HDR UK Big Data for Complex Disease Driver Programme

Call for PhD project proposals.

1. Background

Health Data Research UK (HDR UK) commences our second 5-year phase (QQ2) from 1st April 2023, and will continue to focus on its **long-term mission to unite and improve health data to enable discoveries that improve people’s lives** by powering-up the UK’s major research investments with large-scale, diverse health-related data that represents the whole population. We will develop infrastructure, datasets and tools, in a trustworthy and open way, to make research faster and easier.

**HDR UK’s strategic ambition for the next five years** is to:

* **Assemble Health Data Infrastructure and Services**: Providing UK-wide and global leadership and coordination of health data infrastructure and services required to make health-relevant data Findable, Accessible, Interoperable and Reuseable (FAIR).
* **Deliver Research Driver Programmes:** Advancing research discoveries through high impact UK-wide research programmes that address major health and societal challenges, guide the development of the infrastructure and services for the benefit of other researchers, and are outward-looking with global reach. Each 5 year driver programme will include training and capacity building functions, and fund a number of PhD studentships and Fellowships.
* **Build One Institute Partnerships:** Through national leadership with a clear vision and ambition to assemble an ambitious health data research ecosystem with enduring benefits for all researchers.
1. Big Data for Complex Disease (BDCD) Driver Programme
* The BDCD Driver Programme is led by Professor Cathie Sudlow (HDR UK) and Professor Mark Lawler (Queens University Belfast, HDR UK Northern Ireland), with a wider leadership team from across the UK.
* **This Driver Programme is launching a call for project proposals to fund up to five PhD studentships** (*3 years of funding available from HDR UK, with option for an additional year funded by the host research organisation(s))*
* **Projects will be selected by an HDRUK convened selection committee, chaired by the BDCD co-leads,** of health data science experts who are also co-investigators on the BDCD programme and drawn from across the UK.
* There is funding for up to five PhD studentships, however, depending on quality and breadth of applications more than five may be shortlisted and final decision on which projects will be funded will be confirmed at the student selection stage, following matching of the projects to the most suitable students. This means that if more than 5 projects shortlisted not all will receive funding.
* PhD Project proposals must be **aligned with the aims and objectives of BDCD Research Driver Programme**:

**Big Data for Complex Disease Driver programme: Aims**

For a wide range of complex diseases, deriving intelligence from nationwide, multisource, linked health relevant data has the potential to yield crucial insights that accelerate and enhance opportunities for innovation in disease detection, diagnosis, treatment, improved care, better outcomes and more rational health policy.

* **Cancer and cardiovascular diseases (CVD) are the two commonest causes of morbidity and mortality in the UK and globally, with incidence, morbidity and mortality increasing over the last several decades as the world’s population has aged.** Slowing these global trends requires approaches that recognise and exploit the power of whole, large population-scale health relevant data to catalyse health data science and its translation.
* **We also need to break down traditionally siloed disease and expertise specific domains, rising to the challenge of jointly addressing cancer, CVD, other complex diseases**, their inter-relationships and their sequelae. Crucially, we need to use the intelligence gained to translate into real benefit for citizens and patients and influence national and international policy and best practice.

**Big Data for Complex Disease Driver programme: Objectives**

The Big Data for Complex Disease (BDCD) Driver Programme will address three core challenges that focus on **deploying whole population, national linked health data:**

