Algemene gegevens / General Information

Programma / Programme	:	**COVID-19 Programma**
Subsidieronde / Subsidy round	:	**Urgent traject aandachtsgebied 1 en 2**
Projecttitel / Project title	:	**Ethnicity and COVID-19: epidemiology and control measures**
Projecttaal / Project language	:	**Engels / English**
Geplande startdatum / Planned start date	:	**15-06-2020**
Geplande duur / Planned duration	:	**12 maanden / months**
Datum indienen / Date of application	:	**11-05-2020**
Projecttype / Project type	:	**Strategisch onderzoek / Strategic research**

Projectleden / Project members

Prof. dr. K. Stronks (Main applicant)
Functie / Position: hoogleraar | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5668594 | *F:* | *E:* k.stronks@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Sociale Geneeskunde

Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Prof. dr. K. Stronks (Projectleader and secretary)
Functie / Position: hoogleraar | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5668594 | *F:* | *E:* k.stronks@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Sociale Geneeskunde

Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Prof. dr. J.A. Romijn (Administrative responsibility)
Functie / Position: voorzitter RvB | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5662109 | *F:* | *E:* j.a.romijn@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Raad van Bestuur

Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Prof. dr. C.O. Agyemang (Co-Applicant)
Functie / Position: hoogleraar | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5664892 | *F:* | *E:* c.o.agyemang@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Sociale Geneeskunde

Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Prof. dr. A.E. Kunst (Project commission member)
Functie / Position: hoogleraar | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5664892 | *F:* | *E:* a.e.kunst@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Sociale Geneeskunde

Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Dr. A. Lok (Project commission member)
Functie / Position: psychiater | *Opleiding / Education:*
Studierichting / Subject:
T: 020 8913600 | *F:* | *E:* a.lok@amsterdamumc.nl

Amsterdam UMC - locatie AMC
Psychiatrie
Meibergdreef 9
1105 AZ AMSTERDAM

Prof. dr. M. Prins (Co-Applicant)
Functie / Position: hoogleraar, hfd onderzoek infectieziekten GGD Adam | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5555911 | *F:* | *E:* mprins@ggd.amsterdam.nl

GGD Amsterdam
Cluster Infectieziekten
Onderzoek
Nieuwe Achtergracht 100
1018 WT AMSTERDAM

Dr. C.J. Schinkel (Project commission member)
Functie / Position: hoofd klinische virologie | *Opleiding / Education:*
Studierichting / Subject:
T: 020 566 | *F:* | *E:* j.schinkel@amsterdamucm.nl

Amsterdam UMC - locatie AMC
Medical Microbiology
Postbus 22660
1100 DD AMSTERDAM ZUIDOOST

Prof. dr. M. van den Muijsenbergh (Project commission member)
Functie / Position: hoogleraar | *Opleiding / Education:*
Studierichting / Subject:
T: 030 234 9800 | *F:* | *E:* m.vandenmuijsenbergh@pharos.nl

Pharos
Expertisecentrum Gezondheidsverschillen
Postbus 13318
3507 LH UTRECHT

Prof. dr. A.P. Verhoeff (Project commission member)
Functie / Position: hoogleraar, directeur Sarphati Amsterdam | *Opleiding / Education:*
Studierichting / Subject:
T: 020 5555911 | *F:* | *E:* averhoeff@ggd.amsterdam.nl

GGD Amsterdam
Onderzoek
Postbus 2200
1000 CE AMSTERDAM

Projectgegevens / Project information

Aandachtsgebieden / Focus

Aandachtsgebied
- 2: Zorg en preventie

Samenvatting / Summary

Recent data from to the United Kingdom and the United States show significant ethnic inequalities in COVID-19 outcomes. These might reflect inequalities in infection rates as well as in prognosis if people get infected with COVID-19. These inequalities are likely to reflect multiple adverse conditions in ethnic minority groups, including higher rates of metabolic comorbidities (e.g. diabetes); and their participation in so-called ‘essential jobs’ (e.g. patient care assistant); low educational levels and low proficiency in language of the host country; housing conditions (e.g. crowding); and help-seeking behaviour (e.g. fear to get infected in a hospital).

We will investigate how ethnicity affects the epidemiology of COVID-19 in the Netherlands, in terms of infection rates and disease outcomes. In addition, we will investigate to what extent control measures reach ethnic minority groups and whether recommended protective measures are taken. Finally, we will assess how these measures impact on individual lives, in particular wellbeing and use of non-COVID health care.

We will answer these questions primarily in the ongoing HELIUS cohort study, that includes people from Surinamese (South Asian and African), Turkish, Moroccan and Ghanaian and ethnic-Dutch origin, complemented with studies using existing databases and collecting qualitative data in other ethnic minority groups. More specifically, the proposed project will be based on the following data collections:

>> Infection rates:
1. A repeated serological study, among a random sample of the HELIUS population. During two extra study visits among 430 participants per ethnic group (total 2580), we will collect sera by venipuncture for storage and determination of SARS-CoV-2-specific antibodies.
2. Database of the Dept. of Infectious Diseases of the GGD Amsterdam, which contains all notified COVID-19 cases in Amsterdam and Amstelland.

>> Disease outcomes:
1. Linkage of the total HELIUS population to Amsterdam based registers on hospitalized COVID-19 patients and GP registrations.
2. Amsterdam based registers on hospitalized COVID-19 patients by region of origin, and Statistics Netherlands causes of death registry by country of birth in the total population of the Netherlands.

>> Control measures: reach and uptake, and impact on individuals:
1. Surveys among the HELIUS study population: an online survey in the total population, and a short extended questionnaire among the HELIUS participants that participate in the COVID-substudy (N = 2580).
2. Focus group interviews among refugee groups, labour migrants from eastern European countries, and undocumented migrants.

Based on our findings, we will draw implications for preventive measures and health care with the aim to reduce infection rates and to improve prognosis of those who have become infected with COVID-19 in ethnic minority populations in the Netherlands and elsewhere.

