ABSTRACTS CATALOGUE

Research Conference
Pandemics

Preparedness for future pandemics from a global perspective

Abstracts catalogue

Organised by
DFG Deutsche Forschungsgemeinschaft
German Research Foundation

Welcome

Dear participant of the DFG conference

The conference offers a unique opportunity to meet and interact with researchers of all disciplines and to become acquainted with a diverse range of scientific projects. In order to derive maximum benefit from this particular constellation of crossover disciplines, I would particularly encourage you to get in touch with those projects you might not normally come into contact with.

I am very pleased to invite you to register for the DFG conference on 15 November 2021. With the aim of promoting networking and collaboration, this interdisciplinary conference will bring together almost 200 DFG-funded research projects related to the COVID-19 pandemic, involving grant recipients, funded doctoral and postdoctoral researchers as well as international cooperation partners.

Please find below the preliminary programme together with further information on the timeline and documents to be submitted by all participants prior to the conference.

I very much look forward to meeting you soon on this exciting occasion!

With kind regards, Katja Becker

abstracts catalogue

Members of the interdisciplinary DFG Commission for Pandemic Research

Prof. Dr. Frank Allgöwer,
Stuttgart

Prof. Dr. Frank Allgöwer heads the Institute for Systems Theory and Automatic Control at the University of Stuttgart and conducts research on methods for the analysis, modelling and control of non-linear systems, on networks of systems and on optimisation and data-based control. In current publications, he deals with predicting the spread of the current pandemic and measures to control it based on a predictive model-based control procedure.

www.ist.uni-stuttgart.de/de/forschung/gruppe-von-frank-allgoewer/COVID-19

Prof. Dr. Marcus Altfeld,
Hamburg

Prof. Dr. Marcus Altfeld heads the Department of Virus Immunology at the Heinrich Pette Institute in Hamburg, and the Institute for Immunology at the University Medical Center Hamburg-Eppendorf. His research focuses on immune responses against human pathogenic viruses (especially HIV, HCV, influenza). Among other things, his work aims to develop innovative vaccination strategies and immunotherapeutic interventions.

www.hpi-hamburg.de/en/research-teams/research-departments/virus-immunology

Prof. Dr. Christian Apfelbacher,
Magdeburg

Prof. Dr. Christian Apfelbacher is Director of the Institute of Social Medicine and Health Systems Research at the Medical Faculty of Otto von Guericke University Magdeburg. His research focuses on the (care) epidemiology of chronic disease, healthcare and quality of life, health literacy and evidence synthesis. He is an executive board member of the German Society for Social Medicine and Prevention (DGSMP) and a member of the coordination and steering group of the COVID-19 Public Health Research Network.

Prof. Dr. Cordula Artelt,
Bamberg

Prof. Dr. Cordula Artelt is Director of the Leibniz Institute for Educational Trajectories (LIfBi) and holds the Chair of Longitudinal Educational Research at the University of Bamberg. She is project leader of the National Educational Panel Study (NEPS), which provides longitudinal data on educational processes in Germany. She conducts research on the basics of scientific and application-oriented issues in the areas of skills acquisition, especially text comprehension metacognition, as well as diagnostics.

Prof. Dr. Cornelia Betsch,
Erfurt

Prof. Dr. Cornelia Betsch is an expert in health communication and health behaviour at the University of Erfurt. Her research focuses particularly on health decisions in connection with infectious diseases. Cornelia Betsch is currently leading a study on knowledge, risk perception, protective behaviour and trust during the current COVID-19 outbreak (COVID-19 Snapshot Monitoring – COSMO) together with the Robert Koch Institute (RKI) and the Federal Centre for Health Education (BZgA).

www.uni-erfurt.de/en/philosophische-fakultaet/seminare-professuren/medien-und-kommunikationswissenschaft/professuren/gesundheitskommunikation

Dr. Carsten Butsch,
Cologne

Assistant professor Dr. Carsten Butsch conducts research at the Institute of Geography at the University of Cologne into urban health in the global south and into the handling of risks and migration processes. His academic work has included subjects such as access to health services, crisis prevention in megacities and new approaches to health reporting. He is the spokesperson for the German Geographical Society working groups “Medical Geography and Geographic Health Research” and “South Asia”.

https://geographie.uni-koeln.de/en/research/working-groups/urban-and-social-geography/staff/scientific-staff/butsch-carsten

Prof. Dr. Christian Drosten,
Berlin

Prof. Dr. Christian Drosten is Director of the Institute of Virology at Charité Berlin and an expert in the field of pathogenic viruses with epidemic potential. He was previously involved in the identification of the SARS-associated coronavirus (SARS-CoV1) in 2003 and his research focuses on the epidemiology and ecology of coronaviruses. In 2020, the Stifterverband and the DFG awarded him the “Special Prize for Outstanding Communication of Science in the COVID-19 Pandemic”.

Prof. Dr. Eva Grill,
Munich

Prof. Dr. Eva Grill is Professor of Epidemiology at the Institute for Medical Information Processing, Biometry, and Epidemiology at LMU Munich. Her research focuses on ageing, participation and patient-reported outcomes. She is a member of the COVID-19 Public Health Research Network and President of the German Society for Epidemiology (DGEpi).

www.ibe.med.uni-muenchen.de/mitarbeiter/professoren/grill/index.html

Prof. Dr. Susanne Herold,
Gießen

Prof. Dr. Susanne Herold is Professor of Infectious Diseases of the Lung at Justus Liebig University in Gießen and Head of Department of the Infectious Diseases Unit at the University Hospital in Gießen. Her research interests include antiviral defence mechanisms in connection with influenza and coronavirus infections and the respiratory pathologies associated with these. She is a member of the scientific advisory board of the Robert Koch Institute.

www.kfo309.de

Prof. Dr. Stefan Liebig,
DIW Berlin

Prof. Dr. Stefan Liebig is Director of the Socio-Economic Panel (SOEP) at the German Institute for Economic Research (DIW), Berlin, and Professor of Sociology at the FU Berlin. He conducts research into the perception and evaluation of social inequalities and problems of survey methodology. In a joint project with the University of Bielefeld, he is leading the study "Socio-economic factors and consequences of the spread of the coronavirus in Germany" (SOEP-CoV) at the DIW and, together with the RKI, the nationwide antibody study "Living in Germany – Corona Monitoring" (RKI-SOEP). These two studies are looking into the acute, medium and long-term socio-economic factors and consequences of the spread of the coronavirus in Germany.

Prof. Dr. Stephan Ludwig,
Münster

Prof. Dr. Stephan Ludwig is Director of the Institute of Virology at the University of Münster. He conducts research into influenza viruses and their infection mechanisms and is a site manager involved in coordinating the National Research Platform for Zoonoses. In addition to his molecular cell biology research, he studies approaches to antiviral therapy.

Prof. Dr. Michael Meyer-Hermann,
Braunschweig

Prof. Dr. Michael Meyer-Hermann heads the Department of Systems Immunology at the Helmholtz Centre for Infection Research (HZI). He is also a professor at TU Braunschweig and a member of the board of directors of the Braunschweig Integrated Centre of Systems Biology (BRICS), an institution administrated jointly by the HZI and TU Braunschweig. In his interdisciplinary research, he works on establishing mathematical methods in biology and immunology with the aim of understanding disease and improving therapy.

www.helmholtz-hzi.de/en/research/research-topics/immune-response/systems-immunology/our-research

Prof. Dr. Jörn Müller-Quade,
Karlsruhe

Prof. Dr. Jörn Müller-Quade heads the "Cryptography and Security" research group at the Karlsruhe Institute of Technology and is director of the Computer Science Research Centre there. He is a computer scientist and an expert in computer algebra. In the context of the coronavirus pandemic, his scientific interest lies in the information security of contact tracing apps.

Prof. Dr. Carla Nau,
Lübeck

Prof. Dr. Carla Nau is Director of the Department of Anesthesiology and Surgical Intensive Care at the University Medical Center Schleswig-Holstein, Lübeck Campus. She is mainly involved in pain research, in particular postoperative pain treatment. She is also an expert in the intensive care and emergency outpatient technologies needed to treat and understand COVID-19 and other respiratory diseases.

Prof. Dr. Karen Nolte,
Heidelberg

Prof. Dr. Karen Nolte holds the Chair of History and Ethics of Medicine and is director of the institute with the same name at the University of Heidelberg. She is concerned with the history of medicine and nursing, the history of patients, gender and the body, the history of psychiatry as well as and the history of medical ethics from the 18th to the 20th century. Her research work has focused on such areas as hospital and clinic historiography as well as that of medical care.

Prof. Dr.-Ing. Michael Schlüter,
Hamburg

Prof. Dr.-Ing. Michael Schlüter heads the Institute of Multiphase Flows at the Technical University of Hamburg. His research focuses on fluid particles in flows of biological and chemical processes. He is particularly interested in transport processes, ranging from microscopic to large-scale. He is an appointed member of the ProcessNet Subject Division on Multiphase Flows and Chair of the EFCE Division on Multiphase Fluid Flow.

www.tuhh.de/ims/welcome.html

Prof. Dr. Jonas Schreyögg,
Hamburg

Prof. Dr. Jonas Schreyögg heads the Hamburg Center for Health Economics at the University of Hamburg. His research currently focuses on the efficiency and quality of hospitals; as a health economist, he is also interested in general developments in the healthcare system. Jonas Schreyögg is a member of the Advisory Council on the Assessment of Developments in the Healthcare Sector. He is a co-director of the European COvid Survey (ECOS) on people's behavioural response to the COVID-19 pandemic in Europe.

www.hche.uni-hamburg.de/en/ueberuns/personen/wissleitung/jonas-schreyoegg

Prof. Dr. Britta Siegmund,
Berlin

Prof. Dr. Britta Siegmund is Director of the Medical Clinic for Gastroenterology, Infectiology and Rheumatology at Charité Universitätsmedizin Berlin. Her research focus is chronic inflammatory bowel diseases. Since 2019, she has been Vice-President of the DFG and Chair of the DFG Senate Commission on Key Questions in Clinical Research (SGKF).

https://gastro.charite.de/en/

Prof. Dr. Simone Sommer,
Ulm

Prof. Dr. Simone Sommer is Director of the Institute of Evolutionary Ecology and Conservation Genomics at the University of Ulm. She looks into the effects of anthropogenic environmental disturbances on the ecology, immunogenetics and health status of wild animals and the emergence and increase of zoonotic infections. Her research includes the interaction of coronavirus infections with the microbiome in bats.

www.uni-ulm.de/nawi/evolutionary-ecology-and-conservation-genomics/prof-dr-simone-sommer

Prof. Dr. Uwe Volkmann,
Frankfurt

Prof. Dr. Uwe Volkmann is Professor of Public Law and Philosophy of Law at the University of Frankfurt. His research focuses on constitutional theory, democratic theory and fundamental rights. In the context of the coronavirus crisis, his scientific interest is primarily focused on the questions of the proportionality of the infringements of liberty in connection with the fight against the pandemic, the constitutional containment of powers under infection control law and the safeguarding of parliamentary participation opportunities in crisis situations.

Press Release No. 22 | 10 June 2020

DFG Establishes Interdisciplinary Commission for Pandemic Research

New body to strengthen basic research and identify research needs / 18 members representing all disciplines led by President Katja Becker / First meeting on 15 June

Against the background of the current coronavirus pandemic, the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is to establish an interdisciplinary commission for pandemic research. The commission will be made up of 18 members representing all research disciplines, and its task will be to strengthen the knowledge-driven research which is essential to pandemic and epidemic research and which forms the basis for nearly all translational approaches. The decision to set up the commission was made by the Executive Committee of the DFG, Germany's largest research funding organisation and the central self-governing organisation of the country's research community.

„Nationally and internationally, a large number of research and networking activities have already been launched to improve our understanding and help us fight the coronavirus pandemic and its consequences. These have a primarily clinical or application-oriented focus. We believe an essential complement to this is a body that concentrates on basic research during this crisis, looking not only at the medical and epidemiological perspective but also the economic, ethical, legal, social, psychological and historical aspects. The new interdisciplinary commission for pandemic research is designed to fill this gap and help to coordinate high-quality research," said DFG President Professor Dr. Katja Becker, who will head the commission, after the decision was announced.

The new commission is to support DFG-funded projects investigating pandemics and epidemics, including both existing work and research projects initiated as the result of the cross-disciplinary call launched by the DFG at the end of March, for which funding proposals can be submitted up to 1 September 2020. The commission will also have the task of monitoring the overall basic research landscape in relation to pandemics and epidemics and identifying potential research needs, giving special attention to inter- and transdisciplinary cooperation and the strengthening of synergies.

As the DFG President emphasised, it is to operate on a purely science-driven basis with a long-term focus, and represent relevant activities of the DFG both within and outside the research community. In particular, this includes close cooperation with national and international institutions and partner organisations.
The 18 scientific members of the commission will be appointed for an initial two-year period. Additional experts may participate in or be invited to attend meetings of the commission to discuss special issues.

Following the Executive Committee's decision, the members of the commission are currently being selected, with the majority having already been appointed. The members confirmed so far are:

- Professor Dr. Frank Allgöwer, Director of the Institute for Systems Theory and Automatic Control at the University of Stuttgart and Vice President of the DFG
- Professor Dr. Christian Apfelbacher, Director of the Institute of Social Medicine and Health Systems Research at the Faculty of Medicine of University Hospital Magdeburg
- Professor Dr. Cordula Artelt, Director of the Leibniz Institute for Educational Trajectories and Professor of Longitudinal Educational Research at the University of Bamberg
- Professor Dr. Cornelia Betsch, Heisenberg Professor of Health Communication at the University of Erfurt
- Private lecturer Dr. Carsten Butsch, research assistant at the Institute of Geography at the University of Cologne and currently substitute professor for Human Geography at the Institute of Geography at Heidelberg University
- Professor Dr. Christian Drosten, Director of the Institute of Virology at Charité – Universitätsmedizin Berlin
- Professor Dr. Eva Grill, Professor of Epidemiology at the Institute for Medical Information Processing, Biometry, and Epidemiology at LMU Munich
- Professor Dr. Susanne Herold, Professor of Infectious Lung Diseases at the University of Giessen and Head of Department for Infectiology at University Hospital of Giessen and Marburg
- Professor Dr. Stefan Liebig, Professor of Sociology at the Free University of Berlin and Director of the Socio-Economic Panel (SOEP) at the German Institute for Economic Research (DIW Berlin)

- Professor Dr. Stephan Ludwig, Director of the Institute of Molecular Virology at the University of Münster
- Professor Dr. Michael Meyer-Hermann, head of the department of Systems Immunology at the Helmholtz Centre for Infection Research in Braunschweig
- Professor Dr. Jörn Müller-Quade, holder of the Chair of IT Security at the Institute of Theoretical Informatics at Karlsruhe Institute of Technology (KIT)
- Professor Dr. Carla Nau, Director of the Department of Anaesthesiology and Intensive Care at the Lübeck Campus of the University Medical Center Schleswig-Holstein
- Professor Dr. Jonas Schreyögg, holder of the Chair of Health Care Management at Universität Hamburg and Scientific Director of the Hamburg Center for Health Economics
- Professor Dr. Britta Siegmund, Director of the Division of Gastroenterology, Infectiology and Rheumatology at Charité – Universitätsmedizin Berlin, Vice President of the DFG and Chair of the DFG Senate Commission on Key Questions in Clinical Research
- Professor Dr. Simone Sommer, Director of the Institute of Evolutionary Ecology and Conservation Genomics at Ulm University
- Professor Dr. Uwe Volkmann, Professor of Public Law and Philosophy of Law at Goethe University Frankfurt

Links to activities

Commission for pandemic research

https://www.dfg.de/foerderung/corona_informationen/pandemie_kommission/index.html

DFG Funding Programmes

https://www.dfg.de/en/research_funding/index.html

International Activities

https://www.dfg.de/en/dfg_profile/international_cooperation/international_activities/index.html

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1

Diagnostic, assessment, management, therapy and rehabilitation

Project Start 01.04.2021

The role of ketogenesis in the immune response towards SARS-CoV-2

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr Christian Bode
Department of Anesthesia and Intensive Care Medicine, University of Bonn

Professor Christoph Wilhelm
University Hospital Bonn

Presentation Slot 10:45

(Kindly note, that the finale presentation slot might be changed. Please doublecheck the online agenda at the conference platform)

Presentation Room >> Link

Note – You need to login to the conference platform with your personal link before you are clicking the room link.

Anorexia and fasting are host adaptation to acute infection, inducing a metabolic switch towards ketogenesis and the production of ketone bodies, including β-hydroxybutyrate (βOHB). However, whether ketogenesis metabolically influences the immune response in pulmonary infections remains unclear. Here we report impaired production of βOHB in humans with SARS-CoV-2 but not influenza-induced acute respiratory distress syndrome (ARDS). βOHB promotes the survival and the production of Interferon-γ from $CD4^+$ T cells. Using metabolic flux analysis, we uncovered that βOHB provides an alternative carbon source to fuel mitochondrial oxidative phosphorylation and the production of bioenergetic amino acids. T cells from patients with SARS-CoV-2-induced ARDS were exhausted and skewed towards glycolysis but can be metabolically reprogrammed by βOHB to perform mitochondrial oxidative phosphorylation, thereby increasing their functionality. Finally, we find that pulmonary fibrosis, a feature particular pronounced in COVID-19 ARDS, is reduced by feeding mice a ketogenic diet. Altogether, our data suggest that impaired ketogenesis in patients with SARS-CoV-2 infection might account for disease progression and that ketogenic diet could improve the clinical outcome in COVID-19 patients if applied upon hospitalization.

Project Start 01.02.2021

Immune-mediated pathogenesis and development of autoimmunity in neurological manifestations of COVID-19

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr Christiana Franke
Department of Neurology, Hindenburgdamm 30, 12200 Berlin

Dr Clemens Warnke
University Hospital Cologne, Neurology

Presentation Slot 11:15

(Kindly note, that the finale presentation slot might be changed. Please doublecheck the online agenda at the conference platform)

Presentation Room >> Link

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CSF analysis in post-COVID-19 is not suggestive of persistent CNS infection

Finja Schweitzer, PhD[1*], Yasemin Goereci, MD[1*], Christiana Franke, MD[2], Steffi Silling, PhD[3], Fabian Bösl, MD[2], Franziska Maier, PhD[4], Eva Heger, PhD[3], Birgit Deiman, PhD[5], Harald Prüss, MD[2,6], Oezguer A. Onur, MD[1,7], Florian Klein, MD[3,8,9], Gereon Fink, MD[1,7], Veronica Di Cristanziano, MD[3**], Clemens Warnke, MD[1**]

Objective: To assess if SARS-CoV-2 causes a persistent central nervous system infection.

Methods: SARS-CoV-2 specific antibody index and SARS-CoV-2 RNA studied in cerebrospinal fluid following COVID-19.

Results: Cerebrospinal fluid was assessed between day 1-30 (n=12), between day 31-90 (n=8), or later than 90 days (post-COVID-19, n=20) of COVID-19 diagnosis. SARS-CoV-2 RNA was absent in all patients, and in none of the 20 patients with post-COVID-19 syndrome intrathecally produced anti-SARS-CoV-2 antibodies were detected.

Interpretation: The absence of evidence of SARS-CoV-2 in cerebrospinal fluid argues against a persistent central nervous system infection as a cause of neurological or neuropsychiatric post-COVID-19 syndrome.

Project Start 01.04.2021

Development and application of statistical models to evaluate potential treatment effects in observational COVID-19 studies

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Professor Dr Martin Wolkewitz
Institute of Medical Biometry and Statistics,
Division Methods in Clinical Epidemiology,
Faculty of Medicine and Medical Center -
University of Freiburg, Germany

Presentation Slot 11:30

(Kindly note, that the finale presentation slot might be changed. Please doublecheck the online agenda at the conference platform)

Presentation Room >> Link

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Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

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Systematic review

Methodological evaluation of bias in observational coronavirus disease 2019 studies on drug effectiveness

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Immortal time bias

ABSTRACT

Background and objective: Observational studies may provide valuable evidence on real-world causal effects of drug effectiveness in patients with coronavirus disease 2019 (COVID-19). As patients are usually observed from hospital admission to discharge and drug initiation starts during hospitalization, advanced statistical methods are needed to account for time-dependent drug exposure, confounding and competing events. Our objective is to evaluate the observational studies on the three common methodological pitfalls in time-to-event analyses: immortal time bias, confounding bias and competing risk bias.

Methods: We performed a systematic literature search on 23 October 2020, in the PubMed database to identify observational cohort studies that evaluated drug effectiveness in hospitalized patients with COVID-19. We included articles published in four journals: *British Medical Journal*, *New England Journal of Medicine*, *Journal of the American Medical Association* and *The Lancet* as well as their sub-journals.

Results: Overall, out of 255 articles screened, 11 observational cohort studies on treatment effectiveness with drug exposure–outcome associations were evaluated. All studies were susceptible to one or more types of bias in the primary study analysis. Eight studies had a time-dependent treatment. However, the hazard ratios were not adjusted for immortal time in the primary analysis. Even though confounders presented at baseline have been addressed in nine studies, time-varying confounding caused by time-varying treatment exposure and clinical variables was less recognized. Only one out of 11 studies addressed competing event bias by extending follow-up beyond patient discharge.

Conclusions: In the observational cohort studies on drug effectiveness for treatment of COVID-19 published in four high-impact journals, the methodological biases were concerningly common. Appropriate statistical tools are essential to avoid misleading conclusions and to obtain a better understanding of potential treatment effects. **Oksana Martinuka, Clin Microbiol Infect 2021;27:949**

Introduction

With a growing number of publications on potential therapeutic candidates for coronavirus disease 2019 (COVID-19) treatment, high-quality observational studies have added value to the assessment of drug benefit in the real-world health-care setting [1,2]. However, the observational study design has important limitations and poses several challenges in the data analysis, particularly regarding the time-dependent nature of the data [3]. Ignorance of methodological biases in observational studies with time-to-event analysis may lead to distorted results and false conclusions on the exposure–outcome associations [4,5]. The aim of this article is to review the observational studies on evaluation of drug effectiveness in individuals with COVID-19 with regard to the presence of three methodological biases referred to as immortal time bias, confounding and competing risk bias. This work also aims to give recommendations on avoiding these biases.

In contrast to randomized clinical trials, in observational cohort studies a drug of interest is often prescribed after initiation of a study, e.g. later during follow-up. Immortal time typically occurs when there is a delay or waiting period between cohort entry and the time of the first prescription, which is falsely accounted for as drug-exposed time. Hence, exposed participants must survive the

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https://doi.org/10.1016/j.cmi.2021.03.003
1198-743X/

initial time period to receive treatment if they are not assigned to the unexposed cohort [5,6]. Exclusion or misclassification of observation time often leads to immortal time bias and consequently to artificial overestimation or underestimation of drug effectiveness [6,7].

Control of both time-fixed and time-varying confounding is crucial because of the lack of randomization in observational real-world data [8]. In contrast to time-fixed confounding bias, time-varying confounding is commonly encountered in longitudinal observational studies [9–11]. In clinical epidemiology, treatment exposures are often time-varying and the values of potential confounders may change during the observational period, leading to time-varying confounding [12,13]. A lack of control of confounding may lead to biased estimates of treatment effects and causal misinterpretation [11,14].

Another issue that is often observed in observational studies with survival or time-to-event analysis is the competing risk bias. By definition, a competing risk is an event that modifies the chance of occurrence of the primary event of interest and can occur when a patient is at risk of more than one type of event [15].

Competing risk events are frequently observed in hospital epidemiology when the follow-up ends with hospital discharge. In turn, hospital discharge is a competing risk for the hospital death that is often the outcome of interest [7,16]. In survival analyses, the survivor function and the hazard function are the two most common methods for representation of survival data. In the presence of competing risks, the naïve Kaplan–Meier estimator takes the competing risks as censored observations. As a result the Kaplan–Meier analysis overestimates cumulative risks and produces upwards-biased estimates [16–18]. Furthermore, the causal treatment effects cannot be completely assessed if the measures of association are reported only for the event of interest [7,17,18]. The key recommendations to address all the three methodological biases are listed as summary points in Box 1.

BOX 1
Summary points

- Time zero, time of treatment initiation and end of follow-up should be clearly described in the research methods. To avoid immortal time bias, follow-up time and treatment status should be properly accounted by the design or statistical methods.
- To avoid competing risk bias, a competing risk analysis has to be performed to describe results on all cause-specific hazards and visualized using cumulative hazard functions. If there is no follow-up beyond hospital discharge, the discharge has to be handled as a 'competing event' in the statistical analysis.
- Immortal time bias, time-fixed confounding and competing risk bias can be addressed simultaneously by applying a cause-specific Cox regression for an event of interest and a competing event with the inclusion of treatment as a time-dependent covariate.
- If robust time-varying clinical data are available and applicable, time-varying confounding should be addressed using a marginal structural Cox model or other g-methods for causal inference.
- Data analysis should be performed in a stepwise manner, starting from simple straightforward methods to increased model complexity.

Methods

Study selection, inclusion and exclusion criteria

A literature search of observational studies on drug effectiveness in hospitalized patients with COVID-19 was performed in four journals: *the British Medical Journal (The BMJ)*, *the New England Journal of Medicine (NEJM)*, *the Journal of the American Medical Association (JAMA)*, and *The Lancet*. Also, their subjournals were selected. These journals were chosen because they are the leading and most cited medical journals with high impact factors. This review required original retrospective observational cohort studies with primary data including time-to-event data analysis. As a result, comments, correspondence, opinions, researcher letters and audio interviews were excluded. The inclusion criteria were hospitalized patients diagnosed with COVID-19. Both single-centre and multicentre studies were included. The literature search included studies that investigated drug effectiveness alone or in combination with standard therapy. Studies that focused on drug preventive rather than therapeutic effects were excluded. Articles that investigated the adverse effects of drug therapy only were not included either. The selection included studies with a comparative control group in which patients either received standard therapy or no treatment. Studies with different time-dependent clinical outcomes, such as in-hospital mortality, overall survival and survival without transfer to the intensive care unit (ICU), were selected for our review. Finally, the study selection was limited to articles published between the start of the pandemic in December 2019 and 23 October 2020. The selection procedure of our literature search is shown in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (Fig. 1).

Data sources and search strategy

The systematic literature review was performed in the PubMed database on 23 October 2020. The review was conducted according to the PRISMA guidelines for reporting systematic reviews [19]. The list of keywords and detailed search strategy are described in the Supplementary material (Tables S1 and S2).

Methodological bias assessment

The assessment of biases was performed independently by all three authors. Each observational study was reviewed in-depth to determine the possible presence of immortal time bias, confounding bias and competing risk bias by screening the Methods as well as the Results section. The design, methods and statistical techniques were evaluated. Studies were considered to be susceptible to the immortal time bias if the time period before treatment allocation was not addressed in the analysis and, as a result, time-dependent drug exposure was statistically handled as a time-fixed exposure. The susceptibility to both time-fixed and time-varying confounding biases was evaluated. The occurrence of time-fixed confounding biases was determined if baseline covariates were not adjusted. However, the evaluation of correctness, adequacy and effectiveness of the applied adjustment methods and the degree of residual confounding were outside the scope of this review. The time-varying confounders were evaluated by examining the presence of time-dependent treatment and time-varying covariates. Studies were considered vulnerable to time-varying confounding bias if sophisticated statistical methods for controlling of time-dependent confounders were not applied. Studies were considered as being susceptible to competing risk bias if follow-up of patients was ensured only until discharge and

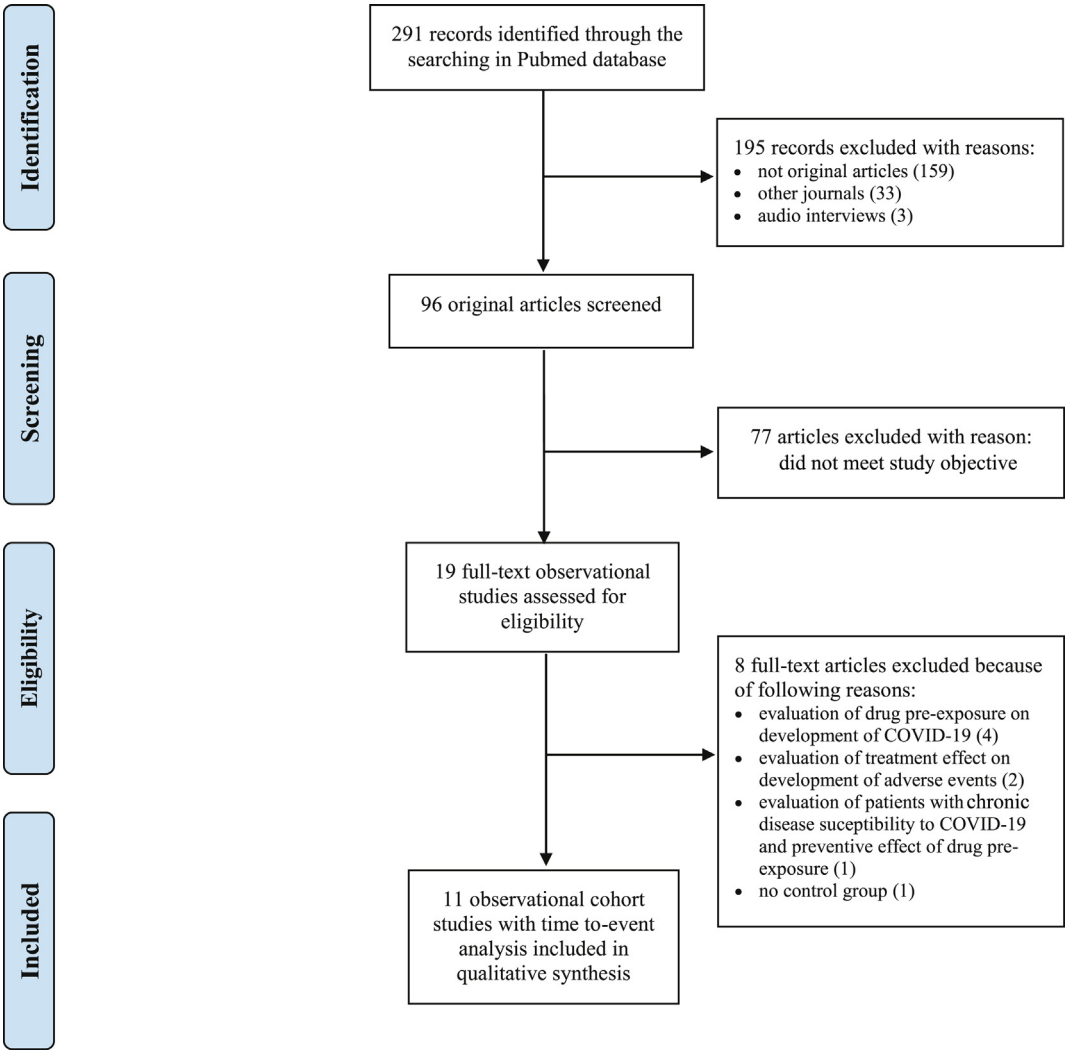

Fig. 1. Flow diagram of the identified studies in the systematic literature review.

individuals who were discharged alive were censored at the time of discharge for quantifying the probability of experiencing the event of interest. To identify whether the biases were addressed, the study methodology (i.e. study design and applied analytical methods) and results were evaluated. In addition, the supplementary materials of the included articles were checked.

Results

Out of 255 articles screened, 11 observational cohort studies on the drug effectiveness for COVID-19 treatment in hospitalized patients were included; six articles from *The Lancet* and its sub-journals, three articles from *the Journal of the American Medical Association* and its sub-journals as well as one from *the British Medical Journal* and one from *the New England Journal of Medicine* (Table 1) [20–30]. These observational studies investigated the effectiveness of drugs such as anakinra, azithromycin, chloroquine or hydroxychloroquine, methylprednisolone and tocilizumab. These drugs were administered alone or in combination with standard therapy. All of these studies were susceptible to at least one of the three discussed types of bias (Fig. 2). The results and examples of the identified biases are given in the following sections.

Occurrence of immortal time bias

Overall, eight studies were susceptible to immortal time bias [20–25,27,29]; in the three remaining studies, the start of the follow-up and/or the start of treatment exposure administration were not clearly defined [26,28,30]. In two of these studies, treatment was artificially converted into a time-fixed exposure by using different time scales for the treated and untreated cohorts, i.e. for the untreated group the start of follow-up was at time zero whereas for the exposed cohort the start of follow-up was set at the time of treatment [21,25]. As a result, artificial conversion of the time scale made the evaluation of the treatment impossible because of starting events before follow-up. It is likely that the three studies with unclear start of treatment administration are also susceptible to immortal time bias (Table 1) [26,28,30].

To account for immortal time bias, four studies performed sensitivity analyses and included the results in the secondary analyses or in the supplementary materials [22,24,27,29]. To address the immortal time bias, methods such as the landmark analysis [22], the target trial emulation analysis [24,27] and the time-dependent Cox regression analysis [29] were performed (Table 1). For instance, Rosenberg et al. accounted for delayed

Table 1
Characteristics of included studies and their features of immortal time bias

First author [reference]	Journal title abbreviation	Study baseline (time zero)	Start of treatment exposure	Susceptibility to immortal time bias	Accounted for bias		Methods addressed immortal time bias
					Primary analysis	Secondary analysis	
Biran [20]	*Lancet Rheumatol*	admission to ICU	early in ICU	yes	no	no	not reported
Cavalli [21]	*Lancet Rheumatol*	admission to hospital	day zero (different time scales for treated and untreated patients)	yes [a]	no	no	not reported
Geleris [22]	*N Engl J Med*	24 hours after admission to hospital	within 48 hours or during follow-up period	yes	no	yes	landmark analysis
Guaraldi [23]	*Lancet Rheumatol*	admission to tertiary hospital	at time of hospital admission up to 24 hours	yes	no	no	not reported
Gupta [24]	*JAMA Intern Med*	admission to hospital	within 2 days of ICU admission	yes	no	yes	nested target trial emulation analysis
Huet [25]	*Lancet Rheumatol*	admission to hospital	day zero (different time scales for treated and untreated patients)	yes [a]	no	no	not reported
Kuderer [26]	*Lancet*	start of follow-up not clearly defined	start of treatment not clearly defined	start of follow-up, start of treatment is not clearly defined	n/a	n/a	not reported
Mahévas [27]	*BMJ*	admission to hospital	within 48 hours, more than 48 hours or during follow-up	yes	no	yes	target trial emulation analysis (mimicking an ITT and an as-treated)
Mehra [28]	*Lancet*	start of follow-up not clearly defined	within 48 hours after diagnosis established	start of follow-up is not clearly defined	n/a	n/a	not reported
Rosenberg [29]	*JAMA*	admission to hospital	at any time during hospitalization	yes	no	yes	sensitivity analysis with time-dependent treatment status
Wu [30]	*JAMA Intern Med*	admission to hospital	start of treatment not clearly defined	start of treatment is not clearly defined	n/a	n/a	not reported

Abbreviations: ICU, intensive care unit; ITT, intention-to-treat analysis; n/a, not available.
Journal title abbreviations: BMJ, *the British Medical Journal*; JAMA, *the Journal of the American Medical Association*; JAMA Intern Med, *the Journal of the American Medical Association Internal Medicine;* N Engl J Med, *the New England Journal of Medicine*; Lancet, *The Lancet*; Lancet Rheumatol, *The Lancet Rheumatology*.
[a] Treatment was artificially converted to a time-fixed exposure.

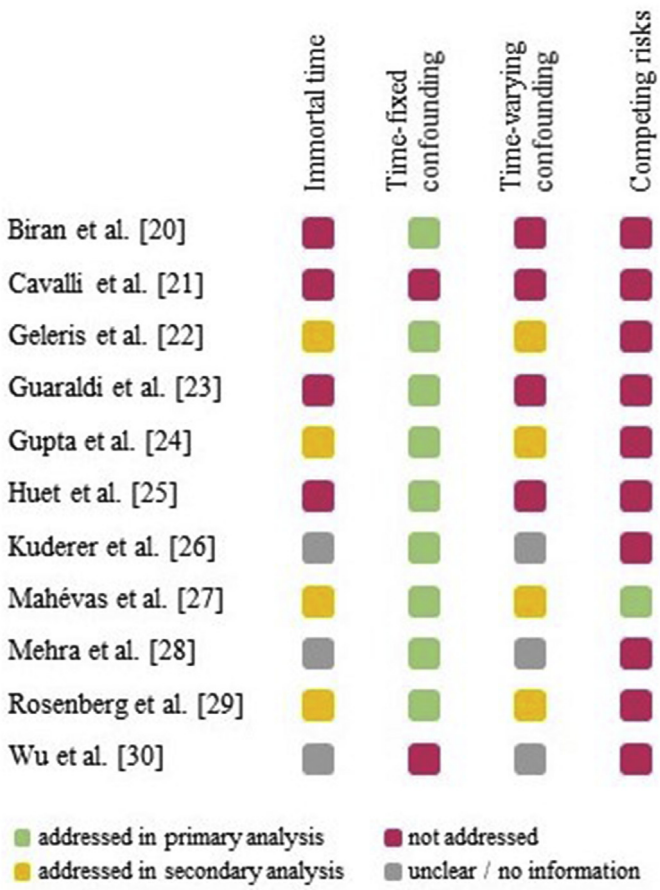

Fig. 2. The summary of biases for the included studies.

treatment start by using the time-dependent Cox proportional hazards model in their sensitivity analysis. The resulting hazard ratio for in-hospital mortality corrected for the immortal time bias increased in all treatment groups. In particular, for the group treated with hydroxychloroquine in combination with azithromycin it increased from 1.35 (95% CI 0.76–2.40) to 1.83 (95% CI 1.02–3.28) and for hydroxychloroquine alone from 1.08 (95% CI 0.63–1.85) to 1.46 (95% CI 0.84–2.55), respectively [29].

Occurrence of confounding bias

Out of the 11 studies susceptible to confounding, nine studies used methods to account for the time-fixed confounding bias [20,22–29]; the two remaining studies showed results from the crude (unadjusted) analysis only [21,30]. The most frequently used methods to control for time-fixed confounding were adjustment in a regression model or stratification. Seven studies applied the propensity score weighting methods for confounding adjustment (Table 2).

In contrast to the time-fixed confounding bias, the time-varying confounding bias was less recognized. In eight studies where the exposure was time-varying (see *Immortal time bias* section), we presume that treatment initiation was caused by evolving clinical characteristics of the patient, which led to time-varying confounding (Table 2) [20–25,27,29]. In these studies, treatment exposure was analysed as a baseline covariate and, as a result, time-varying confounding was not addressed. For instance, covariates such as blood cell count as well as biochemical, coagulation and inflammatory parameters were more likely routinely collected and influenced the subsequent decisions on drug administration and on the outcome.

The time-varying confounding was controlled and secondary results were presented by four studies. For example, in the study conducted by Geleris et al. the landmarking analysis was based on the value of time-varying exposure at the landmark point (24 and 48 hours), after which the time-varying exposure may change value [22]. In the studies conducted by Gupta et al. and Mahévas et al. an observational target trial emulation methodology was used and appropriate adjustment methods, like inverse probability weighting, were applied [24,27]. In the study conducted by Rosenberg et al. a time-dependent Cox model that accounted for time-dependent treatment was used [29].

Occurrence of competing risk bias

Several time-to-event primary outcomes were investigated in the studies, such as development of acute respiratory distress syndrome, admission to ICU, administration of invasive mechanical ventilation, in-hospital death or 30-day in-hospital mortality, survival without transfer to ICU and overall survival. These end points were studied as a single event, or as a composite end point of several events (Table 3).

