



**INDUSTRIAL
STRATEGY**

UK Research
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HDRUK
Health Data Research UK

HEALTH DATA RESEARCH INNOVATION GATEWAY

Specification for Phase 2:
Technology Partnership

16 October 2019

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Purpose of the document

This document provides a specification for development and operation of Phase 2 of the Health Data Research Innovation Gateway, delivered as part of a national programme to build the UK’s capability to improve safe and responsible use of health data for research and innovation. This work offers a unique opportunity to work in partnership to deliver a game changing portal for health research and innovation. The document provides information for suppliers who are responding to the opportunity posted on the Official Journal of the European Union (OJEU).

Note that the funding for this procurement is provided through UK Research and Innovation (UKRI) as part of the Industrial Strategy Challenge Fund.

1. Introduction

Health Data Research UK is working in partnership with NHS organisations and other data controllers across the UK to lead a £37.5million government investment on behalf of UK Research and Innovation to improve the safe and responsible use of health-related data at scale for research and innovation. It is doing this through the Digital Innovation Hub (DIH) Programme, which aims to address the difficulties that exist in the UK in accessing data quickly (mentioned as a major barrier by 70% of respondents across researcher and direct industry engagement¹), and identifying the location of data and understanding data quality (mentioned as a major barrier by 55% of respondents).

Health Data Research UK

Health Data Research UK (HDR UK) is the national institute for health data science. Its mission is to unite the UK's health data to enable discoveries that improve people's lives. By working in partnership with the NHS, industry, academia, patients and the public to provide safe and secure access to rich health data, it aims to better understand diseases and discover new ways to prevent, treat and cure them. It is funded by UK Research and Innovation (UKRI), the Department of Health and Social Care (DHSC) in England and equivalents in Northern Ireland, Wales and Scotland, and leading medical research charities.

www.hdruk.ac.uk

Industrial Strategy Challenge Fund

The DIH Programme is co-funded by the Industrial Strategy Challenge Fund (ISCF), part of the Government's modern Industrial Strategy, and its Data to Early Diagnosis and Precision Medicine Challenge. The fund is delivered by UKRI. The ISCF brings together the UK's world-leading research with business to meet the major industrial and societal challenges of our time. It provides funding and support to UK businesses and researchers, part of the government's four-year £4.7 billion increase in research and development.

UK Research and Innovation

The Health Data Research Innovation Gateway, part of the DIH Programme, is also funded by the Medical Research Council, part of UK Research and Innovation. UKRI brings together the UK Research Councils, Innovate UK and Research England into a single organisation to create the best environment for research and innovation to flourish. The vision is to ensure the UK maintains its world-leading position in research and innovation. For more information visit www.ukri.org

The DIH Programme

The DIH Programme is a 4-year programme to develop three essential elements:

1. UK Health Data Research Alliance ('Alliance') – an alliance of data custodians committed to making an unprecedented breadth and depth of data available for research and innovation purposes for public benefit. Find out more at www.ukhealthdata.org
2. Health Data Research Hubs ('Hubs') – centres of expertise dedicated to making data available, curating data, and providing expert research services. The Hubs will enable researchers and innovators to collaborate and co-create with colleagues, clinicians and patients to draw insight and understanding from raw and fragmented data. Find out more at www.hdruk.ac.uk/infrastructure/the-hubs.uk/infrastructure/the-hubs

¹ Industry Engagement conducted as part of the DIH Design and Dialogue phase, which involved 32 in-depth interviews with industry representatives

3. Health Data Research Innovation Gateway ('Gateway') – an application providing discovery, accessibility, security and interoperability to find data, support linkage, and enable health data science to take place in a safe and efficient manner. Find out more at www.hdruk.ac.uk/infrastructure/gateway

An overview of the DIH Programme can be found at www.hdruk.ac.uk/infrastructure

The Gateway

HDR UK is seeking a technology partner to design, deliver, operate and continually improve the Gateway.

The Gateway will act as a common portal through which researchers and innovators in academia, industry and the NHS can search for and request access to the health data held by members of the Alliance and the Hubs in Trusted Research Environments². The Gateway will support the use of data, facilitate interoperability, and provide analytical capability. It will take the form of a common web application providing the following functions:

- The ability to search for available data
- The facilitation of access requests to multiple data custodians
- Integration with accredited Trusted Research Environments to provide secure access to linked datasets
- A library of curated analytics tools and scripts
- A dashboard to show usage and quality of datasets for research and innovation to provide transparency to data users, data custodians and the public

The Gateway will not store or hold health data. Data security is paramount, and data will continue to be held and managed by data custodians in Trusted Research Environments. The Gateway will operate under principles of federated access, with existing data custodians retaining robust governance procedures to ensure that any access to data remains appropriate, proportionate and necessary, including adherence to the Five "Safes"³. The Gateway will hold metadata to facilitate discovery and will support secure access to de-identified data for use in a broad range of research and innovation applications.

The Gateway will be designed to operate at a national and international scale, and to be scalable as the uses of health data increases. HDR UK works in partnership with NHSX and other NHS bodies to ensure that the Gateway aligns with related NHS endeavours, including the development of clear standards for the use of technology in the NHS.