Samenwerking / Collaboration

Samenwerking tussen onderzoek en praktijk / Cooperation between research and practice:
Nee / No

Organisaties

GGD Amsterdam

Postbus 2200
1000 CE AMSTERDAM

Pharos
Expertisecentrum Gezondheidsverschillen

Postbus 13318
3507 LH UTRECHT

Inhoud / Content

Relevantie / Relevance
The rapid spread of COVID-19 has overwhelmed health care systems and is disrupting society worldwide. Far-reaching and diverse measures are being taken to mitigate its spread in a situation for which we still have very little scientific knowledge. The proposed project addresses the epidemic among the multi-ethnic population in the Netherlands.

Data on ethnic differences in COVID-19 have been limited to the United Kingdom (UK) and the United States of America (US), where significant ethnic inequalities in COVID-19 outcomes exist. In both countries, a disproportionate number of hospital critical cases and deaths are occurring among ethnic minority groups, especially of African and South Asian descent. The UK's Intensive Care National Audit and Research Centre (ICNARC) report shows that about a third of all critically ill COVID-19 patients belong to these ethnic minority groups; this is more than double the 14% ethnic minority population in the UK [1]. In addition, 70% of frontline National Health Service (NHS) healthcare professionals who have died were from ethnic minority communities [2]. In the US, several states have analysed COVID-19 by ethnic groups and data show that mortality rates among African Americans are higher than among White Americans [3]. For example in Chicago 70% of individuals who died from COVID-19 were African Americans, despite representing only one third of the population [4]. In New York State, COVID-19 has been more fatal for African Americans and Hispanic Americans than for White Americans [5].

Ethnicity can be considered an 'umbrella construct' that comprises many different aspects. These include characteristics that

can be attributed to a certain ethnic group, such as genetic profile or cultural orientation, as well as aspects that characterize the position of a certain ethnic group in society, including socio-economic position and the extent to which a group has access to the health care system [6]. In case of COVID-19, the epidemiology and outcome in ethnic minority groups is likely to be affected by factors such as the higher rates of metabolic comorbidities (overweight/obesity, diabetes, hypertension), which are independent factors of adverse outcome in COVID-19 disease; participation in so-called 'essential jobs' (e.g. patients care assistant); low educational levels and low proficiency in language of host country; housing conditions (e.g. crowding, intergenerational cohabitation); and help-seeking behaviour (e.g. fear of acquiring infection in health care) [7,8].

So far, little is known on ethnic disparities in the burden of COVID-19 disease and its consequences in the Netherlands and elsewhere. In addition, it is unknown which of the ethnicity related factors mentioned above actually account for adverse COVID-19 outcomes in ethnic minority populations. When disentangling the relative importance of potential factors, we should consider two types of explanations for the increased adverse outcomes. Firstly, these inequalities in outcomes might result from increased infection rates among ethnic minority groups. For example, ethnic minorities may be more vulnerable to infection because they experience more difficulties in taking protective measures, due e.g. to their participation in 'essential COVID-19 jobs', or because educational messages about prevention measures do not reach them. In addition, prognosis might be less favourable for ethnic minority groups if they become infected with COVID-19. This might, e.g., be due to the fact that ethnic minority groups are more likely to have underlying conditions (e.g. overweight/obesity, diabetes, hypertension, cardiovascular disorders) that increase disease severity [9].

The current proposal aims to inform health care and policy makers on taking optimal preventive measures among ethnic minority populations in the Netherlands to minimize infection risk/reduce infection rates and to improve prognosis of those who have become infected with COVID-19. This requires further research in these populations, in comparison with the host population, on the following aspects:
1. Epidemiology of COVID-19 infection.
2. Epidemiology of outcomes among individuals infected with COVID-19.
3. The reach and uptake of control measures.
4. The impact of control measures on wellbeing as well as use of non-COVID health care.

As the populations at stake have been shown to have a higher susceptibility to infections in general [10], especially because of factors such as social inequality, poverty and their environmental correlates, the results of this study will also be relevant for future emerging infections.

Kennisoverdracht, implementatie, bestendiging / Knowledge transfer, Implementation Consolidation

Although the project will be focused primarily on data collected in Amsterdam, we expect the insights to be applicable to other settings in the Netherlands and elsewhere. Activities to promote knowledge utilisation and transfer are aimed at increasing societal, educational and scientific impact.

SOCIETAL IMPACT
Our results will inform decision making at the local and national level. We refer to work package 4 below for a detailed description of the dissemination strategies we will employ.

EDUCATIONAL IMPACT
The project's insights will be disseminated in the curriculum of relevant studies, through the participation of members of the project group, including:
- Medical Education: the outcomes of the project (e.g. relating to the increased vulnerability of migrant populations for infectious diseases) will be translated into the training of medical doctors as provided by the two universities in Amsterdam as well as in Nijmegen, in which several project members have a coordinating and executive role.
- Through their networks, the members of the project group have access to national networks and organisations that will be used to promote the integration of the outcome of this study in other relevant curricula, including the training of GPs, medical and public health doctors and nurses (e.g. NSPOH, GGD-based trainings).

SCIENTIFIC IMPACT
We will employ proven dissemination strategies to reach scientific peers, such as publishing articles in relevant journals and presenting our findings and approaches through existing networks (e.g. Academische Werkplaats AMPHI infectieziekten, EUPHA migrant health section, WHO-Europe migrant health section), and at key conferences (national and international).

Doelstelling / Objective

We propose to investigate how, in the Netherlands, ethnicity affects the epidemiology of COVID-19, both in terms of infection rates and disease outcomes. In addition, we will investigate to what extent control measures reach ethnic minority groups and whether they actually follow the recommended protective measures. Finally, we will assess how these measures impact on individual lives, in particular wellbeing and use of non-COVID health care. We focus on the main ethnic minority groups in the Netherlands and will compare them with the population from Dutch origin. The results of the proposed study will ultimately be used to inform decision-making regarding COVID-19 preventive measures and care.

We will answer the research questions primarily in the ongoing HELIUS cohort study. Between 2011 and 2015, baseline data were collected among Amsterdam inhabitants aged 18-70 years old. The uniqueness of this study lies in the representation of ethnic minority populations: HELIUS comprises first and second generation people from Surinamese (South Asian and African), Turkish, Moroccan and Ghanaian and ethnic-Dutch origin.