* **To better predict** development of cancer and CVD and to stratify risk for better early detection, early diagnosis and prevention.
* **To improve understanding of the inter-relationship between** these complex diseases to ensure that data-driven insights fully inform strategies for the prevention, early diagnosis and management of both treatment sequelae and long-term risk.
* **To examine and better understand the impact of inequalities** to influence and mitigate the negative impacts on incidence and outcomes associated with age, gender, ethnicity, geography and deprivation.
1. Funding criteria
* **Project:** Each project proposal will be rated on scientific excellence, but also on its importance, originality, feasibility, and alignment with the BDCD programme (+/- other HDR UK research driver programmes – *see Appendix A),* including aim to exploit key population-wide linked multisource data enabled by the programme. Provided there are applications of sufficiently competitive quality and co-funding arrangements can be developed with other driver programmes, we are also keen to award studentships for projects which explicitly bridge across the BDCD programme and one or more other HDR UK programmes.
* **Supervisory team**: Expertise, experience and time commitment from supervisory team, which must include a primary supervisor based at a UK-based, degree-awarding research organisation / university with capabilities to support health data research, and at least one secondary supervisor based at another research organisation / university. Within these arrangements, joint supervision will be encouraged. It is expected that employment contracts of the supervisory team will extend beyond the duration of the PhD programme.
* **Host research organisation(s):** Able to offer excellent training and career development opportunities and environment for the student. Track record of attracting and supporting excellent PhD student applicants from health data science backgrounds from award of studentship through to completion of PhD and successful onward career. Students will be hosted by one research organisation throughout the studentship but may spend part of the studentship as a ‘visiting student’ to other HDR UK affiliated research organisation/s whose HDR UK programmes of work are aligned to the BDCD Driver Programme. Primary host organisation must have mechanisms in place to enrol the student for and award a higher degree (e.g., PhD, MD), and be able to provide students and fellows a training environment that nurtures and develops open and team science principles.
* **Host organisation(s) must be signatories to the HDR UK Institute Agreement, or a part of a Consortium Agreement subject to the Institute Agreement and** will be responsible for meeting the costs of PhD tuition fees *(see Section 4).* The Award Letter for the project will be issued subject to the terms and conditions of the Institute Agreement.
* **The latest studentships can start will be March 2024.** However, preference is for October 2023 start where possible.
1. Student Selection
* **After the projects are selected, a rapid competition to recruit students to each project will then be launched via HDR UK.**
* HDR UK will advertise the PhD studentship opportunities for the successful projects via the HDR UK website, disseminating widely to the HDR UK community. Host organisations for successful projects should also advertise the opportunities within their organisations, networks and via their usual organisation studentship advertising processes. The application form for students will be available via the HDRUK website and application administration managed by HDRUK.
* **The selection committee will include the primary supervisor of each project (or their nominated deputy) and the co-leads of the BDCD driver programme (or their nominated deputies).**  The co-leads will chair the student shortlisting, interview and selection process and will have the right to veto the selection and award of funding to any student who, in their judgement, is unlikely to deliver their project at a sufficient level of quality to benefit the BDCD programme.
* **Our aim is that the HDRUK selection panel interview will be considered the single, formal interview for each student. Applicants are therefore requested to confirm with their research organisations that an additional interview will not be expected as part of the admission process at that organisation**. To ensure that the selection of each student fulfils the requirements of the relevant host organisation, a representative of the postgraduate office from each relevant research organisation will be invited to join the selection panel as an observer and will have the right to veto the selection of any student who does not fulfil the requirements for their host organisation.
* A conditional offer will be made to successful student applicants after the selection panel.
* The Host Organisation will be responsible for ensuring that the selected students are eligible for admission to the relevant PhD programme at their organisation, managing enrolment process, and for putting in place any agreements with the student that may be necessary to ensure the student’s compliance with the terms of funding as set out in the award letter.
* Award letters will be issued to successful Host Organisations with both a project and student selected to undertake the project.
* Following signature of the award letters, the Host Organisations shall make an , unconditional offer ifor postgraduate study to the selected student
1. Funding available
* Each studentship award will comprise a three-year stipend and research costs **of maximum £75,000[[1]](#footnote-1) per studentship awarded to the host organisation(s)**. This is based on [**UK Research and Innovation (UKRI) minimum rate**](https://www.ukri.org/our-work/developing-people-and-skills/find-studentships-and-doctoral-training/get-a-studentship-to-fund-your-doctorate/) (see Appendix B)
* **Host organisations will be responsible for meeting the costs of PhD tuition fees** (including, where needed, the relevant overseas supplement for non-UK home students), for arranging and funding any necessary visa arrangements for overseas students, and for meeting the costs of an initial MSc or equivalent year as part of a four-year programme if required. Applicants should confirm this with their Heads of Department and postgraduate offices prior to applying.
* Host organisations will be responsible for meeting the costs of any statutory maternity or paternity pay and any other completion delays due to illness or other circumstances.
* All students will have access to courses available via the HDR UK Wellcome Trust PhD programme and will be expected to take part in HDR UK PhD student events as part of a national HDR UK PhD student cohort.
1. Timeline
* Deadline for applications- 17:00 Friday 5 May 2023
* Project review panel – w/c 15 May 2023
* Host organisations notified of project selections –May 2023
* Student applications – May – 9 June 2023
* HDR UK student selection panel – w/c 19 June 2023
* Conditional offer/s made – during or before w/c 26 June 2023
* Unconditional offer made – during or before w/c 17th July 2023
* Award letter issued – during or before w/c 24th July 2023

Please complete the proposal project form and return to learn@hdruk.ac.uk by **17.00hrs Friday 28th April 2023**

Appendix A: HDRUK Driver Programmes

**Summary**

* **HDR UK’s 2023-2028 Research Driver Programmes build upon well-established national and global networks and partnerships** cultivated in the first five years and are designed to demonstrate that health data and its associated infrastructure can be used to maximise patient and public impact.
* Six Driver Programmes will exemplify data integration for a health research purpose and leave a legacy for the benefit of the wider health research community. These programmes are:
1. **Molecules to Health Records (John Danesh, Sarah Lewington**)

Creating new informatics infrastructures and data science methods that help achieve a deep integration of biology, biomedicine and population health sciences and gain major new insights into the underlying causes and biology of diseases.

