

2023

CHAIN AT A GLANCE

Annual Report 2023



Another breakthrough by CHAIN!

Research takes time, but in the end, it is worth the effort.

On the International Day of Education (January 24, 2024), CHAIN published a ground-breaking study in The Lancet Public Health, showing what education really holds in store in terms of its global health benefits.

We already knew that there is a connection between our education and our health, but the magnitude of this evidence has been too extensive to be quantified on a global scale, until CHAIN (led by Mirza Balaj) decided to conduct such an effort in collaboration with our key partner in Seattle, the Institute for Health Metrics and Evaluation (IHME).

What we find is a universal connection between education and mortality risk that stays robust, even into old age! The risk of death drops by two per cent with every additional year of education. That means those who completed six years of primary school has a lower risk of death by an average of 13 per cent. After graduating from secondary school, the risk of dying is cut by nearly 25 per cent, and 18 years of education lowered the risk by 34 per cent. Every year matters. These associations are even stable across countries that have reached different stages of development.

We hope these findings are a game changer, and that governments start increasing their investments in education as health investments. We have shown that we need to look beyond health systems.

Our findings made headlines all over the world, from the Guardian to Forbes and Time Magazine. Our evidence is timely as well, as school attendance has been a major issue in many countries after the pandemic.

Furthermore, our article is another step into making social science relevant for the medical field, which still dominates public health.

I would like to thank the whole team of 26 authors who worked intensively over almost 4 years, enabling the largest meta-study ever published in science. A world record!

A special thanks to our collaborators in Seattle, including Emmanuela Gakidou and Chris Murray, who will receive their honorary doctorates at NTNU on November 15 later this year. Thank you also to Bill Gates and to the Norwegian Research Council, who funded us.

Finally, I would like to acknowledge Mirza's massive effort in leading this scientific endeavour. The magnitude of the study is beyond comprehension. It is probably the last study of its kind that can be done by humans alone, without machine learning technologies, which in turn speaks to the quality of the study.

It has been another great year for CHAIN!

*Terje Andreas Eikemo,
Leader of CHAIN*

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1

CHAIN

Centre for Global Health Inequalities Research



CHAIN is the leading centre and interdisciplinary research network for global health inequalities, based at the Norwegian University of Science and Technology (NTNU) in Trondheim. It brings together expert researchers in the field of health and the determinants of health, civil society and the UN system to advance health inequalities research, especially for children's health.

The CHAIN structure

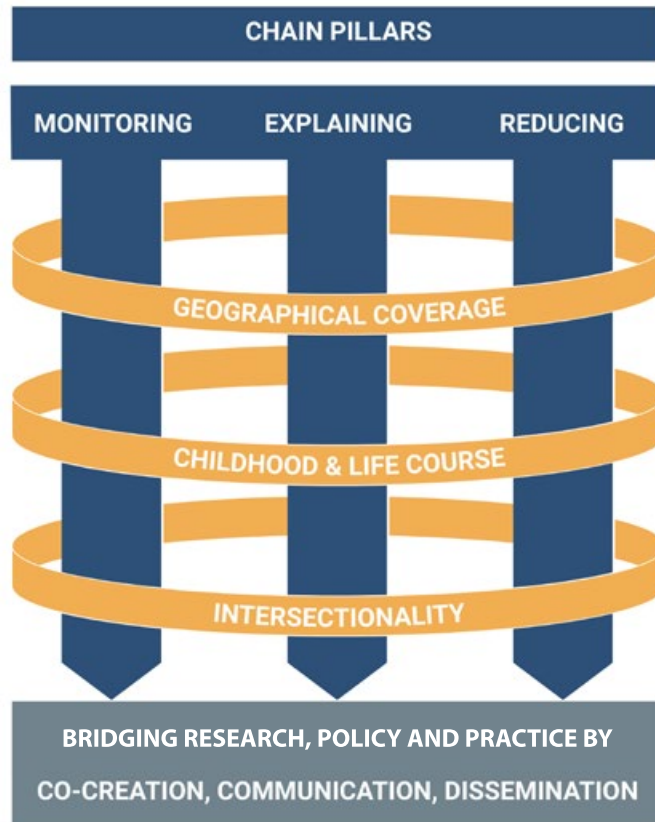
CHAIN is the leading centre and interdisciplinary research network for global health inequalities, based at the Norwegian University of Science and Technology (NTNU). It brings together expert researchers in the field of health, social determinants, civil society and the UN system to advance health inequalities research, especially for children's health.

