

# HELIUS Collaboration Policy (version January 2025)

This document is an appendix to the HELIUS regulatory document (version 1.0) and describes the organization of the HELIUS (HEalthy LIfe in an Urban Setting) study, the opportunities for collaboration and the procedures for the use of research data.

## 1) General

- a) HELIUS has been set up to study health differences among the six largest ethnic groups in Amsterdam, with emphasis on cardiovascular disease, infectious disease and mental health. HELIUS is being carried out by the Amsterdam UMC and the Public Health Service of Amsterdam (GGD Amsterdam). Various departments of the Amsterdam UMC and of the Public Health Service of Amsterdam are participating in the study. The HELIUS team is open to proposals for collaboration with internal and external research teams.
- b) Proposals regarding scientific collaboration should be submitted to the Scientific Coordinator, preferably after consulting the relevant Theme Leader (see below). The proposals will then be considered by the HELIUS Executive Board, on the basis of: 1. compatibility with the general objectives of the HELIUS study, 2. the quality of the research proposal, 3. possible overlap with other cohort studies, 4. the use of biological material, 5. logistical feasibility and 6. the (financial) contribution to be made. See **appendix 1** for details on the types of research question HELIUS can be used for. See **appendix 2** for a summary of the study design and an overview of the HELIUS data collection.
- c) Scientific collaboration is possible only after approval of the proposal by the HELIUS Executive Board and subject to agreement being reached regarding the matters referred to in this document.
- d) Each research team is separately responsible for obtaining approval from AUMC's Medical Ethical Review Committee (METC) for the team's research proposal (where relevant). No proposal for further HELIUS-based research may be submitted to the METC without the prior approval of the HELIUS Executive Board.
- e) Researchers working with HELIUS data should comply to the principles of conduct for research integrity in and across the University Medical Centers in Amsterdam.

## 2) Organization

- a) The HELIUS team consists of the Executive Board, the Project Group and the Operational Management Team. In addition, the HELIUS steering group has a supervisory role and guarantees the strategic embedding of HELIUS within the Amsterdam UMC and GGD Amsterdam.
- b) The Executive Board (*Dagelijks Bestuur*, DB) has ultimate responsibility for HELIUS. The DB is made up of the Chair, Vice-chair, Theme Leaders (for each research theme), at least one representative of the Public Health Service of Amsterdam, the Scientific Coordinator and one representative of the Operational Management Team (if applicable). The DB is responsible for progress and the day-to-day operations, acquisitions not covered by the normal scientific subsidy applications, the assessment of research plans and formulation of the budget. The Chair and the Financial Controller of AMC Medical Research (AMR) together undertake the financial management. The DB is part of the Project Group.
- c) The Operational Management Team (MT) is responsible for the day-to-day data collection activities. Its members are as follows: Scientific/General Coordinator (MT coordination, research coordination, biobank management, liaison between

DB, MT and PG), Research Secretariat Coordinator (coordination of logistics at research secretariat, quality control), Fieldwork Coordinator (coordination of data collection during the physical research, quality control), Interview Coordinator (coordination of data collection interviews, quality control), Data Manager (maintenance of the ICT structure, data cleaning, data extraction for researchers), and the Communication Manager (responsible for communication regarding HELIUS). In the event of problems or disagreements within the MT or regarding the data collection, the DB has the final say.

### 3) Researchers

- a) Researchers affiliated with a Dutch or international research institute may request data or samples to conduct a study that fits within the general aims of HELIUS.
- b) PhD students
  - i) Scientific participation in HELIUS often involves the appointment of a PhD student whose doctoral research is based at least partly on the HELIUS study data.
  - ii) A PhD student whose doctoral research is based exclusively on the HELIUS study data contributes to the general HELIUS activities (i.e. data collection) for one full-time year. The year's work may be spread out over the first two or three years of the appointment. The HELIUS activities undertaken are not necessarily related to the student's own research. We aim for a situation where, during the period of attachment, half of the student's time can be devoted to his/her own research. However, priority is given to the general HELIUS activities.
  - iii) If PhD students contribute to the data collection they are required to sign a HELIUS confidentiality statement, which is available from the supervising MT member.
  - iv) If the PhD student's doctoral research is based only partly on HELIUS data, the amount of time contributed to general HELIUS activities is adjusted on a pro rata basis.
  - v) If a disagreement arises regarding the contribution that a PhD student should make to general HELIUS activities, the final decision lies with the DB.
  - vi) The general HELIUS activities undertaken by a PhD student are supervised by the Scientific Coordinator or an appointed MT member. Scientific supervision of the PhD student's activities in connection with his/her own research project is provided by his/her thesis supervisor(s).
  - vii) PhD students working within HELIUS participate in the general meetings and activities for HELIUS staff and researchers.
- c) Students
  - i) Students (supervised by researchers affiliated with the AUMC or the GGD) may also request data to conduct a study that fits within the general aims of HELIUS. Preferably these are Master's students.
  - ii) Students contribute to general HELIUS activities (i.e. data collection or cleaning) one day per week.
  - iii) If students contribute to the data collection they are required to sign a HELIUS confidentiality statement, which is available from the supervising MT member. If a disagreement arises regarding the contribution that a student should make to general HELIUS activities, the final decision lies with the DB.
  - iv) The general HELIUS activities undertaken by a (PhD) student are supervised by the Scientific Coordinator or an appointed MT member. Scientific

supervision of the student's activities in connection with his/her own research project is provided by his/her thesis supervisor(s).

- v) Students working within HELIUS participate in the general meetings and activities for HELIUS staff and researchers.
- d) In consultation with the DB, alternative means of scientific collaboration may be agreed.
- e) Where scientific participation is agreed, the relevant research project is embedded within one of the three research themes (cardiovascular disease, infectious disease and mental health) by the DB. Each of the three research themes is supervised by the Theme Leader who represents the project within the DB. If there is any doubt regarding the compatibility of a research project with one of the research themes, the DB may be contacted and has the final say.

#### 4) Procedures for the use of data

- a) In order to secure approval for a larger research project within HELIUS, a research proposal must be submitted:  
The research proposal is submitted for a proposal for a subsidy application, a proposal for a sub-study (additional data collection in HELIUS participants) or a proposal for a doctoral programme. Research proposals should be submitted using the HELIUS Research Proposal Form (**appendix 3**). The HELIUS DB assesses research proposals on the basis of the following criteria: compatibility with the general objectives of the HELIUS study, the quality of the research proposal, possible overlap with other cohort studies, the use of biological material, the logistical feasibility and the (financial) contribution to be made.
- b) In order to secure approval for the publication of available HELIUS data, a publication proposal must be submitted:  
A publication proposal is required for each article to be written using HELIUS data (also if a related research proposal has already been approved). Publication proposals should be submitted using the HELIUS Publication Proposal Form (**appendix 4**). This allows for an overview of all HELIUS publications and avoids possible overlaps. The DB assesses all publication proposals. A HELIUS Publication Proposal Form should also be submitted for provisional analyses, presentations and internships that are not intended for (immediate) publication.
- c) In order to specify the exact data to be used for a proposal, a data request is submitted:  
A data request should accompany a publication proposal, or a research proposal concerning a study that involves the collection of additional data on a selection of participants. Data requests are submitted using the HELIUS Data Request Form (**appendix 5**). On the basis of the data request, a data file is created after the approval of the proposal, which is then used for the analyses associated with the relevant publication or study.
- d) To obtain stored biological material for laboratory measurements a material request is submitted:  
A material request should accompany a research or publication proposal wherever the proposal involves the use of the stored biological material in the HELIUS biobank. Material requests are made using the HELIUS Biobank Material Request Form (**appendix 6**). After the approval of the research or publication proposal,

any accompanying material request is forwarded by the Scientific Coordinator to the person who has physical control of the material in question.

- e) Research proposals, publication proposals, data requests and material requests should be submitted to the HELIUS Scientific Coordinator ([HELIUScoordinator@amsterdamumc.nl](mailto:HELIUScoordinator@amsterdamumc.nl)), using the appropriate forms.

