COMMIT2DATA Call for Proposals

BIG DATA & HEALTH

*Early detection and prevention of cardiovascular disease*

*July 2018*

The Hague, July 2018
Netherlands Organization for Scientific Research
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# 1 Introduction

## 1.1 Background

NWO, ZonMw, the Netherlands Heart Foundation, the top sectors of Life Sciences & Health (LSH), ICT and Creative Industries, and the Ministry of Health, Welfare and Sport (VWS) and the Netherlands eScience Center have jointly taken the initiative to develop a public-private research programme in the field of big data and health. The programme is to promote collaboration amongst relevant scientific disciplines and with the business community, in consultation with citizens, patients and (care) professionals.

The parameters for the research programme are provided by the Knowledge and Innovation Agendas of the top sectors of ICT, Creative Industries and LSH. The programme is being rolled out under the umbrella of the national big data research platform COMMIT2DATA.

## 1.2 Available budget

A grant in excess of M€ 6.58 is available for operating the research programme: NWO M€ 1.41, ZonMW M€ 0.94, Topsector LSH M€ 2.35, Hartstichting M€ 0.94, and VWS M€ 0.94. In addition, personnel capacity will be made available, totalling at least 12 FTEs\(^2\) (working years) and comprising eScience Research Engineers working at the Netherlands eScience Center (value: M€ 1 to M€ 1.5).

In principle, grants can be awarded only in respect of applications that receive a final appraisal of 'Excellent' or 'Very good'. However, applications that receive a final appraisal of 'Good' may qualify in exceptional circumstances. Grants cannot be awarded in respect of applications considered to be of inadequate quality, even if budgetary scope exists.

## 1.3 Closing date

This call for proposals defines the procedure for the appraisal of grant applications submitted on or before the closing date of 8 January 2019, 14:00 CEST. The closing date for preregistration (obligatory) is 1 October 2018, 14.00 CE(S)T.

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\(^1\)https://www.dutchdigitaldelta.nl/big-data/over-commit2data

\(^2\) FTE = Full Time Equivalent; 1.0 FTE implies 1680 person-hours available for implementation of the project.
2 Purpose

2.1 Purpose of the programme

The focus of the Big Data & Health Research Programme is the use of big data for the early detection and prevention of cardiovascular disease, within the parameters of the Knowledge and Innovation Agendas (K&I Agendas) for ICT\(^3\), Creative Industries\(^4\) and LSH\(^5\). The research programme will support the ambitions of the Netherlands Heart Foundation, the Ministry of VWS and the Netherlands eScience Center, as well as those of Commit2Data for the top sectors of ICT, LSH and Creative Industries, as set out in those sectors’ 2018-19 Knowledge and Innovation Contracts with NWO\(^6\).

Challenges in the health domain are often complex, because the new solutions required to address them depend on commitment from inside and outside the health sector and impact on working methods throughout the health care chain. A cooperative approach is needed, involving various research disciplines, businesses, citizens, patients and (care) professionals. In the context of the new programme, such cooperation will be promoted by focusing on a single unifying theme: the early detection and prevention of cardiovascular disease. Cardiovascular disease is very common and large volumes of data about such disease are available. The intention is that the programme should yield new insights into methods and technologies that are transferrable to the detection and prevention of other conditions.

The aims of the research programme are as follows:

a) To contribute to the early detection and prevention of cardiovascular disease through scientific research in the fields of data science and health, medical and creative industries research, within the parameters of the K&I Agendas for ICT, LSH and ClickNL of the top sectors of ICT, LSH and Creative Industries.

b) To promote interdisciplinary and public-private cooperation involving research disciplines, businesses and citizens/patients/(care) professionals with good prospects for innovation and progress on challenging research questions.

c) To reinforce demand-led research and innovation, as well as valorization geared to strategic opportunities for economic growth and the development of responses to social challenges.

d) To realize reusable and sustainable scientific and technological solutions that will remain in use after the research programme has ended.

See subsections 2.2.1 and 2.2.2 for definitions of ‘big data’ and ‘the early detection and prevention of cardiovascular disease’.

The intention is that roughly five complementary, multidisciplinary, public-private research projects will be undertaken, which together form a coherent whole and all benefit from the input of eScience Research Engineers (see subsection 3.2.2). The projects should be based upon the principles of vital functioning and positive health\(^7\). The programme will adhere to the FAIR\(^8\) and FACT\(^9\) principles, in particular the security of the data and their use. With a view to ensuring that the research projects have the desired multidisciplinary character, researchers from the following disciplines will be involved (see subsection 6.1):

- Data Science: the study of generic means of obtaining surprising and reliable insights from data and effectively communicating such insights from and to users and the people around them.
- Life and Health Sciences
- Creative Industries Research – data-driven design

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\(^3\)https://www.dutchdigitaldelta.nl/actieplan
\(^4\)https://www.clicknl.nl/
\(^7\)www.ipositivehealth.com
\(^8\)https://www.dtls.nl/fair-data/fair-data/
\(^9\)http://www.responsibledatascience.org/
• Social Sciences (ethical and legal issues)

2.2 Content parameters

2.2.1 Big data

Improving health and making health care cost-effective are key challenges for the nation. The ability to make optimal use of big data can be very useful in relation to the way we manage our health and organize health care. Data regarding the health of individuals has unprecedented potential for new scientific research and therefore new solutions. The surfeit of data now available also makes new demands of scientific researchers, requiring them to review their research objectives, methods and techniques. Working with big data necessitates the use of alternative methods and technologies for analysis, such as data mining and machine learning, and for storage. Furthermore, the way that data are gathered, shared, processed and linked raises new issues in the fields of privacy, ethics and liability. At the same time, the significance and role of, for example, FAIR and FACT principles (see subsection 6.1) are now becoming clear, and we are witnessing the development of solutions such as the Personal Health Train and MedMI. In this light, it it important to connect to existing infrastructures, such as HealthRI, a recent initiative to set up a national infrastructure for health research.

At the interfaces between the relevant top sectors (LSH, ICT and Creative Industries), one finds issues relating to matters such as behaviour influencing, system change and social impact, as well as issues that prompt resistance to change. Digitization and in particular the background collection of users' data trails are creating increasing scope for the personalization of products and services.

Definition of big data

'Big data' is a broad term applied to data collections that are so large and/or complex that traditional analysis techniques and infrastructures are inadequate for viable consultation or utilization of the data. The 5V model of big data identifies volume, velocity, variety, veracity and value as the key characteristics of big data. Big data may consist of heterogenic datasets of any size, including unstructured data. The analysis of big data is closely linked to artificial intelligence (e.g. machine learning and deep learning) and therefore implies a revolution with potentially significant consequences for the health domain.

Big Data in the Health Domain

• Using big data to promote health practically means using different types of data from various sources to enable new scientific developments and discoveries that will lead to better lifestyle advice, prevention, diagnostics, and treatment tailored to the individual, and to provide personalized, effective, real-time feedback. The possibilities for large-scale data collection of very diverse types of health-related data have significantly increased and several big data-related questions have become urgent in the health domain. Some examples of big data issues to be addressed:
  • Safety and reliability of data-collection systems should be secured.
  • New types of information, such as data relating to behaviour, lifestyle, health, and environmental factors are collected from everyday life through the Internet, mobile phones,
and from sports watches, activity trackers, and heart rate monitors. These new data sources are currently not standardized, nor collected systematically, requiring innovations in data analysis methods, to enable interpretation.

- Better and new artificial intelligence technology and self-learning systems are needed to enable the automatic interpretation of large amounts of data for personalized health and of real-time decision support systems.
- Big data-technology combined with behavioural models may stimulate the design of new interventions such as individually adapting coaching systems that can support people in a motivating way on their path towards self-management/shared management and healthy behaviour.

**Data sources in the Health Domain**

Scientific and medical instruments that generate data, such as sequencing and high-throughput and imaging techniques, are being used on a growing scale. Genetic data have undergone a revolution as demonstrated by the DNA Data Deluge.\(^\text{16}\) With next generation sequencing technology it has become possible to sequence the complete genome of a person in a short space of time and at low cost. This will contribute significantly to the development of a personalized provision of health care. Electronic Health Records and Medical files are another source of data. These are now largely digitized, but are also predominantly confidential and protected and must be handled with care. There will be an exponential growth of (and better understanding of) phenomes from Electronic Health Records. One of the most important areas for data harvesting is General Practitioner data, which although unstructured, is personalised for each person and geographical area and will be invaluable to stratify and personalise medical interventions. A large number of these sources are text. This means that advanced text analysis techniques such as text mining are necessary to unlock the information stored in these sources.

Biobanks also contain large amounts of valuable data in the form of blood, urine, and tissue samples. Furthermore, there are large epidemiological databases that contain other types of information about the participants and their lives and patient registries also contain a great deal of relevant data.

eHealth data are also relevant to this call. EHealth is the use of digital information and communication technologies to support or improve health and healthcare. EHealth data are data from medical files, the personal health environment, social media, and networks, including sensor data about the emotional and physical condition of an individual and his/her environment. Sensor data can be made available to the individual or their health care provider via a mobile phone or another electronic device and generated feedback may be used for medical and behavioural interventions and for self-management/shared management (patient compliance, requesting help on time in case of psychological stress, increased exercise, better eating habits, sleep, etc.).

When combining these data sources, legal standards and ethical considerations that could have significant impact on the implementation of studies must be taken into account. Health care data is currently fragmented and most data is not stored according to FAIR principles hampering combining (different) data sets. Projects in this programme will contribute to the realisation of a sustainable dataset with longitudinal collected data concerning lifestyle and health and heart data. This data should be supplemented frequently and will be made available for research, personalised care and innovation in healthcare. When needed, the Netherlands Heart Foundation can support projects in their ambition to collect data about cardiovascular diseases or to organise the data. Besides exploring existing data sets, researchers are encouraged to generate new data and add these data to already existing data sets. More information about the cardiovascular diseases and the position of the Netherlands Heart Foundation can be found in subsection 6.2.