In addition, we will also use existing data (e.g. health registries) from other ethnic minority groups, in Amsterdam and nationwide. Finally, we will set up a qualitative study among a number of ethnic minority populations not represented in HELIUS.

Plan van Aanpak / Strategy

The project will be implemented through four workpackages (WPs):
1. Epidemiology: infection rates.
2. Epidemiology: disease outcomes.
3. Control measures: reach and uptake, and impact on wellbeing and use of non-COVID care.
4. Implications for policy and practice, and dissemination of results.

This section contains:
I. a description of the HELIUS study;
II. a description of the activities in each of the WPs.

I. HELIUS STUDY

The HELIUS study is designed as a prospective cohort study, including six ethnic groups (including the ethnic Dutch as a reference) living in Amsterdam, the Netherlands [11]. The general objective is to study the causes of (the unequal burden of) diseases across these ethnic groups, with emphasis on three disease categories: cardiovascular diseases, mental health and infectious diseases.

Baseline data collection took place from 2011 to 2015 and included residents of Amsterdam aged between 18 and 70. Participants from Dutch, African Surinamese, South-Asian Surinamese, Turkish, Moroccan and Ghanaian ethnic descent were randomly selected from the municipal population register, stratified by ethnicity, to ensure roughly equal numbers from each group. A person was defined as of ethnic minority origin if he/she fulfilled one of two criteria: (1) he/she was born outside the Netherlands and has at least one parent born outside the Netherlands (first generation) or (2) he/she was born in the Netherlands but both parents were born outside the Netherlands (second generation). Data were collected by questionnaire and in a physical examination, in which biological samples were also obtained. Participants who were unable to complete questionnaires in Dutch were provided questionnaires in English or Turkish or received assistance from a trained, ethnically matched interviewer. Baseline data were obtained from 24,789 participants, including 4671 from ethnic Dutch origin, and 3369 of South-Asian Surinamese (Hindustani), 4458 of African Surinamese (Creole), 2735 of Ghanaian, 4200 of Turkish and 4502 of Moroccan origin.

Data collection for the second wave of HELIUS started in May 2019. This includes a short questionnaire (multiple health behaviours including mental health), a very short physical examination (blood pressure, weight), and blood samples (fasting) to measure a few blood parameters in relation to cardiovascular risk (e.g. glucose). Because of travel restrictions and social distance requirements related to COVID-19, routine HELIUS follow-up visits have been cancelled and postponed from March 16, 2020 onwards. So far, follow-up data have been collected for approximately 6000 respondents. We will continue to schedule routine follow-up visits of the remaining participants once government relaxes lock down measures allowing to restart these activities.

In the current proposal, we will set up an additional data collection in a subsample of the total study population, and we will link the baseline data to a number of health registries. Both activities are possible within the available informed consent. More specifically, in the participants' written informed consent obtained at baseline, we asked permission (1) to store biological samples in the HELIUS biobank for future research (94% of total study population agreed), (2) to link their individual data to registries containing data relating to the participants' health (such as hospital admissions, pharmacy data, vaccination programmes; 90% agreed), (3) to request the official causes of death from Statistics Netherlands (87% agreed) and (4) to approach them for additional studies in the future (substudies; 92% agreed).

The responsibility for the HELIUS study lies with the Executive Board. The scientific members of the Board cover multiple disciplines: Bert-Jan van den Born (MD, cardiovascular disease), Eric Moll van Charante (GP, cardiovascular disease prevention), Anja Lok (MD, mental disorders), Prof. Maria Prins (infectious diseases), Prof. Karien Stronks (ethnic inequalities in health), Prof. Arnoud Verhoeff (health care in an urban setting), and Prof. Koos Zwinderman (biostatistics). All members of the Executive Board will participate in the proposed study.

Through the organisations in which these members are embedded, we also have access to other experts. From the GGD Amsterdam, at least the following collaborators will participate in the proposed project: Yvonne van Duijnhoven (PhD), Tjalling Leenstra (MD, PhD), Anja Schreijer (MD, PhD), Mariken van der Lubben (PhD), and Anders Boyd (PhD).

A list of all publications that are based on data from the HELIUS study (currently > 110) is available at this website: http://www.heliusstudy.nl/nl/researchers/publications.

II. DESCRIPTION OF PLAN OF WORK FOR EACH OF THE WORKPACKAGES

WP1 - COVID-19 epidemiology: infection rates in a multi-ethnic population (PI: Prof.dr Maria Prins)

The overall aim of this WP is to gain insight into rates of SARS-CoV-2 infection and the general epidemiology of COVID-19.

More specifically, this WP has three objectives:
1a. To measure the prevalence of past exposure to SARS-CoV-2 infection, along with their determinants among residents of Amsterdam belonging to different groups of non-Dutch and Dutch-origin (task 1a).
1b. To estimate the incidence of new SARS-CoV-2 infections among residents of Amsterdam belonging to different groups of non-Dutch and Dutch-origin (task 1b).
2. To examine whether notified cases of SARS-CoV-2/COVID-19 per 100.000 inhabitants differ across ethnic groups using existing registration databases (task 2).

Current data on infection rates in the multi-ethnic population in the Netherlands are limited as testing is currently restricted to specific groups (e.g. heath care workers with symptoms, individuals having symptoms with severe disease at hospital admission) and the number of non-Western migrants included in the recently initiated serological studies on COVID-19 prevalence in the general population in the Netherlands (Sanquin blood donor study and Pienter study [12]) are small.

@Task 1a and 1b: HELIUS study
>> Study design and population
We will perform a repeated serological study, embedded in the HELIUS study. During two extra study visits among 430 participants per ethnic group (total 2580), we will collect sera by venipuncture for storage and determination of SARS-CoV-2-specific antibodies and participants will be asked to fill in questionnaires on reach of COVID-19-related prevention communication, uptake of COVID-19 control measures, risk perception, symptoms and disease as described below (WP3). Participants, now aged 25-79 years, of the larger HELIUS study will be randomly selected for this sub-study, stratified by ethnicity. Participants of the sub-study will complete visit 1 between June and September 2020 and will be asked to return for visit 2 after 5 months, between November 2020 and January 2021.