All in all, ten out of the eleven studies seemed to be susceptible to competing risk bias because a follow-up ended with hospital discharge and discharged patients were censored in probability analyses [20–26,28–30]. In nine out of the ten studies, the classical Kaplan–Meier method was applied to display the treatment effect and to compare survival probabilities between the treatment and control groups [20–25,27,29,30]. In one study, performed by Mahévas et al., the competing event of discharge alive for the primary outcome (survival without transfer to ICU) was addressed by the extension of follow-up for discharged patients, and the corrected Kaplan–Meier curves were presented in the supplementary material [27].

All of the studies used a regression model (logistic regression and/or the Cox proportional hazard regression model) to quantify the treatment effect for the primary event of interest. The Cox proportional hazards model provides a correct estimate of the treatment effect on the event of interest. Nonetheless, the regression analysis is incomplete if the hazard ratio for the competing event is not reported. Only in one sensitivity analysis, conducted by Gupta et al., discharge was addressed by keeping discharged patients in the risk set and not treating them as randomly censored. As a result, the adjusted hazard ratio of the event of interest shifted from 0.71 (95% CI 0.56–0.92) to 0.72 (95% CI 0.56–0.93). Keeping discharged patients in the risk set is targeted at estimating a subdistribution hazard [31]. We remark that this approach is not appropriate if the treatment is time-dependent [24].

Discussion

Since the number of studies on COVID-19 treatment effectiveness and the speed of publishing new data in journals has drastically increased [32], unbiased results from observational studies are extremely important as a complement to randomized controlled trials. The methodological challenges in studying observational COVID-19 data and performing statistical analysis on drug effectiveness has been described in detail elsewhere [33,34]. However, our review has demonstrated that methodological issues such as

immortal time bias, confounding bias and competing risk bias are commonly found in articles published in high-impact medical journals.

To our knowledge, for treatment effectiveness assessment, the best practice is to perform analysis in a stepwise manner, starting from simple straightforward methods to increased model complexity. To ensure a complex approach and enhance confidence, the results from simple and extended models should be presented side by side [35]. This approach can be used to address time-to-treatment, confounders, and competing risks issues. For details on the proper statistical techniques and analysis of time-to-event data in observational studies, we highly recommend the guidance of Kragh Andersen et al. [36].

As the primary step, a complete competing risk analysis should be presented that includes a cause-specific Cox regression analysis for the event of interest and for all competing events [7,33,36,37]. An initial model should include baseline covariates, further, time-fixed confounders need to be adjusted. This analysis provides insights into the effect of treatment and covariates on each event type separately [38]. To account for non-randomized treatment administration and reduce the effects of confounding, the model can be extended using more complex procedures, such as propensity score-based methods. Further, to estimate the causal treatment effect, more sophisticated analysis for time-varying confounders, such as g-methods (i.e. the inverse probability of treatment weighted marginal structural models, g-computation formula and g-estimation of structural nested models) must be applied [8,10]. For instance, in the excellent study by Ursino et al., the g-computation approach was applied to evaluate the potential treatment effect of corticosteroids and interleukin antagonists like tocilizumab and anakinra [39]. In addition, we refer to the textbook of Hernán et al. for the detailed tutorial on causal inference and g-methods [40].

In the presence of competing risks, we discourage the use of Kaplan–Meier plots for effect visualization because of the high risk of potentially misleading conclusions. Instead, cumulative cause-specific hazards can be calculated and should be plotted for the events of interest and for the competing events [41]. This method allows us to account for competing events and to display treatment exposure differences [16]. More generally, the multistate methodology offers several advantages for survival data analysis with multiple outcomes. A multistate model allows us to evaluate the

Table 2
Characteristics of included studies and their features of time-fixed and time-varying confounding bias

First author [reference]	Type of exposure	Susceptibility to time-fixed/ time-varying confounders	Accounted for time-fixed confounding bias	Accounted for time-varying confounding bias		Methods controlling for confounding bias	
				Primary analysis	Secondary analysis	Time-fixed	Time-varying
Biran [20]	time-dependent exposure	yes/yes	yes	no	no	semiparametric multivariate methods: regression models, PS matched analysis and PS covariate adjustment	not reported
Cavalli [21]	time-fixed exposure at day zero	yes/no	no	no	no	n/a	not reported
Geleris [22]	time-dependent exposure	yes/yes	yes	no	yes	stratification; semiparametric multivariate methods: regression models, PS matched analysis and PS covariate adjustment, IPW	landmark approach
Guaraldi [23]	time-dependent exposure	yes/yes	yes	no	no	stratification; semiparametric multivariate methods: regression models	not reported
Gupta [24]	time-dependent exposure	yes/yes	yes	no	yes	semiparametric multivariate methods: regression models and IPW	by conducting the nested target trial emulation approach and using IPW
Huet [25]	time-fixed exposure at day zero	yes/no	yes	no	no	semiparametric multivariate methods: regression model	not reported
Kuderer [26]	unclear defined	yes/unclear	yes	unclear	n/a	semiparametric multivariate methods: regression models	not reported
Mahévas [27]	time-dependent exposure	yes/yes	yes	no	yes	standardization; semiparametric multivariate methods: regression models, PS and IPTW	by conducting the target trial emulation approach and using IPTW
Mehra [28]	unclear defined	yes/unclear	yes	unclear	n/a	semiparametric multivariate methods: regression models, PS matched analysis	not reported
Rosenberg [29]	time-dependent exposure	yes/yes	yes	no	yes	by design: hospital-stratified random sampling; at analysis stage: semiparametric multivariate methods: regression models	time-dependent Cox regression
Wu [30]	unclear defined	yes/unclear	no	unclear	n/a	n/a	not reported

Abbreviations: IPW, inverse probability weighting; IPTW, inverse probability of treatment weighting; PS, propensity score.

Table 3
Characteristics of included studies and their features of competing risk events

First author [reference]	Primary end point/outcome	Competing event	Competing risk analysis		Cause-specific regression analysis for competing event	Graphical representation of survival curves
			In primary analysis	In secondary analysis		
Biran [20]	in-hospital mortality	discharge alive	no	no	no	event-free survival probabilities; i.e. KM plot [a] for overall survival
Cavalli [21]	overall survival (at day 21), MV-free survival	discharge alive, discharge without need for MV	no	no	no	event-free survival probability; i.e. KM plots for overall survival and MV free survival
Geleris [22]	intubation or death without intubation as a composite endpoint	discharge alive without need for intubation	no	no	no	event-free survival probability; i.e. KM plot
Guaraldi [23]	composite of IMV or death, in-hospital death	discharge alive without need for IMV	no	no	no	cumulative incidence probabilities for MV or death, and death alone; i.e. 1−KM
Gupta [24]	in-hospital death (30-day mortality)	discharge alive	no	yes [b]	no [b]	cumulative incidence probabilities for mortality; i.e. 1−KM
Huet [25]	admission to ICU for IMV or death as a composite endpoint	discharge alive before ICU or without need for IMV	no	no	no	event-free survival probabilities; i.e. KM plots for event-free of IMV, death, and IMV or death
Kuderer [26]	30-day all-cause mortality	discharge alive	no	no	no	forest plot for 30-day all-cause mortality
Mahévas [27]	survival without transfer to ICU (at day 21)	no competing event	not necessary, CR is addressed by extended follow-up		no competing risk bias	event-free survival probability; i.e. KM plot for survival without ICU admission
Mehra [28]	in-hospital mortality	discharge alive	no	no	no	forest plot for in-hospital mortality
Rosenberg [29]	in-hospital mortality	discharge alive	no	no	no	cumulative incidence probabilities for in-hospital mortality; i.e. 1−KM
Wu [30]	development of ARDS and death among those with ARDS	discharge alive among those with ARDS	no	no	no	event-free survival probability; i.e. KM plots for overall survival

Abbreviations: ARDS, acute respiratory distress syndrome; CR, competing risk; ICU, intensive care unit; IMV, invasive mechanical ventilation; MV, mechanical ventilation; KM, Kaplan−Meier.
[a] The KM curves provided for the secondary end point (overall survival).
[b] Discharge was addressed by keeping discharged patients in the risk set and not treating them as randomly censored. Keeping discharged patients in the risk set targets at estimating a sub-distribution hazard. This approach is not appropriate if the treatment is time-dependent.

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time dynamics of disease progression by describing the occurrence of the events as transitions between different states [42]. This also makes it possible to visualize primary outcomes of interest and competing events simultaneously over a time period in a single plot [43].

The article by Lapadula et al. presents an appropriate analysis on antiviral treatment assessment in patients with COVID-19 [44]. In their study, the landmark analysis was applied to estimate survival rates conditional on a landmark time (7 days after intubation) to adjust for immortal time bias. The exposure was modelled to each treatment (remdesivir, hydroxychloroquine and lopinavir/ritonavir) as time-dependent covariates. The competing risk bias was addressed by estimation of two cause-specific hazard functions: for the event of interest such as in-patient hospital death and for the competing event such as discharge, respectively. As a result, the competing risk analysis showed that remdesivir was significantly associated with hospital discharge (hazard ratio 2.25; 95% CI 1.27–3.97) and with a non-significantly lower mortality (hazard ratio 0.73; 95% CI 0.26–2.1). Moreover, the cumulative hazard plots were used to visualize potential treatment effects [44]. This example addresses all three methodological biases and clearly demonstrates the need to study competing events.

With our study, we assessed the presence of methodological biases and provided recommendations. Several study limitations are noteworthy, such as the inclusion of only four journals and their sub-journals. As a result, we cannot extend the results obtained to other journals. Another limitation is that an incomplete or unclear description of the study methodology or/and results in the investigated publications could have resulted in incorrect interpretation of the analyses.

Conclusions

Immortal time bias, confounding bias and competing risk bias alone or in combination were present in all of the 11 reviewed observational studies on treatment effectiveness evaluation for hospitalized patients with COVID-19. These biases may have led to a severe overestimation or underestimation of COVID-19 treatment effectiveness estimates. As a result, the drugs may appear to be either more effective or conversely to have little to no effect. In fact, making valid causal inferences from real-world observational data is a demanding task that requires high-quality data and adequate statistical methods as well as clinical knowledge and statistical expertise.

Even though every study has its unique features, which should be addressed in a tailor-made analysis, the summary points (Box 1) and the following recommendations could be taken into account to prevent or decrease the occurrence and the severity of the methodological biases. To overcome immortal time bias, time-dependent treatment exposures should be included in the Cox regression model as a time-dependent variable [45]. In the presence of time-varying confounders, a marginal structural Cox model can be used and estimated using inverse probability of treatment weights [8]. In the competing risks setting, the cause-specific hazard ratios could also be obtained from the time-dependent Cox regression model. Furthermore, treatment effects should be visualized with cumulative hazard functions for the event of interest and all competing events [37,46]. Finally, corrected estimates should be reported as primary findings in the primary results section.

Transparency declaration

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cmi.2021.03.003.

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Project Start 01.05.2021

Infection of intestinal cells by SARS-CoV2 and its effects on intestinal function

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Professor Dr Hassan Y. Naim
University of Veterinary Medicine Hannover,
Department of Biochemistry

Presentation Slot 11:45

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Hassan Y. Naim, Hannover

Infection of intestinal cells by SARS-CoV2 and its effects on intestinal function

Abstract

CoVid-19 is characterized by infection of the airways by SARS-CoV-2. Apart from the respiratory tract, other organs are also involved, e.g. the intestinal tract. The importance of the intestinal infection is increasingly recognized. In a large proportion of pediatric patients, virus was detected in rectal swabs and virus shedding from the intestine was found even when oral swabs had become negative. Therefore, prolonged virus shedding and fecal-oral transmission have to be considered. This notion is supported by detection of the virus in wastewater.

The aim of this short project is to apply intestinal cell cultures to characterize the infection of differentiated intestinal epithelial cells by SARS-CoV-2 and thereafter intestinal orgranoids.

This in vitro infection approach will target the following aims:

1. Characterization of the replication efficiency of SARS-CoV-2 (virus yield, virus exit, virus entry, apical, basolateral).
2. Localization of the cellular receptor(s) in human intestinal Caco-2 cells
3. Investigation of the trafficking of the cellular receptor(s), determination and subsequent modulation of their mode of interaction with membrane microdomains (lipid rafts, LRs)
4. Effects of glycosylation modulators on the spike glycoprotein and its interaction with intestinal cells
5. Implication of virus infection on the trafficking and function of crucial enzymes of the intestinal physiology (APN, SI, LPH, DPP4).

This project will provide substantial information on the replication of SARS-CoV-2 in intestinal epithelial cells, evaluate its effects on the intestinal function and provide solid hypotheses on the molecular and biochemical basis for the symptoms elicited by SARS-CoV-2 infections. These hypotheses can be then examined at a later stage in intestinal organoids. Further, unravelling the biosynthetic pathway, glycosylation pattern and mode of interaction of the SARS-CoV-2 receptors and its modulation could constitute exquisite targets for potential therapy.

Project Start 01.04.2021

meCocan - Towards a mechanistic understanding of the interaction of SARS-CoV-2 spike glycoprotein and host heparan sulphate proteoglycans

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

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Professor Dr Rebecca Wade
HITS and Heidelberg University

Presentation Slot 12:00

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meCocan - Towards a mechanistic understanding of the interaction of SARS-CoV-2 spike glycoprotein and host heparan sulphate proteoglycans

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Abstract

Heparan sulphate proteoglycans (HSPGs) are host cell co-receptors on the surfaces of human cells that consist of a core protein with long linear polysaccharide chains covalently linked [1]. Experimental data indicate that HSPGs are indispensable for SARS-CoV-2 infection and, by binding the viral spike glycoprotein (spike), increase the SARS-CoV-2 concentration on the host cell surface and facilitate its interaction with the host cell angiotensin-converting enzyme 2 (ACE2) receptor [2,3]. Heparin, a linear anionic polysaccharide chain administered intravenously to COVID-19 patients [4] and via aerosol for the treatment of other lung diseases [5], acts as an antiviral agent against SARS-CoV-2 trapping the spike and preventing its interaction with the HSPGs.

In the meCocan project, we aim to investigate the mechanisms by which HSPGs interact with SARS-CoV-2 spike facilitating host cell infection and affecting host susceptibility, as well as the antiviral effect of heparin, using the molecular dynamics (MD) simulations as a "computational microscope" that allows a real-time visualization at an atomistic level of the interaction mechanism. For this purpose, due to the structural similarity between heparin and the linear chains of the host cell co-receptors, heparin is also used as model for both. Thus, we modelled the prefusion configuration of the homotrimeric spike in active (open) and inactive (closed) states in the presence of zero, one or three linear polyanionic chains of heparin. Further models of spike in open conformation with heparin and ACE2 were prepared. More than 20 microseconds simulations and several replicas of each system were performed.

Our models reveal long basic groove patches, spanning from the S1/S2 multibasic site to the basic residues of the receptor binding domain on both closed and open spike head, that can accommodate linear anionic polysaccharide chains. Some N-glycans of the spike are also involved in these interactions. We identify direct and allosteric mechanisms by which heparin and HSPGs can affect the spike-host cell interaction. Our results provide a basis for understanding the role of HSPGs in SARS- CoV-2 pathogenesis and for the rational optimization of heparin derivatives for new antiviral therapies.

References

[1] Xu D, et al. *Annu. Rev. Bioch.* **83**, 129-157 (2014).
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[3] Kim SY, et al. *Antiviral Res.* **181**, 104873 (2020)
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Project Start 01.11.2021

Deposition of inhaled aerosols: a biological-fluid mechanical analysis of the deposition of particles in a respiratory model to assess the propagation of inhaled agents and the efficiency and toxicity of active substances in human airways using allicin as reference substance

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr Martin Gruhlke
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Dr Michael Klaas
Institute of Aerodynamics, RWTH Aachen University

Presentation Slot 14:00

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The severe respiratory disease COVID-19 is caused by the corona virus SARS-CoV-2. The primary transmission route is through aerosol inhalation, i.e., airborne droplet infection, either through direct contact with infected patients or indirectly via aerosols, e.g., in contaminated rooms. Also, life-threatening respiratory diseases that are caused by bacteria, e.g., pneumonia and tuberculosis, are transmitted via inhalation of infected droplets. To better understand the progression of these diseases from infection through symptom onset to hospitalization, it is a must to analyze the particle deposition of the virus- and bacteria-containing aerosols in the human airways in detail.

An effective treatment of these respiratory diseases requires new approaches in the form of new classes of pharmaceutical active agents as well as new application strategies. Respiratory diseases provide the opportunity to apply the drugs via the inhalation of aerosols. New active substances, however, must be tested for their toxicity and efficiency in preclinical studies. In this context, the deposition of the aerosols of active agents in the respiratory tract is of particular importance.

The scope of this study is to develop, evaluate and establish a fully three-dimensional, generic model of the human respiratory tract that allows to analyze the deposition of virus- and drug-containing aerosols in the human respiratory system under realistic in vitro conditions and to assess the toxicity and efficiency of drug-containing aerosols in a non-animal alternative test system using a combined approach of biology and experimental fluid mechanics.

Project Start 15.07.2021

Determination of the UV radiation dose of an aerosol using UV-sensitive dyes to optimize UV room air filters

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Professor Dr Frank Einar Kruis
University Duisburg-Essen

Presentation Slot 14:15

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Determination of the UV radiation dose of an aerosol using UV-sensitive dyes to optimize UV room air filters

Qingqing Fu, Frank Einar Kruis

Institute of Technology for Nanostructures (NST) and Center for Nano Integration Duisburg-Essen (CENIDE), Faculty of Engineering, University of Duisburg-Essen, Bismarckstr. 81, 47057 Duisburg, Germany

Applying ultraviolet (UV) radiation is a well-known method to disinfect air, liquids, and surfaces. It kills or inactivates microorganisms and viruses, by damaging their genome and preventing effective replication [Reed 2010]. Air disinfection via ventilation systems is attractive because it can directly reduce airborne viral transmission of respiratory diseases, such as the Influenza Pandemic. In UV disinfection and sterilization, the irradiation dose, which is the product of intensity (W/m^2) and exposure duration (s), plays a crucial role in evaluating virus reduction efficiency. It has been reported that 4 mJ/cm^2 inactivates 90% of viruses and 1 J/cm^2 kills 99.9% of the present viruses [Heßling 2020]. However, it is unclear whether these results also apply to viral aerosols. Moreover, since UV intensity is also a function of penetration depth in the liquid [Putt 2012], droplet size and residence time in the irradiated zone play an important role.

UV-sensitive dyes have already been known and tested as quantitative model systems to determine UV dose. The aim of our studies is to determine the UV radiation dose of an aerosol by analyzing the changes in color intensity of UV-sensitive dyes. We aim to answer the question: whether the color intensity of UV-sensitive dyes still decreases with increasing UV dose, when aerosol droplets containing UV dyes are exposed to UV radiation. This would allow to verify the effectiveness of UV-based air purifiers, by comparing the decrease in color intensity of the UV-sensitive dye to a known correlation between UV dose and virus inactivation.

In the present study, we use a commercial aerosol generator to produce aerosol droplets from UV sensitive dye solutions. In a first step, we select DEHS (Diethylhexylsebacat) as the carrier liquid to generate droplet aerosols due to its long lifetime of droplets. A suitable combination of DEHS liquid and UV-sensitive dyes is to be determined. The size distribution of generated aerosol droplets with/without UV dyes is investigated by online aerosol measurements, including SMPS, ELPI, APS, and TEOM.

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Project Start 02.09.2021

Privacy-preserving Contact Context Estimation

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr Nadja Käding
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Presentation Slot 14:30

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CoContext: Privacy-Preserving Contact Context Estimation

The inherent tension between quickly understanding the most common infection chains during a pandemic on one side and protecting the citizen's privacy on the other side has been starkly highlighted during the COVID-19 pandemic. The lack of a detailed understanding of common infection chains led to large scale lockdowns in many parts of the world.

Utilizing mass surveillance technologies for understanding infection chains might be effective but clearly violates the citizen's privacy. Recent work on decentralized technologies, such as the DP-3T protocol (the basis of the Corona Warn App), provides basic support in understanding infection chains while protecting the citizen's privacy. Yet, DP-3T does not provide any information in which surroundings and contexts critical contacts happen in general, which can inform regulators and epidemiologists in carefully deciding on epidemiological measures.

With a priority on privacy-preservation, we plan to research methods for estimating in which surrounding a critical contact has occurred (the contact context) while preserving the privacy (guaranteeing so-called Differential Privacy) of any involved parties. In an initial study shows that the Corona Warn App can be combined with acoustic scene classification techniques to assess the contact context in a smartphone in a practical manner. We plan to utilize user-feedback to locally improve the acoustic scene classifier on the smartphones. We will research privacy-preserving scalable distributed and federated learning methods to securely merge these local improvements (in a so-called secure multi-party computation).

Beyond the contact context, the critically of a contact is also influenced by whether a mask was worn during the contact and whether the contacted person was coughing or not. As audio data on speech with and without mask and coughing is limited or of low-quality, we will first conduct a clinical study that will use several common smartphones to record coughing sounds of patients in a controlled environment, annotated with each patient's diagnosis. Second, we will conduct a clinical study to record speech with and without a mask. We will validate the quality of publicly available data sets, and, using data from patients that give their consent, we will assemble publishable data sets to facilitate future research. Such data sets might be of interest beyond the COVID-19 pandemic, e.g., to predict the burden of seasonal respiratory infections before patients are diagnosed by physicians.

Project Start 01.10.2021

Functional analysis of interactions of the SARS-CoV-2 genome with microRNAs and virus inhibition by circular RNAs as a novel therapeutic concept

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr Oliver Rossbach
Institute of Biochemistry, University of Giessen

Presentation Slot 15:00

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Functional analysis of interactions of the SARS-CoV-2 genome with microRNAs and virus inhibition by circular RNAs as a novel therapeutic concept

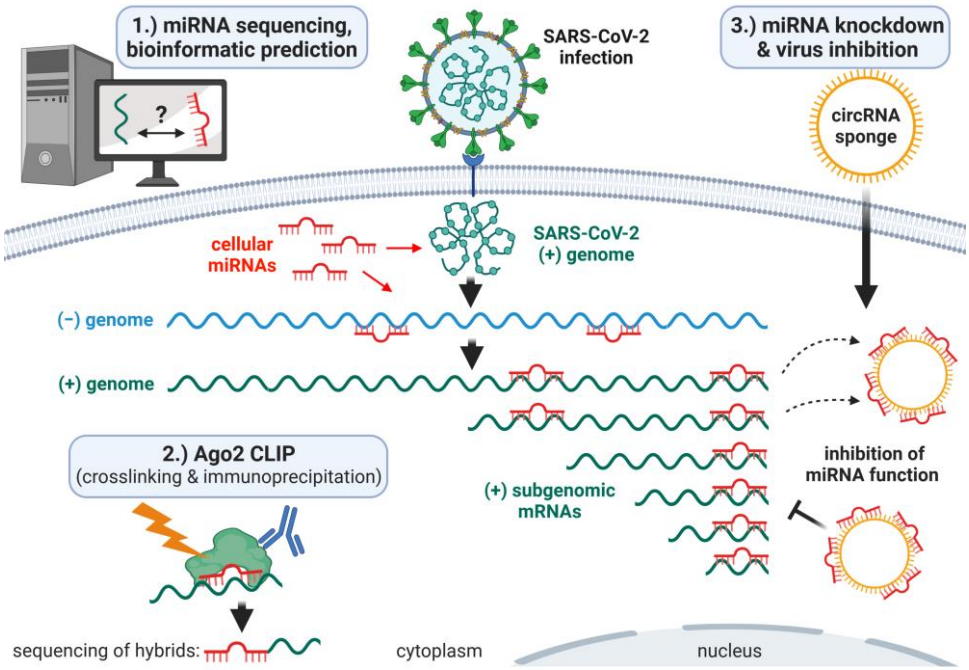
Oliver Rossbach, Institute of Biochemistry, Faculty of Biology and Chemistry, University of Giessen

Keywords: SARS-CoV-2; microRNAs; circRNAs; iCLIP; RNA-Therapeutics

The molecular biology of the coronavirus SARS-CoV-2, the causative agent of the COVID-19 pandemic, still raises many questions. The cell surface receptors for virus entry are known, but a variety of intracellular conditions and factors has to be present for the virus to replicate efficiently and to produce a sufficiently high viral load to infect other cells, tissues or individuals. This explains why SARS-CoV-2 does not replicate in many tissues despite a suitable receptor set.

In this research project we plan to elucidate one of the mechanisms that contributes to tropism of SARS-CoV-2 and thereby unravel why it productively infects only certain cell types. We will investigate the interactions of the viral RNAs with microRNAs (miRNAs), and use this information to disrupt interactions essential for the virus in order to inhibit replication as basis for a novel therapeutic approach. MiRNAs are small cellular RNAs that naturally regulate the expression of proteins through binding to the corresponding mRNA. For other RNA viruses such as the Hepatitis C Virus (HCV) it was demonstrated that certain miRNAs are hijacked during viral infection. A direct interaction with the viral RNA is essential for HCV replication. SARS-CoV-2 is also a positive-strand RNA virus and its genome replicates in the cytoplasm and expresses a number of viral proteins. The presence of certain miRNAs is probably responsible for the fact that these processes can function efficiently.

To identify such miRNA-virus interactions, we will first determine the miRNA composition of certain cell types in which SARS-CoV-2 replicates efficiently by small RNA sequencing. Using this data set, we will then apply bioinformatic analyses to predict potential binding sites of abundant miRNAs on the SARS-CoV-2 genome. In parallel, the CLIP technology (crosslinking and immunoprecipitation) is used to experimentally determine miRNA/SARS-CoV-2 interactions. With CLIP, a certain protein is purified and all bound RNAs are identified by RNA-seq. In this case, CLIP will be performed in SARS-CoV-2 infected cells with the miRNA-associated protein Ago2. We can then purify and sequence complexes consisting of miRNAs and viral RNA, and thus monitor where on the virus genome and sub-genomic viral mRNAs the miRNAs bind and what function they might have. We will then specifically disrupt interactions that are essential for the SARS-CoV-2 replication cycle by inhibiting specific miRNAs using competing artificially produced circular RNA decoys. In a proof-of-principle study using HCV as a model system, we had already successfully validated this concept of virus inhibition as a novel antiviral therapeutic strategy. Mapping miRNA-virus interactions could support many other groups in the research of the molecular biology and pathogenesis of SARS-CoV-2 and provide the foundation for novel RNA-therapy approaches.



Project Start 01.09.2021

Revealing the mechanism of nucleotide selection, addition and proofreading of the SARS-coronavirus replication transcription complex at the single molecule level

Cluster: Diagnostic, assessment, management, therapy and rehabilitation

Principal investigators

Dr David Dulin
FAU Erlangen-Nuremberg, VU Amsterdam

Presentation Slot 15:30

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Revealing the mechanism of nucleotide selection, addition and proofreading of the SARS-coronavirus replication transcription complex at the single molecule level

RNA viruses are a very diverse group of pathogens. This is particularly underlined by the large variety of factors involved in their replication transcription complex (RTC) and their artfulness in modes of messenger and genomic RNA synthesis. Viral RNA synthesis is ensured by the RTC, which also ensures evolution through nucleotide mismatch incorporations and by promoting viral genome recombination. However, the mutation rate of the RTC is too high to generate infectious virions for long genome single stranded positive RNA viruses, such as coronavirus (CoV) (~30 kb). Therefore, CoV have solved this problem by encoding an RNA proofreading enzyme, i.e. a 3' to 5' exonuclease to correct the excessive numbers of mutations, which also protects human pathogenic CoV's, e.g. the Middle East respiratory syndrome (MERS), severe acute respiratory syndrome (SARS) and new coronavirus 2019 (COVID-19) from antiviral nucleotide analogues targeting the RTC. Understanding how CoV exonuclease senses nucleotide mismatch and analogues after incorporation remains an important research topic to develop more efficient antiviral drugs. To characterize the kinetics of nucleotide mismatch and analogues incorporation and derive a kinetic model, standard bulk biochemistry assays use short templates (~10 nt) and no competing nucleotides, which are not realistic conditions. Using high throughput magnetic tweezers and kilobases long templates, I will be able to monitor the kinetic signature of SARS-CoV RTC nucleotide mismatch and analogue incorporation at the single molecule level with near single base resolution and in competition with the four natural nucleotides at saturating concentrations. SARS-CoV RTC is arguably the best-known coronavirus RTC, and the high degree of conservation of CoV RTC will make the future results of my proposal extendable to other CoVs, such as MERS and COVID-19. I will derive a complete kinetic model describing the kinetics of nucleotide mismatch incorporation and characterize the mechanism of action of commercially available nucleotide analogues using SARS-CoV RTC.

2

Transmission, non-medical prevention and medical prevention

Project Start 01.11.2021

Influence of air quality on the expected burden on the health care system in the event of pandemics

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Dr Susanne Breitner-Busch
LMU Munich, IBE-Chair of Epidemiology

Dr Sabine Wüst
DLR Oberpfaffenhofen

Professor Dr Jörn Rittweger
German Aerospace Center (DLR), Institute of Aerospace Medicine

Presentation Slot 10:30

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Influence of air quality on the expected burden on the health care system in the event of pandemics

Michael Bittner [1], Susanne Breitner [2], Jörn Rittweger [3], Sabine Wüst [4]

[1] *Universität Augsburg, Institut für Physik*

[2] *Ludwig-Maximilians-Universität München, Institut für Medizinische Informationsverarbeitung, Biometrie und Epidemiologie*

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Infectious diseases, whose spread in the worst case has the character of a pandemic, influence our behavior in different ways. Different measures were proclaimed to prevent infection or at least reduce its probability (e.g., hygienic rules, “social distancing”, stay-at-home policy).

These measures do not only have a direct effect on the probability of infections with COVID-19, but also affect human health for other reasons. These effects can be positive as well as negative:

Air pollutants weaken the human defense mechanisms and lead to increased vulnerability, i.e., easier infection and/or more severe disease progression. If air pollutant levels are reduced - as it happened due to the stay-at-home policy - positive effects on health have already been observed in the past (e.g., Olympic Games in Beijing).

On the other hand, people no longer go to preventive medical checkups or seek treatment for fear of infection. Surgeries are canceled to free up capacity for patients requiring hospitalization in the case of COVID-19, which can negatively affect human health.

Accordingly, the proposed project addresses the following objectives:

Objective 1: To model the inter-relationship between environmental stressors and virus-borne infections that can lead to pandemics. To address this objective, we will use COVID-19 and influenza infection data from AOK Baden-Württemberg as well as population-based data from the Research Data Center of the Statistical Offices of the Federal States (Forschungsdatenzentrum, FDZ of the Statistisches Bundesamt). Environmental data (air quality and meteorology) come from CAMS and POLYPHEMUS/DLR as well as from the NOAA GFS forecasting system accompanied by DLR’s WRF processing chain for mesoscale weather forecasts.

Objective 2: To understand the impact of the lockdown disease burden, mediated either via environmental stressors or via other routes. To address this question, we will analyze the relationship between changes in air quality and other (non-COVID-19 associated) respiratory and cardiovascular diseases.

Objective 3: To model the relative lockdown effects via contact rates and versus alterations in air quality. This objective will be addressed by modeling the disease spread via stay-at-home policy/hygiene practices by including empirical estimates of air quality influences. Moreover, we will also include a calculation of the burden to the health care system.

Project Start 01.12.2021

Reusable Face-Masks and Safe-to-Touch Covers Based on Flexible Large-Area Virus-Inactivating Electronic Layers

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Dr Bahman K. Boroujeni
Chair of Circuit Design and Network Theory, Institute of Electrical and Electronic Engineering, TU Dresden

Professor Dr Stephanie Pfänder
Ruhr University Bochum

Presentation Slot 10:45

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Project´s title: "Reusable Face-Masks and Safe-to-Touch Covers Based on Flexible Large-Area Virus-Inactivating Electronic Layers (E-Mask)"

Title in German: "Wiederbenutzbare Mund-Nase-Schutzmasken und Safe-to-Touch Covers basierend auf großflächiger, flexibler Elektronik mit Virus-inaktivierender Funktion"

Applicants: Dr. Bahman K. Boroujeni, Dresden; Dr. Hans Kleemann, Dresden; Jun. Prof. Dr. Stephanie Pfänder, Bochum

GZ: BO 5926/2-1 | KL 2961/5-1 | PF 890/5-1 (E-Mask)

Corresponding DFG call: "Call for Multidisciplinary Research into Epidemics and Pandemics in Response to the Outbreak of SARS-CoV-2"

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Abstract:

Emerging infections are a constant threat as exemplified by the current COVID-19 pandemic. This situation presented us with new challenges regarding prevention of airborne and surface transmittable pathogens. More effective protective measures are needed against pathogens, and in this regard, face-masks are the front-line defense against bio-aerosols and droplets.

Organic and flexible electronics is an emerging technological platform that can potentially be utilized for pathogen inactivation. While conventional silicon electronic is suitable for compact, rigid, high-speed circuits and applications, organic electronics offers innovative methods of manufacturing for applications that require mechanical flexibility, low-cost and large-area circuits, in addition to being potentially environmentally-friendly and suitable for integration into textiles and on-body applications. Dresden has been a center for developing organic electronics in Germany in the past ten years.

In this multidisciplinary research, we intend to combine electronics, physics and virology to develop new preventive measures against emerging pathogens including SARS-CoV-2. A face-mask in general needs to be flexible, lightweight, low-cost, and disposable. Therefore, integrating organic electronic circuits into a face-mask for the purpose of microorganism inactivation in principle would be an effective prevention measure. Biomolecules such as proteins, lipids, and nucleic acids are the foundation of all microorganisms. Denaturation refers to a conformational change resulting in unfolding or structural damage to the biomolecule by application of external stress factors such as: UV light, chemicals, electromagnetic wave radiation, and alternative magnetic field causing strong eddy current. In this project we will utilize organic electronic technology to fabricate functional electronic circuits which can generate such strong stimuli in order to electrically inactivate pathogen contamination on a mask or on other surfaces. These novel devices can potentially be used for fabricating better protective equipment in the future. Fabricated devices shall be reusable and generalizable to new pathogens. They will be tested and optimized against various respiratory viruses and bacteria using standardized assays.

In conclusion, we propose the generation of a novel layer of protection, which can be easily implemented upon pathogen emergence in order to effectively contribute towards infection prevention.

Project Start 01.12.2021

Deep lung aerosol generation and virus encapsulation

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Fabian Denner
Otto-von-Guericke-Universität Magdeburg,
Institute of Process Engineering

Presentation Slot 11:00

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Deep lung aerosol generation and virus encapsulation

Heike Walles[1,4], Claus-Dieter Ohl[2,4], Fabian Denner[3,4]
[1] Core Facility Tissue Engineering, Institute of Chemistry, Otto-von-Guericke-Universität Magdeburg, Germany
[2] Department Soft Matter, Institute of Physics, Otto-von-Guericke-Universität Magdeburg, Germany
[3] Chair of Mechanical Process Engineering, Institute of Process Engineering, Otto-von-Guericke-Universität Magdeburg, Germany
[4] Center for Advanced Medical Engineering, Otto-von-Guericke-Universität Magdeburg, Germany

Microscopic aerosols are the primary infection pathway for SARS-CoV-2 as well as other communicable diseases. These droplets are generated deep inside the lung from lining fluids when the airways open during inhalation, and may encapsulate and carry the viral load. These aerosols already form during tidal breathing and may remain suspended in air for minutes or hours, in contrast to larger droplets formed in the upper airways and during violent respiratory events, and, thus, pose a higher risk for airborne infection. While the dispersion of aerosols has been studied widely, and research efforts in this direction have intensified drastically since the outbreak of the SARS-CoV-2 pandemic, little is known about the formation of aerosols deep inside the lungs and how virus particles become encapsulated in these aerosols.

As an interdisciplinary team, we will tackle the science of aerosol generation and virus encapsulation by combining medical, biological, and fluid mechanics expertise. The project focuses on the fast and delicate flows resulting in film rupture, droplet generation, encapsulation, and stabilization, considering realistic fluids together with viral particles. Emphasis is placed on high spatio-temporal resolution experiments and simulations of the atomization and drop formation process of thin films, and the biological virulence of the aerosol particles generated by this process. While the research was originally motivated by the virulence of SARS-CoV-2, we will also consider other viruses to unravel the fundamental fluid mechanics that results in airborne transmission of pathogens from the lung.

Project Start 01.11.2021

Neurobiological mechanisms of spontaneous facial self-touches and possibilities of its active suppression to prevent the risk of infection

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Kevin Butz
Paul-Flechsig-Institute, University of Leipzig

Presentation Slot 11:15

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Neurobiological mechanisms of spontaneous facial self-touches and possibilities of its active suppression to prevent the risk of infection
Prof. Dr. Martin Grunwald et al.

Abstract

Self-touches directed toward the face are performed between 400 and 800 times a day by every human being. This spontaneous and mostly unconscious behavior is one of the most frequent of human actions. Facial self-touches are a critical source of infections with bacteria or viruses since pathogens can be transmitted directly from the finger skin to orifices (mouth, nose). This behavior is not only ubiquitous, it is also very difficult to control over extended periods of time especially during cognitive and emotionally challenging situations. Own investigations (Grunwald et al., 2014) (Mueller et al., 2019) proved that immediately before and after spontaneous facial self-touches (sFST) electrical brain activity significantly changed. The dynamics of EEG changes support the assumption that sFST are involved with the regulation of both emotional and working memory processes. It could further be shown that sFST were more often directed towards the middle axis of the face than to the left or right side of the face. The planned study is set to investigate which neurobiological and memory effects occur while volitionally suppressing sFST under different straining conditions and if an active suppression is accompanied by an increase of untargeted limb and/or whole body movements. Additionally the study aims to examine if adverse neurobiological and memory effects occur when sFST are actively substituted with different compensatory actions (e.g. facial self-touch with an object). The study results are intended to generate new scientific knowledge about the phenomenon of sFST and to create feasible advice how to manage, control and/or substitute sFST in pandemic times.

Project Start 01.09.2021

Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr André Karch
Institute of Epidemiology and Social Medicine

Antonia Zapf
University Medical Center
Hamburg-Eppendorf

Presentation Slot 11:30

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Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings

Antonia Zapf[1], Nicole Rübsamen[2], Madhav Chaturvedi[2], Denise Köster[1], André Karch[2]

[1]Institute for Medical Biometry and Epidemiology, University Medical Center Hamburg-Eppendorf,

[2]Institute of Epidemiology and Social Medicine, University of Münster

During an epidemic or pandemic, the early and reliable diagnosis of an infection is not only essential for determining the disease status of an individual, but also for the model-based evaluation of the effectiveness of infection control measures at population level. For emerging infections like SARS-CoV-2, new diagnostic tests have to be developed during the early phase of the epidemic or pandemic, and their accuracy needs to be evaluated within a tight period. Therefore, the acceleration of research for innovative diagnostic tests is a central goal. This will be of even higher importance once the amendment of the national medical device law in the EU will be put in practice, and new standards for the regulation of diagnostic tests will be implemented. This interdisciplinary project combines two research areas: Adaptive (seamless) designs for diagnostic studies, which enable modifications during the course of a trial and thereby speed-up the development of diagnostic tests, and dynamic mathematical models, which use realistic infection spread concepts as a basis for the simulation of interventions. A correct parametrisation of basic epidemiological measures in these models is crucial for the interpretability of model results. These parameters are directly derived from aggregated results of diagnostic tests, and have to take the diagnostic accuracy of the respective tests into account. The aim of this project is to create a flexible study concept for the accelerated development of diagnostic tests that can support real-time modelling of infectious disease dynamics in the case of an epidemic or pandemic. The developed concept will result in earlier and better evidence for the decision for or against infection control measures to contain the epidemic or pandemic and will help to minimize the human and economic damage. The results will be prepared in such a way that they can be easily implemented in case of future epidemics or pandemics. For this purpose, guidance documents will be written, which contain flow charts, study designs and models with the corresponding explanations. Furthermore, all methods will be implemented in a user-friendly way in open source software and their application will be explained.