Gateway development principles

The design and development of the Gateway should be executed in keeping with the HDR UK Development Principles, outlined in Appendix 6.

² As part of the UK Health Data Research Alliance a workstream has been established to define the functions and best practice for Trusted Research Environments across the UK with a view to agreeing on an accreditation process. The Trusted Research Environments will be expected to integrate best in class de-identification and encryption software across the Alliance for privacy and interoperability, in line with information governance requirements, to enable secure, novel data linkages across a wide range of datasets to meet researcher needs while ensuring privacy of sensitive health data.

³ Safe Projects; Safe People; Safe Settings; Safe Data; Safe Outputs; From Desai, Tanvi; Ritchie, Felix; Welpton, Richard (2016). "Five Safes: designing data access for research". Bristol Business School Working Papers in Economics

In particular:

- Patient and public involvement and engagement is critically important at all states of design and development of the Gateway, and needs to be achieved in a consistent way which aligns with other HDR UK initiatives and areas of engagement
- Design and development of the Gateway should be driven by a deep understating of user needs
- The project should use Agile development processes
- The Gateway should build on tools and best practices that already exist in the UK, such as the NIHR Health Data Finder and associated Metadata Catalogue tool and build on insights developed through HDR UK's [Sprint Exemplar Projects](#) where appropriate. Where new solutions are needed, insights from existing 'best of breed' solutions should be sought from the market and custom development will be required to incorporate these and to develop integrated functionality
- The Gateway should be developed in a modular way, and each module with all components should be integrated through fully documented open APIs. Components of the Gateway should be developed in the open, using open-source principles and with focus on providing a service that incorporates best practice in security, reliability, availability and scalability such that it can meet the business critical requirements of industry as well as researchers from academia and the NHS.

Principles for Participation

All suppliers are required to sign up to the [Programme Principles of Participation](#)

Patient and public engagement and involvement

HDR UK is committed to earning, building and sustaining the trust and confidence of people who are producers and consumers of data and the users of the health and care system. The needs, interests and values of patients and the public should shape the quality of the health data research. This requires state-of-the-art approaches to engagement and involvement of patients and the public at every stage of the innovation pathway. All partners and suppliers involved in the DIH Programme are expected to support this commitment by demonstrating how patients and the public will be involved in informing the direction, planning and delivery of projects and services.

2. Development approach

The Gateway is being developed in 2 phases, with Phase 1 currently underway. **This specification outlines the requirements for a technology partnership to deliver and operate Phase 2 of the Gateway.**

Phase 1 (already underway)

The first phase is aimed at delivering a Minimum Viable Product (MVP) to demonstrate the capabilities across the DIH Programme and to provide further insight on user needs to inform Phase 2. Partners have been selected for the first phase and it is currently underway, divided into three streams of work:

- A Metadata Catalogue, providing the underlying data repository and metadata management functionality
- A Gateway Portal – providing the front-end web application with which most users will interact for discovery and exploration
- Metadata onboarding and process improvement

The functionality to be delivered through Phase 1 will:

- Allow users to **discover data** through a common point of access, which provides a view of available datasets and seamless user experience. It will be enabled by federated metadata management and search tools to provide improved visibility, comparability and navigation of existing datasets
- Provide a means of requesting **access to data** that retains data custodians' requirements whilst harmonising processes, reducing transaction costs and improving access to more isolated, important datasets.

In accordance with our development principles, the MVP is being designed in a modular way, so that components of this phase can be incorporated into the phase 2 of the development.

Phase 1 is expected to be completed by 10 January 2020.

Phase 2

Phase 2 of the Gateway development and operation, about the procurement for which this document provides detail, is envisaged to provide the following functionality as a minimum. It is expected that the required functionality will evolve during the development process in response to user feedback and changing user needs.

1. Metadata onboarding:

- I. Provide a self-service mechanism to allow Alliance members to update or onboard new metadata and self-service dashboards to help verify metadata imports
- II. Onboarding of existing metadata
 - a. Should the supplier choose not to use the metadata catalogue developed as part of the MVP, all metadata already held within the MVP should be migrated into the phase 2 Gateway
 - b. Metadata for data held by Alliance members that are not already included in the MVP should be exported into the Gateway

2. **User-friendly discovery portal:** Allow users to discover Alliance datasets (including those developed by the Hubs), create high-level metrics and aggregate reports from the metadata through a suitable front

end that meets user requirements (including semantic search and support for cohort building) and also provides tools to support analysis of dataset quality and identify novel linkage options and associated risk.