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\(^{16}\)http://spectrum.ieee.org/biomedical/devices/the-dna-data-deluge
2.2.2 Early detection and prevention of cardiovascular disease

Cardiovascular disease is one of the most common and incapacitating medical conditions in the Netherlands. Roughly 1.4 million people in the Netherlands suffer from cardiovascular disease. By 2030, that number is forecast to reach 1.9 million\(^{17}\). That implies that one in seven adults will have a cardiovascular illness. Nationally, more than a hundred people a day still die from the consequences of cardiovascular disease. The manifestation of cardiovascular disease -- a sudden heart attack or the development of dangerous arrhythmia -- frequently comes as a shock. Nevertheless, with hindsight, it is often possible to see that there were warning signs. New research is needed to provide a better understanding of the (vague) symptoms and early signals associated with common forms of cardiovascular disease.

The new research programme is to be aligned with the recently formed Dutch Cardiovascular Alliance (DCVA), through which various organizations have joined forces to promote the early detection and treatment of cardiovascular disease. The DCVA addresses shared challenges in fields such as infrastructure, valorization, implementation and talent development.

Central to the research programme will be the early detection and prevention of common cardiovascular illnesses:

- Earlier detection of important risk factors for cardiovascular disease
- Identification of new risk factors for cardiovascular disease
- Prevention of cardiovascular disease (addressing risk factors)
- Enabling the identification and investigation of prodromal signs of cardiovascular disease in patients and the general public
- Enabling people to ascertain the prevalence of common life-threatening cardiovascular illnesses within their families.

There is also a need for greater clarity regarding aspects such as early-phase differences between ethnic groups and/or between men and women.

The intention is that the wealth of lifestyle data on topics such as dietary patterns, health and medical status collected over extended periods of time should be utilized for research directed towards the large-scale early detection of risk factors and cardiovascular illnesses and the more effective (preventive) treatment of such illnesses, with a view to curbing the major growth in the associated disease burden. However, it should be noted that projects concerned exclusively with the refinement of existing risk prediction models utilizing existing data sources cannot be supported through the research programme. With a view to maximizing the number of cardiovascular patients who benefit from research associated with the programme, the focus is to be on common cardiovascular conditions, such as myocardial infarction, acute stroke, heart failure and atrial fibrillation. Applications relating to projects that address less common forms of cardiovascular disease will be considered if designed to lead to methodologies and approaches that are more broadly applicable.

\(^{17}\)https://www.vtv2018.nl/
3 Guidelines for applicants

3.1 Who may apply

An applicant must hold a Master’s degree or equivalent qualification and must participate in the project. A main applicant, and a co-applicant who is not actually involved in the research, must have a doctorate from or be a professor at a Dutch university, and must have a permanent employment contract with or hold a Tenure Track appointment. If the applicant is not employed by a Dutch university, (s)he must demonstrate sufficient experience in the relevant field of Research and in overseeing scientific Research\(^{18}\).

An application must be submitted on behalf of a consortium by a principal applicant. The principal applicant holds a permanent salaried post or a fixed-term salaried post at an NWO-accredited research institute at least for the duration of the application process and the project realization. The principal applicant will have ultimate responsibility for the project.

An application may have multiple co-applicants from research organizations seeking grants: NWO-accredited research institutes, TO2 establishments. Care (R&D) institutes based in the Netherlands may, under specific conditions, request funding and participate as cofinancer (see subsection 3.2.1). See subsection 6.3 for the definition of TO2 and Care (R&D) establishments.

A consortium must consist of:

1) At least three research groups, at least two of which are within an NWO-accredited research organization or organizations\(^{19}\)
2) At least one enterprise
3) Two to three eScience Research Engineer FTEs

Provision will also be made for the participation of end users. End users are citizens, patients and/or (care) professionals.

NWO-accredited research organisations:

- Dutch universities;
- University medical centres;
- NWO and KNAW institutes;
- the Netherlands Cancer Institute;
- the Max Planck Institute for Psycholinguistics in Nijmegen;
- researchers from the DUBBLE Beamline at the ESRF in Grenoble;
- NCB Naturalis;
- Advanced Research Centre for NanoLithography (ARCNL);
- Princess Máxima Center.

Research institutions that are ineligible for a grant may, however, participate in a consortium and thus contribute to knowledge development within a project. Financial contributions are also permitted (and, indeed, encouraged), but such a contribution does not count as co-funding (see subsection 3.5.2) and should not be included in the project budget submitted with the grant application.

Enterprises (see subsection 6.3 for definition) are not eligible to receive grants, but contribute to the research \textit{in cash} and/or \textit{in kind}. Non-Dutch research organizations and enterprises are allowed to


\(^{19}\) See the NWO Grant Rules [http://www.nwo.nl/subsidieregeling](http://www.nwo.nl/subsidieregeling)
participate in consortia, providing that the results of the research project are of benefit to the Dutch knowledge infrastructure and economy.

## 3.2 What may be applied for?

The overall requested budget for a research project can be, depending on the type of research (see subsection 3.5.2), between M€ 1 (50% co-funding) up to a maximum of M€ 2,25 (25% co-funding) and between 2.0 and 3.0 FTE eScience Research Engineer capacity. See subsection 3.5.2 for details about the cofunding and specific conditions for the project budget. At least half of the cash resources available to each project is intended for the appointment of temporary scientific personnel to an NWO-accredited research organization (see subsection 3.2.1.1a).

The overall budget for a research project is to be at least € 2 million, but no more than € 3 million, comprising:

1. The cash grant applied for
2. Private co-funding in cash and in kind
3. Contributions in kind from participating research organizations

The eScience Research Engineer capacity sought (between 2.0 and 3.0 FTEs) is additional.

### 3.2.1 Subsidy

The following forms of expenditure qualify for grant funding:

1a) PhD/PDEng/MD PhD
For each PhD, the guideline is that 1 fte PhD for 48 months or 0.8 fte for 60 months can be applied for. If a different duration of appointment is desired for the realisation of the proposed research, then the guidelines may be deviated from as long as this is well justified (e.g. PDEng 2 years or MD PhD longer than 4 years).

The salary costs will be remunerated according to the agreements in the ‘Agreement for Funding Scientific Research’ made with the Association of Universities in the Netherlands and are based on the collective labour agreement of the Dutch universities (for ZonMw, the costs are based on the collective labour agreement of the Netherlands Federation of University Medical Centres).

In addition to salary costs, the project employee funded by NWO will receive a one-off individual bench fee (€ 5000) to encourage his or her scientific career. The agreement and the maximum amounts for personnel costs can be found at [https://www.nwo.nl/approval-of-funding-for-scientific-research-2008](https://www.nwo.nl/approval-of-funding-for-scientific-research-2008) and [https://www.nwo.nl/salarytables](https://www.nwo.nl/salarytables).

1b) Postdoc
The guideline is that the appointment period of a postdoc can be between 12 and 48 months. The minimum size of the appointment is 0.5 fte for 12 months. This deployment can be spread over a longer or shorter period, for example across the entire duration of the project.

If the applicants wish to deploy expertise for a shorter period of time, then the material credit can be used for this.

The salary costs will be remunerated according to the ‘Agreement for Funding Scientific Research’ made with the Association of Universities in the Netherlands (for ZonMw, the costs are based on the collective labour agreement of the Netherlands Federation of University Medical Centres).

In addition to salary costs, the project employee funded by NWO will receive a one-off individual bench fee (€ 5000) to encourage his or her scientific career. The agreement and the maximum amounts for personnel costs can be found at [https://www.nwo.nl/approval-of-funding-for-scientific-research-2008](https://www.nwo.nl/approval-of-funding-for-scientific-research-2008) and [https://www.nwo.nl/salarytables](https://www.nwo.nl/salarytables).

1c) Non-scientific personnel
For the appointment of non-scientific personnel, specifically needed for the research project which funding is applied for, a maximum of € 100,000 can be requested with this module. This can concern
personnel such as student assistants, programmers, technical assistants, analysts, et cetera. This module can only be applied for in combination with modules 1a and/or 1b. The minimum size of the appointment is 0.5 fte for 12 months. The minimum appointment can be spread over a longer period of time. If the applicants wish to deploy expertise for a shorter period of time, then the material credit can be used for this.

Salary costs are dependent on the level and are remunerated in accordance with the agreements in the most recent ‘Agreement for Funding Scientific Research’ made with the Association of Universities in the Netherlands and are based on the collective labour agreement of the Dutch universities. The agreement and the maximum amounts for personnel costs can be found at https://www.nwo.nl/approval-of-funding-for-scientific-research-2008 and https://www.nwo.nl/salarytables.

1d TO2 and care (R&D) co-applicants
Since 1 January 2018, the appointment of staff at these knowledge centres has been subject to the system set out in the Handleiding Overheidstarieven (‘Government Tariff Guide’, HOT for short), specifically the tariffs in the column ‘Hourly cost-covering tariff’ of table 2.2 (Total wage costs). The cost-covering tariff comprises the gross salary, including anticipated pay rises, holiday allowance, year-end bonus, social security and pension costs, plus an overheads allowance. The highest scale that can be used in the context of an application is scale 16. For this call, the tariffs stated in the Handleiding Overheidstarieven 2017 (‘Government Tariff Guide 2017’, or ‘HOT 2017’) apply20.

Module 1d is not applicable to co-applicants working for NWO-accredited research organizations.

NB: When stating the wage costs for TNO and Care (R&D) co-applicants, account must be taken of the maximum permitted hourly tariffs based on the standard methods that apply in the context of the PPS allowance scheme21. In some cases, the HOT tariffs will exceed the maximum permitted in the PPS allowance scheme. In such cases, the maximum permitted hourly tariffs calculated using one of the three standard methods referred to in chapter 4, articles 11 to 14, of the National Economic Affairs Grant Framework Decree apply. The National Economic Affairs Grant Framework Decree recognizes the following three standard methods:

- The total cost system;
- The wage cost plus fixed allowance system;
- The fixed hourly tariff system.

