research training. The ICR Annual Conference is an integral part of our academic calendar, helping to foster new collaborations and bringing together researchers from all disciplines.

Development of research collaborations, networks and partnerships

The ICR and RM partnership is crucial to conducting research for patient benefit. During the REF period we have reviewed our joint working arrangements, revised our Honorary Faculty appointment process, and enhanced our joint governance.

In 2016 we established a strategic partnership between ICR and Imperial College London (Imperial)—a Cancer Research Centre of Excellence—and together we have been awarded Cancer Research UK (CRUK) Major Centre status. Under the founding Director, Professor Paul Workman FRS, we have established the CRUK Convergence Science Centre, which brings together leading researchers in engineering, physical sciences, life sciences and medicine to develop innovative ways to address challenges in cancer. We are also combining ICR’s expertise in cancer epidemiology and genetics with Imperial’s School of Public Health to create and develop a joint Cancer Epidemiology and Prevention Unit. The Unit’s founding Director is Professor Elio Riboli.

ICR and RM have both joined the Imperial College Academic Health Science Centre (AHSC), a strategic University-NHS partnership that aims to accelerate the translation of scientific breakthroughs into innovative ways to provide patient care.

We work in partnership, nationally and internationally with leading funders and industrial collaborators through:

- CRUK Accelerator Awards: we lead two and are involved in an additional eight of these

collaborative projects.

- The UK Experimental Cancer Medicine Centres (ECMC) Adult and Paediatric Network, which is vital for conducting early phase trials in a multi-centre setting.
- Leadership of the Prostate Cancer UK and the Movember Foundation-funded London Centre of Excellence.
- The Breast Cancer Now Centre, a partnership with the charity of more than 20 years, brings together scientists and clinicians to focus on breast cancer biology, diagnosis and treatment.
- Children's Brain Tumour Centre of Excellence, joint between the University of Cambridge and the ICR.
- Founding members of the international Elekta MR Linac Consortium established to facilitate evidence-based introduction of MR-guided radiotherapy (MR Linac) with members across the USA, Europe and Canada.

Enabling the impact of ICR research

The fourth Pillar of our research strategy is to "Make it count" by embedding new treatments, technologies and approaches into routine healthcare, by building an evidence base to support their adoption, leading through national and international networks, and influencing healthcare policymakers. To meet our aims we:

- Systematically translate the findings from basic science to clinical research, then take learnings from the clinic back to the bench (reverse translation).
- Lead practice-changing trials.
- Partner with pharmaceutical, biotechnology and medical equipment companies.
- Lobby for changes to improve the ecosystem for drug innovation.

Delivery is facilitated by the Business and Innovation Office, which manages our industrial collaborations, identifies opportunities for commercialisation and devises exploitation routes; and through the Communications and Policy Directorate, which is responsible for our public engagement and policy work. We work closely with organisations such as PraxisAuril to share best practice.

ICR contributions to the economy and society

ICR has an outstanding track record in delivering against its mission and taking scientific discoveries through to the clinic resulting in both improved outcomes for patients and considerable economic impact.

We are playing a leading role in the discovery and development of new cancer drugs. An analysis carried out in 2018 revealed that ICR was directly involved in 17 of the 97 cancer drugs licensed by the European Medicines Agency (EMA) between 2000 and 2016. ICR researchers were involved in identifying drug targets, designing and discovering new drugs, and leading the evaluation of drugs in clinical trials with the RM. We have been involved in some of the most important advances in treatment in the last two decades, working with commercial partners to take treatments to patients. As well as discovering abiraterone, we pioneered the targeting of *BRCA*-mutated cancers with olaparib, which became the first cancer drug to be licensed that exploits an inherited genetic fault.

We developed and supported the implementation of improved radiotherapy regimens. Based on ICR-led clinical trials, shorter standard curative radiotherapy regimens have been adopted internationally. For patients, the shorter regimens lead to reduced side effects, less time off work and savings in travel time and costs without loss of very high levels of cancer control. Healthcare systems also benefit from reduced treatment costs.

Other indicators are:

- A 2017 Times Higher Education report placed the ICR in the top 10 universities worldwide for collaboration with industry. ICR filed 92% of patent applications with an industry partner, compared to an average of 60% for Higher Education Institutions.