* Focus on molecular underpinnings of multi-disease aetiology, therapeutic target prioritisation, genomic causes of rare disorders, and risk prediction and stratified prevention.
1. **Medicines in Acute and Chronic Care (Elizabeth Sapey, Munir Pirmohamed)**

Curating the most complete map of medicine indication, use and outcome across the health ecosystem globally, and using this to transform medicines use for patients of all ages, especially those with complex care needs and multiple long-term conditions.

* Focus on responsive algorithms which support personalised clinical decision making in real time, increase understanding of the impacts of polypharmacy, reducing medicines-related harm and enable de-prescribing, building treatment guidelines which are fit for purpose for our changing demography and care needs, sharing methodologies, guidelines, and recommendations across the globe.
1. **Inflammation and Immunity (Aziz Sheikh, Jenni Quint)**

 Transforming the UK’s understanding of mechanisms of inflammatory disease and improve management and health outcomes using respiratory and allergic disorders as exemplar clinical domains.

* Focus on near real time national mapping of the epidemiology, healthcare utilisation and outcomes of common allergic and respiratory conditions. Identifying inequalities and generating risk prediction algorithms to improve health outcomes and reduce inequalities. Evaluating the cost effectiveness of interventions and sharing outputs globally
1. **Social and Environmental Determinants of Health (Paul Elliott, Ruth Gilbert)**

Providing national infrastructure and methods to link place-based information on social and environmental determinants of health to existing, longitudinal administrative data from health and related services.

* Focus on developing a systematic interoperable approach for using Unique Property Reference Number (UPRN) to link people to their homes and households at a high spatial resolution. Developing computational approaches for analysing UPRN level data over time and linking UPRN level data to broader administrative datasets. Enhancing longitudinal cohorts by appending UPRN-linked timespecific social and environmental data.
1. **Pandemics and Outbreaks (Kenneth Baillie, co-lead TBC**) *(currently paused)*

Developing sustainable Outbreak Data Analysis Systems (ODAP) within the UK, through an Antimicrobial Resistance (AMR) exemplar, to create the underpinning infrastructure, skills, and capacity building to rapidly detect and characterise new disease threats causing severe illness, demonstrate their effectiveness and facilitate adoption worldwide.

* Focus on creating a robust system to detect important phenotypes of critical illness using automated data collection, linkage and analysis. Using this system to recruit patients into clinical and laboratory research with relevance to pandemics and outbreaks and providing real time feedback to improve the quality of NHS critical care.
1. **Big Data for Complex Disease (Cathie Sudlow, Mark Lawler)**

 Connecting data on all of us to enable improvements in health for all through insights that accelerate and enhance opportunities for innovation in disease detection, diagnosis, treatment, improved care, better outcomes and more rational health policy, initially in cancers and cardiovascular diseases (CVD).

* Focus on improved prediction and risk stratification for cancer and CVD, improved understanding of the inter-relationship between these complex diseases and insights into the impact of inequalities on incidence and outcomes.

**Appendix B – Summary of Three Year Studentship Awards Available**

Studentship Award

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| **Item**  | **Total per three year studentship**  |
| Stipend  | Up to\* £58,618.15 (outside London) up to\* £65,253.66 (inside London)  |
| This is a tax-free payment made to the student  |
| Research training and support grant  | £15,000 (£5,000 per year)  |
| Contribution towards consumable costs of training research students.  |
| Travel and conference allowance  | £900 (£300 per year)  |
| Contribution to the costs of attending scientific conferences, workshops or visits to collaborators.  |
|   |
| TOTAL  | £74,518.15 (outside London) - £81,153.66 (inside London) |

What is not included

* **Sessional fees including tuition, supervision, registration and bench fees** (including, where needed, the relevant overseas supplement for non-UK home students
* The cost of an optional fourth year
1. Funding available per studentship as per MRC Guidance

<https://www.ukri.org/what-we-offer/developing-people-and-skills/mrc/mrc-studentships/minimum-amounts-for-studentship-stipends-and-allowances/> [↑](#footnote-ref-1)