For this call, we are focusing on the following standard method:

The wage cost plus fixed allowance system
Fundable expenditure should be stated by multiplying the direct wage costs per hour by the number of working hours directly attributable to the project, and then applying a fixed allowance of 50 per cent.

What are direct wage costs?
- Gross pay, as stated in the salary table accompanying the CLA (scale/step) or the individual employment contract
- Holiday allowance
- Year-end bonus/13th month’s salary (insofar as not profit-linked)
- Employer’s contributions:
  - Employer’s pension contributions
  - Statutory unemployment insurance contributions
  - Statutory disability insurance contributions
  - Statutory health insurance contributions
  - Other employer’s unemployment and health insurance contributions

21 Op de PPS-toeslagregeling is de Regeling nationale EZ-subsidies (Hoofdstuk 3, Titel 3.2, PPS-toeslag onderzoek en innovatie) en het Kaderbesluit nationale EZ-subsidies van toepassing.
The remaining wage costs, which cannot be covered by the standard method, should be met by the applicant institution itself.

Care (R&D) establishments are entitled to receive grants for undertaking scientific research in accordance with the guidance in this module, subject to a limit of 50 per cent of their co-funding contributions in cash and in kind (for information about co-funding, see subsection 3.5.2).

Where students are concerned, only the actual amounts paid to the students may be included in the stated project costs. A maximum hourly tariff of €25 always applies.

1e) patient and/or citizen participation
For the funding of patient and/or citizen participation, the fixed-hourly-rate system should be used. Fundable expenditure should be stated by multiplying the number of input hours directly attributable to the project by a fixed hourly rate not exceeding €60. Article 14 of the Framework Decree on National Grants by the Ministry of Economic Affairs\(^2\) applies to the system.

1f) Other scientific personnel
Budget for other scientific personnel such as university graduates, graduate physicians and graduate physicians training to be specialists that are needed for the research project that funding is requested for. This module can only be applied for in combination with module 1a and/or 1b. The maximum period of appointment is 48 months for 1fte and 60 months for a part-time appointment. The minimum size of the appointment is 0.5 fte for 12 months. This deployment can be spread over a longer or shorter period, for example across the entire duration of the project.

2) Material credit
A maximum of €15,000 per year per full-time scientific position (modules 1a and 1b) can be applied for, specified according to the three categories stated below:

- Project-related goods/services:
  - consumables (glassware, chemicals, cryogenic fluids, etc.);
  - equipment and/or software (e.g. lasers, specialist computers or computer programs, etc.);
  - measurement and calculation time (e.g. supercomputer access, etc.);
  - costs for acquiring or using data collections (e.g. from Statistics Netherlands);
  - access to large national and international facilities (e.g. cleanrooms, synchrotrons, datasets, etc.);
  - work by third parties (e.g. laboratory analyses, data collection, etc.);
  - personnel costs smaller in size than those offered in module 1.

Travel and accommodation costs (for the employees for which a personnel grant was requested in module 1)
- travel and accommodation costs (national and international);
- congress visits (max. 2 per year);
- fieldwork;
- work visits.

Implementation costs
- national symposium/conference/workshop organised by the project;
- costs of open access publishing;
- data management costs;
- recruitment costs (incl. advertisement costs);

\(^{22}\) http://wetten.overheid.nl/BWBR0024796/2018-01-01
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— costs involved in applying for licences (e.g. for animal experiments).

Costs that cannot be applied for are:
— basic facilities within the institution (e.g. laptops, desks, et cetera);
— maintenance and insurance costs.

If the maximum amount is not sufficient for realising the research, then it may be deviated from if a clear justification is provided in the proposal. The only exception to this is the amount for small equipment.

3. Knowledge utilization
The aim of this module is to facilitate the use of the knowledge that emerges from the research. The contribution requested may be no more than € 25,000 and must be specified. As knowledge utilisation can assume very different forms in the various scientific disciplines, it is up to the applicant to specify which costs are needed, for example for producing an educational package or realising a feasibility study into application possibilities, or the costs of submitting a patent application. For further information about knowledge utilisation, please see https://www.nwo.nl/en/policies/knowledge-utilisation

4. Internationalisation Money follows Cooperation (MfC)

The aim of this module is to encourage international collaboration via the principle of Money follows Cooperation, for which the national research budget is used for cross-border collaboration that offers the possibility to create added value for individual research projects by deploying expertise from abroad which is not available in the Netherlands at the desired level for the project. This concerns expertise from organisations outside of the Netherlands that have a public task and carry out research independently. In the proposal, the applicant must convincingly demonstrate that the expertise concerned is not available in the Netherlands. This will be assessed in the selection process. If the arguments are not sufficiently convincing, then the funds for this module cannot be made available. Furthermore, the applicant needs to state the amount to be deployed for this module in the budget. In principle, there is no limit to the amount that can be requested.

The size of the grant ultimately awarded must be consistent with the Ministry of Education, Culture and Science’s audit protocol, the guidelines on the auditing of NWO projects formulated with the universities.

3.2.2. EScience Research Engineers
The domain of eScience (also known as digitally enhanced science) is closely related to Data Science. eScience aims to bridge the gap between data-intensive and computationally demanding scientific issues and the capabilities of advanced ICT methods, data analysing techniques and hardware systems (supercomputers, bulk data storage systems, light paths) et cetera. As well as pursuing scientific breakthroughs, eScience seeks to develop methods and software tools that are reusable for tackling other problems, and even in other research domains. Consequently, through the involvement of the Netherlands eScience Center\(^\text{23}\), eScience is closely associated with the current Call for Proposals.

eScience Research Engineers are scientists working for the Netherlands eScience Center at the interface between various scientific disciplines and advanced ICT. They are to play an integral role in each project’s research team, focusing on the development and implementation of eScience technologies and software. Their first function will be to ensure that the research team is able to make convenient and effective use of the appropriate ICT. They are able to help with interpretation of the research results and ensure that the eScience tools delivered are suitable for a wide group of

\(^{23}\) https://www.esciencecenter.nl/expertise
users. Where possible, they will contribute to the research team's publications as co-authors. The eScience Research Engineers will carry out their project work both at the eScience Center in Amsterdam and at the project locations (usually the institute of the principal applicant). That will enable them to deliver input directly to the project team while also retaining direct access to the expertise of the eScience Center and its wider networks.

It is assumed that each of the research projects to be funded through this programme will involve the input of one or more eScience Research Engineers working at the Netherlands eScience Center (the capacity deployment being 2.0 to 3.0 FTEs\textsuperscript{24}). Departure from that general principle will be possible only in exceptional cases, where the expertise of the Netherlands eScience Center is outside the scope of the project. The case for any such departure must be convincingly made in the project proposal.

Each project proposal should provide for the involvement of eScience Research Engineers (see below) attached to the eScience Center. The proposed input should amount to at least 2.0 FTE\textsuperscript{25} and no more than 3.0 FTEs. The involvement of eScience Research Engineers is mandatory unless it can be adequately demonstrated that such involvement would (or could) have no added value for the project. The eScience Center is responsible for the budget for the input of its Research Engineers. Part of the budget is explicitly intended for generalization of the research software developed, and – if possible – its addition to the Research Software Directory\textsuperscript{26} (RSD). An application for input exceeding the minimum of 2.0 FTEs must be adequately justified and should demonstrate that the additional in-kind budget requested is closely aligned with the specific role and scope of the eScience Center. A project with a clear e-Infrastructure\textsuperscript{27} requirement may also be eligible for support from SURFsara and SURFnet.

3.3 When may applications be made?

The closing date for preregistration (obligatory) is 1 October 2018 at 14:00 CE(S)T and the closing date for submission of full applications is 8 January 2019, at 14:00 CE(S)T.

3.4 Composing an application

Preregistration involves summarizing the issues to be addressed by the project, the approach, the consortium membership and the budget for the grant application under development.

The application proper has three elements: 1) a fact sheet, 2) the application form and 3) co-funding statements (see subsection 6.4 and 6.5). The fact sheet can be completed directly in ISAAC. When completing the on-line fact sheet in ISAAC, only ASCII characters (‘plain text’) should be used. Hence, the fact sheet cannot contain (structure) formulae, illustrations, font styles, etc. Such features may, of course, be included in the application proper.

The application form can be downloaded from the ISAAC on-line application system or from the NWO website (www.nwo.nl/kiaict).
- Complete the application form.

\textsuperscript{25} FTE = Full Time Equivalent; 1.0 FTE implies 1680 person-hours available for implementation of the project.

\textsuperscript{24}https://www.research-software.nl/

\textsuperscript{27}https://www.surf.nl/over-surf/werkmaatschappijen/surfsara
• Save the form in PDF format and upload it to ISAAC.
• The application should be written in English.
• Upload a copy of the letter from the principal applicant (with the co-funding statements of the enterprises appended to it) to ISAAC, again in PDF format (see subsection 6.4 and 6.5). The letter and the appendix should follow the corresponding templates.

See subsection 6.5 for the co-funding statement template. In the co-funding statement to the NWO, a consortium member undertakes to make the stated contribution to the project in kind and/or in cash if the application is successful. The co-funding statement is unconditional and contains no release clauses, except insofar as the co-funding commitment is dependent upon the application being successful. The letter and co-funding statement templates can also be downloaded via the funding instrument page of this research program.

The application must not be accompanied by additional information in the form of appendices (e.g. additional results, manuscripts, supporting letters, etc).

In accordance with the agreement between NWO and the VSNU, an applicant must inform his/her research organization about the application. The applicant is to send a copy of the application to the scientific director or dean of the research organization or faculty. NWO assumes that every applicant has informed his/her research organization and that the research organization in question accepts the programmes grant conditions.