- U-Multirank 2020 placed the ICR second worldwide for the number of our publications cited in patents.

Future research plans

Working with our partners and collaborators, and building on successes from our current research strategy, we are:

- Establishing a **Centre of Genome Stability Research** to further enhance our understanding of genome stability and the DNA damage response and their implication for tumorigenesis and cancer treatment.
- Co-locating the Centre for Evolution and Cancer with the Cancer Therapeutics Unit in the new **Centre for Cancer Drug Discovery** (see Infrastructure) to harness our understanding of tumour evolution and drug resistance to develop more effective treatment strategies.
- Forming a **Centre for Translational Immunotherapy** to enhance links between ICR and RM teams working on the immunotherapeutic aspects of cancer research.
- Establishing **The Radiation Research Centre of Excellence (RRC)** at ICR/RM, a programme of interlinked preclinical and clinical research themes as part of the **CRUK Radiotherapy Network (RadNet)**.
- With RM, developing an **Integrated Pathology Unit** to rapidly translate research advances in digital pathology.

Engagement with diverse communities and the public

Our public engagement strategy stresses our responsibility as a publicly funded higher education institution and charity to communicate openly about our work. We have a focus on engaging with schools and local communities in Sutton and Chelsea, enhancing support for projects such as The London Cancer Hub (see later). Following a recent review, we will strengthen the focus on engagement with schools, and with under-served groups—especially work to reach children from disadvantaged backgrounds or ethnic minority groups who might not consider a career in science.

ICR and RM worked together with Patient Representatives to develop the NIHR Biomedical Research Centre (BRC) strategy to engage and involve patients in our research. We build strong links between researchers and patients, promote the benefits of patient involvement and share best practice. We ensure patients have a voice in prioritising research, train our researchers in engagement, and involve patients, carers and the public throughout the research cycle.

The ICR focuses its policy engagement and influencing in areas where we have extensive expertise, for example, drug discovery and development, radiotherapy, clinical trials, patient data, industry collaboration and genetics. The ICR's 2019 Summer Summit brought together experts from leading academic institutions, charities, stakeholder groups and pharmaceutical companies to create and publish a nine-point plan providing practical recommendations to improve access to new cancer treatment.

Future impact plans

We are working on a major initiative with the London Borough of Sutton and RM to deliver a world-leading life science campus specialising in cancer research, treatment, education and enterprise, The London Cancer Hub. It will offer research and development space for biotech, pharma, software and equipment companies. With the potential to create 13,000 new jobs and contribute an estimated £1.2B p.a. to the UK economy, it will drive growth across Sutton and rebalance the local economy, which is currently heavily skewed towards housing. Work has begun on incubator space, which is due to open in late 2021.

Open research environment

The ICR supports open access publication and is committed to disseminating our research widely for maximum public benefit. The library supports researchers in ensuring publications are made open access through regular communications, training and covering the costs of gold open access. To achieve compliance with the Concordat on Open Research Data; we have

developed and maintain open source software tools, deposit datasets in public repositories, provide access to datasets and promote our research widely to a range of audiences.

A culture of research integrity

The ICR is committed to upholding the Concordat to Support Research Integrity. Responsibility rests with the ICR's Executive Board who have sponsored a programme of activities to refresh training, introduce Research Integrity Champions and enhance awareness. The ICR's Guidelines on Good Research Practice emphasise the importance of integrity and rigour in all research carried out at, and in partnership with, the ICR, and ensure that all researchers are aware of their obligations with respect to proper scientific conduct. Staff and students undertake courses in: research integrity, good research practice, research culture, academic writing, publication, authorship and open access, intellectual property, statistics and experimental design and analysis, research ethics and governance, data management, leadership and supervision and mentorship.

All ICR research involving human participants is subject to ethical approval, through submission to the joint ICR/RM Committee for Clinical Research prior to submission to the NHS Research Ethics Committee. We are committed to ensuring the confidentiality, integrity, and security of personal information relating to participants in research. We have a mandatory online data protection training module and a Data Quality Champions Network, which promotes and advises on best practice.