CHAIN is working towards a global transformation in actionable health inequalities research.

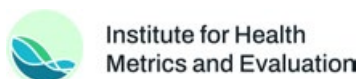
Our 5 main objectives are:

1. To monitor health inequalities, by describing the magnitude and variation of socioeconomic inequalities in health and mortality in the world through space and time.
2. To explain how these inequalities arise.
3. To reduce health inequalities by evaluating interventions that are effective in promoting health equity.
4. To reduce the gaps between research, policy and practice through outreach activities.
5. To develop the next generation of health inequality researchers.

Our work covers three pillars: Monitoring, Explaining, and Reducing health inequalities. Their results feed into CHAIN's co-creation, communication and dissemination activities aimed at making bridges between research, policy and practice.



CHAIN is the result of a unique partnership between academic institutions, policy agencies, international organisations, and the UN system. Together, we are reducing the gaps between research, policy and practice.



International Agency for Research on Cancer



The CHAIN partnership meets to discuss further collaboration and increase its impact

In May 2023, CHAIN colleagues from all over Europe and the USA gathered at the UNICEF Innocenti offices in Florence, Italy. Throughout the two-day meeting, participants presented their innovative work in the fields of inequalities related to both child health and climate change. Alongside diverse new areas of research, numerous opportunities for collaboration emerged. The meeting also examined how to incorporate research results into policymaking processes, in turn supporting evidence-based action when addressing health inequalities.

2

MONITORING HEALTH INEQUALITIES

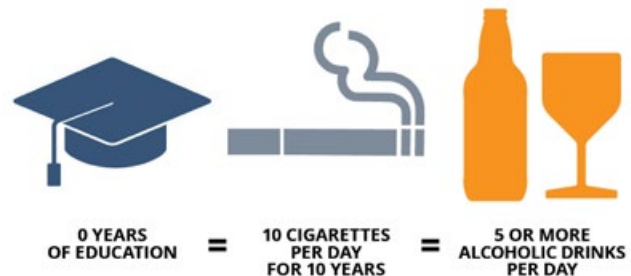


Data on health inequalities and determinants of health needs to be continuously expanded and updated to inform adequate policies and interventions. A core CHAIN priority is to ensure the availability and quality of data on health inequalities and determinants of health by building capacity to collect, analyse and share. The work of the Monitoring pillar helps monitor health inequalities in Europe and beyond, and lays the groundwork for all other CHAIN activities.

What are the links between education and adult mortality?

CHAIN and the Institute of Health Metrics and Evaluation (IHME) released a [ground-breaking study highlighting education as a vital factor in reducing adult mortality across demographics](#). Published in *The Lancet Public Health* in January 2024, the study also sparked significant media attention from some of the largest outlets including the [Guardian](#), [Forbes](#) and [Time Magazine](#).

Receiving no education is as bad for your health as smoking or drinking



Findings reveal that each extra year of education reduces mortality risk by nearly 2%, and that education benefits people of all ages and backgrounds. Those who completed six years of education had a 13% lower mortality risk, while 18 years of education resulted in a reduction of 34%. Having had no schooling was shown to be as bad for your health as smoking 10 cigarettes a day.