### 3.5 Conditions on granting

#### 3.5.1 Consortium and projects

A project must be concerned with the (future) use of big data (see definition in subsection 2.1.1) for the early detection and prevention of cardiovascular disease (see subsection 2.1.2) and must involve at least three of the following research disciplines (see subsection 6.1)

- Data Science → research consistent with the ICT K&I Agenda
- Life and Health Sciences: → research consistent with the LSH K&I Agenda
- Creative Industries Research → research consistent with the Creative Industry K&I Agenda
- Social sciences and humanities (ethics and law)

All projects must satisfy the following conditions:

- The duration of the project must not exceed five years.
- The project must start no more than nine months after the grant award, if made.
- The full application must be accompanied by a co-funding statement from each member of the consortium setting out the contributions to be made in cash and in kind by that party (see subsections 6.4 and 6.5). It is important that, in the statement, the relevant party explicitly states the size of the contribution to be made.
- The project must not start until a consortium agreement has been signed. Approval of the consortium agreement by NWO is necessary. Template consortium agreements are available on request and must be used.
- The co-funder(s) will receive invoices from NWO for their cash contribution(s). Subject to consultation between NWO and co-funders, cash contributions may be invoiced in tranches.
- With the exception of the contribution to be made by the Netherlands eScience Center, contributions in cash and in kind that are included in the project budget must correspond to the co-funding statements in which the enterprise(s) undertake to NWO that the contributions will be made. See subsections 6.4 and 6.5 for the co-funding statements and the subsection 3.5.2 for the conditions that contributions in kind and in cash must satisfy.
- Enterprises and research organizations must contribute to the project costs partly in kind; see subsection 3.5.2.
- Contributions in kind are essential to the project and must be included in the research budget associated with the grant application for the project.
Each project in this program must contain work units, which describe fundamental or industrial research (see subsection 6.3 for PPS definitions). The balance between fundamental and industrial research should be stated and justified in the application. Projects consisting entirely of either fundamental or industrial research are permissible.

The project must involve genuine collaboration amongst consortium members. That implies, for example, the project being undertaken at joint expense and risk and every consortium member making a contribution to the project. See subsection 6.3 for definitions on Public-Private partnerships.

**End user participation**

For projects funded through the programme, the input of patients, citizens and (care) professionals is vital, because such groups constitute the end users of the project results. End users possess unique knowledge and experience, which can be utilized to guide the project, thus enhancing the quality of the research and the utility of the results. The digitization, collection and generation of data by patients and citizens raises numerous issues and sometimes resistance. Hence, project developers should not assume that any given form of end user participation is possible. Participation must be ethically and legally acceptable and desirable. Furthermore, society must be ready to embrace the technology. The involvement of citizens, patients and/or (care) professionals is a requirement for all research projects, and the views of the end users in question will be considered during appraisal of the applications, see Chapter 4. Research proposals must describe the role that end users have played at each stage in the formulation of the application and the role that they will play at each stage in the project’s implementation. The Heart Council promotes the participation of end users in scientific research into cardiovascular illnesses. For information and guidance, see www.hareraad.nl/cve. ZonMw also encourages the participation of end users. Involving end users increases the probability of the research being in step with the needs of everyday practice and of the project results being utilized quickly and successfully. For more information and guidance on end user participation, see the ZonMw website: https://www.zonmw.nl/nl/over-zonmw/participatie/

### 3.5.2 Co-funding

**3.5.2.1 General co-funding provisions**

Participation of enterprises and research organizations in research projects funded through the programme is possible by contributing **in cash** and/or **in kind**. Such participation is subject to the following conditions:

- Contributions and input made **in kind** must be essential to the project and must be included in the research budget submitted with the grant application for the project in question and approved by NWO.
- If an enterprise intends to participate in a research project by contributing partly **in kind**, as described above, the enterprise must make an undertaking to NWO that both the contribution **in kind** and the cash contribution will indeed be made. The relevant undertaking is to be made in a consortium agreement. The enterprise will then be invoiced for the cash contribution by NWO.

**3.5.2.2 General provisions regarding contributions **in kind****

The following expenses incurred by an enterprise or a research organization may be treated by the consortium partners as contributions **in kind** insofar as they are directly attributable to the research project in question:

- Wage costs, subject to the understanding that such costs are to be based on an hourly rate of pay, calculated from the annual pay for full-time working stated in the ‘Pay before tax’ column of the payroll, plus any additional statutory or contractual pre-deduction entitlements, and assuming 1650 productive hours per year; the figure thus calculated may be increased by an allowance for other general expenditure not exceeding 50 per cent of the wage costs. The
resulting hourly rate chargeable to the project, including the uplift for general expenditure is capped at € 100.

- Expenditure on consumable materials, resources and software (licences) directly attributable to the project, on the basis of the original purchase prices.

- Use of equipment and machinery:
  - Expenditure on the acquisition and use of machinery and equipment, subject to the understanding that such expenditure is to be based on the depreciation costs attributable to the project, calculated from the original purchase prices and a depreciation period of at least five years; expenditure on consumables and maintenance during the usage period.
  - Expenditure on the acquisition and use of machinery and equipment not acquired exclusively for the project may be included only as project contributions on the basis of the calculation method described above, subject to the condition that a comprehensive usage log is available for each machine or item of equipment.
  - Contributions in kind in the form of discounts on the normal commercial purchase price (list price) of machinery and equipment. Any such discount should be at least 25 per cent of the list price. The expenditure charged to the project's equipment budget is then the list price minus the discount.
  - Contributions in kind in the form of software made available to the project.

All contributions in kind must be specified in a manner from which it is apparent that the criteria set out above are met.

The inclusion of consultancy fees in the mandatory co-funding contribution is not permitted.

Enterprises and research organizations are required to declare their contributions in kind to NWO in the form of a schedule of costs incurred, submissible to NWO within three months of the conclusion of the research project to which the contributions were made. A university partner should submit an application for the determination of a contribution in kind together with the grant determination application and accompanied by a joint final report. If a declarable contribution in kind exceeds € 125, the application should be accompanied by an auditor's report from the contributing partner. Where smaller amounts are concerned, a written statement from the partner declaring that the stated contributions in kind were indeed attributable to the project is sufficient.

If an enterprise undertakes to make a contribution in kind to a research project, but does not ultimately make that contribution (or makes a smaller contribution), or cannot account for the contribution made, NWO may invoice the party in question for (the shortfall in) the contribution in kind, so that the overall contribution remains as promised.

### 3.5.2.3 Specific co-funding provisions

Every project supported through this research programme must include work units of either fundamental or industrial research (see subsection 6.2 for the PPS definitions).

Every project must have private co-funding. The minimum private co-funding required for each work unit within a project will depend on the type of research to be undertaken. The maximum grant available for each type of research and the associated requirements regarding private co-funding in kind and in cash are set out in the table below. Only the final percentage is counted when calculating the private co-funding requirement. Hence, the co-funding percentages for the individual work units may depart from the percentages stated below, as long as the final percentage corresponds to the balance between fundamental and industrial work units within the project.

Of a project's total private co-funding in cash, 6 per cent is designated for knowledge dissemination and valorization activities associated with the programme as a whole, and will be hold by NWO. Such activities benefit both the project and the wider programme.
Section 3: Guidelines for applicants / COMMIT2DATA – Big Data & Health

<table>
<thead>
<tr>
<th>PER WORK UNIT / PROJECT</th>
<th>Fundamental research work unit (TRL 1 to 4)</th>
<th>Industrial research work unit (TRL 4 to 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligibility:</strong></td>
<td><strong>Percentage of total project budget</strong></td>
<td><strong>Percentage of total project budget</strong></td>
</tr>
<tr>
<td>Grant: in cash</td>
<td>Max. 75%</td>
<td>Max. 50%</td>
</tr>
<tr>
<td>M€ 1 – M€ 2,25 per project (see subsection 3.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Mandatory contribution from own resources:** | **in cash** | **in kind** |
| Contributions in kind by participating research organizations | Min. 10% | Min. 15% |
| Private co-funding (in cash + in kind) | Min. 15% | Min. 35% |
| - of which minimum private co-funding in cash | Min. 7.5% | Min. 20% |

Requirements regarding minimum co-funding contributions to be made *in kind* and *in cash* by each type of enterprise:

<table>
<thead>
<tr>
<th>Private co-funding conditions:</th>
<th><strong>in cash</strong></th>
<th><strong>in kind</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>In cash / in kind</em> split for large enterprises</td>
<td>Min. 2/3 in cash</td>
<td>Min. 1/10 in kind</td>
</tr>
<tr>
<td><em>In cash / in kind</em> split for SMEs</td>
<td>No restrictions on in-cash contributions</td>
<td>Min. 1/10 in kind</td>
</tr>
<tr>
<td><em>In cash / in kind</em> split for others (e.g. care (R&amp;D) establishments)</td>
<td>Min. 1/2 in cash</td>
<td>Min. 1/10 in kind</td>
</tr>
</tbody>
</table>

For definitions for large enterprises and SME see subsection 6.3.

### 3.5.3 Intellectual property

In dealing with intellectual property (IP), the ENW PPS Fund follows NWO policy, which allows the parties involved in a project to make customised agreements, for example depending on the composition of the consortia and the extent of the (financial) contribution. Such agreements must be in compliance with the EU Support Framework Regulations in order that no ‘prohibited state aid’ will be involved. The EU state aid schemes offer two options: 1) a general block exemption regulation, which offers, under certain conditions (including its being mentioned on the State Aid website), the possibility of ‘authorised aid’ and 2) the application of the ‘Framework for State Aid for Research and Development and Innovation’, which specifies the conditions under which support is not considered to constitute state aid. The second option is applicable here. The ‘Framework for State Aid for Research and Development and Innovation’ mentioned under Option 2 above gives two possibilities: a) making agreements in advance as to how any IP rights to the results are to be allocated, as long as such allocations ‘adequately reflect’ the efforts, the contributions and the respective interests of the parties involved in the project, or b) letting the IP rights accrue to the project party that generated the results concerned; in the event that a different project party wishes to obtain exclusive rights with an eye to commercialisation (this will ordinarily be a private party), that party will need to pay a normal market compensation for that to the generating party.