Project Start 01.12.2021

Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Dr Dina Maskileyson
University of Cologne

Dr Sebastian Sattler
Bielefeld University, Faculty of Sociology

Presentation Slot 11:45

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Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]

Abstract

To prevent the further spread of COVID-19 infections and fatal disease outcomes, a deeper understanding of the causes of violations of current COVID-19 prevention measures is needed. This understanding will facilitate informed assessment, adaptation, and communication of pandemic response measures. This requires two aspects: 1) identifying populations that are not complying with such measures; and 2) examining the action-generating mechanisms that lead to non-compliance.

Therefore, this project aims to provide an inventory of the extent to which different populations violate prescribed behaviors (e.g., wearing masks, restricting contact and movement radii, testing after travel to high-risk areas, or complying with quarantine). Building on this, the main goal of this project is to explain the violations of preventive measures by analyzing the influence of personal and situational characteristics in the context of the national and local state of the pandemic. To better understand the action-generating mechanisms behind such violations, we use current theories that explain human behavior through the interplay of personal and situational characteristics (such as psychological Dual-Process Theories, the sociological Model of Frame Selection, the criminological Situational Action Theory, and the Cultural-Behavioral Model from medical sociology).

The empirical basis of the project will be provided by the collection and analysis of various data sources. First, person-level panel data will provide information on actual behaviors, personal characteristics, and their changes over time – reflecting people's adaptations to the pandemic. Second, factorial vignette experiments will be conducted to manipulate situational characteristics, which would otherwise be challenging due to ethical and practical concerns. This experimental method is particularly useful for testing causal hypotheses and investigating action-generating mechanisms. Third, regional information on the local and temporal status of the pandemic (e.g., the incidence of infections or deaths) will be linked to the survey data. This allows for the study of individual responses to the evolution of the pandemic.

Combining these different data sources will yield a better understanding of the causes of behavioral breaches in order to develop interventions against COVID-19 for different populations. The project's findings will be used to derive recommendations on how to induce behavioral change and alter underlying social norms, e.g., by adapting guidelines and communicating them to specific groups (e.g., parents, at-risk groups, those living alone).

Project Start 02.08.2021

Feasibility of involving trained community mediators in COVID-19 prevention measures (COVID-TCM)

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Hajo Zeeb
Leibniz-Institute for Prevention Research and Epidemiology-BIPS

Presentation Slot 12:00

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Feasibility of involving trained community mediators in COVID-19 prevention measures (COVID-TCM)

PI: Prof. Hajo Zeeb, Leibniz-Institute for Prevention Research and Epidemiology-BIPS, Bremen

During the pandemic it has become clear that the spread of COVID-19 is socially structured, and socio-economically disadvantaged residential areas including those with a higher proportion of citizens with migrant background are disproportionally affected. Thus, there is an urgent need for specific approaches to improve infection prevention and control in these settings.
This project therefore focuses on communities living in Osterholz, one of Bremen's culturally most diverse city districts, where in 2019, about 53% of the population had a migration background (Bremen: 37%) and 22% were entitled to basic support for jobseekers (Bremen: 17%). In 2013, the average income in Osterholz was 18.600 Euro, compared to 22.200 Euro in Bremen as a whole. According to health statistics for the calendar weeks 38-47, Osterholz had the highest SARS-CoV-2 infection rate per population in Bremen (20.5/1000), about three times higher than city districts with high socioeconomic indicators.
We plan to develop and investigate novel approaches to implement community-based infection prevention in this exemplary district. Our aim is to investigate whether involving specifically trained community health mediators (TCMs) at neighbourhood level can improve COVID-19 communication and prevention activities, thus leading to higher acceptance of preventive actions (including vaccine uptake) and ultimately lower infection and disease rates.
The research questions are:

1. Which needs and concerns regarding effective infection prevention exist in communities disproportionally affected by SARS-CoV-2 infections?
2. How can these needs and concerns be addressed by TCMs?
3. How can digital tools be applied to enhance communication between the community, TCMs and health and social services?
4. Which factors are likely to support the sustainability of a TCM-based approach with regard to community (pandemic) preparedness?

Our findings will be highly relevant for research on the role of intercultural health mediators in advancing health in diverse and disadvantaged populations, as well as on the importance of appropriate training and programme implementation.The project is conducted within the context of the Leibniz Living Lab (LLL), a community health research center set up as part of the long-term research and transfer strategy of the Leibniz-Institute for Prevention Research and Epidemiology-BIPS.

Project Start 01.11.2021

CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Marc Avila
Zarm, University of Bremen

Presentation Slot 12:15

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CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk

Daniel Feldmann, Christoph Kühn, Marc Avila (University of Bremen)
Daniel Schanz, Philipp Godbersen, Andreas Schröder (DLR, Göttingen)

There is compelling evidence that transmission of SARS-CoV-2 occurs predominantly indoors, that airborne transmission via aerosols is one significant route of infection, and that smaller aerosols can directly infect the lungs, thereby triggering the most sever courses of COVID-19. Thus, understanding aerosol transport in indoor environments is indispensable for controlling the ongoing pandemic and to help preventing future ones involving airborne transmission. However, bio-aerosol transport dynamics in indoor environments is notoriously complex and therefore not straightforward to model and asses. In this proposal, we aim at testing and validating computationally affordable, generally accessible CFD-approaches for indoor aerosol transport. First, we will identify key aspects of aerosol transport and accumulation in such environments by analysing our unique, highly-resolved experimental data. Second, we will model aerosol transport in using unsteady simulations to assess whether the most significant aerosol transport and accumulation processes can be acceptably reproduced. We will combine both approaches to provide validation and parametrisation guidelines for future design and modelling efforts. This will help the global research community to quickly tailor ventilation and room-air-hygiene concepts.

Project Start 01.01.2022

Micro-biophysical characterization of respiration aerosols and their role in airborne transmission of infectious diseases

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Dr Gholamhossein Bagheri
Max Planck Institute for Dynamics and Selforganization

Professor Dr Silke Christiansen
Fraunhofer IKTS

Professor Dr Eberhard Bodenschatz
Max Planck Society / MPI-DS Goettingen

Presentation Slot 12:30

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Human exhaled particles and their origin

Gholamhossein Bagheri, Oliver Schlenczek, Laura Turco, Birte Thiede, Katja Stieger, Jana-Michelle Kosub, Mira L. Pöhlker, Christopher Pöhlker, Jan Molacek, Simone Scheithauer, and Eberhard Bodenschatz

Göttingen, Mainz und Leipzig

Detailed knowledge of the properties of exhaled particles from the human respiratory tract for all genders and ages is essential to determine the modes of transmission of airborne diseases. This applies not only to the current COVID-19 pandemic, but also to many others, be it measles, seasonal influenza, or tuberculosis. To date, there are no data on the individual-specific concentrations and sizes of exhaled particles over the entire size range from nanometre to millimetre. Here we present a comprehensive data set, measured by particle size spectrometry and in-line holography covering the entire size range from 132 healthy volunteers aged 5 to 80 years for a defined set of breathing and vocalisation activities. We find age to have a large effect on small particle concentrations <5 micron doubling in children during adolescence and in adults over a 30-year period. In contrast, gender, body mass index, smoking or exercise habits have no discernible influence. Particles 20 micron \show on average no measurable dependence on the type of vocalisation with the exception of shouting. We show evidence that particles <5microns mainly originate in the lower respiratory tract, 5-15 micron in the larynx/pharynx, and 15 microns in the oral cavity.

Project Start 01.10.2021

Sensors and exposition analyses for aerosol transport in dynamic situations

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Christoph Egbers
BTU Cottbus-Senftenberg, Dept. of Aerodynamics & Fluid Mechanics

Professor Dr Andreas Schröder
DLR, BTU Cottbus

Professor Dr Uwe Hampel
TU Dresden

Presentation Slot 12:45

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Sensors and exposition analyses for aerosol transport in dynamic situations

Partners: Technische Universität Dresden (U. Hampel), Brandenburgische Technische Universität Cottbus-Senftenberg (Ch. Egbers, A. Schröder)

Acronym: SENSAERO

Abstract

Within the planned project, a novel methodology to study aerosol transport in highly dynamic situations involving many people shall be developed and applied. WG Hampel develops and deploys a new mobile counting device for Helium soap bubbles which can be carried by test persons and which counts small Helium bubbles emitted by a mobile bubble generator simulating a spreader. The sensor is inexpensive, robust and remotely operated. It bases on a light-optical camera technique. Different experimental studies investigating situations in classrooms, in narrow corridors, group dynamics indoors and outdoors, installation of air purifiers in a class or seminar room as well as window opening ventilation scenarios will be carried out. We study the effective particle inhalation using the mobile sensors together with the macroscopic 3D particle transport in the room using the experimental Shake-the-Box Lagrangian particle tracking concept of WG Schröder and WG Egbers. The new experimental concept allows studying the effectiveness of protective measures such as masks, distance and ventilation with regard to the risk of infection to be assessed in realistic settings and enables in particular the future investigation of scenarios in public spaces, such as schools, public transport, cultural events, restaurants or sports facilities.

Project Start 01.02.2022

High-fidelity modeling of the drying kinetics, lifetimes, and trajectories of saliva droplets

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Dr Holger Grosshans
Physikalisch-Technische Bundesanstalt

Presentation Slot 14:00

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High-fidelity modeling of the drying kinetics, lifetimes, and trajectories of saliva droplets (DROPLIFE)

Holger Grosshans[*,1,2], Gizem Özler[1], Edouard Berrocal[3]
[*]*holger.grosshans@ptb.de*
[1]*Analysis & Simulation in Explosion Protection, Physikalisch-Technische Bundesanstalt*
[2]*Institute of Apparatus- and Environmental Technology, University of Magdeburg*
[3]*Combustion Physics, Lund University*

So far, simple physical models are used to evaluate the drying and spreading of saliva droplets. These models support the critical conclusion that large droplets, which carry most viral copies, cause most Covid infections. These large droplets settle fast, so there is no danger as long as we keep a distance of two meters to other persons. However, the high number of infections in Germany during the lockdown since November 2020 implies that these assumptions are not justified. Instead, large droplets might dry into small particles which are light enough to be transported airborne over large distances and cause indirect virus transmission. Since the viral copies do not evaporate, these small particles might be the most dangerous ones. In previous projects, we have developed advanced numerical models for droplet evaporation and particle formation. Also, we developed a CFD tool for the transport of droplets and particles by turbulent airflow. In the proposed project, we will adapt the existing models to drying saliva and assemble them into one tool. This tool reflects the detailed droplet drying kinetics, including modifying the evaporation rate due to the solutes and forming a solid layer on the droplet surface. Such an approach is superior to the classical D-square model and will predict possible hollow particles. In the spray imaging laboratory at Lund University, we will measure simultaneously the droplet number, size, and velocity when a person is speaking, coughing, or sneezing, using imaging techniques of high detection sensitivity and spatial resolution. From this experimental data, we will generate accurate input conditions for our simulations of the virus transmission in a room. Such detailed simulations will lead to a better understanding of the saliva droplet drying kinetics and the virus transmission in specific situations. This project's results can lead to the re-evaluation of Covid protection guidelines, especially the two meters distancing rule. Hence, we contribute to managing the current and future pandemics.

Project Start 01.11.2021

Aerosol chamber studies to characterize the SARS-CoV-2 transmission through aerosol particles (AEROVIR)

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Hartmut Herrmann
Leibniz-Institute for Tropospheric Research

Professor Dr Uwe G Liebert
Leipzig University

Presentation Slot 14:15

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Abstract

Aerosol chamber studies to characterize the SARS-CoV-2 transmission through aerosol particles (AEROVIR)

One of the most important challenges of the current COVID-19 pandemic is to understand the transmission process of the SARS-CoV-2 through aerosol particles which appears to govern spread from infected persons [1-4]. Recent laboratory studies demonstrated that SARS-CoV-2 remained viable in aerosol particles throughout several hours of laboratory experiments [5]. Field experiments could proof that Covid-19 patients produce aerosol particles containing viable SARS-CoV-2 serving as a source of transmission of the virus [6-8].
Therefore, the AEROVIR project aims for a better understanding of the transmission of SARS-CoV-2 through aerosol particles by investigating the temporal physico-chemical and virological behaviour of virus-loaden aerosol particles in aerosol chamber experiments under variation of the experimental conditions resulting in the identification of the most important impact factors on virus transmission through aerosol particles with the health effects caused.
For the detailed and quantitative elucidation of the parameter dependencies of the virus half-life, experiments are planned in the Atmospheric Chemistry Department – Chamber at the Leibniz Institute for Tropospheric Research, Leipzig investigating the influence of the following parameters: temperature (278 K≤T≤328 K), relative humidity (RH) and aerosol liquid water content (~0≤RH≤0.85), aerosol particle composition (ions, organic matrix, lipids, carbohydrates, peptides) and aerosol particle size (150 nm≤Dp≤3,500 nm). Experiments will be performed in trilateral cooperation with the Department of Isotope Biogeochemistry of the Helmholtz Centre for Environmental Research, Leipzig and the Institute of Virology, Universitätsklinikum Leipzig. The consortium together comprises significant experience in the analysis of differently composed airborne particles under changing environmental conditions, visualization and detection of virus particles and chemical compounds.
The project will deliver a comprehensive data set on lifetimes and infectivity of virus-loaden aerosol particles in dependence of the above-mentioned parameters. The experimentally determined data can be used as input parameters for future modelling of aerosol particle-facilitated spatial spread of the viruses allowing an improved management of the present and also possibly forthcoming future pandemics.

[1] M.A. Kohanski, et al., Int. Forum Allergy Rh. (2020), 10, 1173. [2] S. Tang, et al., Environ. Int. (2020), 144, 106039. [3] Robert Koch Institut, Epidemiologischer Steckbrief zu SARS-CoV-2 und COVID-19 (14.07.2021). [4] L. Morawska, et al., Clin. Infect. Dis. (2020), 71, 2311. [5] N. van Doremalen, et al., N. Engl. J. Med. (2020), 382, 1564. [6] J.A. Lednicky, et al., Int. J. Infect. Dis. (2020), 100, 476. [7] P.Y. Chia, et al., Nat. Commun. (2020), 11, 2800. [8] K. Nissen, et al., Sci. Rep. (2020), 10, 19589.

Project Start 01.10.2021

ExAero: Aerosol emission during exercise in relation to lung function, age and body weight

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Henning Wackerhage
TU München, TU München, TU München

Presentation Slot 14:30

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ExAero: Aerosol emission during exercise in relation to lung function, age and body weight

Stephanie Kaps[1*], Benedikt Mutsch[2*], Felix Grätz[1], Marie Heiber[1], Martin Schönfelder[1], Rudolf Joerres[3], Christian Kähler[2*], Henning Wackerhage[1*]

1 Technische Universität München
2 Universität der Bundeswehr
3 Ludwig-Maximilians-Universität München
*Joint first/last authors

Introduction. The SARS-CoV-2 coronavirus is mainly transmitted via droplets (≥5 µm) and aerosols (<5 µm). During exercise, ventilation can increase from 5-10 l/min to extremes of ≈200 l/min in some endurance athletes. It is unknown whether this increase of ventilation leads to a proportional increase of aerosol emission. We also do not know how much aerosol emission varies during exercise and what factors determine individual aerosol emission. The aim of our project is to fill this gap in our knowledge by answering two research questions:

1) How does exercise intensity affect aerosol emission and what is the size distribution of the emitted aerosol particles?
2) Are lung function (as determined by lung function testing and impulse oscillometry), age, and BMI associated with aerosol production at rest and during exercise?

Methods. We have started to recruit young (age 20-40) and elderly (age 60-75) women and men which either have normal weight or are obese (BMI >25–35 kg/m^2; 80 subjects in total). Each subject will perform a lung function test and impulse oscillometry. Afterwards, we will measure respiration and aerosol emission both at rest (4 min sitting, 4 min standing) and during a graded exercise test to exhaustion (start at 25 or 50 W; 25 W increments every 4 min). Aerosol emission will be measured with the optical particle counter Palas Promo 3000 (Palas GmbH, Karlsruhe, Germany).

Results. In the first three subjects (age 24-31 years) exhaled aerosol concentrations increased from ≈10 particles/L at rest (range: 12-74 particles/L) up to an extreme of 950 particles/L in one subject during maximal exercise (range of maxima: 197-950 particles/L). The sum of exhaled particles during a whole, graded exercise test ranged from $6.97 \cdot 10^5$ to $6.77 \cdot 10^7$ particles.

Discussion. Aerosol emission increases with exercise intensity but we now need to study a large cohort to understand whether aerosol emission increases proportionally to ventilation, to determine the effects of age, sex and body weight and to quantify inter-individual variability. The results of these experiments are needed to develop evidence-based infection control policies of fitness centres, sports and leisure venues to avoid SARS-CoV-2, influenza or other aerosol-transmitted infections.

Funding. This project is funded by the Deutsche Forschungsgemeinschaft (DFG).

Project Start 18.10.2021

Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Ulrich Riebel
BTU Cottbus-Senftenberg, Chair of Particle Technology

Presentation Slot 15:00

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DFG Grant # Ri533/17-1

Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.

Prof. Dr.-Ing. Ulrich Riebel* (PI), MSc Parvathy Kizakanveatil Subhash, MSc Jan Stepputat (all Chair of Particle Technology, BTU)
Prof. Dr. rer. nat. Fabian Commichau, Dr. rer. nat. Robert Hertel (both Chair of Synthetic Microbiology, BTU
***corresponding author: riebel@b-tu.de**

Abstract

Aerosols are seen as a decisive pathway for spreading COVID-19 and other viral or bacterial infections. The primary liquid aerosols are drying very fast in the air, forming residual aerosols in the size range from 0.1 to 100 µm. Due to the low deposition rate, aerosols below about 10 µm can accumulate in indoor air and reach critical concentrations. Meanwhile, the size range below 5 µm is suspected to be the most important for spreading infections.

Electrostatic precipitators (ESPs) are ideally suited for the separation of fine aerosols in the size range from 0.1 to 100 µm. The extremely low pressure drop of ESPs (amounting to a few Pa only) allows the combination with low-noise ventilators. Low noise is an important factor for the acceptance of aerosol precipitators for indoor applications. Moreover, ESPs offer easy access for the inactivation of the precipitated aerosol by means of UV light or gas ions. A problem, however, is the formation of ozone in the corona discharges which are used, so far, as a source of gas ions for aerosol charging in all ESPs. Ozone is regarded as highly toxic in concentrations exceeding about 70 µg/m³.

The present project intends to provide the basic knowledge for building a new type of ozone-free ESPs. As ozone is instable at higher temperatures, a moderate heating of the corona wire should be sufficient to suppress ozone formation. Further aspects which shall be addressed are the inactivation of virus model aerosols by UV light, interactions between ozone und UV, and the enhanced deposition of electrically charged particles emitted with the clean gas.

Project Start 01.10.2021

Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms

Cluster: Transmission, non-medical prevention and medical prevention

Principal investigators

Professor Dr Rüdiger Schwarze
Technische Universität Bergakademie Freiberg, Institute of Mechanics and Fluid Dynamics

Presentation Slot 15:15

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Schwarze, Rüdiger, Orcid-ID https://orcid.org/0000-0003-4602-2208

Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms

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The project aims to investigate the airborne transport and spread of respiratory aerosol droplets loaded with SARS-CoV-2 viruses in closed patient rooms with and without high-volume air conditioning (HVAC) system. Our motivation is based among others on the observation, that recently discussed air sampling studies show conflicting findings with positive or negative PCR in similar test situations.

Since only general information about the HVAC systems like air exchange rates are given in these papers, our project is based on the hypothesis, that the ***air flow field in a patient room has a strong impact on the spread of aerosols and viruses***. In detail, the following research questions will be examined:

1. ***How does the viral load in the aerosolized droplets correlate with the viral load in oral fluid samples*** from COVID-19 patients along the airborne transport routes in the patient room?
2. How are these ***correlations influenced by*** the room climatic conditions, in particular the ***air flow field structure***, ***humidity*** and the ***air exchange rate***, the ***distance*** from and the behavior of the ***patients*** (***breathing, speaking, singing***, but not coughing or sneezing)?

Therefore, the project addresses important open questions about the SARS-CoV-2 viral load of exhaled aerosol clouds, which have been raised in recent papers of the airborne transmission route of SARS-CoV-2. Furthermore, we expect that our database will serve as a reference and as benchmark for other, knowledge-based risk assessment models for airborne SARS-CoV-2 virus infection.

The proposed project is done in close cooperation with the ongoing air sampling study "Aerosol spread (as a carrier of SARS-CoV-2) depending on spatial, ventilation, phonation-dependent and respiration-related conditions, as well as under therapeutic oxygen supply", which is actually carried out within a cooperation between colleagues from the University of Leipzig Medical Center and the St. Georg Hospital Leipzig together with the applicant.

3

Vaccination

Project Start 01.05.2021

Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior

Cluster: Vaccination

Principal investigators

Christof Geldmacher
Division of Infectious Diseases and Tropical Medicine,, University Hospital, LMU Munich

Lena Janys
University of Bonn

Presentation Slot 10:30

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Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior (SEPAN)

Jan Hasenauer[1], Lena Janys[1], Eleftheria Zeggini[2], Michael Hoelscher[3,4] and Christof Geldmacher[3,4]

[1]Rheinische Friedrich-Wilhelms-University Bonn
[2]Technical University of Munich (TUM)
[3]University Hospital of Munich (LMU)
[4]German Center for Infection research (DZIF), partner site Munich

The spread of infectious diseases is a multifaceted and dynamic process that depends on the virulence of the pathogen, host immune responses, and human behavior (e.g., adherence to social distancing, mask wearing). The interplay of these factors is not well understood, and interindividual variability (biomedical and socioeconomic) is often ignored. We will examine (1) interindividual variability in host-virus interactions during SARS-CoV-2 infections and (2) decision-making processes of healthy and infected individuals (and their household members) in different economic and social interactions to determine relevant factors for viral transmission versus containment. The project will establish a systems epidemiology approach that considers biomedical and (micro-)economic aspects. The Munich-KoCo19 framework will provide virological, immunological/serological, host genetic and clinical characterization data for up to 6000 individuals, as well as information on their behavior and socio-economic profiles. This comprehensive dataset will be analyzed using statistical and machine learning approaches. In addition, we will develop integrative epidemiological-economic models that account for inter-individual variability and its influence on decision-making (e.g., whether individuals stay home or go to work, depending on income, savings, or other pre-existing conditions) and ultimately the dynamics of the SARS-CoV-2 epidemic. The integration of multifaceted factors will provide new insights and methods that can be applied to other infections and future epidemics.

Project Start 01.05.2021

Impact of the COVID-19 pandemic on health care for patients with chronic diseases

Cluster: Vaccination

Principal investigators

Professor Dr Stefanie Klug
Technical University of Munich, Chair of Epidemiology, Department of Sport and Health Sciences

Dr Ronja Flemming
Technical University of Munich, Chair of Health Economics

Presentation Slot 10:45

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Impact of the COVID-19 pandemic on health care for patients with chronic diseases

M. Eberl, C.T. Lehner, L.F. Tanaka, G. Schauberger, S. J. Klug

Epidemiology, Department of Sport and Health Sciences, Technical University of Munich, Germany

R. Flemming, W. Schüttig, L. Sundmacher

Health Economics, Department of Sport and Health Sciences, Technical University of Munich, Germany

The COVID-19 pandemic caused a tremendous change in priorities and reallocation of resources within national health systems. Surgeries were delayed, general practitioner (GP) practices temporarily closed and even a decline in number of emergency patients was reported. Preliminary data have shown that also the outpatient sector has been greatly affected. This project aims to investigate the impact of the COVID-19 pandemic on health care for patients with chronic diseases focussing on patients with type 2 diabetes (T2D), coronary heart disease (CHD) and cancer.

In an interdisciplinary approach between Epidemiology, General Medicine and Health Economics, we examine the impact of the pandemic on T2D, CHD and cancer patients from multiple perspectives. We describe how diagnosis, disease management, prevention and access to health care and have developed during the first wave of the pandemic (March to May 2020) and the following months of the continuing pandemic (June 2020 to June 2021) in comparison to the reference period (2010 to 2019). The project answers the following overarching research questions: How did incidence of newly diagnosed chronic diseases and mortality develop during the pandemic? How do patient characteristics and area indicators impact upon the continuity of care for patients during the pandemic? Is there any indication that changes in primary care for patients with chronic diseases are associated with changes in health outcomes?

We will use health claims data of approximately 11 million people, provided by the Bavarian Association of Statutory Health Insurance Physicians (KVB) as well as KVB prescription data and KVB disease management data for T2D and CHD patients. Further, data on cancer incidence is obtained from the Bavarian Cancer Registry, and hospital DRG and mortality statistics from the Bavarian State Office for Statistics.

This project consists of four modules (Epidemiology, Disease management, Prevention and Health economics) with disease-specific research questions. Work program WP1 primarily investigates in disease incidence, prevention and the direct impact of COVID-19 on chronic diseases. Work program WP2 is mainly concerned with the topic of health economics, continuity of care and regional access to the health care system. Both work programmes jointly generate relevant evidence for the modules. This project is a descriptive secondary data analysis designed to show how care of chronic diseases patients developed during the pandemic and whether patterns of time-series disruption or group-differences are observable. By using reliable routine data that covers over 85% of the Bavarian population, we will be able to generate important insights into the effects of the pandemic and lockdown measures on health care for chronic diseases in the largest and most affected German region. The project will help to reveal potential deficits in chronic diseases care by investigating specific patient cohorts more closely and thus generate evidence relevant for patients, policy-makers and other researchers to better prepare for future pandemics.

Project Start 01.12.2020

SARS-CoV-2 Spike Protein-Priming Cysteine Cathepsin L Acting at Microvilli of Intestine Epithelial Cells

Cluster: Vaccination

Principal investigators

Professor Dr Klaudia Brix
Jacobs University Bremen, Dept Life Sci & Chem, Campus Ring 1, D-28759 Bremen

Presentation Slot 11:30

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DFG Focus Funding COVID-19 **Brix, Bremen** **BR1308/17-1**

SARS-CoV-2 Spike Protein-Priming Cysteine Cathepsin L Acting at Microvilli of Intestine Epithelial Cells

Alaa Al-Hashimi, Maren Rehders, and Klaudia Brix
Department of Life Sciences and Chemistry, Jacobs University Bremen
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SARS-CoV-2, responsible for causing COVID-19, enters *via* epithelial cells including enterocytes of the small intestine. While the proteases ACE2 and TMPRSS2 are recognized as entry co-receptor/s of SARS-CoV-2 target cells, it is not sufficiently understood how the cysteine peptidase cathepsin L involves, which can act as a viral spike protein-activating enzyme in principle. We demonstrated previously that cathepsin L is secreted from intestine epithelial and goblet cells into the gut lumen, from where the protease re-associates with the mucosal cells. Here, we aim to clarify whether cathepsin L present at well-exposed microvilli of the small intestine epithelium can play a role in priming of the coronaviral spike protein to enable SARS-CoV-2 infection of the small intestine.

The principal possibility of cathepsin L-mediated spike protein cleavage at microvilli before or within endosomes after viral entry was investigated *in vitro* by simulating conditions expected for the gut lumen and endo-lysosomes, respectively. At neutral and oxidizing conditions simulating protease action at microvilli, a 100 kDa fragment of the trimeric spike protein appeared, which was degraded by cathepsin L within few minutes. Cell-free *in vitro* degradation assays simulating endosomal conditions suggested that the S2-subunit of trimeric wild type spike protein featured rapid proteolytic processing by cathepsin L, while processing of the B.1.1.7 alpha variant happened even more readily. We conclude that neutral and oxidizing conditions at cell surfaces are not ruling out cathepsin L-mediated priming of SARS-CoV-2, that is to say, before viral entry.

Consequently, we addressed cellular colocalization of cathepsin L, ACE2 and TMPRSS2 in the small intestine *in situ* by immunofluorescence labeling of human tissue sections. The results confirmed co-localization of ACE2, cathepsin L and TMPRSS2 at the brush border and within endo-lysosomes of gut lining cells. Therefore, next, we will test for the enzymatic activity of cathepsin L and its ability to process trimeric SARS-CoV-2 spike protein at microvilli of intestine epithelial cells using our established organoid-typical coculture model consisting of enterocytes and goblet cells. Eventually, the significance of cathepsin L activity for maintenance of microvilli at cells of the small intestine will also be investigated.

In summary, this project tests a novel and non-conventional mechanism of SARS-CoV-2 spike protein activation, and the results will help to more comprehensively approach therapeutic prevention of coronavirus entry into target cells.

Project Start 01.01.2021

Biochemical and structural characterization of the SARS-CoV-2 non-structural protein 16 (Nsp16), a cap ribose 2'O-methyltransferase

Cluster: Vaccination

Principal investigators

Dr Grzegorz Popowicz
Helmholtz Zentrum München

Dr Emanuel Wyler
Max Delbruck Center Berlin, Berlin Institute for Medical Systems Biology

Presentation Slot 12:00

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Acriflavine, a clinically approved drug, inhibits SARS-CoV-2 and other betacoronaviruses

G. Popowicz, M. Sattler, K. Pyrc, H. Kamyar

The COVID-19 pandemic caused by SARS-CoV-2 has been socially and economicaly devastating. Despite an unprecedented research effort and available vaccines, effective therapeutics are still missing to limit severe disease and mortality. Using high-throughput screening, we identified acriflavine (ACF) as a potent papain-like protease (PL^{pro}) inhibitor. NMR titrations and a co-crystal structure confirm that acriflavine blocks the PL^{pro} catalytic pocket in an unexpected binding mode. We show that the drug inhibits viral replication at nanomolar concentration in cellular models, *in vivo* in mice and *ex vivo* in human airway epithelia, with broad range activity against SARS-CoV-2 and other betacoronaviruses. The ACF efficacy in cellular and ex vivo assays is 50-times better than remdesivir. Despite fast clearance, ACF is accumulated in lung tissue and approved doses might be sufficient to inhibit coronavirus replication. Considering that acriflavine is an old, inexpensive drug approved in some countries (Brazil – systemic, OTC for UTI; Japan – oral gargle), it may be immediately tested in clinical trials and play an important role during the current pandemic and future outbreaks.

Project Start 01.02.2021

Deciphering the impact of Sars-CoV-2 envelope protein glycosylation on human pathogenicity

Cluster: Vaccination

Principal investigators

Dr Thomas Rexer
Max Planck Institute for Dynamics of Complex Technical Systems

Presentation Slot 12:30

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Deciphering the impact of SARS-CoV-2 envelope protein glycosylation on human pathogenicity

Mariana Juárez [1], Johannes Ruhnau [1], Julia Volckmar[2], Dunja Bruder [2,3], Thomas Rexer [1], Udo Reichl [1,4]

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2 Infection Immunology, Institute of Medical Microbiology, Infection Prevention and Control, Health Campus Immunology, Infectiology and Inflammation Otto-von-Guericke University Magdeburg, Germany

3 Immune Regulation Group, Helmholtz Centre for Infection Research, Braunschweig, Germany

4 Otto-von-Guericke University Magdeburg, Chair of Bioprocess Engineering, Magdeburg, Germany

Abstract

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike glycoprotein is the antigen target of all licensed vaccines and vaccine candidates, including virus like particles and subunit vaccines that are variants of the spike protein. However, the impact of the protein glycosylation on the immunogenicity in viral envelope proteins like the spike protein is severely underinvestigated. This is as easy-to use systems for the generation of various homogenous glycoforms are missing. Here we present the development of an *in vitro* glycoengineering platform for the generation of close-to homogeneous complex glycoforms on recombinant viral glycoproteins derived from baculovirus insect cell expression systems. The latter is readily utilized to produce viral glycoproteins for research as well as for subunit vaccine and vaccine candidates. Through our platform consisting of a cascade of Leloir glycosyltransferases expressed in *E. coli* the glycans of the recombinant SARS-CoV-2 spike protein derived from insect cells were principally converted from paucimannose to galactosylated complex-type glycans, to mimic human-cell derived recombinant spike. The galactosylated spike produced by this platform will be used to carry out an *in vivo* study in mice to assess the impact of the protein glycosylation on the immunogenicity. As a reference, the spike protein from insect cells without any modification is used in this study.

The project is funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)- Projektnummer 458633485. DB acknowledges funding from the State of Saxony-Anhalt (Förderkennzeichen I 130).

Keywords: SARS-CoV-2, COVID-19, glycoengineering, subunit vaccine, cell-free synthetic biology.

Project Start 01.07.2021

Infection, transport and degeneration of human neurons caused by severe acute respiratory syndrome coronavirus 2

Cluster: Vaccination

Principal investigators

Professor Abel Viejo-Borbolla
Institute of Virology / Hannover Medical School

Presentation Slot 12:45

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Infection, transport and degeneration of human neurons caused by severe acute respiratory syndrome coronavirus 2

Vania Passos, Kai Kropp, Lisa Henkel, Jiayi Wang, Shuyong Zhu, Guorong Sun, Florian Wegner, Günter Höglinger, Abel Viejo-Borbolla

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) causes mainly respiratory illness. Nevertheless, many patients suffer neurological complications, including loss of taste and smell, and encephalopathies, suggesting that the peripheral and central nervous systems (PNS and CNS, respectively) are affected. Clinical data and in vitro experiments showed that SARS-CoV2 infects neurons despite low expression level of its receptor, ACE2. There are contradictory reports on whether neuronal infection is productive or not and on the pathological consequences. Most studies focused on the CNS, while little is known about the infection of the PNS. We aim to investigate the replication and spread of SARS-CoV2 and the innate immune response to infection using induced pluripotent stem cells (iPSC)-derived PNS and CNS cells.

Preliminary data on CNS neurons showed increased gene expression of SARS-CoV2 *Membrane* (M) and *Nucleocapsid* (NC) in a time and viral-multiplicity of infection (MOI) dependent manner. Moreover, we observed efficient viral translation with the detection of NC protein by immunoblotting. Interestingly, immunofluorescence data showed low infection rate of CNS neurons, as shown by others. In addition, we detected SARS-CoV2 NC in GFAP-positive cells, indicating the ability of SARS-CoV2 to infect glial cells. PNS neurons infected with SARS-CoV2 revealed a similar NC protein expression, although the pattern of infection varied. PNS neurons were more susceptible than the CNS ones and showed more neurite degradation, which could be a consequence of the exacerbated expression of pro-inflammatory cytokines characteristic of COVID-19. Therefore, we will analyze the effect of infection on the production of pro-inflammatory cytokines and degeneration/apoptosis markers to obtain information on the neuronal pathology. The role of interferon (IFN) in neuronal defense against SARS-CoV2 is not well studied. Inhibition of the JAK/STAT pathway with Ruxolitinib increased the number of infected PNS cells, as well as the ability of SARS-CoV2 to spread from cell-to-cell. We will discriminate if SARS-CoV2 spreads from neuron-to-neuron, neuron-to-glia cell or glia-to-glia cells by using use specific cellular markers. We will test whether the IFN response modulates viral gene expression and how SARS-CoV2 affects the expression of IFN-stimulated genes. We will detect the subcellular localization of pSTAT-1 and address the role of the JAK-STAT pathway with specific inhibitors. We will also explore the role of known cellular intrinsic factors, in protecting CNS and PNS neurons upon SARS-CoV2 infection.

In conclusion, SARS-CoV2 infects both CNS and PNS neurons and glia cells, although there are important differences between the different cell subtypes. To better understand the cellular differences we will sort infected neurons and glial cells and determine their transcriptomes. The results obtained in this project will inform on the consequences of SARS-CoV2 infection of PNS and CNS cells, providing potential therapeutic targets for intervention.

Project Start 03.05.2021

Does discourse breed an appetite for Covid-19 vaccination? An online experiment on group dynamics, arguments, and narratives

Cluster: Vaccination

Principal investigators

Professor Dr Lydia Mechtenberg
Hamburg University

Presentation Slot 14:00

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DOES DISCOURSE BREED AN APPETTITE FOR COVID-19 VACCINATION? AN ONLINE EXPERIMENT ON GROUP DYNAMICS, ARGUMENTS AND NARRATIVES

Juliane Koch, Lydia Mechtenberg, Huyen Nguyen and Grischa Perino

Extended Abstract

This study investigates how peer-to-peer communication with vaccination supporters affects the willingness to get vaccinated (henceforth, WGV) against Sars-Cov-2 among vaccine skeptics and vice versa. Various large-scale surveys indicate diverging opinions on newly developed vaccines against Sars-Cov-2 across different socio-demographic groups (Kumar et al. 2021). Without increasing the WGV among these groups, it will be particularly challenging and politically costly to attain herd immunity by vaccination. This challenge is further heightened by the widespread misinformation in online echo chambers and the growing presence of anti-vaxxers communities (Patel und Binjola 2020; Mheidly und Fares 2020). Questions such as (i) whether herd immunity can be reached with the current vaccination levels; (ii) how much and which incentives should be used to increase its levels among vaccine-skeptics; and (iii) which role peer communication plays, are at the core of the Sars-Cov-2 debate among politicians and the population worldwide (Klüver et al. 2021; Graupensperger et al. 2021).
Since online peer-to-peer communication is a relevant source of information for vaccine skeptics, this work aims to shed light on whether and how different types of arguments and persuasion tactics are effective in changing beliefs and motivations. Existing studies mostly focus on how the usage of different media types has influenced people's vaccination behavior (Puri et al. 2020), with scarce empirical work thoroughly addressing the specific influence of argumentation types (McKinnon und Orthia 2017).

Our two-wave randomized control trial uses a sample of 3600 non-Sars-Cov-2-vaccinated subjects of Germany's general population. We implemented a 3x2 factorial between-subjects design and ask participants whether or not they intend to get vaccinated and what can be held in favor and against it. In the first wave, the treatments vary in the argument types the subjects were primed to use before entering a discussion process. Moreover, by having a control group that does not chat with other participants we test for the effectiveness of the integrated chat itself. Precisely, by analyzing the sentiments and discourse dynamics from the text generated from the discussions, we seek to understand how narrative-based arguments (i.e. anecdotes, stories) versus fact-based arguments play a role in shifting opinions across social groups. We investigate vaccination preferences on both an individual and a collective level, i.e. how individuals change their normative evaluations through discussion with random peers. Specifically, we first elicit individual preferences with Likert-scale survey questions as well as from textual data from free-form text boxes. Afterwards, participants discuss their preferences with up to four other randomly assigned participants. As a final step of the first wave, we re-elicit their vaccination preferences to investigate whether group discussion changes their attitude regarding the Sars-Cov-2 vaccine.

Eight weeks later, the same subject group was surveyed in order to identify the participants' vaccination status. This allows us to observe whether they behaved as stated in the first wave. The results indicate that nearly 60% behaved as initially stated. Surprisingly, about 35% of the subjects who initially indicated that they are very or rather likely to take the vaccine once available, had not received their first shot at the time of the second wave, despite the fact that vaccines were no longer scarce and vaccination appointments were relatively easy to get at this point. However, due to the summer holiday season, people might have been travelling. In terms of treatment effects, there was a significant increase in vaccination behavior relative to their initial stated attitude among those participants who were primed to use narrative-based arguments. As expected, the number of vaccine

supporters in the discussion process increases the propensity of skeptical participants to get vaccinated.

Our analysis combines the results from survey outcome variables, along with extracted text variables usingtopic modelling (Jeloda et al 2019) dictionary-based text analysis techniques (Tausczik und Pennebaker 2010; Tan et al. 2016) on the free-form text-boxes and chat discussions. This allows us to obtain a comprehensive understanding of how private attitudes of various social groups interplay with the argumentation strategies that they use in randomly matched chat discussions.