## **5) Collaboration in data collection (sub studies)**

- a) The HELIUS Executive Board has the final say over all decisions to share data.
- b) All data will be stored centrally at the department of Public and Occupational Health of the AUMC (G disc).
- c) If sub studies are being performed, other departments or researchers within the AUMC or the GGD may be responsible for the content and execution of part of the data collection.
- d) In cases where information about participants' names, addresses, places of residence and phone numbers is required for additional data collection (sub-studies), the information is provided in the form of address labels (names and addresses) or printouts (names and phone numbers). HELIUS participants must be approached and informed in writing about any sub-study and subsequently contacted by phone (if possible and necessary).
- e) Information about participants' names, addresses and places of residence must be stored in a safe place and strictly separated from research data. HELIUS must be informed as to which participants have been contacted regarding participation in a sub-study and whether each of them agreed to participate.
- f) The HELIUS DB and sub study researchers may agree on 'co-ownership' of the data that are being collected.
- g) In case of co-ownership 1) at least one of the co-owners will co-author publications resulting from these data 2) co-owners are asked for advice by the HELIUS DB regarding approval of a publication proposal. If a disagreement arises regarding the approval of a proposal that includes sub study data, the final decision lies with the DB.
- h) Sub study data or samples may in exceptional cases be stored and processed by sub study researchers, but always within the AUMC or GGD. At least two researchers should have access to these data, and a back-up will be stored in the central HELIUS database. Additional conditions may be agreed between HELIUS DB and the researcher(s).
- i) In case sub study data are stored and processed by sub study researchers (but within the AUMC or GGD), data will be requested via the HELIUS procedures, and the HELIUS DB still has the final say over all decisions to share the data.
- j) Data for scientific analyses always is supplied stripped of information about matters such as the participants' names, addresses and places of residence and of any additional data that is traceable to personal data.
- k) Sub study researchers are responsible for compliance to all agreements that are made with the HELIUS DB.

## **6) Financial arrangements**

- a) Fees represent 1) the value of the data, expressed in the investment that was made to collect the data/samples, and 2) the costs HELIUS makes to disclose the data/samples. The pricing strategy for access to HELIUS data, biological material

and infrastructure, is a tiered strategy with different rates based on the investment that was made to collect the data, the investment that is needed to share the data, and the type of user. Tiers do not take into account all possible differences in investments or in data management tasks associated with data requests. But with these tiers we do aim to cover incremental costs associated with data collection and maintenance of the HELIUS infrastructure.

- b) The pricing structure will be effective per March 1st, 2025 and will be evaluated at the end of 2025, to see if adjustments are needed based on our experiences.
- c) In-kind contributions: During a data collection round, it is also possible to contribute in kind to the data collection costs by providing equipment or personnel capacity of an equivalent value.

### Overview of Tiers:

Note that all prices in the table below are excl. VAT.

		Extra costs	
<b>MSc students</b>		Free use	-
<b>Tier 1 – Basic</b>	HELIUS-1/HELIUS-2 data for 1 intended publication	€5,000	-
<b>Tier 2 – Plus</b>	HELIUS-1/HELIUS-2 data for 1 intended publication + -Linked data (already available) -Sub study data with higher collection/maintenance costs -myDRE	€10,000	Linking costs that exceed 10K, in case of new linkage
<b>Tier 3 – Biobank</b>	<500 samples: €10,000 >=500 samples: €15,000	€10,000/ €15,000	Collecting samples from Biobank
<b>Tier 4 – Novel data collection</b>		€15,000	Organization and execution of data collection
<b>Multi-institutional access</b>	€1,500 per extra institution		

- d) MSc students: free of charge
- e) Tier 1: Basic - €5k per publication.  
Requests include HELIUS-1 (baseline) and HELIUS-2 (follow-up) data only.
- i) This amount will be charged per intended publication. In the event that one publication proposal includes more than one publication, the amount will be adjusted accordingly (ie, 2 publications is 10K).

- ii) The costs for data access cover both the investment that was made to collect the data, and the man-hours that are needed to maintain data quality and sharing of data.
  - iii) There is no limit on the number of variables.
- f) Tier 2: Plus – €10k per publication.  
Proposals that fall in this category request 1) linkages with registry data, 2) substudy data that are complex data that cost more to collect and/or maintain. In addition, projects that need myDRE (needed in specific cases, mostly for linked data, or for complex computing) fall in this category.
- i) The following data are regarded as sub study data in this tier as they are associated with more intensive data collection and/or higher maintenance costs: Microbiome data (HELIUS-1/HELIUS-2), genomics data (HELIUS-1), nutritional data (FFQ-HELIUS-1), COVID sub study data (HELIUS-2), NAFLD data (HELIUS-2), LYRICA data (HELIUS-2).
  - ii) Regarding linkages with registries, we distinguish between:
    - (1) Previously linked data (already available): 10K
    - (2) Newly linked data (data that are not yet available, and will be made available in this project): 10K, or the actual costs for linkage if higher than 10K.
  - iii) The use of other HELIUS-1 and/or HELIUS-2 data is included in this amount.
  - iv) This amount will be charged per publication. In the event that one publication proposal includes more than one publication, the amount will be adjusted accordingly (ie, 2 publications is 20K).
  - v) The costs for data access cover both the investment that was made to collect the data, and the man-hours that are needed to maintain data quality and sharing of data.
  - vi) There is no limit on the number of variables.
- g) Tier 3: Biobank – €10k to €15k per publication + biobank costs  
For biobank use, we charge different fees depending on the number of samples:
- i) 10K when up to 500 samples
  - ii) 15K when 500 samples or more
  - iii) This amount is charged per intended publication, and includes the use of HELIUS data (Basic or Plus).
  - iv) The costs for data and sample access cover both the investment that was made to collect the data and samples, and the costs and man-hours that go into data/sample storage, maintenance and logistics.
  - v) This amount is charged by HELIUS in addition to costs that the biobank charges for collecting, eloquating, transporting the samples.
- h) Tier 4: Additional data collection - €15k per study  
This tier concerns all new data collection, including access to HELIUS participants for recruitment for additional studies, and use of the participant panel.
- i) This amount is charged as overhead, so in addition to the costs associated with the actual administrative, secretarial, data management and measurement costs.
  - ii) For additional studies where HELIUS only provides access to participants and data collection is done by others, we do not charge 15K, but 200 euros per participant that is invited.

- i) Additional Fees: Multi-Institutional Access: If more than one institution is involved, an additional fee of €1,500 per extra institution will be charged.
- j) Other requests: If a specific request falls outside the scope of these tiers, than the HELIUS executive board will determine the price on a case-by-case basis.

## 7) Publication rules

- a) HELIUS follows the publication rules as defined by the International Committee of Medical Journal Editors (ICMJE) ([ICMJE | Recommendations | Defining the Role of Authors and Contributors](#)). Additional publication rules:
- b) A possible co-author must be given sufficient time to make a substantial contribution (two weeks to read draft results or a draft article). The person in question must then actually make a substantial contribution in order to justify being credited as a co-author.
- c) At least two members of the HELIUS DB must co-author every HELIUS publication:
  - i) First, the Theme Leader(s) for the research theme to which the publication relates must be a co-author. If the publication relates to two research themes, both the relevant Theme Leaders may be co-authors. If the publication is of a general nature, one Theme Leader or another DB member is selected on the basis of consultation. If the publication does not relate to any of the research themes, the DB selects one DB member to co-author the publication.
  - ii) Second, in principle the Scientific Coordinator must co-author the publication with a view to assuring consistency (e.g. appropriate general description of the HELIUS project and use of the correct methods).
- d) In principle, every HELIUS publication should be co-authored by a representative of the AUMC and a representative of the Public Health Service of Amsterdam.
- e) No contribution may be submitted to a journal for publication unless and until a Publication Plan has been submitted and approved.
- f) If possible, the title of any publication (including abstract submissions) should include 'the HELIUS study'.
- g) Every publication must include the standard HELIUS acknowledgements. The most recent version of the acknowledgements is available from the Scientific Coordinator on request.
- h) Upon publication, HELIUS will receive the complete dataset (including derived variables) and syntaxes which document how the results of the publication were obtained. These will be archived by HELIUS for audit purposes.
- i) In principle, the authorship guidelines set out above apply equally to HELIUS sub-studies. In the case of a sub-study in which HELIUS participant data were used only for participant selection (without HELIUS cohort data being used), in principle only one DB member needs to act as a co-author. That will usually be the Theme Leader for the research theme to which the publication relates.
- j) The authorship guidelines set out above apply equally to publications whose principal author is not employed by the AUMC or the Municipal Health Authority.
- k) The authorship guidelines set out above apply equally to preprint publications, internships, posters and presentations, since such items normally constitute (draft) publications.
- l) In the event of uncertainty or disagreement regarding authorships of HELIUS DB members and Theme leaders, the DB has the final say. Regarding the authorships of other co-authors, the applicant of the publication proposal has the final say.