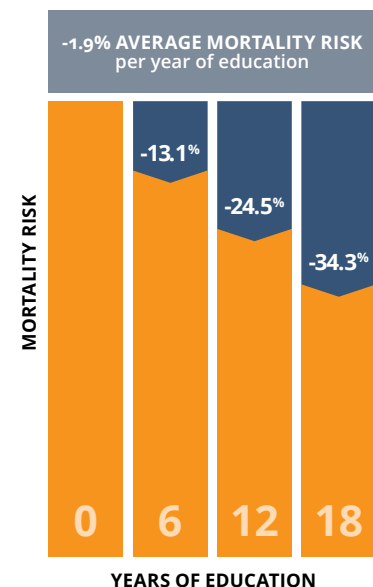
Education provides a pathway to improving overall health, as it leads to better employment, income, and access to healthcare. The study emphasizes the need for global efforts to improve education access to interrupt the cycle of poverty and preventable deaths.

Access the study's factsheet [here](#).

Creating a Global Social Burden of Disease database

The study on levels of education and mortality was a result of CHAIN's collaboration with IHME to add socioeconomic indicators to the [Global Burden of Disease \(GBD\) study](#). The GBD is the largest scientific endeavour of its kind - one which quantifies levels and trends in health, while ensuring its data and accompanying data tools are made publicly available. Adding socioeconomic indicators to the study effectively creates a 'Global Social Burden of Disease' database, and will be a major milestone both for the GBD, but also for the development of evidence-based policies in global health.

In 2021, CHAIN and IHME collaborators established the [links between a parent's level of education and the risk of their child dying before the age of 5](#). The study found that each additional year of a father's and mother's schooling is linked to a reduction in under-5 mortality of respectively 1.6% and 3.0%. Together, these two studies are the "anchor studies", that will pave the way for the inclusion of socioeconomic indicators into the GBD.



Further use of data from the Global Burden of Disease study

The data from 2019's GBD study has also been used by CHAIN researchers for other studies, including to [measure inequalities in the burden of noncommunicable diseases](#) across European countries as well as the [burden of disease attributed to drug use in Nordic countries](#).

Sharing the work with the research community

Over the course of 2023, Professor Terje Andreas Eikemo, Leader of CHAIN, joined several conferences to discuss CHAIN's collaboration with IHME in creating a 'Global Burden of Health Inequalities' database. Among them were:

- [Why reduced inequalities will create more sustainable societies](#). The NTNU European Conference in February 2023;
- [Measuring, explaining and reducing health inequalities in the Nordic countries](#). Nordic Health Promotion Research Conference in June 2023;
- [Monitoring of Health Inequalities](#). Robert Koch Colloquium in June 2023;
- [Global Health Norway Conference – Inequity and health system strengthening](#) – Institute of Health and Society. November 2023.

Assessing the long-term health impact of Covid-19: The importance of using self-reported health measures



While it is estimated that 1 in 10 COVID-infected patients get symptoms of long COVID, data may not accurately reflect its prevalence due to a lack of clear definitions and diagnoses.

In an [editorial in the Scandinavian Journal of Public Health](#) published in June 2023, CHAIN researchers set out the challenges of researching long COVID and the important role that data on self-reported health can play in getting a clearer picture of population health.



3

EXPLAINING HEALTH INEQUALITIES

How do socioeconomic determinants interact with health and lead to health inequalities? That is the core question examined by our Explaining pillar.

In 2023, CHAIN researchers looked into a wide range of determinants to explain health disparities, including environments, trade, Covid-19 and the effectiveness of welfare policies and employment.

Examining subnational inequalities in pre-pandemic Europe

A CHAIN study examined [premature deaths across countries in the European Economic Area before Covid-19](#). The study was published in collaboration with the European Burden of Disease Network. It revealed varying declines in years of life lost (YLLs) between countries from 2009 to 2019, which corresponded with disparities in socioeconomic factors such as education, income, and poverty risk.



Gaps persist in understanding the impact of these factors on social inequalities in YLLs, hindering effective policymaking and community involvement. Lead research Carl Michael Baravelli also presented the findings of the study at the European Public Health Conference in November 2023 in Dublin.

CanScreen5 project findings drive cancer research forward

CanScreen5 Findings from the [CanScreen5 project](#), which aims to collect information on the characteristics and performance of screening programmes for breast, cervical and colorectal cancer across the globe, have been disseminated in the journals [Nature Medicine](#) and [Cancer Medicine](#). CanScreen5 is a project of the International Agency for Research on Cancer (IARC), a partner of CHAIN.