Prior to the start of the research project, parties involved in the project will enter into a Project Agreement with each other and with NWO, in which they agree on IP, the transfer of knowledge and a number of other matters (see subsection 3.5.1).

### 3.5.4 Other provisions

This Call for Proposals is governed by the *NWO Grant Rules*, 2017 version ([www.nwo.nl/subsidieregeling](http://www.nwo.nl/subsidieregeling)) and the agreement entitled *Approval of funding for scientific*
research (www.nwo.nl/akkoordbekostiging). The contribution of the Netherlands eScience Center is additionally governed by that organization’s Special Conditions.\(^{28}\)

**Commit2Data**

Every applicant is considered to have agreed to contribute to additional reports, meetings and/or interim evaluations in the context of COMMIT2DATA. Such contributions will involve at least the following:

1. COMMIT2DATA-wide synergy. Researchers will actively contribute to the dissemination of their results within the wider COMMIT2DATA community. Dissemination is to explicitly address application domains not directly associated with the project, e.g. through participation in COMMIT2DATA-wide events.
2. Programme synergy. Researchers will actively contribute to the programme assembled on the basis of this call, e.g. by participating in events organized within the programme segment.
3. Big data hubs. Where possible, collaboration will be sought with relevant COMMIT2DATA big data hubs and field labs (both those now in existence and those under development), with a view to realizing valorization and dissemination activities aimed at enterprises.
4. Reporting. Researchers will provide regular (annual) and transparent reports on the progress of the project and the results achieved, covering:
   (i) Scientific output (quantity and quality); benefit to society
   (ii) Collaboration with participating enterprises and/or end users (citizens/patients/(care) professionals)
   (iii) Valorization activities
   (iv) Synergy with other projects, within the Big Data and Health Programme and within COMMIT2DATA as a whole
   (v) Non-academic dissemination activities, e.g. publications in professional journals, presentations to the general public, popular-science publications, contributions to radio, TV and other media

**FAIR principles**

Researchers are to follow the FAIR principles on the sharing of data.\(^{29}\) For the collection and processing of big data not only the correct facilities must be available, but the accountability, roles and responsibilities for the (long-term) management of the data must also be formalized. This is defined by the term ‘data stewardship’. These are the facilities and processes that guide the responsible storage of data, that secure future access to data, and that will guarantee the quality of data for future analysis. An important aspect that is especially significant for the health-domain is regulated access to data to guarantee anonymity, integrity, and safety of data, even when different data sources are combined. Standardization can contribute to the exchangeability of data.

The fragmentation of data between hospitals, citizens, research institutes, policy organizations, industry, and other parties combined with differences in laws and regulations presents a barrier for the use and full potential of big data for the benefit of health. The Registratie aan de Bron programme (registering at the source) is trying to address this barrier. It is not always necessary to combine all data for analysis. Certain research questions may also be applied to derived data. Alternatively, analysis algorithms may also be transferred to the data instead of vice versa. Innovative data analysis solutions and algorithms can help with this. For this call, project proposals must follow the FAIR data principles, meaning that all projects must ensure that the data used or generated is findable, accessible, interoperable, and reusable and is saved in a safe location. Analytics across FAIR data sources are required.

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\(^{28}\) [https://www.esciencecenter.nl/Bijzondere_voorwaarden_NLeSC_subsidies_2017.pdf](https://www.esciencecenter.nl/Bijzondere_voorwaarden_NLeSC_subsidies_2017.pdf)

\(^{29}\) [https://www.dtls.nl/fair-data/](https://www.dtls.nl/fair-data/)
Open access
All academic publications relating to research supported by grants awarded on the basis of this Call for Proposals must immediately be globally and freely accessible ('open access'). Various open access publication mechanisms are possible. For details, visit www.nwo.nl/openscience.

Data management / software sustainability
Good research implies responsible data management and high-quality software. NWO wishes research data and software resulting from publicly funded research to be 'freely' and sustainably available for re-use by other researchers wherever possible. NWO also wishes to promote awareness amongst researchers regarding the importance of responsible data management and software sustainability. Applications should therefore conform to the NWO data management protocol and (where applicable) the Netherlands eScience Center software sustainability protocol. In both cases, compliance with the protocol has two stages.

1. Data management section
Every application is to include a data management section. In it, the researchers should address four questions regarding data management within the proposed research project. Before the research commences, the applicant is expected to consider how the gathered data are to be organized and categorized in order to allow for free availability in due course. It is often necessary to take steps during data generation and analysis to enable subsequent storage and sharing. Researchers may autonomously specify the research data considered to be appropriate for storage and re-use.

2. Data management plan
If a grant is awarded, the researcher is required to draw up a data management plan based on the data management section. The plan must be submitted to NWO using ISAAC within nine months of the grant award. NWO will consider the plan for approval as quickly as possible. Approval of the data management plan by NWO is a condition for payment of the grant. The plan may be modified while the research is in progress.

For details of the NWO data management protocol, see: www.nwo.nl/datamanagement.

The two stages of compliance with the software sustainability protocol are as follows:

1. Software sustainability section
Every application is to include a software sustainability section. In it, the researchers should address a number of questions regarding software sustainability in the context of the proposed research project. The software sustainability section is to cover matters such as how the licensing and publication of research software developed for the project is to be organized in order to ensure the free availability of the software. It is often necessary to take steps during software development to enable long-term re-use. Researchers may autonomously specify the research software considered to be appropriate for publication and re-use.

2. Software sustainability plan
If a grant is awarded, the researcher is required to draw up a software sustainability plan based on the software sustainability section. The plan must be submitted to NWO using ISAAC within nine months of the grant award. The Netherlands eScience Center will consider the plan for approval as quickly as possible. Approval of the software sustainability plan is a condition for payment of the grant. The plan may be modified while the research is in progress.

More information about the software sustainability protocol will be made available on the Netherlands eScience Center website.

eInfrastructure
In this call, all applicants are asked to indicate the project’s e-Infrastructure needs, in terms of compute hours, data storage capacity, lightpath connectivity, or otherwise. A ‘use-or-explain’ policy will be applied, meaning that
- projects **without** e-Infrastructure needs are asked to give a brief explanation;
- projects with clear e-Infrastructure needs are expected to select the hardware resources and services as part of the Dutch National e-Infrastructure as first option, and to indicate the expected extent of use;
- projects with clear e-Infrastructure needs that aim to use international (e.g. PRACE, XSEDE, etcetera) or commercial (e.g. web, cloud, etcetera) hardware and services instead are required to give a brief explanation.

The use of the Dutch National e-Infrastructure is not a requirement, nor is it a formal review criterion. However, in all cases in which the Dutch National e-Infrastructure is not used, a justification should be provided. Researchers are encouraged to join an existing registration system, such as that the Dutch Heart Register.30

**Data protection**

All projects funded through the programme must comply with statutory personal data protection requirements. The Care Sector Personal Data Processing (Supplementary Provisions) Act came into force on 1 July 2017. The Act lays down rules on the electronic exchange of patient information and patients’ right to obtain electronic access to their medical records. In addition, the EU’s General Data Protection Regulation came into force on 25 May 2018. The use and storage of data must comply with the ELSI-principles (Ethical, Legal and Social Implications) principles. 31

**Nagoya Protocol**

The Nagoya Protocol came into force on 12 October 2014, providing a framework for the fair and reasonable distribution of the benefits arising from the use of genetic resources (Access and Benefit Sharing; ABS). Researchers whose work involves the use of genetic sources in/from other countries need to be familiar with the Nagoya Protocol (www.absfocalpoint.nl). NWO assumes that all researchers supported through the programme will comply with the Nagoya Protocol.

**Ethical aspects**

It is important that all projects funded through the programme deal carefully with any ethical issues that the scientific research might raise. Certain types of research project will require a statement of approval from an accredited medical ethics review committee (METC) or an animal experimentation ethical review committee (DEC). Furthermore, certain types of research projects require licensing under the Population Screening Act (WBO). Information about the METC system is available from the Central Committee on Research Involving Human Subjects (CCMO), while information about the DEC system is available from the Netherlands Association of Animal Experimentation Ethical Review Committees. The Health Council and others provide information about the WBO.

The applicant is responsible for ascertaining whether the research project is liable to raise ethical issues and, if so, for ensuring that a statement of approval is obtained from the relevant review committee and/or that a WBO licence is obtained, as appropriate. NWO subscribes to the Code for Transparency in Animal Testing and the Biosecurity Code. Where relevant, a research project must not commence until NWO has received a copy of the statement of approval and/or the WBO licence. Where a project raises complex ethical issues, NWO reserves the right to seek specialist external advice. If, after consulting the applicant, NWO considers that a proposed project requires ethical review, the applicant is obliged to arrange for the proposal to be considered by an appropriate review committee. Where a statement of approval from an appropriate review committee is required, failure to provide such a statement will result in the withdrawal of funding.

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30[https://nederlandsehartregistratie.nl/](https://nederlandsehartregistratie.nl/)
31[http://wetten.overheid.nl/BWBR0011468/2017-03-10](http://wetten.overheid.nl/BWBR0011468/2017-03-10)
32[http://wetten.overheid.nl/BWBR0023864/2017-07-01](http://wetten.overheid.nl/BWBR0023864/2017-07-01)
33[http://bmjopen.bmj.com/content/bmjopen/7/12/e018647.full.pdf](http://bmjopen.bmj.com/content/bmjopen/7/12/e018647.full.pdf)
3.6 Submission of an application

The preproposal and the full grant application must be submitted using NWO’s ISAAC on-line application system. The necessary documents can be downloaded via the funding instrument page of this research program. When submitting an application using NWO’s ISAAC electronic application system, data must also be provided online. It is therefore necessary to begin the submission process at least one day before the closing date for applications specified in this Call for Proposals. Applications that are not submitted using ISAAC, or are submitted after the deadline, will not be considered.

