

# Annual Report 2021

## Institute of Social and Preventive Medicine ISPM



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## Director's Letter



2021 brought the second year the world lived and worked during the COVID-19 pandemic. For us at the Institute of Social and Preventive Medicine (ISPM), we demonstrated flexibility amidst change and remained steadfast in our commitment to public health. Through the year, public health remained the focus of our research, teaching, and outreach, especially as we commemorated ISPM's 50th anniversary and hosted the annual Swiss Public Health Conference.

In August, we hosted the three-day Swiss Public Health Conference, welcoming onsite attendees to Bern (and remotely via Zoom) from the University of Bern's beautiful main building – one with an impressive view of the Bernese Alps. The Conference featured several speakers from ISPM, such as Thomas Abel, Christian L. Althaus, and Georgia Salanti.

In October, ISPM celebrated a jubilee milestone with an onsite symposium at Langhans Hörsaal (and remotely via Zoom) featuring an array of respected speakers including esteemed ISPM directors, Theodor Abelin, Matthias Egger, and Oscar Franco, among others.

It was a great pleasure to have the entire ISPM director lineage in person. They provided a fascinating look back to the starting moments of ISPM, its development over the years, and ISPM's future possibilities and challenges. We also published a booklet about ISPM's history and the history of public health in Switzerland: <https://bit.ly/3JsxJfO>.

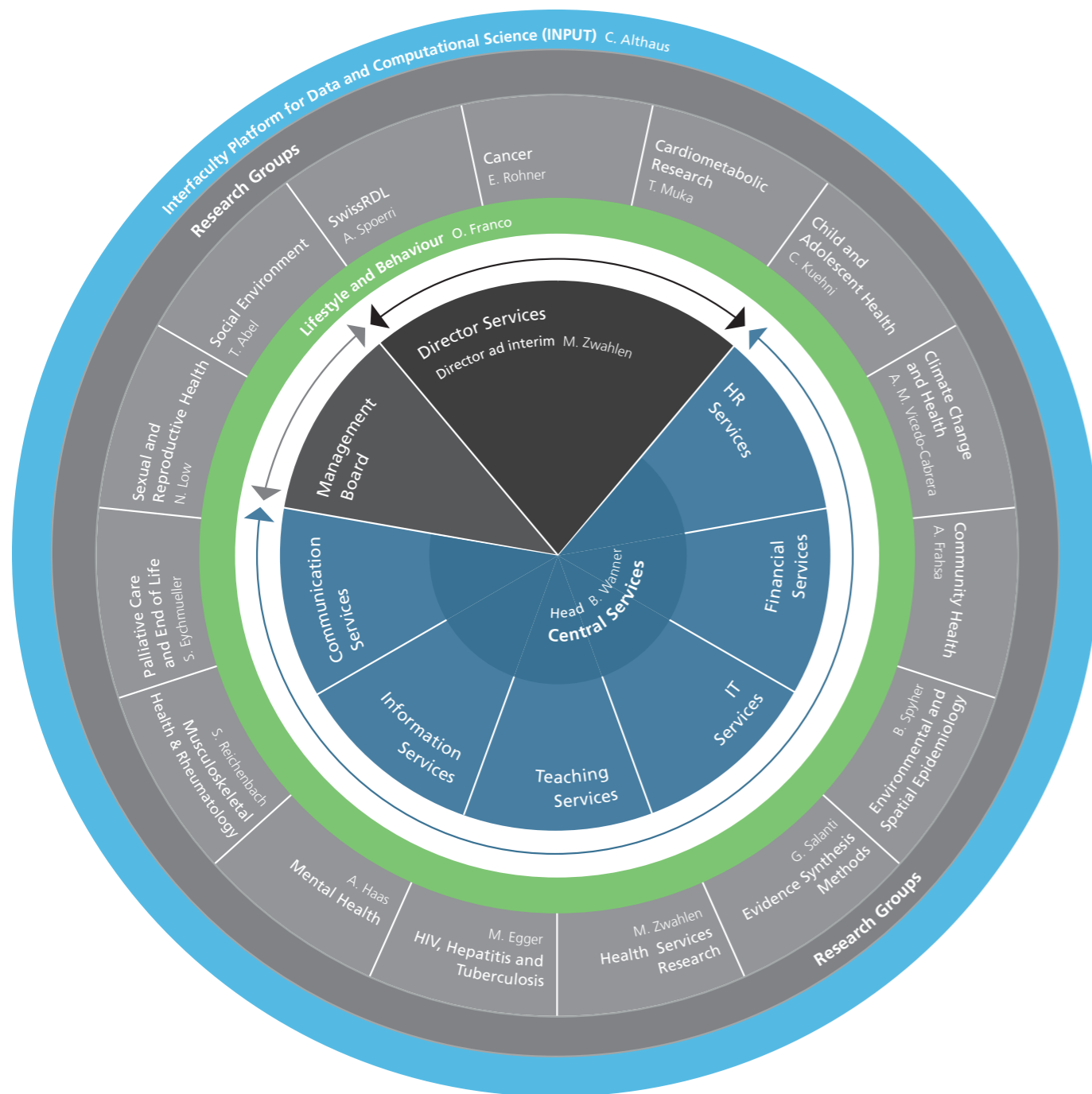
The end of the 2021 brought expected and unexpected changes for ISPM. Thomas Abel retired in December and for personal reasons, Oscar Franco stepped down as ISPM's director in November. Their dedication to public health research and teaching are marks of ISPM's excellence – ones I now respectfully build upon as ISPM's director (a.i.).

I end by thanking all members of ISPM's community for their demonstrations of flexibility amidst change and their steadfast commitments to public health by conducting relevant, scientifically sound health-related research and teaching today. The latter preparing the next generation of physicians, doctors, and other health professionals about population health for tomorrow.

I hope you enjoy reading the annual report, which reflects ISPM's value as a public health institute and our diversity of scientific, scholarly, and pedagogical activities.

Marcel Zwahlen, Director

# Organizational Chart



# ISPM Facts and Figures

as of 31.12.2021

Our research profile covers health areas from cardio-metabolic to HIV, cancer, childhood and adolescents, NCDs to environmental influence, with the tiers of development of new methods and lifestyle and behavior reaching across all fields.

We actively participate in University teaching programs for students of medicine, biomedical engineering and biomedicine (including students from the University of Fribourg) and are engaged in PhD and postgraduate programs of the University of Bern and SSPH+.

## Staff

**Prof. Dr. Marcel Zwahlen**  
Director a.i.

**Staff members total** 148

**Research** 126

**PhD students** 43

**Admin, technics** 22 (covering 3 institutes)

**Nationalities** over 30

**Research groups** 15

## Education

### Postgraduate courses

CAS Clinical Research in Health Care Organizations  
CAS Leadership in Health Care Organizations  
CAS Managing Medicine in Health Care Organizations  
MAS in Leading Learning Health Care Organizations  
Swiss Epidemiology Winter School

### Interuniversity Public Health Education

MPH, DAS, CAS

### Medical Specialist in Prevention and Public Health

Certified training facility

### Bern Lectures in Health Science

10 monthly seminars plus 6 special talks

## Teaching

### Total numbers

Courses	68
Course attendees	1268
Undergraduate lectures	783

## Grants

### Grants, new in 2021

4 SNSF (whereof 1 Ambizione, 1 Eccellenza professorship) (total CHF 3'490'838)  
1 WHO (CHF 71'920)  
2 NIH (CHF 2'255'000 + 15 Mio.)  
1 BAG (CHF 104'388)  
Lindenhof Foundation Professorship  
12 other competitive projects (total CHF 6'830'060)

### 3rd Party money spent

SNF	CHF 2'992'507
Other competitive	CHF 5'094'988
Non-competitive	CHF 3'042'265

## Publications

Original in house	99
Original collaborations	132
Reviews in house	21



Reports  
from the  
Research  
Groups

## Cancer

*We study the occurrence of and risk factors for cancer, and we inform cancer prevention programs. The group currently focuses on the epidemiology of HIV-related malignancies and the prevention, treatment, and survival of cervical cancer in sub-Saharan Africa.*

### Key scientific activities

The group continued our work analyzing data from the South African HIV Cancer Match (SAM) study, a record-linkage study based on laboratory records from the National Health Laboratory Service and cancer diagnoses from the National Cancer Registry in South Africa. The SAM study database includes information about several million people living with HIV; it offers a unique opportunity for research and surveillance on HIV-related malignancies.