Most recently, the culmination of face-to-face workshops with regional collaborators resulted in a robust action plan to tackle barriers in the cancer screening pathway across 21 participating countries, presented at the IARC Scientific Council.

How have Covid-era decisions affected infant feeding practices?



As part of the [Milk Shock](#) project, CHAIN's PhD candidate Virginia Kotzias published a [study](#) exploring how Covid-era policies, economic factors, and social changes impact decisions on infant feeding practices. One aspect of the study involved interviews with Norwegian mothers about breastfeeding and childcare during lockdown. The results of these interviews were presented at [Healthy Future Conference](#), [Global Health Day](#), the [American Public Health Association National Meeting](#); and discussed on [Motherhood Uncensored](#).

Measures such as adequate maternity leave and workplace accommodations, coupled with accessible breastfeeding resources and adherence to formula marketing regulations, have proven to positively impact breastfeeding rates. The Norwegian University of Science and Technology (NTNU) launched a [newsletter](#) for the Milk Shock project for updates.

What are the health consequences of informal employment among female workers and their children?

Informal work is an unprotected and unregistered form of work, often characterised by precarious working arrangement. Although it remains among the most common type of employment worldwide, little scholar attention has been directed to its impact on health, which are thought to be significant. A [literature review](#) conducted by a group of CHAIN researchers led by Amanda Aronsson, found an association with worse health outcomes, particularly on child nutritional status and antenatal health.

Does educational mobility in mid-life affect mortality?

A new study examines the [potential benefits of following additional formal education at older ages](#). The study by Mirza Balaj and Emilie Agardh was performed in collaboration with the Karolinska Institute, and examined these benefits among Swedish adults aged 40-50. Findings revealed that women who increased their educational level in mid-life had a reduced risk of mortality. In men, mortality was reduced only for those who increased their education from a low level.

How do education levels relate to mental disorders, substance use and self-harm at different ages?

A group of CHAIN researchers set out to investigate the [links between low education and risk of mental disorders, substance abuse disorders and self-harm](#) among different age groups. Their study covered 1.6 million people born in Stockholm between 1931 and 1990, and linked them to their own or their parents' highest level of education in 2000. Researchers followed up for these disorders in health care registers between 2001 and 2016. The study found associations between low education and higher risks of most mental disorders, of substance use disorders and of self-harm in all age-groups, but especially among those aged 28–50 years.

How have educational inequalities in mortality rates developed over time?

While studies have shown that educational inequalities in mortality rates have changed over time, it is unclear if the same can be said from a birth cohort perspective. A CHAIN study published in February 2023 [compares changes in inequality in mortality between a period and a cohort perspective in 14 European countries](#), and explores mortality trends among low-educated and high-educated birth cohorts. It finds that trends in mortality inequalities by birth cohort are less favourable than by calendar period, and that inequalities may further widen.

4

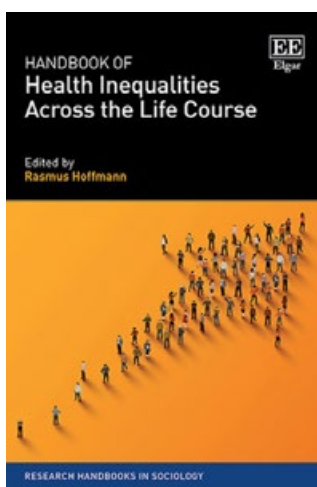
REDUCING HEALTH INEQUALITIES

In CHAIN's third pillar, our researchers identify what works to reduce health inequalities. In several ongoing research projects, journal articles and commentaries, we raise awareness of key public health challenges and the need to take action.

Microsimulation as a tool to evaluate policies and their impact on health inequalities

A recent CHAIN study identified microsimulation as a cost-effective and promising tool to evaluate the impact of policies and interventions. Microsimulations are an emerging tool in epidemiological and public health research. They bring together evidence, theories, and data to project a population of e.g. individuals or households over time, allowing to predict the impact of policy changes and initiatives. Based on the results, the study calls for collaboration between researchers and policymakers to produce microsimulations to reduce health inequalities.