Each principal applicant is obliged to submit his/her application using his/her own ISAAC account. If the principal applicant does not yet have an ISAAC account, he/she should create one at least one day before the application is to be submitted. Advance account creation will facilitate the prompt resolution of any registration problems that might arise. If the principal applicant already has an account with NWO, it is not necessary to create a new account in order to submit a new application.

When submitting an application using ISAAC, certain additional data must be provided online. It is therefore important to allow sufficient time.

Technical questions about the application process may be addressed to the ISAAC helpdesk; see subsection 5.1.2.
4 Appraisal procedure

4.1 Procedure

General
All personnel involved in appraisal and/or decision-making and staff of partner organizations to this programme are subject to the NWO Code of Conduct on Conflicts of Interest\textsuperscript{34}.

In its Grant Rules, NWO stipulates that all NWO-funded research must be carried out in a manner consistent with nationally and internationally accepted standards of scientific practice, as referred to in the Netherlands Code of Conduct for Scientific Practice 2014 (VSNU)\textsuperscript{35}.

NWO will classify each full application received\textsuperscript{36}. The classification will be communicated to the applicant when a grant award decision is made.

Preregistration

Preregistration appraisal
Preregistration is mandatory. The Chair of Commit2Data, the Director of the LSH top sector, the Director of the Creative Industries top sector and a representative of the Netherlands Heart Foundation will give advice on the preproposal’s consistency with the aims of the call (see section 2 and subsection 6.1). The bureau, which is staffed by personnel from all partner organizations to this programme, will give advice regarding the procedural admissibility (section 3) and regarding connections that could be made between individual preregistrations and with relevant consortiums, organizations and/or research infrastructures. These advice on procedural admissibility will be communicated with the main applicant. In addition, the bureau will discuss with each (main-)applicant the details of the admissibility check during a personal (by telephone) conversation. Preregistration is mandatory, but no selection will take place.

End user consultation
After the closing date for preregistrations, principal applicants will be asked to present their project ideas to a group of citizens, patients and (care) professionals. The end users attending the meeting will be invited to respond to the project ideas and give advice from the end user’s perspective. The end users’ observations will be communicated to the committee that appraises the full applications.

Full applications

Admissibility
The first step in the appraisal of a full application involves checking whether the application satisfies all procedural conditions, as set out in section 3. In addition, the application’s consistency with the aims of the call (see section 2 and subsection 6.1) will be considered by the Chair of Commit2Data, the Director of the LSH top sector, the Director of the Creative Industries top sector and a representative of the Netherlands Heart Foundation, each in relation to his or her particular field.

Any decision to declare an application inadmissible will be made by the NWO ENW board as advised by the Steering Committee of this programme. The Steering Committee is made up of representatives of all the organizations participating in the programme: NWO, ZonMw, the Netherlands Heart Foundation, the Ministry of VWS, the LSH top sector and the Netherlands eScience Center. Only applications that are deemed consistent with the aims of the call and

\textsuperscript{34}\url{http://www.nwo.nl/gedragscode}
\textsuperscript{35}\url{www.nwo.nl/integriteit}
\textsuperscript{36}\url{http://www.nwo.nl/kwalificaties}
admissible will be considered. If the decision is made not to consider an application, the relevant applicant will be informed by letter.

**Referees**
All admissible applications will be sent for appraisal by external advisors known as referees. Referees are experts in the fields addressed by proposed projects, who report on the strengths and weaknesses of the applications referred to them.

Each applicant is asked to nominate up to three non-Dutch referees; the nominees' details have to be entered in ISAAC. The nominees must not include anyone with whom the applicant is currently collaborating, has collaborated in the last three years, or is due to collaborate. In that context, both co-authorship and other cooperative work forms are considered to be collaboration. To be suitable to act as a referee, a nominee must have no association with the research team seeking funding or with the application. The nominees must work outside the Netherlands. The appraisal committee may also be asked to nominate referees. A number of independent referees will be appointed from amongst the experts nominated by the applicants and identified by other means.

**Non-referees**
The referee nomination form also allows applicants to name up to three people who should NOT act as referees. Naming non-referees is optional.

**Perusal and response to referees’ reports**
The anonymized referees' reports are forwarded to the principal applicant, who has the opportunity to submit a written response.

**Prioritization**
The Appraisal Committee meets to discuss and rank the applications and submits its recommendations to the Programme Steering Committee. The Appraisal Committee's role is to make an independent assessment on the basis of the criteria, the grant application, the referees' reports, the outcomes of the end user consultation on the preproposals and the applicant's response. In the appraisal process, the referees' reports serve as an important source of guidance, but are not the sole basis of the Appraisal Committee’s decision-making. The Appraisal Committee considers both the observations made by the referees (including any differences of opinion) and the strength of the counterarguments made in the applicant's response to the critical aspects of the reports. Furthermore, unlike the referees, the Appraisal Committee has an overview of the entire body of applications and responses, and is able to consider their relative merits.

The committee is also asked to consider the complementarity and collective coherence of the projects which are near the cut-off for funding in their advice to the Steering Committee. When applications have the same quality, the project with the highest complementarity is prioritized.

**Decision-making**
The steering committee of the programme makes recommendations to the NWO ENW Board regarding the allocation of available resources. The NWO ENW Board decides how the available resources will be used.

**Indicative time line**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preregistration deadline</td>
<td>1 October 2018</td>
</tr>
<tr>
<td>End user consultation</td>
<td>8 October 2018</td>
</tr>
<tr>
<td>Conversation concerning admissibility check</td>
<td>mid October 2018</td>
</tr>
</tbody>
</table>

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37 The Code of Conduct on Conflicts of Interest is published on the NWO website: [http://www.nwo.nl/gedragscode](http://www.nwo.nl/gedragscode). The Code describes the forms of interest that an outside expert might have in a project.
### 4.2 Criteria

In principle, a grant can be awarded only if the Appraisal Committee’s final appraisal of the application in accordance with the NWO classification system is ‘Excellent’ or ‘Very good’. However, applications that receive a final appraisal of ‘Good’ may qualify in exceptional circumstances. Appraisal against each individual criterion (1, 2 and 3) must be at least ‘Good’. A qualification of ‘Excellent’ or ‘Very good’ does not guaranty funding. The complementarity of the proposals is an extra criterium that can be taken into account in the decision to fund a proposal (see subsection 4.1).

The relationships between research disciplines and the degree of scientific innovation can vary from one research field to the next within a project. The scientific innovation of at least one of the research disciplines involved must be rated ‘Very good’ (criterion 1d).

Admissible applications are considered first by the referees and then by the independent Appraisal Committee in relation to the following appraisal criteria:

1. **Scientific quality (40 per cent)**
   a. Scientific approach
   b. Clarity of focus and objectives
   c. Feasibility
   d. Scientific innovation of the individual research fields
   e. Balance between aims and available resources (budget, personnel)
   f. Relevance to end users: citizens/patients/(care) professionals
   g. Relevance to the early detection and prevention of cardiovascular disease
   h. Relevance to the K&I Agendas for LSH, ICT and Creative Industries

2. **Quality of the consortium (40 per cent)**
   a. Track record of the academic partners
   b. Track record of the enterprises
   c. Synergy, complementarity and value added in the collaboration and promotion of interdisciplinary and public-private partnerships
   d. Participation of end users (citizens, patients and/or (care) professionals)
   e. Availability of infrastructure within the consortium, including data required for implementation of the project

3. **Knowledge utilization (20 per cent)**
   a. Social and economic impact
   b. Quality of the knowledge utilization plan
   c. Ethical and legal feasibility of the research and the knowledge utilization
   d. Degree of innovation in application and reinforcement of demand-led research
   e. Re-usability of the scientific results and technological solutions following conclusion of the research programme and/or for conditions other than cardiovascular disease

The requested eScience Research Engineer input is authorized only if the quality of the project's eScience component is rated at least ‘Very good’ by the Appraisal Committee. If the quality is insufficient, the grant may be awarded with the reservation that the principal applicant will improve the project proposal in consultation with the Netherlands eScience Center, within one month after the grant award in order to achieve the requisite quality level. If that proves impossible, no eScience Research Engineer input will be authorized and the applicant is requested to show how the cancelled
eScience part will be compensated. When the withdrawal of the eScience part has a substantial negative influence on the practicability of the project, the awarded subsidy to the whole project may be withdrawn.

Nor will eScience Research Engineer input be authorized in exceptional circumstances where the expertise of the Netherlands eScience Center is outside the scope of the project. If the expertise of the Netherlands eScience Center is not required for a proposed project, sound reasons must be presented in the application.

eScience criteria:

a. Innovation in the use and/or development of eScience/ICT solutions for the objectives of the project

b. Broad impact and applicability, re-usability and sustainability of the developed eScience/ICT solutions, explicitly continuing beyond the duration of the project
5 Contact and other information

5.1 Contact

5.1.1 Substance of the call process

On matters relating to the substance of this Call for Proposals, please contact NWO:
Tess van de Voorde, NWO Policy Officer for the Exact & Natural Sciences Domain
Phone: +31 (0)70 349 4158
E-mail: data2person@nwo.nl

5.1.2 ISAAC electronic application system

On technical matters concerning the use of ISAAC, please contact the ISAAC helpdesk. Before
contacting the helpdesk, please consult the guidelines for users. The ISAAC helpdesk is open
Monday to Friday 10:00 to 17:00 (Dutch time). The number to call is +31 (0)20 346 71 79.
Alternatively, e-mail your enquiry to isaac.helpdesk@nwo.nl. The helpdesk responds to e-mail
enquiries within two working days.

5.1.3 NWO Objections & Appeals Committee

An Objections and Appeals Procedure exists for the consideration of formal appeals against decisions
made in the context of this Call for Proposals. After submitting a formal appeal, the applicant will be
invited to appear before the NWO Objections & Appeals Committee. Details of the Objections and
Appeals Procedure are available from the secretariat of the NWO Objections & Appeals Committee,
Ms C Hansildaar, +31 (0)70 344 0807, e-mail: c.hansildaar@nwo.nl.