Our main objective with this chat experiment is to better understand the argumentation strategies of people who are in favor and against vaccination, thus contributing a valuable empirical finding on society's attitude towards vaccination. Moreover, this study is externally relevant to studyother economically and politically relevant situations, where public good provision and welfaredepends on the coordinated actions of individuals who form their beliefs and motivations within their own social networks.

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Project Start 01.05.2021

Enhance the willingness of healthcare workers to be vaccinated against COVID-19 in Germany

Cluster: Vaccination

Principal investigators

Nicole Skoetz
University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Evidence-based Oncology

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Interventions to increase COVID-19 vaccine uptake: A Cochrane Scoping Review

Authors: Marike Andreas, Emma Bohndorf, Claire Iannizzi, Ina Monsef, Vanessa Piechotta, Nicole Skoetz

Affiliation: University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Cochrane Haematology

Context

Vaccines are effective in preventing COVID-19, a disease for which few treatments are available and which can lead to severe disability or death. Widespread vaccination against COVID-19 ensures the protection of those not yet able to get vaccinated. In addition, new and vaccine-resistant mutations of SARS-CoV-2 are less likely to develop if the spread of COVID-19 is contained. Vaccines are now widely available in most high-income countries. Experts recommend that a vaccination rate between 60% to 80% and above needs to be reached for heard immunity. However, vaccine hesitancy is a serious threat to the goal of nationwide vaccination in many countries.

Objective

We aimed to scope the existing research landscape on interventions to enhance the willingness to get vaccinated against COVID-19 or to decrease COVID-19 vaccine hesitancy and map the evidence according to targeted populations and intervention categories.

Methods

We systematically searched relevant databases until June 2021. Two authors screened the literature and extracted data. We included studies that assess the impact of interventions implemented to enhance the willingness of different populations to be vaccinated against COVID-19 or to decrease COVID-19 vaccine hesitancy. We included RCTs, observational studies, and single-arm and case-studies studies with more than 100 participants. Furthermore, we included systematic reviews and meta-analyses. Using an interactive tool, we mapped the identified interventions according to pre-specified intervention groups. We adapted the intervention groups to fit our results. Furthermore, we mapped the country in which the study was conducted and whether the design was randomised-controlled or not.

Results

We included 41 studies in the scoping review, 20 of which are still ongoing. Most studies assessed the intention to get the vaccine after the intervention as an outcome. Furthermore, vaccination uptake and vaccine hesitancy were assessed in studies. 10 studies with published results were randomised-controlled and 15 ongoing studies planned a randomised design. A majority of studies was conducted in English-speaking high-income countries. Moreover, most studies investigated the interventions in an online setting and not in the real world. Populations that were addressed were quite diverse with studies targeting healthcare workers, ethnic minorities in the US, students, soldiers, villagers, at-risk patients, elderly, or the general population.

Conclusion

A manifold of studies exist that investigate interventions to increase COVID-19 vaccine uptake. To ensure the topicality of this scoping review, we will perform an updated search. Results will then be discussed with stakeholders. Based on this discussion, a systematic review will be conducted. The results from this scoping review and subsequent systematic review can help policymakers to identify effective and population-specific interventions to increase COVID-19 vaccine uptake.

Project Start 18.05.2020

Natural killer cell-mediated ADCC in SARS-CoV-2 infected individuals and vaccine recipients

Cluster: Vaccination

Principal investigators

Kerri Hagemann
Leibniz Institute for Experimental Virology,
Virus Immunology

Presentation Slot 14:45

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Abstract

COVID-19, caused by SARS-CoV-2, has emerged as a global pandemic. While immune responses of the adaptive immune system have been in the focus of research, the role of NK cells in COVID-19 remains poorly understood. Here we characterized NK cell-mediated SARS-CoV-2 antibody-dependent cellular cytotoxicity (ADCC) against SARS-CoV-2 spike-1 (S1) and nucleocapsid (NC) protein. Serum samples from SARS-CoV-2 resolvers induced significant CD107a-expression by NK cells in response to S1 and NC, while serum samples from SARS-CoV-2-negative individuals did not. Furthermore, serum samples from individuals that received the BNT162b2 vaccine induced strong CD107a-expression by NK cells that increased with the second vaccination and was significantly higher than observed in infected individuals. As expected, vaccine-induced responses were only directed against S1 and not against NC protein. S1-specific CD107a responses by NK cells were significantly correlated to NK cell-mediated killing of S1-expressing cells. Interestingly, screening of serum samples collected prior to the COVID-19 pandemic identified two individuals with cross-reactive antibodies against SARS-CoV-2 S1, which also induced degranulation of NK cells. Taken together, these data demonstrate that antibodies induced by SARS-CoV-2 infection and anti-SARS-CoV-2 vaccines can trigger significant NK cell-mediated ADCC activity, and identify some cross-reactive ADCC-activity against SARS-CoV-2 by endemic coronavirus-specific antibodies.

Project Start 08.01.2020

Establishment of long-term humoral memory against SARS-CoV-2 after vaccination versus infection

Cluster: Vaccination

Principal investigators

Professor Dr Hans-Martin Jäck
University of Erlangen

Professor Dr Klaus Überla
University Hospital Erlangen,,
Friedrich-Alexander Universität
Erlangen-Nürnberg

Presentation Slot 15:15

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Title: Establishment of a long-term humoral memory against SARS-CoV-2 after vaccination versus infection

Investigators

Jäck, Hans-Martin, **Überla, Klaus and Winkler, Thomas**,
Friedrich-Alexander-Universität Erlangen-Nürnberg
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Summary

There is currently almost no data available about a long-term B cell memory after infection with Severe Acute Respiratory Syndrome (SARS) coronavirus 2 (CoV-2) or other coronaviruses via the respiratory tract. Therefore, our long-term goal is to understand in detail the induction of a humoral memory response during a natural infection with SARS-CoV-2 and compare the response with that induced by different vaccination protocols. Therefore, this proposal's primary goal is to compare humoral immune responses during natural CoV-2 infection with that induced by vaccination. To reach this goal, we will follow antibody titers, antibody affinity maturation and frequencies of CoV-2 spike protein-specific memory B cells and plasma cells in a mouse line that carries a humanized allele of the CoV-2 receptor angiotensin-converting enzyme 2 (i.e., hACE-2 KI mouse) and produces human antibodies (i.e., the so-called Trianni mouse that produces only human antibodies) either naturally infected with CoV-2 or immunized with various vaccines. These studies will provide a clearer picture of how a protective long-term humoral immunity against SARS-CoV-2 is induced and whether B cell responses differ between a single infection and various vaccine protocols. This knowledge might be extrapolated to other respiratory coronaviruses and establish vaccination protocols for a future pandemic by SARS coronavirus variants or other zoonotic respiratory pathogens.

Aims of the project

There is currently almost no data about long-term B cell memory after infection with SARS-CoV-2 or other coronaviruses via the respiratory tract. Therefore, our long-term goal is to understand in detail the induction of a humoral memory response during natural SARS-CoV-2 infection and compare the response with that induced by different vaccination protocols. We will use mice expressing a human antibody repertoire (i.e., the Trianni mouse) and mice carrying a humanized SARS-CoV-2 entry receptor required for natural infections with CoV-2 to reach the following specific aims

- **AIM 1:** Analyze humoral immune responses at the cellular level against different CoV-2 spike protein vaccine formats at the cellular level in C57/Bl6 mice and antibody-humanized Trianni mice
- **AIM 2:** Compare the kinetics of humoral responses between naturally infected and vaccinated mice
- **AIM 3**: Analyze the antibody repertoires and transcriptome landscapes between Bmem cells and plasma cell subsets from SARS-CoV-2-infected and CoV-2 spike protein-vaccinated mice

These studies will provide a clearer picture of how protective long-lived humoral immunity against SARS-CoV-2 is induced and whether B cell responses differ between a single infection and a classical boost vaccination. This knowledge might be extrapolated to other respiratory coronaviruses and establish vaccination protocols for a future pandemic by SARS virus variants or other zoonotic respiratory pathogens.

Project Start 01.05.2021

Phenotypic and functional analysis of immune cells during severe COVID-19

Cluster: Vaccination

Principal investigators

Professor Dr Anja Erika Hauser
Charité - Universitätsmedizin Berlin

Presentation Slot 15:30

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Tissue remodeling and repurposing upon severe COVID-19: an immune-mediated, self-perpetuating mechanism for fibrosis

Ronja Mothes[1,2*], Anna Pascual-Reguant[2,3*], Ralf Köhler[2], Juliane Liebeskind[2,3], Alina Liebheit[2,3], Sandy Bauherr[2], Raluca Niesner[2,4], Helena Radbruch[1**], Anja E. Hauser[2,3**]

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Equally contributing first * and senior ** authors

During the course of the pandemic, it has become evident that immune pathology is decisively contributing to the pronounced tissue damage occurring in severe COVID-19. Here, we have combined multiplexed histology with spatially resolved transcriptomic analysis in lung autopsy tissues, in order to phenotypically characterize and map the immune response, and identify mechanisms of immune-mediated tissue destruction. We have analyzed tissue of patients at various time points of severe COVID-19 by multiplexed histology (MELC). We find that the acute phase of the disease is characterized by endothelial destruction, which triggers the accumulation of macrophages expressing the heme receptor CD163 in perivascular regions. Spatial transcriptomics analysis of serial sections reveals pro-fibrotic factors to be highly enriched in those areas, which thereby act as seed points for the fibrotic cascade. In addition, at late time points after infection, we see an accumulation of T cells in those areas, along with the up-regulation of factors attracting those cells. Together, our data suggest an immune-mediated, self-perpetuating mechanism of dysregulated repair, followed by tissue repurposing and excessive T cell accumulation.

4

Information dissemination, Misinformation

Project Start 01.06.2021

The Impact of Public Discourse on Health Care Utilization during the COVID-19 Pandemic

Cluster: Information dissemination / Misinformation

Principal investigators

Dr Esra Eren Bayindir
Universität Hamburg, Hamburg Center for Health Economics

Professor Dr Robert Fuchs
Department of English, University of Hamburg

Presentation Slot 10:30

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The aim of this project is a comparative analysis of public discourses around the COVID-19 pandemic across time and two countries (Germany and England) that adopted distinct public policy responses. Through the use of several complementing analytical tools and data sources, the analysis will reveal which variables affected the public response to health policy measures adopted in the face of the pandemic and utilization of healthcare services unrelated to COVID-19. Against the background of the unintended and long-lasting public health consequences associated with the COVID-19 pandemic, our project will provide essential lessons for public policy actors on how public policies are perceived by the population and to what extent they comply or respond to them. England and Germany provide an instructive test case for this approach for several reasons. Both countries share considerable demographic, social, economic and cultural similarities, but England fared

This project will track public debates through a big data approach, based on newspaper and social media data. We will identify a range of keywords associated with the debate around COVID-19 (e.g., for German, *Corona, Coronalüge, Lockdown*). Based on these keywords, we will compile a large database of newspapers reports and geo-tagged social media data. This database will then be analyzed as to the frequency of the debate, non-literal language as well as sentiments expressed during the debate. We will focus on the period of time between December 2019 (i.e. before the onset of the pandemic in England and Germany) until end of the pandemic, or three months before the end of the project period, whichever comes first.

Using this data, we will estimate the causal impact of intensity of the debate, sentiments and metaphors associated with it, on actual uptake of public policies and utilization of healthcare services unrelated to COVID-19 by county/*Landkreis* across time. Public response to health policy measures and utilization of emergency departments, ambulatory care services for preventive care will be tracked based on reports and surveys in general, and *claims data* of statutory health *insurance* funds for Germany and data from the National Health Service for England. While comparing countries, we will focus on changes in the variables to avoid reverse causality, which will be present when population characteristics determine the intensity of public discourse.

Project Start 01.09.2021

Elucidating the interplay of COVID-19 epidemic and social dynamics via Internet media in Germany

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Vitaly Belik
Freie Universität Berlin

Presentation Slot 10:45

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Assessing safety profiles and social perception of COVID-19 vaccines via Internet media content analysis

Andrzej Jarynowski and Vitaly Belik
System Modeling Group, Institute for Veterinary Epidemiology and Biostatistics, Freie Universität Berlin, Berlin, Germany

Within our project on the Internet media analysis in the context of COVID-19 we have launched a study on pharmacovigilance and social perception of Adverse Events (AE) of COVID-19 vaccines. We quantitatively analyzed "digital traces" on the Internet (social media such as Twitter and Telegram and content filtering media such as Google Search) for concepts related to potential post-vaccination adverse reactions from December 2020 until October 2021. The primary goals were i) to estimate the incidence of mild adverse events (and their co-occurrence) for various vaccines and vaccinated populations using deep learning for named entities recognition; ii) to describe the dynamics of attention to the topic using time series analysis of keyword appearance and interdependencies in the form of topic modeling and sentiment analysis. In a case study we obtained frequencies of selected 12 non-severe adverse effects (AEs) of Sputnik V vaccine extracted by deep learning from 11 515 self-reported post vaccination effects posted on the Russian language Telegram group [1]. We also performed validation of the AEs frequencies against known registries on AEs. Besides, we built a risk calculator for non-severe AEs of Sputnik V to encourage people's understanding of reactivity patterns of the vaccine, which would not be possible by using very limited knowledge from publicly available clinical trials and post-marketing registries. We observed no simple relation between the number of vaccinations performed and the number of thematic posts or search queries. Interest in possible adverse reactions is not related to the epidemiology of adverse events, and it is to a large extent the result of the socio-political determinants of the vaccination process. The greatest increase in interest was observed when the vaccination process accelerated (freshness effect). For instance, interest in blood clots on Google in march 2021 exploded in some countries (i.e. Germany) but in other did not change at all (i.e. Russia). We claim that Internet content related to vaccine safety profiles seems to be in general more closely related to media coverage than to actual safety profile of vaccines. However, infoveillance can be useful in early warning pharmacovigilance for some AEs during mass vaccination campaigns in some settings such as participatory/community epidemiology forums on social media. Adverse event extraction from embedded posts with known individuals' characteristics (age, sex) with application of BERT deep learning technology could sometimes, as it was shown for Sputnik V, provide very detailed knowledge even superior to vaccine registration documentation based on clinical and post marketing surveillance. Currently, we are investigating the discourse on vaccines' AEs on German language social media to reveal insights on the socio-political interplay to eventually facilitate vaccination campaigns.

[1] Jarynowski A, Semenov A, Kamiński M, Belik V. Mild Adverse Events of Sputnik V Vaccine in Russia: Social Media Content Analysis of Telegram via Deep Learning. Journal of Medical Internet Research. 28/09/2021:30529 (forthcoming/in press) https://doi.org/10.2196/30529

Project Start 01.07.2021

Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Emese Domahidi
Technische Universität Ilmenau

Dr Andreas Schwarz
TU Ilmenau

Professor Dr Martin Löffelholz
Technische Universität Ilmenau

Dr Nadine Steinmetz
TU Ilmenau

Presentation Slot 11:15

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DECIPHER - Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA

Abstract:

DECIPHER, short for 'Deciphering the pandemic public sphere', is an international research project carried out by the Technische Universität Ilmenau in cooperation with the German Federal Institute of Risk Assessment (BfR). The project aims at evaluating and comparing the cross-national effectiveness of risk and crisis communication concerning the Covid-19 pandemic over the course of three years, from 2021 to 2024. The principal investigators and research associates are working on four different work packages which each focuses on different aspects of Covid-19 risk and crisis communication. The project is supported by a number of internationally renowned scholars (Mercator fellows) from Italy, the Netherlands, Spain, Sweden, the United Kingdom and the USA.

The first objective of the project is the comparative analysis of strategies, structures and messages by governments and health institutions during the Covid-19 pandemic to understand the impact of government communication on infection rates, self-protective behaviour of the public and public opinion in general. In order to do so, researchers will conduct in-depth interviews with governments representatives and health organisation officials, along with an analysis of government documents, press releases and information published on official social media channels. The second goal is to examine the discourse in online news media with the widest distribution and different political leanings in each country, as well as certain social media platforms and how they decided to present the pandemic and governmental communication on Covid-19 to the public. Furthermore, DECIPHER aims at analysing the citizens´ perceptions in order to understand whether governments and media have met citizens´ expectations and information needs during the course of the pandemic. With a survey based on the results of individual in-depth interviews, citizens´ reactions to Covid-19, the relevance of government communication on their behaviour and the spreading of disinformation will be inquired. Additional computational analyses of social media contents will reveal influential opinion leaders, their Covid-19-related risk messages and their impact on other stakeholders active on social networks. This also aims at understanding the spread of misinformation and the emergence of echo chambers.

The project´s overall goal is to compare the effectiveness of the publicly provided messages between the seven participating countries and, with help of aggregated data, develop a theoretical model of cross-national risk and crisis communication for public health crises, a

strategy for real-time monitoring of social media-based risk and crisis communication, and guidelines for improving government communication during pandemics. This multifaceted research requires not only a multidisciplinary approach ranging from communication science, psychology, and computer and data science, but also a combination of qualitative, quantitative and computational research methods.

Project spokespersons are Prof. Dr. Martin Löffelholz (martin.loeffelholz@tu-ilmenau.de) and Jun.-Prof. Dr. Emese Domahidi (emese.domahidi@tu-ilmenau.de), both researchers at TU Ilmenau. More information on the project can be found on the official website: https://www.tu-ilmenau.de/decipher

Project Start 01.06.2021

Science communication during pandemics: The role of public engagement in social media discussions

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Nicole Krämer
University Duisburg-Essen

Presentation Slot 11:30

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Science communication during pandemics: The role of public engagement in social media discussions

Prof. Dr. Nicole Krämer

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Department of Computer Science and Applied Cognitive Science

Department of Social Psychology: Media and Communication

Prof. Dr. Stefan Stieglitz

Lea-Marie Braun

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Prof. Dr. Monika Taddicken

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Department of Social Sciences

During times of pandemics, it is vital that the public is well informed about the disease, its dissemination, and necessary countermeasures. During the current Covid-19 crisis, direct communication by scientists proved to be more effective than general media consumption regarding the audience's knowledge, self-efficacy, and intention to adhere to the measures (Szczuka, Meinert, & Krämer, 2020). However, it has not been sufficiently addressed how this direct science communication resonates in social media and to what extend the public engagement with scientific knowledge leads to the messages being corroborated or contradicted and eroded. The goal of the proposed project is to contribute to this question by analysing the proportion of evidence-based social media activities as well as the dissemination of emotionally toned messages (primarily focusing on fear and anger). Based on findings that pandemics are prone to the dissemination of disinformation, we further scrutinize how actual and feigned experts differ in their communication and how well laypeople can distinguish them. We will employ in-depth manual coding of social media content (communication science), apply this to – already collected - large data sets by computational methods (computer science) and analyse psychological effects and mechanisms by experimental methods (psychology).

Project Start 01.10.2021

Pinning Down the Hypothetical. Pandemic Preparedness since the 1990s – Historical, Ethical and Legal Preconditions of Managing Corona Virus Response

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Heiko Stoff
Institut für Ethik, Geschichte und Philosophie der Medizin, Medizinische Hochschule Hannover

Presentation Slot 11:45

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DFG: Research Conference *Pandemics,* 15. November 2021

Prof. Dr. Cornelia Rauh (Historisches Seminar, Leibniz Universität Hannover)
Dr. Jonathan Voges (Historisches Seminar, Leibniz Universität Hannover)

Apl. Prof. Dr. Heiko Stoff (Institut für Ethik, Geschichte und Philosophie der MHH)
Dr. Wiebke Lisner (Institut für Ethik, Geschichte und Philosophie der MHH)

Pinning down the Hypothetical. Pandemic Preparedness since the 1990s – Historical preconditions of managing corona virus response (PreCoM)

Abstract

The “age of immunity” (Thießen) came to an end at the latest in the 1980s. As the flip side, of a new phase of globalization, the perception of viruses as a threat to health, the economy, prosperity, and security increased. At the same time, contagion control, in many cases historically verifiable, was never accompanied by medical and hygienic consequences only, but always by—more or less far-reaching—political, social, economic, ethical, and legal ones as well. The pandemic plans that have been advanced since the 1990s were therefore directed at a field of action founded in epidemiology in a complex future contingent on numerous uncertainties. Hence both the World Health Organization (WHO) as well as responsible authorities in the Federal Republic of Germany attempted to plan for a pandemic future. These plans were readjusted following the outbreak of every new pandemic. What resources the plans were based on? What public health measures were projected? What perspectives were included or excluded? What social segments were taken into account?

Preparedness concepts and pandemic plans were produced in communication and negotiation processes between health experts, supranational institutions, national actors, and civil societies. These processes between “global” and “national”, “public” and “private”, nation and individual will be considered based on two objects of study since the 1990s:

The WHO will be one object of study: After the Cold War and with the newly emerging viruses the international organization searched for a new role in world politics. It developed a self-conscious mode of action, invited international experts from the various fields of public health and published several pandemic preparedness plans. All of them were based on the assumption that only international cooperation would be able to stop viruses from spreading. The 1990s and early 2000s could be interpreted as a case study for the significance of a strong WHO which did not shy away to challenge national sovereignties in order to give a forceful answer towards the global risk of a pandemic outbreak.

For newly reunited Germany—the second object of study—it is necessary to clarify how pandemic plans were taken up and effectuated in a federal structure for the old and the newly formed German states. Owing to the Robert Koch Institute’s responsibility and leading role in infection protection the plans were oriented toward epidemiology and virology. Also, the national pandemic plan ascribed crucial importance to risk and crisis communication for

successful crisis management. The project examines from a history of medicine perspective the decision-making and planning process as well as its concretizations during outbreaks of pandemics in the 1990s and 2000s (e.g. the avian influenza) in Germany as a national example. It thereby underlines the need for crisis dialog as well as for widening the circle of experts including other social segments attempting pandemic planning.

Project Start 01.01.2022

Boosting citizens' vaccination decision-making using effective communication - VaccineComm

Cluster: Information dissemination / Misinformation

Principal investigators

Dr Felix Rebitschek
Harding Center for Risk Literacy, Faculty of Health Sciences BB, University of Potsdam

Presentation Slot 12:15

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Abstract

Our research seeks to boost citizens' vaccination decision making by designing and testing communication tools that are based on medical evidence, acknowledge uncertainties and reach people with diverse vaccine preferences and cultural/regional contexts. We also seek to understand the extent to which transparent and honest communications impact the trustworthiness of public health institutions (e.g., the RKI, the BZgA). We will evaluate different tools and communication strategies in the light of these objectives to inform future vaccination communication campaigns, theories on vaccination uptake and hesitancy and trust in institutions.

Project Start 03.01.2022

Assisting behavioral science and evidence-based policy making using online machine tools

Cluster: Information dissemination / Misinformation

Principal investigators

Dr Stefan Herzog
Max Planck Institute for Human Development

Presentation Slot 12:30

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POLTOOLS: Assisting Behavioral Science and Evidence-Based Policy Making Using Online Machine Tools

Social and behavioral measures remain central to the world's response to COVID-19. Though the emphasis on different aspects of the behavioural sciences will change as the pandemic unfolds, one unifying theme connects all threads: Providing a suitable and useful evidence base for high-stakes policy decisions under time pressure requires rapidly drawing together research across sub-fields and disciplines that are presently, at best, loosely interconnected; formulating and conducting new research; distilling findings into formats digestible by policymakers, and providing expert guidance to decision-making bodies.

New ways of engaging the whole scientific community are needed to support these urgent needs while avoiding the adverse consequences of group-think in small groups of scientific advisors. And all this has to happen at speed, without sacrificing scientific quality and integrity, and without needlessly reinventing wheels. Furthermore, the facts that scientific evaluation is increasingly found on social media (esp. Twitter), that scientists take on ever more public roles, that there is increased demand for transparency of science-to-policy interactions, and that even alternative science advisory bodies have emerged emphasizes the important question of how the behavioural sciences should adapt to best support evidence-based policy in the rapidly changing, high stakes environment of a crisis.

To help meet the challenges stemming from COVID-19 and other, future global crises, there is thus an urgent need to develop, deploy and empirically evaluate online machine tools (e.g., intelligent search and collaboration interfaces) that improve the scientific process and the interface between behavioral science and evidence-based policy making.

This project (POLTOOLS; https://scibeh.org/poltools) builds on already operating systems implemented by the SciBeh initiative and methodologies developed by havos.org. The project will pursue the following three objectives by implementing suitable tools to achieve them in three respective real-world use cases:

(1) Facilitating rapid knowledge creation by connecting and enriching existing, ad hoc infrastructure to support efficient and rapid development, analysis, evaluation, and dissemination of emerging and extant research (e.g., consolidating a preprint's timely, but scattered discussion on Twitter into a short, digestible format to assist the evaluation of preprints).

(2) Facilitating rapid knowledge curation, integration and aggregation using natural language processing (NLP), information retrieval technologies and minimal, scalable human curation (e.g., visualizing emerging topics in the scibeh.org knowledge base using NLP tools, such as topic models).

(3) Facilitating rapid policy making (e.g., by organizing machine-assisted rapid open think tanks by implementing a hybrid human/machine approach to create and synthesize key arguments and insights from scientific and policy discussions).

Project Start 01.06.2021

Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Jan Häusser
Justus-Liebig-University Giessen

Professor Dr Andreas Mojzisch
University of Hildesheim

Presentation Slot 12:45

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Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model

Organizations influence their employees' behavior in a wide range of areas. But can organizations affect how strictly employees adhere to COVID-19 guidelines? Building on organizational climate research, we predict that an organizational climate that values safety and health in times of the pandemic increases employees' adherence to COVID-19 guidelines both at work and in their private life. The main goal of the proposed project is to test this hypothesis. By adopting a social psychological lens, we propose a new moderated mediation model which provides a thorough understanding of how organizational climate promotes adherence to COVID-19 guidelines. We hypothesize that the effect of organizational climate on adherence to guidelines is mediated by the perception of COVID-related injunctive social norms. We also predict that this mediation is moderated by climate strength (i.e., the degree of within-unit agreement of climate perceptions) and by organizational identification. Climate strength is proposed to moderate the relationship between organizational climate and the perception of COVID-related injunctive norms such that the relationship is stronger at higher levels of climate strength (i.e., a first-stage moderated mediation). The importance of organizational identification, the second proposed moderator, can be derived from social identity and self-categorization theory. According to these theories, the perceived group norms become relevant only when group membership is a vital component of one's self-definition. Hence, we predict that the relationship between the perception of COVID-related injunctive norms and adherence to COVID-19 guidelines is stronger the more employees identify with their organization (i.e., a second-stage moderated mediation). Finally, we predict a spillover effect from work to private life. Thus, we predict that organizational climate affects adherence to guidelines in private life, which is mediated by adherence to guidelines at work. In a pre-study with N = 304 UK employees (Hubert et al., 2021), we developed a 7-item measure to assess an organizational climate for preventing infectious diseases (OCID). In the proposed project, we will significantly extend this work. Specifically, we aim to conduct two multi-wave studies that allow the entire moderated mediation model to be examined. From a theoretical perspective, our project addresses a fundamental gap in organizational climate research: We still have scant knowledge about the mechanisms underlying the effects of organizational climate on desired behavioral outcomes. From a practical perspective, our project highlights the role of organizations in the current pandemic. So far, attention has focused on government and media as agents for promoting adherence to guidelines, while the role of organizational efforts in COVID-19 prevention has received little attention.

Project Start 01.10.2021

Populist Discourses on COVID-19 in the Global South (POP-DISC)

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Sandra Destradi
Albert-Ludwigs-Universität Freiburg

Presentation Slot 14:00

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Populist Discourses on COVID-19 in the Global South (POP-DISC)

Sandra Destradi, University of Freiburg, Germany
sandra.destradi@politik.uni-freiburg.de

Project funded by the German Research Foundation, 2021-2022

Populism appears to have substantial implications in the context of the COVID-19 pandemic, both in terms of undermining the fight against the pandemic through appeals to 'common sense' against 'elitist' expert knowledge (Lasco 2020), and with regards to a weakening of democratic institutions in the name of crisis management for the 'people' ('pandemic backsliding', see V-Dem 2021). In the deeply divided societies of several countries of the Global South, these effects of populism can be expected to be particularly detrimental (Rogenhofer and Panievsky 2020). Yet, we actually see a high degree of variation in populists' approaches to the pandemic.

The proposed project (POP-DISC) aims to make a first contribution towards a theorization and systematic empirical analysis of the impact of populism in the context of COVID-19. It does so by focusing on **populist discourses on the pandemic**, asking the following questions:

RQ1: Which narratives shape the official discourse on the pandemic in countries governed by populists?

RQ2: How are these narratives received, reproduced or contested by the wider public, including on social media?

The main assumption underlying POP-DISC is that the way in which governments communicate about the pandemic with the public plays a fundamental role in the implementation of policies aimed at limiting the spread of the virus. Convincingly framing state responses to COVID-19 as a common battle of the 'people' against the virus might help the implementation of such policies, while discrediting science would obviously undermine them (Lasco 2020; Painter and Qiu 2020). At the same time, populist discourses on the pandemic, for example entailing the stigmatization of minorities excluded from the 'true people', can exacerbate societal divisions and underscore 'pandemic backsliding'. If we want to understand the impact of populism in the context of COVID-19, we therefore need to study populist discourses on the pandemic in the first place.

POP-DISC takes a theory-led explorative approach, assessing to what extent the constitutive elements of populism (anti-elitism and people-centrism, involving an often exclusionary definition of the 'people') are reflected in discourses on the pandemic. The empirical analysis will focus on **five countries in different regions of the Global South with populist governments: Brazil, India, Israel, Mexico, and Turkey**.

POP-DISC will analyze both official **government** narratives on the pandemic as well as the reception, reproduction or contestation of such narratives among the **larger public**, with a particular focus on **social media and chat apps**.

Project Start 15.10.2021

Belief states of vulnerable groups in crises in Latin America: sociolingustic and computational assessment

Cluster: Information dissemination / Misinformation

Principal investigators

Olga Kellert
Universität Göttingen, Romance Department

Professor Dr Stavros Skopeteas
University of Göttingen

Presentation Slot 14:15

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Belief states of vulnerable groups in crises in Latin America:

sociolingustic and computational assessment

Principal Investigators

Olga Kellert and Stavros Skopeteas, University of Göttingen

Cooperation partners: Barbara Blaha Degler Pfeiler (Mexico); Claudia Crespo (Peru); Marleen Haboud (Ecuador); Jana Lasser (Austria); Fernando Ortega (Ecuador)

Indigenous people belong to the particularly vulnerable groups in the COVID-19 era are disproportionally affected by epidemics and other crises, as acknowledged by the United Nations. Beyond the general problems related to the socio-economic marginalization and the concomitant inaccessibility of health-care services (in particular in rural regions and remote communities), a major threat for indigenous people arises through miscommunication, either due to the sparsity of information material in indigenous languages or due to cultural differences hindering the interpretation/application of the recommended health measures; see recent reports on Latin American indigenous people in. Dissemination of reliable COVID-19-related information, adapted to cultural and linguistic background of indigenous peoples is a major priority in the current crisis.

The major aim of the present project proposal is to determine what role the linguistic and cultural background of indigenous people from Latin America plays in dissemination of relevant information about COVID-19 propagated by high-impact news outlets (henceforth the Reference Corpus). This aim entails the development of interdisciplinary methods (including sociolinguistic and computational linguistic metrics) for assessing belief states and measuring the degree to which these belief states mirror the Reference Corpus. Special attention is given to complement questionnaire-based data collections with more socially natural data-gathering methods (e.g. free interview), which are particularly important in order to include individuals who are less accustomed to performing highly controlled tasks.

In order to reach the major aim of the project proposal, we created an interdisciplinary group of experts, already cooperating in various related projects. The group combines expertise in linguistic analysis and sociolinguistics, social and medical anthropology, computational methods in social sciences and sociolinguistics, statistic modelling, bilingualism research in Latin America and research of indigenous languages in Latin America, in particular Ecuador, Peru and Yucatán.

Based on the results of this study, the project partners envisage to submit a larger proposal with the contribution of experts from further regions for the study of the role of indigenous languages and cultures in the dissemination of information with social relevance.

Project Start 01.08.2021

COVID-19 and pastoralism in a context of rupture and structural reforms in Benin: Learning from uncertainty management from below

Cluster: Information dissemination / Misinformation

Principal investigators

Dr Jeannett Martin
Georg-August University of Goettingen,
Göttinger Institut für Ethnologie

Presentation Slot 14:30

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Abstract

The project examines the social and economic implications of the current COVID-19 pandemic, and of the knowledge and perception of these phenomena at the margins of the infectious events. These margins include large parts of the African continent, which have among the lowest infection rates worldwide. For analysing such dynamics, the project focuses on pastoralists, a group that is also living in the shadow of globally circulating information flows. Pastoralists are an interesting case: they are seen as experts in dealing with uncertainties, while their livelihoods have come under serious pressure in many parts of Africa. The core question of this project is whether – and if so how and to what degree – pastoralists are affected by a virus that is causing havoc in completely different parts of the world. The project therefore seeks to contribute to a better understanding of the pandemics, not from its centres but from what is assumed to be its periphery. To examine the current dynamics, the project draws on approaches from anthropology and the sustainable livelihood framework, using 'uncertainty' as central theoretical concept and analytical lens. As women are often seen as carrying the bulk of the burden of pandemics, gender is used as a further lens. Empirically, the project seeks to scrutinise how the pandemic is experienced, interpreted and managed by pastoralists in different parts of Northern Benin. Therefore, ethnographic research will be conducted through two case studies – (1) pastoral households and (2) pastoralist women's associations – in two regions of Northern Benin. The project uses a mixed-method approach comprised of participant observation, open and standardised interviews, digital communication and situational analysis. Drawing a much more nuanced picture of how and with what consequences this 'global' pandemic evolves at its edges and how pastoralists who are experienced in dealing with uncertainty perceive the outcomes of the pandemic will help to clarify the scope of the pastoralists' adaptability. This knowledge is important in how it might affect the future of pastoralism in this region, but also in how it might contribute to a better understanding of the globalising effects of crises which started in China, Europe or elsewhere.

Project Start 01.09.2021

Education Systems and COVID-19 Management in Central Africa

Cluster: Information dissemination / Misinformation

Principal investigators

Dr Julia Seibert
Universität Bamberg

Presentation Slot 14:45

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Education Systems and COVID-19 Management in Central Africa - EduCOV

Prof. Dr. Annette Scheunpflug, Dr. Julia Seibert, University Bamberg

Abstract

How do schools respond to COVID 19 and its related consequences? What strategies are teachers, principals, school boards, and governments using to mitigate immediate consequences of the pandemic? This study examines how education systems in Rwanda and the Kivu region (Democratic Republic of Congo) are responding to the pandemic and how education stakeholders are managing the crisis. Both study sites are in the Great Lakes region. Education systems in this region face significant challenges structurally and have multiple experiences in crisis management (previous experience with the pandemic due to Ebola, vulnerability of political structures, plurality of providers in the education system, and civil society engagement, etc.). Both countries/regions have experienced significant school closures and organizational changes in the school system since March 2020 due to the pandemic.

The study attempts to analyze the different levels of governance of education systems. Who decides on school closures or on measures to contain the pandemic? How does this process differ in Rwanda, usually described as an authoritarian state, from the Democratic Republic of Congo, which is considered a fragile or non-state? Who takes actions to manage the pandemic? Who takes the initiative and appropriates new (learning) spaces, for example, through distance learning via radio or other media? How do both education systems contribute either to overcoming the crisis (e.g., through education about the pandemic, through appropriate hygiene measures, vaccination campaigns) or to exacerbating it (e.g., by deepening educational inequality, through social exclusion of groups of students and teachers)?

The study focusses on the following research questions:

(1) Mapping: how do different levels of education system governance (government, school boards, school administrators, and teachers) in the Great Lakes region respond to the pandemic?

(2) Analysis of the governance during the crisis: which factors prove to be stabilizing/ destabilizing - with respect to the different educational systems?

(3) Analysis of the different school providers: what role does the "plurality of school providers" play in such a crisis? Does plurality mitigate or exacerbate the consequences of a pandemic?

Project partners:

Protestant University of Rwanda in Huye/Butare (Rwanda)

Université Libre des Pays des Grands Lacs in Goma (DRC)

Project Start 01.01.2022

Design and Control of Incompletely Specified Products

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Jochen Gönsch
Universität Duisburg-Essen

Presentation Slot 15:15

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Design and Control of Incompletely Specified Products

Jochen Gönsch, Universität Duisburg-Essen

Many industries from retail to travel increasingly use a new selling strategy that is based on reducing waste – be it otherwise unused airplane seats or discarded groceries. The customer of a so-called incompletely specified product (ICSP) buys a menu of alternatives. After the purchase, the firm assigns her an alternative. Examples are the widely-known upgrades as well as more recent innovations. Consider “Blind Booking” by Germanwings: Customers choose departure airport and day along with a theme (like “Beach and Sun”). Destination and departure time are chosen by the airline. This has two major advantages for the airline:

1) Due to their inherent uncertainty, ICSPs offer an entirely new dimension for customer segmentation, namely strength of customer preferences. Whereas a price-sensitive leisure customer may buy “Blind Booking” to get to the beach, it is hard to imagine a business traveler going to an arbitrary town.
2) If the firm assigns the alternative some time after the purchase, it may benefit from additional flexibility because uncertainty regarding demand is usually smaller at this later point in time.

Although the revenue share of ICSPs is often small, it is important to note that their additional revenue is associated with negligible costs. Analogous to the indispensable traditional revenue management, the key idea is to better use existing capacities. Thus, the impact on profits is considerable.

Currently, ICSPs gain additional relevance from the COVID-19 crisis. In the travel industry, the traditional price differentiation based on advance booking is merely applicable because few customers book in advance. Additionally, most airlines actually offer solely ICSPs. Although they pretend to sell specific flights, advance sales are based on a pre-Corona schedule that is already known to drastically shrink close to departure.

Strategic operations management strives to theoretically explain ICSPs’ existence and derive recommendations for their design (e.g. alternatives to include, pricing). However, customers with a simplified preference structure are assumed. An important consequence is that optimal ICSPs consist of only two alternatives, which are selected with equal probabilities by the firm. By contrast, more complex ICSPs are prevalent in practice. In revenue management, which controls operational sales processes (e.g. availability, assignment of alternatives), the consideration of ICSPs’ flexibility is still limited.

The proposed project will first focus the design of ICSPs. In particular, it will evaluate whether more general customer preferences can explain the prevalence of ICSPs with more than two alternatives in practice. This is also the basis for the analysis of customizable ICSPs (so-called variable opaque products).

Next, revenue management approaches will be tackled. Here, a framework analogous to the state-of-the-art one for choice-based revenue management will be developed.

Project Start 01.07.2020

NFDI4Health – Task Force COVID-19: Better understanding the COVID-19 outbreak and its consequences through integrated and harmonised research efforts

Cluster: Information dissemination / Misinformation

Principal investigators

Professor Dr Juliane Fluck
ZB MED Information Centre for Life Sciences

Presentation Slot 15:45

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NFDI4Health Task Force COVID-19: Better understanding the COVID-19 outbreak and its consequences through integrated and harmonized research efforts

COVID-19 poses a major challenge to individuals and societies around the world. Lockdown efforts dramatically changed social lives, economic prospects and health services. This created a huge demand for scientific data to understand the virus' spread, therapeutic options and consequences of the pandemic mitigation measures. Within the medical, epidemiological and public health sciences a large number of studies were launched which lacked coordination to secure common standards and comparable results. Record linkage of individual data across various data sources was insufficiently implemented. Imaging as a diagnostic tool needed more attention. The focus of this early research was on COVID-19 inpatients, while less attention was paid to outpatients and the public health effects of mitigation measures. These shortcomings impaired the usability of research results for future medical, societal and public health decisions.