What is the role of social protection policies in reducing health inequalities?



CHAIN researchers Amanda Aronsson, Clare Bambra and Terje Andreas Eikemo, pairing with Hande Tugrul of Bocconi University, have published a chapter on social protection in the *Handbook of Health Inequalities Across the Life Course*. The chapter explores the pathways through which social protection policies can influence health, especially within a life-course perspective. It shows that policies that improve the conditions of the parents have a positive impact on children now and later in life, and can contribute to greater child health equality.

What are Scandinavian countries doing to promote labour market inclusion of the chronically ill?

CHAIN researchers have carried out a scoping review of efforts in labour market inclusion of people living with chronic illnesses in Scandinavian countries. Their review aimed to identify promising strategies and needs for further research, and reviewed approaches that either targeted workplaces or the individual.

The review found little evidence for effectiveness of government programmes directed towards the supply side of the labour market, but indicated that multidisciplinary workplace interventions have a substantial effect. It also identified a significant lack of research on the effect of various governmental policies and programmes, including local health, work and welfare services, and limited coordination and cooperation between health and work services professions.

Have stimulus packages mitigated the negative health impacts of Covid-19-related job losses?

Have Covid-19 stimulus packages mitigated potential harms to health from unemployment? A team of CHAIN researchers led by Dr Courtney McNamara conducted a systematic review of the health effects of job loss during the first year of the pandemic. It found that such programs limited the impact on food security and mental health. However, despite the implementation of large-scale stimulus packages to reduce economic harm, there were clear associations between job losses and negative impacts on health and wellbeing.

Can low- and middle-income countries invest in pandemic preparedness in times of austerity?

The World Health Organization, World Bank and International Monetary Fund are calling on low- and middle income countries to invest in pandemic preparedness and response systems, but will they be able to? A team of CHAIN researchers found that public spending is set to decrease sharply in over half of low-and middle income countries, the key driver being external debts. This sets the stage for worsening population health, while public health services face increased needs.

They stress that international financial institutions such as the International Monetary Fund and World Bank must enable and support greater public spending to improve population health.

Are patient navigation programmes effective in increasing participation to cancer screening?

1.24 Inequalities in cancer incidence and mortality can be partly explained by unequal access to health services such as cancer screening. Patient navigation is a type of intervention focusing on reducing barriers to care. A group of CHAIN researchers led by Dr Isabel Mosquera set out to identify the reported components of patient navigation and to assess its effectiveness in promoting screening for breast, cervical and colorectal cancers.

Does opposition from the far-right hinder vaccine programmes?

A group of CHAIN researchers led by Manuel Serrano-Alarcón has examined whether far-right politicians' opposition to Covid-19 vaccination in Spain complicated vaccine roll-out. Analysing data from Spain's monthly survey on political and social issues, the researchers found that far-right politicians can encourage vaccine hesitancy. However, public attitudes towards vaccination can be changed, and rapid and effective vaccine rollout can help overcome the resistance of far-right voters to get vaccinated.

5

POLICY AND OUTREACH



CHAIN's policy and outreach activities ensure that research from its three pillars lead to concrete action on the determinants of health. To make this happen, we engage with researchers and policymakers in- and outside of the public health community and use the evidence we have produced to demonstrate the need for and benefits of taking action.

EuroHealthNet presents priorities for the 2024-2029 EU policy landscape



After the June 2024 European Elections, a new European Commission will be formed, and so will the EU policy agenda for the following five years. In anticipation of the elections, EuroHealthNet has published its [EU policy priorities for the new European Commission](#), to improve health equity and wellbeing in Europe by 2030 through action on the determinants of health.

By taking on these priorities, the new European Commission can take forward its objective to protect health across all policies, especially those outside of the health policy remit, such as employment, education, agriculture, trade or economy.