We used data from the SAM database to examine the risk of developing cancer among adolescents and young adults living with HIV in South Africa. In a scoping review, we assessed mathematical modelling studies' comparative effectiveness and cost-effectiveness of cervical cancer prevention strategies among populations, including women living with HIV. Our diagnostic test accuracy study of a portable colposcope for the detection of cervical intraepithelial neoplasia in Zambia continues: our statistical analyses are complete and manuscript writing is ongoing.

We successfully applied for funding for a study on cervical pre-cancer treatment among women living with HIV in Zimbabwe, as well as obtained funding for developing a mathematical model for cervical cancer prevention in Zambia.

### Key academic activities

**Students:** Katayoun Taghavi completed her PhD work on secondary prevention of cervical cancer in low- and middle-income countries. Yannick Turdo started his MD thesis on cervical cancer survival in South Africa.

**Teaching:** Teaching and tutoring medical students at the University of Bern.

**Scientific talks and presentations:** Yann Ruffieux presented research results at two virtual conferences: the Conference on Retroviruses and Opportunistic Infections and the International Conference on Cancer in Africa.

### Grants

**Swiss Cancer Research foundation** (KFS-5441-08-2021): Cervical pre-cancer treatment failure among women living with HIV in Zimbabwe: a cohort study (CHF 355,150; PI: Eliane Rohner; 01/2022–01/2026).

**Swiss Cancer Research foundation** (KFS-5447-08-2021): Comparative effectiveness and cost-effectiveness of cervical cancer prevention policies in Zambia: mathematical model and interactive web-based learning platform (CHF 186,700; PI: Rowan Iskandar; 04/2022–03/2025).

**National Institute of Allergy and Infectious Diseases** (U01AI069924): International Epidemiology Databases to Evaluate AIDS – Southern Africa (leDEA-SA) (USD 16 million; PI: Matthias Egger; 2021–2026).

### Internal and external collaborations

International epidemiology Databases to Evaluate AIDS – Southern Africa (leDEA-SA); National Cancer Registry of South Africa; Swiss Tropical and Public Health Institute; Swiss Institute for Translational and Entrepreneurial Medicine (sitem-insel), Switzerland; WHO's International Agency for Research on Cancer; Cervical Cancer Prevention Program, Zambia; and Newlands Clinic, Zimbabwe.

### Key team members

Matthias Egger (head of HIV, hepatitis, and tuberculosis research group); Rowan Iskandar (postdoc); Eliane Rohner (head of research group); Yann Ruffieux (research associate); Katayoun Taghavi (postdoc); Yannick Turdo (research assistant).

### Selected publications

Pry JM, Manasyan A, Kapambwe S, **Taghavi K**, Duran-Frigola M, Mwanahamuntu M, Sikazwe I, Matambo J, Mubita J, Lishimpi K, Malama K, Bolton Moore C. **Cervical cancer screening outcomes in Zambia, 2010-19: a cohort study.** *Lancet Glob Health.* 2021;9(6):e832–e40.

**Ruffieux Y**, Dhokotera T, Muchengeti M, Bartels L, Olago V, Bohlius J, Singh E, **Egger M**, **Rohner E**. **Cancer risk in adolescents and young adults living with HIV in South Africa: a nationwide cohort study.** *Lancet HIV.* 2021;8(10):e614–e22.

**Ruffieux Y**, Muchengeti M, **Egger M**, **Efthimiou O**, Bartels L, Olago V, Davidović M, Dhokotera T, Bohlius J, Singh E, **Rohner E**. **Immunodeficiency and cancer in 3.5 million people living with human immunodeficiency virus (HIV): the South African HIV cancer match study.** *Clin Infect Dis.* 2021;73(3):e735–e44.

Shamu T, **Rohner E**, Chokunonga E, **Spoerri A**, Mandiriri A, Chimbetete C, **Egger M**, Bohlius J, Borok M. **Cancer incidence among people living with HIV in Zimbabwe: A record linkage study.** 2021:1597.

Tafadzwa D, **Riou J**, Bartels L, **Rohner E**, Chammartin F, Johnson L, Singh E, Olago V, Sengayi-Muchegeti M, **Egger M**, Bohlius J, Konstandinoudis G. **Spatiotemporal modeling and mapping of cervical cancer incidence among HIV positive women in South Africa: a nationwide study.** *Int. J Health Geogr.* 2021;20(1):30.

## Cardiometabolic Research

*Our research group puts epidemiologic principles into practice in clinical and public health environments. We aim to develop better prevention and detection tools for cardiometabolic diseases, such as type 2 diabetes and cardiovascular disease. Our main research themes include 1) determining sex differences in cardiometabolic diseases; 2) understanding the link between diabetes and cardiovascular diseases; and 3) quantifying the burden of cardiometabolic diseases in spinal cord injury (SCI).*

### Key scientific activities

Within women's health, our research group has shown that women increase their levels of traditional cardiovascular risk factors as they grow older, and this change is similar across different reproductive stages. Although our genetic findings do not support the hypothesis that early onset of menopause is associated with higher blood pressure, they do suggest that different age at natural menopause-related genetic pathways could differently impact blood pressure. Preliminary data from our team shows that iron biomarkers vary by sex and age; they can also partially mediate the levels of Nt-proBNP – a prognostic marker for heart failure.

In the area of diabetes and cardiovascular disease, our research highlights that patients with diabetes may have reduced recognition of atrial fibrillation symptoms, which may result in a delayed diagnosis of atrial fibrillation. Consequently, reduced recognition of atrial fibrillation symptoms also brings more complications, such as stroke. In addition, diabetic patients may be more at risk of developing non-paroxysmal atrial fibrillation rather than paroxysmal atrial fibrillation.

Our findings in SCI suggest 1) the level of injury may be an additional non-modifiable cardiovascular disease risk factor in chronic SCI (we reported distinct lipid profile, blood pressure, and body composition among individuals with tetra- as compared to paraplegia) and 2) the burden of cardiometabolic diseases among individuals with non-traumatic injury may be higher compared to traumatic injury.

Our Chagas disease research also recently showed a dehydroepiandrosterone sulfate (DHEA-S) hormone may have a prognostic role in Chagas cardiomyopathy.

### Key academic activities

**Teaching:** Lectures in sex- and gender-specific medicine, clinical epidemiology, public health, systematic reviews and meta-analysis, and GRADE assessment.

### Grants

**Leading House for the Latin American Region, Switzerland:** Circulating microRNA and cardiac biomarkers to detect and classify cardiac involvement and its prognosis in Chagas disease. (CHF 25,000; PI: Taulant Muka; 01/2020–12/2021).

**Swiss National Science Foundation (IZSTZ0\_190277).** Spirit grant, Non-caloric sweeteners, microbiome and cardiometabolic risk: a randomized clinical trial of Iranian women. (CHF 500,000; co-PI: Taulant Muka; 10/2020–10/2023).

**Swiss National Science Foundation (IZLIZ3\_200256).** Sex and menopausal differences in iron status/biomarkers as potential causative factor contributing to sex differences in cardiometabolic disease (IRONNES). (CHF 350,000; PI: Taulant Muka; co-PI; 07/2021–06/2024).

**Leading House for the Latin American Region, Switzerland.** Predictive value of novel circulating biomarkers in Chagas disease: the Brazilian Chagas disease cohort. (CHF 23,670; PI: Marija Glisic; 07/2021–07/2022).

**Swiss Federal Commission for Scholarships.** Three Swiss Government Excellence PhD Scholarships (supervisor: Taulant Muka).