3. **Harmonised Access Request Management:** Provide an access request functionality and harmonised workflow management across custodians to improve response times for access decisions by custodians and provide reports on requests, turnaround times and use.
4. **Trusted Research Environment (TRE) integration and tool repository:** Integrate between the Gateway and the TREs and provide federated access to datasets held across TREs:
 - I. Through integration with TREs provide **analytical workspaces** for researchers and innovators
 - II. Provide tools to support **federated access** to datasets held across TREs, including tools to support access to linked and de-identified datasets across the data custodians in the Alliance and mapping between datasets.
 - III. Provide a curated **repository of tools and scripts** in the Gateway that can be reused for analysis into Trusted Research Environments, including:
 - a. **Exploratory computing:** provide an integrated library of industry standard tools and software to allow users to explore, visualise and perform simple cohort data analysis on demand within the federated platform, e.g. tranSMART, Talend, etc.
 - b. **Interactive computing:** provide industry standard software components and tools that allow users to perform interactive data analysis e.g. Jupyter, R, IDEs, Software Appliances via Virtual Desktops
 - c. **Batch computing:** provide standardised cluster computing components that facilitate the federated submission and management of batch computing workloads, e.g. HPC, Spark, etc.
 - d. **Stream computing:** provide components for the integration and near real-time processing of secure data feeds/streams from IoT devices
5. **Infrastructure as a service:** Provide a common interface to support the provisioning of workloads into TREs
6. **Dashboard, user reporting, logging and metrics:** Provide a customisable, user friendly dashboard for user activity and access management performance and dataset usage. Enable the collection of usage metrics to allow analysis of patterns of use, identify gaps in data and datasets and support future research and innovation investment decisions. Build and validate analytic reports on Gateway data.
7. **Analytics and phenotype libraries:** Provide libraries in the Gateway that are repositories for artefacts such as reusable or shareable analytics, linkage maps and to deliver the infrastructure to support an extensible human phenotype library.

3. Technology partnership requirements

HDR UK wishes to build a strategic relationship with a partner organisation or a consortium of organisations (with a single lead organisation) to undertake the phase 2 development and operational needs of the Gateway. The partner procurement will establish technical capability to enable HDR UK to support its data science objectives and meet the Industrial Strategy Challenge Fund requirements.

The selected technology partner will be responsible for designing, developing, operating and continually improving the Gateway through an agile co-development approach working in partnership with HDR UK, the members of the Health Data Research Alliance and a broad community of stakeholders across academia, NHS and industry. The technology partner will be expected to actively contribute their own perspective to this co-development and show the capability to deliver and operate the Gateway while recognising that the initial vision will evolve significantly during the course of the project.

The partnership will initially run to April 2022 (the time period covered by this procurement) at which point HDR UK plans to have retendered for ongoing operation of the Gateway and further development. HDR UK believes this procurement offers a unique opportunity to work in partnership to deliver a game changing portal for research and innovation and create the basis for potential long-term collaboration. The requirements and specifications for the partner are as follows:

Required skills and experience

The technology partner is required to demonstrate the following skills, capability and experience:

- World class skills in design thinking and user experience, coordinated to deliver a world class user experience
- Best of breed capability for metadata management, distributed analytics, support and integration into trusted research environments
- Ability to develop new solutions to meet user needs in a secure and efficient way
- Delivery of secure web-based applications, with evidence of operating robust governance processes and quality management
- Operation and maintenance of functional infrastructure (infrastructure as a service) to meet Service Level Agreements for a high reliability and responsive user service, including embedding a continuous improvement culture that ensures the service improves to meet evolving user needs
- Understanding of the UK health data environment for research and innovation
- Experience of effectively involving and engaging patients and the public in complex development programmes
- Expertise and successful track record in delivering complex programmes of work on time, in full in a high pace environment, using Agile development methods in a co-development approach with numerous stakeholders and partners
- Commitment to develop the Gateway in the open and for the underlying code for the Gateway to be open source
- Commitment to ensure that the delivered solution does not lock-in HDR UK and that HDR UK maintains the ability to switch technology partners on completion of the contract in April 2022

Required technology development milestones

The technology partner will be required to deliver the following development milestones:

- Milestone 1a: Complete the rapid development task (20 March 2020)
- Milestone 1b: Contracting complete and commence Gateway development (30 April 2020)
- Milestone 2: Complete Gateway 1.0 (31 October 2020)
- Milestone 3: Complete Gateway 2.0 (30 April 2021)
- Milestone 4: Complete Gateway 2.1 (31 October 2021)
- Milestone 5: Complete Gateway 2.2 (30 April 2022)

Each milestone is described in more detail in Appendix 1. All development will be undertaken in line with HDR UK Development Principles detailed in Appendix 6.

Required training

At the completion of each milestone from milestone 2 onwards, the technology partner will be required to provide training for an initial cohort of personnel from HDR UK and data custodians on the functions of the Gateway, and to develop interactive training materials that can be reused across the data custodian community.

Required operation

The technology partner will be required to operate the Gateway in line with an Operational Service Level Agreement (see Appendix 4), which will come into effect at Milestone 2 (31 October 2020).

Payment for design and development of the Gateway will consist of a combination of in-progress payments together with payment at each milestone dependent on achievement against delivery and performance criteria (see Appendix 3). Payment for operation of the Gateway will be based on performance against the specifications of the Service Level Agreement.

Required governance

The technology partner will be required to participate effectively in the governance process for the project, outlined in Appendix 5.

Intellectual Property Rights arrangements

In line with the HDR UK development principles the source code of the Innovation Gateway and any work developed as part of this engagement should be made available as open source under the MIT licence.

The functionality of the Gateway should not be dependent on any pre-existing or licenced intellectual property provided by the supplier, and the supplier should not include any of their existing intellectual property in a way that introduces any limits, restrictions or costs on the ability of HDR UK to perpetually exploit, disseminate, develop or otherwise use the Gateway.