5.2 Other information

A full English version of this Call for Proposals is available on the NWO website, where the
application forms can be downloaded from the call website.

The Dutch version of the call for proposals "Big Data & Gezondheid" supersedes the English
translation. No rights can be derived from the English translation.
6 Annexes

6.1 Associated research disciplines

6.1.1 Life Sciences & Health Research

In this programme all research areas in the broad scope of disciplines of the (red) life sciences and health can participate, e.g. (medical) biology, medical sciences, psychology, neuroscience, kinesiology, etc., with a special focus on cardiovascular disease. There is also a need for greater clarity regarding aspects such as differences in prevalence between ethnic groups and/or between men and women. Research in large groups of citizens is encouraged.

The four "P's" of Medicine are applicable:
Predictive: Customise diagnosis and treatment;
Pre-emptive: Better than curative;
Personalised: Determine risk profiles, predict outcomes;
Participatory': Involve patients and citizens.

The Life Sciences & Health Research in project proposals for this call for proposals needs to fit in the Dutch Knowledge Innovation Agenda for Life Sciences & Health\(^\text{38}\).

6.1.2 Data Science

Wikipedia: "Data science is a "concept to unify statistics, data analysis, machine learning and their related methods" in order to "understand and analyze actual phenomena" with data. It employs techniques and theories drawn from many fields within the context of mathematics, statistics, information science, and computer science."

Data Science studies generic methods to determine eye-opening and reliable insights from data and to communicate these effectively between users and their environment. Data Science is a scientific field that uses methods such as artificial intelligence, data and process mining, machine learning, statistics, text and image analysis, information retrieval, and visual analytics to design and verify computational models for clustering, classification, and prediction. Predictive analytics are used to explore correlations between data. Technologies such as context awareness and intelligent interaction are used for informed decision-making processes; Gamification is a dialogue technology that can help to promote behavioural change.

Data Science brings us exciting scientific challenges and intriguing new insights. Data scientists are predominantly searching for interesting and robust patterns in data and methods for combining data from different sources. If something is 'interesting,' it often means that something unexpected has been observed, such as patterns that result in new and astonishing insights. Data Science enables us to create better predictive models with less assumptions and theories than models based on small samples and hypotheses. Making smart use of data can create a great deal of value, yet it is also marred by restrictions and dangers. For example, incorrect use or input can result in inaccurate conclusions. A comprehensive knowledge of this field, collaboration with other disciplines and end users, and knowledge of the application domain are required if Data Science is to be applied correctly.

The principles of responsible data analysis can be explained by FACT\(^\text{39}\):

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\(^{38}\)https://www.health-holland.com/

\(^{39}\)http://www.responsibledatascience.org/
**Fairness:** Data Science without prejudice. How to avoid unfair conclusions, even when they are true?

**Accuracy:** Data science without guess work. How to answer question with a guaranteed level of accuracy?

**Confidentiality:** Data science that ensures confidentiality. How to answer questions without revealing secrets?

**Transparency:** Data science that provides transparency. How to clarify answers such that they become indisputable?

The principles of responsible data storage can be explained by FAIR\(^{40}\):

- **Findable:** easy to find for both humans and computers, with metadata that facilitate searching for specific datasets,
- **Accessible:** stored for long term so that they can easily be accessed and/or downloaded with well-defined license and access conditions (open access when possible), whether at the level of metadata, or at the level of the actual data,
- **Interoperable:** ready to be combined with other datasets by humans or computers,
- **Reusable:** ready to be used for future research and to be further processed using computational methods

The Data Science in project proposals for this call for proposals needs to fit in the Dutch Knowledge Innovation Agenda for ICT-Research\(^{41}\).

### 6.1.3 Creative Industries Research – Data-driven design

The creative industries seek to connect technology to the values and interests of people and society, with the focus on intervention, instigation and mobilization. Ethical issues are also influential. In addition to the ICT issues and the Key Enabling Methodologies, the Societal Readiness Levels is of relevance. In simple terms, it is not merely whether something is possible that matters, but also whether it is permissible (ethically and legally), desirable (based on technology that society is ready to embrace) and of added value to actors in the health domain.

The knowledge and innovation agenda for the creative industries is organised along three thematic lines: Design for Change (knowledge on system transitions and behavioural changes), The Human Touch (on the impact of sociotechnological systems on individuals, communities and cultures), Value Creation (finding an answer to changes in the market and society). At the heart of the creative industries research are questions on behavioural change, system level, societal impact and resistance against change. The Creative Industries aim at combining technology with values and interests of individuals and society thus creating change or steering the dynamics within intricate processes.

In this call, Big Data and health, the Creative Industries actively connects with big data science and science for healthcare, in order to realise societal impact with validated strategies, methods (key enabling methodologies) and models thus contributing to our healthcare at individual and system level. Digitisation in combination with knowledge on user behaviour enables the development of personalised products and services. (KIA Creative Industries p. 82-86) the development of relevant adaptive systems is a complex task which can only be accomplished through interdisciplinary research. Prevention and vital functioning require self-control. Creative Industries researches how smart systems can contribute to help people to take be in control of their own health. Strategies to conquer unhealthy behaviour should be successful on the long term. The assumption is this effect can only be reached if we question the complexity of the system as a whole. What are the key factors in the interaction between several layers of the system and the interaction between the

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individual and the community? Can a better understanding of the dynamics of complex system interactions lead to a model that can be used to make interactions visible in order to monitor how a complex system will develop in order to predict and steer desired healthy behaviour?

Creative Industries research is aimed at the research and design of system behaviour. Creative professionals design, describe, implement and guide system interventions which eventually lead to the desired situation. How can we provide insights which lead to the actual use of e-health solutions? How can the use of new technologies further solutions with impact in the field of care and health? How can we get civilians more involved? How do we look after it that civilians will use the say they have over their own data? How can we realise effective solutions by sharing and connecting data? How can smart systems be of help to the detection and prevention? To what end and how much must a civilian know about the systems in place? Though the technology might be available the question is if society is ready to embrace it. Therefore next to ICT problems and the Key Enabling Methodologies (with the help of which we can bridge the gap between new technical solutions and societal challenges) Societal Readiness levels are relevant as well.

The Creative Industries Research in project proposals for this call for proposals needs to fit in the Dutch Knowledge Innovation Agenda for Creative Industries.

6.1.4 Social sciences and Humanities (Ethics and Jurisdiction)

Digital innovation can be of much help to solve social issues and big data is an often-mentioned solution to many problems. Having said this, it is important not to follow certain solutions blindly but to take into account the legal and ethical challenges these solutions bring along.

Using big data in health care may help to personalize health care and to focus (more) on the patient and caretakers. But the more digital innovations make their way into our health care it will also demand more trust and (digital) skills from everyone involved. Especially if you want to keep all stakeholders concerned. It’s not only about administrative changes and the ability to cope with different systems (digital skills), but also a shift in mentality having a system or computer telling you about your health (trust). And how are we going to be certain that people will make these changes and make use of their right to deal with their own data? Will people develop the skills to be capable to make decisions based on the available data?

Another issue that needs to be addressed is the privacy of patients. The more data is collected about a person, the more can be said of someone. Medical information can have a great impact on someone’s social or economic position. Therefore, the General Data Protection Regulation (GDPR) limits the processing of medical data making it only possible under strict conditions. Additional protective security measures must be taken. Furthermore, discussions about the ownership of data have erupted. A problem is that data, legally, can’t be owned (ownership is only possible of tangible affairs). Also, once data is copied or used in an analysis it will be difficult to comply with the rights of data subjects, such as the right to be forgotten.

There are also ethical discussions to take into account. What if a doctor and computer system have a different diagnosis, who has the final say? And who is accountable? What do we do with self-learning systems? How do we know exactly how they’ve come to their conclusion and is it necessary that we know this? Also, the more data we acquire, the more we can know about people. What is the influence on people’s life? How explicit should a system be? What if we can predict who will get ill and who won’t and suddenly people are denied mortgages or loans because of this information? These are all issues that need to be addressed. A common view is that certain questions are in the way of innovation and development. Think of it more as a catalyst to innovation (be creative to address both these issues and new technical developments) and as a way of creating support for

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https://www.clicknl.nl/
your research. Privacy is a fundamental right and we rely on people to share their data, so dealing with it appropriately is a way to maintain those fundamental rights and gain trust of people.

### 6.2 Background in cardiovascular disease

Never your old self after a myocardial infarction partly paralysed after a stroke or even deceased after a cardiac arrest. A cardiovascular disease can happen to anyone. Many cardiovascular diseases hit unexpectedly. For instance a stroke or myocardial infarction, or a cardiac arrest can occur suddenly without prior complaints noticed or associated with an upcoming threat by the person or the physician or treating specialist. The consequences can be disastrous, irreparable damage or even fatal.

Currently there are 1.4 million cardiovascular patients in the Netherlands. In the coming years there will be a dramatic increase in patients with cardiovascular diseases, partly by the increase of elderly in our general population (referentie www.vtv2018.nl). In 2030, cardiovascular diseases will affect one in seven Dutch adults. This increase in cardiovascular diseases leads to burden for patients and their families, and leads to higher healthcare costs.

Research into the earlier recognition of known and yet unknown risk factors will help us to diagnose cardiovascular diseases before they strike seriously. We can save lives and prevent or postpone the effects of cardiovascular diseases as much as possible. Ultimately, this will lead to an improvement in quality of life and savings in healthcare costs because these people will require less care and will live with fewer limitations.