## **8) List of appendices**

**Appendix 1. HELIUS research question types**

**Appendix 2. Study design and basic data collection in HELIUS**

**Appendix 3. HELIUS Research Proposal Form**

**Appendix 4. HELIUS Publication Proposal Form**

**Appendix 5. HELIUS Data Request Form**

**Appendix 6. HELIUS Material Request Form**



## Appendix 1: HELIUS research question types

### *Introduction*

What sets HELIUS apart from other cohorts in the Netherlands is the way subjects' ethnic origin is differentiated. In the Netherlands, ethnic origin is routinely determined from a person's country of birth and that of his/her parents. In other words, geographical origin is the dominant factor in the conceptualization of ethnic origin in the Netherlands. However, country of birth is not an ideal indicator, because a given country is liable to contain several population groups of distinct ultimate geographical origin. So, for example, Surinam has several distinct prominent population groups, such as Hindustani (South-Asian origin) and Creole (African origin) ethnic groups. Distinction between such groups requires the collection of additional self-identification data (Stronks K., Kulu-Glasgow I., Agyemang C. The utility of 'country of birth' for the classification of ethnic groups in health research: the Dutch experience. *Ethn Health*. 2009 Jun;14(3):255-69).

The unique ethnic differentiation in the HELIUS data can be utilized for scientific research in two ways. First, it facilitates the explanation of ethnic differences in health (see below, section A). Second, the ethnic differences can be used as a starting point for researching the aetiology of medical conditions (section B).

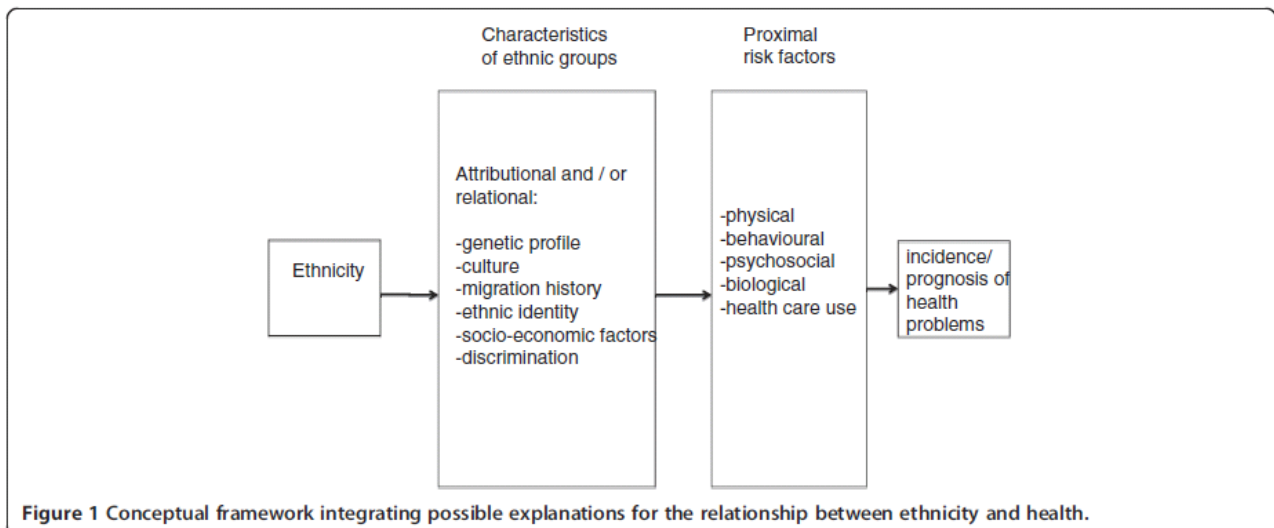
### *A. Explanation of ethnic differences in health and care*

The well-documented phenomenon of differences in diabetes incidence amongst ethnic groups serves as an example for studies concerned with ethnic differences in health and care. To understand the background to the phenomenon, it is necessary to utilize a conceptual model that specifies the relationship between ethnic origin and health (see figure below). The underlying assumption is that ethnic origin is a collective expression of various more specific health and care consumption determinants. In the literature, three types of determinant predominate:

1. Socio-economic factors
2. Cultural influences
3. Genetic factors

In addition to those determinants, there is increasing interest in influences deriving from migration history (e.g. things experienced in the 'home country', refugee experiences, being separated from family) and ethnic identity (i.e. perceived ethnic origin). Such determinants ultimately influence health through more specific health determinants (proximal risk factors), such as lifestyle and living conditions. This conceptualization is visualized in Figure 1. A similar rationale can be applied to the use of care consumption as an outcome indicator.

The findings made regarding ethnic differences in health or care consumption will to some extent be ethnically specific (e.g. the influence of discrimination, or living between two cultures), but will also have a universal dimension, i.e. be valid for the population as a whole. The role of communication processes in care is a good example. The knowledge obtained from research into such processes is often applicable in relation to the majority population as well. However, the circumstances of ethnic minority population groups will often magnify issues that exist within the population as a whole. An ethnic minority can therefore serve as a 'magnifying glass' for the study of more universal mechanisms.



### B. Aetiological questions

HELIUS can be used not only for the explanation of ethnic differences in health and care, but also for the examination of aetiological questions in various ways:

1. Ethnic variation amplifies variations in underlying risk factors, facilitating the study of those risk factors. For example, Brewster et al. investigated the relationship between CK and hypertension: the variation in CK within the ethnically diverse research population in the SUNSET study (Surinamese Creoles and Hindustanis and Dutch people) can be used to quantify the relationship between CK and hypertension, without the ethnic variation in the risk factor itself being the object of study (Brewster L.M. et al. Creatine kinase activity is associated with blood pressure. *Circulation* 2006;114:2034-9).
2. Unexpected associations between risk factors and outcome indicators in particular ethnic groups can be used as a starting point for investigating the aetiology of the relevant outcomes. For example: hypertension is relatively uncommon in the Bangladeshi population in the UK, yet the mortality due to stroke is twice as high in that group as in the majority population. What light does that shed on the aetiology of strokes?
3. The investigation of associations between risk factors and outcome indicators in various ethnic groups can shed light on causality. For example: if the relationship between a given risk factor and a given outcome indicator differs from one ethnic groups to the next, that may suggest that other (unidentified) risk factors may additionally impact outcome or that the relation between risk factor and outcome is influenced by other aggravating or ameliorating factors.
4. Genetic-environmental interactions form a particular focus of attention for aetiological research. Ethnic minority groups tend to experience particularly marked changes in factors such as culture, living conditions and lifestyle from one generation to the next. Therefore HELIUS provides a unique opportunity to study such interactions.

Ultimately, the knowledge of risk factors/aetiology obtainable from HELIUS is potentially beneficial for the population as a whole, regardless of ethnic origin.

*See also: Stronks et al. Unravelling the impact of ethnicity on health in Europe: the HELIUS study. BMC Public Health 2013 Apr 27;13:402.*

## Appendix 2: Study design and basic data collection HELIUS

HELIUS (acronym for HEalthy LIfe in an Urban Setting) is a multi-ethnic cohort study carried out in Amsterdam, including participants of Dutch, African Surinamese, South-Asian Surinamese, Turkish, Moroccan and Ghanaian ethnic origin. The objective of HELIUS is to unravel the causes of the unequal burden of diseases across ethnic groups. The emphasis is on cardiovascular diseases (including diabetes), mental health (i.e. depressive disorders and substance use disorders), and infectious diseases, all major causes of the global burden of disease. Important themes related to these diseases are nutrition, physical activity and health care utilization.