Third party products or licencing which are required for the ongoing function of the platform should be included on a case-by-case basis with the agreement of HDR UK, based on the supplier identifying risks, associated costs and alternative approaches.

4. Process for technology partner selection

Overview of approach

The procurement of the technology partnership will take place through six stages.

- Stage 1: Expressions of interest
- Stage 2: Detailed proposal
- Stage 3: Triage and interview
- Stage 4: Rapid development task (8 week “bake-off” to produce a prescribed, functional element of the Gateway)
- Stage 5: Final selection
- Stage 6: Contracting

Timescale

The timescale for the process is as follows:

16 October 2019	OJEU contract notice posted requesting expressions of interest through Standard Selection Questionnaire
12pm, 8 November	Deadline for questions on expression of interest
12pm, 15 November	Deadline for submission of Standard Selection Questionnaire
22 November	Request for proposal issued
12pm, 6 December	Deadline for questions on request for proposal
12pm, 13 December	Deadline for proposal submission
7 January 2020	Invite to interview (no more than six respondents)
15 January	Interviews
17 January	Shortlisted candidates notified (no more than three)
24 January	Contracts for rapid development task signed
27 January	Rapid development task commences
20 March	Rapid development task completed
27 March	Partner selected
17 April	Contract for Phase 2 support signed
30 April	Development commences

Expressions of Interest

Those interested in applying to undertake this work must complete the Standard Selection Questionnaire, returning this to procurement@hdruk.ac.uk by 12pm on 15 November 2019. The questionnaire template can be accessed on the HDR UK website www.hdruk.ac.uk/gateway-development-phase-2

Questions on the Expressions of Interest process should be sent to procurement@hdruk.ac.uk
 Anonymised questions and answers will be posted on www.hdruk.ac.uk/gateway-development-phase-2
 The deadline for questions is 12pm on 8 November 2019.

Detailed proposal

Those considered a possible suitable match for the partnership through the evaluation of the Standard Selection Questionnaire will be invited to submit a proposal document. The proposal should be submitted

to procurement@hdruk.ac.uk by 12pm on 13 December 2019. The required contents of the proposal, as well as further details on the approach to applying, are given in Appendix 2.

A draft contract for the rapid development task (excluding specification of the task) and specifications for the service level agreement for operating the Gateway will be shared with the suppliers who are invited to submit a proposal. Questions on the proposal process should be sent to procurement@hdruk.ac.uk. Anonymised questions and answers will be posted on www.hdruk.ac.uk/gateway-development-phase-2. The deadline for questions is 12pm on 6 December 2019.

Triage and interview

Following submission of proposals, the applications will be reviewed by a multi-disciplinary panel based on the criteria outlined in Appendix 2 and no more than six applicants will be invited to interview. Interviews will take place in London on 15 January 2020 and will include stakeholders such as members of the HDR UK Public Advisory Board, representatives from the Alliance, and representatives of the industry users.

Rapid development task

Following interviews, a shortlist of no more than three applicants will be invited to take part in a rapid development exercise. This will take place over eight weeks and will involve the shortlisted applicants working independently to build and test a specified functional component of the Gateway. The HDR UK team will work alongside each applicant over this period and the work will be remunerated according to the contract for this task.

During the eight-week rapid development task participants will be provided with a functional overview of the component to be built and access to users and subject matter experts. Participants will be given a full use-case to implement as well as business and technical challenges proposed in two-week sprint meetings.

During this rapid development task, HDR UK will assess

- Technical quality of product produced (including security and robustness)
- Usability of the end product and the user experience
- Ability to meet timescales, problem solve and work in an agile way
- Ability to work with HDR UK and partners (including ability to contract, collaborate and co-develop)

The rapid development task will culminate in a final presentation of the functional component, along with a final interview with an independent panel.

The rapid development task will be confirmed when the short-listed suppliers are notified following the interview

Final selection

Following completion of the rapid development task, HDR UK will select a partner based on the completed component and the experience over the rapid development period.

Contracting

The draft contract for development and operation of the Gateway (milestones 2-5) will be provided to the suppliers who have been invited to take part in the rapid development task shortly after the task commences. Contracting will take immediately following selection of the partner with the objective of having contracts signed by 17 April 2019.

Appendix 1: Technical development requirements and milestones

The specification for this work is to deliver and operate Phase 2 of development of a technology platform, ‘the Gateway’, which will provide the core functions outlined in this Appendix and, where appropriate, will integrate the existing tools developed in Phase 1.

In line with the HDR UK Development Principles set out in Appendix 6, the code for the Gateway should provide an open and extensible fabric for development of community driven tools built upon the underlying code.

The Gateway development will be an agile co-development project between the technology partner, HDR UK, the members of the Health Data Research Alliance and a broad community of stakeholders across academia, NHS and industry. The specification below outlines the initial vision for the capabilities that are expected to be required across six-monthly milestones, however a key responsibility of the technology partner will be to continuously refine these priorities in collaboration with HDR UK and the stakeholder community to respond to user feedback and the changing requirements needed to support world class research and innovation on health data. The technology partner will be expected to actively contribute their own perspective to this co-development and show the capability to deliver effectively while recognising that the initial vision will evolve significantly during the course of the project.