Unknown or not recognised early symptoms

It often appears in hindsight that there were earlier indications suggesting a cardiovascular disease, for example fainting, palpitations, unexplained accidents, shortness of breath, sleep disorders, fatigue or general malaise. They are called prodromal or initial symptoms: signs presaging a disease onset. It is not always clear that these complaints point to a cardiovascular disease. Patients, physicians or other caregivers may not recognise these symptoms as signs of cardiovascular diseases. This applies to symptoms suggesting a stroke or heart attack, or other cardiovascular diseases such as narrowing of the leg arteries. In addition, it can be difficult to recognise a cardiovascular disease if someone already has another disease. For example, a doctor could ascribe shortness of breath in a patient with COPD to the lung disease, although it can also be a sign of heart failure. A heart attack in someone with diabetes may produce different symptoms than in someone without diabetes. And women can display other symptoms than men.

Known methods to detect the risk for cardiovascular diseases are (among others) measuring cholesterol and hypertension. Increasing and magnifying the predictive value of cholesterol and hypertension data demands that these measurements are performed on a large scale from the age of 40 years. Currently measurements are not structural, in-frequent, not at home, not specific and there is no feedback loop to changes in lifestyle. Results of measurements are linked to pre-defined and not personalised care systems in the hospital and physician. There is no push by the individual citizen. This programme creates chances to have an increase in the frequency of (heart-)health measurements, obtaining data from a larger population and to link information of groups of people, ill and not ill, to create a bigger predictive value for the possible occurrence of disease. This predictive value should lead to a larger set of tools for citizens and health care providers for personalized health care.

Next to the identification and frequent measuring of known risk factors like hypertension and high cholesterol, there is a need to identify new risk factors, in patients but also in people who are not ill or suffering from disease yet. Analysis of large (health) data sets plus additional of new data can contribute to the detection of relevant prodromal symptoms/early warning signs. Prodromal symptoms that are maybe not yet linked to the early phase of cardiovascular disease
Mapping family history and hereditary burden

It is estimated that around 60,000 people have a strong hereditary predisposition to cardiovascular disease whose genetic factors are already known, of which they are not aware. These people are unnecessarily at risk of irreparable damage or death. It is therefore important to identify these people. Then there is the group of people with a weaker hereditary predisposition. Cardiovascular disease is seen more often in their families but the exact risk should be clarified by big data analysis.

The retrieval and crosslinking of family history and genetic information should be improved: which data is necessary, which family data is needed, how to organise the retrieval and comparison of data? Results from this programme should provide tools to identify predisposed people and to develop relevant tools for citizens and health care providers to discover hereditary predisposition.

Research into not recognized early symptoms and hereditary burden will allow us to diagnose cardiovascular diseases before they convey serious damage. The aim is to save lives and prevent cardiovascular diseases as much as possible, ultimately leading to an improvement in quality of life and savings in healthcare costs for citizens.


6.3 PPS definitions

**Input in kind:** input to a collaborative project that is quantifiable in monetary terms calculated using a method that is normal and verifiable for the project participants, is based on business management principles and standards that are generally considered acceptable, and is systematically used by collaborative project participants.

**Private co-funding:** financial resources not provided directly or indirectly by either of the following:
- A research organization, including the Netherlands Organization for Scientific Research and the Royal Netherlands Academy of Science
- A public body

**Public body:** within the governmental structure of the Kingdom of the Netherlands, a governmental body charged with the performance of certain tasks within a defined geographical area or logical field. The main public bodies are the national government, the provincial authorities, the municipal authorities and the water agencies.

**Care (R&D) institution:** an organizational entity that is licensed in accordance with Section 5, subsection 1, of the Health Care Institutions (Licensing) Act:
1. An organizational entity belonging to a category of establishment defined by General Administrative Order that provides care to which entitlement exists under Section 3.1.1 of the Long-term Care Act or under a health insurance policy, as referred to in Section 1(d), of the Health Insurance Act, must be licensed by Our Minister to provide the care in question.
2. A commercial establishment may be licensed only if it belongs to a category defined by General Administrative Order.
See Section 5, subsection 1, of the Health Care Institutions (Licensing) Act.

**TO2 institute:** a member of the association of applied research organizations known as the TO2 Federation (Deltares, ECN, MARIN, NLR, TNO, WUR/DLO).

**Enterprise:** a natural person, legal entity or partnership that operates a business and is not a legal entity constituted under public law. An enterprise must:
- be registered with the Chamber of Commerce (or, in the case of a non-Dutch undertaking, with a comparable body in the relevant country); and
- have a direct and relevant knowledge and/or innovation requirement and make a cash contribution. The cash contribution must have a private source (implying that it must not, for example, originate from a grant obtained elsewhere or from other public resources).

The following criteria apply to smaller/newer enterprises/start-ups in particular:
- The enterprise must not have been created for the project. The enterprise must have been in existence for at least a year.
- Annual accounts must be available on request.
- The academic applicants or researchers in the research group associated with an application must not hold positions within any enterprise participating in the proposed project; ‘arms-length’ consultative involvement is not necessarily precluded, however.

**MKB**

Micro-enterprises are defined as enterprises that employ fewer than 10 persons and whose annual turnover or annual balance sheet total does not exceed EUR 2 million.
Small enterprises are defined as enterprises that employ fewer than 50 persons and whose annual turnover or annual balance sheet total does not exceed EUR 10 million.
Medium-sized enterprises are defined as enterprises that employ fewer than 250 persons and either have an annual turnover that does not exceed EUR 50 million, or an annual balance sheet not exceeding EUR 43 million.

For more details 'The revised User Guide to the SME definition' can be downloaded [here](#).
**Collaborative project**: a project that:

a. entails actual collaboration;

b. is undertaken by at least two participants, including a research organization and an enterprise, and

c. involves fundamental and/or industrial research.

**Actual collaboration**: collaboration between at least two independent parties with a view to exchanging knowledge or technology or to achieving a common objective by means of a distribution of responsibilities, where the parties jointly define the extent of the joint undertaking, contribute to its implementation, and share the associated risk and results. One or more parties may bear the full cost of the joint undertaking, thus relieving the other party or parties of the associated financial risks. Contract research and the provision of research services are not considered to be actual collaboration.

**Fundamental research**: experimental or theoretical activities undertaken primarily with a view to acquiring new knowledge regarding the fundamental aspects of phenomena and observable facts, without a direct commercial application or a direct commercial use in prospect.

**Industrial research**: systematic or critical research directed towards the acquisition of new knowledge and skills with a view to developing new products, procedures or services, or significantly improving existing products, procedures or services. Such research includes the creation of components for complex systems and can also include the construction of prototypes in laboratory settings and/or in settings with simulated interfaces with existing systems, as well as pilot lines, where necessary for the industrial research and particularly for the validation of generic technology.
6.4 Template for principal applicant's letter

Notes:
The principal applicant is required to submit a letter confirming the arrangements made with the partner(s) that is/are to co-fund the project *in kind* and/or *in cash* (for details, see subsection 3.5.2). The letter is to be formulated using the template below and may be submitted as an annex to the digital application.

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**Template for principal applicant's letter:**

NWO
F.a.o. Dr A Steenbruggen
Director of Exact and Natural Sciences

Subject: Statement of arrangements made with project participants

[place], [date]

Dear Ms Steenbruggen,

I am writing to confirm the arrangements made with the members of the consortium associated with the project proposed in response to the COMMIT2DATA Big Data & Health call, entitled [title of project].

If a grant is awarded, the following partners will provide the required co-funding of € [amount], of which a total of at least € [amount] will be *in cash*:

<table>
<thead>
<tr>
<th>[NAME OF CO-FUNDER 1]</th>
<th>Contribution: € xx,xxx (<em>in cash / in kind)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>[NAME OF CO-FUNDER 2]</td>
<td>Contribution: € xx,xxx (<em>in cash / in kind)</em></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>€ xx,xxx</td>
</tr>
</tbody>
</table>

*Delete as appropriate

The ratio fundamental and industrial research is [% fundamental versus % industrial]. The total percentage for *in kind* and *in cash* cofunding is [%] *in kind* and [%] *in cash*. These percentages correspond with the ratio between fundamental and industrial work units within the project, as described in the guidelines in the Call for Proposals, subsection 3.5.2. With regard to the intellectual property rights, the conditions set out in the Rules on Public-Private Partnerships in the Programming and Implementation of Fundamental and Applied Research are applicable. As project leader, I shall ensure that the project complies with the conditions of this programme.

Yours sincerely,

......[signature]

[NAME + TITLE]

Enclosures:
- A co-funding statement from each of the private and public partners, namely:
  O [NAME OF CO-FUNDER 1]
  O [NAME OF CO-FUNDER 2]
  O ......
6.5 **Co-funding statement template**

*Notes:*
Each partner that provides co-funding is required to make a co-funding statement detailing their contribution to the project. The statement is to be appended to the digital application. In the co-funding statement, which is addressed to NWO, the partner undertakes to make the specified contribution to the project. The co-funding statement must be:
1) written on the relevant partner’s headed paper;
2) signed by an authorized signatory (with the date and place of signature specified);
3) addressed to NWO, Exact and Natural Sciences Domain (f.a.o. the Domain Director);
4) consistent with the budget included in the application in terms of the extent of the co-funding. Contributions *in kind* must be specified and capitalized.

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**Co-funding statement template:**

NWO  
F.a.o. Dr A Steenbruggen  
Director of Exact and Natural Sciences  
Subject: Co-funding statement  

[place], [date]

Dear Ms Steenbruggen,

I hereby undertake that, if NWO awards the requested grant, [name of private/public partner] will make the contribution detailed below to the project proposed in response to the COMMITZDATA Big Data & Health call, entitled [title of project]. This undertaking is unconditional and irrevocable.

The principal applicant associated with the proposal is [name].
The cash contribution to be made is € [amount].
The contribution to be made *in kind* has a value of € [amount], quantified in accordance with the guidelines set out in the Call for Proposals, subsection 3.5.2.
The contribution to be made *in kind* involves the following activities: [details of activities].
The type of enterprise is [large enterprise / MKB/ other].
The specified contributions are consistent with the budget contained in the application.

Yours sincerely,

...... [signature]  
[NAME + TITLE]