From June 2020 until the end of the second study period, participants of the sub-study who experience COVID–19-related symptoms for 24 hours will be tested using standard protocol (currently by collecting naso-pharyngeal swabs) and procedures (through the GGD). Specific information on why and when to test will be distributed to increase test uptake and testing in the home setting will be facilitated. In case of a positive test result, contacts, including household contacts, will be traced according to national protocols (through the GGD). In addition, at study visit 2, a naso-pharyngeal swab (or a saliva sample if validated for identifying mild or subclinical infections) will be collected from all participants of the sub-study and tested for incident SARS-CoV-2 infection.

Furthermore, for all participants of HELIUS who gave written permission for data linkage, notification data will be linked to complement data on confirmed COVID-19 cases. This will be based on the database of the Dept. of Infectious Disease of the GGD Amsterdam, which includes data on all notified COVID-19 cases in Amsterdam and Amstelland.

>> Sample size
The primary outcome measure is the prevalence of SARS-CoV-2 antibodies among the six ethnic groups. With 430 respondents in each ethnic group, and an estimated 5% prevalence in the population from Dutch origin (during the period of data collection), we will be able to determine at least a two times higher risk in ethnic minority populations with statistical significance at 5%, and a power of 80%. We feel this is a realistic assumption (personal communication GGD Amsterdam, UK data [13]).

>> Laboratory measurements
SARS-CoV-2-specific antibodies in serum will be determined using validated and approved commercial assays. The choice of serological assay will be based on quality and availability of assays. Most likely we will use the Wantai total immunoglobuline test. Importantly, the same assay will be used for the two sampling points. Storage of sera allow additional testing for antibodies once better performing assays are available (sensitivity of the currently available assays is around 90%). Testing for incident infections will be done by non-commercial RT-PCR for SARS-CoV-2 on respiratory specimens, which is validated and extensively used in the Netherlands.

>> Data analysis
1a. For each ethnic group, the crude prevalence, defined as the proportion of individuals with SARS-CoV-2 antibodies at each study visit (indicating COVID-19 infection at some time in the past), will be estimated, along with their 95% confidence interval. Adjusted prevalence will be estimated as average marginal predicted probabilities from a logistic regression model correcting for age and sex. Determinants of past infection, including ethnic group, will be evaluated using logistic regression. Data on potential determinants are already available through routine HELIUS data collection at baseline and follow-up, or will be collected by questionnaire with items related to COVID-19.

1b. Cumulative incidence will be estimated among those without antibodies at visit 1 using serological test results at visit 2. Incidence rate of new cases identified by PCR testing of participants having COVID-related symptoms from June 2020 until January 2021 will be estimated and determinants of incident infection will be assessed using survival regression models. Overlap between incident cases identified by PCR testing and individuals who seroconvert for SARS-CoV-2 antibodies during follow-up will be explored, taking self-reported COVID-19-related symptoms into account.

@ Task 2: Amsterdam based registry data
To test whether the rate ratios as observed in the HELIUS population also apply to the larger multi-ethnic population, including ethnic minority groups not included in HELIUS (such as people from the Antilles), we will use data from the database of the Dept. of Infectious Diseases of the GGD Amsterdam on all notified COVID-19 cases in Amsterdam and Amstelland. In this database, ethnic origin is indicated by means of country of birth data. Where missing, we will complement these data with information from the Municipal Registry (BRP, Basis Registratie Personen). We will calculate the confirmed COVID-19 cases

per 100.000 inhabitants and examine whether rates differ across ethnicities, focusing on differences between the six ethnic groups represented in HELIUS as well as the other ethnic groups.

WP2 – COVID-19 epidemiology: disease outcomes in a multi-ethnic population (PI: Prof.dr Charles Agyemang)

The overall aim of this WP is to evaluate diseases outcomes in COVID-19 patients from different ethnic background. The key research questions to be answered in this WP are:
a. Does the severity of COVID-19 infection and disease vary between ethnic groups in the Netherlands?
b. Are there ethnic inequalities regarding COVID-19 mortality in the Netherlands?
c. Does the access to COVID-19 care vary between ethnic groups in the Netherlands?
d. If so, which factors influence ethnic inequalities in access to care for COVID-19 and COVID-19 severity?

The HELIUS study provides a unique opportunity to explore factors that may underlie the ethnic inequalities in outcomes of patients with COVID-19, as detailed data on e.g. comorbidities are available (task 1). In addition, other databases will be used to assess ethnic inequalities in severity of COVID-19 for other ethnic groups not included in the HELIUS cohort (task 2).

@ Task 1: HELIUS study
>> Study design and population
To shed light on severity of COVID-19 infection, disease and access to care for COVID-19 and its underlying determinants among major ethnic groups in the Netherlands, we will link the HELIUS database (total study population) with Amsterdam UMC database on hospitalized COVID-19 patients and their clinical course and outcomes, and with the Academic Medical Centre, University of Amsterdam and Free University Medical Centre General Practitioners network database. From these databases, we will derive the following indicators for outcomes of COVID-19 infection includes (1) severity of symptoms of COVID-19 infection and disease among COVID-19 patients admitted to the hospital (including emergency department); (2) confirmed COVID-19 hospital admissions who received respiratory support at the ICU, (3) length of stay in critical care prior to discharge or death and (4) accessibility to COVID-19 care (late presentation of COVID-19 infection to healthcare facility, and use of primary care and hospital for COVID-19 care). Data from the HELIUS database will be used to explore how socio-demographic factors, socio-economic status, acculturation, psychological factors, and medical history influence these disease outcomes.

>> Analyses
Severity of COVID-19 infection and disease on admission will be based on the need for oxygen and oxygen saturation at admission. Length of stay in critical care will be calculated as number of days spent in ICU before discharge or death. The late presentation with COVID-19 infection to GP/hospital will be calculated as time lag between day of onset of COVID-19 symptoms and the day of GP/hospital admission. We will also examine whether there were ethnic differences in primary care and hospital care use for COVID-19 care. Regression analysis will be used to examine factors associated with COVID-19 outcomes.

