



CHAIN – Centre for Global Health Inequalities Research

Summary report 2019 – 2025

CHAIN is financed by a strategic grant (miljøstøtte) from the Norwegian Research Council (project number 288638).

Reflections on CHAIN's achievements (2019 – 2025) and future ambitions

It brings me great joy to look back at all our achievements since the official start of CHAIN on 23 October 2017, and through some extremely productive years of institutional funding (NOK 97 million) as part of the Norwegian Research Council (NRC) Miljøstøtte funding scheme (April 1, 2019 - March 31, 2025). We have reached significant milestones since the project's inception, marked by the publication of hundreds of articles, appearances in news outlets, and dissemination events.

During this period, CHAIN has established itself as a pioneering research centre with a vision that extends beyond mere academic inquiry, making a tangible difference in health equity both nationally and globally.

I would like to take this opportunity to thank all those involved, including research assistants, PhD students, postdoctoral students, researchers, professors, and all our partners outside the academic community.

Our journey began as a collaboration between our interdisciplinary research groups at NTNU and UNICEF Norway. We had approached health equity from two complementary perspectives: our goal as researchers was to generate actionable knowledge that could immediately benefit governments and communities. At the same time, UNICEF sought evidence-based insights to guide its interventions. This synergy led to the formation of CHAIN, a

centre designed to bridge disciplines and sectors to combat health inequities.

As I reflect on our past, it becomes clear that our achievements, such as the discovery of a global universal association between parental education and child mortality in 2023, have laid a strong foundation for what's ahead.

Receiving the grant from NRC marked not only an achievement but also a commitment to our pioneering efforts to monitor, explain, and, ultimately, reduce socioeconomic inequalities in health on a global scale.

We have achieved our ambition to change the landscape of health disparities. For example, we have developed new monitoring systems, including the implementation of our health inequalities module in the European Social Survey, the collection and harmonisation of European register data, and through our systematic reviews and meta-analyses on the effects of education on mortality. The latter has paved the way for the inclusion of low education as a risk factor in the Global Burden of Disease Study.

Furthermore, our finding that both positive (i.e., technological innovations) and negative (i.e., pandemics, pollution, climate change) societal changes increase health inequalities demonstrates that time and context are inherently connected to our social environments. As our societies change, health gaps increase because those with the most flexible resources, such as money or knowledge, will benefit more from good times and be better able to protect themselves during bad times.

We have also worked closely with our partners to mitigate health inequalities. For example, CHAIN provided evidence to the WHO Technical Advisory Group on COVID-19 mortality, showing how the pandemic

disproportionately affected the most vulnerable segments of global populations. We also collaborated with the WHO's cancer division (IARC) to identify interventions that can increase participation in cancer screening. I would like to highlight our numerous successes with UNICEF. We have provided analytical evidence for their Report Card series on child health, contributed to a report on children's exposure to lead pollution, which estimated that approximately 800 million children — 1 in 3 children worldwide — have lead poisoning, and co-developed a new framework for implementation research at UNICEF. In summary, we have demonstrated that it is possible to integrate the data, analytical capacity, and frameworks of CHAIN, along with our partnerships, to implement

actionable research that informs policies and initiates meaningful interventions.

As we move forward, our vision is for CHAIN to remain a global leader in advocating for health equity.

Building on our current strengths, we will continue to bring socioeconomic determinants of health to the forefront of global discussions. We will expand our unparalleled data infrastructure that will enhance our understanding of health inequalities. We will continue to uncover new insights into the relationship between socioeconomic status and health outcomes, and we will continue to develop frameworks for evaluating interventions from an equity perspective, ensuring that our work leads to real change in policies that benefit vulnerable populations.



Terje Andreas Eikemo,
Leader of CHAIN

Contents

1. Introduction to CHAIN	4
2. Monitoring	7
3. Explaining	13
4. Reducing	17
5. Events, meetings, and dissemination	25
6. Policy recommendations	30
7. Norway’s leadership in global health equity: A call for action through CHAIN	34
8. The CHAIN team	36
9. List of publications	39



The Centre for Global Health Inequalities Research

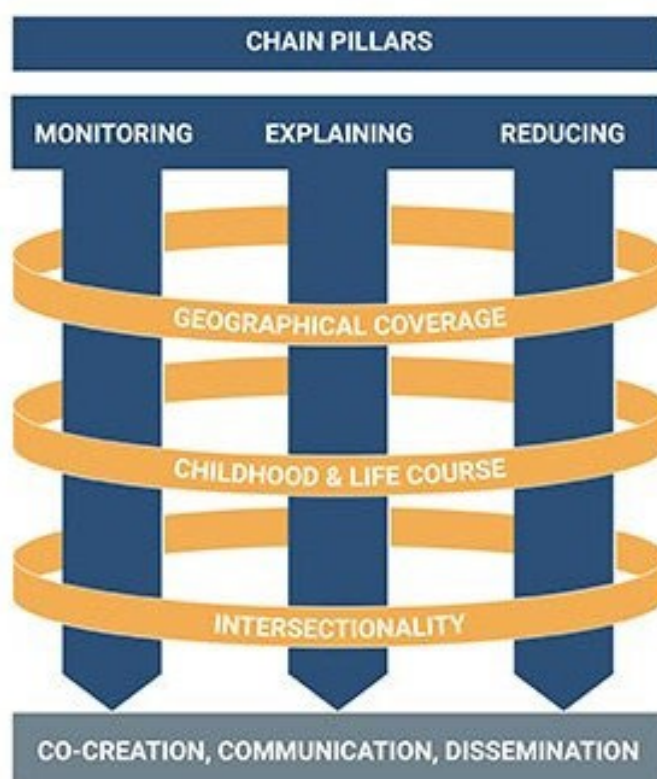
1. About CHAIN

CHAIN, the Centre for Global Health Inequalities Research, 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 social determinants, civil society, and the UN system to advance research on health inequalities, especially for children's health.

1.1 CHAIN structure

CHAIN works towards a global transformation in actionable health inequalities to

- **Monitor** health inequalities by describing the magnitude and variation of socioeconomic disparities in health and mortality in the world through time and space.
- **Explain** how these inequalities arise.
- **Reduce** health inequalities by evaluating interventions that are effective in promoting health equity.
- **Reduce the distance between research, policy and practice** through outreach activities.
- **Develop the next generation** of health inequality researchers.



1.2 About NRC funding

The CHAIN kick-off meeting, held on 9-10 April 2019, allowed our international network to meet one another, exchange knowledge, and plan our priorities for our collaborative work in the years to come. At the meeting, the group discussed CHAIN's three central pillars: monitoring, evaluating, and reducing global health inequalities.

In May 2023, the CHAIN consortium 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.

On March 25, 2025, the Norwegian Public Health Association convened a diverse assembly of academics, organisations, and politicians, including representatives from the Conservative Party to the Red Party. The primary aim of this gathering was to identify effective policies that address health inequalities.

The discussions started after an overview of the most recent evidence on health inequalities by Prof. Terje A. Eikemo. A list of [suggestions within several policy areas](#) was identified and delivered to our politicians. Increasing child allowances emerged as a shared point of agreement among the politicians present.

1.3 Norwegian Research Council: CHAIN is a success story!

The Research Council of Norway (NRC) has highlighted CHAIN as a success story, emphasising its impactful work in understanding and addressing social health inequalities worldwide ([Jo meir utdanning du tek, jo betre helse får du og barna dine](#)). The NRC notes that.

“Established in 2017 through collaboration with UNICEF and funded with 36.8 million NOK, CHAIN conducts groundbreaking research on how social factors like education influence health outcomes across the globe”.

A key achievement is the discovery of the significant role that a father's education plays in children's survival, a finding that has shaped global health policies. The centre's work demonstrates that health disparities are deeply rooted in social structures, and reducing these inequalities is crucial for building resilient societies.

Through extensive data analysis and international collaboration, CHAIN influences health strategies and promotes social justice by advocating for equitable access to healthcare and resources. CHAIN exemplifies how targeted funding can drive world-leading research with tangible societal benefits, making it a true success story in advancing global health equity.”

Jo meir utdanning du tek, jo betre helse får du og barna dine

Terje Eikemo og Centre for Global Health Inequalities Research (CHAIN) har sett på samanhengane mellom utdanning og helse i den største metastudien i verda. Blant funna ser vi at betydninga av fars utdanning er viktigare enn vi tidlegare har trudd, og at samanheng mellom helse og utdanning er like sterk same kvar i verda du bur.

Se hvordan det gikk da vi tok en prat med Eikemo i Forskningsrådets studio på Lysaker i mai 2025



Les mer om CHAIN-senteret og forskningen deres i artikkelen under. Artikkelen ble først publisert høsten 2024.

– Saman med akademikarar, praktiskarar, politikk-påverkarar og internasjonale organisasjonar jobbar vi mot eit felles mål: å finne ut av korleis vi best kan bruke ressursane i verda til å redusere sosiale helseulikskepar, fortel Terje Andreas Eikemo, forskar ved NTNU og leiar av CHAIN.

CHAIN-senteret tek utgangspunkt i ein av dei største samfunnsutfordringane våre nasjonalt og globalt: sosiale ulikskepar i helse. Prosjektet blir koordinert frå Trondheim (NTNU) og Brussel, men forskingssenteret jobbar globalt. Det vart oppretta i 2017 i samarbeid med UNICEF og har fått 36,8 millionar kroner frå Forskningsrådet.

[Les meir om CHAIN-senteret.](#)

NRC invited Prof. Eikemo to an [interview about CHAIN's achievements](#) (in Norwegian only).

1.4 The CHAIN consortium

The CHAIN project was led by the [Norwegian University of Science and Technology \(NTNU\)](#). NTNU has a main profile in science and technology, a variety of programmes of professional study, and great academic breadth that also includes the humanities, social sciences, economics, medicine, health sciences, educational science, architecture, entrepreneurship, art disciplines and artistic activities.



[Bocconi University](#) is a leading European research and teaching University with a strong international orientation and an offer that encompasses the areas of Economics, Management, Finance, Legal Studies, Political Science, Data and Computer Science, and AI.



[Erasmus University Rotterdam](#) is a highly ranked, international research university. The university is known for its research in the broad range of the social sciences and humanities, including behavioural, legal, economics & business research, as well as medicine.



[EuroHealthNet](#) is the European Partnership of public health bodies building a healthier future for all by addressing the determinants of health and reducing inequalities. Its focus is on preventing disease and promoting good health by looking within and beyond the health care system.



The [Norwegian Institute of Public Health \(NIPH\)](#) is a national competence institution placed directly under the Ministry of Health and Care Services. Its social mission is to produce, summarise and disseminate knowledge to support good public health efforts and healthcare services.



An independent population health research organisation based at the University of Washington School of Medicine, the [Institute for Health Metrics and Evaluation \(IHME\)](#) collaborates with researchers worldwide to develop timely, relevant, and scientifically valid evidence that illuminates the state of health everywhere.



[UNICEF](#) is a UN agency dedicated to helping children worldwide. It focuses on protecting children's rights, providing humanitarian and developmental aid, and ensuring their survival, development, and potential are fulfilled. The UNICEF Norway and Global offices, as well as the Innocenti Global Office of Research and Foresight, are partners of CHAIN.



The [International Agency for Research on Cancer \(IARC\)](#) is a specialised cancer agency of the World Health Organization (WHO). Its mission is to conduct and coordinate research into the causes of cancer and to develop strategies for cancer prevention.



[Newcastle University](#), a research-intensive institution and a founding member of the Russell Group, has been a prominent UK university since its founding in 1834. It is renowned for its research strengths in areas like ageing and health, data, and sustainability.



1. Monitoring

Data on health inequalities and determinants of health need 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, laying the groundwork for all other CHAIN activities.

1.1 Collaboration with IHME

CHAIN has collaborated closely with its key partner, the Institute for Health Metrics and Evaluation at the University of Washington, to incorporate education as a risk factor into the Global Burden of Disease study. This will help quantify the impact of educational inequalities on health, with a specific focus on child and adult mortality. The CHAIN project has enabled the inclusion of education in the 2025 round of the GBD Study.



The GBD is the largest scientific endeavour of its kind – one that 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 significant milestone both for the GBD and for the development of evidence-based policies in global health.

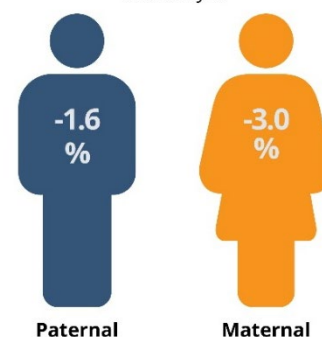
The process began in 2019, when CHAIN researchers outlined plans to establish a global socioeconomic network and data warehouse to monitor and explain health inequalities. The warehouse would bring previously disparate datasets together under one roof, enabling essential discoveries through the linkage of existing and new data. CHAIN and IHME worked closely to develop a protocol and train master’s students and researchers on research techniques.

The link between parental education and child mortality

In June 2021, this collaboration led to the publication of a groundbreaking study on the relationship between parental education and child mortality. The study was one of the first to include an examination of fathers’ education, which is critically under-communicated, as well as mothers’ education. Additionally, the study exceeded the scope of previous research by extending beyond the perinatal period to examine mortality during the first 5 years of life and by encompassing over 3 million live births.