### Internal and external collaborations

Department of Cardiology, University Hospital of Bern, Inselspital; Department of Angiology, University Hospital of Bern, Inselspital; Department of Nuclear Medicine, University Hospital Zurich; Swiss Paraplegic Research, Nottwil; CoLaus Study, University of Lausanne, Switzerland; Imperial College London, UK; Department of Epidemiology, Erasmus Medical Center, Rotterdam, the Netherlands; PREVEND Study, University of Groningen, the Netherlands; Department of Public Health and Clinical Medicine, Umeå University, Sweden; McGill University, Canada.

### Key team members

Noushin Sadat Ahanchi (PhD student); Fadi Aljila (MSc student); Arjola Bano (postdoc); Jackie Buttia (research fellow); Jessica Laine Carmeli (postdoc); Zayne Roa Diaz (PhD student); Helga Dizdari (research fellow); Marija Glisic (postdoc); Valentina Gonzales (PhD student); Oche Adam Itodo (PhD student); Lum Kastrati (PhD student); Farnaz Khatami (PhD student); Taulant Muka (head of research group); Sergio Gómez Ochoa (research fellow); Jemal Matchavariani (PhD student); Hamidreza Raeisi (PhD student); Peter Francis Raguindin (PhD student); Dante Salvador Jr (PhD student); Stevan Stojic (research fellow); Faina Wehrli (postdoc)

### Selected publications

**Aljila F, Buttia C, Reichlin T, Razvi S, Minder B, Wilhelm M, Muka T, Franco OH, Bano A.** Association of diabetes with atrial fibrillation types: A systematic review and meta-analysis. *Cardiovasc Diabetol.* 2021;20(1):230.

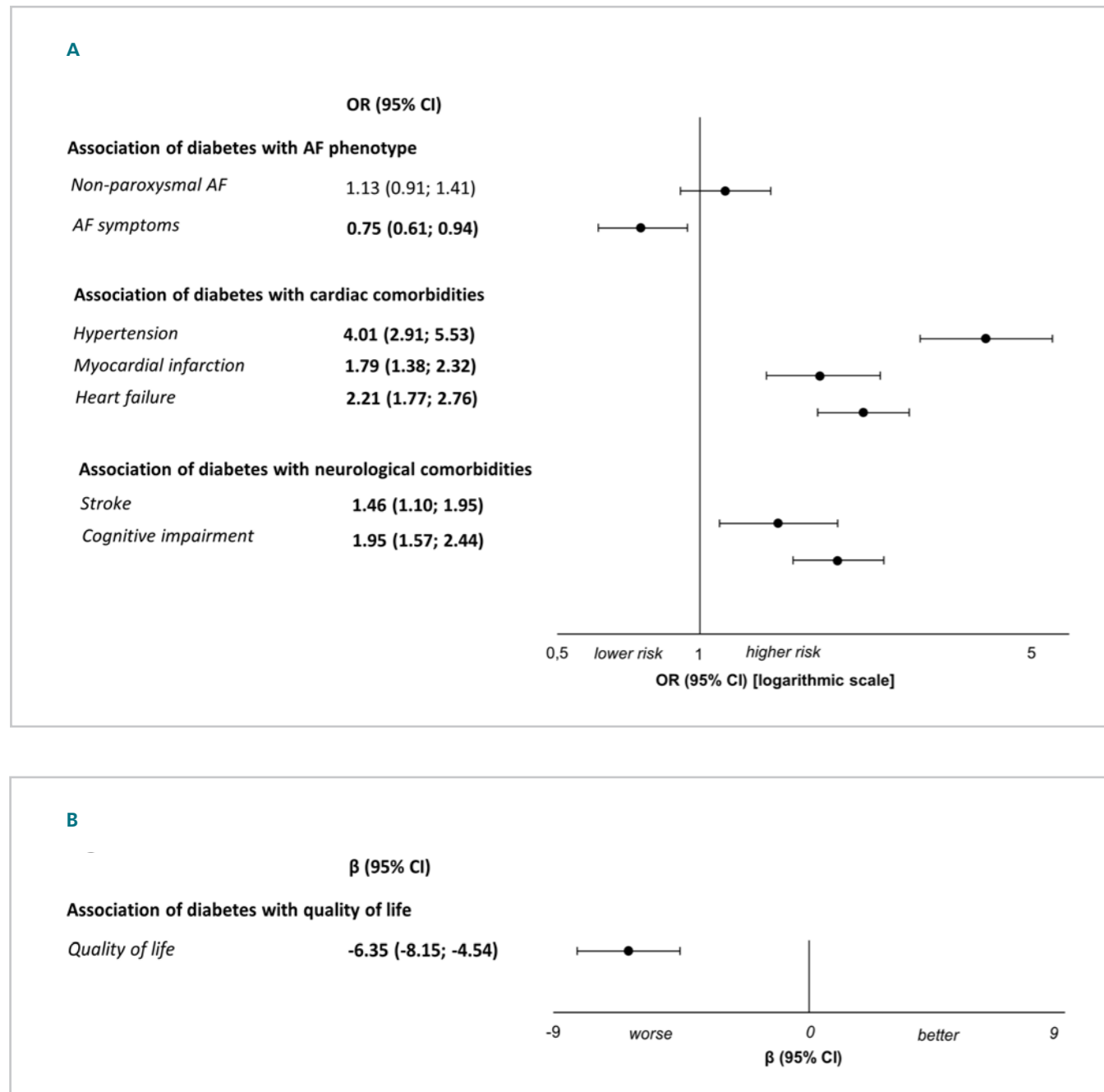
**Bano A, Rodondi N, Beer JH, Moschovitis G, Kobza R, Aeschbacher S, Baretella O, Muka T, Stettler C, Franco OH, Conte G, Sticherling C, Zuern CS, Conen D, Kuhne M, Osswald S, Roten L, Reichlin T, of the S-I.** Association of diabetes with atrial fibrillation (AF) phenotype and cardiac and neurological comorbidities: Insights from the Swiss-AF study. *J Am Heart Assoc.* 2021;10(22):e021800.

**Raguindin PF, Frankl G, Itodo OA, Bertolo A, Zeh RM, Capossela S, Minder B, Stoyanov J, Stucki G, Franco OH, Muka T, Glisic M.** The neurological level of spinal cord injury and cardiovascular risk factors: A systematic review and meta-analysis. *Spinal Cord.* 2021;59(11):1135–1145.

**Roa-Diaz ZM, Asllanaj E, Amin HA, Rojas LZ, Nano J, Ikram MA, Drenos F, Franco OH, Pazoki R, Marques-Vidal P, Voortman T, Muka T.** J Clin Med. Age at natural menopause and blood pressure traits: Mendelian randomization study. 2021;10(19):4299.

Rojas LZ, **Gomez-Ochoa SA**, Echeverria LE, Bautista-Nino PK, Hunziker L, Eisenga MF, **Muka T.** Circulating DHEA-S levels and major cardiovascular outcomes in chronic Chagas cardiomyopathy: A prospective cohort study. *Int J Cardiol.* 2022 Feb 15;349:90–95.