The ICR activities in this area include:

- A signatory to the 2014 Concordat on Openness on Animal Research.
- Selected as a Leader in Openness by the Understanding Animal Research Society (2019).
- Signed the San Francisco Declaration on Research Assessment (DORA) in support of fairer assessment of research achievements (2018). ICR recruitment, tenure review and promotion policies include explicit statements that journal impact factors will not be used in these assessments.

3. People

We aim to attract and retain the very best staff; to promote a sustainable structure with an appropriate balance of early career and senior researchers and support staff; and to nurture the development and progression of all staff.

In July 2020 our REF independent researchers fell into the following age bands: 26–40 (18.9%), 40–50 (36.0%), 50–60 (28.8%), >60 (16.2%).

Our scientific workforce is multinational, with 51 countries represented. Our 143 postdoctoral researchers come from 32 countries.

Team Leader recruitment

Taking into account the views of the Research Leadership Board, recommendations from our International Scientific Advisory Board and, where relevant the feedback from quinquennial peer-reviews of major funding, the CEO makes strategic decisions about when to recruit new Team Leaders into specific Divisions and/or research areas. Appropriate Search Committees are then convened and, as part of our Athena Swan Charter action plan, always have a gender balance. Team Leaders recruited by Search Committees are either tenured Faculty (for senior appointments) or Career Development Faculty (CDF) on tenure-track with a six-year appointment.

The ICR and RM work together on succession planning for clinical researchers. We support research active RM NHS clinicians by awarding Honorary Faculty status. We recruit team leaders from industry as part of our Impact Strategy. Where there is a strategic need to cement collaborations and partnerships, we make joint appointments with other institutions.

Over the period of assessment, we have recruited 12 CDFs and 20 tenured Team Leaders, some at Reader or Professorial level.

Start-up packages and mentoring

We provide new Team Leaders with access to excellent core research facilities, targeted allocation of a PhD studentship and a start-up package for equipment, consumables and staff as well as substantial (typically 20–50%) matched funding for major equipment items applied for on research grants. CDFs are mentored by their Head of Division, and an independent senior team leader. We enable them to gain supervisory and leadership skills through training, such as the European Molecular Biology Organization (EMBO) Laboratory Leadership for Group Leaders course and the ICR's Effective Research Degree Supervision workshop. A CDF Forum has regular meetings and is represented on the CEO Forum to highlight issues they are having and feed into ICR decision-making.

Tenure review

CDF progress is overseen by the Dean of Research and Academic Affairs. We perform “mid-term” reviews early in the third year of appointment to provide timely feedback. Tenure review occurs no later than the end of the fifth year.

Bespoke pay structure

To achieve our aims it is important to provide a sustainable attraction and retention employment offer to meet the requirements of national and international markets. We conduct frequent market testing to ensure we are competitive with other leading cancer research organisations. In 2019 we restructured the ICR pay model to:

- Align with and support organisational goals.
- Be affordable and sustainable.
- Recognise and support performance and contribution.

Staff development

We invest heavily in training. The ICR has committed to implementing the principles of the Concordat to Support the Career Development of Researchers. We were one of the first organisations to achieve the European Commission HR Excellence in Research Award (2010) and have received a successful 10-year review. We are a founder member of the Technician Commitment, and received a successful 8-year review in 2019.

Career development provision greatly increased between 2013 and 2020 with a major focus on supporting early career researchers through the transition points—student to postdoctoral researchers and postdoctoral researchers to independent researcher.

Our Learning and Organisational Development team works closely with ICR's four Staff Associations (Student, Postdoc, Scientific Officer and CDF), Academic and Corporate Leadership Boards, and the Research Degrees Committee to identify, deliver and evaluate training. Staff associations manage their own budgets and promote a range of activities, including away-days, scientific conferences, training courses and careers conferences, and also inform, prioritise and help to deliver the 150 training and career development activities provided each year. There is an active exchange of course places between the ICR and other HEIs to ensure our researchers have access to the widest possible range of opportunities.