The study found that lower parental education levels are a risk factor for child mortality under the age of 5. It further found

Each additional year of schooling leads, on average, to a **reduction** in under-5 mortality of



that the education of both parents is important, that each additional year is linked to an improvement in child survival, and that education matters regardless of location. A [factsheet](#) was created to visualise the study's findings.

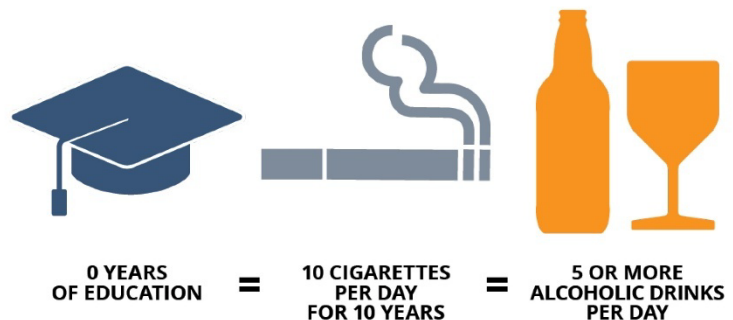
What are the links between education and adult mortality?

In January 2024, CHAIN and IHME released another groundbreaking study using GBD data, this time highlighting education as a vital factor in reducing adult mortality across demographics. Published in *The Lancet Public Health*, the study also sparked significant media attention from some of the most prominent media outlets, including *The Guardian*, *Forbes*, *Time Magazine*, *Think Global Health* and *Dagsrevyen 2.1*.

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

The study demonstrated that education provides a pathway to enhancing overall health, leading to improved employment, increased income, and greater access to healthcare. The study emphasises the need for global efforts to improve access to education to interrupt the cycle of poverty and preventable deaths. The study's findings were presented in a [factsheet](#).

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

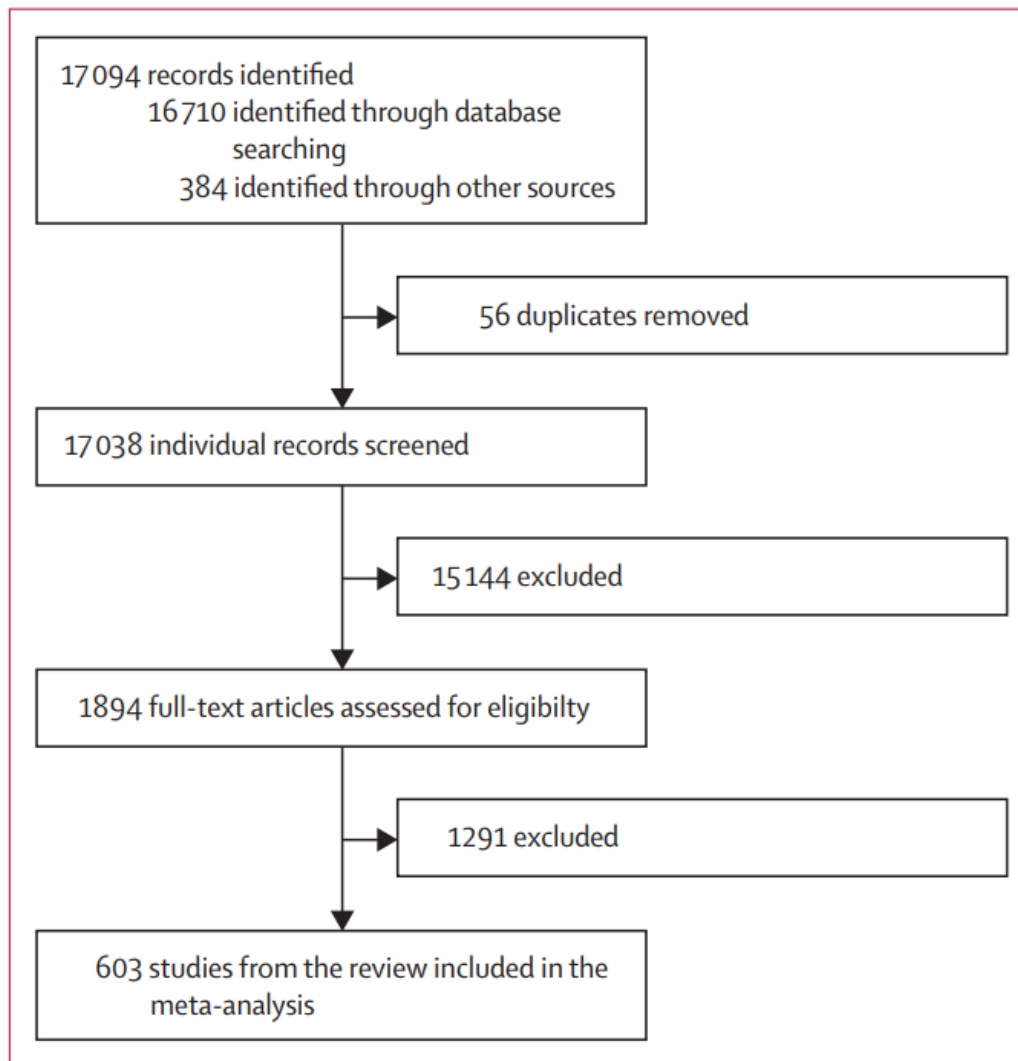


A critical collaboration with the NTNU University Library

CHAIN has long been collaborating closely with the NTNU University Library to create a foundation of the best available scientific evidence. The library's support ensures researchers have access to necessary articles, thereby elevating the credibility and impact of their findings.

As an important partner in CHAIN's efforts to establish the relationship between education and health, the Library identified 17,094 studies on the topic. It helped narrow these down to 603 high-quality studies to be included in the meta-review, an unofficial record. The comprehensive nature of this meta-analysis underscores the importance of meticulous data collection, access to diverse resources, and rigorous validation—all areas where the NTNU University Library's expertise plays a vital role.

The collaboration between CHAIN and the NTNU University Library exemplifies the importance of integrating research expertise with librarian services to enhance the quality and impact of scientific work. Their close partnership is built on mutual understanding and shared resources, fostering a productive environment that benefits both parties and advances research outcomes.



This successful partnership serves as a model for how academic institutions can foster stronger links between research and library services, ultimately contributing to more robust scientific discoveries and informed policymaking on a global scale.



The librarians behind the unofficial world record are Senior Research Librarian Magnus Rom Jensen, Research Librarian Solvor Solhaug, Research Librarian Lene Elisabeth Bertheussen, and CHAIN leader Prof. Terje Andreas Eikemo.

Related studies

CHAIN and IHME's collaboration to incorporate education as a risk factor into the Global Burden of Disease study enabled subsequent studies on several other health risk factors. Studies explored

- The association between education and adult mortality in the [Asia Pacific Region](#)
- [Patterns in the prevalence of tobacco use](#) and attributable disease burden, signalling a large implementation gap in tobacco control.
- [Population-level risks of alcohol consumption](#), calling for stronger interventions to reduce the substantial global health loss attributable to alcohol, particularly in younger individuals.
- [Inequalities in the burden of non-communicable diseases](#) across European countries
- The [burden of disease attributed to drug use in Nordic countries](#).

GDB data collection: what's next?

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.

While the Global Burden of Disease (GBD) tool will enable us to stratify data according to socio-economic factors between countries, it will not allow us to do so within individual countries. A [study](#) by CHAIN researchers conducted a Cox regression analysis to stratify on educational groups to examine inequalities in cause-specific mortality and years of life lost. This approach could be a possible solution to integrating social inequalities into the GBD Study or when using a burden of disease framework approach more generally.

1.2 Collecting data on health and the stratification of societies – a collaboration with the European Social Survey

The biennial European Social Survey maps the attitudes, beliefs, and behaviour patterns of people in Europe. CHAIN first implemented a health inequalities questionnaire (module on the social determinants) in [round 7 of the European Social Survey \(ESS\) in 2014](#), making the ESS the first health survey to include rich questions on the stratification systems of societies. The data of round 7 of the ESS, which is freely available, has been used by numerous researchers within and outside CHAIN. In 2021, results were shared with the European Commissioner of Health and Food Safety and national governments.



CHAIN worked with ESS to [repeat the module on the social determinants of health in Round 11](#), the data from which was released in 2023. Due to the timing, the module presented a rare opportunity for the research community to examine how European welfare states of varying size and quality impacted health and its social determinants during the COVID-19 pandemic.

1.3 CHAIN collected individual-level data on education and cause-specific mortality from 2015 to 2020

CHAIN and its partner, the Erasmus Medical Centre Rotterdam, collaborated to expand the existing European data register on education and mortality by cause of death up to 2019/2020, which has been named the Erasmus-CHAIN data.

The database (shown on the map) goes back to 1970 and is the largest harmonised data source of its kind. CHAIN is currently analysing the data, which will lead to crucial updates on European trends in cause-specific mortality by educational level.



1.4 Monitoring the impact of the pandemic to assess what works to reduce health inequalities

In 2021, researchers from [CHAIN and IHME published a paper](#) arguing that the pandemic offers an opportunity to measure what works in containing and decreasing health inequalities. To act on this potential, new, rapid, and socially stratified data collection and reporting mechanisms should be prioritised, and research agendas must now prioritise social inequalities. The authors conclude that the pandemic may offer the opportunity to establish the merits of the Nordic model as a global example for reducing social inequalities in health.

1.5 Joining a Europe-wide longitudinal study on children

CHAIN became a key partner of the [Growing Up in Digital Europe \(GUIDE\)](#) Study, the first European-wide longitudinal study of children’s and young people’s wellbeing. The GUIDE Study is one of the largest social science projects ever conducted. It will follow up two cohorts of thousands of children, aged 8 months and 8 years, across Europe from 2027 to 2052.



GUIDE aims to track children’s personal wellbeing and psychosocial development, in combination with key indicators of children’s homes, neighbourhoods, and schools, across Europe. Together, these measurements will show how children’s wellbeing develops in response to children’s experiences of growing up in different European Member States. GUIDE will be an important source of evidence in developing social policies for children, young people, and families across Europe for many years to come.

CHAIN’s tasks are to ensure funding for the Norwegian data collection and to work politically at the international level to promote the inclusion of other countries.

2. Explaining

2.1 Education later in life adds more years of life!

An [article](#) led by Dr Mirza Balaj used data from a cohort study covering 1.3 million individuals in Sweden to identify education as a key marker of social position. The article examined the significant impact of education on mortality through various pathways. It was found that, generally, these pathways originate from initial life conditions, such as cognitive ability in childhood, childhood socioeconomic circumstances, and health in early life, which affect both health and educational attainment in adulthood.

2.2 Gender equality and health

COVID-19 and the gender health paradox

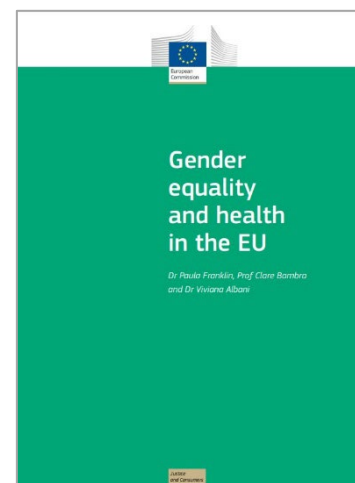
An [article by Prof. Clare Bamba, Viviana Albani, and Paula Franklin](#) examined gender-based health inequalities arising from the COVID-19 pandemic, drawing on insights from research into the ‘gender health paradox’. The paradox is that, while men have shorter life expectancies and higher mortality rates than women, women report higher morbidity. These gender-based health inequalities also appear to be evident during the pandemic and its aftermath.

Examining the gender pain gap in chronic pain

While chronic pain is increasingly considered to be a public health issue, little is known about differences in chronic pain between genders. Using data from the European Social Survey, CHAIN researchers [examined gender inequalities in pain](#) across Europe. They found that women were more likely to experience pain, with 62.3% of European women reporting experiencing pain, compared to 55.5% of men. Inequalities were most significant in Slovenia and the Czech Republic, while in some other countries, no significant gender pain inequalities were found.

Gender equality and health in the EU

In 2021, Professor Clare Bamba and Dr Viviana Albani collaborated with the European Trade Union Institute to produce a [report on gender equality and health in the EU](#). The report, commissioned by the EU’s Directorate-General for Justice and Consumers, offers a comprehensive overview of the various health challenges faced by men and women. It examines challenges at the individual level in both mental and physical health, as well as within healthcare systems. The report presents evidence and outlines key areas for policy development, along with illustrative practices for enhancing access to services and making them more gender-sensitive.



2.3 Employment, income, and health

Linking working conditions and occupational inequalities in NCDs

A CHAIN [paper](#) examined the relationship between working conditions and occupational inequalities in non-communicable diseases (NCDs) across Europe. The results suggest that employment and working conditions are important determinants of occupational inequalities in NCDs. Thus, labour market regulations should be considered when formulating NCD prevention strategies.

How does one's field of employment impact health-related behaviour?