Participants aged 18 to 70 years were randomly sampled, stratified by ethnicity, from the municipal population register of Amsterdam (GBA). Participants' ethnicity was defined according to the country of birth of the participant as well as that of his/her parents, which is the currently the most widely accepted and most valid assessment of ethnicity in the Netherlands (Stronks et al, Ethn Health 2009). Specifically, a participant was considered as of non-Dutch ethnic origin if he/she fulfilled either of the following criteria: 1) he/she was born abroad and has at least one parent born abroad (first generation); or 2) he/she was born in the Netherlands but both his/her parents were born abroad (second generation). A limitation of the country of birth indicator for ethnicity is that people who are born in the same country might have a different ethnic background, which in the Dutch context is applicable to the Surinamese population (Stronks et al, Ethn Health 2009). Therefore, after data collection, the Surinamese group was further classified according to self-reported ethnic origin into 'African', 'South-Asian', or 'other'. For the Dutch sample, we invited people who were both born in the Netherlands and whose parents were born in the Netherlands.

Participating GBA subjects (index persons) were asked if they had parents, siblings, a partner, and children from the age of 18-70 years, who are living in Amsterdam. We included a maximum of three related persons per index person. If an index person had parents in Amsterdam, then both parents will be invited to participate as well as a sibling of the index person (Figure 1). In case an index person has no parents living in Amsterdam, but has one or more children from the age of 18 years living in Amsterdam, then a maximum of two children was invited as well as the partner of the index (Figure 2). In case an index person had no parents or children of 18 years onward living in Amsterdam, only the index person was included in HELIUS.

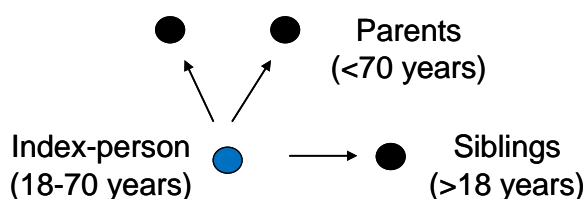


Figure 1

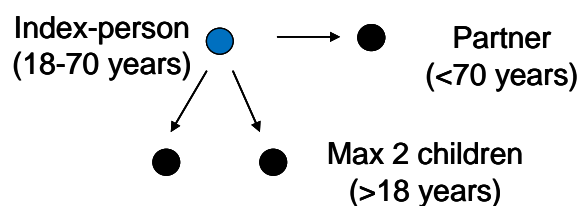


Figure 2.

At the baseline data collection, participants filled in a questionnaire (or were interviewed, if necessary) about their health and they underwent a physical examination (for specific topics see overviews below). Biological samples were obtained, analysed and stored (biobank, including DNA).

The first follow-up examination was conducted between 2019-2022. All persons that participated in the baseline examination ( $n \sim 25.000$ ) and gave consent to be invited for follow-up examinations received a written invitation for the follow-up examination combined with written information regarding the study and a response card. After a positive response, either by response card, telephone or e-mail, an appointment for a physical examination was made and participants received a confirmation letter by mail or e-mail of the appointment at a local health centre.

During the follow-up visit blood samples with a total of 25 mL, a faeces sample and an urine sample were collected. In addition, a throat, nose and tongue swab was taken (from March 2021 onwards). We asked the participants about lifestyle (smoking, alcohol), mental health (PHQ-9), negative life events, their medication use and medical history. Finally, we performed blood pressure measurements and we collected anthropometric data. Note that the data-collection at this follow-up examination is much less extensive compared to the baseline examination (which included much more measurements at the physical examination and a separate, extensive questionnaire/interview).

Follow-up examinations are planned at 5 to 10 year intervals. In addition, data of participants are linked to registry data. Linkages are established with environmental data (source: Geoscience and Health Cohort Consortium (GECCO)), causes of death data (source: Statistics Netherlands), data on incident diabetes (source Vektis/Achmea), COVID-19 outcomes (source: Municipal Health Service Amsterdam), cancer outcomes (source: Netherlands Cancer Registry) and outcomes from general practice records (source: Network of Academic General Practitioners Data Base).

An overview of HELIUS can be found on the website:  
<http://heliusstudy.nl/nl/researchers/publications/>

*For more details see:*

[MB Snijder et al. Cohort Profile: the Healthy Life in an Urban Setting \(HELIUS\) study. \*BMJ Open\* 2017;7\(12\):e017873.](#)  
[H Galenkamp et al. The Healthy Life in an Urban Setting \(HELIUS\) study in Amsterdam, The Netherlands: cohort update 2024 and key findings](#)

## Overview variables in baseline HELIUS questionnaire

DETERMINANTS OR RISK FACTORS					
General	Infectious diseases	Mental health	Cardiovascular diseases	Health care	Nutrition
<ul style="list-style-type: none"> <li>- Sex, age</li> <li>- Marital status*</li> <li>- Household composition</li> <li>- Ethnic origin (incl. subgroups and province)</li> <li>- Migration history</li> <li>- Educational level</li> <li>- Occupational status*</li> <li>- Work-related recovery opportunities</li> <li>- Religion</li> <li>- Cultural distance</li> <li>- Smoking*</li> <li>- Alcohol intake*</li> <li>- Cannabis use</li> <li>- Physical activity (SQUASH)</li> </ul>	<ul style="list-style-type: none"> <li>- Sexual behaviour</li> <li>- Anti-conception use (women)</li> <li>- HPV vaccination (women)</li> <li>- Circumcision (men)</li> <li>- Travel behaviour (incl. visited countries)</li> <li>- Use of self-tests</li> <li>- Blood transfusions</li> <li>- Use of drugs by injection</li> <li>- Surgery in other country</li> </ul>	<ul style="list-style-type: none"> <li>- Perceived discrimination (Everyday discrimination scale, Forman et al 1997)</li> <li>- Perceived social support (Social Support Questionnaire for Satisfaction Emotional Support Subscale)</li> <li>- Childhood trauma (NEMESIS-I)</li> <li>- Parental psychiatric history (NEMESIS-I)</li> <li>- Mastery (NEMESIS-I)*</li> <li>- Neuroticism (NEO-FFI)</li> <li>- Extraversion (NEO-FFI)</li> <li>- Stressful life events (NEMESIS-II)*</li> <li>- Psychological stress (2 items from INTERHEART)</li> </ul>	<ul style="list-style-type: none"> <li>- History of high blood pressure (incl. family history)</li> <li>- History of dyslipidaemia (incl. family history)</li> <li>- History of diabetes (incl. family history)*</li> <li>- Fainting</li> <li>- Age of menarche</li> <li>- Age of menopause</li> <li>- Variables to link with LVR</li> </ul>	<ul style="list-style-type: none"> <li>- Difficulty understanding medical information</li> <li>- Compliance to medication</li> <li>- Perceived quality of GP</li> </ul>	<ul style="list-style-type: none"> <li>- Weight perception</li> <li>- Fruit intake</li> <li>- Vegetarian diet</li> <li>- Dietary pattern (breakfast, lunch, meal)</li> <li>- Coffee/tea and sugary drinks intake</li> </ul>