Collaboration with UNICEF Innocenti contributes to enhancing global children's programs

UNICEF Innocenti Research Institute, CHAIN and the Centre for Evidence and Implementation collaborated to create Implementation Research and the Case Compendium summaries to enhance global children's programs. This initiative integrates research into existing programs for sustainable improvements, aligning with UNICEF's commitment to leveraging research for children's well-being and achieving Sustainable Development Goals.

The Case Compendium synthesises studies in a uniform format, facilitating cross-sector learning and promoting broader adoption of implementation research for children's benefit.

Erasmus University of Rotterdam presents work on health equity

CHAIN partner Erasmus MC delivered presentations for several studies contributing to advancing research on socioeconomic inequalities.

Nienke Boderie delivered an oral presentation titled "Socioeconomic Inequalities in Smoking Attributable Mortality Trends in Europe between 2000 and 2020" at the [2023 conference of the European Chapter of the Society for Research on Nicotine and Tobacco](#).

Two CHAIN researchers presented their work as part of the [2023 Annual Academy for students in Population, Health and Data Science](#), organised by the Max Planck Institute for Demographic Research (MPIDR).

- Wilma Nusselder presented on the topic "Has Cancer Surpassed Cardiovascular Diseases: What Can Different Measures Tell Us about Educational Inequalities across Europe?"
- Su Yeon Jang addressed "Inequalities in Life Expectancy between Migrants and Natives across Europe" in an oral presentation. Find more of her work on migrant health [here](#).

Leading health inequalities expert presents findings on the impact of Covid-19 in the UK

The UK Covid-19 Inquiry was set up to examine the UK's response to the impact of the Covid-19 pandemic and learn lessons for the future. CHAIN's Professor Clare Bambra of Newcastle University presented [a report and evidence to the Inquiry](#), which she has written with Professor Sir Michael Marmot of University College London. It highlighted that "the UK entered the pandemic with its public services depleted, health improvement stalled, health inequalities increased and health among the poorest people in a state of decline." Access a video of her evidence [here](#).

Scandinavian Journal of Public Health focuses on migrant health, and the health and wellbeing consequences on Covid-19



The [Scandinavian Journal of Public Health](#) is an international peer-reviewed journal, which has a particular focus on ageing and health, global health and child health. It is edited by CHAIN Leader Terje Andreas Eikemo.

The pressing public health issues faced by migrant groups

While migrants are counted amongst society's most vulnerable groups, migration health remains a widely under-researched field and migrants are often

approached as a homogeneous group. However, as data on migration and health has increased exponentially, there is a growing momentum in migration health research.

In [this issue](#) of the [Scandinavian Journal of Public Health](#), the featured studies examine pressing public health issues among migrant groups categorised according to age, country of origin, sub-population groups, duration of stay and reasons for migration. Topics included reproductive health, mental health, infectious diseases and cardiovascular diseases and the use of healthcare services. While it demonstrates progress in this field of research, the edition also illustrates the need to shed light on new complexities and interdependencies. It calls for a new research agenda stressing for example that more research and moving beyond researcher driven 'cherry picking' of migrant groups and topics is needed.

Examining the social, economic and health-related consequences of Covid-19

Another issue features studies that highlight that [the use of self-reported health measures is vital for fully assessing the long-term impact of the Covid-19 pandemic](#) on health and health inequalities. It discusses strengths and limitations of specific measures that capture direct self-reports of long Covid. It then outlines how the impact of long Covid may also be reflected in response patterns to more general self-reported health measures and give suggestions on how these can be used to examine the long-term health impact of the Covid-19 pandemic.

What is at stake for reforming community-based health care workforce policy in Nepal?

PhD Candidate Roosa Tikkanen conducted three months of fieldwork in Nepal for her PhD project “Reforming Community-Based Health Care Workforce Policy in Nepal: Current Challenges and Opportunities in the Context of Federalization”. The stay was organised in collaboration with Kathmandu University Dhulikhel Hospital’s Community Health Division.

The project was presented by Ms Tikkanen at the Norway Nepal Global Health Conference where she was awarded Best PhD Presentation Prize among ten candidates from Norway and Nepal. Follow her research updates on [LinkedIn](#) or [X](#) for more information.