In 2022, CHAIN researchers published a [paper](#) examining the general relationship between individuals' health-related practices and their affiliation with various fields within the occupational structure. It argues that 'healthy behaviour' may be particularly induced in the field of service occupations (jobs where one is providing a service, rather than producing a physical product), rendering such practices an emerging capital in the sense advanced by Bourdieu.

2.4 Heavy metals and essential minerals during pregnancy and associations with ADHD and autism in children

[Neurotox](#), a collaborative project between the Norwegian Institute of Public Health (NIPH) and CHAIN researchers, investigates whether environmental contaminants in maternal blood during pregnancy hurt the child's neurodevelopment.

The project released a report '[The Toxic Truth](#)' detailing the extent of children's exposure to lead around the world and estimating that 800 million children (1 in 3 children) globally have lead poisoning. Because lead is a powerful neurotoxicant, it negatively impacts children's IQ and can lead to attention problems and aggressive behaviours. At this scale, this means that lead has a major impact on our societies, which is also described. The report outlines several key steps for remediation and prevention. The report was covered by [NRK](#) and [Gemini](#).

As part of the NeuroTox study, [NIPH also conducted a study](#) that found that exposure to heavy metals and essential minerals during pregnancy is associated with autism and ADHD.

2.5 The COVID-19 pandemic

The syndemic pandemic: We are not all in it together

During the early days of the pandemic, the COVID-19 virus was seen as the 'great equaliser'. The more we learned about the pandemic, however, the more it became evident that COVID-19 was experienced differently, with higher rates of infection and mortality among the most disadvantaged communities.

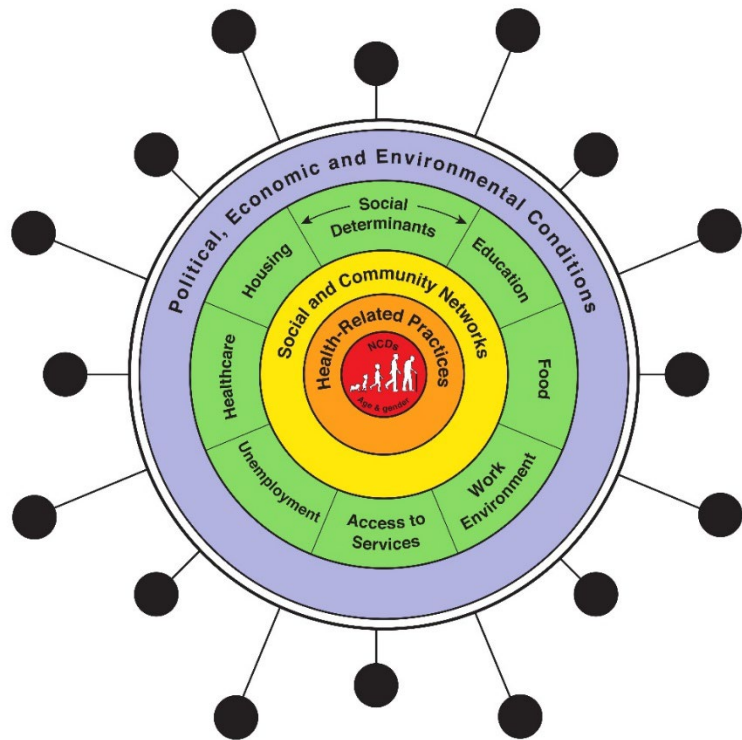
In a key [2020 CHAIN publication](#), Professor Clare Bambra argued that COVID-19 was actually a “syndemic pandemic”, as the virus interacted with existing inequalities in social determinants of health, exacerbating existing inequalities in chronic diseases in disadvantaged communities. Additionally, the potential consequences of COVID-19 policy responses and austerity measures to counter the probable post-pandemic slump were likely to be long-term and have a significant impact on health inequalities due to their effect on political and economic pathways.

The paper suggested public policy responses to prevent the pandemic from increasing inequalities, including:

- Expanding social protection
- Expanding public services
- Pursuing green inclusive growth strategies.

Based on the popular paper, CHAIN created a [factsheet](#) called ‘The COVID-19 pandemic and health inequalities: we are not all in it together’. The factsheet was translated into [Norwegian](#) and [Italian](#).

Professor Clare Bambra’s paper, ‘The COVID-19 pandemic and health inequalities’, was picked up by the [BBC](#) and the [Daily Mail](#) to explain why the coronavirus had hit Northern England worst.



The radically unequal distribution of COVID-19 vaccinations

A 2022 [paper](#) published in the Nature journal Humanities and Social Sciences Communications explored vaccines through the lens of fundamental cause theory and diffusions of innovation theory. These theories predicted that better-resourced individuals and countries would prioritise harnessing the greatest vaccine benefit for themselves, leaving large populations of disadvantaged people unprotected.

These theories also helped illuminate other processes that generate health inequalities (e.g., the introduction of new technologies). The paper explored countermeasures and measures that could be applied to avoid inequitable distribution, subsequently helping to ensure greater vaccine equity.

2.6 Why are social inequalities in health relatively large in the Nordic countries?

Published in 2022, a [CHAIN study](#) explained the “Nordic paradox” of inequality. Through the application of multiple correspondence analyses using data from the European Social Survey, the study finds that the magnitude of health inequalities in Norway is primarily driven by the increased social resilience of higher-educated groups, characterised by higher levels of morbidity, rather than by the loss of resources among lower-educated groups.

2.7 CHAIN examines the impact of increased pension income on mental wellbeing in England

A CHAIN [study](#) provided tentative evidence that an increase in pension income in England for low-income pensioners can reduce inequalities in mental wellbeing, particularly for men. Findings therefore recommend that future state pension policies need to consider this.

2.8 The role of technology in explaining health inequalities

Technological innovations are expected to shape health inequalities in the future. How can those changes be modelled? In the new [Handbook of Global Health](#), Daniel Weiss and Terje Andreas Eikemo argued that technological innovations, which are increasingly valued as socioeconomic capital, have the potential to both mediate and increase health inequalities, but that more research needs to be done to detect how these innovations are influencing the persistence and growth of social inequalities in health.

The [chapter](#) presents a conceptual model of the mechanisms throughout the social spectrum that affect social determinants of health and health equity, along with the theoretical and empirical research that supports this model.

2.9 Changes in second-hand smoke exposure in workplaces

In the [most extensive study of its kind to date](#), CHAIN researchers and colleagues aimed to describe the scope, trends over time, socio-demographic risk groups, and the association with progressive regulations relating to workplace second-hand smoke (SHS) exposure. The 2021 study, which used a multinational series of cross-sectional surveys to examine trends in passive smoking in the workplace, found that countries with more comprehensive workplace smoking bans overall report lower levels of SHS exposure among their workforce.

3. Reducing

3.1 Child health and wellbeing

CHAIN-UNICEF collaboration produced a new Report Card on healthy environments for children

Published in 2022, [Report Card #17](#) examines the progress of 43 OECD/EU countries in creating healthy environments for children. It assessed access to clean drinking water, good air quality, and green spaces, as well as exposure to overcrowded and unhealthy housing environments and unsafe traffic.

The report found that, even in wealthy nations, too many children are deprived of a healthy home, and that over-consumption in these nations is destroying children’s environments globally. It lays out a set of policy recommendations to ensure safe and healthy environments.

The Report Card was produced in collaboration between UNICEF Innocenti and CHAIN researchers, and received particular input from [Neurotox](#), a CHAIN-affiliated study on exposure to environmental pollutants during pregnancy and its impact on brain development.



The impact of cuts to early years centres on childhood obesity in the UK

CHAIN researcher Tim Huijts published a [commentary](#) reflecting on the impact of spending cuts to UK Sure Start Children’s Centres, which aim to reduce obesity and health inequalities. The commentary focused on three main topics: (1) estimates of the number of children affected by the cuts and their implications for reinvesting in Sure Start; (2) involvement of target/reference groups; and (3) the implications of this study in light of the COVID-19 pandemic.

A UNICEF programme for child health and environmental health

In 2020, CHAIN postdoctoral fellow Kam Sripada spearheaded the creation of a new programme area at UNICEF, focusing on the growing global health problems associated with environmental pollution and climate change. In 2021, UNICEF launched a strategic framework to guide this work, titled ‘[Healthy Environments for Healthy Children](#)’, capping nearly 2 years of collaboration. UNICEF staff from over 40 countries participated in a series of webinars following the launch to learn more about integrating children’s environmental health into their portfolios.

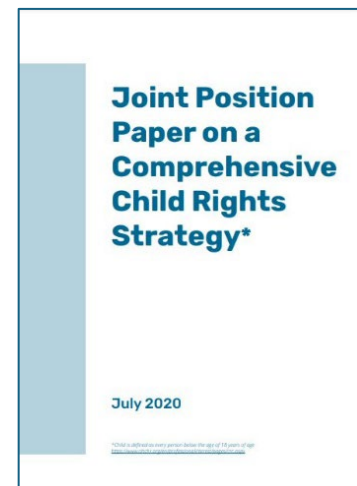


Which public health interventions are effective in addressing health inequality among children?

In an [umbrella review](#), CHAIN PhD candidate Elodie Besnier and colleagues synthesised evidence on interventions to reduce health inequality in children under 5. The study focused on preventing morbidity and mortality from infectious diseases amongst children in low- and middle-income countries. It identified some prevention interventions that might be useful in reducing under-five mortality from infectious diseases in LMICs, particularly amongst the most disadvantaged groups.

What would a comprehensive EU child rights strategy look like?

In 2020, CHAIN joined a consortium of public health and child well-being organisations to respond to the EU’s plan to develop a child rights strategy. In a [joint position paper](#), they outline key principles to guide the strategy and actions for the EU, its Member States, and partner countries. Among other things, it called for children’s rights and wellbeing to be mainstreamed in all EU policies, and for the strategy to ensure the rights of all children, especially those in vulnerable situations.



Advocating for an effective EU Child Guarantee

The purpose of the European Child Guarantee is to prevent and combat social exclusion by guaranteeing effective access to a set of key services for children in need, including free care, healthcare, education, healthy nutrition, and adequate housing.



In May 2025, EuroHealthNet published a [brief](#) providing evidence and policy inputs for strengthening the health aspects of the European Child Guarantee (ECG), including mental health, healthy eating, and reducing obesity.

EuroHealthNet has also long been working with the [EU Alliance for Investing in Children](#), which brings together over 30 European networks sharing a commitment to promoting child wellbeing across Europe. The Alliance advocates for an effective implementation of the Child Guarantee through events, meetings with policymakers and [joint statements](#).

3.2 What works? Reviewing interventions for health equity

Levelling up: Global examples of reducing health inequalities

In 2021, in a [commentary](#) in the Scandinavian Journal of Public Health, CHAIN researcher Prof Clare Bambra presented and analysed historical examples of when sizable population-level reductions in health inequalities have been achieved.

Examining five global examples between the 1950s and 2000s, she identified three commonly held ‘levellers’, whereby health inequalities can be reduced at scale. The levers are welfare state expansion, improved access to healthcare, and enhanced political incorporation. The article further argued that ‘levelling up’ population health through reducing health inequalities requires a long-term effort.

CHAIN reviewed the impact of actions to reduce health inequalities in Europe

[Joint Action on Health Equity Europe \(JAHEE\)](#) was a European collaborative project focusing on inequalities in health and funded through the third health program in the EU. The project involves the European Commission and 22 EU member states, as well as Bosnia and Herzegovina, Norway, and Serbia. JAHEE implemented over 70 actions to improve health monitoring systems, healthcare access, a healthy living environment, and migrant health, as well as to strengthen health in all policies. CHAIN was invited to review the impact of these actions. Its review team consisted of Terje Andreas Eikemo, Clare Bambra, Mirza Balaj, Anna Gkiouleka, Emil Øversveen, Solomiya Kasyanchuk and Pilar Vidaurre Teixidó. The review report was finalised in 2021.



3.3 The public health system: review and the future

What will public health look like in 2035?

[EuroHealthNet’s 2024 Foresight study](#) examined the role of public health in achieving health equity by 2035, with a focus on health promotion and prevention, particularly in the context of the digital and green transitions. The study identified several key public health challenges for Europe: persistent inequalities, (unhealthy) living conditions, rising chronic diseases and mental health problems, the digital transition, as well as demographic and climate change.

According to experts, political will and collaboration among policy-makers, health professionals, and communities will be indispensable. In contrast, political polarisation, a lack of trust, and disinformation will have made achieving public health goals in Europe much more difficult. It was expected that increasing socio-



economic inequality would be the greatest challenge to achieving public health-related goals in Europe.

CHAIN contributed a chapter on Albania to the handbook on health systems throughout Europe

[Health Politics in Europe: A Handbook](#) is a comprehensive reference work that provides a historical background and up-to-date information and analysis on health politics and health systems across Europe. In particular, it captures developments that have taken place since the end of the Cold War, when most post-communist transition countries privatised their state-run health systems, and many Western European health systems experimented with new public management and other market-oriented health reforms.

CHAIN researcher Mirza Balaj wrote a chapter that provides an in-depth examination of health politics and the compulsory health insurance system in Albania.