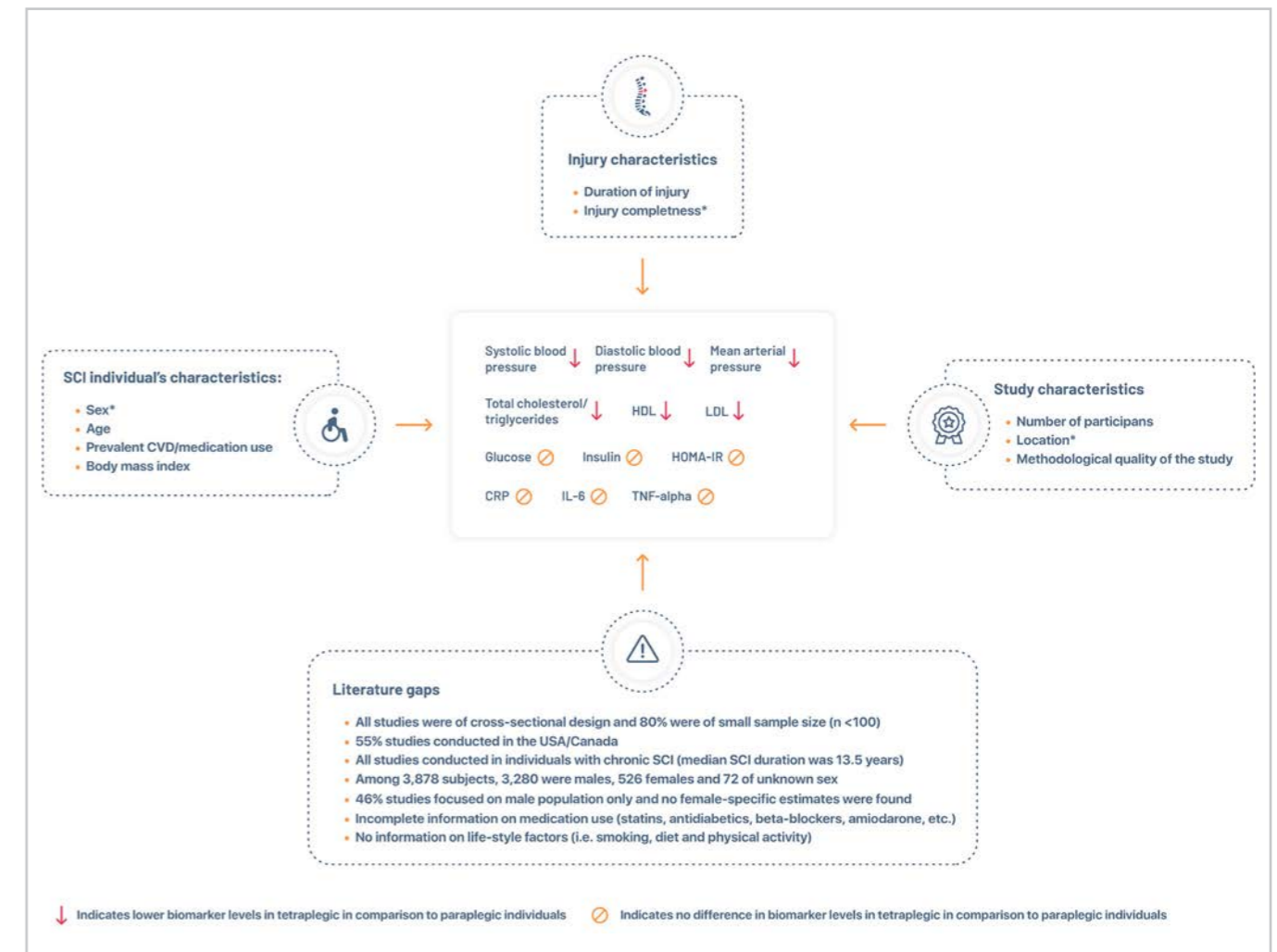
Figure 1. Association of diabetes with atrial fibrillation (AF) phenotype and cardiac and neurological comorbidities.



A) Age- and sex-adjusted odds ratios (ORs) and 95% CIs are derived based on logistic regression. The vertical line represents an OR of 1.

B) Age- and sex-adjusted beta regression coefficient ( $\beta$ ) and 95% CIs are derived based on linear regression. The vertical line represents a  $\beta$  of 0. The quality-of-life score ranges from 0-100, with higher values indicating better quality-of-life.

Figure 2. Illustrative summary of the most important findings and literature gaps from our paper on the level of the spinal cord injury (SCI) and cardiometabolic risk factors.





# Child and Adolescent Health

Paediatric Respiratory Epidemiology, Pediatric Cancer Registry, Paediatric Cancer Epidemiology, and Paediatric Rare Disease Registry (and other studies) comprise the Child and Adolescent Health research group.

## 1. Paediatric Respiratory Epidemiology Group

*The Paediatric Respiratory Epidemiology group studies common and rare respiratory disorders during childhood and over the life course. Main areas of interest are asthma and other wheezing disorders, chronic cough, cystic fibrosis (CF), and primary ciliary dyskinesia (PCD). We look into the role of environmental and behavioral influences on the development of respiratory disorders, the prediction of clinical course, and phenotypes of diseases, such as asthma and PCD.*

### Key scientific activities

We conduct population-based and clinical cohort studies and registries.



**Swiss Paediatric Airway Cohort (SPAC):** The SPAC (<https://spac-study.ch/>) is a prospective observational national multi-center clinical cohort study, which includes over 3,000 children referred to paediatric respiratory outpatient clinics for wheeze, cough, and exercise- and sleep-related respiratory problems. In 2021, we studied factors that drive asthma treatment adjustment by physicians, phenotypes of cough, predictors of asthma control, and the utility of the Predicting Asthma Risk in Children (PARC) tool to predict outcomes among this population.

**Luftibus in the School** is a population-based study on respiratory health among school-aged children in the Canton of Zurich. In 2021, we studied agreement between parents and children's replies in questionnaire surveys and global lung function reference equations validity for Switzerland. Now we are investigating risk factors and phenotypes of recurrent cough.

**The international survey on newborn screening (NBS)** aims to describe the current state of CF from the NBS in Europe using key comparable parameters



**Swiss PCD registry (CH-PCD):** In 2021, we analyzed data on the upper and lower respiratory symptoms and physical activity of people with PCD. To do so, we sent a questionnaire survey to participants with PCD; it had a response rate of 86%. Currently, we are planning a new survey to study longitudinal changes in respiratory symptoms and evaluate treatments taken by people with PCD.

**COVID-PCD:** This online longitudinal participatory study includes more than 700 people with PCD from all over the world. Since recruitment started in May 2020, participants have completed regular questionnaires. We found that the incidence of COVID-19 stayed low among people with PCD most likely because people with PCD reported high compliance with preventive measures, such as wearing facemasks and receiving vaccinations. Results are published weekly on the study website ([www.covid19pcd.ispm.ch](http://www.covid19pcd.ispm.ch)).

**Ear-Nose-Throat (ENT) Prospective International Cohort of PCD patients (EPIC-PCD):** The EPIC-PCD is a multi-center cohort study on characteristics and prognoses of upper respiratory disease among patients with PCD. In 2021, we expanded recruitment. Now EPIC-PCD includes 340 participants from 13 centers in 10 countries. We also published the study protocol.

**Research priorities in PCD:** This is a mixed methods study combining qualitative and quantitative analytical approaches to determine future priorities for clinical and epide-

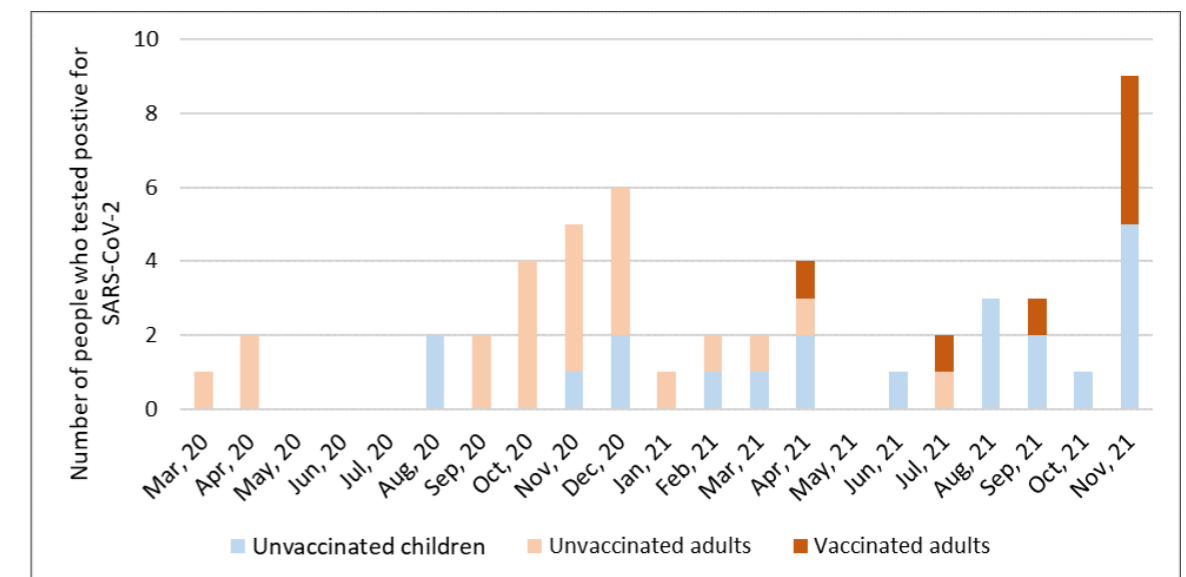
miological research on PCD. In 2021, we conducted and analyzed semi-structured interviews with experts in the field and began interviewing people with PCD and parents of children with PCD from Switzerland and the UK.