Against this background, we have extended the National Research Data Infrastructure for Personal Health Data (NFDI4Health) work programme by a further use case "NFDI4Health Task Force COVID-19" and set up a nationwide COVID-19 research information and guidance infrastructure. NFDI4Health with its strong public health community provides the necessary structures to address the shortcomings mentioned above. It integrates major German institutions experienced as methodology developers, data holders and analysts.

The overarching goals of the NFDI4Health Task Force COVID-19 are to strengthen harmonized medical, epidemiological and public health related research and to improve prospects for informing stakeholders on research results. Contrary to other initiatives in the medical sciences, we focus on public health consequences of the pandemic outbreak such as morbidity, mortality, health care utilization, and effects of social isolation.

So far, we have implemented the following parts of our work programme: (1) We created an inventory of German COVID-19 studies covering structured health data from clinical trials incl. vaccination studies, epidemiological studies, and public health surveillance. The three components of our COVID-19 study portal – central search portal, document portal and instrument portal – improve findability of and access to these resources and foster data sharing, harmonized quality assessments, and interoperability. (2) We have developed an AI-based image analysis service tool for CT data and made it available to the public. (3) We have formulated a concept to link different data sources like hospital, medication, sequencing, imaging, and psychosocial data. (4) To create central access to preprints on COVID-19, we have set up a text-mining-based preprint viewer with semantic search functionalities.

The NFDI4Health Task Force COVID-19 will be funded until June 2023. The project results will be summarized and published in a blueprint paper "Covering future pandemics".

13.10.2021

5

Impact on economics, culture, politics, education, society and democracy

Project Start 01.08.2021

Causes and consequences of drug shortages

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Katharina Blankart
University of Duisburg-Essen

Presentation Slot 10:30

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Causes and consequences of drug shortages

Katharina Blankart & Eva Goetjes (University of Duisburg-Essen), Jan Panhuysen & Mujaheed Shaikh (Hertie School)

Summary

Adequate supply of medicines is fundamental to the achievement of key aspects of universal health coverage. The COVID-19 pandemic however, has jeopardized access to care by interrupting the supply of essential medicines. In Germany, between March and June 2020, 116 drug presentations were newly reported to be on short supply. Among them were medicines to treat patients suffering from severe symptoms of COVID-19 such as propofol used to sedate patients in critical care needs and in patients requiring ventilation.

Medicine shortages reflect the lack of sufficient access to (essential) medicines, at least for a limited amount of time where supply cannot meet demand at a national level. Before the COVID-19 pandemic, medicine shortages were present in many fields of therapy from complex injectable cancer drugs, inexpensive products such as saline, to high volume drugs such as valsartan to treat common high blood pressure.

This project analyzes the causes and consequences of drug shortages. We aim to develop a framework that aids in identifying causes of drug shortages across economics, management, and medical disciplines. Unlike the vast majority of the existing evidence that describes the situation in the United States, we will focus on health care provided by European health care systems and particularly shortages reported in Germany, Austria and Switzerland. Moreover, we will make accessible new data sources to characterize the scope of drug shortages reported in Europe, classify the causes of drug shortages and perform causal analysis of the drivers of drug shortages at national level. Specifically, we aim to describe the pharmaceutical supply chain and identify bottlenecks within the supply chain framework, due to the interruptions caused by the COVID-19 pandemic. We will map all global and regional policy and industry measures taken by governments and health care systems to overcome such interruptions. We will then empirically identify causal effects of supply-chain, regulatory and governance related aspects that lead to drug shortages in a particular health system. The objective is to combine product level data on drug shortages from national reporting systems of drug shortages, trade-flows, prices, regulatory and governance systems, and perform econometrics analysis. We will then turn to analyzing the consequences of drug shortages on health and health care cost in one particular health care system (Switzerland), using health insurance claims data in one health insurance system. The focus of our work will center on the situation arising from the COVID-19 pandemic and the resulting changes in supply and demand of medicines.

Key words: Causal analysis of medical supply chain, access to care, health systems, regulation, pharmaceutical markets, supply chain, medicinal products, econometrics

Primary field: 112-03 Business Administration (Economics)

Secondary fields:, 205-08 Pharmacy (Medicine), 112-02 Economic Policy and Public Finance (Economics); 205-02 Public Health, Health Services Research, Social Medicine (Medicine); 112-04 Statistics and Econometrics (Economics)

Project Start 15.01.2022

COVID-19 and Executive Personalization in Sub-Saharan Africa, Asia, Latin America and the MENA Region

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Dr Thomas Richter
German Institute for Global and Area Studies
(GIGA)

Presentation Slot 10:45

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Project duration: January 2022 – December 2024

Mariana Llanos[1], David Kuehn[2], Thomas Richter[3]
German Institute for Global and Area Studies (GIGA)

COVID-19 and Executive Personalization in Sub-Saharan Africa, Asia, Latin America and the MENA Region

When the COVID-19 pandemic began to spread, leaders around the world were challenged to grapple with it. They issued stay-at-home orders or imposed lockdowns, quarantines, curfews and movement controls. Public gatherings, including elections, were delayed or canceled, freedoms of assembly, association and speech were limited, and democratic institutions were constrained in their work. Although many of these measures conformed to expert recommendations to contain the disease, they also provided executives with a window of opportunity to bolster power. International media reported plenty of evidence – from Russia to the USA, from Hungary to Brazil – revealing how power concentration in the chief executive was becoming ubiquitous and suggesting that a global increase of personalization of executive power might be underway. Executive personalization – the process by which the chief executive's discretionary power grows at the expense of other political actors – may have long-lasting negative policy consequences across political regimes. Thus, understanding the roots of this phenomenon is necessary to preclude harm, save lives, avoid economic depression, and improve public health. Further, since the COVID-19 pandemic occurred in the context of a global backsliding of liberal democracy, the study of the micro-foundations that drive personalization is even more crucial.

This project seeks to assess the impact of the COVID-19 pandemic on the personalization of executive power in the Global South. As the scholarly literature has documented, triggering events or external shocks – such as a pandemic – empower incumbents to steer the critical situation, deepen power asymmetries in their favor, and weaken civil society and political actors' willingness and ability to counteract their actions. This trend may be particularly worrying in the regions of the Global South where constraints on the chief executives were already weak and processes of personalization well established, both in democratic and authoritarian regimes, although never comparatively assessed. In this project, we will develop a concept of the personalization of executive power that is novel for its application across regime types and different world regions and construct a theory of the personalization of the executive during the COVID-19 pandemic. To analyze the influence of the COVID-19 pandemic upon the personalization of executive power, we will collect empirical data on such personalization before and during the COVID-19 pandemic across 36 countries in sub-Saharan Africa, Asia, Latin America and the MENA region. The project aims to contribute to the burgeoning literature on democratic backsliding and autocratization, the emerging research on the political impacts of the COVID-19 pandemic, and the diverse contributions from area studies that have long tracked patterns and processes of personalization within the Global South.

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Project Start 01.06.2021

Covid Apps for young adults for preventing transmission and promoting vaccination among refugees

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Dr Hannah Comteße
Katholische Universität Eichstätt-Ingolstadt

Professor Dr Rüdiger Pryss
University of Würzburg, Institute of Clinical Epidemiology and Biometry

Professor Dr Ulrich Frick
HSD University of Applied Sciences,
Waidmarkt 3, D - 50676 Cologne

Presentation Slot 11:00

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About 1.7 million refugees have applied for asylum in Germany since 2015, of whom most still live in collective accommodations. Several media reports have documented the great risk of high incidence rates in collective housings for refugees. Moreover, children, youth, and young adults display more frequently an asymptomatic course of COVID-19, if infected, and thus may transmit the virus inadvertently. The objective of this study is to capacitate adolescents and young adults who are seeking asylum in Germany and are collectively housed (a) to take adequate preventive measures against transmission of SARS- CoV-2 and (b) to foster informed decisions on forthcoming vaccination campaigns. Need for Cognition, disease knowledge, behavioral strategies, and informed decisions on risk/benefit ratio of vaccines will be promoted via smartphone apps based on gamification of learning objectives alone versus combined with an educational group intervention in developmentally and culturally adapted contexts.

Project Start 01.08.2021

Non-Pharmaceutical Interventions and Social Context Analysis for Safe Events

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Frank Fiedrich
University of Wuppertal, Institute for Public Safety and Emergency Management

Presentation Slot 11:15

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Abstract NORMALISE (PI: Frank Fiedrich, University of Wuppertal)

Events like festivals, concerts and sports events have been severely curtailed because of the measures taken to contain SARS-CoV-2. Events as social settings and contexts fulfill important societal functions. They enable social exchange, cultural innovation, political participation, and provide socio-psychological relief.

Despite the economic, cultural, and societal importance of events, a lastingly convincing re-opening concept has not yet been found. Not least, this is due to interacting social, technical and organizational components, which made events complex in planning and realization even before the SARS-CoV-2 pandemic. However, so far there is no scientifically recognized scheme for the evaluation of concepts for the reopening of events, which event organizers, approving authorities, and event service providers could use for fact-oriented guidance. NORMALISE aims to fill this gap and focuses on both crowd safety and occupational health and safety in the social and organizational context of events.

A successful non-pharmaceutical intervention (NPI) for infection prevention does not only need to be effective, but also to be feasible (to enable implementation) and acceptable (to make people cooperate more likely). In order to enhance the ability to assess NPIs for the prevention of infections in the complex socio-technical setting of events on a substantiated basis, a mixed-method-design will be used: Based on insights of a literature review and semi-structured expert interviews, relevant NPIs for safe re-opening of events will be identified. In a second step, these interventions will be checked for acceptability, feasibility, and effectivity. A representative online population survey will assess the acceptance of the implementation of event related NPIs. Feasibility and effectivity of measures in event contexts will be evaluated in workshops comprising stakeholders.

NORMALISE will deliver scientific and practical results in order to revive the complex socio-technical setting “event” and its important social and cultural function. As a scientific result, a temporal, factual and social systematization for the identification of explanatory “pattern variables” for organizational decisions and pathways during (pandemic) crises will be developed. Additionally, a multidimensional scheme for the evaluation of acceptance, feasibility, and effectiveness of NPIs for event-related infection prevention will be developed. This scheme serves as a scientifically substantiated baseline for socially, technically and organizationally embedded implementation of NPIs.

The project builds on prior research of the principal investigator in two transdisciplinary research projects on event safety and security. Therefore, NORMALISE will benefit from the longstanding and trustful connections to the event sector and immediate access to relevant stakeholders will be possible.

Project Start 01.06.2021

ECOS – European COVID Survey

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Johanna Kokot
University of Hamburg, Hamburg Center for Health Economics

Presentation Slot 11:30

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European Covid Survey (ECOS)

Iryna Sabat[2], Sebastian Neumann-Böhme[1,4] , Benedicta Hermanns [4], Nirosha Elsem Varghese[3], Aleksandra Torbica[3], Jonas Schreyögg[4], Werner Brouwer[1], Pedro P. Barros, Tom Stargardt[4], Johanna Kokot[4]

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[4] Hamburg Center for Health Economics, University of Hamburg, Germany

Abstract

Our study aims to estimate the willingness to pay (WTP) for a COVID-19 vaccine, or more specifically, quicker access to this vaccine in seven European countries, as well as the willingness to be vaccinated (WTV). Furthermore, we conducted behavioural experiments to study dynamic risk preferences: How do risk attitudes change after meeting a person with a coronavirus infection? Moreover, we examine how people perceive the consequences of past pandemic behaviour and whether they use different mental accounts to do so. Additionally, we investigate many more topics, such as policy perceptions.

Methods:

We report data from the European COVID Survey (ECOS) consisting of representative samples of the population from Denmark, France, Germany, Italy, Portugal, the Netherlands, and the UK in terms of age, gender, regional distribution and education. The data presented consists so far of the eight ECOS data collection conducted in two-month intervals between April 2020 and September 2021.

We elicited the WTP for access to two hypothetical COVID-19 vaccines (100% and 60% effective). Respondents were asked how much they would be willing to pay to get an immediate COVID-19 vaccination rather than to wait for a free offer through the public system. Furthermore, we elicited the WTV against COVID-19 since April 2020 using a three-point choice question. Respondents are asked, "Would you be willing to get vaccinated against the novel coronavirus?" with the answer options Yes/No/Unsure. While the WTV is a very relevant

result in itself, we also expect it to be an essential determinant influencing the amount a person is willing to pay for earlier access.

For the experiments, we developed an infection risk elicitation task. Participants were presented with a frame with 25 boxes representing 25 persons, with one person infected with the coronavirus. They were asked to choose how many persons to meet and monetarily benefit from meeting people. This does not apply if the infected person has been met. Then they suffer a monetary loss. The more persons a participant meets, the more risk-taking he/she is. In our treatment condition, after the third of four rounds, we make participants aware of the consequences of their behaviour up to that point, suggesting a separate mental accounting.

Results:

Respondents gave mean WTP of 54.96 € (median 37 €) for access to a hypothetical 100% effective COVID-19 vaccine in January 2021 and 44.32 € (median 32.79 €) for one with an effectiveness of 60%. Our results indicate that age category, country of residence, income, health state and well-being are important determinants for the WTP. In January 2021, 67.76% of respondents were willing to be vaccinated, 17.57% were unsure, and 14.67% stated they were unwilling to be vaccinated. As expected, being unsure or unwilling to receive a vaccination was associated with a lower WTP. We furthermore find that a higher perceived risk of infection with or health risk of COVID-19, trust in the safety of vaccines and the expected waiting time are associated with a higher WTP for access to a vaccine. In total, 72.6% of respondents were willing to pay for immediate access to a 100% effective vaccine and 69.9% for one that is 60% effective, ranging from the lowest share in the Netherlands (65.5% / 58.4%) to the largest in Portugal (83.1% / 80.9%).

We find that individuals reduce risk-taking after meeting an infected person. Furthermore, we find indications of mental accounting: If the benefit from the people's meetings did not outweigh the fact that among them were infected ones, the risk-taking was particularly reduced. This effect applies to all countries considered.

Project Start 01.10.2021

COVID-19 in Latin America: Covid-19 in Latin America: The role of social protections for households with children

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Merike Blofield
GIGA/University of Hamburg

Presentation Slot 11:45

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Covid-19 in Latin America: The role of social protections for households with children

This research project analyzes the socio-economic fall-out of the COVID-19 pandemic, and the intervening role of social protections, on families with children in eight Latin American countries. Latin America, with high levels of inequality, labor informality, and urbanization, has been particularly hard hit by both pandemic deaths as well as economic effects. The social protection responses of countries in the region, however, have varied dramatically, from a massive emergency assistance plan in Brazil to virtually no additional cash transfer aid in Mexico.

Given the particular vulnerability of children (almost half of children in Latin America lived in poverty already before the pandemic) and the fact that their wellbeing has been less visible (with physical school closures and shelter-at-home policies), systematic surveys of households with children are imperative. Yet, to date, we do not have them.

We plan to fill this gap. The experience of this past year allows us to systematically study in real time variables related to (i) the socioeconomic shock created by social distancing, (ii) the social protection programs deployed to cope with this shock; and (iii) how these programs affected and mitigated adverse effects on the wellbeing of households with children. We will conduct representative surveys of caregivers of children, in eight Latin American countries, with phone surveys of approximately 1,500 respondents per country. This will provide us with a pooled dataset of about 12,000 cases, allowing us to control for a broad variety of individual, household, community and national-level factors. We will specifically examine:

a. The actual access to and sufficiency of cash transfers, in-kind transfers (primarily food) and services (primarily health care) during the pandemic
b. The effects of social protection on key indicators of well-being, by comparing children and families with and without social protection and with different sufficiency and quality of social protection
c. The role of social protection in households' willingness/ability to adhere to social distancing measures, issues of attribution and perceptions of role of government.

Our surveys will be able to test a variety of hypotheses from the social policy and cash transfer literature, which will not only contribute to our theoretical understanding of social protections, wellbeing and perceptions, but will also be critical for policy design for any future socioeconomic shock preparedness in countries with high levels of labor informality and lower state capacity.

Our research project will be conducted by the principal investigator, Merike Blofield, and Juliana Martínez Franzoni, Professor of Comparative Social Policy and Humboldt Chair (2021) at the University of Costa Rica, the top-ranked university in Central America, and leading expert in social protection in Latin America.

Project Start 01.09.2021

In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Solveig Richter
University of Leipzig

Presentation Slot 12:15

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In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia

Principal Investigators

Prof. Dr. Solveig Richter / Leonardo Salecedo
University of Leipzig, Germany

Dr. Pablo Ramos
Pontificia Universidad Javeriana
Bogotá, Colombia

Laura Barrios
Universidad del Rosario
Bogotá, Colombia

Abstract

The Covid19 pandemic has exposed the vulnerabilities of populations in the fragile, conflict-ridden countries in the Global South, specifically in rural areas that are often characterized by an absence of basic health infrastructure and widespread state neglect in service and security provision. However, we hardly have any knowledge about the strategies of non-state actors in these areas to cope with (or even profit from) the effects of the Covid19 pandemic, be it local communities, indigenous and ethnic groups or armed actors.

Colombia is a case in point: The peace agreement with the biggest rebel group FARC-EP in 2016 enshrined comprehensive prescriptions to address root causes of the conflict, most importantly rural development in order to achieve territorial peace. Yet, the Covid19 pandemic hit a highly vulnerable country, for two reasons: Firstly, the demobilization of the FARC-EP left a power vacuum which the Colombian state was not able to fill resulting in further erosion of public order and a dispersion of non-state armed groups. Secondly, the Colombian state has also not yet delivered its promises in the peace agreement with regard to rural development e.g., in health infrastructure and health systems (such as access to water, health access points). Thus, due to long-term state neglect many conflict-affected communities during the Covid19 pandemic faced a double challenge for protecting their life from health and security risks. The research project will thus ask: ***How can we explain differing local dynamics of health and security protection in rural areas and which strategies have proven effective and conductive for the ongoing peace process?***

The projects will analyse the effects of the Covid19 pandemic on the reconfiguration of territorial order after the peace agreement and the strategies of non-state actors to mitigate the spread of the Coronavirus. From a first initial observation we can find a broad variety of strategies, ranging from strict confinement measures by armed dissident groups to traditional community protection by indigenous groups and self-organized health networks in remote areas. We will acquire original data by applying a mixed-methods approach and compare the effects of the Covid19 pandemic with regard to other countries in the Global South and in a long-term perspective in Colombia by modelling our results. Our research project will thus considerably contribute to the academic and political discussion on strategies of health and security protection in rural areas during the Covid19 pandemic, a widespread phenomenon in countries of the Global South. The one-year research project will be embedded in ongoing interdisciplinary research projects at the University of Leipzig (Heisenberg programme), the Javeriana and Rosario and will profit from existing research collaboration with the CAPAZ research network (the German-Colombian Peace Institute).

Project Start 01.09.2021

Effects of the Covid-19 Pandemic on German Language and Literature Teachers in Germany and their Familiarity with, Use of and Views on Digital Media

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Thomas Gfrörer
Hector Research Institute of Education Sciences and Psychology, University of Tübingen

Presentation Slot 12:30

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The aim of the GETDIME project is to gain empirically validated knowledge about the effects of the Corona pandemic on German language and literature teachers in Germany and their use of, familiarity with and views on digital media. This involves addressing a twofold desideratum: (1) the lack of knowledge about pre-pandemic baselines and (2) the lack of knowledge about German teachers' use, familiarity, and views toward digital media during the pandemic. Two studies are planned to address this double desideratum.

The focus of Study 1 is the investigation of German language and literature teachers in Germany and their familiarity with, use of and views on digital media before the Corona pandemic. The empirical basis will be IEA data on native language teachers from ICILS 2018, which have not yet been analyzed and from which relevant subject-specific insights can be gained. Three research questions (RQ) will be investigated in Study 1 based on the data of ICILS 2018 by latent profile analysis, a person-oriented statistical method for modelling categorical latent variables:
RQ 1. How many profiles of German language and literature teachers' familiarity with, use of and views on digital media can be identified, what is the percentage of teachers in each of these profiles and how are the profiles predicted by school and teacher characteristics?
RQ 2. How do these profiles (and the overall levels of the constituting variables) differ from those of the overall population of teachers in Germany in 2018?
RQ 3. How do these profiles (and the overall levels of the constituting variables) differ from those of teachers for native languages in other countries?

The focus of Study 2 is the investigation of empirical data from N=2011 German language and literature teachers of several federal states in Germany, who participate in the ongoing online questionnaire study 'Digital Distance Learning in German Language and Literature' (DiDiD). There are data of two cohorts: 1. Data referring to the first lockdown in spring 2020; 2. data referring to the second lockdown starting 16.12.2020. Three research questions will be addressed in Study 2 using a confirmatory latent profile modeling approach:
RQ 1. How many profiles of German language and literature teachers' familiarity with, use of and views on digital media can be identified, what is the percentage of teachers in each of these profiles and how are the profiles predicted by school and teacher characteristics?
RQ 2. How do these profiles (and the overall levels and specifics in cohort 1 and 2) differ from those identified on the basis of ICILS 2018 in Study 1?
RQ 3. Which subject-specific profiles for the promotion of subject-specific competencies using digital media and new digital options can be identified among the German language and literature teachers and what interest in subject-specific in-service training events does exist?

Project Start 01.07.2021

Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Mareike Kunter
DIPF | Leibniz Institute for Research and Information in Education

Professor Dr Thamar Voss
University Freiburg

Presentation Slot 12:45

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Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)

Mareike Kunter (DIPF | Leibniz-Institut for Research and Information on Education), Uta Klusmann (Leibniz Institute for Science and Mathematics Education), Thamar Voss (University of Freiburg)

Teachers have a special responsibility during the Covid19 pandemic. With school closures in March 2020, they have had to abruptly adapt to unprecedented forms of distance learning and support their students' learning in the home environment. Surveys with students, parents, and teachers alike show a wide range of how well teachers managed to cope with these challenges in terms of their instructional performance and well-being. However, there are currently hardly any studies available that examine factors that can explain these differences between teachers. Furthermore, existing studies on teachers' behaviors during the pandemic are cross-sectional surveys, almost exclusively examine the quantity of learning opportunities provided by teachers. In contrast, little is known about the quality of the teachers' instructional behaviors.

Therefore, the TeaCop study will use longitudinal data first to describe how teachers adapt to the pandemic-related challenges, considering their well-being and the quality of their instruction. Second, we will explore which individual and contextual factors explain differences in successful adaptation.

We will make use of a currently ongoing longitudinal study, the DFG-funded study COACTIV-ExpeRt. In the longitudinal study, more than 800 mathematics (future) teachers were investigated during their induction phase and beyond (T1 to T3, 2007 to 2011) regarding their professional competence, their general cognitive abilities, their personality, and their well-being. In 2019 the participants were investigated again with around ten years of teaching experience (T4). The TeaCop study will be scheduled for the summer/fall of 2021. It includes an online teacher and school survey. With the (a) teacher survey, the quality of teachers' instructional activities during the pandemic will be measured using teacher self-assessments and evaluations of samples of the teachers' learning materials during distance learning. The evaluation will be based on the well-established basic dimensions of instructional quality: the potential for cognitive activation, the provision of learning support, and organizational support. In addition, we will investigate teachers' occupational well-being. For the (b) school survey, teachers will be asked to recruit up to 10 of their colleagues to collect school-level data on important school characteristics.

Through this wealth of personal and context-related data from the participants before and during the pandemic situation, it is possible to describe changes in teachers' professional experience and behavior during the pandemic and identify personal and context-related conditions for successful adaptation. Thus, the study can make an important contribution to understanding how teachers successfully adapt to the challenging situation of the pandemic. This is particularly important to prevent the risk of increasing educational inequity during a pandemic.

Keywords: Teacher competence, teacher well-being, Covid 19 pandemic, instructional quality, longitudinal study

Project Start 01.10.2021

Effects of the Corona pandemic on job-related learning in adult life

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Corinna Kleinert
Leibniz Institute for Educational Trajectories
(LIfBi)

Presentation Slot 14:00

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Abstract submitted to the virtual DFG Research Conference Pandemics, 15 November 2021

Effects of the Corona pandemic on job-related learning in adult life

Assessing trends, mechanisms and causal effects

Corinna Kleinert, Leibniz Institute for Educational Trajectories and University of Bamberg

Since the first lockdown in March 2020, it has been discussed widely and controversially how the Corona pandemic has affected learning participation, processes, and outcomes. However, these debates have focused heavily on children and adolescents in initial education. The question of how the pandemic has affected learning in adult age, particularly job-related adult education and training (AET), has been largely neglected in public discourse and research. The necessity of lifelong learning has grown in recent decades due to technological change and demographic ageing of the workforce, yet the participation in AET remains socially stratified. The Corona pandemic has now profoundly changed the supply and demand for adult education in a short period of time. Traditional AET in the form of on-site courses has largely collapsed, and many firms have reduced their investment in training. At the same time, new opportunities for professional learning have emerged for some groups of employees due to short-time work, while others had less time because they had to care for their children when working from home. Finally, the crisis led to accelerated digitization, which has created the need for many employees to learn new things quickly. Overall, therefore, it is yet to be seen—and so far not sufficiently studied empirically—how the pandemic has affected participation in different forms of AET, which learning barriers and opportunities the crisis brought, and how this has changed patterns of social inequality in AET. Since AET will be a key component in mitigating pandemic-related distortions in the labour market, it is important to answer these questions soon in order to derive targeted adult education strategies.

To this end, we plan to conduct empirical analyses using large-scale panel data from NEPS collected annually since the late 2000s through fall 2020-spring 2021, providing detailed longitudinal information on nonformal and informal job-related learning among employed adults. Our program consists of three sequential work packages: in the first step, we will describe the extent and form of pandemic-related changes in AET among different groups of employees. Subsequently, we will examine how the crisis has affected adult learning. Stepwise regressions and decomposition techniques will help to assess the impact of pandemic-related changes in working conditions, family life, and well-being on AET participation. In the third step, we plan to use fixed effects regressions to identify causal effects of the pandemic on AET participation and to analyse how the crisis changed prevailing patterns of social inequalities in AET.

Project Start 01.01.2022

The Transformation of Peer Relationships and Participation during the Covid-19 Pandemic

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Sina-Mareen Köhler
RWTH Aachen/Institute of Educational
Science, Eilfschornsteinstr. 7, 52062 Aachen

Presentation Slot 14:15

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PeerPartiCo - The Transformation of Peer Relationships and Participation during the Covid-19 Pandemic (Prof. Dr. Sina-Mareen Köhler, KO 4696/3-1)

Keywords: English: Covid-19 Pandemic, Youth, Peers, Participation

The research project focuses **first**, changes in peer relationships with respect to the associated opportunities for support. **Second**, it considers peers' relevance in terms of changes in individual and collective participation to other forms of (non)participation. The project accordingly explores young people's possibilities for (non)participation in school education as well as politics during the Covid-19 pandemic among youth with an increased risk of exclusion in connection with an identified need for support in the field of learning and youth in regards to a defined educational disadvantage. Through a qualitative data analysis, interviews and group discussions will be used to explore orientations and practices in a longitudinal perspective. By means of the documentary method, implicit knowledge will be reconstructed as 'tacit knowledge' (cf. Polányi 1966) on the basis of the performative and semantic content of the communicatively generated data. The project's sample is broadly conceptualised according to an expected panel attrition rate and comprised 30 interviews in the first wave. The aim of the case selection was to compile an as richly contrastive interview sample as possible in the sense of theoretical sampling (cf. Glaser/Strauss 1970). The broad contrast results *first* from the young people's involvement in different peer relationships and *second* from their different interests in political issues. Thus, adolescents with no or only a small peer network are given as equal consideration as those who are disinterested in politics. Two-thirds of the sample consists of young people (20) with special educational needs in the field of learning and one-third of the participating young people (10) are educational disadvantaged. Group discussions were conducted among the friend circles of the 20 participants with support needs. A further 10 young people were selected from these 20 group discussions. The analysis that will be completed during the 12-month project refers to 8 central cases, which are also longitudinal. In addition 6 first wave interviews will be reconstructed. From the perspective of *political socialization research*, the Covid-19 pandemic represents an extraordinary experience in the transformation of everyday public and private life through political control measures. 13- and 14-year-olds are currently experiencing the effects of political decisions in a very powerful way, which can impact their political interest and trust in state institutions or in the school and education system and thus form a sounding board for peer participation practices.

Project Start 01.08.2021

Physics Learning in Distance Instruction

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Dr Daniel Laumann
Westfälische Wilhelms-Universität Münster

Presentation Slot 14:30

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Physics Learning in Distance Education (PhyDi)

In a previous, DFG-funded transfer project with the title “Physics Instruction based on core concepts – Cumulative competence development at the example of the energy concept” (energie.TRANSFER), a total of 12 digital instructional units (DIUs) have been developed and implemented. The units were supposed to be evaluated with 30 teachers in the form of in-person instruction with respect to their effect on the development of students’ competence in physics. The DIUs can easily be adopted to build on preceding instruction or students’ competence respectively.

At beginning of the COVID-19 pandemic about half of the data collection was completed. Since the units were already available in digital form, it was possible to adapt them so that data collection could continue in distance instruction. This offers the unique chance to investigate the impact of digital innovations (DIUs) in the context of the COVID-19 pandemic, more specifically the organizational form of instruction (i.e., in-person vs. distance instruction), on school teaching and learning through a secondary analysis of available data. With the emergence of the COVID-19 pandemic teachers were required to transition from in-person to distance instruction on short notice. Because the DIUs developed in the project energie.TRANSFER were designed as DIUs that can be seamlessly integrated into existing curriculum, they are particularly suitable for distance learning.

The overarching aim of the project is to investigate the impact of the COVID-19 pandemic, more specifically distance instruction, on school teaching and learning. So far, research on school science teaching and learning has mainly focused on in-person instruction as the organizational from. Research on digital innovations in science education has almost exclusively focused on their efficacy. Consequently, there is a lack of insights both nationally and internationally on the functioning of DIUs in distance instruction. While there are voices suggesting that less motivated or low achieving students may experience fewer attention in distance instruction, impeding their learning, there is a lack of evidence in support of this position.

Therefore, it seems necessary to investigate the influence of DIUs on students’ learning motivation and learning of groups of students with different prerequisites. It is open to which extent DIUs (or any other type of instruction unit), originally developed with in-person instruction in mind, function identically in distance instruction. The elimination of experiments, for example, may impede students’ learning motivation and learning. In the light of the increasing availability and use of DIUs, there is also the question of whether teachers recognize the potential of the units for distance learning, and which features of the units are seen as potentially beneficial or pitfalls hindering learning in distance instruction.

Project Start 01.09.2021

Impacts of Primary School Closures on Educational Inequalities

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Professor Dr Thorsten Schneider
University of Leipzig, Institute of Sociology

Presentation Slot 14:45

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Impacts of Primary School Closures on Educational Inequalities (IPSCEI)

Abstract

To curb the spread of Covid-19, schools in Germany closed in mid-March 2020 for a period of several weeks and again at the end of the same year. Instead of in-person instruction, they introduced several forms of remote learning. In spring 2020, no one was fully prepared for this situation—neither schools and teachers nor parents and children. This led to a massive reduction in teaching time and likely also teaching quality, and placed much of the burden of learning support on parents, especially in the case of younger children.

This project will focus on students in primary school and will address two key questions: 1) how parental support for learning differed by socio-economic status (SES) during primary school closures as part of the first and second lockdown in Germany, and 2) what role parental support and family activities played in reducing or increasing achievement gaps by SES. We will use theories and research on cultural resources, home learning environments, parental learning support, and on how school holidays affect achievement gaps to explain and predict the effects of the first lockdown, school closures in spring 2020.

The project will analyze data from Starting Cohort 1 of the German National Educational Panel Study (NEPS SC1). The nationwide probability sample of children born between February and June 2012 tested the same children and interviewed their parents on repeated occasions: before school enrolment in spring 2018, at the end of first grade in 2019, in summer 2020, after the first school closures, at the transition between second and third grade, and in spring/summer 2021, again. In 2020 and 2021, parents reported in detail on how they supported their child during school closures, thus we can address change over time. We will use different regression techniques to investigate SES differences in the quantity and quality of parental learning support, and to study if and how this support changed SES gaps in student numeracy and early reading literacy.

Answers to both questions will not only provide descriptive evidence on the first and second lockdown; they will also advance our understanding of how important families are in producing achievement inequalities and to what degree (primary) schools counterbalance these inequalities.

Keywords: Educational inequality, cultural capital, parental learning support, summer setback, achievement development, COVID-19

Project Start 01.09.2021

Professional developments in inclusive schools under conditions of the Covid-19 pandemic

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Dr Jenny Lenkeit
Potsdam University

Presentation Slot 15:00

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Project title: Professional development in inclusive schools under conditions of the Covid-19 pandemic

Project group: Prof. Dr. Nadine Spörer[a] (project head), Prof. Dr. Antje Ehlert[a], Prof. Dr. Michel Knigge[b] & Dr. Jenny Lenkeit[a]

Affiliations: [a] Potsdam University, [b] Humboldt-University of Berlin

As a result of the Covid-19 pandemic the suspension of face-to-face teaching has challenged teachers and head teachers in their professional roles and their efforts to provide quality teaching for all students. One of the central assumptions about the effects of the pandemic is that existing inequalities in learning relevant personal and social skills between students with and without risk characteristics have therefore increased. This increase may be predominant in inclusive learning settings, where students with and without special educational needs learn together in one classroom. Cooperation among pedagogical staff can, for example, improve educational processes (also in distance learning situations) and therewith counteract the intensification of inequalities. The goal of the present study is thus to examine the extent to which professional activities, experiences and attitudes of pedagogical staff and head teachers have changed during distance learning periods and how these changes relate to changes in inequalities among students with and without special educational needs.

The quantitative research design of the project ties in with longitudinal data collected in a previous study (2018-2020) on the prerequisites of successful inclusive education in the federal state of Brandenburg, Germany. The same students, pedagogical staff and head teachers are included in the present project, albeit in a smaller sample. Fifth grade students from 16 classes (formerly 2nd graders) and 10th grade students from 12 classes (formerly 7th graders) provide information on subject specific self-concept and interest, their perceived social integration, classroom climate, feeling of acceptance as well as how they perceived teacher support, learning situations, social contact and teaching methods during distance learning in the times of the pandemic. Next to pedagogical staff and head teachers of the respective student sample schools, staff from further 56 schools provide information on cooperative activities, their attitudes towards inclusive teaching as well as differentiating teaching methods, professional development and work related stress. Information provided by head teachers relates to management styles, cooperative activities and provisions for their implementation. Both retrospective views on teaching and learning during distance learning and views of the respective current teaching-learning situation are collected. The use of respective scales from the previous study enables a systematic comparison of the data obtained immediately before the onset of the pandemic with the current situation of head teacher, pedagogical staff and learners.

Results provide information on the extent to which inequalities between different groups of students may have increased during the pandemic and advocate professional skills that may help schools and their staff to better navigate future critical periods.

Project Start 01.01.2022

Students' self-regulated learning at home during pandemic-related school closures

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Dr Ilka Wolter
Leibniz Institute for Educational Trajectories

Presentation Slot 15:15

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Students' self-regulated learning at home during pandemic-related school closures

Dr. Ilka Wolter, Leibniz Institute for Educational Trajectories, Bamberg, Germany.

Students, families, and teachers were facing manifold demands to reorganize teaching and learning at home since the beginning of school closures due to the Covid-19 pandemic. Not only teachers but also parents were confronted with diverse challenges and were sometimes struggling with adequately supporting their children. Hence, during school closures students often had to self-organize and self-regulate their learning.

Previous research showed that self-regulation is an important predictor of learning outcomes and of successful coping with challenging tasks (e.g., Murayama et al., 2013). More recent studies focusing on learning during the period of nationwide school closures also showed that students who describe themselves as highly self-regulated in learning also perceive their learning outcomes as higher (Huber & Helm, 2020). The self-organized learning phases during school closures were particularly challenging with respect to finding a structure during the day and understanding instructions without the immediate support by teachers. Consequently, recent studies reported that a substantial share of students struggled with learning at home and was difficult to motivate to work on their school tasks during the pandemic-related school closures (e.g., Huber et al., 2020; Lockl et al., subm.). Moreover, students' willingness to exert effort as well as their reading competence were positively related to their motivation and to them coping well with learning at home (Lockl et al., subm.).

Against this background, the project aims at examining from a longitudinal perspective how well students coped with self-organized learning at home during the pandemic-related school closures. Furthermore, we will focus on the intraindividual development of two characteristics in particular: students' willingness to exert effort and learning enjoyment. Finally, we will investigate the impact of individual prerequisites on students' learning and attempt to identify students at risk.

To this effect, we plan to analyze data from the German National Educational Panel Study (NEPS; Blossfeld et al., 2011) with two cohorts of students who were either in primary (NEPS-SC 1) or secondary school (NEPS-SC 2) during the pandemic-related school closures. We will used data from the longitudinal panel with at least three measurement points for students' willingness to exert effort and learning enjoyment in each cohort, but also additional information from previous measurement points about students' socio-economic background or prior competence. Within the NEPS, additional Covid-19 surveys were conducted to cover the specific situation and challenges associated to the pandemic-related lockdowns and school closures. In summary, the project aims at a better understanding of the relevant factors to promote self-regulated learning with the goal to reflect on pedagogical implications for teachers and parents.

Project Start 15.03.2022

The Management of Loss

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Theresa Mentrup
University of Mainz, Department of Anthropology and African Studies

Presentation Slot 15:30

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JOHANNES GUTENBERG UNIVERSITÄT MAINZ

University of Mainz | Department of Anthropology and African Studies | Forum Universitatis 6 | D-55099 Mainz

The Management of Mourning: Politics of Life and Death in Minas Gerais (Brazil)

Whereas 'crises,' such as the outbreak of an epi- or pandemic and the 'catastrophic' collapse of infrastructures, are usually analyzed separately in anthropology, this project suggests a shift of attention. Instead, it scrutinizes the *interrelated ways* in which multiple crises shape expectations towards and understandings of governance and (state) care practices, and the consequences these bear for the people affected, by focusing on a specifically local, postcolonial and post-dictatorial context.

For this purpose, this project focuses on two disasters that are typologically different but coincide in time. In the city of Brumadinho, in the state of Minas Gerais in southeastern Brazil, the population is currently experiencing not only a particularly severe development of the Covid-19 pandemic, which confronts the entire South American country with the dramatic consequences of a chronically underfunded public health system (Sistema Único de Saúde – SUS); the community is also dealing with another central and, as yet, unresolved crisis: the collapse of the tailings dam of an iron ore mine in January 2019 that killed 272 people and devastated the surrounding area – a crime that gained worldwide attention.

The project understands the temporal intersection of these two crises as an opportunity to reflect on how iterating states of exception are (inter)related through different moral valuations and valorizations – of suffering, of life and death, but also of the right to be cared for by the state. Against this background, it asks to what extent both crises reconfigure the moral economies relating the state and its citizens, the living and the dead. The project, thus, draws upon the fact that no crisis, as mighty and current as it might seem, appears as a singular incident but rather refers (back) to a temporalization of 'normality' that relates different dimensions and perceptions of 'crisis.' Accordingly, the project aims at contributing anthropologically towards the understanding of different complementing and competing layers of time and meaning based on the perspectives of the different actors involved.

Principal investigator: Prof. Dr. Heike Drotbohm

Project member: Theresa Mentrup, M.A.