@ Task 2: Assessing severity of COVID-19 disease in Amsterdam and nation-wide databases
>> Study design and population
In this task, we will use other databases to assess whether the results of task 1 also apply to the larger multi-ethnic population, including ethnic minority groups not included in HELIUS. These will be assessed by several outcome measures including (1) the ethnic distribution of hospitalized COVID-19 positive patients, (2) the proportion of confirmed COVID-19 hospital admissions who received respiratory support at the ICU, (3) length of stay without ICU-admission, (4) lengths of stay in critical care prior to discharge or death and (5) COVID-19 related mortality.

We will use Amsterdam UMC database on hospitalized COVID-19 patients and their clinical course and outcomes, which has data on the Dutch majority population as well as ethnic minority groups defined according to WHO categorisation of region of origin (e.g. Sub-Saharan Africa, Middle-east and North Africa, South Asian etc.). In addition, we will explore whether it is possible to obtain similar data from COVID-19 patients from OLVG and BovenIJ hospitals to extend the study population. We will use this database to evaluate ethnic inequalities in access to COVID-19 care (late presentation of COVID-19 infection to healthcare facility) and the severity of COVID-19 disease.

In the second step, we will use the Statistics Netherlands causes of death registry data to further evaluate COVID-19 mortality by country of birth in the total population of the Netherlands. Causes of death are coded at Statistics Netherlands using the 10th revision of the International Classification of Diseases (ICD-10) classification of the WHO. Our team work very closely with the Statistics Netherlands.

>> Analyses
The description of the outcome measures are provided in task 1. The distribution of hospitalized COVID-19 positive patients and mean length of stay with ICU admission and without ICU admission will be estimated. In addition, the ethnic differences in late presentation of COVID-19 infection to primary care and hospital will be estimated. Cox proportional hazard regression analysis will be performed to assess ethnic differences in the risk of admission to ICU and risk of death following initial primary care/hospital admission. Poisson regression analysis will be used to estimate ethnic differences in COVID-19 related mortality at the national level using the CBS Causes of Death Registry data.

WP3 - Control measures: reach, uptake and impact on wellbeing and use of non-COVID care (PI: Prof.dr Karien Stronks)

This WP addresses the measures which are taken to control the COVID-19 epidemic, such as social distancing and testing.

The aim of this WP is to investigate the reach and uptake of these measures in ethnic minority populations, and to assess whether observed inequalities could be an explanation for differences in the epidemiology of COVID-19 infection. In addition, we will investigate how these measures impact on individuals in these populations, both in terms of wellbeing and use of non-COVID care. More specifically, this WP has two objectives:
1. To measure the reach and uptake of control measures as well as how these measures impact on wellbeing and the use of non-COVID care in different groups of non-Dutch and Dutch-origin residents of Amsterdam (task 1).
2. To explore the reach, uptake and impact of wellbeing and use of non-COVID care in other ethnic minority groups in the Netherlands, in particular refugee groups, recent labour migrants and undocumented migrants (task 2).

The results of the research activities in this WP will complement ongoing studies on control measures for COVID-19, in particular the ongoing survey in the general population as initiated by GGD Nederland and RIVM. As very few people from ethnic minority background participated in the first wave of this survey (personal communication GGD Amsterdam), the proposed data collection definitely fills a gap.

@ Task 1: HELIUS study
>> Study design and population
We will implement a survey among the HELIUS study population. This includes, first, a short, online survey in the total study population, containing questions on reach and uptake of control measures. Secondly, we will collect data among the HELIUS participants that participate in the COVID-sub-study (see WP1), during visit 1 and 2 (n=430 per ethnic group), on disease symptoms, reach and uptake of control measures, wellbeing and use of non-COVID care. Questionnaires will be provided in Dutch, English and Turkish. Participants who are unable to fill out the questionnaires themselves will receive assistance from an ethnically matched interviewer at the research location.

>> Measurements
The following items will be included in the questionnaire: 1. symptoms of COVID-19 infection over the past weeks, and COVID-19 diagnosis since the start of the epidemic; 2. perceptions of COVID-19 disease: taboo related to COVID-19 infection, ,perceived risk of acquisition, perceptions on infectious diseases in general; 3. reach of COVID-19-related prevention communication, related to hygiene, social distancing, testing; knowledge of the measures and sources of information (language, source from host or country of origin),understanding of information, trust in Dutch measures, ability and possibilities to comply to the measures; 4. individual wellbeing: depression, anxiety, loneliness, perceived discrimination and stigmatization, income, employment etc.; and 5. use of non-COVID care in the previous two months. The selection of questions will be made as follows. Firstly, where relevant, we will use the same measurements as used in the HELIUS baseline and follow-up data collection. This enables comparison of measurements over time (before and after the COVID-19 epidemic). This e.g. applies to the questionnaire on depressed mood (PHQ-9). Secondly, where possible, we will use relevant measurements from questionnaires that have been used in on other, ongoing studies on the COVID-19 epidemic, such as the abovementioned survey by GGD Nederland/RIVM, and the questionnaires used in the Lifelines cohort and the recently initiated cohort of COVID-19 patients (funded by ZonMW, PI's: Menno de Jong and Maria Prins).

>> Analyses
Descriptive statistics are used to assess differences between ethnic groups for the main outcome measures (reach and uptake of control measures, wellbeing and use of non-COVID care). We will relate the observed differences between groups to relevant variables obtained through routine HELIUS data collection at baseline or follow-up. In addition, we will describe differences within groups, e.g., by migration generation and educational level.

@Task 2: qualitative studies in other ethnic minority groups
>> Study design and population
To explore the generalisability of the results of the above described study on control measures for some specific, probably high risk, other ethnic minority populations, i.e. groups not included in the HELIUS study, we will conduct focus groups discussions. We will include four broad categories of ethnic groups: 1. refugees that have recently migrated to the Netherlands, in particular people from Syria and Eritrea; 2. refugees that have lived in the Netherlands for several decades, in particular people from Afghanistan and Iraq; 3. labour migrants from eastern European countries, such as Poland and Romania; 4. Undocumented migrants.

