Nordic Health Data Research Projects on COVID-19

Public descriptions of funded projects
https://www.nordforsk.org/calls/nordic-health-data-research-projects-covid-19

Nordic Collaborative Health Register Network for Covid-19 Epidemiology (Nordic COHERENCE)

https://www.nordforsk.org/projects/nordic-collaborative-health-register-network-covid-19-epidemiology-nordic-coherence

Project leader:
Morten Andersen

Coronavirus Disease 2019 (Covid-19) was officially declared a pandemic by WHO on 11 March, and has since spread across the world, affecting the health of millions of people, resulting in a global public health crisis, disrupting healthcare systems, and exerting a huge impact on societies and global economy. Knowledge of this new disease has gathered in parallel with the development of the pandemic. Some risk factors for severe Covid-19 are now apparent, but our knowledge is incomplete. While a medical treatment and a vaccine are extremely important goals, it is equally important to generate new evidence on the characteristics and course of Covid-19.

We will establish an internationally unique multi-country database network with data from healthcare registers in Denmark, Norway, Sweden and Scotland with the purpose of conducting epidemiological studies on Covid-19. The access to population-based data covering 25 mill. people will provide opportunities to study and thoroughly characterise disease course in individuals and evaluate the impact of the pandemic on healthcare. We will also evaluate differences across countries and the possible influence of different policies.

Focus will be on risk factors for severe Covid-19 (disease leading to hospitalisation, intensive care or fatal outcome), identifying vulnerable populations and characterising the disease course, also pertaining to long-term sequelae among survivors of severe Covid-19. Additionally, we will investigate collateral effects of the pandemic on healthcare and drug utilisation in the general population to assess secondary effects on public health.

In our analyses we will combine data science approaches and state-of-the-art epidemiological methods. We will apply machine learning for hypothesis generation and test findings in studies using more conventional epidemiological methods.

The generated evidence is expected to have high significance for patients, healthcare professionals and policymakers with an impact on recommendation how to handle Covid-19 in specific patient groups, for protecting vulnerable populations, for recommendations on medication use and for follow-up of patients surviving severe Covid-19 to treat complications. Our studies should thus inform patients, healthcare professionals and policymakers, leading to improved decision-making and providing knowledge that could mitigate some of the effects of the Covid-19 pandemic and protect public health.

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Data streams and mathematical modelling pipelines to support preparedness and decision making for COVID-19 and future pandemics (NordicMathCovid)

https://www.nordforsk.org/projects/data-streams-and-mathematical-modelling-pipelines-support-preparedness-and-decision-making

Project leader:
Tom Britton, Stockholm University

The goal of this programme is to, for the first time, create a joint Nordic long-term academic collaboration on pandemic preparedness using advanced mathematical modelling and systematically collected health data from a broad range of sources. To start off the programme involves Finland, Norway, and Sweden, but our ambition is to also include Denmark, Iceland, and the Baltic countries later on. The programme participants comprise epidemiologists, statisticians, mathematicians, and computer scientists, and will involve several participants from each of the three national public health institutes, with the directors of the institutes contributing as members of the Scientific Advisory Board of the programme.

The aim of the programme is to use clinical health data combined with real-time data streams representing social activity and human mobility, together with advanced mathematical modelling and computational methods to address several of the most urgent questions for COVID-19 and future pandemics:

- What effects do community structure, individual heterogeneities, and spatial mobility have on reproduction numbers, community immunity, and the efficacy of different preventive measures?
- How can real-time data streams of social activity and human mobility combined with clinical health data aid in making more accurate predictions and more informed control decisions related to structurally and geographically targeted nonpharmaceutical interventions?
- How can Nordic health data and novel data streams of relevance for the ongoing COVID-19 and future pandemics be shared and published in a way that allows for better analyses without compromising data privacy of the individuals?

The programme will develop methods, tools, and operational procedures for implementing cross-Nordic interoperable health data pipelines, novel methodology published in international scientific journals, and support the national public health institutes in their aim to keep disease spreading low without causing too high burden on Nordic societies.

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SCOPE - Scandinavian studies of COVID-19 in Pregnancy

https://www.nordforsk.org/projects/scope-scandinavian-studies-covid-19-pregnancy

Project Leader:
Siri Håberg, Norwegian Institute of Public Health

It is difficult to predict how the current COVID-19 pandemic will develop, but it is likely that multiple waves of COVID-19 can be expected in the coming years.
Many well-studied viral diseases, including other coronavirus infections and other viruses causing respiratory diseases, such as influenza and other common infections, are known to affect the health of the foetus and may place pregnant women at a particular high risk of severe illness and hospitalization.
It is not known is pregnant women are especially susceptible to COVID-19, or if they are at higher risk of developing severe symptoms and complications. Many countries have included pregnant women in the group of particularly susceptible individuals, out of a precautionary principle. The limited evidence available today, do suggest that pregnant women with COVID-19 and their newborns are at increased risk of adverse outcomes, and vertical transmission (from mother to foetus) cannot be ruled out and may affect foetuses in as yet unrecognized ways.

Our multidisciplinary Scandinavian team has expertise in perinatal epidemiology, in social epidemiology, in surveillance, and in obstetrics. We have extensive experience in using national registries to study pregnancy outcomes after infections and pandemics.