Project Start 01.10.2021

De- and restabilization of evidence during the corona crisis

Cluster: Impact on economics, culture, politics, education, society and democracy

Principal investigators

Michael Schönwolff
Technical University of Munich (TUM), School of Social Sciences and Technology

Presentation Slot 15:45

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De- and restabilization of evidence during the corona crisis

The project aims to investigate how the production, communication and social negotiation of scientific evidence about COVID-19 takes place under the conditions of the corona crisis. The rapid spread of COVID-19 and the associated pressure to act and make decisions increase the need for trustworthy scientific knowledge: however, dissenting experts, the repeated adjustment of figures, statistics and recommendations, and the intensive medialization of divergent opinions and conflict foster, at the same, skepticism towards authorized sources of evidence. Against this background, this interdisciplinary project aims to investigate the de- and restabilization of scientific evidence in the corona crisis. We investigate four central arenas where evidence about COVID-19 is being negotiated (scientific research, medical practice, science journalism, and social media), thereby combining the expertise of four research fields (science & technology studies (STS), medical ethics, communication science, and sociology). This allows us to examine the evidence dynamics in these arenas and, most importantly, their interactions in the de- and destabilization of evidence. Furthermore, the integration of the project into the DFG Research Group "Practicing Evidence – Evidencing Practice" allows us to investigate what might be novel about the production, communication and social negotiation of evidence during the corona crisis and whether and how continuities with other conflicts about evidence in contemporary knowledge societies can be established.

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Impact on agriculture, environment, climate, zoonosis

Project Start 01.04.2022

The consequences of biodiversity loss and land use change on infectious disease emergence

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Professor Dr Lisa Biber-Freudenberger
Center for Development Research, Bonn University

Dr Sandra Junglen
Institute of Virology, Charité Universitätsmedizin Berlin

Presentation Slot 10:30

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The consequences of biodiversity loss and land use change on infectious disease emergence

Sandra Junglen; Lisa Biber-Freudenberger; Julius Lutwama; Anthony M. Nsubuga; Innocent B. Rwego; Thomas Gillespie

The current SARS-CoV-2 pandemic clearly demonstrates the vulnerability of health, societies and economies worldwide to new emerging infectious diseases. Similar to other pathogens, its origin and stages of emergence remain largely obscure. The emergence of infectious diseases, in particular vector-borne zoonotic diseases, has been linked to environmental changes, such as biodiversity loss, land use and socioeconomic change. Increasing livestock densities and massive global environmental change is responsible for the ongoing sixth mass extinction. While the far-reaching shifts in species abundance and density are predicted to affect infectious disease transmission patterns and accelerate pandemic emergence, there is little understanding of the underlying drivers of the emergence process. This project focuses on the understanding of epidemic emergence by dissecting the most initial processes and dynamics of infectious disease emergence in rural settings of hotspot regions for virus emergence based on a multi-host and multi-pathogen system. The interdisciplinary and international team aims to detect and model arbovirus infection and transmission patterns in mosquitoes, livestock (cattle and goats as hosts for Rift Valley fever virus and chicken as hosts for West Nile virus) and humans (hosts for Dengue virus, Chikungunya virus, Zika virus and Yellow fever virus) under varying ecological and socioeconomic conditions at the interface to natural biodiversity hotspots in order to identify common patterns and drivers of emerging diseases. We will further study the genetic adjustment of pre-epidemic variants by analysing intra- and inter-host genetic diversity and selective pressures as drivers for virus evolution and diversification after spillover infections to new vectors and hosts. We will assess how changes in vector and host species community composition, socio-economic parameters, land use and climate impacts arbovirus emergence through phylogeographic reconstruction of virus spatial movement and ecological niche factor analysis. Risk of virus emergence will be modelled across time and space under different socioeconomic, land use and climatic change scenarios. Based on these findings we will be able to predict the effectiveness of policy interventions to reduce the current and future risk of zoonotic epidemic outbreaks under changing environmental and socioeconomic conditions. Overall, the project will allow the early detection of emerging viruses in a hotspot region of virus emergence, study spillover infections in mosquitoes, livestock and humans using state of the art molecular methods and provide effective prevention and risk reduction measures.

Project Start 15.07.2021

Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Dr Ines Mulder
Justus-Liebig University Giessen

Presentation Slot 10:45

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Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria

Quaternary alklyammonium compounds (QAAC) are a central ingredient of many disinfectants and surfactants and it has been known that they are not completely degraded during waste water treatment. Instead, they can accumulate in sewage sludge, soils and sediments. Several pathogenic bacteria have already acquired QAAC resistance. Also, resistance genes have been found widespread in wastewater treatment plants and receiving environments. A key concern is the genetic linkage of QAAC- and antibiotic resistance genes.
The biocidal activity of QAACs has already raised concerns about their environmental effects before the SARS-CoV-2 pandemic. However, with considerably increased QAAC consumption, potential risks in the environment are amplified with the pandemic, with currently incalculable consequences for public health.
Therefore, our projects aims at answering the following hypothesis: (1) As a consequence of the SARS-CoV-2 pandemic, concentrations of QAAC reaching the environment via wastewater effluent or sewage sludge rise. (2) Increased disinfectant concentrations in waste water treatment plants enhance the development of QAAC- and antibiotic multi-resistance in potential pathogens and environmental bacteria. (3) Increasing QAAC concentrations inhibit microbial degradation of antibiotics, with unknown consequences for the selection of antibiotic resistance.
In this project, we will monitor the increase of QAAC concentrations with the onset of the SARS-CoV-2 pandemic in WWTPs and receiving environments and their effects on antibiotic resistance gene spread and multi-resistance in potential pathogenic and environmental bacteria which came in contact with QAACs.
Our sample sets include, among others, monthly collected particulate suspended matter from the river Saar as well as waste water influent and effluent, waste water irrigated soils from Mexico City sampled before and after March 2020 – both located at or near national and international SARS-CoV-2 hot spots. Due to the importance of the environmental impact of QAACs, incubation experiments with soils and river water will accompany monitoring data and help to clarify their effects on the degradation of pharmaceuticals as well as antibiotic and multi-resistance development in bacteria.
In a multidisciplinary approach, our study will identify the QAAC footprint and will help to get a realistic picture of QAAC associated risks in the environment that arise from the SARS-CoV-2 pandemic.

Project Start 01.07.2021

MOMO-Med: Modelling mosquito vectors and disease risk in the Mediterranean area under climate and land use change

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Dr Christian Merkenschlager
University of Augsburg, Faculty of Medicine

Presentation Slot 11:15

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MOMO-Med: Modelling mosquito vectors and disease risk in the Mediterranean area under climate and land use change

Elke Hertig, Professorship of Regional Climate Change and Health, University of Augsburg

Heiko Paeth, Professorship of Climatology at the Chair of Geography, University of Wuerzburg

Mosquito-borne diseases are spreading globally and there are major concerns on further expansions yielding significant increases in the Mediterranean area. The main aim of the proposed project is to advance the modelling of vector distributions (Aedes and Anopheles species) and mosquito-borne disease risks (dengue, chikungunya, zika, yellow fever and malaria) and, thus, to assess the risk of vector-borne diseases under conditions of climate and land use change. Vector-borne diseases represent a major health threat to human societies with millions of people affected. There is increasing evidence that the situation of the considered diseases will aggravate under ongoing climate change and land degradation, spreading into densely populated regions like the Mediterranean area. The planned project contributes to an improved understanding of the global drivers and modes of the spread and activity of vectors and pathogens that are of crucial relevance to global and regional human societies. We intend to contribute to three major research fields, i.e. the advancement of the modelling of species distributions and transmission stability under future climate change, the assessment of the impact of dynamic land use changes in regional climate model simulations on species distributions, as well as the projection of disease risk under climate and land use change.

Project Start 07.01.2021

COVID-19 and the response of Ethiopian rural food systems

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Professor Dr Detlef Müller-Mahn
University of Bonn, Department of Geography

Presentation Slot 11:30

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COVID-19 and the response of Ethiopian rural food systems
PI: Detlef Müller-Mahn, University of Bonn

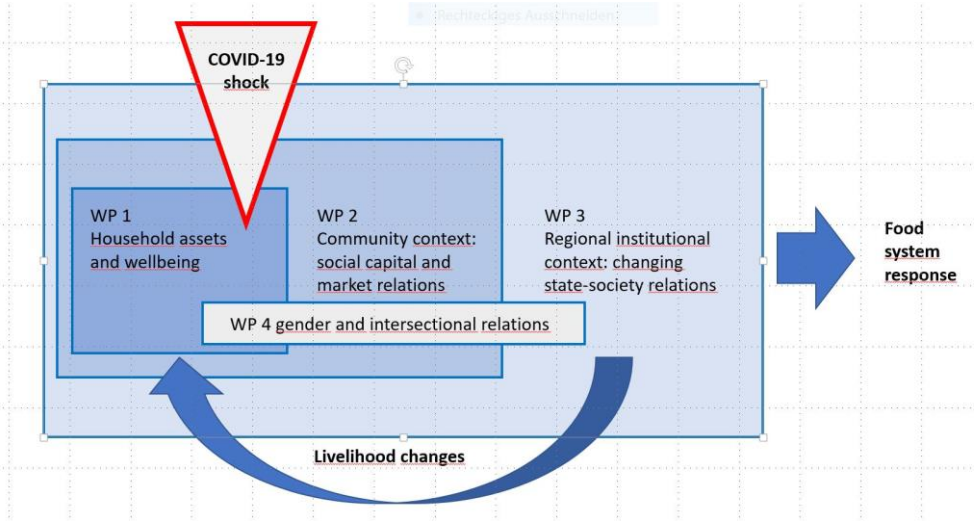
The project aims at understanding regional food systems, household vulnerabilities, and their transformation under the impact of the current COVID-19 crisis. The research focuses on communities in an area near Lake Tana in northwestern Ethiopia, where it links up to a previous study conducted by the same team shortly before the outbreak of the pandemic. It evaluates the response of smallholder production, marketing and livelihoods to the emerging crisis, and scrutinizes how this relates to household vulnerabilities.

As in other parts of Africa, rural populations in Ethiopia were hit particularly hard by COVID-19 and the disruptions caused by measures to curb the pandemic (Tamru et al. 2020; UN 2020a). This had immediate effects on rural livelihoods, agricultural production, and market relations. These changes are highly heterogeneous, little is known so far about their outcomes, but there are repeated warnings that the current crisis may end up in a 'hunger pandemic'. COVID-19 exemplifies the importance to recognize the dynamics of food systems on the one hand, and the socially and geographically differentiated vulnerabilities on the other hand.

The project takes its departure from the following **research questions**:

1. To what extent does COVID-19 aggravate existing crises and weaknesses of the Ethiopian food system?
2. What explains the regional and social heterogeneity of COVID-19 impact on social capital, vulnerabilities, and conversely, capacities for resilience?
3. How do changing market relations influence livelihood and food system vulnerabilities?
4. How does COVID-19 enhance 'hidden vulnerabilities' related to gender and intersectionality?
5. How does COVID-19 instigate food system innovations and a reorganization of state-society relations.

We thus propose to use the frame of the current COVID-19 crisis to understand how actors of the Ethiopian food system have reacted to the high degree of uncertainty generated by the pandemic and accompanying measures to circumvent it.



COVID-19 and the response of Ethiopian rural food systems – Project design and workpackages (WP)

Project Start 01.08.2021

The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Professor Dr Annette Peters
Helmholtz Zentrum München, Neuherberg, Ludwig Maximilians Universität München

Dr Alexandra Schneider
Helmholtz Zentrum München, Institute of Epidemiology

Dr Tamara Schikowski
IUF-Leibniz-Institut für umweltmedizinische Forschung

Marie Standl
Helmholtz Zentrum München, Institut für Epidemiologie

Presentation Slot 12:00

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Summary (English)
The recently discovered virus “Severe Acute Respiratory Syndrome CoronaVirus 2” (SARS-CoV-2) is the pathogenic agent of COVID-19. The disease course of COVID-19 is often mild, but leads in a substantial number of cases to hospitalization and even death, which is likely depending on pre-existing conditions and genetic predisposition. Ambient air pollution is a major environmental risk factor for cardio-metabolic, respiratory and neurological diseases, and also has been implicated to significantly contribute to COVID-19 disease spread and severity. It is the objective of COVGENAIR to assess the role of chronic diseases, environmental factors and genetic predisposition and their interplay on the severity of SARS-CoV-2 infections. In particular, we will investigate: (a) the prevalence of SARS-CoV-2 infections and symptoms within different age and risk groups, (b) disentangle the association between environmental exposures and SARS-CoV-2 infections, (c) identify susceptible subgroups in the population who might be particularly vulnerable for an infection with the SARS-CoV-2 virus, and (d) investigate the long-term health effects of an infection with SARS-CoV-2. This proposal is based on data obtained from three comprehensively phenotyped longitudinal cohort studies, all reaching back more than 20 years with participants now being 20 to 95 years old, comprising an extensive assessment of previous subclinical disease manifestations, exposure history, lifestyle factors and genotyping before the COVID-19 pandemic. Within the proposal, we will collect data on SARS-CoV-2 infections by questionnaire and antibody tests and invite subjects for re-examination to assess the most common consequences of COVID-19, such as loss of smell and persistent respiratory problems. Elucidating the environmental and molecular pathways which could increase the risk of a SARS-CoV-2 infection to identify susceptible subjects and determining the long-term post-COVID-19 health outcomes on the respiratory, cardiometabolic and neurological system are important steps in managing the public health challenges of the COVID-19 pandemic. Specifically, understanding the influence of our genetic make-up and the interplay with air pollution and pre-existing conditions on the response to an infection in different age groups would help to better understand the underlying molecular pathways as well as the variability and pathogenesis in at-risk individuals.

Zusammenfassung (deutsch)
Das kürzlich entdeckte Virus „Severe Acute Respiratory Syndrome CoronaVirus 2“ (SARS-CoV-2) ist der pathogene Erreger von COVID-19. Der Krankheitsverlauf von COVID-19 ist häufig mild, erfordert aber in einer beträchtlichen Anzahl von Fällen eine stationäre Behandlung und kann bis zum Tod führen, was vermutlich von existierenden Vorerkrankungen und der genetischen Veranlagung abhängt. Luftverschmutzung ist ein wichtiger umweltbedingter Risikofaktor für kardiometabolische, respiratorische und neurologische Erkrankungen und es wird vermutet, dass Luftverschmutzung ebenfalls zur Ausbreitung von SARS-CoV-2 beiträgt als auch den Verlauf der Infektion beeinflusst. Daher ist es das Ziel von COVGENAIR, die Rolle von chronischen Erkrankungen, Umweltfaktoren und genetischer Veranlagung sowie deren Wechselwirkung auf das Auftreten und den Schweregrad von SARSCoV-2-Infektionen zu untersuchen. Der Fokus liegt hierbei auf: (a) der Bestimmung der Prävalenz von SARS-CoV-2-Infektionen und Symptomen innerhalb verschiedener Alters- und Risikogruppen, (b) der Klärung des komplexen Zusammenhangs zwischen Umweltfaktoren und SARS-CoV-2-Infektionen, (c) der Identifikation von Risikogruppen in der Bevölkerung, die besonders anfällig für eine Infektion mit dem SARS-CoV-2-Virus sind, und (d) der Bestimmung langfristiger gesundheitlicher Auswirkungen einer Infektion mit SARSCoV-2. Dieser Antrag basiert auf Daten, die in drei umfassend phänotypisierten Längsschnitt-Kohortenstudien gewonnen wurden, die alle mehr als 20 Jahre zurückreichen, wobei die Teilnehmer inzwischen 20 bis 95 Jahre alt sind. Diese Studien wurden vor der COVID-19-Pandemie umfassend charakterisiert, wobei bestehende chronische, auch subklinische, Erkrankungen, die umfangreiche Expositionshistorie sowie Lebensstilfaktoren erfasst und alle Teilnehmenden genotypisiert wurden. Im Rahmen dieses Projekts werden wir mit Hilfe von Fragebögen und Antikörpertests Informationen über SARS-CoV-2-Infektionen sammeln und alle Teilnehmenden zur erneuten Untersuchung einladen, um u.a. chronischen Geruchsverlust und anhaltende respiratorische Beschwerden als die häufigsten Folgen von COVID-19 zu untersuchen. Ein Identifizieren vulnerabler Subgruppen

basierend auf der Kombination aus bestehenden Vorerkrankungen, Umwelteinflüssen und beteiligten genetischen Mechanismen, sowie die Bestimmung von langfristigen Auswirkungen auf die respiratorische, kardiometabolische und neurologische Gesundheit nach einer COVID-19 Erkrankung sind wichtige Schritte zur Bewältigung der Herausforderungen im Zusammenhang mit der COVID-19-Pandemie für das Gesundheitssystem. Insbesondere das Aufklären der Rolle der genetischen Prädisposition und deren Zusammenspiel mit Luftverschmutzung und chronischen Vorerkrankungen bei einer SARS-CoV-2 Infektion und deren Schweregrad in verschiedenen Altersgruppen kann zu einem besseren Verständnis der zugrunde liegenden Wirkmechnismen sowie der Variabilität in der Pathogenese bei Risikopersonen beitragen.

Project Start 01.01.2022

Crisis as catalyst: Covid-19, social citizenship and political transformation in India

Cluster: Impact on agriculture, environment, climate, zoonosis

Principal investigators

Camille Buat
Center for Modern Indian Studies, University of Göttingen

Presentation Slot 12:15

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Crisis as Catalyst: Covid-19, social citizenship and political transformation in India.

Principal Investigator: Prof. Dr. Ravi Ahuja
Postdoctoral researcher: Camille Buat
Centre for Modern Indian Studies, University of Göttingen

The spread of the Covid-19 in India in two successive waves (March-June 2020 and April-May 2021), and the introduction of a nation-wide lockdown, followed by localised restrictive measures to limit the circulation of the virus precipitated a large-scale economic and social crisis. This crisis was sharpened by the heterogeneity of the country's welfare institutions, which limits the social entitlements of large portions of the population. The project examines the Covid-19 crisis as a crisis of social citizenship, articulated at three levels: 1/ it created unprecedented strains on India's *infrastructure of social redistribution*, 2/ it impacted on existing *modalities of governance* and created new fields of contestation over issues of social entitlement and 3/ it gave rise to contradictory *discourses and perceptions* of "social citizenship". The ongoing crisis is analysed as an *unfolding historical event*: as a moment of societal acceleration creating sudden socio-political strains, triggering efforts at absorbing these strains, and opening new possibilities for consolidation as much as for contestation. Applying methods of historical research to the present, the project will provide an *analytical chronicle* of the crisis from the first weeks of 2020 when the first cases of SARS-CoV-2 were registered in India, until the summer of 2021, as the country emerged from a deadly second wave of infections. This analytical chronicle will trace the socio-political mutations of the crisis through the articulation of three spatial scales: a) It will investigate the formulation, implementation and contestation of the country's social policy during the pandemic at the level of the Indian Union. b) It will juxtapose divergent regional trajectories of the crisis through the study of the states of Maharashtra (a highly urbanized and industrialized region at the receiving end of inter-regional migration) and Bihar (an overwhelmingly agricultural region of outmigration). c) A "test case" study of Bihar's Bhojpur district will serve to examine how the pandemic was experienced, and how access to social entitlements was negotiated at the local level. The analytical chronicle will be documented through the consultation, at each scale, of a range of sources, both published and digital, and through the collection of oral testimonies. By creating an account of the first eighteen months of India's Covid-19 crisis while the event continues to unfold, the project aims at capturing the dynamism of social perceptions, behaviours and the contradictory possibilities opened up by the crisis. The analytical chronicle generated by the project is intended to serve as the basis for a deeper historical investigation of the mutations of post-colonial India's uneven and contested structure of "social citizenship".

7

Impact on health beyond COVID-19 and health care systems

Abstracts catalogue

Project Start 01.10.2021

The role of pandemic and individual vulnerability in longitudinal cohorts across the life span: refined models of neurosociobehavioral pathways into substance (ab)use?

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Frauke Nees
University Medical Center Schleswig-Holstein,
Kiel University

Dr Olaf Reis
University Medical Center Rostock,
Department of Child and Adolescent
Psychiatry and Neurology

Presentation Slot 10:30

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Suchtverhalten und riskanter Substanzkonsum sind nicht durch individuelle Faktoren wie Impulsivität oder Stresssensitivität gekennzeichnet, sondern es spielen dabei auch sozioaffektive Faktoren wie soziale Normen und Möglichkeiten sowie sozial Kontextfaktoren wie Stress in der Familie oder der Bezug zu Freunden und Gleichaltrigen. Die COVID-19 Pandemie hat nun durch den verhängten Lockdown, den limitierten Aktionsradius und die Einschränkung sozialer Begegnungen erhebliche soziale Veränderungen mit sich gebracht, die sich je nach individueller Lage und über alle Altersspannen hinweg erstreckt. Zuvor identifizierte normative und nicht-normative Risikoverhaltensweisen und -bedingungen für einen Substanzkonsum könnten sich somit ebenso verändert haben. Durch den Rückgriff auf bereits existierende längsschnittliche Kohorten (IMAGEN, ROLS, MARS) und querschnittlicher Datensätze, bei denen auch Informationen direkt in alltäglichen Situationen erhoben wurden (IMAC-Mind) sowie COVID- 19 bezogene Erhebungen zu Gesundheit, sozialen Faktoren und Verhaltensweisen während des Lockdowns, werden wir multivariate Analysen durchführen, um die Stabilität von in früheren Studien identifizierten Maßen unter COVID-19 zu schätzen und zu sehen, wie sich diese über die Zeit hinweg nochmals verändern. Hierfür verwenden wir Daten zu Gehirnstruktur und -funktion, Sensor-basierte Verhaltensdaten in alltäglichen Situationen sowie Maße der Affektregulation („mindfulness“), die wir auch über verschiedenen Alterspannen hinweg, kreuzvalidieren. Faktoren, die zuvor als Schutzmaßnahmen klassifiziert wurden könnten sich abschwächen oder verstärken und andere Mechanismen und Prozesse könnten sich als zentral herausstellen. Dies könnte auch Unterschiede zwischen den Geschlechtern betreffen. Durch das aktuelle Projekt könnten wertvolle Einblick in die gesundheitsbezogenen Konsequenzen einer solchen Pandemie über verschiedene Lebensphasen hinweg gewonnen werden.

Individual decisions for risky behavior, such as substance consumption, are influenced by neurobehavioral microstates, including impulsivity or maladaptive stress reactivity. These decisions have, yet, also been attributed to socioaffective cues – from macrosocial norms and opportunities, including access routes or private space, to mesosocial factors, including closeness to consuming peers or amount of familial stress. The COVID-19 pandemic provoked many restrictions and changes in social functioning along differently equipped individuals in every age cohort, and we might need to refine previously identified normative and nonnormative risk-taking trajectories for substance use prediction. Capitalizing on existing longitudinal cohort studies (IMAGEN, ROLS, MARS) and cross-sectionally fitted high-resolution real-life momentary data (IMAC-Mind), where COVID-19-related health/sociobehavioral assessments have been added during the lockdown, we will perform multivariate analyses estimating the stability of measures under COVID-19 and relations over time. We will asses new brain and daily, sensor-based behavioral data in the samples to capture risktaking/ perceptions, longitudinally after-lockdown, and key features of affect regulation (mindfulness) and cross-validate age data. Factors established as protective classifiers might weaken or strengthen and new key associations of mechanisms might exhibit, including even stronger gender differences. We may gain valuable insight into pandemic health consequences in sensible periods along the life span.

Project Start 08.10.2021

Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

ter Horst Julian
Universität Osnabrück

Thomas Reiter
Ludwig-Maximilians-University Munich, Chair for Psychological Methods & Assessment

Julian Scharbert
Department of Psychology, University of Münster

Presentation Slot 10:45

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Major public health crises, such as the COVID-19 pandemic, pose serious risks to people's physical health and psychological well-being. To manage the pandemic, governments around the world have mandated policies that restrict people's activities and limit social contact with others. Importantly, individuals differ in how they cope with these challenges psychologically. The Coping with Corona (CoCo) Project aims to explore and predict (WP1: build up theoretically derived and data-driven machine learning models) as well as to understand and target (WP2: unpack mediating processes) individual differences in coping with the pandemic. These work packages (WP1 and WP2) will be applied in three sub-projects focused on key domains of social coping processes: social situation selection (SP1), interpersonal expression and perception (SP2), and emotional co-regulation (SP3). The CoCo team integrates interdisciplinary theoretical and methodological expertise of leading researchers in the fields of personality, relationship, developmental, network, and behavioral data science. This project will generate insights of empirical, theoretical and practical importance. Specifically, results will provide (a) a rich description of how different people cope with the current and similar pandemics, and (b) novel insights on person-environment transactions that explain these differences. Thus, it will provide a conceptual and empirical basis for personalized prevention and intervention efforts to help individuals effectively cope with pandemics.

Project Start 01.09.2021

Impact of the COVID-19 Pandemic on Child Marriage, Sexual and Reproductive Health, and Domestic Violence in India and Zambia

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Janina Steinert
Technical University of Munich

Presentation Slot 11:00

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The COVID-19 pandemic has caused more than two million deaths worldwide and pushed an estimated 115 million people into extreme poverty (World Bank, 2020). With countries in the Global South facing devastating socioeconomic consequences, the pandemic is projected to severely slow down progress towards reaching the **Sustainable Development Goals (SDGs)** of the United Nations 2030 Agenda. The SDG5 for "Gender Equality" is no exception (Wenham et al., 2020). Accordingly, UN Secretary-General António Guterres notes: "*Limited gains in gender equality and women's rights made over the decades are in danger of being rolled back due to the COVID-19 pandemic"* (United Nations, 2020). In light of this, the proposed project aims at assessing the **impact of the COVID-19 pandemic on gender inequality in the Global South**. We thereby put specific focus on three central indicators of gender inequality, namely (1) domestic violence (*SDG target 5.2*), (2) child and forced marriage (*SDG target 5.3*), and (3) sexual and reproductive health (*SDG target 5.6).* A growing body of empirical literature documents negative impacts of the current and previous public health emergencies on these three indicators. First, emerging evidence points to an **increase in domestic violence** in consequence of COVID-19 lockdowns, which UN Women has prominently labelled the "shadow pandemic" (Agüero, 2021; UN Women, 2020). Similarly, previous studies have documented a higher prevalence of violence against women and girls during the Ebola crisis (Chandan, 2020; O'Brien & Tolosa, 2016). Explanations for the increase include barriers in accessing services or social support and elevated levels of stressors such as financial insecurity, symptoms of depression and anxiety, and an increased care burden (Mazza et al., 2020; Schneider et al., 2016). Second, a recent publication in *The Lancet* warns that the COVID-19 pandemic may put an additional 2.5 million girls around the world at **risk of child marriage** within the next five years (Cousins, 2020). A possible explanation for the increased risk is that marrying off a daughter to receive a bride price can become a survival strategy for families who are under immense economic pressure due to the pandemic (Anderson, 2007). Third, public health emergencies can have **detrimental impacts on women's and girls' sexual and reproductive health** (Hall et al., 2020). For example, a study reveals that the rate of teenage pregnancies increased by 65-75% during the Ebola epidemic in West Africa (Rissa-Gill & Finnegan, 2015). Underlying reasons might be that women and girls engage in (quasi-) transactional sex to cope with the economic shock induced by the pandemic, which also increases the risk of contracting HIV and other sexually transmitted diseases (Steinert et al., 2017). Apart from this, policy advocates have warned that the COVID-19 pandemic is causing major disruptions in supply chains for modern contraceptives in several low-income countries (Nanda et al., 2020).

Despite some preliminary evidence, **knowledge on specific mechanisms underlying the pandemic's detrimental social impacts** remains incomplete and a **profound understanding of which groups of girls are most vulnerable** is to date missing. The proposed project aims to shed light on these questions in two countries of the Global South, in which strong existing research partnerships will enable fast evidence generation: **Zambia and India**. UNICEF (2020) estimates that 1.5 million girls in India are married before reaching adulthood each year and up to one in four Indian girls give birth during adolescence (Nguyen et al., 2019). Recent estimates suggest that one in eight women was exposed to physical and/or sexual violence in the previous year (Daruwalla et al., 2020). In Zambia, almost one in three girls is married and falls pregnant before her 18th birthday (UNICEF, 2020). Over 40% of Zambian women and girls have experienced sexual and/or physical violence in their lives (Simona et al., 2015). In view of the countries' poor performance on these gender indicators, both appear as suitable settings for this project. Focusing on two countries will enable us to account for possible cultural and contextual differences between Sub-Sahara Africa and South Asia and explicitly examine how they may moderate the pandemic's impact on the three SDG targets. For instance, cultural differences in marriage customs could translate into a higher risk of child marriage in systems in which resources are transferred to the bride's family (i.e. bride price customs in African countries) as compared to those in which the bride's family has to offer a substantial dowry like in India (see Corno et al., 2020). Similarly, variations in the stringency of countries' lockdown policies may have different implications for gender inequality. In India, the strict closure of factories and workplaces has taken people's livelihood sources and unleashed an unseen internal labour migration from urban to rural communities. This may, at the same time, have elevated women's and girls' vulnerability to violence and sexual exploitation (Rajan et al., 2020). In light of this, the proposed research consists of the following three objectives:

- **Objective 1:** Understanding the pandemic's impact on child marriage, sexual and reproductive health, and domestic violence in India & unpacking underlying mechanisms (see WP1 below).
- **Objective 2:** Understanding the pandemic's impact on child marriage, sexual and reproductive health, and domestic violence in Zambia & unpacking underlying mechanisms (see WP2 below).
- **Objective 3:** Examining how cultural and contextual differences shape the impact of the pandemic on the above gender inequality outcomes (see WP3 below).

The proposed research will provide crucial insights into the immediate harms that the pandemic puts onto young women and girls. Knowledge on which groups are most vulnerable is vital information for policy-making and can help channelling emergency relief and support mechanisms towards these families and girls. High-quality data on households' coping behaviours can be best collected while the pandemic is still ongoing so as to avoid retrospection and possible measurement error. More importantly, detrimental impacts on the three identified SDG targets will have **long-term economic consequences related to girls' educational opportunities and women's employment prospects** (see Wenham et al., 2020). I aim to explore these long-term consequences in future research projects, drawing on the same samples as well as secondary data sources.

Project Start 01.09.2021

Deciphering epigenetic changes related to the SARS-CoV-2 pandemic in a genetically informative, longitudinal twin family study: The TwinLife Epigenetic Change Satellite (TECS) project

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Theresa Rohm
Universität Bremen

Presentation Slot 11:15

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Deciphering epigenetic changes related to the SARS-CoV-2 pandemic in a genetically informative, longitudinal twin family study: The TwinLife Epigenetic Change Satellite (TECS) project

Prof. Dr. Dr. Elisabeth Binder, Max Planck Institute of Psychiatry, Munich.
Prof. Dr. Martin Diewald, Department of Sociology, Bielefeld University, Bielefeld.
JProf. Dr. Andreas J. Forstner, Institute of Human Genetics, University of Bonn, Bonn.
Prof. Dr. Christian Kandler, Department of Psychology, University of Bremen, Bremen.
Prof. Dr. Markus M. Nöthen, Institute of Human Genetics, University of Bonn, Bonn.
Prof. Dr. Frank M. Spinath, Department of Psychology, Saarland University, Saarbrücken.

Summary

The SARS-CoV-2 pandemic is a global challenge leading to extensive individual and societal constraints. The pandemic has consequences not only for physical health, but also for mental and social well-being. The impact of the pandemic, however, varies between individuals depending on constitutional, psychological, and social factors (e.g., socio-economic status). Medium- and long-term effects on individual phenotypes and behavior can be mediated and stabilized through epigenetic changes (e.g., changes in DNA methylation).

The aim of the proposed project is thus to systematically investigate epigenetic effects associated with the SARS-CoV-2 pandemic stressors in a large longitudinal multiple-cohort twin family study – TwinLife (www.twin-life.de). Its extended twin family design is ideally suited, as it focuses on behavioral and social phenotypes over the lifespan. As the collection of a first saliva sample was conducted before the SARS-CoV-2 outbreak, we have now the unique opportunity to investigate epigenetic changes associated with the pandemic in thousand twins and their families. The deciphering of those changes and its dependence on individual risk factors and buffering resources will reveal important insights, which will allow us to identify risks and risk compensation even before negative long-term consequences of pandemic-related experiences become visible in individual development, overt behaviors, or life course outcomes. They may be comparable to early warning signs in functional medical, psychological, and sociological monitoring on the level of the individual and the core family.

For the planned longitudinal epigenetic analyses, we will use phenotypic data and additional saliva samples collected during and after the SARS-CoV-2 pandemic, and investigate a subgroup of 1,000 TwinLife participants using the MethylationEPIC array, which allows epigenome-wide analyses of >850,000 methylation sites. The proposed epigenetic analyses will be leveraged by existing genome-wide genotype data to study gene-environment interactions. The results will be followed up in international data sets for intercultural comparisons and replications.

Keywords

SARS-CoV-2 pandemic, TwinLife, mental and social stressors, DNA methylation, longitudinal twin family study, epigenome-wide analyses

Project Start 01.06.2021

Psychosocial and health-related impact of the SARS-CoV-2 pandemic, antibodies and vaccination in older individuals (CORO-TREND)

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Gerhard W. Eschweiler
University Hospital Tübingen, Geriatric Center

Dr Sebastian Heinzel
Dept. of Neurology, Kiel University

Presentation Slot 11:30

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Psychosocial and health-related impact of the SARS-CoV-2 pandemic, antibodies and vaccination in older individuals (CORO-TREND)

Project Description

SARS-CoV-2 infections can cause severe and diverse health issues. However, so far relatively few individuals suffer from direct infection causes in Germany compared to the impact of restrictions that may affect health and livelihoods on a population scale. Imposed restrictions of everyday living and isolation affect emotional and behavioral processing, social networks and mobility. Senior citizens are particularly at risk of COVID-19, and thus often most protected and restricted. Long-term effects of these restrictions for their lives, and factors deciding, who suffers most from current and future restrictions and who is resilient or coping well, are still unclear. Moreover, the effects of disclosing SARS-CoV-2 antibody status and of (potential) vaccinations on psychosocial aspects of life are unknown.

In the study applied for, longitudinal changes (11 years pre-outbreak and 3 years post-outbreak) of the outcome variables quality of life, depressivity, mobility/frailty, cognitive functioning and blood biomarkers (neurofilament light chain (NfL), β-amyloid) will be investigated in 800 older individuals (age: ~72 years). All subjects have been extensively examined every 2 years since 2009 (e.g. medical history, neuropsychological and neurological expert examination, lifestyle, mobility/quantitative motor skills, biomarkers (e.g. NfL, β-amyloid, APOE genotype)) as part of the prospective TREND study (www.Trend-Studie.de; **T**übingen evaluation of **R**isk factors for **E**arly detection of **N**euro**D**egeneration). During the funding period, these variables as well as additional psychosocial factors, social networks, perceived loneliness and stress, pandemic-related worries, tested SARS-CoV-2 antibody and reported immunization status, will be collected repeatedly. Data will be collected at ≥2 onsite/at-home visits (with approved hygiene/safety measures) and 3 postal/online surveys (piloted in May 2020), and may flexibly adapt to new restrictions with increased postal/online surveying.

Objectives comprise the investigation of 1) longitudinal changes in outcome variables, 2) their modulation through resilience, coping and psychosocial, demographic and biological factors, 3) the effects of (new) restrictions and (informed) antibody status/vaccination on longitudinal outcomes, 4) interdependencies between variables and changes thereof through restrictions, antibodies, and vaccination, and 5) potential ascertainment bias and differences in data acquisition methods and best statistical adjustment. To address these objectives, comprehensive hypothesis-driven and exploratory statistical analyses will be performed using longitudinal structural equation models. The findings can inform policy making of future restriction/protection strategies for elderly citizens and the general public regarding the interplay of (psychosocial) factors influencing quality of life and health during this pandemic and beyond.

Project Start 01.05.2021

Influence of the COVID-19 pandemic hygiene and distance rules on the transmission of multidrug-resistant gram-negative pathogens in hospital settings

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Marco Galardini
Twincore, MHH

Presentation Slot 11:45

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Absichtserklärung zur Einreichung eines Projektes im Rahmen der Ausschreibung zur fachübergreifenden Erforschung von Epidemien und Pandemien anlässlich des Ausbruchs von SARS-CoV-2

Antragsteller: Prof. Marco Galardini (RESIST-Professur)

Prof. Susanne Häußler

Twincore, Zentrum für Experimentelle und Klinische Infektionsforschung, eine Einrichtung der Medizinischen Hochschule Hannover und des Helmholtz Zentrums für Infektionsforschung in Braunschweig

Feodor-Lynen-Straße 7

30625 Hannover

Title: Influence of the COVID-19 pandemic hygiene and distance rules on the transmission of multidrug-resistant pathogens in hospital settings

The COVID-19 pandemic is exposing the influence of non-pharmacological interventions in controlling the spread of infectious agents. Time will tell if these interventions will persist in society, especially improved hygiene in hospital settings. The pandemic has also accelerated the use of data such as cases counts and genomics to inform policy changes in near real-time. This momentum can be leveraged to tackle the threat of nosocomial infections from multidrug-resistant bacteria, by integrating genomics with epidemiological data.
In this project, we seek to investigate the effect of improved hospital hygiene on the spread of multidrug-resistant gram-negative bacteria. We hypothesise that the COVID-19 pandemic will have an impact on the circulating lineages, and we seek to understand how lasting this perturbation will be once interventions are lifted. We propose to collect gram-negative isolates from before, during and after the pandemic, across university hospitals in Germany and Italy. We will apply whole genome sequencing to identify the circulating lineages at high resolution. This data will be augmented by epidemiological data to identify sources of pathogen transmission and their changes. This project will form the basis of a modern pathogen surveillance system and the establishment of guidelines for effective infection control measures.

Project Start 01.10.2021

The consequences of SARS-CoV-2 for societal inequalities

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Dr Claudia Hövener
Robert Koch Institute

Professor Dr Sabine Zinn
SOEP DIW / Humboldt Universität zu Berlin

Professor Dr Oliver Razum
School of Public Health, Bielefeld University

Presentation Slot 12:30

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Groups put at Particular Risk by COVID 19 (GaPRisk)

DFG - Project number 458299140

Principal Investigators:
Dr. Claudia Hövener: Robert Koch-Institut (RKI)
Professor Dr. Oliver Razum: Bielefeld University, School of Public Health
Professor Dr. Carsten Schröder: Deutsches Institut für Wirtschaftsforschung (DIW)
Professorin Dr.-Ing. Sabine Zinn: Deutsches Institut für Wirtschaftsforschung (DIW)/Sozio-oekonomisches Panel (SOEP)
Staff: Dr. Emily Finne (Bielefeld University), Dr. Niels Michalski (RKI) and others

Summary. The Covid-19 pandemic poses numerous societal challenges. We will examine how it affects distinct social and at-risk groups in Germany, what it implies for societal inequalities, and what role welfare state measures play. First, we will describe the situation of the population before and during the pandemic in the health and the socio-economic domain. In each domain, we will study a set of core outcomes (e.g., physical and psychological health in the first domain; household income and frequency of social contacts in the second). We will describe levels of and inequalities in outcomes both for the overall population and for at-risk groups. Second, we will examine the implications of Covid-19-related policies in the health and the socio-economic domain to identify policies that have proven beneficial and will recommend policies that could be implemented in combination with these to mitigate unintended side-effects. To achieve these aims, our interdisciplinary team will apply descriptive and causal statistical techniques, taking advantage of regional variation in policies and infection rates and small-area estimation. We will use a unique integrated dataset, comprising: (a) the Socio-Economic Panel (SOEP); (b) SOEP-CoV, providing detailed information on the pandemic-related situation of about 6,700 SOEP respondents in the 2nd quarter of 2020; (c) blood and saliva tests from approx. 20,000 SOEP respondents (collection starting in Sept. 2020 in collaboration with Robert Koch Institute (RKI)).