>> Data collection
We will contact eligible participants through community organisations, health care workers, personal contacts and snowballing techniques, facilitated by the access to these groups of the organisations represented in the project group (Pharos, GGD Amsterdam). We aim to convene 2 focus groups per migrant group, with 5-10 people per group. The details of the data collection will be adapted to the national guidelines on social distancing. Groups will be segmented by sex and age where relevant. The focus group interviews will cover the same topics as covered in the HELIUS data collection (task 1): perceptions of COVID-19 diseases, reach (e.g. knowledge) and uptake of control measures (ability and willingness), and impact of control measures on wellbeing and use of non-COVID care. The focus groups will be held in people's mother tongue when necessary. We will consider the possibilities to adapt the topic list to the list that it used in another, ongoing, qualitative study on the reach and uptake of COVID-19 control measures in migrant populations, led by Prof. van den Muijsenbergh, member of our project group (together with prof. Denktas).

>> Analysis
The focus group discussion will be transcribed and quality-checked. Focus group held in other languages will be transcribed directly into Dutch. Coding and analysis will be informed by a thematic analysis approach, and will be done deductively and inductively. Deductive codes will be derived from the research insights obtained in task 1. Inductive codes will be derived from original narratives and ideas expressed by the groups linked to the objectives of this WP.

WP4 – Implications for policy and practice, and dissemination of results (PI: Prof.dr Maria Prins & Prof.dr Karien Stronks)

The aim of this WP is to
1. draw implications for policy and practice, both regarding preventive measures (e.g. testing, informational campaign on social distancing) and health care (e.g. accessibility of health care system for COVID and non-COVID care, guidelines for care of COVID-19 patients) in ethnic minority populations.
2. disseminate results and implications for policy and practice to relevant target groups in decision-making, both at the local and national level, as well as internationally.

>> Implications for policy and practice
These implications will be based upon the results of the proposed studies, against the background of the measures that have already been taken to target ethnic minority groups (e.g. translated information materials as provided through the Pharos website; Corona helpdesk statushouders).

At the start of our project, we will compose a board of accomplished experts in public health, policy-making, and clinical care, as well as representatives from ethnic minority populations. We will involve them in the design and methods of our study, in the interpretation of our findings and of the implications for public health policy and clinical care. Through these experts and the organisations they are based (e.g. Pharos, GGD Nederland), we will have good insight in the adaptations in control measures that currently have been implemented for ethnic minority groups in the Netherlands, which promotes the policy relevance of the implications we will draw.

>> Dissemination of findings
The milestones for reporting results to the funder are as follows:
• End of month 3: preliminary results on differences in infection rates (WP1, task 1a and 2), differences in diseases outcomes (WP2, task 2), and control measures (reach and uptake, implications) in ethnic minority populations (WP3, task 1 and 2).
• End of month 6: further results of the aforementioned tasks; preliminary results on disease outcomes from other than HELIUS databases (WP1, task 2).
• End of month 9: preliminary results on repeated measurement of infection rates (WP1, task 1a and 1b); further results of the aforementioned tasks.
• End of month 12: final report on all activities and project objectives.

We will involve the abovementioned experts in the dissemination of our finding to key target groups (policy makers at national and local level, clinicians) and the general public. The participation of members of our project group in relevant forums will facilitate the dissemination of results. This include the 'Wetenschappelijke Adviesraad voor de RIVM Corona gedragsunit' (Agyemang, van den Muijsenbergh), RIVM Outbreak Management Team (GGD Amsterdam, Amsterdam UMC), Center for infectious disease RIVM (Prins), GGD Nederland (Prins, Stronks), national network of Academic Collaborative for Public Health (Prins, Verhoeff), the municipality of Amsterdam, Pharos (van den Muijsenbergh), relevant medical specialist organisations (several members of Executive Board of the HELIUS study), community based migrant organisations (Agyemang, van den Muijsenbergh, Stronks), WHO Regional Office for Europe Migration and Health Programme (Agyemang), the EUPHA migrant health section (Agyemang, Stronks), WONCA special interest group on migrant care (van den Muijsenbergh).

Referenties / References

1. ICNARC report on COVID-19 in critical care 24 April 2020 https://www.icnarc.org/OurAudit/Audits/Cmp/Reports [Accessed 2/05/20]
2. Chaand Nagpaul: The disproportionate impact of covid-19 on ethnic minority healthcare workers. April 20, 2020 https://blogs.bmj.com/bmj/2020/04/20/
chaand-nagpaul-the-disproportionate-impact-of-covid-19-on-ethnic-minority-healthcare-workers/ [accessed 02/05/20]
3. Provisional Death Counts for Coronavirus Disease (COVID-19): Weekly State-Specific Data Updates by Select Demographic and Geographic Characteristics. Last updated: 4/21/2020 https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/ [Accessed 25/04/20]
4. Yancy CW. COVID-19 and African Americans. JAMA. Published online April 15, 2020. doi:10.1001/jama.2020.6548
5. New York State Department of Health. COVID-19 fatalities. Updated April 25, 2020. [Accessed April 25, 2020]. https://covid19tracker.health.ny.gov/views/NYS-COVID19-Tracker/
NYSDOHCOVID-19Tracker-Fatalities?%3Aembed=yes&%3Atoolbar=no&%3Atabs=n
6. Stronks K, Snijder MB, Peters RJG, Prins M, Schene AH, Zwinderman AH. Unravelling the impact of ethnicity on health in Europe: the HELIUS study BMC Public Health 2013;13: 402
7. Bhala N, Curry G, Martineau AR, Agyemang C, Bhopal R. Sharpening the global focus on ethnicity and race in the time of COVID-19. Lancet 2020; 6736(20)31102-8 https://doi.org/10.1016/S0140-6736(20)31102-8
8. Pareek M et al. Ethnicity and COVID-19: an urgent public health research priority. Lancet 2020 https://doi.org/10.1016/S0140-6736(20)30922-3
9. We refer to HELIUS website for multiple publications on this issue: http:// www.heliusstudy.nl/nl/researchers/publications
10. Madhav N, Oppenheim B, Gallivan M, et al. Pandemics: Risks, Impacts, and Mitigation in: Jamison D TH et al (edit). 2018. Disease Control Priorities: Improving Health and Reducing Poverty. Disease Control Priorities (third edition), Volume 9. Washington, DC: World Bank. Doi:10.1596/978-1-4648-0527-, chapter 17 (315 – 47
11. Snijder MB, Galenkamp H, Prins M, Derks EM, Peters RJ, Zwinderman AH, Stronks K. Cohort profile: the Healthy Life in an Urban Setting (HELIUS) study in Amsterdam, The Netherlands. BMJ Open 2017;7:e017873
12. Pienter study: cbi.nlm.nih.gov/pmc/articles/PMC6537387