**BEAT-PCD Clinical Research Collaboration:** The BEAT-PCD Clinical Research Collaboration (CRC)—a network of multidisciplinary researchers and clinicians—was funded in 2020 by the European Respiratory Society. The CRC coordinates research from basic science to clinical care to improve diagnosis and develop treatments that lead to better long-term outcomes of patients with PCD. Myrofora Goutaki cochairs the network, Claudia Kuehni is a member of the management committee, and Yin Ting Lam is a PhD student representative on the advisory board. Within the BEAT-PCD framework in 2021, numerous research projects were developed and progressed. The network also organized a successful international annual meeting and a training school for early career researchers.

### Paediatric Respiratory Epidemiology Group and the COVID-19 pandemic

The COVID-19 pandemic caused recruitment and data collection delays for several research projects, yet the pandemic also offered new research opportunities. At the start of the pandemic, people living with the rare lung disease PCD were concerned they might be at high risk for hospitalization or death due to SARS-CoV-2 infections. At their request and in partnership with PCD support groups from all over the world, we set up an international participatory project—the COVID-PCD study. Patient representatives have a major role in the COVID-PCD study, including the study design and interpretation and dissemination of results.

COVID-PCD is a prospective anonymous cohort study. People with PCD register online through the study website and complete regular questionnaires via email. Questionnaires are available in five languages (English, French, German, Italian, and Spanish). The study was set up quickly, and recruitment started in May 2020. By December 2021, over 700 people with PCD from 47 countries had participated, making COVID-PCD the largest worldwide study collecting data directly from people living with PCD.



**Figure: Vaccination status among COVID-PCD study participants who tested positive for SARS-CoV-2 between March 2020 – November 2021 (by children under age 18 and by vaccination status for adults).**

COVID-PCD led to better knowledge about the incidence of COVID-19 and its consequences among people with PCD; it also allowed for closer engagement in our research with affected people. The project evolved from understanding the effects of COVID-19 on people with PCD to also researching other topics relevant for PCD. Through our regular meetings with PCD support group members and study participants, they also suggested research questions. COVID-PCD will continue beyond the pandemic. Thus, in addition to all the harm it did, the pandemic in this case helped empower people living with a rare disease and facilitated a participatory research program where people with PCD can shape and promote research that relates to PCD.

**Key academic activities**

**Students:** During 2021, the group included five PhD candidates. Rebeca Mozún successfully defended her PhD thesis in May 2021.

**Teaching:** Regular teaching with lectures and tutoring of undergraduate and postgraduate students (University of Bern, MPH program) by Claudia Kuehni, Myrofora Goutaki, Cristina Ardura-Garcia, and Eva Pedersen.

**Conferences and events:** Co-organization of the annual meeting of the BEAT-PCD CRC (September 2021), the BEAT-PCD training school (September 2021), and the annual Swiss-PCD meeting (December 2021).

**Scientific talks and presentations:** Cristina Ardura-Garcia received a participation award for “Rotavirus disease and health care utilisation among children under five years of age in highly-developed countries” at the 39th Annual Meeting of the European Society for Paediatric Infectious Diseases (online) May 24–29, 2021.

**Outreach and representation:** Myrofora Goutaki participated in the Swiss COVID-19 Science Task Force as a member of the Public Health expert group.

**Grants**

**Swiss National Science Foundation** (320030B\_192804): Natural history, phenotypes and disease classification in primary ciliary dyskinesia (phase II). (CHF 447,055 CHF; PI: Claudia Kuehni; 05/2020–04/2023).

**Swiss National Science Foundation** (32003\_182628): Phenotypes and prognostic modelling in childhood asthma moving towards clinical applications (phase II). (CHF 904,000; PI: Claudia Kuehni; 10/2018–09/2022).

**Swiss National Science Foundation Ambizione** (PZ00P3\_185923): From the nose to the lungs: the importance of upper respiratory disease in Primary Ciliary Dyskinesia. (CHF 950,341; PI: Myrofora Goutaki 10/2019–09/2023).

**Swiss Lung League:** Predicting asthma attacks in Swiss children: SPAC-Attacks, a clinical cohort study. (CHF 67,300; 07/2019–06/2021; PI: Cristina Ardura-Garcia).

**Swiss Lung League:** Phenotypes of Primary Ciliary Dyskinesia and their association with genotypes and disease progression. (CHF 86,082; PI: Eva SL Pedersen; 09/2021–03/2024).

**Johanna Dürmüller-Bol:** Treatment burden of people with PCD in Switzerland. (CHF 12,646; PI: Myrofora Goutaki).

**OM Pharma Clinical Research Grant Agreement:** Assessing the impact of COVID-19 preventive measures on respiratory infections and wheezing episodes in children. (CHF 93,887; PI: Claudia Kuehni).

**Internal and external collaborations**

The Paediatric Respiratory Epidemiology group works with an extensive national and international multidisciplinary network of researchers, clinicians, and scientists in the field of paediatric and rare respiratory diseases. We also collaborate closely with patient associations and support groups through projects, such as SPAC and COVID-PCD, and research initiatives, such as BEAT-PCD CRC.

**Key team members**

Daria Berger (PhD candidate); Myrofora Goutaki (senior researcher); Cristina Ardura-Garcia (postdoc); Helena Koppe (research assistant); Claudia Kuehni (head of research group); Yin Ting Lam (PhD candidate); Gia Thu Ly (research assistant); Maria Christina Mallet (PhD candidate); Eva Sophie Lunde Pedersen (postdoc); Leonie Schreck (PhD candidate).



Claudia Kuehni



Maria Christina Mallet



Cristina Ardura-Garcia



Daria Berger



Eva Sophie Lunde Pedersen



Helena Koppe



Leonie Schreck



Gia Thu Ly



Myrofora Goutaki



Yin Ting Lam

**Selected publications**

**Ardura-Garcia C, Pedersen ESL, Mallet MC, de Jong CCM, Barben J, Jochmann A, Jung A, Mueller-Suter D, Regamey N, Singer F, Kuehni CE.** Treatment decisions in children with asthma in a real-life clinical setting: the Swiss paediatric airway cohort. *J. Allergy Clin. Immunol. Pract.* 2021.

**Goutaki M, Lam YT, Alexandru M, Anagiotos A, Armengot M, Bequignon E, Boon M, Burgess A, Coste A, Emiralioglu N, Erdem E, Haarman EG, Harris A, Hool SL, Karadag B, Kim S, Latzin P, Lorent N, Ozcelik U, Reula A, Roehmel J, van Gogh C, Yiallourous P, Zappe SM, team E-P, Papon JF.** Study protocol: the ear-nose-throat (ENT) prospective international cohort of patients with primary ciliary dyskinesia (EPIC-PCD). *BMJ Open.* 2021;11(10):e051433.

**Mallet MC, Hitzler M, Lurà M, Kuehni CE, Regamey N.** Facemasks do not lead to abnormal gas exchange during treadmill exercise testing in children. *ERJ Open Res.* 2021.

**Mozun R, Ardura-Garcia C, Pedersen ESL, Goutaki M, Usemann J, Singer F, Latzin P, Moeller A, Kuehni CE, LUIS group.** Agreement of parent- and child-reported wheeze and its association with measurable asthma traits. *Pediatr Pulmonol.* 2021;56(12):3813–21.