Zusammenfassung. Die Covid-19 Pandemie stellt die Gesellschaft vor vielfältige Herausforderungen. Das erste Ziel des vorliegenden Projekts ist es, die Folgen der Pandemie für verschiedene gesellschaftliche (Risiko-) Gruppen in Deutschland, soziale Ungleichheiten und die Rolle des Wohlfahrtsstaats zu beschreiben. Dazu wird im ersten Schritt die gesundheitliche und sozio-ökonomische Situation der Bevölkerung vor und in der Pandemie beschrieben. Diese Beschreibung wird auf verschiedenen Größen auf Individual- und Haushaltsebene basieren - z.B. psychisches und physisches Wohlbefinden zur Beschreibung der gesundheitlichen Situation bzw. Einkommen und Anzahl sozialer Kontakte zur Beschreibung der sozio-ökonomischen Situation. Für jede Größe wird die zeitliche Entwicklung (Höhe und Verteilung) für die Bevölkerung insgesamt sowie für verschiedene Risikogruppen dargestellt. Das zweite Ziel des Projekts besteht darin, die Implikationen verschiedener Politikmaßnahmen, die als Reaktion auf die Pandemie in Deutschland implementiert wurden, zu analysieren. Diese Analyse dient dazu, erfolgreiche Maßnahmen zu identifizieren und Bedarfe für ergänzende Maßnahmen zur Abfederung unerwünschter Nebeneffekte aufzudecken. Zur Erreichung beider Projektziele wird das interdisziplinäre Projektteam deskriptive und kausale Evaluationsmethoden sowie kleinräumige Schätzmethoden verwenden, die die regionale und zeitliche Variation der Maßnahmen sowie des Infektionsgeschehens zur statistischen Modellierung nutzen. Als Datengrundlage wird eine einzigartige integrierte Dateninfrastruktur verwendet, die folgende Datensätze umfasst (a) das Sozio-oekonomische Panel (SOEP); (b) SOEP-CoV, eine Zusatzbefragung von rund 6.500 SOEP-Befragten mit detaillierten Angaben zu ihrer Lage während der Pandemie (2. Quartal 2020); (c) Blut- und Speicheltests von voraussichtlich ca. 20.000 SOEP-Befragten, die ab September 2020 gemeinsam mit dem Robert-Koch-Institut (RKI) erhoben werden.

Project Start 01.08.2021

PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Dr Sonja Ayeb-Karlsson
UNU-EHS

Presentation Slot 14:00

(Kindly note, that the finale presentation slot might be changed. Please doublecheck the online agenda at the conference platform)

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PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)

Ayeb-Karlsson[1,2], Harasym[1], Johns[1], Mathews[1], Sheaffer[1], Martins[2] and Raju[3]

About a billion people around the world live in slums, including roughly 30–50% of the urban population in the Global South (Lilford et al. 2017). In India, similar to other countries in the Global South, people often settle down in informal settlements upon their arrival in cites after having migrated from rural areas in search for seasonal work. Most of these migrant populations work in informal sectors and are left out of the healthcare and social safeguarding systems. Further, stigma, forced evacuations and structural mistreatment cause mistrust for the government (Ayeb-Karlsson et al. 2016, 2020). In India, the media already reported the first case of COVID-19 in a slum with 23,000 people in less than a square kilometre in Mumbai in March last year. Imaginably, WHO's COVID-19 guidelines of two metres physical distancing and 20 seconds of hand washing with soap was almost impossible (Raju and Ayeb-Karlsson 2020; Kluge et al. 2020). The Indian context and events represent an important case study to better understand the changes and shocks triggered by the pandemic upon societies in the Global South (Raju and Van Niekerk 2020).

There are various reasons why mobile and 'trapped' populations are particularly vulnerable in the face of the COVID-19 pandemic (Ayeb-Karlsson et al. 2018, 2019; Watts et al. 2021; Raju et al. 2021). Migrants often live and work in precarious conditions. Lockdowns and restrictions left many without an income as informal labour could not be carried out at home. People on the move tend to have underlying vulnerabilities, including anxiety and post-traumatic stress, related to their experiences pre-, during or post-migration. Adding to this, the pandemic aggravated an already hostile environment for migrants. Displaced people were often accused of spreading the virus and in India returning migrants were sprayed with toxic disinfectant liquids in a belief that it would prevent the spread.

The aim of PROWELLMIGRANTS is to qualitatively investigate the impact of COVID-19 upon migrants' wellbeing and mental health in India. Migrants (mainly seasonal and temporary) in India who form a crucial part of the national informal labour forces were severely affected due to the sudden lockdown. Many ended up homeless as they were evicted out of accommodation provided to them by their employing industries. As transportation services shut down, they were forced to walk for weeks and months to get home. The roadblocks ended up trapping them in between states forcing them to seeking shelter and food in overcrowded public squares. In this context and with great ethical caution, we (1) investigate how the overall COVID-19 response in India impacted the mental health and wellbeing of migrant labours; (2) Examine how shocks to migrant livelihoods impacted their wellbeing; (3) Propose policy and

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[2] University of Sussex
[3] University of Copenhagen

practice recommendations that can strengthen existing health systems and better support pandemic responses in the future.

Principal Investigator Dr Ayeb-Karlsson (UNU-EHS) and Co-Investigators Dr Raju (University of Copenhagen) and Co-Investigator Dr Martin (University of Sussex) have extensively researched the wellbeing of migrants and displaced populations in various contexts including India. Besides this, two of the research team members, Research Associate Dr Johns and Research Assistant Ms Mathews, are based in Kerala. At UNU-EHS in Bonn, the research team is supported by Research Assistants Ms Sheaffer and Ms Harasym.

Project Start 01.01.2022

Space-time exploration of COVID-19 data and local risk factors in Berlin: the example of the district of Neukölln

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Tobia Lakes
Humboldt-Universität zu Berlin

Dr Nicolai Savaskan
Gesundheitsamt Neukölln

Presentation Slot 14:30

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Starting Point

On March 11, 2020, the WHO declared the outbreak of the coronavirus disease a global pandemic. With the onset of the COVID-19 pandemic, among others, three characteristics become distinct: 1. The close connection between health and a number of other factors. Not only biomedical factors are drivers of the pandemic, but also environmental, social and economic parameters play their part in the spread of the coronavirus (Ehlert 2021, Gibson & Rush 2020, Kadt et al. 2020, Mercker et al. 2020, Stojkoski et al. 2020). This has been shown for the individual level in other countries but not yet in Germany. 2. There is a distinct spatial pattern and underlying process in the number of COVID-19 cases. These spatial differences are not only observable on a national but also on a regional and local level (Guan et al. 2020, Chen et al. 2020, Murugesan et al. 2020). Health monitoring in Germany, however, generally uses aggregated regional data in an attempt to determine the driving forces for health-related problems in an ecological analysis. An initial analysis was done by the Berlin Senate Administration for Health, Nursing and Equal Opportunity at the district level to show the statistical significance of some of the determinants of the COVID-pandemic in late summer 2020 (Berlin Senate Administration for Health, Nursing and Equal Opportunity 2020). As the Berlin districts are very heterogenous in regard to their population, their social structure and the built environment, we believe that the district level is not differentiated enough for a robust analysis. This project will take advantage of the unique situation Berlin provides with the system of small-scale lifeworld-oriented areas (LOR, similar to neighbourhoods) that are used by most units of the city and district administrations to aggregate their data. This pandemic hence revealed that there is substantial potential to improve the workflows and techniques to assess, analyse, monitor and adequately address this pandemic (and potential other health) situations with policy measures.

This project aims to develop and apply a set of innovative spatiotemporal data analysis techniques to assess, analyse and monitor the COVID-19 pandemic on a detailed spatial level of LOR neighbourhoods. We use administrative data from the data-pool in connection with data of the health department in regard to the spread of the coronavirus pandemic at the LOR neighbourhood level in in Berlin-Neukölln. We aim to investigate the spatio-temporal distribution of COVID-19. We argue that there is a meaningful connection between socio-economic factors and the distribution of COVID-19 cases. This has been shown in earlier studies for other health aspects already, e.g. Cutter et al. (2003), Evans and Kim (2010), Flanagan et al. (2011) and, initially, also for COVID-19, e.g. Stojkoski et al. (2020), Ehlert (2020), Mercker et al. (2020), Whittle et al. (2020) or Fu et al. (2021). Although initial spatial and statistical analyses on COVID-19 have been conducted, such as regression- and network models (Islam et al., 2021), aspatial regression models (Sun et al. 2020), geospatial cluster analysis (Cordes and Castro 2020) or advanced statistical models (Sun et al. 2021), and have constituted important insights in spatial determinants of COVID-19, this research is limited because most of the COVID-19 data was aggregated to different geographic units like state, province, country, city etc. Research that specifically addresses COVID-19 cases on small geographical units and their connection with socio-economic variables of the neighborhood are missing (Andersen et al., 2021). This study seeks to analyse socio-economic data with COVID-19 cases on small administrative units. The findings help to develop a High Risk Index (see also Gibson and Rush, 2020) for neighborhoods in Berlin and - on a very detailed spatial level of neighbourhoods - in Berlin-Neukölln. By using verified COVID-19 cases with a high spatial resolution collected by the health office in Neukölln, the identified neighbourhoods will be checked for clusters of COVID-19 outbreaks.

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Project Start 01.01.2021

Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Dr Ann-Katrin Job
University of Braunschweig, Department of Psychology, Institute of Clinical Psychology, Psychotherapy and Assessment

Presentation Slot 15:00

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Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences (ZF-IV-COVID-19)

funded by German Research Foundations (JO 1632/3-1)

Head of Study: Dr. Ann-Katrin Job*

Study Manager: M. Sc. Psych. Aline Debener*

M. Sc. Psych. Emma Drewes*

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Within in a few weeks, the COVID-19 pandemic has radically changed the life of many people all over the world. It is not yet known, which long-term psychological and physical effects the pandemic will have in Germany and which groups of people will prove to be resilient or vulnerable. For the prevention and alleviation of the pandemic's consequences, it is of great importance to identify factors that have an influence on the development and stability of mental health and somatic symptoms. The ZF-IV-COVID-19-project is an additional project to the current DFG project "Zukunft Familie IV" ("Future Family IV"; JO 1632/1-1), in which the 18-year catamnesis of approximately 360 families is currently being carried out. Since kindergarten age, parent and child variables have been collected repeatedly (at the age of approx. 4, 5, 6, 7, 8, 14 years). While the children are currently in young adulthood (21-24 years) and thus in the critical phase of their career entry, the parents represent a risk group for a severe course of COVID-19 due to their age (50-60 years), so that both groups have an increased vulnerability. The current project aims to collect data on (1) the development of the psychological burden of the pandemic, (2) life satisfaction, and (3) the long-term negative and positive consequences of the crisis for the young adults and their parents. Furthermore, the institutional trust, willingness to be vaccinated, and the participants' handling of the actions to contain the pandemic ordered by the authorities will be analyzed. The assessment takes place at three points of measurements over a period of one year. The first assessment started in January 2021; the third assessment will be completed in autumn 2022. Due to the prospective design of the "Zukunft Familie" project, the ZF-IV-COVID-19-project offers the possibility to uncover longitudinal relationships between different risk and protective factors, individual stress, and life satisfaction. Comparisons of the results with German and international studies are planned.

German Clinical Trial Register: https://www.drks.de/drks_web/setLocale_EN.do

Project Start 17.02.2020

The evidence for interventions in early childhood allergy prevention - a living systematic review

Cluster: Impact on health beyond COVID-19 and health care systems

Principal investigators

Professor Dr Christian Apfelbacher
Institute of Social Medicine and Health Systems Research, Otto von Guericke University Magdeburg

Presentation Slot 15:15

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Abstract

Politics in Search of Evidence (PoSEvi)

The role of Political Philosophy and Public Health in the political responses to COVID-19

J Piel, C Apfelbacher

Institute of Social Medicine and Health Systems Research, Medical Faculty, Otto-von-Guericke University Magdeburg

Background

The COVID-19 pandemic shed new light on the relationship between science and politics.

The **dynamic** of virus transmissions required politics to respond quickly in order to protect the population. Policy-makers addressed evidence-based knowledge to guide and justify political decisions.

Before long, they realized that some of the evidence was weak (e.g. regarding treatment strategies for COVID-19), changing quickly (e.g. regarding the effects of mask-wearing) or completely missing (e.g. regarding the effect of reopening schools).

Against this background, they were not just faced with enforcing and legitimizing containment interventions but also with a **heterogeneity** of standards in **evidence** and had to weigh which evidence to prioritize for population protection.

Normative assumptions such as the avoidance of triage situations in intensive care played a central role in the scientific discourse on the pandemic. Position papers of relevant scientific societies (of epidemiology, social medicine, public health, medical statistics, medical sociology) mirror these implicit or explicit normative assumptions.

Overall, the pandemic raised reviving the question on the **relationship** between **epidemiology, public health** and **evidence-based policy making**.

Research Interest

In a **qualitative study**, the Public Health sub-project of PoSEvi addresses this aspect by examining how **epidemiologists and public health scientists experience** the relationship between science and politics in the different phases of the COVID-19 pandemic.

We focus on **how** these groups

- perceive the role of their respective **discipline in policy-making**,
- experience the situation as representatives of their profession and from the **perspective of a citizen**,
- position themselves in the public,
- perceive **communication processes** within sciences on the pandemic (e.g. debates on quarantine measures, physical distancing or further containment strategies).

Methodology

The research approach is guided by the principles of **Grounded Theory**, characterized by an iterative process of data gathering and interpretation. First, we will perform a **document analysis** of e.g. position papers/statements/policy briefs of scientific societies; interviews with experts in media formats.

Secondly, we will conduct **qualitative expert interviews** with **20-25 representatives** from **epidemiology** and its sub-disciplines, from **public health** and related fields. After processing the interviews, the datasets will be combined.

In collaboration with the Philosophy sub-project, we examine how **normative assumptions** on the relationship between science and politics are relevant among scientists during the pandemic. Possible traces of normative assumptions are reconstructed in the triangulated data. The research process is documented and reflected with supplementary field notes and by communicative group validation.

Outlook

In dialogue with the philosophy team, we aim to identify commonalities and differences in the perspectives, interests and expectations of scientists and policy-makers and examine tensions between them in relation to the pandemic. This feeds into a **comprehensive model** on using **evidence-**

characters (without spaces): 2927

based knowledge in policy. Finally, the findings will be presented in a stakeholder dialogue to reflect and discuss strategies for the **organization of science-policy interactions in future** pandemics and similar scenarios.

8

International Responses and Global Strategies

Project Start 01.10.2021

Politics in Search of Evidence. The role of Political Philosophy and Public Health in the political responses to COVID-19

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Michael Reder
Munich School of Philosophy, Vicepresident,
Chair for Practical Philosophy

Presentation Slot 10:30

(Kindly note, that the finale presentation slot might be changed. Please doublecheck the online agenda at the conference platform)

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Principal Investigators (Gemeinschaftsantrag: Sachbeihilfe)

- Prof. Dr. Michael Reder, Chair of Practical Philosophy, Professor of Social and Political Philosophy, Director of Institute for Ethics and Social Philosophy, Munich School of Philosophy, Germany
- Prof. Dr. Christian J. Apfelbacher, PhD, Director of the Institute of Social Medicine and Health Systems Research (ISMG), Medical Faculty, Otto von Guericke University Magdeburg, Germany

Politics in Search of Evidence

Political Philosophy and Public Health on the Political Responses to COVID 19

The concept of evidence-based politics (EBP) has been proposed during the COVID-19 pandemic as a response to a political situation of extreme uncertainty. However, how a convincing form of EBP might look like is unclear. Political philosophy has been dealing with global crises (such as climate change) and how politics should react to them. Against this theoretical background, the philosophical subproject will analyse the concept of EBP in terms of its inherent models of science, the relationship between science and politics and the underlying normative assumptions. The science of public health and its core discipline epidemiology has received a lot of attention in the COVID-19 pandemic but views as to how political public health scientists should be varies. The aim of the public health subproject is to reflect the relationship between public health science and politics by interviews with scientific representatives from epidemiology and document analysis of published position papers and policy briefs from relevant scientific societies. By integrating political philosophy and public health, the project reconstructs, analyses and criticizes the concept of EBP from an interdisciplinary perspective. This allows to develop and justify a comprehensive EBP model for a convincing political response during the COVID 19 and future pandemics.

Project Start 01.07.2021

Regional economic disparities in the aftermath of the COVID-19 outbreak: the role of digitalization and working-from-home

Cluster: International Responses and Global Strategies

Principal investigators

Dr Sarra Ben Yahmed
ZEW – Leibniz Centre for European Economic Research

Professor Dr Rolf Sternberg
Leibniz University Hannover, Institute of Economic and Cultural Geography

Presentation Slot 10:45

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This project aims to analyse the impact of the COVID-19 crisis on regional labour markets and firm dynamics in Germany and on their disparities within and between regions. In particular, we plan to investigate the role of digitalization for the varying regional responses to the crisis. Indeed many firms and workers have invested in digital technologies and adopted remote working since the start of the pandemic. These factors are likely to have significant impacts regional labour markets and firm structure in both the short and long term, while the different opportunities to use digital technologies is likely to affect inequalities. The project consists of five working packages (WP). First, we investigate how differences in digitalization, working-from-home arrangements and exposure to international trade have affected the regional employment responses to the crisis and employment inequalities within regions (WP1). Second, we investigate whether disparities between urban and rural regions have increased in the aftermath of the Covid-19 outbreak and highlight the role played by the digital infrastructure and digital competences of individuals and firms for the resilience and economic development of selected rural regions (WP 2 and WP3). Third, we analyse the effects on regional firm dynamics looking at firms' responses to the crisis and by evaluating the impacts of the implemented public aid measures for small businesses (WP4 and WP5). While the focus of the project is on the short to medium run effects on regional economic development, the results are expected to be informative about the possible future evolution of disparities within and between regions. The results will also bring novel insights for national, regional and local governments in Germany that are responsible for regional policies. Policymakers will get, in particular, evidence-based arguments in favour of strategies and instruments aiming to improve the situation of rural regions in COVID-19 era, as a complement to national policies assisting individuals and firms. The project applies a dedicated mix of quantitative and qualitative data collection and data analysis. The research team is diverse in terms of academic fields so that the comparative advantages of economists and geographers, enriched by sociologists in a specific workshop, will be exploited in an optimal division of labour.

The project is being carried out in cooperation between the Institute of Economic and Cultural Geography and the Leibniz Centre for European Economic Research (ZEW) in Mannheim. ZEW complements the existing competencies of the Institute of Economic and Cultural Geography with its profound knowledge in labor market research.

Project Start 01.04.2022

Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Marian Burchardt
Leipzig University

Dr Caroline Meier zu Biesen
Global Health Lab, University of Leipzig

Dr Nina Mackert
University of Leipzig, Leipzig Lab Global Health

Professor Dr Maren Möhring
Leipzig University, Institute for Cultural Studies

Presentation Slot 11:00

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Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona

As the current COVID-19 crisis powerfully shows, pandemics are inherently spatial phenomena that necessitate a re-ordering in how people and pathogens interact. Responses to the current pandemic focus on quarantine, at scales historically unprecedented, targeting not only specific groups (of infected or risky bodies) but entire populations. Quarantine, however, is more than simple forced immobility. Technologies of self-isolation, flexible confinement, social distancing, and the policing of compliance rely on activating individuals to coproduce their own and others' health, or 'responsibilizing' citizens. While this concept is central in recent studies of public health, we lack insight into how responsibilization shapes how ordinary people construe and navigate bodily and public space in pandemic times.

Our project investigates quarantining strategies and practices as central public health tools against pandemics and the processes of responsibilization that seek to make them effective. By illuminating the nexus of quarantine and responsibilization, the project will significantly contribute to the history and theory of disease prevention. Using an interdisciplinary approach involving historians, sociologists, and anthropologists, thereby bringing together transregional and comparative perspectives, we will pursue three interrelated axes of analysis:

(1) subproject 1: the circulation of quarantine knowledge in global public health discourses,

(2) subproject 2: the history of quarantine during the Spanish Flu in the United States, and

(3) subproject 3: current practices of quarantine in response to coronavirus in South Africa.

While subproject 1 takes a transregional perspective to reconstruct the history of increasingly shared knowledge and norms of disease control, and their (post)colonial legacies, the case studies in subprojects 2 and 3 focus on the implementation and negotiation of quarantine on the ground. Both in the US and South Africa, these efforts have been shaped by race, which plays a fundamental role in the social and spatial order of public health in both societies.

We understand pandemic space and its construction via quarantine as conceived through expert knowledge, regulated by public health institutions enacted by ordinary citizens, and cutting across multiple scales in a context of worldwide viral spread. Our main research questions are: How have pandemic space and quarantining strategies been conceptualized and codified in international/global health discourses? Which social groups have been considered as responsible citizens, and what role has race played in this respect? What scientific observations and popular assumptions about personal space and sanitation have directed public health debates towards responsibilized behavior, and how have they been taken up by ordinary citizens?

Project Start 01.10.2021

Contain Epidemics with Stochastic Mixed-Integer Optimal Control

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Gerd Wachsmuth
BTU Cottbus-Senftenberg

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Brandenburgische Technische Universität, Cottbus - Senftenberg

Ralf Wunderlich
Brandenburg University of Technology Cottbus-Senftenberg, Institute of Mathematics

Presentation Slot 11:30

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CESMO – Contain Epidemics with Stochastic Mixed-Integer Optimal Control

Prof. Dr. Armit Fügenschuh Prof. Dr. Gerd Wachsmuth
Prof. Dr. Ralf Wunderlich

October 18, 2021

The temporal and spatial course of a large-scale epidemic or pandemic can be described using mathematical models. These divide the total population into different compartments: the number of people not yet infected (susceptible to the disease), acutely infected (and contagious) people, and those who have recovered (with or without permanent immunity). The transition of a person from one of these compartments to another is described mathematically, e.g. by means of equations or probabilities that depend on parameters measuring the infection rates, incubation times or mortality of the disease and people's behavior.

If one does not take the epidemic curve for granted, there are numerous possibilities for intervention in order to influence the parameters favorably. For example, exit restrictions can lower contact and mobility rates. Transporting medical supplies to hospitals in outbreak hotspots can lower the mortality rate. Such measures have financial or social costs. Furthermore, the available capacities for transport and the delivery quantities are limited. What is needed is a system optimum that describes an optimal containment of the epidemic through a mix of measures consisting of the distribution of goods and necessary behavioral restrictions.

This problem is very challenging from a mathematical point of view, since several research areas interact: The dynamics of the epidemic are described using deterministic and stochastic differential equations. Classic SIR models are significantly expanded to cover different regions, genders, age groups and mobility behavior. Additional extensions of the classic models relate to asymptomatic disease courses with a high number of unreported cases of undetected infections and test strategies tailored to them. The data are therefore fraught with uncertainty. The influencing of the epidemic and the distribution of goods are treated using methods of optimal control and operations research (mixed-integer optimization), whereby uncertainties must also be taken into account and robust solutions are sought.

In an interdisciplinary manner, three researchers from the respective mathematical fields will work together, use and further develop modern mathematical methods in order to be able to model and solve this problem together. The solution methods are to be implemented in the form of a prototype demonstrator. In this planning tool, after entering data to describe a spatial area and characteristic parameters of an infectious disease, a user should receive suggestions for containing it (e.g. distribution of medical goods, local lock-down measures), which were derived from the solution of the mathematical models.

Project Start 01.07.2021

Exploring the impact of COVID-19 on regional resilience and disparities in Germany and China

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Annekatrin Niebuhr
Institute for Employment Research, Kiel University

Presentation Slot 11:45

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Exploring the impact of COVID-19 on regional resilience and disparities in Germany and China

Large crises affect regional economies differently, partly because of the specific characteristics of the crisis in question, but also because of differences in regional economic structures, in experiences in dealing with previous crises and in policy reactions at the national and regional level. The effects of the current COVID-19 crisis undoubtedly also differentiate between countries and regions. However, previous research provides only limited evidence on regional economic effects of pandemic crises and existing findings are often not applicable because basic conditions with respect to globalisation, ICT and mobility of individuals and goods differ significantly from the current situation. Based on first observations, we see two outstanding effects of COVID-19. First, containment measures restrict mobility and face-to-face interaction thereby diminishing classical agglomeration advantages and in particular learning opportunities that cities provide. Secondly, and simultaneously, global production networks are strongly disturbed, which may lead to a regionalization of value chains, however, without agglomeration advantages. How this complex situation will affect regional resilience and disparities will be the core aim of this project. It will do so, by comparing the regional effects of COVID-19 in Germany and China, using complementary quantitative techniques and qualitative case-study methods. The project will not only lead to policy-relevant empirical research results, it will also reevaluate the explanatory power of theoretical concepts in economic geography and regional economics around agglomeration advantages, global production networks and regional resilience.

The project will deal with four main research questions:
1) How does the COVID-19 crisis affect regional economies in Germany and China and do, in particular, agglomeration effects and an integration in global value chains influence the size of the regional shock and economic recovery of regions? How do economic crisis and health crisis interact at the regional level?
2) Does the crisis reduce agglomeration advantages because work from home and declining labour mobility might weaken learning effects?
3) How does the crisis affect global value chains and global production networks and what are the implication for regional disparities in Germany and China?
4) Do we need to revise the current theoretical approaches on regional effects of major crises because evidence derived from the work packages 1 to 3 suggests that their assumptions and arguments do not apply anymore?

Project Start 01.10.2021

COMPliaNCE Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation

Cluster: International Responses and Global Strategies

Principal investigators

Dr Paola D'Orazio
Ruhr University Bochum

Professor Dr Eike Steinmann
Ruhr-University Bochum

Professor Dr Klaus Steigleder
Ruhr University Bochum, Institute of Philosophy I, Chair of Applied Ethics

Dr Vladimir Ponizovsky
Ruhr-Universität Bochum

Presentation Slot 12:00

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COMPliaNCE - Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation

Dr. Paola D'Orazio, Prof. Wilhelm Hofmann, Prof. Klaus Steigleder, Prof. Eike Steinmann,

Ruhr Universität Bochum

The proposed **multidisciplinary** project aims to study pandemics' complexity from an integrated multidisciplinary perspective by relying on contributions from economics, ethics, psychology, and virology. It contributes to informed model-based policymaking by analyzing the possible consequences of alternative policy scenarios. Different socio-economic scenarios will be developed and used to test the effectiveness of different policy mixes to tackle the pandemic and address economic recovery. More specifically, the project has four main objectives:

1. To develop an **agent-based model** and apply it to analyze the virological, social, and economic effects and the effectiveness of different policy interventions to fight epidemics such as the one caused by SARS-CoV-2. In particular, we focus on how the government can increase interventions' effectiveness by appropriate strategies of communication. The model will be empirically validated with data from the Ruhr area, Germany.
2. Tostudythe**psychologicalfoundations**ofeffectivepolicyinterventions. It is neither possible nor desirable in a democracy to implement the interventions only by force. Voluntary compliance with the mandated measures is crucial for their effectiveness. We hence explore when and why people comply with the restrictions to counter pandemics.
3. To study the **virological foundations of effective policy interventions**. In order to develop effective countermeasures, it is necessary to under- stand the incidence of active virus infections and the development of antibody responses. This knowledge is important to identify the interventions that are recommendable for a medical perspective, to identify vulnerable groups, and to predict the course of the pandemic.
4. To study the **ethical conflicts of goals during the pandemic**. The ethical project's overall objective is to develop criteria for a well-founded moral evaluation of different policies and policy options concerning the corona pandemic. They are applied to the policy simulation scenarios.

The project will have a specific spatial focus on the Ruhr area. The rationale for that is threefold. First, the Ruhr is the largest urban area in Germany and the second largest in the European Union. Second, the multidisciplinary group is based at the Ruhr-University Bochum and is positioned within an essential network of research and stakeholders rooted in the area. Third, the population density and the concentration of critical production sites make the area relevant for studying the dynamics of the outbreak, diffusion, and containment of pandemics.

The project's contribution is to provide useful data and theoretical instruments that can guide public policy to cope with pandemics, such as the current COVID-19 pandemic. Data will be gathered from laboratory and field research in virology and social psychology. The theoretical instruments are the agent-based model, validated with the generated data, used as a policy simulator, and the ethical criteria to evaluate different policy options with conflicting goals.

Project Start 01.01.2022

The pandemic as a stress test of the patent system – a legal-economic re-examination of exclusivity, liability rules, open innovation, and complementary policy levers

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Martin Stierle
University of Luxembourg

Presentation Slot 12:30

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Project:

The pandemic as a stress test of the patent system – a legal-economic re-examination of exclusivity, liability rules, open innovation, and complementary policy levers

During the COVID-19 pandemic, the European patent system needs to prove that it can function under extreme circumstances. While certain institutions and market players emphasize its importance in the fight against COVID-19, others consider intellectual property rights as a hindrance to urgently needed innovation. Indeed, the innovation incentive mechanism of patents relies on exclusivity – a concept that naturally appears to be diametrically opposed to the idea of a joint fight against a pandemic.

This project investigates whether the European patent system is fit for a pandemic or a similar state of emergency. The analysis is based on the general hypothesis that the structure of European patent law is a major driver for innovation in a pandemic but might need finetuning and complementary policy measures for an even better functioning. Thereby, the project will focus on three main research questions:

The first research question asks whether patent law provides sufficient exceptions to exclusivity to serve the public interest. During the crisis, many jurisdictions have been expanding the regime of liability rules within their patent system. Members of the European Parliament and other voices advance the idea of a European compulsory license. The project will evaluate the need for such measures.

The second research question asks whether patent law offers beneficial structures for open innovation during pandemics. In the current crisis, such open innovation practices tend to reach industry sectors which were previously characterized as functioning on closed-innovation models. However, present developments demonstrate that these practices do not experience a strong support from major pharmaceutical companies. The study will analyse potential levers to incentivize open innovation practices as well as fast and extensive disclosure of patent applications and contextual information.

The third research question asks whether society needs complementary policy measures to the patent system as drivers for innovation during pandemics. Various scholars have argued for a movement towards a more proactive innovation policy with research prizes instead of exclusivity-based patents. An integral part of the EU's combat strategy against COVID-19 is the organization of a fund raiser for SARS-CoV-2 vaccine research. The project will analyse the need for alternative incentive mechanisms in comparison to patents as exclusivity-based rights.

The pharmaceutical sector has been selected as a field of study for the analysis due to its importance in pandemic scenarios. The methodology of the study will rely mainly on a theoretical comparative analysis: comparative legal analysis and comparative statics in economics. Case studies and roundtable workshops will be carried out with multiple representatives of major pharmaceutical companies, selected as representing best practices. The project team consists of legal and economic researchers from France, Germany, Japan, and Sweden. The results of this study will have the potential to serve policy makers, patent offices, courts and legislators to design a legal structure for innovation that functions efficiently under extreme circumstances, e.g. a pandemic or similar states of emergencies.

For further information please contact:
Associate Professor Dr. Martin Stierle
martin.stierle@uni.lu

Project Start 07.07.2021

Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Christian Kühn
TUM

Benedikt Lienkamp
TU Munich, Chair of Operations Supply Chain Management

Professor Dr Rolf Moeckel
Technical University of Munich

Presentation Slot 12:45

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Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)

Christian Kühn (TUM Department of Mathematics), Rolf Moeckel (TUM Department of Mobility Systems Engineering), Maximilian Schiffer (TUM School of Management), Technical University of Munich

In epidemic scenarios, authorities steadily balance between preserving the functionality of (critical) infrastructure and confining foci of infection. Transportation networks are part of the critical infrastructure as the movement of people and goods is mandatory to keep the economy and daily supply operational.

Unfortunately, transportation networks are also major foci of infection, especially with ambitions towards sustainable and shared transportation networks that focus on public transport and ride pooling. A central question is how transportation networks should be designed to allow for sustainable operations during normal times but also for robust and resilient operations that enable epidemic mitigation strategies during extreme situations, without relying on parallel infrastructure or redundant capacities. To answer this question, we study multilayer network dynamics by coupling epidemic networks and transportation networks, where each person that travels in a transportation network is also part of an epidemic network.

We combine approaches from three disciplines to allow for a holistic assessment and decision support. Specifically, we combine network dynamical systems to model epidemic networks with graph theoretic methods and optimization algorithms to design and operate robust transportation networks; we further include agent-based transport simulations to verify the effectiveness of the designed transportation networks and operational concepts. We use this algorithmic environment to design and validate new transport networks and potential epidemic mitigation strategies to develop efficient and safe transportation systems for a new normal.

Project Start 01.11.2021

Uneven geographies of vaccine manufacturing in the Global South: assessing the relations between research & development and global equity

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Ulrike Beisel
Department of Human Geography, Freie Universität Berlin

Presentation Slot 14:00

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Uneven geographies of vaccine manufacturing in the Global South: assessing the relations between research & development and global equity

Prof. Dr. Andrew Barry, Department of Human Geography, University College London, United Kingdom; Prof. Dr. Uli Beisel, Department of Human Geography, Freie Universität Berlin, Germany; Dr. John Kuumuori Ganle, School of Public Health, University of Ghana, Ghana; Dr. Nele Jensen, Department of Global Health & Social Medicine, Kings College London, United Kingdom; Dr. Ann H. Kelly, Department of Global Health & Social Medicine, Kings College London, United Kingdom; Dr. Gustavo Matta, Oswaldo Cruz Foundation (Fiocruz), Brazil; Prof. Dr. Richard Rottenburg, Wits Institute for Social and Economic Research, University of the Witwatersrand, South Africa

The pace of COVID-19 vaccine development has been nothing short of remarkable. In under a year from when genomic sequence of the novel coronavirus was made publicly available, millions of people around the world have received one of many viable candidates. Despite this tremendous achievement the global impact and public health value of these critical tools remains to be demonstrated. The transformative power of COVID-19 vaccines hinges upon their effectiveness not only in reducing the severity of disease but in arresting the transmission. But as efforts ramp up to, quite literally, vaccinate the planet, production, logistics and distribution challenges loom large. Vaccine equity, already a long-standing focus of global health concern, has, in the current crisis, become a lightning rod for geopolitical debate. For in addition to the profound inequities within and between societies Covid-19 has laid bare, the pandemic and the measures taken to control it have shown the interdependences between biomedical innovation and the health care system.

This proposal interrogates how fair access can be built into the design of vaccines and critically, their manufacturing processes. Production capacity remains concentrated in a few middle-income countries with established manufacturing infrastructures, such as Mexico, Argentina and critically, Brazil and India, although even here production of biomedical products is often limited by the lack of networks between contract manufacturers and fragile supply chains. As a result, it is critical to understand how technology transfer is being achieved in countries such as India, Brazil and South Africa that do have the capacity to produce COVID-19 vaccines domestically, and the impact that this will have for local vaccine access and delivery. This project aims to provide in-depth, granular analysis of the tech-transfer and collaborative production processes in South Africa, Ghana and Brazil. Through the collaboration between social science scholars in the Americas, the United Kingdom, Germany and the African continent, we hope to pilot a more substantive international research collaboration that accompanies the accelerated efforts to build up and strengthen vaccine-manufacturing efforts in the Global South. Studying vaccine R&D and manufacturing from a social science perspective will elaborate comparative insights and generalizable models for how social and global justice is currently being enacted in these processes and could be in the future.

Project Start 01.08.2021

Consequences of the Covid-19 crisis on Social Inequalities and Convivial Relations in Three Paraguayan Border Cities

Cluster: International Responses and Global Strategies

Principal investigators

Dr Raquel Rojas
Freie Universität Berlin

Presentation Slot 14:15

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Consequences of the Covid-19 crisis on Social Inequalities and Convivial Relations in Three Paraguayan Border Cities

Prof. Sérgio Costa, Freie Universität Berlin
Dr. Raquel Rojas, Freie Universität Berlin

Building on previous theoretical elaborations[1] the research project explores how the COVID-19 pandemic and its containment measures have affected different convivial spheres (family, neighborhood, public spaces) and dynamics of production and reproduction of social inequalities in the three most important border cities of Paraguay: Asunción (the capital city), Ciudad del Este, and Encarnación. These are the main crossing points between Paraguay and its border countries (Argentina and Brazil), however, the level of integration and interrelation of these cities with their foreign neighbors varies widely. While Ciudad del Este's economy relies heavily on border trade and a large part of its population depends economically on “shopping tourism”; Asunción, despite being an important entry port for products to the country, does not depend on tourists crossing from Argentina to keep its economy running. Encarnación, for its part, occupies an intermediate position. Border trade is highly relevant, but the city is also well integrated with its rural surroundings, and the agro-industrial sector has an important weight in its economy. Along these lines, the impact that border closures have had on the economy and convivial interactions in these cities differs from one case to the other.

The project combines a quantitative approach (survey) and a qualitative one (focus groups), allowing to identify different impacts of the containment measures regarding factors such as gender, social stratum, ethnicity, and region. By focusing on Paraguay, the project enables a deeper understanding of how people in countries with high levels of inequality, elevated degrees of informality and lack of social security were affected by Covid-19 containment measures, and how the population organized to cope with these difficult circumstances. The collection of the data a year after the impositions of mobility restrictions will allow assessing the socioeconomic consequences in the mid- and longer run. The results will not only offer a description of the situation in the selected cities but will also make it possible to compare how the closure of borders affected their inhabitants, inviting further discussions of different models of integration in border regions.

[1] Costa, S. (2019): “The neglected nexus between conviviality and inequality”, *Novos estudos CEBRAP* 38(1): 15-32.

Project Start 30.03.2022

Varieties of COVID-19 Reactions and Changing Modes of Globalization in the Global South

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Christina Teipen
Hochschule für Wirtschaft und Recht Berlin
(HWR)

Presentation Slot 15:00

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Varieties of COVID-19 Reactions and Changing Modes of Globalization in the Global South

Project No. 468243969

Project team and partners:
Prof. Dr. Christina Teipen, Prof. Dr. Hansjörg Herr, Dr. Petra Dünhaupt, Fabian Mehl at Hochschule für Wirtschaft und Recht Berlin, Germany;
Prof. Dr. Ernesto Noronha and Prof. Dr. Premilla D'Cruz at the Indian Institute of Management Ahmedabad, India;
Prof. Dr. Bruno de Conti at University of Campinas, Brazil;
Dr. Ben Scully at the University of Witwatersrand, Johannesburg, South Africa.

About

The project will analyse the impact of COVID-19 on social upgrading trajectories in global value chains (GVCs). It will investigate how key players in the Global South as well as external players like lead firms reacted to the COVID-19 crisis, and to which extent existing socio-economic regimes and varieties of capitalisms shape these crisis reactions.

Theoretically, the project will bring together GVC approaches and comparative institutionalism through a unique and specific interdisciplinary approach. The combined interdisciplinary theoretical framework will make exclusive contributions to the literature on GVCs, industrial policy, comparative institutionalism and labour sociology. In particular, we will link vertical perspectives on how national sectors are integrated in GVCs with horizontal perspectives aiming to explain the relevance of national politics and institutions. The outcome could form an important pivotal point for further theoretical efforts to conceptualize the interaction of economic and social upgrading trajectories and national policy regimes.

Empirically, it will contribute to the literature by examining the crisis management in India, Brazil and South Africa and the impacts of COVID-19 on social and economic upgrading trajectories in these countries. Brazil is an example of a large emerging economy with strong, albeit currently contested, labour power. India stands for an emerging economy with weak labour institutions and a huge informal sector. South Africa achieved social upgrading in some sectors, such as the automotive industry, with huge inequalities in other segments of the labour market. These differences make it worthwhile to enquire about general influences of national socio-economic regimes or even if new modes of globalization are evolving.