3.4 Falling down the rabbit hole? CHAIN researchers explore issues in current health inequalities research

While decades of research have illuminated the mechanisms that underlie health inequalities, we have yet to move beyond observations to develop policies that can effectively reduce them.

In 2022, CHAIN researcher Clare Bambra and colleagues published a [paper](#) that highlighted tensions in the field of health inequalities research regarding the relationship between social determinants and health outcomes, as well as the effectiveness of welfare policies. The paper provides insight into the evidence on causality, welfare systems, and policies aimed at addressing the social determinants of health inequalities.

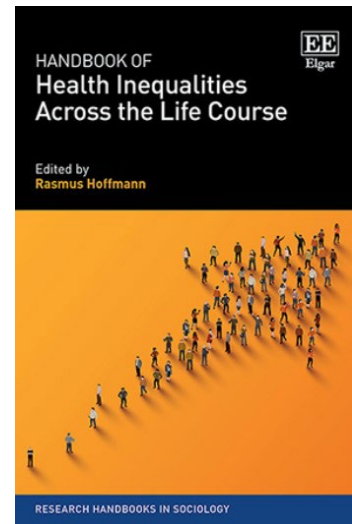
3.5 Citizen engagement and care in the community

Community-based healthcare 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. Ms Tikkanen presented the project at the Norway-Nepal Global Health Conference, where she was awarded the Best PhD Presentation Prize among ten candidates from Norway and Nepal.

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

In 2023, CHAIN researchers Amanda Aronsson, Clare Bambra, and Terje Andreas Eikemo, pairing with Hande Tugrul of Bocconi University, published a chapter on [social protection in the Handbook of Health Inequalities Across the Life Course](#). The chapter examines the pathways through which social protection policies can impact health, particularly 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.



Social participation for needs-based policies and restoring trust

Involving citizens in policymaking helps create policies that reflect real needs, have community endorsement, and are sustainable. It is especially powerful in public health: dialogue can reduce health inequalities, improve the efficiency of health interventions, and increase transparency in health-related decisions.

A EuroHealthNet [Policy Précis](#) examines the potential of social participation and citizen engagement in improving health, equity, and wellbeing. It provides an overview of EU, WHO, and international initiatives and shares recommendations for embedding social participation and citizen engagement in local, national and international decision-making.



3.6 Healthcare and health technologies

CHAIN’s collaboration with IARC on cancer screening

The [Cancer Screening in Five Continents \(CanScreen5\) project](#) collected and harmonised information on the characteristics and performance of cancer screening programmes across the globe. This information was further disseminated to enhance programme management and inform policymaking.

CanScreen5

CHAIN’s participation in this project contributed towards the data collection and monitoring of social inequalities in cancer screening, improving the quality of and equal access to breast, cervical, and colorectal cancer screening programmes in Europe.

Cancer screening in Latin American and Caribbean States

IARC helped foster a network of collaborators in the field of cancer screening in countries in the Community of Latin American and Caribbean States (CELAC). Stakeholders included representatives from the Pan American Health Organization (PAHO), representatives from Ministries of Health, health providers, and data managers. Working with the network, it was found that of [26 CELAC countries](#), 21 reported having a cervical cancer screening and 15 a breast cancer screening programme, with a high variability in their level of organisation.

The network provided insights into the barriers in cancer screening at different levels, most importantly, those related to the information system, such as the population register not being accurate or complete (70%). All but one country reported barriers related to quality assurance (e.g. insufficient monitoring of individuals diagnosed with precancer or cancer (63%)). Identifying those barriers was key not only for achieving the project goals but also for the long-term sustainability of the proposed interventions.

In 2021, CanScreen5 launched capacity-building activities for the network in the form of online learning modules, live sessions, and face-to-face train-the-trainers workshops on ‘Improving accessibility, coverage & impact of cancer screening programmes’. Topics covered in the training included the organisation of screening programmes, stakeholder engagement, prioritisation of barriers, selection of interventions to approach the barriers, and preparation of an action plan.

The face-to-face workshops with regional collaborators yielded a robust action plan to address barriers in cancer screening across 21 participating countries, which was subsequently presented to the IARC Scientific Council.



Innovative health technologies can worsen health inequalities, CHAIN researcher warned

While new health technologies offer more opportunities for better treatment, not everyone has access to such technology. [CHAIN Researcher Emil Øversveen’s work](#) examined whether new technology, while full of potential to improve health, might be further increasing health disparities due to unequal access.

An [article in Norwegian SciTech News](#) outlined the work on selective empowerment in the distribution of medical technologies. The author further argues that vaccines, too, are a form of health technology, and that this knowledge can help explain why some countries and groups receive vaccinations first.

Primary care and health promotion: tools for health equity

Preventing people from getting sick directly reduces health inequalities, but requires investments in primary care and health promotion. EuroHealthNet’s resources on [health-promoting care](#), [overcoming vaccine barriers and inequalities](#), [promoting healthy ageing](#), and [tobacco and nicotine prevention](#) help policymakers at all levels of government formulate policies that promote good health and prevent people from getting sick as long as possible. An [exchange visit on creating caring communities](#) helped public health practitioners at the local and national level implement this innovative practice for health promotion.

this knowledge can help explain why some countries and groups receive vaccinations first.



3.7 Health equity in times of a pandemic: COVID-19

The double burden of COVID-19

The [first issue of the Scandinavian Journal of Public Health in 2021](#) was a special issue focusing on the social, economic, and health-related consequences of COVID-19.

The editorial, written by Editor and CHAIN leader Terje Andreas Eikemo, argued that the COVID-19 pandemic caused a double burden on the most disadvantaged social and demographic groups due to preexisting health and social inequalities. To lessen the burden, there was a strong need for strategies that addressed the long-term population impact of the virus. Moreover, decision-makers had to weigh the gains of lockdowns against their consequences in terms of health loss and increased mortality, especially among vulnerable groups.



The [Scandinavian Journal of Public Health](#) has published eight special issues on COVID-19 and its social and economic consequences from 2021 to 2025.

What did past economic downturns teach us about the health consequences of the COVID-19 recession?

In a 2022 [editorial](#) in the Scandinavian Journal of Public Health, CHAIN researchers drew lessons from past economic crises to inform responses to the economic crises resulting from the COVID-19 pandemic. They warned about the apparent threat to health and wellbeing, the unequal economic consequences, the inevitability of austerity measures, and the risk of greater isolation and loneliness caused by further decentralisation and growing precariousness of work.

Calling on policymakers to consider social inequalities in vaccine distribution

In an [editorial in the European Journal of Public Health](#), Newcastle University faculty members and CHAIN partners Adam Todd and Clare Bambra called on policymakers to consider the inverse equity hypothesis in the COVID-19 vaccine rollout. This hypothesis suggests that when new health interventions are developed, they initially favour more privileged members of society due to preferential access and uptake, thereby increasing health inequalities in the short term. Only over the longer term do such interventions eventually reach all parts of societies.

While the discovery of COVID-19 vaccines represents a significant breakthrough, it will not necessarily address inequalities in the pandemic experience. To avoid exacerbating such inequalities, vaccine distribution strategies must ensure that more vulnerable communities are not disadvantaged when it comes to vaccine supply and delivery.

Have stimulus packages eased the health impact of COVID-19 job losses?

A CHAIN [systematic review of the health effects of job loss](#) during the first year of the pandemic 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.

4. Events, meetings, and dissemination

4.1 CHAIN leadership recognised with prestigious awards

Professor Terje Andreas Eikemo, leader of CHAIN, [received NTNU's Prize for Internationalization 2025](#), recognising his efforts to enhance NTNU's global reach through international research collaborations and innovative initiatives. His work with organisations like WHO and UNICEF, along with his leadership of CHAIN, has helped position NTNU as a prominent player in global health inequality research. Eikemo's focus on education as a social determinant has contributed valuable insights into health disparities, strengthening CHAIN's international reputation.

Dr. Mirza Balaj, research coordinator at CHAIN, was [awarded the 2024 GBD Emerging Researcher Award](#) for her work on the socioeconomic factors affecting health and longevity. Her research on the role of education in health outcomes has influenced global health discussions and policies. Her leadership within CHAIN and efforts toward social justice, especially in Albania, highlight her commitment to advancing health equity.

These awards reflect the ongoing impact of CHAIN and its leadership. They celebrate the dedication and achievements of Eikemo and Balaj, and underscore CHAIN's role in fostering international collaboration and advancing health justice worldwide.



4.2 CHAIN provides keynote at NTNU European Conference

The 8th edition of the NTNU European Conference focused on the mid-term assessment of Horizon Europe, with discussions helping to shape and set priorities for the next European framework programme (FP10).

CHAIN Leader Terje Andreas Eikemo delivered the keynote speech, '[When Education Makes the Difference](#)'. He presented CHAIN's work on the links between education and health, including its collaboration with IHME to quantify the impact of education and its joint work with the UNESCO chair for Global Health and Education to measure mental wellbeing in school-aged children.

4.3 Dialogue on data and health inequalities research

During the 2020 World Congress on Public Health, CHAIN led an [online event on developments in the world of data and their impact on health inequalities research](#). Speakers included:

- IHME’s Emmanuela Gakidou reflected on CHAIN and IHME’s ongoing efforts to integrate education as a data point in the Global Burden of Disease Studies.
- Salma Abdalla, Lead Project Director at the Rockefeller Foundation’s 3D-Commission, discussed the Commission's work to engage policymakers to integrate data and social determinants into their decision-making processes.
- Dr Samira Asma, Assistant Director General of the WHO Division of Data Analytics and Delivery for Impact, spoke about the importance of data to know who is being left behind and to ensure progress towards the SDGs. Nicole –
- Valentine, Director of the WHO Social Determinants Division, discussed the use and importance of high-quality and comparable data

A video of the Dialogue is available [here](#).



4.4 Creating a common language about health determinants

In 2021, Professor Terje Andreas Eikemo spoke at the regional launch of a 3-D Commission report, which called for creating a common language about health determinants, data science, and decision-making, and for turning principles of health equality into concrete actions. Terje Andreas spoke about CHAIN’s work to improve the availability and comparability of data by creating a framework for global data collection, adding a health module to the European Social Survey, and embedding education as a risk factor in the Global Burden of Disease study.

4.5 CHAIN and Sir Michael Marmot present lessons from Norway on reducing health inequalities

CHAIN Leader Terje Andreas Eikemo held a [joint presentation](#) with renowned health equity expert Sir Michael Marmot at the 2025 Conference of the Association of the British Pharmaceutical Industry. The presentation examined what the United Kingdom (UK) can learn from Norway about reducing health inequalities and set out three main lessons:

- The Norwegian healthcare system was inspired by the UK’s National Health Service (NHS), and now it is time for Norway to return the favour. Looking to Norway, the UK will see a system built on the values that shaped the NHS in the first place—a reminder of the values you may have lost touch with.
- Health must always remain a public responsibility.
- We must promote equality in opportunities for the next generation. The UK and Norway should fund and take the lead of the [GUIDE Study](#): Europe’s first and only child cohort study. Europe must remain united in this fight.



4.6 CHAIN and EuroHealthNet meet with the European Commission to discuss measuring access to healthcare

In April 2020, CHAIN research coordinator and postdoctoral researcher Mirza Balaj, along with colleagues from EuroHealthNet, met with representatives of the EU’s Directorate-General for Health and Food Safety to discuss indicators that could help assess citizens’ access to healthcare. Future ways of working together were discussed, and CHAIN shared its work on incorporating a health module into the European Social Survey, which enabled the examination of health inequalities in Europe and the drivers of these inequalities.

4.7 CHAIN speaks at EuroHealthNet seminar on investing in wellbeing during childhood and later stages of life

The 2022 EuroHealthNet Annual Seminar brought together experts and policymakers to explore the necessary conditions under which all members of society, including young and older people, feel capable and valued members of their immediate and broader communities.

Professor Terje Andreas Eikemo, Leader of CHAIN, joined a line-up of speakers from the European Commission, the UNESCO Chair for Global Health and Education, and the Joint Action for Health Equity Europe (JAHEE), among others. It was organised by EuroHealthNet, the European Partnership for Health, Equity and Wellbeing, which is also a partner of CHAIN.



A [video and the seminar report](#) are available.

4.8 COVID-19 & inequalities: applying lessons for change

EuroHealthNet organised a webinar on inequalities in the experience of COVID-19 and how to put health equity at the heart of policy and practice responses to the pandemic. The webinar was part of the 2021 EUPHA European Public Health Week and had various speakers, including EuroHealthNet Director Caroline Costongs and CHAIN researcher Clare Bamba.

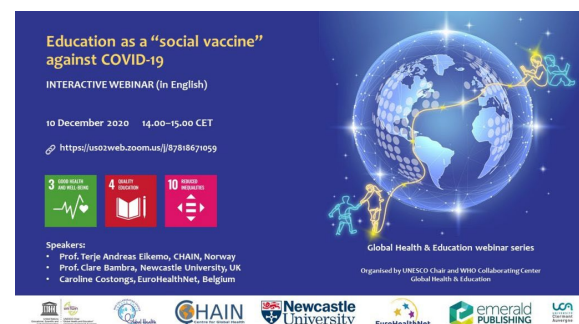


Watch: [COVID-19 & Health Inequalities: applying lessons to deliver change - EuroHealthNet & EUPHA webinar](#)

4.9 Education as a ‘social vaccine’ against COVID-19

In December 2020, CHAIN’s Terje Eikemo, Clare Bamba, and Caroline Costongs discussed how COVID-19 had exposed and exacerbated health inequalities in our societies, and how education can serve as a ‘social vaccine’ against such and future threats to health.