**Pedersen ESL, Goutaki M, Harris AL, Dixon L, Manion M, Rindlisbacher B, Lucas JS, Kuehni CE.** SARS-CoV-2 infections in people with PCD: neither frequent, nor particularly severe. Eur. Respir. J. 2021;58(2):2004548.



## 2. Paediatric Cancer

### 2.a Childhood Cancer Registry (ChCR)

*Since January 1, 2020, the Cancer Registration Act (CRA/KRG) has been in effect in Switzerland, which makes cancer diagnosis registration compulsory. The Federal Office of Public Health (FOPH) transferred the task to manage the national Childhood Cancer Registry (ChCR) to the consortium of the Swiss Paediatric Oncology Group (SPOG) and the Institute of Social and Preventive Medicine (ISPM) at the University of Bern.*



ISPM is mandated by the FOPH to maintain and host the national registry, report national data, and collaborate internationally to securely deliver data about cancer among children and adolescence in Switzerland. ChCR data support etiological, epidemiological, and outcome research.

In addition to registering diagnoses of cancer among children and adolescents under age 20 in Switzerland, ChCR has ethical obligations and other objectives, such as monitoring disease development and generating early detection, quality of care, diagnosis, and treatment measures. Further detailed information can be found on the ChCR website ([www.childhoodcancerregistry.ch](http://www.childhoodcancerregistry.ch)).

#### Key scientific activities

ChCR data build the basis for national evaluations, international monitoring, and benchmarking, as well as supporting childhood cancer research in Switzerland. For this reason, our team's key tasks include registering, coding, and ensuring data quality (RCD).

ChCR is also responsible for securely delivering registry data to international benchmarking and monitoring studies for childhood cancer cases. In 2021, the ChCR received five requests for registry data from international childhood cancer organizations.

Migration continued to the Swiss Confederation/FOPH registration software in 2021, and the process remains ongoing.



**Cancer Report:** 2021 was finalized, published, and introduced to the public during a press conference in October. The report covers 2013–2017. Cancer Report: 2025 will focus on the consequences of the SARS-CoV-2 pandemic on cancer treatments and the development of cancer cases.

The ChCR developed the national harmonized reporting cancer among adults, children, and adolescents together with the Federal Statistical Office and National Agency for Cancer Registration. The harmonized reporting includes standards for the publication of the methods and means of statistical analyses.

Routine analyses of ChCR datasets are available on our website.

**Key academic activities**

**Scientific talks and presentations:** Ursula M. Kühnel presented “Childhood cancer registry data utilisation” at the Swiss Oncology and Haematology Congress on November 19, 2021, in Zurich.

**Outreach and representation:** On October 14, 2021, at a press conference in Bern, Shelagh Redmond presented the results of childhood cancer cases from Cancer Report: 2021, which describes the development of cancer disease in Switzerland between 2013–2017. The press conference is available for viewing (<https://www.youtube.com/watch?v=wzZUNM-sVaM>).

**Grants**

**Swiss Federal Office of Public Health (FOPH):** The Childhood Cancer Registry of Switzerland is mandated and funded by the FOPH.

**Internal and external collaborations**

In Switzerland, we collaborate with the Federal Office of Public Health; National Agency for Cancer Registration; Swiss Paediatric Oncology Group; Association Suisse des Registres du Cancer; and Federal Office of Statistics. Outside of Switzerland, we collaborate with the International Associations of Cancer Registries; European Network of Cancer Registries; and German Childhood Cancer Registry.

**Key team members**

Meltem Altun (registration); Erika Brantschen Berclaz (registration and coding); Katharina Flandera (administrative support); Anna Glenck (medical data management), Ursula Kühnel (executive coordinator since 06/2021); Claudia Kuehni (head of registry and head of child and adolescent health research group); Eleftheria Michalopoulou (statistics); Erika Minder (coding); Verena Pfeiffer (co-head until 03/2021); Shelagh Redmond (head RCD); Ben Spycher (head of statistics and head of environmental and special epidemiology research group); Cornelia Stadter (documentation and communication).



Claudia Kuehni



Ben Spycher



Katharina Flandera



The Childhood Cancer Registry Team at a Christmas market before the pandemic's fifth wave in Switzerland

**Selected publications**

P. Cirillo, A. Feller, **C. Kuehni**, M. Lorez, **E. Michalopoulou**, **V. Pfeiffer**, **S. Redmond**, E. Roy, T. Rüegger, **B. Spycher**, U. Wagner, R. Weitkunat. **Swiss Cancer Report. (Schweizerischer Krebsbericht)**. Sponsored by Bundesamt für Statistik (BFS), Nationale Krebsregistrierungsstelle, and Kinderkrebsregister, 2021. Oct. BFS report number: 1177–2100.

## 2.b Paediatric Cancer Epidemiology

*The Paediatric Cancer Epidemiology group studies the effects of childhood cancer over the life course. Our main areas of interest concern long-term outcomes after childhood cancer. This includes prevalence, incidence, and spectrum of somatic and psychosocial late effects, such as cardiac and pulmonary dysfunction, somatic health, mental health, educational and social outcomes, health-related quality-of-life, secondary neoplasms, and long-term mortality.*

### Key scientific activities

We conduct population-based clinical follow-up studies on long-term outcomes after childhood cancer.



**Swiss Childhood Cancer Survivor Study (SCCSS):** The SCCSS is a nationwide population-based questionnaire survey continuously enrolling all patients with childhood cancer registered in the Childhood Cancer Registry who survive more than five years after their cancer diagnosis. We study the spectrum of somatic and psychosocial outcomes childhood cancer survivors experience, health-related quality-of-life, and health behaviors. In 2021, we contacted all survivors diagnosed between 2011–2015. Currently, we are conducting a follow-up survey of survivors who already participated in a previous survey to assess changes in health status over time. **SCCSS-Nutrition** is a sub-study which collects dietary information via urine samples and self-reported questionnaires of survivors.

**Cardiovascular Late Effects after Childhood Cancer (CardioOnco) Study:** The CardioOnco study is a prospective longitudinal multi-center study. It compares conventional echocardiography with speckle tracking echocardiography for the early detection of cardiac disease among childhood cancer survivors and also to understand clinical determinants for developing cardiac disease after childhood cancer. The study started in 2016 at the University Hospital of Bern, Inselspital and it is currently being expanded to four other centers in Switzerland.



**Community-based screening program for hearing loss after childhood cancer:** This prospective study evaluates access to novel, low-threshold hearing tests for former patients with childhood cancer. We invite patients with childhood cancer at risk of hearing loss for a free hearing test in a local hearing aid shop. The study has a participatory approach through a stakeholder advisory group of former patients, physicians, and hearing experts. We use questionnaires, interviews, and group discussions with all stakeholders to evaluate the screening program.



**Genetic risks for Complications in Children after Oncological Treatment in Switzerland (GECCOS):** The aim of the GECCOS project is to find genetic risk factors of complications after childhood cancer. We have collected more than 500 germline DNA samples in the Biobank for Childhood Cancer and Blood Disorders. We extracted and sequenced DNA from patients with childhood cancer in Switzerland to contribute to international research collaborations on second cancers. This will help to better understand why some patients develop second cancers after childhood cancer and others do not.



**International Late Effects of Childhood Cancer Guideline Harmonization Group (IGHG; [www.ighg.org](http://www.ighg.org)):** This initiative aims at developing standardised recommendations for follow-up surveillance after childhood cancer. Our research group leads a guideline on

pulmonary dysfunction, and we are involved in several other guidelines related to ototoxicity, metabolic syndrome, and psychosocial problems.



**Swiss Paediatric Haematology/Oncology Metabank (Biolink):** The Metabank project built a platform to combine data from the Swiss Childhood Cancer Survivor Study and two biobanks: the Swiss germline DNA Biobank for Childhood Cancer and Blood Disorders and the Swiss Pediatric Hematology Oncology Biobank Network in a privacy-preserving way. The Metabank facilitates project development through the rapid assessment of available data and samples, then links clinical data with biosamples. Biolink enables in depth research in the fields of cancer predispositions, pharmacogenetics, and genetic modifiers of long-term complications after childhood cancer.