OUTCOMES					
General	Infectious diseases	Mental health	Cardiovascular diseases	Health care	Nutrition
<ul style="list-style-type: none"> <li>- General diseases</li> <li>- Quality of life (SF-12)</li> <li>- Functional limitations</li> </ul>	<ul style="list-style-type: none"> <li>- Allergy/asthma (incl. family history)</li> <li>- Rhinitis</li> <li>- Food allergy</li> <li>- Urogenital infections</li> </ul>	<ul style="list-style-type: none"> <li>- Cigarette dependence (Fagerström)</li> <li>- Alcohol dependence (AUDIT)</li> <li>- Lifetime alcohol dependence</li> <li>- Cannabis dependence (CUDIT)</li> <li>- Lifetime cannabis dependence</li> <li>- Current depression and depressive disorder (PHQ-9)*</li> <li>- Lifetime depression</li> <li>- Post-traumatic stress disorder</li> </ul>	<ul style="list-style-type: none"> <li>- Angina pectoris (Rose)</li> <li>- Myocardial infarction*</li> <li>- Intermittent claudication (Rose)</li> <li>- Heart failure</li> <li>- CVA/TIA*</li> <li>- Family history CVD and sudden death</li> </ul>	<ul style="list-style-type: none"> <li>- Visit to GP</li> <li>- Visit to specialists</li> <li>- Psychological help</li> <li>- Alternative health care</li> <li>- Medication or care in other country/countries</li> </ul>	<ul style="list-style-type: none"> <li>- Self-reported weight and height</li> </ul>

\*variables marked with an asterisk were (partly) measured at the first follow-up, at the research location

## Overview measurements/variables baseline and first follow-up HELIUS physical examination

Questions at physical examination		Baseline 2011-2015	1 <sup>st</sup> follow-up 2019-2022
Time of latest meal (to check fasting state)		X	X
Time of latest cigarette		X	
Currently breastfeeding		X	
Normal dietary pattern for the last 3 days		X	
Normal physical activity patterns for the last 3 days		X	
Current/recent (past 2 weeks) health problems:	Fever	X	
	Head ache	X	
	Muscle pain	X	
	Pain in throat	X	
	Coughing	X	
	Shortness of breath	X	
	A cold	X	
Part of twin		X	
Medication	Name, dose, frequency, indication	X	X
Nutritional supplements	Name, indication	X	
Health literacy test		X	
<b>Measurements</b>			
Anthropometry	Weight	X	X
	Height	X	X
	Waist circumference	X	X
	Hip circumference	X	X
	Thigh circumference	X	
	Arm circumference	X	
	Calf circumference	X	
Body fat percentage	(by bio-impedance)	X	
Hand grip strength		X	
Blood pressure	(sitting)	X	X
Ankle-arm index	(supine position)	X	
ECG	Left ventricular hypertrophy, infarction, etc.	X	
Nexfin	Cardiac output, peripheral resistance	X	
Arteriograph	Arterial stiffness	X	
<b>Collection biological material</b>			
Morning urine sample	Storage Direct determination of: micro-albumin, creatinine	X	X (without storage)
Fasting blood sample	Storage Direct determination of: total chol, HDL, LDL, triglycerides, creatinine, glucose, Hb, HbA1c, CK	X	X (without storage)
Throat swab	Storage	X	X
Tongue swab			X
Nose swab	Storage	X	X
Vaginal swab (women only)	Storage	X	
Faeces sample	Storage	X	X

## Appendix 3: HELIUS Research Proposal Form

This form should be used to submit a research proposal – e.g. a proposal for a subsidy application, a proposal for a sub-study, or a proposal for a doctoral programme – to HELIUS.

NB for data use for publications, internships, or quality checks of the data, please use the Publication Proposal Form (appendix 4).

NB publication proposals still need to be submitted for each publication making use of HELIUS data, also if the related research proposal has already been approved by the HELIUS board.

For notes and guidance, please refer to the full HELIUS Collaboration Policy.

<b>1. Applicant</b>	<p>Name          University / Hospital / Faculty / Department / Research institute          Type of appointment (position)          Street address          Postcode and city          Phone          E-mail</p>
<b>2. Title of the proposed study</b>	
<b>3. Main subject</b>	<p>What is the main subject of the proposed study?          Does the proposal relate to an activity which is part of a larger research project? If so, give a brief description.</p>
<b>4. Keywords</b>	<p>Give up to eight keywords.</p>
<b>5. Background</b>	<p>Describe the background to and rationale for this research proposal (including key references) and the significance/relevance in relationship to ethnicity.</p>
<b>6. Research question(s)</b>	<p>Describe the exact research question or questions</p>
<b>7. Study design and methods</b>	<p>Describe the study design and study population:</p> <ol style="list-style-type: none"> <li>What health outcomes and what exposures/risk factors/possible causes will be measured?</li> <li>Will the study exclusively use cross-sectional baseline data, or also data on incidence over time?</li> <li>In how many people will exposure be measured?</li> </ol>
<b>8. Use of HELIUS data</b>	<p>How does the applicant propose to use the HELIUS data?</p> <p><u>Level 1:</u> use of the existing basic data collection  <u>Level 2:</u> use of the biobank (use of biological samples for lab tests)  <u>Level 3:</u> addition of a parameter (measurement or collection of biological samples) to the basic data collection; please specify whether in a selection of the HELIUS study population or the whole population (sub-study during basic data collection)  <u>Level 4:</u> measurement of additional parameters other than at basic data collection time in a selection or all of the HELIUS study population (sub-study after basic data collection)</p> <p>NB: If the proposed study involves the selection of participants for a sub-study on the basis of HELIUS data, this research proposal should be accompanied by a HELIUS Data Request Form. The information entered on the latter form will serve as a basis for the Data Transfer Agreement (collaboration agreement).          NB: If the proposed study involves use of the biobank, this research proposal should be accompanied by a HELIUS Biobank Material Request Form. The information entered on the latter form will serve as a basis for the Material Transfer Agreement (collaboration agreement).</p>

<b>9. Proposed approach to the handling of findings</b>	<i>If the proposed study involves the lab testing of stored materials or the measurement of additional parameters: Do any of the lab tests or measurements have the potential to yield findings that warrant disclosure to the participant, due to their clinical significance? If so, what approach to disclosure is proposed?</i>
<b>10. Anticipated results</b>	<i>What are the anticipated outcomes of the proposed study?</i>
<b>11. Innovative features</b>	<i>What innovative features does the proposed study have in relationship to the multi-ethnic population?</i>
<b>12. Funding</b>	<i>How will the proposed study be funded? What proportion of the cost will be funded by the proposing institute and/or what proportion has yet to be covered by sponsors? Is funding to be applied for? If so, when and from whom?</i>
<b>13. Project group</b>	<i>What other researchers are associated with this research proposal?</i>
<b>14. Timing</b>	<i>What is the planned start date for the proposed study? What is the planned end date for the proposed study?</i>
<b>15. Fee</b> <i>To be filled in by HELIUS</i>	<input type="checkbox"/> MSc student <input type="checkbox"/> Basic (5,000 euros) <input type="checkbox"/> Plus (10,000 euros) <input type="checkbox"/> Biobank (10,000/15,000 euros) <input type="checkbox"/> Novel data collection (15,000 euros/200 per invited participant) <input type="checkbox"/> Multi-institutional access (1,000 per extra institution)
<b>Agreed by both parties</b>	<p><b>On behalf of HELIUS:</b> Name: Signature: Date:</p> <p><b>Researcher</b> Name: Signature: Date:</p> <p><b>Budget holder</b> Name: Signature: Date:</p>



## Appendix 4: HELIUS Publication Proposal Form

This form should be used to submit a publication proposal making use of the HELIUS data.

This form should also be used to submit a proposal regarding the use of HELIUS data for activities that will not lead to a publication, such as an internship, data quality control activities, etc.