The technology development milestones for the work are as follows:

Phase 1 (already underway and not the subject of this tender)

- Milestone 0: Successful completion of the MVP (10 January 2020)

Phase 2

- Milestone 1a: Complete the rapid development task (20 March 2020)
- Milestone 1b: Contracting complete and commence Gateway development (30 April 2020)
- Milestone 2: Complete Gateway 1.0 (31 October 2020)
- Milestone 3: Complete Gateway 2.0 (30 April 2021)
- Milestone 4: Complete Gateway 2.1 (31 October 2021)
- Milestone 5: Complete Gateway 2.2 (30 April 2022)

The capabilities that are currently envisaged to be delivered at each milestone are as follows:

Milestone (completion date)	Functional Area	Required capability delivered
0/MVP (10 January 2020) <i>Note this is not part of the technology partner</i>	Discovery	Metadata based search with integrated metadata catalogue
	Access Request Management	Simple access request management through email notifications
	Logging	Infrastructure to support logging of all activity in front and back end
	User Management	Basic support for user management including self-registration and user roles to segregate responsibilities

specification but included for context	These capabilities will be delivered through the MVP project and will provide the initial starting position for the technology partnership development.	
1a (27 March 2020)	Rapid Development Task	Delivery of capability specified in the Rapid Development Task. This will be shared with applicants follow the shortlisting process for interview.
1b (30 April 2020)	Process	Signed contract
		Development team in place
2 (31 October 2020)	Discover	MVP of semantic search using secure connections to datasets
		MVP of cohort identification
		Gap analysis support to identify searches that do not yield results to support prioritisation of dataset onboarding and improvement to search functionality
	Dashboard	Visualisation of all user search activity
		User-friendly visualisation and exploration of metadata
		Dashboard showing data usage – focused on public and patient use cases. Includes MVP for tracking outcomes associated with data use (e.g. research publications)
	Access Request Management	Infrastructure to support workflow management and rules-based pre-validation, based on existing Alliance best practice access management processes
		Adapters to support at least 3 data custodians’ access management processes
		Dashboard for users to visualise data pricing, access requests, turnaround times and progress monitoring
	User Management	Integration with the federated identity management from, for example UK Access Management Federation (https://www.jisc.ac.uk/uk-federation) and OpenAthens (https://www.openathens.net/)
		Integration of user collaboration tooling to build communities around the Gateway e.g. Slack, Github
	Data Engineering	Integration of a data quality tool, e.g. Data Cleaner or Talend, to provide analysis and reporting on data quality for users and custodians
		Integration of terminology server, e.g. from NHS Digital Terminology Service
		Coordination with TREs to support for de-identification
	Prototype of a tool to identify linkage opportunities across two or more datasets to support studies that require multi-cohort analysis, longitudinal records and linkage of multi-modal datasets	
Analytics	MVP of Analytics Library to include a curated library of algorithms encapsulated in scripts, software, containers, workflows and notebooks. The service will	

		provide faceted search functionality to all users and allow authorised users to edit their entries in the library
	TRE Integration	Prototype of common interface (API & web portal) to provision underlying multi-cloud infrastructures – virtual machines, compute accelerators, containers, networking, object storage and database services on demand on a federated collection of public, academic/research cloud providers through integration with selected Trusted Research Environment.
		Semi-automated deployment of containerised workloads including de-identification pipeline and adapters to support customised deployment
		Should the supplier choose not to use the metadata catalogue developed as part of the MVP, migrate all metadata already held within the MVP into the phase 2 Gateway.
	Onboarding	Work with existing and legacy systems of Alliance members to arrange for metadata exports into the Gateway for data not already included in the MVP. Self-service support for offline and synchronous metadata onboarding. Adapters available for structured data.
	Operations	Fully operational to SLA operational requirements
		Migration of support for the Innovation Gateway MVP
3 (30 April 2021)	Discover	Production deployment of semantic search (building on MVP in milestone 2) with support for 3 health data custodians
<i>Milestone 3 requirements will be reviewed and refined at the end of Milestone 2 to reflect latest developments and learnings</i>		Production deployment of cohort identification (building on MVP in milestone 2) with support for 3 health data custodians
		MVP for semantic search against multi-modal datasets including imaging, genomic and streaming data
	Access Request Management	Adapters available for all major Alliance data custodians, extending from the 3 developed in in milestone 2
	Dashboard	Visualisation of semantic search and cohort identification into dashboard
		Customised dashboards for key stakeholders, including custodian dashboards tracking dataset quality and access request activity
		Detailed dashboards on access request activity and performance for users, custodians and Gateway operations
		Dashboard showing data usage – focused on public and patient use cases with linkage to outputs (i.e. research outputs)
		Prototype of a secure personalised dashboard showing outcomes associated with use of a patient’s own data
	Data Engineering	MVP of tool to identify linkage opportunities across at least two datasets (building on prototype developed in milestone 2)