The [webinar](#) was part of UNESCO’s Global Health & Education webinar series.



4.10 An exchange of best practices to reduce child poverty

In 2024, EuroHealthNet organised a [Country Exchange Visit](#) for its members to exchange lessons and experiences in reducing child poverty and health inequalities.

The visit was hosted by Public Health Scotland. For several years, Scotland has had a [Child Poverty Act](#) in place that addresses child and family poverty cross-sectorally by taking action on the underlying causes, employing a whole-system approach. EuroHealthNet members gained insights into the local partnerships supporting the most vulnerable individuals and how these partnerships positively impact their health and development. A [report of the event](#) is available.



4.11 An online portal for resources and information on health inequalities

EuroHealthNet’s ‘Health Inequalities Portal’ (health-inequalities.eu) is *the* information hub on health inequalities in Europe. It explains what health equity is and how it affects different countries, providing information about research, policy, data, practices, projects, EU initiatives, financing, tools, and publications.

Health Inequalities
Portal

Users with and without a background in public health and health equity can use the portal to learn how health inequalities affect different countries and populations, where to find more information, and what you can do as a civil servant, researcher, public health professional, teacher, city planner, or a professional building a more sustainable, fair future.

4.12 Access and barriers to cancer care for vulnerable groups

Dr Mirza Balaj and Prof Terje Andreas Eikemo from CHAIN presented at a workshop, ‘[Social Inequalities in Cancer – the steps ahead](#)’, organised by the European Cancer Organization. Their contribution presented CHAIN’s work on identifying barriers to access to cancer care that vulnerable groups particularly experience, and how to address these barriers.

The workshop aimed to bring together civil society organisations working in the field to advance the rights of historically marginalised communities, to collect first-hand information, discuss the specific disparities affecting marginalised communities in healthcare and cancer care, and delineate the needs to address these barriers.

The workshop provided a unique opportunity to develop ideas for future projects that can contribute to the development of more equitable cancer care, particularly in terms of data collection, evidence-based policy development, and consensus-building at the European level.

5. Policy recommendations

5.1 Data is key

The importance of high-quality data can not be overstated. It provides the empirical foundation for understanding, analysing, and explaining the social structures and trends that lead to and maintain health inequalities, and is essential for informing effective policies and interventions. To improve the collection of data on health inequalities:

- **Increase investments in a comprehensive health inequality monitoring system at global, European, national, and local levels:** Continue and enhance investment in a standardised, worldwide data infrastructure that regularly tracks health inequalities, ensuring consistent and long-term monitoring across populations and regions. Liaise with European and international institutions such as the World Health Organization and its [Health Inequality Monitoring initiative](#).
- **Expand and continuously update European data on health inequalities and their determinants:** Ensure the availability and quality of data on health inequalities and the broader determinants of health by building capacity to collect, analyse, and share relevant data continuously. Support the inclusion of a dedicated ‘health inequality’ module in existing surveys, such as the European Social Survey (ESS), to enable robust cross-national comparisons and longitudinal analysis of disparities in health outcomes. Furthermore, national-level register data linking social determinants to cause-specific mortality should be collected every 5 years from national authorities and harmonised. Due to data sharing restrictions in many countries, we recommend that the original data sources not be collected. Instead, mortality rates (by social group/age/sex/cause of death) should be analysed nationally and stored centrally by CHAIN. Finally, Norwegian participation in GUIDE, Europe’s first comparative cohort study, must be ensured.
- **Create a global database on systematic reviews (with meta-analyses if available) on social determinants and cause-specific mortality.** Establish a centralised, regularly updated database of systematic reviews focused on the relationship between social determinants and mortality using CHAIN’s standardised methodology, which has been applied for education and cause-specific mortality. This resource should support researchers and policymakers in synthesising existing evidence and identifying research gaps.

5.2 From data to decisions

Research informs policymaking by identifying areas for action, providing the necessary evidence base for decision-making, and evaluating the impact of those decisions. International and European research is not just instrumental for collaboration and building joint expertise. It is key for comparison and benchmarking, which often justifies and makes visible the actions needed to avoid lagging.

- **Invest in timely, actionable research that directly informs policy development:** Support the systematic use of research findings to guide health policy decisions by funding research addressing real-world challenges. Promote collaborative, interdisciplinary research methodologies focused on reducing health inequalities and scale up funds for implementation research. In addition, encourage cost-benefit analysis and research into return on investment.
- **Foster collaborative platforms for policy-oriented research:** Create and support multi-stakeholder platforms that bring together academics, policymakers, philanthropists, civil society, and the private sector. These platforms should facilitate the co-creation of research agendas, the joint development of policy solutions, and the coordinated implementation of actions to address health disparities. Well-designed Terms of Reference and Ethical Frameworks will be required to achieve mutual understanding and common agreements.

5.3 Primary healthcare: a cure for inequality

While healthcare advancements can save lives and increase the time spent in good health, they can also exacerbate inequalities in access to care if not well considered. In addition, a shift in healthcare is needed to move away from hospital-based care to care in community settings, linking primary care services, social services, long-term care and mental health services.

- **Promote equitable access through innovation and strengthened primary care:** Find innovative solutions that close the gap between medical advancements and equitable access to care. Prioritise primary healthcare as a core public responsibility, ensuring it is universally accessible and grounded in the principles of equity, affordability, and inclusiveness. This includes investing in community-based services, linking them to other care services, utilising digital health tools, and implementing outreach programs that target underserved populations.
- **Address the rising prevalence of non-communicable diseases,** which impact health and quality of life, pose an economic burden to our healthcare systems and families, and contribute to growing health inequalities. Effective action includes improving tobacco and alcohol control, creating environments that promote a healthy diet and physical activity, and investing in disease prevention.

5.4 Good health is built in the community

Social determinants of health shape the conditions in which people are born, grow, live, work, and age — and these conditions have a profound impact on health outcomes. While health inequalities present complex challenges, they are solvable through sustained collective commitment, cross-sector collaboration, and the adoption of innovative, evidence-based approaches.

- **Implement health-in-all policies and universal approaches:** Promote the integration of health considerations across all sectors and policies ('health-in-all policies'), prioritise universalistic social and health policies, and emphasise early interventions through a life course approach to reduce inequalities before they become entrenched.
- **Address social determinants through integrated strategies:** Develop and implement comprehensive strategies that acknowledge the critical links between education, socio-economic status, environment and health outcomes. These strategies should operate at local, national and global levels to effectively combat health disparities.

5.5 Investments in child health yield lifelong returns

Education not only helps lift people out of poverty but also plays a vital role in preventing preventable deaths by providing individuals with the knowledge and skills to make healthier choices.

- **Strengthen social protection policies to enhance child health equity:** Design policies that improve the social protection conditions of parents, such as paid parental leave, social insurance, and poverty alleviation programs. These policies can have a lasting positive impact on children's health, both in childhood and later in life, contributing to greater health equity for the next generation.
- **Invest in health-promoting schools:** Create supportive and healthy school environments that help students learn better, shape healthy habits that last a lifetime, support mental health and emotional wellbeing, and reduce inequalities by ensuring access to health services, meals, and safe environments.
- **Prioritise education as a key factor in health and wellbeing:** Recognise the crucial role of education in safeguarding both individual and societal health. Advocate for global initiatives that aim to enhance access to quality education, particularly in underserved communities, to break the cycle of poverty and promote long-term health improvements. Emphasise the need for coordinated global efforts to improve access to education, particularly in low-income and marginalised communities.

5.6 Health for all starts with fairness for all

Social inequality creates the conditions that lead to health inequalities, and health inequalities, in turn, deepen social divides. Addressing inequalities is not just a matter of social justice, but a strategic necessity for long-term societal stability. Addressing social disparities must be treated as a priority in national and international policy agendas, ensuring resources are allocated to achieve equity.

- **Recognise that health inequalities disproportionately affect marginalised populations:** Implement policies aimed at mitigating these impacts, such as expanding social protection programs, improving access to quality education, and enhancing public service delivery, particularly in underserved communities.
- **Invest beyond the healthcare system:** Make comprehensive investments in sectors beyond healthcare, including education, housing, employment, and social protection, to make a tangible and lasting impact on health outcomes. These cross-sector investments should be integrated into national strategies for reducing health inequities.
- **Strengthen public policy responses to prevent worsening inequalities:** Ensure that public policy responses to current and future challenges (such as pandemics, climate crisis or economic crises) focus on preventing exacerbation of existing inequalities. This can be achieved through the expansion of social protection systems, strengthening public service accessibility, and pursuing green, inclusive growth strategies that benefit all populations.
- **Expand the welfare state and improve political representation:** Strengthen the welfare state by expanding social safety nets and improving healthcare access for all, particularly vulnerable groups. Additionally, enhance political incorporation and participation for marginalised communities to ensure their voices are heard in policy decisions, thus promoting health equity at scale.

6. Norway's leadership in global health equity: A call for action through CHAIN

As the world grapples with unprecedented challenges, from climate change, fertility declines, geopolitical instability, to health disparities, Norway stands at a crossroads. With a commitment to health equity rooted deeply in our national identity, we are uniquely positioned to lead global efforts in addressing these pressing issues. As we advance into a future marked by changing demographic dynamics—where, by 2100, half of all children born globally will come from sub-Saharan Africa—we must prioritize our efforts in this region, ensuring that education and healthcare equity are at the forefront.

The Nordic model, while admired globally, is not without its flaws. The disparities in health outcomes within our society underscore a critical truth: health inequalities, significantly influenced by socioeconomic factors such as education and income, hinder individuals from achieving their full potential and burden our healthcare system. The reality that many health issues can be prevented through targeted interventions invites us to rethink how we engage with these disparities—not as inevitable facts of life but as challenges we can systematically address. It is crucial that we confront these disparities, not merely as a matter of social justice, but as a strategic necessity.

Our leadership role in global health must, therefore, be accompanied by a commitment to understanding and mitigating health inequalities both at home and abroad. The [Stoltenberg report](#) aligns perfectly with this vision, encouraging us to

leverage our unique position to inspire and lead global movements for health equity. Norway has long enjoyed positive trends in health and life expectancy when compared to other countries. This means we are doing something right.

CHAIN's experiences in international dialogues highlight Norway as a source of recognition and inspiration, which puts us in a position to share the principles of public health promotion, rooted in the values of universality, equity, and public responsibility—guiding principles that propelled our successful welfare model.

We should also advocate for innovative solutions that can bridge the gap between health advancements and equitable access to care: CHAIN's research has underscored that successful inequality-reducing health technologies are those that are accessible, affordable, and effective in reducing disparities.

Currently, Norway allocates around 1.1% of its gross national income to aid, a figure that demonstrates our commitment to alleviating suffering and promoting healthcare globally. However, recent trends indicate a decline in international aid, especially amidst global crises. Hence, we must explore innovative ways to ensure that our resources are used effectively to further bridge health gaps.

Let us consider establishing a **Nordic Matching Fund** to foster public-private collaborations aimed at sustainable health initiatives. This could serve as an enduring source of funding that aligns with global health goals. The future of CHAIN could be

envisioned in the form of a foundation or national centre dedicated to monitoring health inequalities both nationally and globally. This platform would facilitate analyses, promote the Nordic model as a response to crises, and lead initiatives such as the GUIDE Study—the world’s first cross-national longitudinal child cohort study. By following through with such projects, we can ensure that we are addressing the needs of the most vulnerable populations, particularly children, who have been disproportionately impacted during the pandemic.

Establishing a Nordic Matching Fund could represent a significant step in solidifying Norway’s leadership in global health. This initiative would facilitate partnerships between the private sector and Nordic governments, thereby creating sustainable funding sources for health initiatives and aligning closely with global health objectives. Such collaborative efforts are vital, especially during a time when budget cuts and geopolitical conflict threaten international aid.

In tandem with these efforts, we must address the need for a comprehensive understanding of social determinants of health within global health frameworks. By

advocating for the inclusion of education, income, and other social and economic risk factors into the Global Burden of Disease Study, we can create scenarios that enable us to better direct our resources towards effective interventions that reflect the realities of our society.

The urgency of this mission cannot be overstated. As global power dynamics shift and population trends evolve, our commitment to health equity will not only enhance our national wellbeing but also bolster our credibility on the world stage. It is imperative that we unite all sectors—academics, policymakers, industry leaders, and philanthropists—under a shared commitment to addressing these critical issues.

In conclusion, let us embrace our responsibility as global leaders in health equity. Let us be guided by the values that shaped our welfare system and drive forward innovative solutions that can influence the health outcomes of the next generation, both in Norway and around the world. Together, we can lead by example and affirm our commitment to health equity. A healthier world should not be merely a vision, but a collective responsibility that we must uphold.