Up to two A4 pages (excluding tables, where relevant)

Manuscript #	Date of submission	Date of approval
<b>1. Applicant</b>	<i>Name</i> <i>University / Hospital / Faculty / Department / Research institute</i> <i>Type of appointment (position)</i> <i>Street address</i> <i>Postcode and city</i> <i>Phone</i> <i>E-mail</i>	
<b>2. Title / subject of the publication</b>		
<b>3. Proposed authors</b>	<i>Who is the proposed first author?</i> <i>Who are the proposed co-authors? The authorship proposals should be consistent with the guidelines set out in the HELIUS Collaboration Policy.</i>	
<b>4. First author's contact details (if not similar to applicant details)</b>	<i>Name</i> <i>University / Hospital / Faculty / Department / Research institute</i> <i>Type of appointment (position)</i> <i>Phone</i> <i>E-mail</i>	
<b>5. Background and rationale</b>	<i>Describe the background to and rationale for this research proposal (including key references).</i>	
<b>6. Research question(s)</b>	<i>Clearly state the main research question and sub-questions.</i>	
<b>7. Data and population</b>	<i>What inclusion and exclusion criteria are to be applied (e.g. age, ethnicity, etc.)?</i>	
<b>8. Analysis plan</b>	<i>Describe on a step-by-step basis the statistical analyses to be performed (type of analyses, regression, tests, etc.) in order to answer each research question (using what dependent and independent variables, what confounders, etc.). What tables will be produced? (Please provide unpopulated tables if possible.)</i>	
<b>9. Administrative aspects</b>	<i>Describe how the data will be transferred (preferably via SURF filesender), stored and analyzed in a secure way (for example, the data are only stored in the secured environment of the receiving institute).</i>	
<b>10. Timing</b>	<i>When will the data analysis start?</i> <i>When will the manuscript be written?</i> <i>When is the manuscript likely to be completed?</i>	
<b>11. Fee</b> <i>To be filled in by HELIUS</i>	<input type="checkbox"/> <i>MSc student</i> <input type="checkbox"/> <i>Basic (5,000 euros)</i> <input type="checkbox"/> <i>Plus (10,000 euros)</i> <input type="checkbox"/> <i>Biobank (10,000/15,000 euros)</i> <input type="checkbox"/> <i>Novel data collection (15,000 euros/200 per invited participant)</i> <input type="checkbox"/> <i>Multi-institutional access (1,000 per extra institution)</i>	
<b>Agreed by both parties</b>	<b><i>On behalf of HELIUS:</i></b> <i>Name:</i> <i>Signature:</i>	

	<p><i>Date:</i></p> <p><b>Researcher</b></p> <p><i>Name:</i></p> <p><i>Signature:</i></p> <p><i>Date:</i></p> <p><b>Budget holder</b></p> <p><i>Name:</i></p> <p><i>Signature:</i></p> <p><i>Date:</i></p>
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## Appendix 5: HELIUS Data Request Form

This form is intended for specification of the data required in connection with the **publication proposal** or **research proposal**.

If you have questions regarding the available data, please contact the Scientific Coordinator ([HELIOUScoordinator@amsterdamumc.nl](mailto:HELIOUScoordinator@amsterdamumc.nl)).

No data are released until the **HELIUS Data Transfer Agreement** has been signed, agreeing to the HELIUS Collaboration Policy and the data utilization conditions.

Name applicant:	
Title research proposal or publication proposal:	
E-mail applicant(s):	
Reason for data request: <i>(please tick)</i>	<input type="checkbox"/> data-analysis for publication (or internship or preliminary analyses) <input type="checkbox"/> selection of participants for sub-study <input type="checkbox"/> quality control of specific data, description:  <input type="checkbox"/> other, namely:

### Explanation

Please tick which data are requested. For data management reasons, the data are sorted by ICT-source of the data.

Not all variables that are available in HELIUS-1 are also available in HELIUS-2.

If additional data from the baseline questionnaire or the physical examination visit(s) are needed, please describe them in the dedicated table.

	<i>HELIUS-1 2011- 2015</i>	<i>HELIUS-2 2019- 2021</i>
<b>Standard variables</b> <i>Standaard variabelen</i>		
<i>HELIUS-1 standard variables will be available in each HELIUS dataset. HELIUS-2 standard variables are added if HELIUS-2 data is requested</i>		
Questionnaire completed (only available at baseline) (yes/no)	X	
Physical examination completed (yes/no)	X	X
Date of physical examination	X	X
Sex	X	
Age	X	X
Migration generation (based on countries of birth of participants and parents)	X	
Ethnicity (based on countries of birth of participant and his/her parents: Dutch, Surinamese, Ghanaian, Turkish, Moroccan)	X	
Ethnicity including Surinamese subgroups (definition of ethnicity completed with	X	

information from the baseline questionnaire)		
Follow-up time between HELIUS-1 and HELIUS-2		X
<b>Already defined variables/composite variables</b>		
<i>Please tick which variables you need for your proposal</i>		
<b>General (defined from questionnaire variables) LimeSurvey</b>		
Marital status (5 categories)	<input type="checkbox"/>	<input type="checkbox"/>
Educational level (highest education obtained, either in Netherlands or country of origin, 4 categories) Deel G	<input type="checkbox"/>	
Working status (4 categories) Deel G	<input type="checkbox"/>	<input type="checkbox"/>
Occupational level (5 categories) Deel G	<input type="checkbox"/>	
Work-related recovery opportunities Deel G	<input type="checkbox"/>	
Quality of life (SF-12, Physical and Mental Component Scores) Deel B	<input type="checkbox"/>	
Physical activity (obtained by SQUASH questionnaire) Deel E	<input type="checkbox"/>	
Smoking status (yes, no, ex-smoker) Deel E	<input type="checkbox"/>	<input type="checkbox"/>
Smoking (packyears) Deel E	<input type="checkbox"/>	
Alcohol use in past 12 months (yes, no) Deel E	<input type="checkbox"/>	<input type="checkbox"/>
Alcohol use in past 12 months (low, moderate, high) Deel E	<input type="checkbox"/>	<input type="checkbox"/>
Body weight perception scores Deel J	<input type="checkbox"/>	
Health literacy scores (SBS-Questionnaire) Sam	<input type="checkbox"/>	
Health literacy scores (REALM-D test, among subsample n~9700) Sam	<input type="checkbox"/>	
<b>Body composition and muscle strength (derived from physical examination) Oracle</b>		
Mean weight Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Mean height Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Body mass index (BMI) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Mean waist circumference Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Mean hip circumference Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Waist-to-hip ratio (WHR) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Mean thigh circumference Blok 1	<input type="checkbox"/>	
Mean arm circumference Blok 1	<input type="checkbox"/>	
Mean calf circumference Blok 1	<input type="checkbox"/>	
Body fat percentage (estimated by bio-impedance) Sam	<input type="checkbox"/>	
Muscle strength (mean and maximum grip strength) Blok 5	<input type="checkbox"/>	
<b>Cardiovascular/medical variables (derived from questionnaire and physical examination variables)</b>		
Mean blood pressures Blok 5	<input type="checkbox"/>	<input type="checkbox"/>
Hypertension (based on self-report, blood pressure, and/or medication) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Blood pressure lowering medication (ATC codes C02 C03 C07 C08 C09) (yes/no) B1	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes (based on self-report, glucose levels, and/or medication) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Glucose lowering medication (ATC codes A10) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Self-reported CVD (according to Rose-questionnaire) (yes/no) Sam	<input type="checkbox"/>	
Self-reported CVA (yes/no) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Self-reported MI (yes/no) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Lipid lowering medication (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Metabolic syndrome (including its individual components) (yes/no) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Kidney function (Cockcroft-Gault eCC, eGFR (MDRD/CKD-EPI), MA, KDIGO) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics (ATC codes J01) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Antithrombotics (ATC codes B01) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Corticosteroids (ATC codes D07 plus specific codes) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Decongestants and allergy medication (ATC codes S01G) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Nasal medication (ATC codes S01G) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Astma/COPD medication (ATC-codes R03) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Systemic antihistamines (ATC-codes R06) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Systemic steroids (ATC-codes H02) (yes/no) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>