Our main objective is to fill three crucial knowledge gaps:

- Are pregnant women more likely to contract COVID-19, and at a higher risk of severe disease, complications and hospitalizations than non-pregnant women of reproductive age? If so, which underlying characteristics, e.g. housing and working conditions, affect the risk of severe COVID-19 in pregnant women?
- Does COVID-19 in pregnancy increase the risk of pregnancy complications, including fetal loss?
- Does maternal COVID-19 during pregnancy adversely affect the health of the child?

To address these questions, we will use unique register data on health and social factors on all women in the reproductive age, together with clinical data on the COVID-19 infections. Combining results from the three Scandinavian countries will strengthen our ability to study severe COVID-19 illness, susceptible subgroups and non-frequent outcomes. The Scandinavian countries have had different course of the pandemic, and this enables us to compare results from different contexts with similar data resources. If findings differ between countries, it may point to social structures or other causes than COVID-19 for adverse pregnancy outcomes.

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Addressing the smoking paradox in the etiology of COVID-19 through population-based studies (Tobrisk-Cov)

https://www.nordforsk.org/projects/addressing-smoking-paradox-etiology-covid-19-through-population-based-studies-tobrisk-cov

Project leader:
Maria Rosaria Galanti, Karolinska Institutet

Contrasting hypotheses, including that of a protective role of nicotine, have been generated concerning the association between smoking and the occurrence of the disease (COVID-19) caused by the SARS-CoV-2 virus. The question has attracted a lively scientific and public debate. However, the studies conducted so far are based on clinical samples, with a majority of hospital case series, thus most likely suffering from bias due to selection. The Nordic Countries (NC) are in a unique position to contribute to a substantial knowledge advancement on this question, capitalizing on a well established set of national and regional registers that allow the identification of population based cohorts with independent assessment of exposure and disease outcome. Another unique feature of the NC is the widespread use of snus among men. Since snus contains non-combustion toxicants among which nicotine the hypothesis of a specific role of this alkaloid in the risk of COVID-19 can be refined with this data.

We propose a Consortium between the Karolinska Institutet, Sweden (host institution); the Finnish Institute for Health and Welfare in Finland; and the Norwegian Institute of Public Health. Each of the participating institutions holds longitudinal datasets accrued from different population samples, complementing surveys with health care register information. In particular each country will contribute with two population-based cohorts, that in Finland and Norway also include serologic tests.

We aim to use these facilities in order to triangulate the following overreaching question: is tobacco use associated with the risk and/or prognosis of Covid-19? We aim to analyse the available data both separately and in a pooled fashion, where the two approaches can be also used to highlight the impact of different settings of the epidemic on the association, as in a natural experiment.

The knowledge generated in this collaborative effort will highly valuable during the current pandemic, e.g. in order to accurately inform the public on the risks associated with tobacco use and to adapt the support to smoking cessation in the health care services. Secondarily, if the proposed studies will provide arguments to strengthen or dismiss the hypothesis of a beneficial role of nicotine their usefulness will extend to future outbreaks caused by the same or by closely related viruses.

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Mental morbidity trajectories in COVID-19 across risk populations of five nations (COVIDMENT)

https://www.nordforsk.org/projects/mental-morbidity-trajectories-covid-19-across-risk-populations-five-nations-covidment

Project leader:
Unnur Anna Valdimarsdóttir

The COVID-19 pandemic has had an unprecedented influence on the global economy and population health. While the WHO and the scientific community have alerted for adverse mental health impact of COVID-19 and called for multinational research, the existing literature is largely limited by relatively small studies with various design flaws. Therefore, vigorous, well-designed studies with complete, long-term follow-up of high-risk groups including COVID-19 patients, their families and frontline workers are imperative for a comprehensive understanding of the mental health impact of the pandemic.

The Nordic-Baltic national registries and biobank resources provide a unique opportunity to gain critical insight into the interplay between mental and somatic health during the COVID-19 pandemic. The COVIDMENT consortium leverages an extensive research experience and infrastructure from ongoing collaborations between four Nordic countries and Estonia, including national registry resources (est. >23 million individuals; of which >70.000 with confirmed COVID-19 infection), biobanks (est. >500.000 individuals) and new COVID-19 cohorts with questionnaire data (est. > 250.000 individuals), to significantly advance current knowledge of mental morbidity trajectories in the COVID-19 pandemic. This program will address the following specific aims: 1) The role of preexisting psychiatric disorders in subsequent risk and progression of a COVID-19 infection. 2) The impact of COVID-19 on short and long-term psychiatric sequel among COVID-19 patients, their families and frontline workers. 3) The impact of the COVID-19 pandemic on population mental health by the varying national mitigating responses and corresponding COVID-19 related mortality rates across 4 Nordic countries and Estonia.

This research program will offer novel insights into the role of psychiatric factors in COVID-19 etiology and health consequences. Given our unique health registers and biobanks together with the new COVID-19 cohorts, we have a worldwide unique opportunity to understand the roles of mental disorders and associated somatic conditions in COVID-19. In order for Nordic healthcare systems to rapidly adjust to changed population healthcare needs in the aftermath of the pandemic and to the next societal disasters, we need state-of-the-art studies of population mental health to identify vulnerable populations and the extent of their problems.