“The Pathway to Independence; Developing Future Scientific Leaders”, an innovative residential programme, was developed through collaboration between the ICR, the Biotechnology and Biological Sciences Research Council (BBSRC) and the Wellcome Trust Sanger Institute. The programme supports postdoctoral researchers at the point in their career when they are seeking their first independent research position. We surveyed our postdoctoral researchers who left between 2009–2018: 93% of these ICR alumni are in science- or education-related roles with over 15% achieving independent academic roles.

Through the Clinical Academic Forum, a network for early career clinical academics, we operate a continuous dialogue on training needs. We provide mentoring from senior clinical academics to support the transitions between clinical training and research. In addition, we run the “Pathway to Independence: clinical academics in cancer research” residential programme, providing intensive coaching to prepare for academic independence and applications for clinician scientist awards. This has been delivered twice since 2016 and is open to national BRCs. 50% of all 2016 participants now hold clinician scientist fellowships, clinical lectureships or principal investigator awards.

Research students

Through the ICR’s Learning and Teaching strategy, we continually enhance our research degree programmes, aiming to attract the highest calibre of students and deliver exceptional support both during their research degree and in the transition to their next research role. Over the 2019/20 academic year, there were 222 students registered on research degrees—174 PhD (26% clinical) and 48 MD(Res).

Our research programmes are organised on an ICR-wide basis. The Academic Dean’s Team and the Registry are responsible for the management of all education and training activities, ensuring that all students receive appropriate supervision and have adequate resources available. There is an active student society, student confidant system and a student-organised buddy system for international students.

The ICR participates in the Higher Education Academy’s Postgraduate Research Survey (PRES). When this biannual survey was last undertaken, in 2019, 92% of ICR students agreed that they were satisfied with their overall experience, the highest satisfaction rate across the UK. Over the full REF period, 88% non-clinical students moved into science-based roles in academia or industry as a first destination post-graduation.

Equality and diversity

As part of our 2016–2021 research strategy, we committed to an “open, equal and collaborative culture”, recognising that equality, diversity and inclusion is integral to our research success.

Our six ICR Values (see below), launched in 2018, are embedded in appraisal, recruitment, management training, induction training and promotion processes. Equality and diversity is included in these—primarily in “Valuing all our people”.



Pursuing **excellence**
We aspire to excellence in everything we do, and aim to be leaders in our fields.



Working **together**
We collaborate with colleagues and partners to bring together different skills, resources and perspectives.



Acting with **integrity**
We promote an open and honest environment that gives credit and acknowledges mistakes, so that our actions stand up to scrutiny.



Leading **innovation**
We do things differently in ways that no one else has done before, and share the expertise and learning we gain.



Valuing **all our people**
We value the contribution of all our people, help them reach their full potential, and treat everyone with kindness and respect.



Making a **difference**
We all play our part, doing a little bit more, a little bit better, to help improve the lives of people with cancer.

The ICR has been a member of the Athena Swan Charter since 2009 and gained a Bronze award in 2012. We worked with AdvanceHE (then the ECU) to develop an Athena Swan

scheme relevant to research institutes, and were awarded Silver in 2015, renewed in 2019.

The ICR's median gender pay gap in 2019 was 9.5% due to more men than women occupying senior, more highly paid, roles and in particular senior clinical academics whose pay is determined by NHS/ Universities and Colleges Employers Association (UCEA) and not by ICR. Whilst this is reflective of the wider higher education sector, we are committed to changing our balance through how we recruit at senior levels and provide more support for the progression of women in their careers at the ICR.

The ICR is a Stonewall Workplace Equality Champion, actively creating a workplace where all are accepted as themselves, regardless of sexual orientation or gender identity.

For a month in 2019, the ICR hosted the Black Dog campaign to start conversations about mental health. This campaign formed part of our wider wellbeing initiatives.

In 2020, we launched a major new project, "BAME: Beyond the statements", which delivers on our commitments to address systemic racial inequalities in higher education and create a culture where all can thrive. Actions include appointing champions to promote ethnic diversity, race equality survey and focus groups, workshops on talking about race and new career development initiatives for BAME staff and students. We are not eligible for the Race Equality Charter in its current form but are working with AdvanceHE to develop a revised scheme for research institutes.