Estimated CVD risk (based on SCORE; in participants aged $\geq 40$ y) (yes/no) Sam	<input type="checkbox"/>	<input type="checkbox"/>
Estimated CVD risk (based on Framingham; in participants aged $\geq 30$ y) (yes/no) Sam	<input type="checkbox"/>	<input type="checkbox"/>
<b>Use of psychotropic medication (physical examination) Oracle</b>		
Anti-psychotics (ATC codes N05A) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Anxiolytics (ATC codes N05BA and N03AE) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Hypnotics (ATC codes N05C and R06AD02) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Modern anti-depressives (ATC codes N06A and N06AX) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Mood stabilizers (ATC codes N03AF, N03AG, N03AN and N05AX) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Stimulants (ATC codes N06BA) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Tricyclic anti-depressives (ATC codes N06AA) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Medication for addiction (ATC codes N07B) Blok 1	<input type="checkbox"/>	<input type="checkbox"/>
Psychotropic medication (use of one of the above medications)	<input type="checkbox"/>	<input type="checkbox"/>
Anti-depressives (modern/tricyclic anti-depressives and mood stabilizers; ATC codes N06AB, N06AX, N06AA, N03AF, N03AG, N05AN en N03AX)	<input type="checkbox"/>	<input type="checkbox"/>
<b>ECG variables Oracle Blok 2</b>		
Supraventricular rhythms (sinus rhythms, atrial rhythms), ventricular and/or paced rhythms	<input type="checkbox"/>	
Premature atrial complexes	<input type="checkbox"/>	
Premature ventricular complexes	<input type="checkbox"/>	
Atrial abnormalities	<input type="checkbox"/>	
Axis	<input type="checkbox"/>	
Atrioventricular (AV) conduction	<input type="checkbox"/>	
Ventricular conduction	<input type="checkbox"/>	
QTc interval	<input type="checkbox"/>	
Q wave morphology	<input type="checkbox"/>	
Left ventricular hypertrophy (LVH) voltage criteria HT guideline (Mancia 2013)	<input type="checkbox"/>	
Left ventricular hypertrophy (LVH) voltage criteria Cato ter Haar (Sokolow-Lyon sum S V1 + R V5/R V6 > 3.5 mV, CornV R aVL + S V3 > 2.8 mV (men), 2.0 mV (women), R aVL > 1.1mV)	<input type="checkbox"/>	
Microvoltages	<input type="checkbox"/>	
T wave/repolarization abnormalities with or without LVH Cato	<input type="checkbox"/>	
T wave/repolarization abnormalities with or without LVH Cato	<input type="checkbox"/>	
Other ECG abnormalities (subjective interpretation)	<input type="checkbox"/>	
Early repolarization pattern (ERP) according to Glasgow program (Macfarlane 2013)	<input type="checkbox"/>	
<b>Mental health (questionnaire, for additional information see document 'Mental Health Instruments in HELIUS')</b>		
Perceived discrimination (score Everyday Discrimination scale) Deel D	<input type="checkbox"/>	
Cigarette dependence (score Fagerstrom) Deel E	<input type="checkbox"/>	
Alcohol dependence (score AUDIT) Deel E	<input type="checkbox"/>	
Lifetime alcohol dependence Deel E	<input type="checkbox"/>	
Cannabis dependence (score CUDIT) Deel E	<input type="checkbox"/>	
Personality: extraversion (score NEO- Five Factor Inventory) Deel H	<input type="checkbox"/>	
Personality: neuroticism (score NEO- Five Factor Inventory) Deel H	<input type="checkbox"/>	
Dealing with everyday problems (score Pearlin-Schooler mastery scale) Deel H	<input type="checkbox"/>	<input type="checkbox"/>
Negative life events (List of threatening experiences, NEMESIS questionnaire) Deel H	<input type="checkbox"/>	<input type="checkbox"/>
Psychological stress (at work and at home) (INTERHEART questionnaire) Deel H	<input type="checkbox"/>	
Experiences during childhood (Childhood trauma; NEMESIS questionnaire) Deel H	<input type="checkbox"/>	
Problems because of unpleasant experiences (Post-traumatic stress disord) Deel H	<input type="checkbox"/>	
Depressive symptoms (PHQ-9) Deel I	<input type="checkbox"/>	<input type="checkbox"/>
Lifetime depression Deel I	<input type="checkbox"/>	
Parental psychological history (NEMESIS) Deel I	<input type="checkbox"/>	
Social support (scores Social Support Questionnaire for Satisfaction – Daily Emotional Support Subscale) Deel I	<input type="checkbox"/>	

<b>Acculturation (questionnaire, for additional information see document 'Acculturation in HELIUS')</b>			
Residence duration (years) Sam		<input type="checkbox"/>	
Age of migration (years) Sam		<input type="checkbox"/>	
Difficulty with Dutch language (yes/no) Sam		<input type="checkbox"/>	
Ethnic identity (Berry's acculturation strategies) Sam		<input type="checkbox"/>	
Cultural orientation (Berry's acculturation strategies) Sam		<input type="checkbox"/>	
Social network (Berry's acculturation strategies) Sam		<input type="checkbox"/>	
Cultural distance to Dutch health care system Sam		<input type="checkbox"/>	
<b>Laboratory measurements (source LAKC, LABTRAIN extract) Labtrain</b> <i>Please tick which variables you need for your proposal</i>		<b>HELIUS-1 2011- 2015</b>	<b>HELIUS-2 2019- 2021</b>
<i>Blood (fasting)</i>			
Glucose		<input type="checkbox"/>	<input type="checkbox"/>
HbA1c (=H1c)		<input type="checkbox"/>	<input type="checkbox"/>
Hb (=HEMO)		<input type="checkbox"/>	<input type="checkbox"/>
Triglycerides		<input type="checkbox"/>	<input type="checkbox"/>
Total cholesterol		<input type="checkbox"/>	<input type="checkbox"/>
HDL		<input type="checkbox"/>	<input type="checkbox"/>
LDL (calculated)		<input type="checkbox"/>	<input type="checkbox"/>
Creatinin		<input type="checkbox"/>	<input type="checkbox"/>
CPK		<input type="checkbox"/>	
ASAT			<input type="checkbox"/>
ALAT			<input type="checkbox"/>
GAMMA-GT			<input type="checkbox"/>
Trombocytes			<input type="checkbox"/>
<i>Morning urine</i>			
Micro-albumin		<input type="checkbox"/>	<input type="checkbox"/>
Creatinin		<input type="checkbox"/>	<input type="checkbox"/>
Micro-alb/creat ratio (calculated)		<input type="checkbox"/>	<input type="checkbox"/>
<b>Results urine dipstick (source Oracle Clinical application, Blok Afsluiting) Oracle, Blok Afsluiting</b> <i>Please tick which variables you need for your proposal</i>			
pH		<input type="checkbox"/>	
Glucose		<input type="checkbox"/>	
Ketones		<input type="checkbox"/>	
Leucocytes		<input type="checkbox"/>	
Nitrite		<input type="checkbox"/>	
Protein		<input type="checkbox"/>	
Erythrocytes		<input type="checkbox"/>	
<b>Physical examination (source Oracle Clinical application) Oracle</b> <i>Enter which additional data from the physical examination you need (see HELIUS CRF)</i>			
<b>Blok</b>	<b>Questions or measurements</b>		
..	....		
..	....		

<b>Questionnaire HELIUS-1 (source Limesurvey application) LimeSurvey</b> <i>Enter which additional questions from the baseline questionnaire you need (section, and number and subject of the question(s), see baseline HELIUS questionnaire)</i>	
<b>SECTION</b>	<b>Number and subject of the question(s)</b>
..	....
..	....

	<b>Substudies</b> (note: participants of different substudies may not overlap)	Substudies
<i>HELIUS-1 Substudies</i>	<i>Subsample n~5800 (five ethnic groups, no Ghanaians) Dietary intake (please specify:.....)</i>	<input type="checkbox"/>
	<i>Subsample n=6000 (six main ethnic groups) D-dimer fibrinogen Lpa ApoB CRP</i>	<input type="checkbox"/>
	<i>Subsample n~6000 (six main ethnic groups) Fecal microbiome</i>	<input type="checkbox"/>
	<i>Subsample ~600 (six ethnic groups, women) Vaginal microbiome (swabs) Vaginal human papillomavirus (HPV) (swabs)</i>	<input type="checkbox"/>
	<i>Subsample ~1200 (six ethnic groups, women) Vaginal Chlamidia trachomatis (swabs)</i>	<input type="checkbox"/>
	<i>Subsample n=1058 (five ethnic groups, no Ghanaians) Cholesteryl fatty acids Carotenoids</i>	<input type="checkbox"/>
	<i>Subsample n=786 (Dutch and South-Asian Surinamese) Acylcarnitines Amino acids Sphingolipids</i>	<input type="checkbox"/>
	<i>Subsample n=500 (Ghanaians and African Surinamese with (pre)diabetes) Metabolomics</i>	<input type="checkbox"/>
	<i>Subsample n=476 (five ethnic groups, no Ghanaians) Physical activity by Actiheart</i>	<input type="checkbox"/>
	<i>Subsample n=4683 (six main ethnic groups, age 18-44 y) Antibodies against human papillomavirus (HPV) Antibodies against human T-lymphotopic virus-1 Antibodies against Helicobacter pylori Antibodies against Herpesvirus Antibodies against Chlamidia trachomatis</i>	<input type="checkbox"/>
	<i>Subsample n=1199 (six main ethnic groups, age 18-44 y) Antibodies against hepatitis E</i>	<input type="checkbox"/>
	<i>Subsample n~2990 (six main ethnic groups, only first generation migrants) Hepatitis B infection (anti-HBc, anti-HBs, HBeAg, anti-HBe, HBV-DNA) Hepatitis C infection (anti-HCV, HCV RNA)</i>	<input type="checkbox"/>
	<i>Subsample n=10283 (Dutch, South-Asian Surinamese, Turkish, Moroccan) Whole genome SNP genotypes (GSA Illumina)</i>	<input type="checkbox"/>
	<i>Subsample n=10252 (all ethnic groups)</i>	<input type="checkbox"/>