7. The CHAIN team



The CHAIN consortium at the kick-off meeting in 2019

NTNU – Norwegian University of Science and Technology

- Leader: Terje Andreas Eikemo
- Research Coordinator: Mirza Balaj

- Mariam Reda Abdallah
- Jalal Arabloo
- Aleksandr Aravkin
- Amanda Aronsson
- Insa Backhaus
- Kathryn Beck
- Nathalie Bennett
- Liubov Borisova
- Lene Elisabeth Bertheussen
- Kathryn Beck
- Elodie Besnier
- Mouna Bourakkad
- Costanza Cardillo
- Hanne Dahl Vonen
- Claire Degail
- Lorena Donadello
- Kristoffer Eikemo
- Henning Finseraas
- Emma Rose Froystad
- Kim Gabrielli
- Anna Gkiouleka
- Indrit Gradeci
- Besi Gjylbegaj
- Simon I Hay
- Kristian Heggebø
- Amy Hobbs
- Trevor Hoftiezer
- Gilda Hoxha
- Tim Huijts
- Hanno Hoven
- Julia Jackman
- Solomiya Kasyanchuk
- Virginia Kotzias
- Gazmir Lame
- Monica Machado

- Susan A McLaughlin
- Sylvia Mihailescu
- Talal Mohammad
- Erin C Mullany
- Lukas Murau
- Erin M O'Connell
- Maria Lisa Odland
- Emil Øversveen
- Ricardo Ortega
- Gerasimos Parisis
- Fatime Qosaj
- Nicole Quattrini
- Jenny Reid
- João Rocha Gomes
- Magnus Rom Jensen
- Håvard Rydland
- Solvor Solhaug
- Indra de Soysa
- Eliezer de Souza Da Silva
- Kam Sripada
- Donata Stonkute
- Andreas Tallaksen
- Hannah Theriault
- Roosa Tikkanen
- Hussein Twabi
- Lode van der Velde
- Pilar Vidaurre
- Daniel Weiss
- Celine Westby
- Peng Zheng

Bocconi University, Italy

- Alexander Kentikelenis
- Manuel Serrano Alarcon

Erasmus MC, Netherlands

- Tanja Houweling
- Silvia Klokgieters
- Frank van Lenthe
- Di Long
- Wilma Nusselder
- Leah Prencipe

EuroHealthNet, Europe

- Caroline Costongs
- Alba Godfrey
- Alison Maassen
- Caoimhe Kelly
- Alexandra Latham
- Gabriella Sutton
- Max Tscheltzoff
- Chantal Verdonschot
- Anne Wagenführ-Leroy

IARC – International Agency For Research On Cancer (World Health Organization), Global

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

Institute for Health Metrics and Evaluation, IHME, University of Washington, United States

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

Newcastle University, United Kingdom

- Viviana Albani
- Clare Bamba
- Heather Brown
- Sarah Darbyshire-Evans
- Courtney McNamara
- Adam Todd

Norwegian Institute of Public Health

- Heidi Aase
- Carl Michael Baravelli
- Jonas Kinge
- Ann Kristin Knudsen
- Simon Øverland
- Thea Steen Skogheim
- Gro Dehli Villanger
- Adriano Winterton

UNICEF Norway

- Kyrre Lind

UNICEF Innocenti, Italy

- Kerry Albright
- Gwyther Rees

University of Geneva, Switzerland

- Hugo Santa
- Silvia Stringhini

UN Global Compact

- Kim Gabrielli

8. List of publications

2019

Hillier-Brown F, Thomson K, McGowan V, et al. [The effects of social protection policies on health inequalities: Evidence from systematic reviews](#). *Scand J Public Health*. 2019;47(6):655-665. doi:10.1177/1403494819848276

Kentikelenis, A., Rochford, C. [Power asymmetries in global governance for health: a conceptual framework for analyzing the political-economic determinants of health inequities](#). *Global Health* **15** (Suppl 1), 70 (2019). <https://doi.org/10.1186/s12992-019-0516-4>

Naik, Y., Baker, P., Ismail, S.A. et al. [Going upstream – an umbrella review of the macroeconomic determinants of health and health inequalities](#). *BMC Public Health* **19**, 1678 (2019). <https://doi.org/10.1186/s12889-019-7895-6>

Todd A, McNamara CL, Balaj M, et al. [The European epidemic: Pain prevalence and socioeconomic inequalities in pain across 19 European countries](#). *Eur J Pain*. 2019;23(8):1425-1436. doi:10.1002/ejp.1409

2020

Amstutz D, Gonçalves D, Hudelson P, et al. [Nutritional Status and Obstacles to Healthy Eating Among Refugees in Geneva](#). *J Immigr Minor Health*. 2020;22(6):1126-1134. doi:10.1007/s10903-020-01085-4

Balaj, M. [Self-reported health and the social body](#). *Soc Theory Health* **20**, 71–89 (2022). <https://doi.org/10.1057/s41285-020-00150-0>

Bambra C, [Growing Health Inequalities - The Governance Report 2019](#). (n.d.). The Hertie School of Governance - Oxford University Press.

Bambra C, Lynch J. Welfare Chauvinism, [Populist Radical Right Parties and Health Inequalities](#). *Int J Health Policy Manag*. 2021;10(9):581-584. Published 2021 Sep 1. doi:10.34172/ijhpm.2020.149

Bambra C, Riordan R, Ford J, Matthews F. [The COVID-19 pandemic and health inequalities](#). *J Epidemiol Community Health*. 2020;74(11):964-968. doi:10.1136/jech-2020-214401

Besnier E, Thomson K, Stonkute D, et al. [Which public health interventions are effective in reducing morbidity, mortality and health inequalities from infectious diseases amongst children in low-income and middle-income countries \(LMICs\): protocol for an umbrella review](#). *BMJ Open*. 2019;9(12):e032981. Published 2019 Dec 29. doi:10.1136/bmjopen-2019-032981

Chadeau-Hyam M, Bodinier B, Vermeulen R, et al. [Education, biological ageing, all-cause and cause-specific mortality and morbidity: UK biobank cohort study](#). *EClinicalMedicine*. 2020;29-30:100658. Published 2020 Nov 19. doi:10.1016/j.eclinm.2020.100658

Eikemo T & Mackenbach J Øverland S, et al. [Establishing a Global Socioeconomic Network and Data Warehouse to Monitor and Explain Health Inequalities](#). *EuropeNow*, issue 28.

Eikemo TA, Besnier E, [Health and Well-being Worldwide - The Governance Report 2019](#). (n.d.). The Hertie School of Governance - Oxford University Press.

- Eikemo TA, Øversveen E. [Social Inequalities in health: Challenges, knowledge gaps, key debates and the need for new data](#). *Scand J Public Health*. 2019;47(6):593-597. doi:10.1177/1403494819866416
- Forster T, Kentikelenis AE, Stubbs TH, King LP. [Globalization and health equity: The impact of structural adjustment programs on developing countries](#). *Soc Sci Med*. 2020;267:112496. doi:10.1016/j.socscimed.2019.112496
- Øversveen, E. (2020). [Stratified users and technologies of empowerment: Theorising social inequalities in the use and perception of diabetes self-management technologies](#). *Sociology of Health & Illness*, 42(4), 862-876. doi.org/10.1111/1467-9566.13066
- Rocha V, Fraga S, Moreira C, et al. [Life-course socioeconomic disadvantage and lung function: a multicohort study of 70496 individuals](#). *Eur Respir J*. 2021;57(3):2001600. Published 2021 Mar 18. doi:10.1183/13993003.01600-2020
- Rydland HT, Fjær EL, Eikemo TA, et al. [Educational inequalities in mortality amenable to healthcare. A comparison of European healthcare systems](#). *PLoS One*. 2020 Jul 2;15(7):e0234135. doi: 10.1371/journal.pone.0234135. PMID: 32614848; PMCID: PMC7332057.
- Rydland HT, Solheim EF, Eikemo TA. [Educational inequalities in high- vs. low-preventable health conditions: Exploring the fundamental cause theory](#). *Soc Sci Med*. 2020;267:113145. doi:10.1016/j.socscimed.2020.113145
- Shriwise, A., Kentikelenis, A. E., & Stuckler, D. (2020). [Universal Social Protection Is It Just Talk?](#) *Sociology of Development*, 6(1), 116-144. <https://doi.org/10.1525/sod.2020.6.1.116>
- Skogheim TS, Villanger GD, Weyde KVF, et al. [Prenatal exposure to perfluoroalkyl substances and associations with symptoms of attention-deficit/hyperactivity disorder and cognitive functions in preschool children](#). *Int J Hyg Environ Health*. 2020;223(1):80-92. doi:10.1016/j.ijheh.2019.10.003
- Stea TH, Nordheim O, Bere E, Stornes P, Eikemo TA. [Fruit and vegetable consumption in Europe according to gender, educational attainment and regional affiliation-A cross-sectional study in 21 European countries](#). *PLoS One*. 2020;15(5):e0232521. Published 2020 May 13. doi:10.1371/journal.pone.0232521
- Todd A, Bambra C. [Learning from past mistakes? The COVID-19 vaccine and the inverse equity hypothesis](#). *Eur J Public Health*. 2021;31(1):2. doi:10.1093/eurpub/ckaa243
- Villanger GD, Drover SSM, Nethery RC, et al. [Associations between urine phthalate metabolites and thyroid function in pregnant women and the influence of iodine status](#). *Environ Int*. 2020;137:105509. doi:10.1016/j.envint.2020.105509
- Villanger GD, Øvrevik J, Aase H, et al, (2020). [Early-Life Environmental Toxic Influences on Neural Development](#). s. 141-159. doi: 10.1007/978-981-15-3797-4_8
- Villanger GD, Ystrom E, Engel SM, et al. [Neonatal thyroid-stimulating hormone and association with attention-deficit/hyperactivity disorder](#). *Paediatr Perinat Epidemiol*. 2020;34(5):590-596. doi:10.1111/ppe.12643
- Weiss D, Eikemo TA. [Technological innovations and the rise of social inequalities in health](#). *Scandinavian Journal of Public Health*. 2017;45(7):714-719. doi:10.1177/1403494817711371
- Wendt C, Bambra C, (2020) [Towards Applying Ideal Types in Health Care System Comparison](#)
- Witvliet MI, Toch-Marquardt M, Eikemo TA, Mackenbach JP (2020). [Improving job strain might reduce inequalities in cardiovascular disease mortality in european men](#). *Soc Sci Med*. 2020;267:113219. doi:10.1016/j.socscimed.2020.113219

2021

- Agardh EE, Allebeck P, Flodin P, et al. [Alcohol-attributed disease burden in four Nordic countries between 2000 and 2017: Are the gender gaps narrowing? A comparison using the Global Burden of Disease, Injury and Risk Factor 2017 study.](#) *Drug Alcohol Rev.* 2021;40(3):431-442. doi:10.1111/dar.13217
- Baggio S, Vernaz N, Spechbach H, et al. [Vulnerable patients forgo health care during the first wave of the Covid-19 pandemic.](#) *Prev Med.* 2021;150:106696. doi:10.1016/j.ypmed.2021.106696
- Balaj M, York HW, Sripada K, et al. [Parental education and inequalities in child mortality: a global systematic review and meta-analysis.](#) *Lancet.* 2021;398(10300):608-620. doi:10.1016/S0140-6736(21)00534-1
- Balaj M. Chapter on Albania in *Health Politics in Europe: A Handbook* (Oxford, 2021; online edn, Oxford Academic, 19 Aug. 2021), <https://doi.org/10.1093/oso/9780198860525.001.0001>
- Bambra C, Albani V, Franklin P. [COVID-19 and the gender health paradox.](#) *Scand J Public Health.* 2021;49(1):17-26. doi:10.1177/1403494820975604
- Bambra C, Lynch J, Smith KE. [Unequal Pandemic: COVID-19 and Health Inequalities](#) (2021). <https://library.oapen.org/handle/20.500.12657/51451>
- Bambra C. Levelling up: [Global examples of reducing health inequalities.](#) *Scand J Public Health.* 2022;50(7):908-913. doi:10.1177/14034948211022428
- Besnier E, Thomson K, Stonkute D, et al. [Which public health interventions are effective in reducing morbidity, mortality and health inequalities from infectious diseases amongst children in low-income and middle-income countries \(LMICs\): protocol for an umbrella review.](#) *BMJ Open.* 2019;9(12):e032981. Published 2019 Dec 29. doi:10.1136/bmjopen-2019-032981
- Carmeli C, Kutalik Z, Mishra PP, et al. [Gene regulation contributes to explain the impact of early life socioeconomic disadvantage on adult inflammatory levels in two cohort studies.](#) *Sci Rep.* 2021;11(1):3100. Published 2021 Feb 4. doi:10.1038/s41598-021-82714-2
- De Ridder D, Sandoval J, Vuilleumier N, et al. [Socioeconomically Disadvantaged Neighborhoods Face Increased Persistence of SARS-CoV-2 Clusters.](#) *Front Public Health.* 2021;8:626090. Published 2021 Jan 27. doi:10.3389/fpubh.2020.626090
- European Commission: Directorate-General for Justice and Consumers, Fondazione Giacomo Brodolini, Franklin, P., Bambra, C., & Albani, V. (2021). [Gender equality and health in the EU](#), Publications Office of the European Union. <https://data.europa.eu/doi/10.2838/991480>
- Forster T, Kentikelenis A, Stubbs T. Chapter on Neoliberalism and Health in [Global Context in the Routledge Handbook of the Political Economy of Health and Healthcare.](#) Routledge. <https://doi.org/10.4324/9781003017110>
- Friedman J, Calderon-Villarreal A, Heggebø K, Balaj M, Bambra C, Eikemo TA. [COVID-19 and the Nordic Paradox: a call to measure the inequality reducing benefits of welfare systems in the wake of the pandemic.](#) *Soc Sci Med.* 2021;289:114455. doi:10.1016/j.socscimed.2021.114455
- Huijts T. [Examining the impact of cuts to local government spending on Sure Start Children's Centres on childhood obesity: a commentary.](#) *J Epidemiol Community Health.* 2021;75(9):813-814. doi:10.1136/jech-2021-217190