Project Start 01.04.2022

Deep learning-based parameter estimation of high spatial resolution mathematical models for the spread and control of COVID-19 in Germany

Cluster: International Responses and Global Strategies

Principal investigators

Professor Dr Gordon Pipa
University of Osnabrueck, Neuroinformatics

Presentation Slot 15:30

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Bayesian Regression Model to Analyse, Predict, and Control the Spreading of COVID-19 in Germany with High Spatial Resolution

Gordon Pipa and Laura Krieger from Osnabrück University

October 2021

1 Abstract

Within this project we aim to provide a fully data-driven analysis and forecast of the temporal dynamics of an infectious outbreak on different scales. The Bayesian regression model is already successfully used to calculate now- and forecast of Covid-19 infections on the level of counties (Landkreise) in Germany (https://covid19-bayesian.fz-juelich.de/). We will now focus on improving the spatial resolution to make predictions on the level of municipalities (Kommunen) that will enable decision-makers to judge the current and predicted dynamics, to asses the reliability and possible variations of the predictions, and to plan and adjust regional regulations to control the outbreak. By including interactions between regions on the same and across scales we want to monitor the spreading and identify possible sources of the infections faster to allow better corrective actions. Furthermore, we want to characterise and monitor the performance and limitations of the model for all scales, case numbers, and in respect to the speed with which changes due to introduced regulations can be identified. For this we will use data from two counties and their municipalities (i.e. Landkreis Osnabrück and Oldenburg). In order to produce a tool with high usability for the authorities in question we are working closely with the Gesundheitsamt Osnabrück.

Overview

Participant List

Abstracts catalogue

Participant list

Last name	First name	Affiliation	Project title
Abdel Hadi	Sascha	Justus-Liebig-University Giessen	Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model
Addo	Marylyn	Universitätsklinikum Hamburg	
Aepfelbacher	Martin	University Medical Center Hamburg Eppendorf	Monitoring the emergence and origin of SARS-CoV-2 mutations – Genetic Inter- and Intrahost SARS-CoV-2 diversity in immunocompetent and immunocompromised patients
Ahrens	Heide	DFG Secretary General	
Al-Hashimi	Alaa	Jacobs University Bremen	SARS-CoV-2 Spike Protein-Priming Cysteine Cathepsin L Acting at Microvilli of Intestine Epithelial Cells
Alpers	Francis	TU Ilmenau	Deciphering the “pandemic public sphere”: Government communication, (social) media discourses on and citizens’ responses to Covid-19 in Europe and the USA
Altfeld	Marcus	Leibniz Institute for Experimental Virology; DFG Commission for Pandemic Research	
Andreas	Marike	University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Evidence-based Oncology	Enhance the willingness of healthcare workers to be vaccinated against COVID-19 in Germany
Apfelbacher	Christian	Institute of Social Medicine and Health Systems Research; DFG Commission for Pandemic Research	The evidence for interventions in early childhood allergy prevention - a living systematic review
Artelt	Cordula	Leibniz Institute for Educational Trajectories; DFG Commission for Pandemic Research	
Avila	Marc	Zarm, University of Bremen	CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk
Ayeb-Karlsson	Sonja	UNU-EHS	PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)
Bagheri	Gholamhossein	Max Planck Institute for Dynamics and Selforganization	Micro-biophysical characterization of respiration aerosols (μResp) and their role in airborne transmission of infectious diseases
Balachandran	Sanjana	Justus-Liebig University Giessen	Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria
Barrios	Laura	University of Leipzig	In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia
Bauer	Katrin	Technische Universität Bergakademie Freiberg	Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms
Bayindir	Esra Eren	Universität Hamburg, Hamburg Center for Health Economics	The Impact of Public Discourse on Health Care Utilization during the COVID-19 Pandemic
Becker	Katja	DFG President	
Beisegel	Jesse	Brandenburgische Technische Universität	Contain Epidemics with Stochastic Mixed-Integer Optimal Control
Beisel	Ulrike	Department of Human Geography	Uneven geographies of vaccine manufacturing in the Global South: assessing the relations between research & development and global equity
Belik	Vitaly	Freie Universität Berlin	Elucidating the interplay of COVID-19 epidemic and social dynamics via Internet media in Germany
Ben Yahmed	Sarra	ZEW – Leibniz Centre for European Economic Research	Regional economic disparities in the aftermath of the COVID-19 outbreak: the role of digitalization and working-from-home
Benmaarouf	Khaoula	TU-Ilmenau	Deciphering the “pandemic public sphere”: Government communication, (social) media discourses on and citizens’ responses to Covid-19 in Europe and the USA
Betsch	Cornelia	University of Erfurt; DFG Commission for Pandemic Research	
Biber-Freudenberger	Lisa	Center for Development Research	The consequences of biodiversity loss and land use change on infectious disease emergence
Biermann	Kaija	University of Braunschweig	Science communication during pandemics: The role of public engagement in social media discussions

Participant list

Last name	First name	Affiliation	Project title
Blankart	Katharina	University of Duisburg-Essen	Causes and consequences of drug shortages
Blofield	Merike	GIGA/University of Hamburg	COVID-19 in Latin America: Covid-19 in Latin America: The role of social protections for households with children
Blokker	Nico	SOCIUM, Uni Bremen	MARDY: Modeling Argumentation Dynamics in Political Discourse (Phase 2)
Bode	Christian	Department of Anesthesia and Intensive Care Medicine	The role of ketogenesis in the immune response towards SARS-CoV-2
Bodenschatz	Eberhard	Max Planck Society / MPI-DS Goettingen	Micro-biophysical characterization of respiration aerosols (μResp) and their role in airborne transmission of infectious diseases
Bohndorf	Emma	University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Evidence-based Oncology	Enhance the willingness of healthcare workers to be vaccinated against COVID-19 in Germany
Bönke	Nikolaus	University Freiburg	Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)
Boroujeni	Bahman K.	Chair of Circuit Design and Network Theory	Reusable Face-Masks and Safe-to-Touch Covers Based on Flexible Large-Area Virus-Inactivating Electronic Layers
Bozorgmehr	Kayvan	Bielefeld University	Natural experiment on contextual effects on health and health care among refugees (NEXUS)
Braun	Lea-Marie	University Duisburg-Essen	Science communication during pandemics: The role of public engagement in social media discussions
Breitner-Busch	Susanne	LMU Munich	Influence of air quality on the expected burden on the health care system in the event of pandemics
Brix	Klaudia	Jacobs University Bremen	SARS-CoV-2 Spike Protein-Priming Cysteine Cathepsin L Acting at Microvilli of Intestine Epithelial Cells
Bruchhausen	Walter	Universität Bonn	Intersectoral Collaboration and Health Services during COVID19: A multi-stage, multi-level mixed-methods study in Ahmedabad, India
Brüggemann	Anne	Deutsche Forschungsgemeinschaft	
Buat	Camille	Center for Modern Indian Studies	Crisis as catalyst: Covid-19, social citizenship and political transformation in India
Buckow	Anjana	Deutsche Forschungsgemeinschaft	
Burchardt	Marian	Leipzig University	Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona
Butsch	Carsten	Universität zu Köln, Geographisches Institut; DFG Commission for Pandemic Research	
Butz	Kevin	Paul-Flechsig-Institute	Neurobiological mechanisms of spontaneous facial self-touches and possibilities of its active suppression to prevent the risk of infection
Chaturvedi	Madhav	Institute of Epidemiology and Social Medicine	Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings
Christiansen	Silke	Fraunhofer IKTS	Micro-biophysical characterization of respiration aerosols (μResp) and their role in airborne transmission of infectious diseases
Comteße	Hannah	Katholische Universität Eichstätt-Ingolstadt	Covid Apps for young adults for preventing transmission and promoting vaccination among refugees
Czarna	Anna	Jagiellonian University	Biochemical and structural characterization of the SARS-CoV-2 non-structural protein 16 (Nsp16), a cap ribose 2'O-methyltransferase
D'Orazio	Paola	Ruhr University Bochum	COMPliaNCE Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation
Debener	Aline	University of Braunschweig	Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences
Denner	Fabian	Otto-von-Guericke-Universität Magdeburg	Deep lung aerosol generation and virus encapsulation

Participant list

Last name	First name	Affiliation	Project title
Deppe	Marco	Universität Bremen	Deciphering epigenetic changes related to the SARS-CoV-2 pandemic in a genetically informative, longitudinal twin family study: The TwinLife Epigenetic Change Satellite (TECS) project
Destradi	Sandra	Albert-Ludwigs-Universität Freiburg	Populist Discourses on COVID-19 in the Global South (POP-DISC)
Domahidi	Emese	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Dörner	Philipp	Institute of Aerodynamics	Deposition of inhaled aerosols: a biological-fluid mechanical analysis of the deposition of particles in a respiratory model to assess the propagation of inhaled agents and the efficiency and toxicity of active substances in human airways using allicin as reference substance
Drewes	Emma	University of Braunschweig	Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences
Dries	Charlotte	Harding Center for Risk Literacy	Boosting citizens' vaccination decision-making using effective communication - VaccineComm
Dulin	David	FAU Erlangen-Nuremberg	Revealing the mechanism of nucleotide selection, addition and proofreading of the SARS-coronavirus replication transcription complex at the single molecule level
Eberl	Marian	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Egbers	Christoph	BTU Cottbus-Senftenberg	Sensors and exposition analyses for aerosol transport in dynamic situations
El Khoury	Marianne	University of Veterinary Medicine Hannover	Infection of intestinal cells by SARS-CoV2 and its effects on intestinal function
Elijan	Abiguel		COVID-19 and pastoralism in a context of rupture and structural reforms in Benin: Learning from uncertainty management from below
Ensser	Armin	Friedrich Alexander Universität Erlangen-Nürnberg	The role of TRIM-family proteins and other host cell factors in the restriction of SARS-CoV-2
Ernst	Christian	Technische Universität Bergakademie Freiberg	Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms
Eschweiler	Gerhard W.	University Hospital Tübingen	Psychosocial and health-related impact of the SARS-CoV-2 pandemic, antibodies and vaccination in older individuals (CORO-TREND)
Eser	Tabea	Division of Infectious Diseases and Tropical Medicine,	Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior
Estella	Pauline Gidget	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Fallkenberg	Timo	Universität Bonn	Intersectoral Collaboration and Health Services during COVID19: A multi-stage, multi-level mixed-methods study in Ahmedabad, India
Farrar	Jeremy James	Wellcome Trust	Keynote Speaker
Feldmann	Daniel	ZARM, University of Bremen	CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk
Fiedrich	Frank	University of Wuppertal	Non-Pharmaceutical Interventions and Social Context Analysis for Safe Events
Finne	Emily	School of Public Health	The consequences of SARS-CoV-2 for societal inequalities
Flemming	Ronja	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Flemming	Ronja	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Fluck	Juliane	ZB MED Information Centre for Life Sciences	NFDI4Health – Task Force COVID-19: Better understanding the COVID-19 outbreak and its consequences through integrated and harmonised research efforts
Franke	Christiana	Department of Neurology	Immune-mediated pathogenesis and development of autoimmunity in neurological manifestations of COVID-19
Frick	Ulrich	HSD University of Applied Sciences	Covid Apps for young adults for preventing transmission and promoting vaccination among refugees
Friedemann	Markus	BTU Cottbus-Senftenberg	Contain Epidemics with Stochastic Mixed-Integer Optimal Control
Frischholz	Bianca	DLR Oberpfaffenhofen	Influence of air quality on the expected burden on the health care system in the event of pandemics

Participant list

Last name	First name	Affiliation	Project title
Fu	Qingqing	Institute of Technology for Nanostructures	Determination of the UV radiation dose of an aerosol using UV-sensitive dyes to optimize UV
Fuchs	Robert	Department of English	The Impact of Public Discourse on Health Care Utilization during the COVID-19 Pandemic
Füller	Henning	Humboldt-Universität zu Berlin	Open Markets in Ghana and Covid-19 interventions. Competing strategies of infection control and lessons for relational urban health
Füller	Henning	Humboldt-Universität zu Berlin	Open Markets in Ghana and Covid-19 interventions. Competing strategies of infection control and lessons for relational urban health
Galardini	Marco	Twincore	Influence of the COVID-19 pandemic hygiene and distance rules on the transmission of multidrug-resistant gram-negative pathogens in hospital settings
Geldmacher	Christof	Division of Infectious Diseases and Tropical Medicine,	Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior
Gerstmann	Marieke	Leibniz-Institute for Prevention Research and Epidemiology-BIPS	Feasibility of involving trained community mediators in COVID-19 prevention measures (COVID-TCM)
Gfrörer	Thomas	Hector Research Institute of Education Sciences and Psychology, University of Tübingen	Effects of the Covid-19 Pandemic on German Language and Literature Teachers in Germany and their Familiarity with, Use of and Views on Digital Media
Gizem	Özler	Physikalisch-Technische Bundesanstalt	High-fidelity modeling of the drying kinetics, lifetimes, and trajectories of saliva droplets
Glaeser	Stefanie	Justus-Liebig University Giessen	Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria
Glatzel	Markus	University Medical Center Hamburg-Eppendorf	Targeting the neurovascular niche in COVID-19
Gönsch	Jochen	Universität Duisburg-Essen	Design and Control of Incompletely Specified Products
Göpel	Maja	Leuphana University Lüneburg	
Grill	Eva	Ludwig-Maximilians University Munich; DFG Commission for Pandemic Research	
Grosshans	Holger	Physikalisch-Technische Bundesanstalt	High-fidelity modeling of the drying kinetics, lifetimes, and trajectories of saliva droplets
Gruhlke	Martin	RWTH Aachen University	Deposition of inhaled aerosols: a biological-fluid mechanical analysis of the deposition of particles in a respiratory model to assess the propagation of inhaled agents and the efficiency and toxicity of active substances in human airways using allicin as reference substance
Gunkelmann	Nina	TU Clausthal	Fundamentals of plasma disinfection for the inactivation of viruses in aerosol particles: Influence of liquid films
Hagemann	Kerri	Leibniz Institute for Experimental Virology	Natural killer cell-mediated ADCC in SARS-CoV-2 infected individuals and vaccine recipients
Hampel	Uwe	TU Dresden	Sensors and exposition analyses for aerosol transport in dynamic situations
Harasym	Mary	UNU-EHS	PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)
Hartmann	Anne Theresa	Potsdam University	Professional developments in inclusive schools under conditions of the Covid-19 pandemic
Hasauzzaman	Gazi	BTU Cottbus-Senftenberg	Sensors and exposition analyses for aerosol transport in dynamic situations
Hasselhorn	Fabian	University of Cologne	Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]
Haug	Fabian	University of Würzburg	Covid Apps for young adults for preventing transmission and promoting vaccination among refugees
Haug	Julian	University of Würzburg	Covid Apps for young adults for preventing transmission and promoting vaccination among refugees
Haunss	Sebastian	SOCIUM, Uni Bremen	MARDY: Modeling Argumentation Dynamics in Political Discourse (Phase 2)
Hauser	Anja Erika	Charité - Universitätsmedizin Berlin	Phenotypic and functional analysis of immune cells during severe COVID-19
Häusser	Jan	Justus-Liebig-University Giessen	Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model
Heinrich	Martin	Technische Universität Bergakademie Freiberg	Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms

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Last name	First name	Affiliation	Project title
Heinzel	Sebastian	Dept. of Neurology, Kiel University	Psychosocial and health-related impact of the SARS-CoV-2 pandemic, antibodies and vaccination in older individuals (CORO-TREND)
Held	Kathrin	Division of Infectious Diseases and Tropical Medicine,	Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior
Hermanns	Benedicta	University of Hamburg	ECOS – European COVID Survey
Herold	Susanne Valerie	University of Giessen Lung Center; DFG Commission for Pandemic Research	
Herrmann	Hartmut	Leibniz-Institute for Tropospheric Research	Aerosol chamber studies to characterize the SARS-CoV-2 transmission through aerosol particles (AEROVIR)
Hertel	Robert	BTU Cottbus-Senftenberg	Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.
Herzog	Stefan	Max Planck Institute for Human Development	Assisting behavioral science and evidence-based policy making using online machine tools
Heyder	Ralf	Charité - Universitätsmedizin Berlin	
Hoebel	Jens	Robert Koch Institute, Berlin	Socioeconomic inequalities in health during the COVID-19 pandemic (INHECOV): empirical analyses and implications for pandemic preparedness
Holderied	Laura	UNU-EHS	PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)
Holl	Reinhard	University of Ulm	A prospective analysis of the long-term impact of the COVID-19 pandemic on well-being and health care among children with a high-risk chronic condition and their families
Honnacker	Ana	Munich School of Philosophy	Politics in Search of Evidence. The role of Political Philosophy and Public Health in the political responses to COVID-19
Hövener	Claudia	Robert Koch Institute	The consequences of SARS-CoV-2 for societal inequalities
Hubert	Philipp	JLU Gießen	Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model
Innocent	Rwego	Center for Development Research	The consequences of biodiversity loss and land use change on infectious disease emergence
Jäck	Hans-Martin	University of Erlangen	Establishment of long-term humoral memory against SARS-CoV-2 after vaccination versus infection
Jan	Mölter	TUM	Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)
Janina	Steinert	Technical University of Munich	Impact of the COVID-19 Pandemic on Child Marriage, Sexual and Reproductive Health, and Domestic Violence in India and Zambia
Janys	Lena	University of Bonn	Systems Epidemiological analysis of the COVID-19 PANdemic accounting for host-virus interaction and human behavior
Jarynowski	Andrzej	FU Berlin	Elucidating the interplay of COVID-19 epidemic and social dynamics via Internet media in Germany
Job	Ann-Katrin	University of Braunschweig	Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences
Jörg	Verena	DIPF I Leibniz Institute for Research and Information in Education	Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)
Juarez-Osorio	Mariana	Max Planck Institute for Dynamics of Complex Technical Systems	Deciphering the impact of Sars-CoV-2 envelope protein glycosylation on human pathogenicity
Julian	ter Horst	Universität Osnabrück	Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic
Junglen	Sandra	Institute of Virology	The consequences of biodiversity loss and land use change on infectious disease emergence
Käding	Nadja	Klinik für Infektiologie und Mikrobiologie	Privacy-preserving Contact Context Estimation
Kähler	Christian Joachim	Universität der Bundeswehr München	The influence of turbulence on the cleaning performance of indoor air cleaners
Karch	André	Institute of Epidemiology and Social Medicine	Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings

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Last name	First name	Affiliation	Project title
Karch	André	Institute of Epidemiology and Social Medicine	Utilization of spatially resolved data sources for an established agent-based model of Germany and its impact on predicted SARS-CoV-2 dynamics
Kellert	Olga	Universität Göttingen	Belief states of vulnerable groups in crises in Latin America: sociolingustic and computational assessment
Kellner	Nils	Klinikum Sankt Georg Leipzig	Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms
Kizakanveatil Subhash	Parvathy	BTU Cottbus-Senftenberg	Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.
Klaas	Michael	Institute of Aerodynamics	Deposition of inhaled aerosols: a biological-fluid mechanical analysis of the deposition of particles in a respiratory model to assess the propagation of inhaled agents and the efficiency and toxicity of active substances in human airways using allicin as reference substance
Kleinert	Corinna	Leibniz Institute for Educational Trajectories (LIfBi)	Effects of the Corona pandemic on job-related learning in adult life
Klug	Stefanie	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Knüpling	Louis	Leibniz University Hannover, Institute of Economic and Cultural Geography	Regional economic disparities in the aftermath of the COVID-19 outbreak: the role of digitalization and working-from-home
Köhler	Sina-Mareen	RWTH Aachen/Institute of Educational Science	The Transformation of Peer Relationships and Participation during the Covid-19 Pandemic
Kokot	Johanna	University of Hamburg	ECOS – European COVID Survey
Köster	Denise	University Medical Center Hamburg-Eppendorf	Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings
Krämer	Nicole	University Duisburg-Essen	Science communication during pandemics: The role of public engagement in social media discussions
Krieger	Laura	Osnabrück University	Deep learning-based parameter estimation of high spatial resolution mathematical models for the spread and control of COVID-19 in Germany
Kruis	Frank Einar	University Duisburg-Essen	Determination of the UV radiation dose of an aerosol using UV-sensitive dyes to optimize UV
Kuebart	Andreas	Leibiniz Institute for Society and Space	Socio-spatial diffusion of COVID-19 in Germany
Kühn	Christian	TUM	Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)
Kunter	Mareike	DIPF I Leibniz Institute for Research and Information in Education	Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)
Lakes	Tobia	Humboldt-Universität zu Berlin	Space-time exploration of COVID-19 data and local risk factors in Berlin: the example of the district of Neukölln
Lambio	Christoph	Humboldt-Universität zu Berlin	Space-time exploration of COVID-19 data and local risk factors in Berlin: the example of the district of Neukölln
Lapesa	Gabriella	IMS Uni Stuttgart	MARDY: Modeling Argumentation Dynamics in Political Discourse (Phase 2)
Laumann	Daniel	Westfälische Wilhelms-Universität Münster	Physics Learning in Distance Instruction
Lehner	Carolin	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Lenkeit	Jenny	Potsdam University	Professional developments in inclusive schools under conditions of the Covid-19 pandemic
Lennartz	Sophie	Justus Liebig University	Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria
Lennartz	Sophie	Justus-Liebig University Giessen	Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria
Liebenow	Johannes	Universität zu Lübeck	Privacy-preserving Contact Context Estimation
Liebert	Uwe G	Leipzig University	Aerosol chamber studies to characterize the SARS-CoV-2 transmission through aerosol particles (AEROVIR)
Lienkamp	Benedikt	TU Munich	Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)

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Last name	First name	Affiliation	Project title
Lindert	Jutta	University of Emden	MItigating the effects of the paNDemic on health workers – preparing and responding (MIND)
Lisner	Wiebke	Institut für Ethik, Geschichte und Philosophie der Medizin, Medizinische Hochschule Hannover	Pinning Down the Hypothetical. Pandemic Preparedness since the 1990s – Historical, Ethical and Legal Preconditions of Managing Corona Virus Response
List	Marit Kristine	DIPF I Leibniz Institute for Research and Information in Education	
Löffelholz	Martin	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Ludwig	Stephan	Institute fo Virology; DFG Commission for Pandemic Research	The role of MAPK pathways in SARS CoV-2 infection and COVID-19 disease
Mackert	Nina	University of Leipzig	Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona
Marb	Anne	LMU Munich	Influence of air quality on the expected burden on the health care system in the event of pandemics
Martin	Jeannett	Georg-August University of Goettingen	COVID-19 and pastoralism in a context of rupture and structural reforms in Benin: Learning from uncertainty management from below
Maskileyson	Dina	University of Cologne	Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]
Mathews	Mishal	UNU-EHS	PROtecting the WELLbeing of MIGRANTS in India during the COVID-19 pandemic (PROWELLMIGRANTS)
Mbouandi Njiasse	Ibrahim	Brandenburg University of Technology Cottbus-Senftenberg	Contain Epidemics with Stochastic Mixed-Integer Optimal Control
Mechtenberg	Lydia	Hamburg University	Does discourse breed an appetite for Covid-19 vaccination? An online experiment on group dynamics, arguments, and narratives
Mechtenberg	Lydia	Hamburg University	Does discourse breed an appetite for Covid-19 vaccination? An online experiment on group dynamics, arguments, and narratives
Mehl	Fabian	Hochschule für Wirtschaft und Recht Berlin (HWR)	Varieties of COVID-19 Reactions and Changing Modes of Globalization in the Global South
Meier zu Biesen	Caroline	Global Health Lab	Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona
Meister	Moritz	Institute for Employment Research, Kiel University	Exploring the impact of COVID-19 on regional resilience and disparities in Germany and China
Mentrup	Theresa	University of Mainz	The Management of Loss
Merbold	Sebastian	BTU Cottbus-Senftenberg	Sensors and exposition analyses for aerosol transport in dynamic situations
Merkenschlager	Christian	University of Augsburg	MOMO-Med: Modelling mosquito vectors and disease risk in the Mediterranean area under climate and land use change
Moeckel	Rolf	Technical University of Munich	Transport and Epidemic Networks: Graphs, Optimization and Simulation (TENGOS)
Mohammadi	Esfandiar	University of Lübeck	Privacy-preserving Contact Context Estimation
Möhring	Maren	Leipzig University	Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona
Mojzisch	Andreas	University of Hildesheim	Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model
Mujaheed	Shaikh	Hertie School	Causes and consequences of drug shortages
Mulder	Ines	Justus-Liebig University Giessen	Increased use of Quaternary Alkylammonium Compounds during the SARS-CoV-2 Pandemic: Impact on Environmental Concentrations and Multi-resistance Development in Pathogenic and Environmental Bacteria
Müller-Mahn	Detlef	University of Bonn	COVID-19 and the response of Ethiopian rural food systems
Naim	Hassan Y.	University of Veterinary Medicine Hannover	Infection of intestinal cells by SARS-CoV2 and its effects on intestinal function
Nees	Frauke	University Medical Center Schleswig-Holstein	The role of pandemic and individual vulnerability in longitudinal cohorts across the life span: refined models of neurosociobehavioral pathways into substance (ab)use?
Neumann-Böhme	Sebastian	University of Hamburg	ECOS – European COVID Survey
Nguyen	Huyen	University of Hamburg	Does discourse breed an appetite for Covid-19 vaccination? An online experiment on group dynamics, arguments, and narratives

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Last name	First name	Affiliation	Project title
Niebuhr	Annekatrin	Institute for Employment Research, Kiel University	Exploring the impact of COVID-19 on regional resilience and disparities in Germany and China
Nowak	Bianca	University Duisburg-Essen	Science communication during pandemics: The role of public engagement in social media discussions
Ossowski	Stephan	University of Tübingen	Identification and characterization of Long COVID-19 patients by whole blood transcriptomics
Padó	Sebastian	IMS, Stuttgart University	MARDY: Modeling Argumentation Dynamics in Political Discourse (Phase 2)
Paiardi	Giulia	HITS and Heidelberg University	meCocan - Towards a mechanistic understanding of the interaction of SARS-CoV-2 spike glycoprotein and host heparan sulphate proteoglycans
Pascual-Reguant	Anna	Charité-Universitätsmedizin Berlin	Phenotypic and functional analysis of immune cells during severe COVID-19
Passos Mendes Kohn	Vania	Institute of Virology / Hannover Medical School	Infection, transport and degeneration of human neurons caused by severe acute respiratory syndrome coronavirus 2
Peters	Annette	Helmholtz Zentrum München, Neuherberg	The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?
Pfänder	Stephanie	Ruhr University Bochum	Reusable Face-Masks and Safe-to-Touch Covers Based on Flexible Large-Area Virus-Inactivating Electronic Layers
Piel	Julia	Institute of Social Medicine and Health Systems Research	The evidence for interventions in early childhood allergy prevention - a living systematic review
Pipa	Gordon	University of Osnabrueck	Deep learning-based parameter estimation of high spatial resolution mathematical models for the spread and control of COVID-19 in Germany
Ponge	Johannes	Department of Information Systems	Utilization of spatially resolved data sources for an established agent-based model of Germany and its impact on predicted SARS-CoV-2 dynamics
Ponizovsky	Vladimir	Ruhr-Universität Bochum	COMPliaNCE Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation
Popowicz	Grzegorz	Helmholtz Zentrum München	Biochemical and structural characterization of the SARS-CoV-2 non-structural protein 16 (Nsp16), a cap ribose 2'O-methyltransferase
Prediger	Susanne	TU Dortmund / IPN Leibniz Institute Kiel	
Prugger	Julian	Munich School of Philosophy	Politics in Search of Evidence. The role of Political Philosophy and Public Health in the political responses to COVID-19
Prüß	Harald	Department of Neurology	Immune-mediated pathogenesis and development of autoimmunity in neurological manifestations of COVID-19
Pryss	Rüdiger	University of Würzburg	Covid Apps for young adults for preventing transmission and promoting vaccination among refugees
Raffler	Nikolai	German Research Foundation (DFG)	
Ramos	Pablo	Universidad Javeriana	In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia
Razum	Oliver	School of Public Health	The consequences of SARS-CoV-2 for societal inequalities
Rebitschek	Felix	Harding Center for Risk Literacy	Boosting citizens' vaccination decision-making using effective communication - VaccineComm
Reder	Michael	Munich School of Philosophy	Politics in Search of Evidence. The role of Political Philosophy and Public Health in the political responses to COVID-19
Rehders	Maren	Jacobs University Bremen	SARS-CoV-2 Spike Protein-Priming Cysteine Cathepsin L Acting at Microvilli of Intestine Epithelial Cells
Reis	Olaf	University Medical Center Rostock	The role of pandemic and individual vulnerability in longitudinal cohorts across the life span: refined models of neurosociobehavioral pathways into substance (ab)use?
Reiter	Thomas	Ludwig-Maximilians-University Munich	Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic
Reiter	Thomas	Ludwig-Maximilians-University Munich	Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic
Rexer	Thomas	Max Planck Institute for Dynamics of Complex Technical Systems	Deciphering the impact of Sars-CoV-2 envelope protein glycosylation on human pathogenicity
Richter	Thomas	German Institute for Global and Area Studies (GIGA)	COVID-19 and Executive Personalization in Sub-Saharan Africa, Asia, Latin America and the MENA Region

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Last name	First name	Affiliation	Project title
Richter	Solveig	University of Leipzig	In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia
Riebel	Ulrich	BTU Cottbus-Senftenberg	Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.
Rittweger	Jörn	German Aerospace Center (DLR)	Influence of air quality on the expected burden on the health care system in the event of pandemics
Rittweger	Jörn	German Aerospace Center (DLR)	Influence of air quality on the expected burden on the health care system in the event of pandemics
Rohm	Theresa	Universität Bremen	Deciphering epigenetic changes related to the SARS-CoV-2 pandemic in a genetically informative, longitudinal twin family study: The TwinLife Epigenetic Change Satellite (TECS) project
Rojas	Raquel	Freie Universität Berlin	Consequences of the Covid-19 crisis on Social Inequalities and Convivial Relations in Three Paraguayan Border Cities
Rossbach	Oliver	Institute of Biochemistry	Functional analysis of interactions of the SARS-CoV-2 genome with microRNAs and virus inhibition by circular RNAs as a novel therapeutic concept
Roswag	Malte	University of Hildeshiem	Effects of Organizational Climate on Adherence to COVID-19 Guidelines: A Moderated Mediation Model
Sakel	Sophia	Ludwig-Maximilians-University Munich	Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic
Salcedo	Leonardo	University of Leipzig	In dire need of protection of life: The dynamics between health and security during the Covid19 pandemic in conflict-affected territories in Colombia
Sattler	Sebastian	Bielefeld University	Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]
Savaskan	Nicolai	Gesundheitsamt Neukölln	Space-time exploration of COVID-19 data and local risk factors in Berlin: the example of the district of Neukölln
Schanz	Daniel	German Aerospace Center	CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk
Scharbert	Julian	Department of Psychology	Coping with Corona (CoCo): Understanding individual differences in well-being during the COVID-19 pandemic
Schederecker	Florian	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Schier	Christina	RWTH Aachen University	Deposition of inhaled aerosols: a biological-fluid mechanical analysis of the deposition of particles in a respiratory model to assess the propagation of inhaled agents and the efficiency and toxicity of active substances in human airways using allicin as reference substance
Schikowski	Tamara	IUF-Leibniz-Institut für umweltmedizinische Forschung	The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?
Schilling	Julia	Department of English	The Impact of Public Discourse on Health Care Utilization during the COVID-19 Pandemic
Schlüter	Michael	Hamburg University of Technology; DFG Commission for Pandemic Research	
Schmitz	Tillman	Humboldt-Universität zu Berlin	Space-time exploration of COVID-19 data and local risk factors in Berlin: the example of the district of Neukölln
Schneider	Alexandra	Helmholtz Zentrum München, Institute of Epidemiology	The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?
Schneider	Thorsten	University of Leipzig	Impacts of Primary School Closures on Educational Inequalities
Schönefeld	Malte	University of Wuppertal	Non-Pharmaceutical Interventions and Social Context Analysis for Safe Events
Schönfelder	Martin	Technical University of Munich	ExAero: Aerosol emission during exercise in relation to lung function, age and body weight
Schönwolff	Michael	Technical University of Munich (TUM)	De- and restabilization of evidence during the corona crisis
Schreyögg	Jonas	Universität Hamburg; DFG Commission for Pandemic Research	
Schröder	Andreas	DLR	Sensors and exposition analyses for aerosol transport in dynamic situations

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Last name	First name	Affiliation	Project title
Schröder	Andreas	DLR	CFD modelling of indoor aerosol transport based on experimental Lagrangian particle tracking measurements to infer airborne SARS-CoV-2 transmission risk
Schulz	Sebastian R	University of Erlangen	Establishment of long-term humoral memory against SARS-CoV-2 after vaccination versus infection
Schwarz	Andreas	TU Ilmenau	Deciphering the “pandemic public sphere”: Government communication, (social) media discourses on and citizens’ responses to Covid-19 in Europe and the USA
Schwarze	Rüdiger	Technische Universität Bergakademie Freiberg	Spreading of SARS-CoV-2-laden aerosol particles in closed patient rooms
Seibert	Julia	Universität Bamberg	Education Systems and COVID-19 Management in Central Africa
Skäbe	Paul	University of Leipzig	Pandemic Space: Understanding Quarantine and Responsibilization in Times of Corona
Skoetz	Nicole	University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Evidence-based Oncology	Enhance the willingness of healthcare workers to be vaccinated against COVID-19 in Germany
Skopeteas	Stavros	University of Göttingen	Belief states of vulnerable groups in crises in Latin America: sociolingustic and computational assessment
Sommer	Simone	Ulm University; DFG Commission for Pandemic Research	
Standl	Marie	Helmholtz Zentrum München	The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?
Steigleder	Klaus	Ruhr University Bochum	COMPliaNCE Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation
Steinert	Janina	Technical University of Munich	Impact of the COVID-19 Pandemic on Child Marriage, Sexual and Reproductive Health, and Domestic Violence in India and Zambia
Steinmann	Eike	Ruhr-University Bochum	COMPliaNCE Computational approach that embeds Medical and Psychological research and develops Normative Criteria for socio-economic policy Evaluation
Steinmetz	Nadine	TU Ilmenau	Deciphering the “pandemic public sphere”: Government communication, (social) media discourses on and citizens’ responses to Covid-19 in Europe and the USA
Stepputat	Jan	BTU Cottbus-Senftenberg	Fundamentals of energy efficient precipitation and inactivation of COVID-19 aerosols by means of an ozone-free electrostatic precipitator designed for indoor use.
Sternberg	Rolf	Leibniz University Hannover, Institute of Economic and Cultural Geography	Regional economic disparities in the aftermath of the COVID-19 outbreak: the role of digitalization and working-from-home
Stierle	Martin	University of Luxembourg	The pandemic as a stress test of the patent system – a legal-economic re-examination of exclusivity, liability rules, open innovation, and complementary policy levers
Stoff	Heiko	Institut für Ethik, Geschichte und Philosophie der Medizin, Medizinische Hochschule Hannover	Pinning Down the Hypothetical. Pandemic Preparedness since the 1990s – Historical, Ethical and Legal Preconditions of Managing Corona Virus Response
Supke	Max	University of Braunschweig	Longitudinal Prediction of Individual Resilience and Difficulties in Coping with the COVID-19-Pandemic and its Consequences
Taflinger	Shannon	University of Cologne	Understanding Non-Compliance with Prevention Measures against COVID-19 Infections in Germany [U-COMPLY]
Tanaka	Luana	Technical University of Munich	Impact of the COVID-19 pandemic on health care for patients with chronic diseases
Tanise	Ceron	IMS, Stuttgart University	MARDY: Modeling Argumentation Dynamics in Political Discourse (Phase 2)
Teipen	Christina	Hochschule für Wirtschaft und Recht Berlin (HWR)	Varieties of COVID-19 Reactions and Changing Modes of Globalization in the Global South
Thomas	Gillespie	Depts. of Environmental Sciences & Health	The consequences of biodiversity loss and land use change on infectious disease emergence
Überla	Klaus	University Hospital Erlangen,	Establishment of long-term humoral memory against SARS-CoV-2 after vaccination versus infection

Participant list

Last name	First name	Affiliation	Project title
Vanessa	Piechotta	University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Center for Integrated Oncology Aachen Bonn Cologne Duesseldorf; Evidence-based Oncology	Enhance the willingness of healthcare workers to be vaccinated against COVID-19 in Germany
Viejo-Borbolla	Abel	Institute of Virology / Hannover Medical School	Infection, transport and degeneration of human neurons caused by severe acute respiratory syndrome coronavirus 2
Vogel	Patrick	University of Würzburg	Magnetic Particle based Cov-Indicator
Voges	Jonathan	Historisches Seminar Leibniz Universität Hannover	Pinning Down the Hypothetical. Pandemic Preparedness since the 1990s – Historical, Ethical and Legal Preconditions of Managing Corona Virus Response
Voss	Thamar	University Freiburg	Teachers and the Covid 19 pandemic – Identifying individual and school factors that predict successful professional adaptation (TeaCop)
Wachsmuth	Gerd	BTU Cottbus-Senftenberg	Contain Epidemics with Stochastic Mixed-Integer Optimal Control
Wackerhage	Henning	TU München	ExAero: Aerosol emission during exercise in relation to lung function, age and body weight
Wade	Rebecca	HITS and Heidelberg University	meCocan - Towards a mechanistic understanding of the interaction of SARS-CoV-2 spike glycoprotein and host heparan sulphate proteoglycans
Wagner	Sarah	Helmholtz Zentrum München, Institute of Epidemiology	The role of chronic diseases, environmental and genetic influences on the infection with SARS-CoV-2: boosters, effect modifiers or mediators?
Wahrendorf	Morten	Heinrich-Heine-University Düsseldorf, Medical Faculty	Socioeconomic inequalities in health during the COVID-19 pandemic (INHECOV): empirical analyses and implications for pandemic preparedness
Warnke	Clemens	University Hospital Cologne	Immune-mediated pathogenesis and development of autoimmunity in neurological manifestations of COVID-19
Wilhelm	Christoph	University Hospital Bonn	The role of ketogenesis in the immune response towards SARS-CoV-2
Wittke	Felina	German Research Foundation (DFG)	
Wolkewitz	Martin	Institute of Medical Biometry and Statistics, Division Methods in Clinical Epidemiology, Faculty of Medicine and Medical Center - University of Freiburg, Germany	Development and application of statistical models to evaluate potential treatment effects in observational COVID-19 studies
Wolter	Ilka	Leibniz Institute for Educational Trajectories	Students' self-regulated learning at home during pandemic-related school closures
Wunderlich	Ralf	Brandenburg University of Technology Cottbus-Senftenberg	Contain Epidemics with Stochastic Mixed-Integer Optimal Control
Wüst	Sabine	DLR Oberpfaffenhofen	Influence of air quality on the expected burden on the health care system in the event of pandemics
Wyler	Emanuel	Max Delbruck Center Berlin	Biochemical and structural characterization of the SARS-CoV-2 non-structural protein 16 (Nsp16), a cap ribose 2'O-methyltransferase
Xu	Yi	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Yasobant	Sandul	Indian Institute of Public Health Gandhinagar (IIPHG)	Intersectoral Collaboration and Health Services during COVID19: A multi-stage, multi-level mixed-methods study in Ahmedabad, India
Yu	Jingyuan	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Zapf	Antonia	University Medical Center Hamburg-Eppendorf	Adaptive (seamless) designs for real-time evaluation of diagnostic tests and their usefulness for the parameterisation of dynamic infection spread models in epidemic and pandemic settings
Zeeb	Hajo	Leibniz-Institute for Prevention Research and Epidemiology-BIPS	Feasibility of involving trained community mediators in COVID-19 prevention measures (COVID-TCM)
Zimic Zare	Ricardo Martin	Technische Universität Ilmenau	Deciphering the "pandemic public sphere": Government communication, (social) media discourses on and citizens' responses to Covid-19 in Europe and the USA
Zinn	Sabine	SOEP DIW / Humboldt Universität zu Berlin	The consequences of SARS-CoV-2 for societal inequalities

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Further Information

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Further information on the cross-disciplinary call for proposals, as well as regular updates on the impacts of the coronavirus pandemic on the work of the DFG, can be found at:

kwww.dfg.de/en/research_funding/coro-na_information

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