	<i>Heart rate variability (HRV) and baroreflex sensibility (BRS) (obtained from Nexfin measurements)</i>	
<i>HELIUS-2 Substudies</i>	<i>Subsample n~2500 (all ethnic groups) COVID-19 seroprevalence sub study (please specify, .....)</i>	<input type="checkbox"/>
	<i>Four subsamples of n~1100 (all ethnic groups) COVID-19 online questionnaire (please specify, .....)</i>	<input type="checkbox"/>
	<i>Subsample n~400 (all ethnic groups) NAFLD substudy, (please specify, .....)</i>	<input type="checkbox"/>
	<i>Subsample n~3000 (Dutch, South-Asian Surinamese, Moroccan groups) LYRICA substudy (please specify, .....)</i>	<input type="checkbox"/>

<b>Registry data</b>	
For an overview of which registry data have been linked to HELIUS and additional procedures and conditions to use these linked data, please ask the Scientific Coordinator (HELIUScoordinator@amsterdamumc.nl)	
<b>Environment data (source: Geoscience and Health Cohort Consortium (GECCO))</b> Environment data based on zip-codes is linked to HELIUS data	<input type="checkbox"/>
<b>Causes of death (source: Statistics Netherlands)</b> Cause of death is linked to HELIUS data (subsample deceased HELIUS participants)	<input type="checkbox"/>
<b>Health insurance data on diabetes (Vektis/Achmea)</b> Data on incident type 2 diabetes is linked to HELIUS data	<input type="checkbox"/>
<b>COVID outcomes (source: Municipal Health Service Amsterdam)</b> Data on COVID testing and COVID infections, and vaccination uptake is linked to HELIUS data	<input type="checkbox"/>
<b>Cancer outcomes (source: Netherlands Cancer Registry)</b> Data on cancer outcomes and treatment is linked to HELIUS data	<input type="checkbox"/>
<b>General Practitioner registry data (source: Network of Academic General Practitioners Data Base)</b> Data obtained from general practices is linked to HELIUS data	<input type="checkbox"/>
New data linkage is requested, <i>(please specify, .....)</i>	<input type="checkbox"/>

<b>Selection</b> <i>Describe whether (and if so, how) participants should be selected (for example: HELIUS-1 participants, HELIUS-2 participants, participants of a certain age, ethnicity or sex, participants who have given permission for additional research / substudies, participants who have been examined in a certain period, etc)</i>



## Appendix 6: HELIUS Biobank Material Request Form

This form is for use in conjunction with a **publication proposal** or **research proposal**, in cases where the proposed activity involves the use of material from the HELIUS biobank. The Biobank Material Request Form will be considered by the Scientific Coordinator in combination with the associated publication proposal or research proposal.

### *Contents of the HELIUS Biobank*

If a HELIUS participant has consented to the storage of biological material, the following materials from the participant are stored in the HELIUS biobank:

#### *Blood and urine (baseline)*

A fasting blood sample is taken and the participant is asked to bring a morning urine sample to the research location. If blood sampling is successful and the requested urine sample is provided, the following samples from each participant are stored in the biobank:

Material	Max. number of test tubes*	Max. quantity per test tube**
Citrate plasma (platelet-poor):	3x	0.75 ml
Serum:	6x	1 ml
Heparin plasma:	7x	1 ml
EDTA whole blood:	3x	1 ml
EDTA plasma:	5x	1 ml
DNA:	1x	1 pellet
Urine:	2x	1 ml

\* There may be fewer test tubes if blood sampling was not completely successful or insufficient material was present.

\*\* Individual tubes may contain less than the indicated quantity of material.

The material is stored at -80 °C in 2D Micronic test tubes. The test tubes do not contain labels but bear a 2D code on the bottom. Blood and urine samples are stored at the AUMC Biobank.

At follow-up, blood and urine samples were drawn but not stored in the HELIUS biobank.

#### *Nose and throat swabs (baseline and follow-up)*

Nose and throat swab samples are taken from a sub selection of the participants, which are placed in a single test tube with transport fluid at the location where the participant is examined. Following transportation to the AUMC (Medical Microbiology Department refrigerator), the test tube is vortexed the same day (or within 72 hours if delivered on a Friday or Saturday). Two 1.5 ml aliquots of the medium are then stored in a freezer at -80 °C.

At follow-up, nose, throat and tongue swabs were taken. These are all used for microbiome analyses and not available for additional analyses.

#### *Vaginal swab (baseline)*

All female participants are asked to provide a self-obtained vaginal swab sample. The swabs are dry-stored in a refrigerator at 4 °C until being sent by post (within two weeks) to the District Laboratory, Infectious Disease Cluster at the Amsterdam Municipal Health Authority. There the swabs are systematically stored in a freezer at -20 °C.

#### *Faeces (baseline and follow-up)*

If a participant has consented to additional tests, he or she is asked at the end of the physical examination to bring a faeces sample to the research location within six hours of its collection. Upon delivery by the participant, the sample is temporarily stored at the research location at -20 °C. It is then transported to the AUMC (Vascular Medicine Department), where it is stored at -80 °C.

Faeces samples of baseline and follow-up are available for additional analyses.

*Notes regarding procedures for and cost of supplying materials*

If the HELIUS DB has consented to the release of the HELIUS material, the Scientific Coordinator and the Data Manager, in consultation with the researcher, compile a list of relevant HELIUS numbers, which is sent to the institute that supplies the samples.

Where blood or urine samples are concerned, an analyst from the Durrer Center will take the relevant samples from the freezers, make them up (if necessary, in consultation) and dispatch them (if necessary, in consultation). Where vaginal swab samples are concerned, a Municipal Health Authority worker will take the relevant samples from the freezers and dispatch them. The cost of the necessary activities, the cost of the necessary materials and the cost of carriage are, in principle, all payable by the applicant. The costs in question depend on various factors, including the number of samples and the method of pipetting (manual or automated). A cost estimate may be requested from the Scientific Coordinator. Materials are normally supplied in 2D Micronic test tubes.

<b>General applicant information (researcher)</b>	
Date of request:	
Name of applicant:	
Applicant's e-mail address:	
Applicant's phone number:	
Applicant's postal address:	
Title of associated publication proposal or research proposal:	

<b>Details of the required material</b>	
What material is required?	
What lab tests will be performed on the material?	
What is the minimum quantity of material required (volume in microlitres)?*	
From which participants is material required (number and selection criteria)?	
Is it problematic if the requested material has been thawed before?	
Is it problematic if within the selection of samples, some were thawed and others were not thawed before?	
What test method will be used? <b>Please append protocol</b>	
In which laboratory will the tests be carried out and who is the contact person?	
Where should the material be sent?	
What will be done with remaining material?	

*\*Applicants are asked to state the absolute minimum quantity required, rather than the 'standard' quantity often requested as a matter of course, which usually includes significant excess. Applicants are also asked to indicate whether they are able to work with diluted material.*