13. UK Office for National Statistics. Coronavirus (COVID-19) related deaths by ethnic group, England and Wales: 2 March 2020 to 10 April 2020.

Financiële gegevens / Financial data

ZonMw budget

	Jaar / Year								
Kostenpost	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	**Totaal / Total**
Personeel	391.187	0	0	0	0	0	0	0	391.187
Materieel	139.994	0	0	0	0	0	0	0	139.994
Implementatie	5.000	0	0	0	0	0	0	0	5.000
Apparatuur	0	0	0	0	0	0	0	0	0
Overig	0	0	0	0	0	0	0	0	0
Totaal / Total	**536.181**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**536.181**

Co-financiering / Cofinancing

Naam co-financier / Name of cofinancier	Bedrag / Amount	Status

Bijzondere gegevens / Additional information

Vergunningen / Permits

	Verklaring nodig / Statement required?		Status verklaring / Statement status		
	Ja / Yes	Nee / No	Verkregen / Acquired	Aangevraagd / Applied	Nog niet aangevraagd / Not applied yet
METC	X				X
DEC		X			
WBO		X			

Onderschrijvingen / Assents

	Ja / Yes	Nee / No	N.v.t. / N.A.
Code biosecurity / Code Biosecurity		X	
Code openheid dierproeven / Code Transparency of Animal Testing			X

Andere vergunningen / Other permits

Historie subsidieaanvraag / History grant application

Deze aanvraag is ook ingediend bij organisatie / This grant application has also been submitted to organization:

DAEB Format

Organisation	Type of organisation	Quoted costs	Quoted co-funding	Requested budget
AMC	Knowledge institution	536.180,58	-	536.180,58
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
	Total	536.180,58	-	536.180,58

Staff costs					
			Costs	Own contribution / 3rd party co-funding	Requested budget ZonMw
Function (will be filled based on "staff"sheet)	Remarks	Organisation (dropdown menu)			
datamanagement HELIUS	E.vd Zwan	AMC	€ 23.875,20	€ -	€ 23.875,20
coordinator dataverzameling HELIUS	A.Koopman	AMC	€ 24.609,77	€ -	€ 24.609,77
logistiek coordinator HELIUS	A.Teitsma	AMC	€ 18.365,50	€ -	€ 18.365,50
coordinator secretariaat HELUIS	E.Laney	AMC	€ 21.303,98	€ -	€ 21.303,98
secretariaat medewerker HELIUS	vacature	AMC	€ 18.365,50	€ -	€ 18.365,50
flexmedewerkers uitvoering dataverzameling HELIUS	flexmedewerkers	AMC	€ 147.377,63	€ -	€ 147.377,63
postdoc WP1	Senior onderzoeker/WP1	AMC	€ 43.066,50	€ -	€ 43.066,50
junior onderzoeker WP2	junior onderzoeker/WP2	AMC	€ 51.156,00	€ -	€ 51.156,00
Postdoc WP3	Senior onderzoeker/WP3	AMC	€ 43.066,50	€ -	€ 43.066,50
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
to be specified			€ -	€ -	€ -
			€ 391.186,58	**€ -**	**€ 391.186,58**

Material, equipment & consumer goods (itemised)					
			Costs	Own contribution / 3rd party co-funding	Requested budget ZonMw
Discription	Remarks	Organisation (dropdown menu)			
bepalen SARS-CoV-2 specific antibodies		AMC	€ 51.600,00	€ -	€ 51.600,00
materiaalkosten HELIUS-COVID sub-study		AMC	€ 58.394,00	€ -	€ 58.394,00
vertaling vragenlijsten online en op studielocatie (WP1 en WP3)		AMC	€ 5.000,00	€ -	€ 5.000,00
koppeling HELIUS met registratiebestanden (WP1 en WP2)		AMC	€ 5.000,00	€ -	€ 5.000,00
CBS data sterfte (WP2)		AMC	€ 10.000,00	€ -	€ 10.000,00
uitvoering focusgroups (WP3)		AMC	€ 10.000,00	€ -	€ 10.000,00
rapportages (incl. open access artikelen)		AMC	€ 5.000,00	€ -	€ 5.000,00

				€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ 144.994,00	**€ -**	**€ 144.994,00**

Other costs (itemised)					
			Costs	**Own contribution / 3rd party co-funding**	**Requested budget ZonMw**
Discription	**cost sort (dropdown menu)**	**Organisation (dropdown menu)**			
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	€ -	€ -
			€ -	**€ -**	**€ -**

Total costs project	€ 536.180,58		
Own contribution / co-funding		€ -	
TOTAL REQUESTED BUDGET ZONMW			€ 536.180,58

Additional explanation for budget

see appendix grant proposal

Approval financial responsible receiving organisation

Receiving organisation	AMC Medical research
Name:	F.J. Gaus
Function:	Projectcontroller
E-mail adres:	f.j.gaus@amsterdamumc.nl
Date:	11-5-2020

BUDGET JUSTIFICATION proposal 'Ethnicity and COVID-19' (May 11, 2020)

The total budget requested for the project equals 536.181 euro. This is mainly spent on the appointment of staff, followed by data collection(including testing).

Requested staff
- Non-scientific staff who will carry out the data-collection within the HELIUS study (WP1 and WP3).
- Researchers who will carry out the scientific work in WP1-3.