Jensen M, Combariza Bayona DA, Sripada K. [Mercury Exposure among E-Waste Recycling Workers in Colombia: Perceptions of Safety, Risk, and Access to Health Information](#). *Int J Environ Res Public Health*. 2021;18(17):9295. Published 2021 Sep 3. doi:10.3390/ijerph18179295

Kentikelenis A, Seabrooke L. [Organising knowledge to prevent global health crises: a comparative analysis of pandemic preparedness indicators](#). *BMJ Glob Health*. 2021;6(8):e006864. doi:10.1136/bmjgh-2021-006864

Künzi M, Joly-Burra E, Zuber S, et al. [The Relationship between Life Course Socioeconomic Conditions and Objective and Subjective Memory in Older Age](#). *Brain Sci*. 2021;11(1):61. Published 2021 Jan 6. doi:10.3390/brainsci11010061

McNamara CL, Toch-Marquardt M, Albani V, Eikemo TA, Bambra C. [The contribution of employment and working conditions to occupational inequalities in non-communicable diseases in Europe](#). *Eur J Public Health*. 2021;31(1):181-185. doi:10.1093/eurpub/ckaa175

Øversveen E, Rydland H. [Sosial ulikhet i helse. En samfunnsvitenskapelig innføring](#) (2021)

Øversveen, E. [Structural determination and social practice: towards a new understanding of 'structure' in health inequality research](#). *Soc Theory Health* **21**, 1–16 (2023). <https://doi.org/10.1057/s41285-021-00163-3>

Prencipe L, Houweling TAJ, van Lenthe FJ, Palermo T. [Do Conditional Cash Transfers Improve Mental Health? Evidence From Tanzania's Governmental Social Protection Program](#). *J Adolesc Health*. 2021;69(5):797-805. doi:10.1016/j.jadohealth.2021.04.033

Prencipe L, Houweling TA, van Lenthe FJ On Behalf of the Adolescent Cash Plus Evaluation Team, et al. [Exploring multilevel social determinants of depressive symptoms for Tanzanian adolescents: evidence from a cross-sectional study](#). *J Epidemiol Community Health* 2021;**75**:944-954.

Rocha V, Severo M, Ramos E, Falcão H, Stringhini S, Fraga S. [Socioeconomic circumstances and lung function growth from early adolescence to early adulthood](#). *Pediatr Res*. 2021;90(6):1235-1242. doi:10.1038/s41390-021-01380-2

Sandoval JL, Petrovic D, Guessous I, Stringhini S. [Health Insurance Deductibles and Health Care-Seeking Behaviors in a Consumer-Driven Health Care System With Universal Coverage](#). *JAMA Netw Open*. 2021;4(7):e2115722. Published 2021 Jul 1. doi:10.1001/jamanetworkopen.2021.15722

Schneider S, Lunau T, Eikemo TA, et al. [Better air but not for all? Changes in second-hand smoke exposure at workplaces in 29 European countries over 10 years](#). *Eur J Public Health*. 2021;31(4):708-714. doi:10.1093/eurpub/ckab035

Serrano-Alarcón M, Kentikelenis A, Mckee M, Stuckler D. [Impact of COVID-19 lockdowns on mental health: Evidence from a quasi-natural experiment in England and Scotland](#). *Health Econ*. 2022;31(2):284-296. doi:10.1002/hec.4453

Serrano-Alarcón M, Kentikelenis A, Stuckler D. [How to protect people in response to COVID-19 economic downturns: Insights from past economic crises](#). *Scandinavian Journal of Public Health*. 2021;50(1):4-5. doi:10.1177/14034948211051912

Skogheim TS, Weyde KVF, Aase H, et al. [Prenatal exposure to per- and polyfluoroalkyl substances \(PFAS\) and associations with attention-deficit/hyperactivity disorder and autism spectrum disorder in children](#). *Environ Res*. 2021;202:111692. doi:10.1016/j.envres.2021.111692

Skogheim TS, Weyde KVF, Engel SM, et al. [Metal and essential element concentrations during pregnancy and associations with autism spectrum disorder and attention-deficit/hyperactivity disorder in children](#). *Environ Int*. 2021;152:106468. doi:10.1016/j.envint.2021.106468

Soares S, Rocha V, Kelly-Irving M, Stringhini S, Fraga S. [Adverse Childhood Events and Health Biomarkers: A Systematic Review](#). *Front Public Health*. 2021;9:649825. Published 2021 Aug 19. doi:10.3389/fpubh.2021.649825

Sripada, Kam; Solomon, Abheet; et al. (2021) [Healthy Environments for Healthy Children: Global Programme Framework](#). (n.d.). UNICEF. <https://www.unicef.org/documents/healthy-environments-healthy-children-global-programme-framework>

Suarez-Lopez JR, Cairns MR, Sripada K, et al. [COVID-19 and children's health in the United States: Consideration of physical and social environments during the pandemic](#). *Environ Res*. 2021;197:111160. doi:10.1016/j.envres.2021.111160

Weyde KVF, Olsen AK, Duale N, et al. [Gestational blood levels of toxic metal and essential element mixtures and associations with global DNA methylation in pregnant women and their infants](#). *Sci Total Environ*. 2021;787:147621. doi:10.1016/j.scitotenv.2021.147621

2022

Albani V, Brown H, Vera-Toscano E, et al. [Investigating the impact on mental wellbeing of an increase in pensions: A longitudinal analysis by area-level deprivation in England, 1998-2002](#). *Soc Sci Med*. 2022;311:115316. doi:10.1016/j.socscimed.2022.115316

Bahl NKH, Øversveen E, Brodahl M, et al. [In what ways do emerging adults with substance use problems experience their communities as influencing their personal recovery processes?](#). *J Community Psychol*. 2022;50(7):3070-3100. doi:10.1002/jcop.22816

Balaj M, Eikemo TA. [Sick of social status: A Bourdieusian perspective on morbidity and health inequalities](#). *Sociol Health Illn*. 2022;44(8):1214-1250. doi:10.1111/1467-9566.13512

Bambra C. [Pandemic inequalities: emerging infectious diseases and health equity](#). *Int J Equity Health*. 2022;21(1):6. Published 2022 Jan 14. doi:10.1186/s12939-021-01611-2

Bambra C. [Placing intersectional inequalities in health](#). *Health Place*. 2022;75:102761. doi:10.1016/j.healthplace.2022.102761

Baravelli CM, Eikemo TA, Klitkou ST, Kinge JM, Clarsen BM, Bølling AK, Balaj M, Knudsen AKS. [Using individual-level stratification as an approach to integrating social inequalities into the burden of disease](#). *Eur J Public Health*. 2022 Oct 25;32(Suppl 3):ckac129.400. doi: 10.1093/eurpub/ckac129.400. PMID: PMC9593894.

Baravelli CM, Eikemo TA, Klitkou ST, Kinge JM, Clarsen BM, Bølling AK, Balaj M, Knudsen AKS. [Using individual-level stratification as an approach to integrating social inequalities into the burden of disease](#). *Eur J Public Health*. 2022 Oct 25;32(Suppl 3):ckac129.400. doi: 10.1093/eurpub/ckac129.400. PMID: PMC9593894.

Baravelli CM, Macsali F, Telle K, et al. [Impact of COVID-19 on pregnancy-related healthcare utilisation: a prospective nationwide registry study](#). *BMJ Open*. 2022;12(10):e064118. Published 2022 Oct 17. doi:10.1136/bmjopen-2022-064118

- Beck KC, Balaj M, Donadello L, et al. (2022). [Educational inequalities in adult mortality: a systematic review and meta-analysis of the Asia Pacific region](#). *BMJ Open*, 12(8), e059042. <https://doi.org/10.1136/bmjopen-2021-059042>
- Friedman J, Balaj M, Islam N, Gu Y, Nahmia P, et al. [Inequalities in COVID-19 mortality: defining a global research agenda](#). *Bull World Health Organ*. 2022 Oct 1;100(10):648-650. doi: 10.2471/BLT.22.288211. Elstad JI, Heggebø K, Dahl E. [Nordic research on health inequalities: A scoping review of empirical studies published in Scandinavian Journal of Public Health 2000-2021](#). *Scand J Public Health*. 2022;50(7):843-851. doi:10.1177/14034948221101304
- Harsløf I, Larsen K, Bamba C. [When health is wealth: occupationally differentiated patterns of health capital in post-industrial Europe](#). *Soc Theory Health*. Published online October 7, 2022. doi:10.1057/s41285-022-00187-3
- Heggebø K, Elstad JI. [Health-related exit from employment before and during the COVID-19 pandemic in Norway: Analysis of population-wide register data 2013-2021](#). *SSM Popul Health*. 2024;25:101598. Published 2024 Jan 2. doi:10.1016/j.ssmph.2023.101598
- Heggebø K, West Pedersen. (2022). The Norwegian Welfare State Adjusting to Crisis – Temporary Changes in Unemployment Benefit Regulations during the COVID-19 Pandemic and their Long-Term Implications in [Citizenship and Social Exclusion at the Margins of the Welfare State](#). <https://doi.org/10.4324/9781003347279>
- Heggebø K. [Gendered health consequences of unemployment in Norway 2000-2017: a register-based study of hospital admissions, health-related benefit utilisation, and mortality](#). *BMC Public Health*. 2022;22(1):2447. Published 2022 Dec 28. doi:10.1186/s12889-022-14899-8
- Kelly-Irving M, Ball WP, Bamba C, et al. (2022). [Falling down the rabbit hole? Methodological, conceptual and policy issues in current health inequalities research](#). *Critical Public Health*, 33(1), 37–47. <https://doi.org/10.1080/09581596.2022.2036701>
- Kentikelenis A, Stubbs T. (2022). [Austerity Redux: The Post-pandemic Wave of Budget Cuts and the Future of Global Public Health](#). *Global Policy*, 13(1), 5-17. <https://doi.org/10.1111/1758-5899.13028>
- Kentikelenis AE, Seabrooke L. [Governing and Measuring Health Security: The Global Push for Pandemic Preparedness Indicators](#). *Glob Policy*. 2022;13(4):571-578. doi:10.1111/1758-5899.13090
- Lewis J, Mildon R, Steele T. [Cross-Sectoral Learning in Implementation Research: Harnessing the potential to accelerate results for children](#), UNICEF Office of Research – Innocenti, Florence, 2022.
- McGowan VJ, Bamba C. (2022). [COVID-19 mortality and deprivation: pandemic, syndemic, and endemic health inequalities](#). *The Lancet Public Health*, 7(11), e966–e975. [https://doi.org/10.1016/s2468-2667\(22\)00223-7](https://doi.org/10.1016/s2468-2667(22)00223-7)
- Oude Groeniger J, Houweling TA, Jansen PW, et al. [Social inequalities in child development: the role of differential exposure and susceptibility to stressful family conditions](#). *J Epidemiol Community Health*. 2023;77(2):74-80. doi:10.1136/jech-2022-219548
- Øversveen E, Kelly CA. [Alienation: A useful concept for health inequality research](#). *Scand J Public Health*. 2022;50(7):1018-1023. doi:10.1177/14034948221085394
- Øversveen, E., Stachowski, J. [“Not a lifestyle disease”: the importance of boundary work for the construction of a collective illness identity among people with type 1 diabetes](#). *Soc Theory Health* 21, 194–208 (2023). <https://doi.org/10.1057/s41285-022-00182-8>

Petrovic D, Carmeli C, Sandoval JL, et al. [Life-course socioeconomic factors are associated with markers of epigenetic aging in a population-based study](#). *Psychoneuroendocrinology*. 2023;147:105976. doi:10.1016/j.psyneuen.2022.105976

Plass D, Hilderink H, Lehtomäki H, et al. [Estimating risk factor attributable burden - challenges and potential solutions when using the comparative risk assessment methodology](#). *Arch Public Health*. 2022;80(1):148. Published 2022 May 27. doi:10.1186/s13690-022-00900-8

Rydland HT, Friedman J, Stringhini S, et al. [The radically unequal distribution of Covid-19 vaccinations: a predictable yet avoidable symptom of the fundamental causes of inequality](#). *Humanit Soc Sci Commun* **9**, 61 (2022). <https://doi.org/10.1057/s41599-022-01073-z>

Santa-Ramírez HA, Wisniak A, Pullen N, et al. [Socio-economic determinants of SARS-CoV-2 infection: Results from a population-based cross-sectional serosurvey in Geneva, Switzerland](#). *Front Public Health*. 2022;10:874252. Published 2022 Sep 23. doi:10.3389/fpubh.2022.874252

Schrempft S, Pullen N, Baysson H, et al. [Prevalence and predictors of psychological distress before, during, and after a COVID-19 pandemic wave in Switzerland, 2021](#). *J Psychiatr Res*. 2023;158:192-201. doi:10.1016/j.jpsychires.2022.12.042

Serrano-Alarcón M, Ardito C, Leombruni R, et al. [Health and labor market effects of an unanticipated rise in retirement age. Evidence from the 2012 Italian pension reform](#). *Health Econ*. 2023;32(12):2745-2767. doi:10.1002/hec.4749

Serrano-Alarcón M, Wang Y, Kentikelenis A, Mckee M, Stuckler D. [The far-right and anti-vaccine attitudes: lessons from Spain's mass COVID-19 vaccine roll-out](#). *Eur J Public Health*. 2023;33(2):215-221. doi:10.1093/eurpub/ckac173

Sripada K, Lager AM. [Interventions to reduce cadmium exposure in low- and middle-income countries during pregnancy and childhood: A systematic review](#). *J Glob Health*. 2022;12:04089. Published 2022 Nov 12. doi:10.7189/jogh.12.04089

Sripada K, Wierzbicka A, Abass K, et al. (2022). [A Children's health perspective on nano- and microplastics](#). *Environmental Health Perspectives*, 130(1). <https://doi.org/10.1289/ehp9086>

Wang J, Zhao Z, Yang J, Ng M, Zhou M. [The association between education and premature mortality in the Chinese population: a 10-year cohort study](#). *Lancet Reg Health West Pac*. 2024 May 7;47:101085. doi: 10.1016/j.lanwpc.2024.101085. PMID: 38751727; PMCID: PMC11091532.