### The Paediatric Cancer Epidemiology Group and the COVID-19 pandemic

Since interactions with other researchers were predominantly online, the pandemic challenged our daily work. At the beginning of the pandemic, there were uncertainties about conducting our clinical research projects. Nevertheless, the CardioOnco Study started recruitment during the pandemic in four Swiss clinics. Our research group successfully continued research on long-term outcomes after childhood cancer. During the last months of 2021, the SCCSS contacted nearly 2,500 childhood cancer survivors to complete a questionnaire about their health, which allowed us to obtain unique information about how childhood cancer survivors are affected by the pandemic.

### Key academic activities

**Students:** During 2021, the group included five PhD students and one medical student working on his MD thesis. Nicolas Waespe and Maria Otth defended their PhDs in March and September 2021, respectively.

**Teaching:** Regular teaching with lectures and tutoring of undergraduate and postgraduate students (University of Bern, MPH program) by Claudia Kuehni and Sven Strebel.

**Honors and awards:** Sven Strebel won the SwissPedNet Translational and Clinical Research Award in 2021.

### Grants

**Swiss Cancer Research and Swiss Cancer League (KLS/KFS-4825-01-2019):** Structural funding for Swiss Childhood Cancer Survivor Study (CHF 480,000; PI: Claudia Kuehni; 01/2020–12/2022).

**Kinderkrebshilfe Schweiz:** Swiss Childhood Cancer Survivor Study (SCCSS) (CHF 40,000; PI: Luzius Mader; 01/2021–12/2021).

**Swiss Cancer Research (KFS-4722-02-2019):** Dietary intake, overweight, and late effects development in childhood cancer survivors (CHF 359,450; PI: Murielle Bochud, Co-Applicant: Claudia Kuehni; 07/2019–06/2022).

**Swiss Cancer Research (KFS-5027-02-2020):** Early detection of heart disease after treatment for cancer during childhood (CHF 336,950; PI: Nicolas von der Weid, Co-Applicants: Claudia Kuehni, Christina Schindera; 01/2021–12/2023).

**Swiss Cancer Research (HSR-4951-11-2019):** Improving access to screening for hearing loss after childhood cancer – a novel community-based approach (CHF 247,850; PI: Claudia Kuehni; 05/2020–04/2023).

**Swiss Cancer Research (KFS-5302-02-2021):** Pulmonary dysfunction after childhood cancer: assessing early-stage disease (phase II) (CHF 369,150; PI: Claudia Kuehni; 07/2021–06/2024).

**Swiss National Science Foundation** (31BL30\_185396): Swiss Pediatric Hematology/Oncology Metabank—a network for precision medicine research (CHF 593,638; PI: Jean-Pierre Bourquin, co-PIs Marc Ansari and Claudia Kuehni).

**Stiftung für krebserkrankte Kinder, Regio Basiliensis**: Prospective Multicentre Cohort Study for Diagnosing Cardiac Dysfunction in Childhood Cancer Survivors (CHF 70,000; PI: Christina Schindera).

**University of Basel Research Fund for Excellent Junior Researchers**: Prospective Multicentre Cohort Study for Diagnosing Cardiac Dysfunction in Childhood Cancer Survivors (CHF 80,000; PI: Christina Schindera).

**Internal and external collaborations**

The Paediatric Cancer Epidemiology group works with an extensive national and international multidisciplinary network of researchers and clinicians in the field of late effects after childhood cancer. In Switzerland, we collaborate with Swiss Paediatric Oncology Group's nine paediatric oncology clinics. Internationally, we are partners in several collaborative projects, such as PanCareSurFup (<http://www.pancaresurfup.eu/>) and PanCareLIFE (<http://www.pancarelife.eu/>).

**Key team members**

Fabiën Belle (postdoc); Claudia Kuehni (head of research group); Luzius Mader (postdoc); Selma Riedo (project coordinator); Christina Schindera (postdoc); Tomas Slama (PhD candidate); Sven Strebel (PhD candidate); Leah Weber (research assistant); Andrea Ziörjen (study nurse).



Claudia Kuehni



Fabiën Belle-van Sprundel



Luzius Mader



Christina Schindera



Sven Strebel



Tomas Slama



Selma Riedo



Andrea Ziörjen



Lea Weber



**Selected publications**

**Belle FN**, Chatelan A, Kasteler R, **Mader L**, Guessous I, Beck-Popovic M, Ansari M, **Kuehni CE**, Bochud M. **Dietary intake and diet quality of adult survivors of childhood cancer and the general population: results from the SCCSS-Nutrition Study**. *Nutrients*. 2021;13(6):1767.

Kasteler R, Lichtensteiger C, **Schindera C**, Ansari M, **Kuehni CE** for the Swiss Pediatric Oncology Group (SPOG) Scientific Committee. **Validation of questionnaire-reported chest wall abnormalities with a telephone interview in Swiss childhood cancer survivors**. *BMC Cancer*, 2021; 21(1):787.

**Ott M**, Yammine S, Usemann J, Latzin P, **Mader L**, **Spycher B**, Gungör T, Scheinemann K, **Kuehni CE**. **Longitudinal lung function in childhood cancer survivors after hematopoietic stem cell transplantation: a cohort study**. *Bone Marrow Transplant*, 2021:1–8.

Reulen RC, Wong KF, Bright CJ, Winter DL, Alessi D, Allodji RM, Bagnasco F, Bárdi E, Bautz A, Byrne J, Feijen EA, Fidler-Benaoudia MM, Diallo I, Garwicz S, Grabow D, Gudmundsdottir T, Guha J, Haddy N, Høgsholt S, Jankovic M, Kaatsch P, Kaiser M, Kuonen R, Linge H, Øfstaas H, Ronckers CM, Hau EM, Skinner R, van Leeuwen FE, Teepen JC, Veres C, Zrafi W, Debiche G, Llanas D, Terenziani M, Vu-Bezin G, Wesenberg F, Wiebe T, Sacerdote C, Jakab Z, Haupt R, Lähteenmäki PM, Zdravec Zaletel L, **Kuehni CE**, Winther JF, de Vathaire F, Kremer LC, Hjorth L, Hawkins MM. **Risk of digestive cancers in a cohort of 69 460 five-year survivors of childhood cancer in Europe: the PanCareSurFup study**. *Gut*. 2021;70:1520–8.

**Waespe N**, **Strebel S**, Marino D, Mattiello V, Muet F, Nava T, **Schindera C**, **Belle FN**, **Mader L**, **Spoerri A**, **Kuehni CE**, Ansari M. **Predictors for participation in DNA self-sampling of childhood cancer survivors in Switzerland**. *BMC Med. Res. Methodol*. 2021;21(1):236.

### 3. Paediatric and Rare Disease Registries

*The Paediatric and Rare Disease Registries group hosts several medical registries and conducts studies in different areas of paediatric epidemiology, such as endocrinology, gastroenterology, nephrology, neurology, and rare diseases. These registries collect data to better understand and treat certain diseases to improve patients' quality-of-life. The registries help answer specific research questions, recruit patients for clinical studies, and coordinate post-marketing surveillance of drugs. They foster communication between researchers nationally and internationally and thus disseminate knowledge.*

#### Key scientific activities

We coordinate platforms, national registries, and cohort studies



**SwissPedRegistry** is a research platform for pediatric registries ([www.swisspedregistry.ch](http://www.swisspedregistry.ch)). SwissPedRegistry is also part of SwissPedNet ([www.swisspednet.ch](http://www.swisspednet.ch)), the Swiss research network of clinical paediatric hubs. SwissPedRegistry provides expertise and advice for the development and conduct of epidemiological and clinical registries collecting data on children or persons of any age. It develops regulatory frameworks, methodologies, and instruments for registries and participates in national discussions and meetings on registry-relevant issues.

**SwissPedData:** This project aims to harmonize the collection of health-related data and biospecimens in paediatric hospitals throughout Switzerland. Harmonized sets of information collected during routine inpatient and outpatient visits will improve the quality of data collected during encounters with patients. It will also allow fast, almost real-time use of the data for high-quality research. We achieved a final consensus with paediatricians representing eight hospitals and all paediatric subspecialties on a standard paediatric dataset among all collaborating clinics. Currently, this dataset is being implemented in clinics.