Material, equipment, consumer goods
- Laboratory measurement (SARS-CoV-2-specific antibodies).
- Material costs for data collection as embedded within the HELIUS study (WP1 and WP3) (invitation letters etc., taking, transportation and storage of blood samples, public transport ticket for respondents).
- Translation questionnaires (English, Turkish)
- Use of register-based datasets (WP1 and 2) (hospital, GP, CBS mortality).
- Focus groups data collection (WP3) (rent location, materials, reimbursement travel costs participants etc.).
- PM: the costs of laboratory measurement of the naso-pharyngeal swab (second study visit, sub-study) exceed the budget provided by ZonMw (estimated costs: 52k euro). Supplementary funding will be sought.

Implementation costs
- The budget for implementation activities covers material costs (production of reports, open access publications).
- The actual implementation costs are much higher than the budget requested from ZonMw (5k euro), as these also include salaries of the senior researchers involved in implementation activities (WP4), which will be covered by their respective organisations (Amsterdam UMC, GGD Amsterdam, Pharos).

Own contribution
The own contribution of the organisations involved (NOT specified in the budget) covers:
- a part (22.750 euro) of the personnel costs for non-scientific and scientific staff (WP1-3);
- the salaries of the senior scientific staff for supervision of research activities (WP1-3);
- personnel costs for implementation activities (WP4);
- rent of study locations for data collection sub-study HELIUS-COVID.

Checklist

for Open science & FAIR data elements in the COVID-19 research programme

Version 1.0

This checklist is for the first 4 out of **8 requirements and recommendations** for the **activities for open science and FAIR** data. They relate to the preparation phase of a research project.
The checklists shows a number of options for open science and FAIR data. Please consult **Open science in COVID-19 research** for more information about what you can do, for recent updates on the guidance, new practices, and instructions.

Choose the options that suit your project best!
The purpose of the checklist is to fill in the options that you choose for your project. Discuss with your data steward (or other data expert) the options that suit your project best. If you have options that are not listed below, you may indicate this as well.

Please fill in the form and attach it as a PDF file to your grant application. This is mandatory.

Requirements & Recommendations	Applicants must report as follows
Who is the data steward who supports the open science and FAIR data planning in your project? Check the website ZonMw's webinars to inform and support data stewards.	☒ I involve a data steward: Name: dr H. Galenkamp Institute: Amsterdam UMC, Public health E-mail: h.galenkamp@amsterdamumc.nl Attended the webinar: ☐ Yes ☒ No ☐ I do not have a data steward yet.
Requirement 1: Alignment and reuse Please show the options for reusing data, biological materials, and/or other resources (from research or from practice) in your project. Check whether it is possible to use resources that are made in the context of COVID-19.	Name the existing resources that you plan to use: ☒ Data: HELIUS database and several health registry databases ☐ Biological materials: Klik of tik om tekst in te voeren. ☐ Research software: Klik of tik om tekst in te voeren. ☐ Other resources, i.e. Klik of tik om tekst in te voeren. ☐ No, I will not use existing resources, because Klik of tik om tekst in te voeren. Please mark the resources that you indicated above in **bold** if it is a COVID-19 related resource
Requirement 2: preregistration of all animal studies **(for all other studies, preregistration is strongly recommended)** You are required (for animal studies) and recommended (for all other studies) to preregister your research plan (including the protocols, methods, etc).	☐ I n case of preregistration: Provide the link or registration code: Klik of tik om tekst in te voeren. ☐ For animal studies, the code at the Preclinical Trial Register is: Klik of tik om tekst in te voeren. ☒ No, I do not preregister my research proposal.
Requirement 3: FAIR data within	Name the COVID-19 specific FAIR data standards, technologies or

COVID-19 research community **Choose the options that suit your project best! (MAATWERK!)** Here you can show the COVID-19 specific standards, technology or infrastructure for FAIR data that you have selected to apply during your project. Once your application is granted, you can use these to fill in your data management plan (DMP) (= requirement 5). Read for more information: 3.Creating FAIR data, tailored to COVID-19	infrastructure that are applicable in your study, and you plan to use: ☐ eCRF of the WHO (machine actionable) ☐ A COVID-19 related or other FAIR data point ☐ COVID-19 research platform for data sharing ☐ Data will be recorded in RDF format ☐ I plan to use the metadata scheme that will be developed for COVID-19 research (planned in summer 2020) ☐ Other COVID-19 related standards, etc: Klik of tik om tekst in te voeren. ☒ Collaboration with COVID-19 data collection(s), namely Cohort of COVID-19 patients (de Jong & Prins) ☐ A new standard, technology or infrastructure will be developed in the project with the COVID-19 research community. Comment on your choice(s) Klik of tik om tekst in te voeren. ☐ None of the above. Comment: Klik of tik om tekst in te voeren. ☐ I did not decide yet.
Requirement 4: Budget for FAIR data and Open Access Publications You need to plan a budget for open science and research data management during your research project. This budget should include data stewardship, and – if applicable - costs for additional services from data service providers (e.g. from Health-RI), or extra e-infrastructure.	**Explain how you budgeted for open science and FAIR data in your project:** ☒ I specified the costs in the budget form. ☐ I cannot specify the costs right now, and make a reservation of 5% maximum of my research budget for data stewardship. ☒ I did not budget the costs, because these costs will be covered by the own contribution of the organisations involved **When you fill in the budget form, you could consider the following aspects:** ○ Data stewardship ○ Data services providers (e.g., at Health-RI, other others) ○ Additional e-infrastructure, exceeding the regular institutional infrastructure. ○ Other open science and FAIR data related costs. ○ (Optional) Open access publication(s): ZonMw requires researchers within the covid-19 programme to make all publications resulting from scientific research, that is fully or partially subsidised by ZonMw, immediately (without embargo) open access available with an open license. You are allowed to include costs for full gold Open Access publications in the project budget up to a maximum amount of € 5000,- (specify with 'Open Access'). Immediate Open Access publishing via other routes is also permitted, but ZonMw does not provide financial resources for this. For the specific conditions we kindly refer to the programme texts.