York HW, Balaj M, Sripada K, Gakidou E, Eikemo TA. [Understanding the social determinants of health - Authors' reply](#). *Lancet*. 2022;399(10334):1467-1468. doi:10.1016/S0140-6736(21)02661-

2023

Agardh EE., Allebeck P et al. [Disease Burden Attributed to Drug use in the Nordic Countries: a Systematic Analysis for the Global Burden of Diseases, Injuries, and Risk Factors Study 2019](#). *Int J Ment Health Addiction* 23, 618–649 (2025). <https://doi.org/10.1007/s11469-023-01131-w>

Aronsson A, Tugrul H, Bambra C, & Eikemo TA. (2023). "Chapter 24: The role of Social Protection Policies in reducing health inequalities". In *Handbook of Health Inequalities Across the Life Course*. Cheltenham, UK: Edward Elgar Publishing. <https://doi.org/10.4337/9781800888166.00034>

Aronsson AE, Vidaurre-Teixidó P, Jensen MR, Solhaug S, McNamara C. [The health consequences of informal employment among female workers and their children: a systematic review](#) [published correction appears in *Global Health*. 2023 Sep 1;19(1):65. doi: 10.1186/s12992-023-00967-0.]. *Global Health*. 2023;19(1):59. Published 2023 Aug 17. doi:10.1186/s12992-023-00958-1

Backhaus I, Gero K, Dragano N, Bambra C. [Health inequalities related to psychosocial working conditions in Europe](#). ETUI, The European Trade Union Institute. June 28, 2023, 11:27 Europe/Brussels. Available at: <https://www.etui.org/publications/health-inequalities-related-psychosocial-working-conditions-europe>. Accessed July 10, 2025.

Backhaus I, Hoven H, Bambra C, et al. [Changes in work-related stressors before and during the COVID-19 pandemic: differences by gender and parental status](#). *Int Arch Occup Environ Health*. 2023;96(3):421-431. doi:10.1007/s00420-022-01933-w

Balaj M, Sjöqvist H, van der Velde L, et al. [Does educational mobility in mid-life affect mortality? A cohort study covering 1.3 million individuals in Sweden](#). *SSM Popul Health*. 2023;25:101589. Published 2023 Dec 23. doi:10.1016/j.ssmph.2023.101589

Bambra C, Marmot M. [Expert Report for the UK Covid-19 Public Inquiry](#) 30 May 2023. <https://covid19.public-inquiry.uk/documents/inq000195843-expert-report-by-professor-clare-bambra-and-professor-sir-michael-marmot-dated-30-may-2023/>

Closser S, Sultan M, Tikkanen R, et al. [Breaking the silence on gendered harassment and assault of community health workers: an analysis of ethnographic studies](#). *BMJ Glob Health*. 2023;8(5):e011749. doi:10.1136/bmjgh-2023-011749

Elstad JI, Heggebø K, and Pedersen AW. [Lønner det seg å jobbe?](#) (2023). Scandinavian University Press. <https://www.scup.com/doi/10.18261/spa.40.2.3>

Heggebø, K., & Pedersen, A. W. (2023). [The Norwegian welfare state adjusting to crisis](#). In *Routledge eBooks* (pp. 48–63). <https://doi.org/10.4324/9781003347279-5>

Hoven H, Backhaus I, Geró K, Kawachi I. [Characteristics of employment history and self-perceived barriers to healthcare access](#). *Eur J Public Health*. 2023;33(6):1080-1087. doi:10.1093/eurpub/ckad178

Kopasker D, Katikireddi SV, Santos JV, et al. [Microsimulation as a flexible tool to evaluate policies and their impact on socioeconomic inequalities in health](#). *Lancet Reg Health Eur*. 2023;34:100758. Published 2023 Oct 18. doi:10.1016/j.lanepe.2023.100758

Long D, Mackenbach JP, Klokgieters S, et al. [Widening educational inequalities in mortality in more recent birth cohorts: a study of 14 European countries](#). *J Epidemiol Community Health*. 2023;77(6):400-408. doi:10.1136/jech-2023-220342

Lorthe E, Richard V, Dumont R, et al. [Socioeconomic conditions and children's mental health and quality of life during the COVID-19 pandemic: An intersectional analysis](#). *SSM Popul Health*. 2023;23:101472. Published 2023 Jul 23. doi:10.1016/j.ssmph.2023.101472

McCrary C, McLoughlin S, Layte R, et al. [Towards a consensus definition of allostatic load: a multi-cohort, multi-system, multi-biomarker individual participant data \(IPD\) meta-analysis](#). *Psychoneuroendocrinology*. 2023;153:106117. doi:10.1016/j.psyneuen.2023.106117

McNamara CL, Kotzias V, Bambra C, Labonté R, Stuckler D. [Have COVID-19 Stimulus Packages Mitigated the Negative Health Impacts of Pandemic-Related Job Losses? A Systematic Review of Global Evidence from the First Year of the Pandemic](#). *Int J Soc Determinants Health Health Serv*. 2023;53(3):311-322. doi:10.1177/27551938231176374

Mosquera I, Barajas CB, Zhang L, et al. [Assessment of organization of cervical and breast cancer screening programmes in the Latin American and the Caribbean states: The CanScreen5 framework](#) [published correction appears in *Cancer Med.* 2024 Jan;13(1):e6775. doi: 10.1002/cam4.6775.]. *Cancer Med.* 2023;12(19):19935-19948. doi:10.1002/cam4.6492

Mosquera I, Todd A, Balaj M, et al. [Components and effectiveness of patient navigation programmes to increase participation to breast, cervical and colorectal cancer screening: A systematic review.](#) *Cancer Med.* 2023;12(13):14584-14611. doi:10.1002/cam4.6050

Prencipe L, Houweling TAJ, van Lenthe FJ, Kajula L, Palermo T. [Climate distress, climate-sensitive risk factors, and mental health among Tanzanian youth: a cross-sectional study.](#) *Lancet Planet Health.* 2023;7(11):e877-e887. doi:10.1016/S2542-5196(23)00234-6

Prencipe L. [Youth mental health in Tanzania: Social determinants, climate change, and the impacts of social protection.](#) Rotterdam, 2023. 233 p.

Richard V, Piumatti G, Pullen N, et al. [Socioeconomic inequalities in sport participation: pattern per sport and time trends - a repeated cross-sectional study.](#) *BMC Public Health.* 2023;23(1):785. Published 2023 Apr 28. doi:10.1186/s12889-023-15650-7

Santa-Ramírez HA, Otálvaro-Castro GJ, Joost S, et al. [Small area vulnerability, household food insecurity and child malnutrition in Medellín, Colombia: results from a repeated cross-sectional study.](#) *Lancet Reg Health Am.* 2023;23:100521. Published 2023 May 26. doi:10.1016/j.lana.2023.100521

Schrempft S, Stringhini S. [Socioeconomic inequalities in the Pace of Aging.](#) *Aging (Albany NY).* 2023;15(6):1706-1707. doi:10.18632/aging.204595

Schrempft S, Trofimova O, Künzi M, et al [Life-course socioeconomic conditions and cognitive performance in older adults: a cross-cohort comparison.](#) *Aging Ment Health.* 2023;27(4):745-754. doi:10.1080/13607863.2022.2084511

Serrano-Alarcón M, Ardito C, Leombruni R, et al. [Health and labor market effects of an unanticipated rise in retirement age. Evidence from the 2012 Italian pension reform.](#) *Health Econ.* 2023;32(12):2745-2767. doi:10.1002/hec.4749

Serrano-Alarcón M, Wang Y, Kentikelenis A, et al. [The far-right and anti-vaccine attitudes: lessons from Spain's mass COVID-19 vaccine roll-out.](#) *Eur J Public Health.* 2023;33(2):215-221. doi:10.1093/eurpub/ckac173

Stubbs T, Kentikelenis A, Gabor D, et al. [The return of austerity imperils global health.](#) *BMJ Glob Health.* 2023;8(2):e011620. doi:10.1136/bmjgh-2022-011620

Weyde KVF, Winterton A, Surén P, et al. [Association between gestational levels of toxic metals and essential elements and cerebral palsy in children.](#) *Front Neurol.* 2023;14:1124943. Published 2023 Aug 17. doi:10.3389/fneur.2023.1124943

2024

Chen-Xu J, Varga O, Mahrouseh N, et al. [Subnational inequalities in years of life lost and associations with socioeconomic factors in pre-pandemic Europe, 2009-19: an ecological study.](#) *Lancet Public Health.* 2024;9(3):e166-e177. doi:10.1016/S2468-2667(24)00004-5

Heggebø K, Elstad JI. [Health-related exit from employment before and during the COVID-19 pandemic in Norway: Analysis of population-wide register data 2013-2021](#). *SSM Popul Health*. 2024;25:101598. Published 2024 Jan 2. doi:10.1016/j.ssmph.2023.101598

Metsä-Simola N, Heggebø K, Kjaer Urhoj S, et al. [Neurological conditions and subsequent divorce risk in the Nordic countries: the importance of gender and both spouses' education](#). *J Epidemiol Community Health*. Published online February 14, 2024. doi:10.1136/jech-2023-221328

Nosrati E, Eikemo TA, Marmot M.. [Health, Wealth, and the Nordic Model Revisited](#). *Nordisk välfärdsvetenskap* | Nordic Welfare Research. 9. 98-102. 10.18261/nwr.9.1.8.

Skalická V, Eikemo TA. [The Nordic model fails to protect vulnerable children](#). *Lancet Reg Health Eur*. 2025;49:101217. Published 2025 Jan 15. doi:10.1016/j.lanpe.2025.101217

Steel N, Bauer Staeb CMM, Ford JA. [Changing life expectancy in European countries 1990-2021: a subanalysis of causes and risk factors from the Global Burden of Disease Study 2021](#). *Lancet Public Health*. 2025;10(3):e172-e188. doi:10.1016/S2468-2667(25)00009-X

Tikkanen RS, Closser S, Prince J, Chand P, Justice J. An [anthropological history of Nepal's Female Community Health Volunteer program: gender, policy, and social change](#). *Int J Equity Health*. 2024;23(1):70. Published 2024 Apr 13. doi:10.1186/s12939-024-02177-5

UNICEF Innocenti – Global Office of Research and Foresight, [Implementation Research Compendium: A systematic presentation of the learnings from nine countries](#), UNICEF Innocenti, Florence, July 2024.

Van der Velde L, Shabaan AN, Månsson A, et al. [Alcohol-attributed disease burden and formal alcohol policies in the Nordic countries \(1990-2019\): an analysis using the Global Burden of Disease Study 2019](#). *Eur J Public Health*. 2025;35(1):52-59. doi:10.1093/eurpub/ckae195



CHAIN – Centre for Global Health Inequalities Research

Summary report 2019 – 2025

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 social determinants, civil society and the UN system to advance health inequalities research, especially for children’s health. To find out more about CHAIN, visit our [website](#) and follow us on [Twitter](#) and [Facebook](#).

This publication was prepared by CHAIN Partner EuroHealthNet, the partnership of organisations, agencies, and statutory bodies working on public health, disease prevention, promoting health, and reducing inequalities. To find out more about our work, visit [eurohealthnet.eu](#) and follow us on [LinkedIn](#), [Instagram](#), and [Bluesky](#).

CHAIN is financed by a strategic grant (miljøstøtte) from the Norwegian Research Council (project number 288638).