Our immediate priorities for 2020 and 2021, resulting from the COVID-19 pandemic, are to reduce disadvantages faced by parents/carers and disabled people when remote working and/or home schooling and supporting good mental health during the pandemic.

The ICR's **long-term aim** is to address the relative under-representation of women and BAME staff in senior roles (Team Leader and senior Professional Services roles).

REF 2021 staff

The ICR is submitting all staff with significant responsibility for leading research programmes (102.4 FTE) of whom 20.7% are early career researchers (ECRs). On REF census date, 66.9% were on permanent contracts. CDFs, those on personal fellowships and some senior Team Leaders beyond pensionable age hold fixed term contracts. The ICR put in place a process to allow REF eligible staff to voluntarily disclose circumstances that have affected their productivity during the period in an appropriate and confidential manner. We explicitly stated in our REF Code of Practice that selection of outputs from individual members of staff is for REF purposes only and is independent of any criterion/decision on promotion or career progression. All ICR recruitment, promotion and progression processes have mechanisms to allow individuals to declare any circumstances that may have impacted on research productivity.

4. Income, infrastructure and facilities

The ICR's Operational Strategy sets out how we generate and allocate the resources needed to support our science and teaching. To deliver efficient and effective support services, this strategy is structured around two Pillars: "Growing income to provide vital funds", and "Delivering a world-class environment".

Income

Over the REF period, the ICR research income has grown from £48.8M in 2013/14 to an average of £71.5M p.a. over the past five years. Our Research England Higher Education Innovation Fund (HEIF) budget (£3.4M in 2019/20) enables us to provide the support required to deliver impact from our research discoveries. Our intellectual property income (£32M p.a. on average, £224M total) and legacies and donations (£11.7M p.a. on average, £93.8M total), in addition to core income from Research England, allows us to invest in cutting-edge, high-risk

areas as well as capital projects and to support the full economic costs of research not covered by external research grants.

Infrastructure

Since 2013, we have opened three new research buildings:

- The ICR/RM **NIHR Centre for Molecular Pathology** (£18.2M) co-locates clinicians, pathologists and geneticists, a Clinical Genomics Research & Diagnostics laboratory, a translational immuno-oncology laboratory and a dedicated biobanking facility.
- The **Centre for Cancer Imaging building** (£20M) houses cutting-edge imaging techniques to develop imaging biomarkers and approaches to monitor response to treatment, including different magnetic resonance imaging (MRI) modalities, ultrasound and positron emission tomography scanners. It also provides completely new state-of-the-art animal facilities for the Sutton site.
- The **Centre for Cancer Drug Discovery**. We successfully applied for £30M from the UK Research Partnership Investment Fund (UKRPIF) award as a vital part of the overall £70M capital costs. The Centre, which opened in 2020, has a gross internal floor area of 7,325m² and accommodates 283 researchers. It brings together the CRUK Cancer Therapeutics Unit with colleagues from the Centre for Evolution and Cancer.

The RM/ICR NIHR competitively awarded BRC, was successfully renewed for a third time in 2017 (£43M). This major benefit in-kind, together with that derived from being a CRUK Centre (renewed 2016, £16.1M) and an Experimental Cancer Medicine Centre (renewed 2017, £2.56M), enables us to support an infrastructure in which we systematically take the findings of fundamental cancer research, cancer drug discovery and radiotherapy and physics through translational steps and into clinical trials.

Facilities

There has been a major change since REF 2014 in consolidating facilities and technical support, including the formation of a new Core Research Facilities unit operating across both sites to improve co-ordination, and strategic decision-making to planned major investments. The ICR has invested over £10M—in addition to funding from CRUK Centre Core Grant and Major Centre grants—in microscopy, proteomics, metabolomics, cryo-electron microscopy, genomics and bioinformatics.

Major bids for equipment are reviewed at an ICR-wide Scientific Services Oversight Committee with recommendations made to the Research Leadership Board. A scheme has been introduced to support purchase of equipment through providing matching funding to partner with Research Council, Wellcome Trust and other sponsors' contributions.

Current commitments include £4M to refurbish the Chelsea animal facility, £1.6M for laboratory refurbishment and £15M to support further staff recruitment.