	Ecosystem	MVP of API library & SDK to support and encourage development of additional tools using the Gateway, creating an ecosystem of tools and applications.
	Analytics	Production deployment of analytics library including industry standard tools (building on MVP developed in milestone 2)
		MVP of phenotype library to provide a standardised approach to depositing and sharing computable representations of validated phenotype algorithms, used to reproducibly record the observation characteristics that define disease status, onset and progression and phenotypes that can be used to support reproducible discovery and analysis using complex routine health datasets.
	TRE Integration	Integration of analytics library with the workload deployment and MVP of automatic deployment of containerised workloads across up to 3 TRE providers
		MVP of a common interface (API & web portal) to provision underlying multi-cloud infrastructures – virtual machines, compute accelerators, containers, networking, object storage and database services on demand on a federated collection of public, academic/research cloud providers through integration with selected Trusted Research Environment.
	Onboarding	Onboarding pipeline for imaging data including integration of de-identification software
		Self-service support for integrating access to datasets to support semantic search / cohort analysis
4 – 31 October 2021	Discovery	Production deployment of semantic search against complex datasets including imaging, genomic and streaming data, based on MVP developed in milestone 3
<i>Milestone 4 requirements will be reviewed and refined at the end of Milestones 2 and 3 to reflect latest developments and learnings</i>	Analytics	Production development of phenotype library, based on MVP developed in milestone 3
	Ecosystem	Production release of API library to support and encourage development of additional tools using the Gateway, creating an ecosystem of tools and applications. Based on MVP developed in milestone 3
	Dashboard	A secure API provisioning outcomes associated with use of a patient’s own data. Integration of the API with a secure personalised dashboard.
	TRE Integration	Production deployment of a common interface (API & web portal) to provision underlying multi-cloud infrastructures – virtual machines, compute accelerators, containers, networking, object storage and database services on demand on a federated collection of public, academic/research cloud providers through integration with selected Trusted Research Environment.
		Prototype of distributed workload deployment
	Data Engineering	MVP of distributed data platform to support TRE Integration (e.g. Graph based)
		Deployment of linkage and risk stratification tool

5 – 30 April 2022	Data Engineering	Deployment of distributed data platform to support TRE Integration (e.g. graph based)
<i>Milestone 5 requirements will be reviewed and refined at the end of Milestones 2, 3 and 4 to reflect latest developments and learnings</i>	Operation	Full 365 * 24 *7 production operations to support international usage

The quality of user experience is of paramount consideration for this project. All capabilities should be developed using a structured design methodology with continuous user engagement.

Appendix 2: Detailed proposal instructions

If invited following the expression of interest stage, suppliers should submit a proposal to procurement@hdruk.ac.uk by 12pm on 13 December. The proposal should be submitted as a single, bookmarked PDF, responding to the below questions and adhering to the word limits and appendix restrictions given later in this section. The use of images and diagrams as part of the response is permitted.

The proposal should adopt the following structure:

Part 1 – Overview

This section will not be evaluated.

1.1 Lead organisation

Please provide details of the lead organisation for the partnership, and key members of the team.

1.2 Consortium members

If applying as a consortium, please provide details of the other organisations involved in the partnership, and key members from each organisation.

1.3 Public description of partnership and proposed solution

Clearly describe your partnership and your proposed solution. The description should be accessible to the public. Do not include any commercially sensitive information. HDR UK may publish this description, or extracts from it, during or after the selection process.

Part 2 – Eligibility section

Suppliers will need to demonstrate that they fulfil this criterion in order to be considered.

2.1 Alignment with the HDR UK development principles

Your response should describe:

- Evidence of your commitment to the HDR UK development principles, as outlined in Appendix 6
- How you will ensure the principles are embedded through the partnership, including the process for reviewing adherence to these on an ongoing basis

Part 3 – Scored section

Suppliers will be assessed on evidence of their capability on each of the following criteria. Failure to demonstrate evidence of minimum required capability for any criterion will result in exclusion of the supplier. Above the minimum required level, the supplier will be scored against the maximum points available for each capability as shown in the table below, and the scores for all capabilities aggregated to give a global score for each supplier.

3.1 Technical quality

Your response should describe:

- The high-level design for the Gateway, setting out how you will meet the technical requirements in Appendix 1 of the specification: this should include the high-level architecture, key components and technologies
- Which aspects of your solution require new research and development, and which are already developed ('off the shelf'), including any licencing implications which may impact wider use
- Evidence of your ability to carry out the new development required to provide the capabilities outlined in Appendix 1 to a production standard
- How your solution will meet the high reliability and high security requirements of the Gateway and the quality management system you have in place to support this
- The training and materials you will provide to data custodians and HDR UK personnel at each milestone stage.

This answer should be accompanied by a diagram summarising the high-level design of the Gateway.