EuroHealthNet publishes guide of support points for EU funding, instruments and networks



To help the research and public health community make better use of resources available at the EU level, EuroHealthNet has launched a [Guide to the National Focal Points for EU programmes, instruments, and networks](#).

It is the first time that one resource brings together information about key contact persons for European funding programmes and technical assistance across EU Member States, to help facilitate more equitable use of these important resources.

6

THE CHAIN TEAM

NTNU-based team

Leader:

- Terje Andreas Eikemo

Scientific Coordinator:

- Mirza Balaj

Professors:

- Indra de Soysa
- Tim Huijts
- Hanno Hoven

Senior researcher:

- Courtney McNamara

Post doctoral researcher:

- Kristian Heggebø
- Insa Backhaus

PhD students:

- Virginia Kotzias
- Amanda Aronsson
- Roosa Tikkanen
- Lukas Murau
- Hanne Dahl Vonen
- Lode van der Velde

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- Magnus Rom Jensen
- Lene Elisabeth Bertheussen

Social Media:

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- Pilar Vidaurre

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- Jalal Arabloo
- Aleksandr Aravkin
- Kathryn C Beck
- Nathalie Bennett
- Liubov Borisova
- Mouna Bourakkadi
- Claire J Degail
- Kristoffer Eikemo
- Lorena Donadello
- Joseph Friedman
- Emma Rose Froystad
- Anna Giouleka
- Besi Gjylbegaj
- João Rocha Gomes
- Indrit Gradeci
- Simon I Hay

- Gilda Hoxha
- Julia Jackman
- Magnus Rom Jensen
- Gazmir Lame
- Monica Machado
- Susan A McLaughlin
- Sylvia Mihailescu
- Talal Mohammad
- Erin C Mullany
- Erin M O'Connell
- Maria Lisa Odland
- Ricardo Ortega
- Gerasimos Parisis
- Fatime Qosaj
- Nicole Quattrini
- Jenny Reid
- Solvor Solhaug
- Kam Sripada
- Donata Stonkute
- Hannah Theriault
- Hussein Twabi
- Lode van der Velde
- Pilar Vidaurre
- Celine Westby
- Peng Zheng

Work package 1: Monitoring health inequalities

Erasmus MC:

- Wilma Nusselder
- Frank van Lenthe

Institute for Health Metrics and Evaluation, University of Washington:

- Emmanuela Gakidou
- Joseph Friedman
- Claire Henson
- Erin Mullany

Norwegian Institute of Public Health:

- Carl Michael Baravelli
- Ann Kristin Knudsen
- Jonas Kinge

KEY PROJECTS: GBD Education, European Social Survey round 11, GBHI

Work package 2: Explaining health inequalities

International Agency for Research on Cancer, World Health Organization:

- Partha Basu
- Andre Carvalho
- Isabel Mosquera
- Eric Lucas

Norwegian Public Health Institute:

- Gro Dehli Villanger
- Thea Steen Skogheim
- Adriano Winterton
- University of Geneva
- Silvia Stringhini
- Hugo Santa

Erasmus MC:

- Tanja Houweling
- Leah Prencipe
- Wilma Nusselder
- Di Long

KEY PROJECTS: NeuroTox and CanScreen5

Work package 3: Reducing health inequalities

Newcastle University:

- Clare Bambra
- Viviana Albani
- Adam Todd
- Heather Brown
- Sarah Darbyshire-Evans

Bocconi University:

- Alexander Kentikelenis
- Manuel Serrano Alarcon

KEY PROJECTS: Heal-Tech project
Environment and child health

Work package 4: Bridging research, policy and practice

EuroHealthNet:

- Caroline Costongs
- Max Tscheltzoff
- Chantal Verdonschot
- Anne Wagenführ-Leroyer

UNICEF Norway:

- Kyrre Lind

UNICEF Innocenti:

- Gwyther Rees

KEY PROJECTS: UN WHO TAG on Covid-19-
mortality, UNICEF Report Card 17, poli-
cy-exchange, publication material

7

PUBLICATIONS

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