3.2 Usability of the end product and the user experience

Your response should describe:

- How you will identify users and understand and define user requirements
- How your solution will be designed and developed to meet user requirements
- Track record and expertise of your named team members in delivering equivalent products that provide an excellent user experience. Please provide weblinks links to these products
- How you will demonstrate and evaluate use of the Gateway

This answer should be accompanied by

- Wireframe of the Gateway home screen based on your current understanding of user needs
- Wireframe of the metrics dashboard screen summarising key metrics for the Gateway

3.3 Operation and continuous improvement

Your response should describe

- How you will configure your organisation and support to ensure that the specifications of the Service Level Agreement will be achieved
- How you will capture and act on feedback on the user experience of the operational environment
- How you will ensure continuous improvement of the service

3.4 Patient and Public Involvement and Engagement

Your response should describe:

- The approach you will take to ensure patients and the public are involved in the development and governance of the programme on an ongoing basis, and are suitably assured of the governance process and security
- Evidence of your commitment to patient and public involvement and engagement through previous work. You should outline the lessons you have learned through past experience and how these will influence your approach in this project

3.5 Ability to meet timescales, problem solve, develop in an agile way and work with HDR UK and partners

Your response should describe:

- The leadership team’s expertise and track record in governance, delivery of complex programmes, management systems and achieving commercial outcomes at pace, including, if you are applying as a consortium, your track record in delivery as a consortium
- How your organisation will ensure it has the expertise, resource, agreements and contracts in place to participate in the Rapid Development Task on 27 January 2020 and to commence development of the Gateway on 30 April 2020
- How each of the required technology development milestones will be achieved, supported by a detailed project plan
- How you will evaluate the phase 1 MVP, decide which aspects of this to adopt into your solution and manage the transition from the MVP to the phase 2 Gateway
- Your approach to agile co-development for this programme and how you will establish and manage an effective working partnership with HDR UK and key stakeholders, including the support and capabilities that will be required from HDR UK for the partnership to be successful
- How you will ensure integration and interoperability with other components of the programme, including the Alliance and the Hubs
- A risk register setting out the key risks to meeting the required milestones, how these will be mitigated and who will be responsible for each. Please identify any specific milestones that you believe may be challenging to achieve

This answer should be accompanied by:

- CVs of the individuals who will play the following or equivalent roles in the project team (these will not count towards the word limit for the section). It is expected that these named individuals will play the relevant roles throughout the project from commencement of the Rapid Development Task until and including Milestone 5 unless a handover to another person is unavoidable for good cause or requested by HDR UK, in which cases the replacement individual will be subject to HDR UK agreement.
 - Project Director
 - Technical Director/Lead Architect
 - Operational Director
 - Design Lead
 - Project Manager
 - Public and Patient Lead
- A project plan, such as a Gantt chart
- A risk register with mitigating actions

If you are applying as a consortium of suppliers, your response should include finalised and signed consortium Heads of Terms with the view that this is developed into a Consortium Agreement if your application is successful. This is not legally binding but should be substantially similar to the Consortium Agreement that would be signed if you were selected. The Heads of Terms should adhere to the Principles for Participation (see Appendix 6) and should include:

- Key tasks and responsibilities of consortium members
- Governance arrangements and decision-making
- Project management arrangements
- Finance/resource contributions

- IP management and distribution arrangements, which includes a commitment to open source
- Data management, governance and data sharing agreements
- Termination/Withdrawal

This document should be no longer than six pages and be signed by someone with authority within each organisation to ratify the legal and financial commitment.

3.6 Value for money

Your response should describe:

- What distinctive innovations and services your proposition includes that will help achieve the vision of the Gateway and provide value for money.

This answer should be accompanied by a completed financial template outlining the costs of both the development and operation of the Gateway. The template will be provided when suppliers are invited to submit a proposal. The maximum total budget for this procurement excluding the rapid development task (i.e. design, development and operation of the Gateway to April 2022, Milestones 2-5) is £6.3 million.

Response limits and score weighting

The wording limits and score weighting for each section are provided below:

Section	Sub-Section	Limit	Maximum score
Non-Assessed Section	1.1 Lead organisation	2 pages	N/A
	1.2 Consortium members	1 page per member	N/A
	1.3 Public description of partnership and proposed solution	250 words	N/A
Eligibility Section	2.1 Alignment with HDR UK development principles	600 words	N/A
Scored Section	3.1 Technical quality	1500 words	25 points
	3.2 Usability of the end product and user experience	1500 words	20 points
	3.3 Operation and continuous improvement	800 words	25 points
	3.4 Patient and public involvement and engagement	600 words	15 points
	3.5 Ability to meet timescales, problem solve, develop in an agile way and work with HDR UK and partners	1000 words	25 points
	3.6 Value for money	600 words	25 points
Additional Material	High level design diagram	1 page	N/A (assessed in 3.1)
	Portal Home screen wireframe	1 page	N/A (assessed in 3.2)
	Metrics dashboard wireframe	1 page	N/A (assessed in 3.2)
	CVs of key team members	1 page per CV (Maximum of 6 CVs)	N/A (assessed in 3.5)

	Project Plan (e.g. Gantt chart)	2 pages	N/A (assessed in 3.5)
	Risk Register	2 pages	N/A (assessed in 3.5)
	Heads of Terms (if consortium application)	6 pages	N/A (assessed in 3.5)
	Financial Template	Template provided at Request for Proposals stage	N/A (assessed in 3.6)

Appendix 3: Development requirements and milestone evaluation criteria

The development process should meet key requirements, amongst which will be the following:

- **Methodology:** Agile (Scrum/XP) with iteration length of two weeks
- **User research and engagement:** Design workshops following HDR UK development principles (see Appendix 6), including meaningful patient and public involvement, and continuous user feedback through access to staging environment by key stakeholders with usability testing prior to any major change
- **User stories:** per industry best practice
- **Process metrics:** For example, to include
 - Lead time – total time between user prioritised story entering backlog until release to production environment (two sprints)
 - Code/test coverage – percentage of lines of code covered by unit tests (>80%).
 - Release frequency – number of releases (staging, production) during a sprint (1 into production).
 - Escaped defects – number of severe bugs (severity level 1 or 2) discovered after release <5
- **Release (production) cadence:** Anytime upon product owner/solution architect acceptance
- **Release (staging) cadence:** Anytime upon acceptance test and signed off by Scrum Master
- **Communication tools:** Industry standard as required (e.g. Jira for story management)

Development will be evaluated at each milestone against defined criteria, amongst which will be the following:

- **Capabilities:** Gateway capabilities delivered against requirements (see Appendix 1)
- **Development requirements:** Performance against development requirements (including process metrics) listed above
- **Training:** Provision of required training and online training materials
- **Governance:** Effective participation in governance processes (see Appendix 5)
- **HDR UK development principles:** Adherence to HDR UK development principles (see Appendix 6)

Appendix 4: Gateway operations service level agreement

Operation of the Gateway will be required to meet the targets set out in a service level agreement. Details of the specifications of the service level agreement will be provided to suppliers who are invited to submit a proposal. The following table gives an indication of what the key specifications of the service level agreement may be:

Service Line Agreement	Service Level
Operational hours	24x7x365
Business support hours (service support hours)	9-5 Mon-Fri (excluding Bank Holidays)*
Planned maintenance downtime	Outside of Business Support Hours
Availability (in business support hours)	99.50%*
Unplanned downtime (mins per month)	58 minutes
Times to resolve	
Incident resolution times (in business support hours):	
Sev1 (loss of system or major function affecting multiple users, no workaround)	4 hrs
Sev2 (loss of major function affecting single user, or major function with workaround)	8 hrs
Sev3 (minor functional impact)	24 hrs (Mon - Fri 9-5 ex BH)
Sev4 (no impact on function)	72 hrs (Mon - Fri 9-5 ex BH)
- Resolution may be provision of workaround or fix.	
Problem fix times	
Sev1	30 working days or an agreed release
Sev2	60 working days or an agreed release
Sev3	120 working days or an agreed release
Sev4	240 working days or an agreed release
RTO - Recovery Time Objective	
<i>Maximum expected recovery time following a service outage</i>	24 hours
RPO - Recovery Point Objective.	
<i>Maximum expected data loss for customer</i>	24 hours

* It is envisaged that the SLA will be modified at Milestone 5 to support the anticipated increase in demand for non-UK access. Details will be evaluated with the technology partner based on usage during Milestones 3 and 4.

Appendix 5: Project governance

The objectives of the project governance are to provide

- Oversight and confidence in progress by the technology partner to HDR UK and key external stakeholders
- Proactive identification of issues, risks, decisions to be made and actions to be taken in order to ensure the success of the project
- Rapid and appropriate decision-making to help drive the project
- Clarity of roles and responsibilities of the technology partner and HDR UK
- Accountability by the technology partner and HDR UK for delivering on their responsibilities

Governance of the project will operate on the following lines

- Oversight of the project will be provided by a joint steering committee consisting of senior members of HDR UK team and external stakeholders (including NHSX and other Alliance members) which will meet monthly
- A smaller Project Board will provide more frequent review and decision-making through fortnightly sprint review meetings and monthly presentations
- The HDR UK Technology Partnership Director will be responsible for contract management and operational delivery
- The HDR UK Chief Technology Officer will be the Design Authority with day-to-day sign-off responsibility
- The ISCF Programme Board is a key external stakeholder group with ultimate sign-off on the programme, and the Technology Partner may be required to report to this board periodically

Appendix 6: HDR UK development principles

- **Patients, the NHS and public centred** – The infrastructure development will be focused on delivering benefits to patients, the NHS and the wider public, and building confidence and trust in how data is accessed and used in research and innovation. All development will actively engage patients, the NHS and the public throughout.
- **User-design led** – The experience for our user community is paramount. All development will follow best design practices, actively engage the user communities throughout and be developed in the open to enable continuous user feedback. Design will be delivered as “Design as Code” to demonstrate working capability.
- **Agile development** – Adopt agile development processes and tools to allow us to deliver exemplars quickly and then build on that experience. At each stage test our approach based on how well it supports our research and innovation user community.
- **Open first** – Support open standards throughout our delivery. Use open source where possible and share HDR UK developed technology assets openly under the MIT licence using the HDR UK GitHub repository.
- **Modular and extensible** – Requirements and tools will evolve. All capability will be integrated through open and documented APIs.
- **Cloud first** - Deploy to Public Cloud by default falling back to on-premise private cloud only where compute or storage makes this significantly more cost effective.
- **Reuse** – Work with open source and our academic and commercial partners to enable reuse whenever possible. New development should be the exception not the default.
- **Build in the ‘ities’ from Day One** – architect for interoperability, scalability, reliability, availability and security throughout the development. This is a production environment and not a research project.

Principles for Participation

As development of the Innovation Gateway forms part of the Digital Innovation Hubs programme, all suppliers will be required to sign up to the [Programme Principles of Participation](#)