**Swiss Rare Disease Registry (SRDR):** The SRDR ([www.raredisease.ch](http://www.raredisease.ch)) is a national, population-based registry for children and adults with rare diseases. The SRDR collects a core dataset from all people with rare diseases in Switzerland, approximately 500,000 people. The SRDR constitutes a platform for rare diseases, enabling clinical and epidemiological studies and facilitating patient participation in national and international trials.

In 2021, we organized a national informational event about the SRDR for health care providers, patient organizations, official bodies, and industry attended by 130 participants. We also presented the SRDR at various symposia, such as Rare Disease Day and the annual Meeting of Paediatrics Switzerland. To address the interests of all parties involved, we optimized the organizational structure of the SRDR and prepared documents regulating data sharing and publication. We implemented specific steps for automatic data transfer from the University Hospital of Bern (Inselspital), Hôpitaux Universitaires de Genève, and Children's Hospital Zurich. We foresee automatic data transfer from these hospitals to start in the first quarter of 2022.

**Swiss Registry for Neuromuscular Disorders (Swiss-Reg-NMD):** The Swiss-Reg-NMD ([www.swiss-reg-nmd.ch](http://www.swiss-reg-nmd.ch)) is a national registry of children and adults diagnosed with Duchenne-Becker Muscular Dystrophy (BMD/DMD), Spinal Muscular Atrophy (SMA), and LAMA2-related Muscular Dystrophy. The core aims of the registry are including patients in current clinical trials and long-term follow-up of patients with these disorders. The medical data collected on SMA allows for ongoing post-marketing monitoring of new disease-modifying therapies. A mid-2021 survey of children and young people with DMD conducted by the registry showed that the pandemic had a severe impact on education and leisure activities of these young people, thus also affecting their inclusion. A quarter of participants who rely on support at school reported a disruption in this essential assistance. Sports activities were also interrupted for more than 80% of participants.



**Swiss Cerebral Palsy Registry (Swiss-CP-Reg):** The Swiss-CP-Reg ([www.swiss-cp-reg.ch](http://www.swiss-cp-reg.ch)) is a national registry that investigates health-related issues among people with cerebral palsy (CP). It includes all children, adolescents, and adults with CP born, treated, or living in Switzerland. The aim is to improve future care and the wellbeing of individuals with CP. In 2021, together with orthopaedic surgeons, we launched a hip surveillance program; setup a collaboration with Swiss Neonatal Network & Follow-up Group; and developed research projects to investigate participation in daily life and concerns from families.



**Pediatric Inflammatory Brain Disease Registry (Swiss-Ped-IBrainD):** The Swiss-Ped-IBrainD ([www.swiss-ped-ibraind.ch](http://www.swiss-ped-ibraind.ch)) collects medical data about paediatric patients with inflammatory brain diseases. The dataset includes information on diagnosis, disease course, and treatment of inflammatory brain diseases. The registry promotes communication and collaboration between specialists through the Swiss-Ped-IBrainD task force. This working group consists of all Swiss-Ped-IBrainD and additional specialists in the field. They will implement the acquired knowledge in the best interest of their patients. The registry aims to improve medical care and quality-of-life of children with inflammatory brain diseases.

#### Grants

**Swiss Federal Office of Public Health:** Financial support for the Swiss Rare Disease Registry under article 24 of the national law on cancer registration. (CHF 250,000 per year; PI: Claudia Kuehni; 11/2020–10/2025).

**University of Zurich, Abteilung für Stoffwechselkrankheiten, Kinderspital Zürich:** Setup for Swiss Rare Disease Registry. (CHF 261,000; PI: Claudia Kuehni; 07/2019–12/2021).

**SwissPedNet:** SwissPedRegistry: a research platform for paediatric registries. (CHF 80,000 per year; PI: Claudia Kuehni; 1/2021–12/2024).

**Schweizerische Stiftung für das Cerebral gelähmte Kind:** Swiss Cerebral Palsy Registry. (CHF 200,000; PI: Anne Tschertter; 4/2020–6/2023).

**Patient organisations** (CHF 51,000 for 2021) and **pharmaceutical companies** (sponsored research agreements and unconditional grants: CHF 201,000 for 2021): financial support for the Swiss-Reg-NMD; see [www.swiss-reg-nmd.ch](http://www.swiss-reg-nmd.ch) for more details.

**Swiss Multiple Sclerosis Society and several pharmaceutical companies:** peer- and non-peer reviewed funding of Swiss-Ped-IBrainD. (CHF 501,000; PI: Sandra Bigi; 2020–2024).

#### Internal and external collaborations

Representatives from Paediatric and Rare Diseases Registries attended national and international meetings with relevant stakeholders, participated in working groups, developed instruments, and represented the needs and interests of paediatric registries. The group collaborates closely with medical Registries and Data Linkage (SwissRDL) at the Institute of Social and Preventive Medicine, particularly for data linkage and software development.

## Climate Change and Health

*The Climate Change and Health research group aims at advancing knowledge on the impact of climate change and other related environmental stressors on health. Our main research lines develop along the intersection between epidemiology, public health and climate sciences.*

These include 1) health impact assessments due to heat and cold temperatures at different geographical scales under historical periods and future climate change scenarios; 2) evaluations of vulnerability factors to heat and cold, including urban features, population characteristics, and the influence of ageing in observed impact trends; 3) the impact of climate change on urban populations by modulating factors and connections with existing challenges, such as social inequalities in cities; and 4) assessments of etiological mechanisms explaining the association between temperature and specific health outcomes, such as mental disorders.

### Key scientific activities

Coordination of international collaborations within the Multi-country Multi-city Collaborative Research Network. Participation in the preparation of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, as a contributing author in chapter 16.

### Key academic activities

**Students:** Supervision of two PhD students (Marvin Bundo and Evan de Schrijver), two MSc students (Christoph Kestenholz and Linnea Friden), and a doctoral thesis (Séverine Bär). Two new MSc students started in September 2021 (Vanessa Rippstein and Sujung Lee).

**Teaching:** Lectures for the first year of medicine on climate change, planetary health, and sustainability (Mensch und Umwelt/human and environment). Several lectures for the MSc Climate Science (University of Bern), including two seminars and a full course on environmental epidemiology applied to climate sciences.

**Conferences and events:** Participation in the preparation of events, such as the International Society for Environmental Epidemiology Conference (online) and the Workshop on Compound Weather and Climate Events (online) hosted by the University of Bern. Participation in international events (e.g., Annual Meeting European Respiratory Society, American Geoscience Union).

**Scientific talks and presentations:** Invited keynote speaker at the Annual Conference of the International Society for Environmental Epidemiology.

### Grants

**Medical Research Council's Population and Systems Medicine Board:** Current and future temperature-related mortality and morbidity in the UK: a public health and climate change perspective. (GBP 519,950; PI: Antonio Gasparrini, co-applicant: Ana M. Vicedo-Cabrera; 10/2021–10/2024).

**EU Joint Research Centre-Seville:** Revisiting temperature-mortality associations using climate reanalysis data. (EUR 137,914; PI: Antonio Gasparrini; collaborator [funded through subcontract]: Ana M. Vicedo-Cabrera; 01/2021–08/2022).

### Key team members

Dominique Baumann (project manager Swiss-Reg-NMD); Natalie Bayard-Guggisberg (research assistant SRDR); Fabien Belle-van Sprundel (project manager SwissPedData); Sandra Bigi (medical head Swiss-Ped-IBrain-D); Katharina Flandera (assistant); Michaela Fux (project manager SRDR); Lorena Hulliger (project manager Swiss-Ped-IBrainD); Sandra Hunziker (research assistant Swiss-CP-Reg and SwissPedRegistry); Claudia Kuehni (head of research group, SwissPedRegistry, and SwissPedData); Nadine Lötscher (data manager and assistant project coordination Swiss-Reg-NMD); Anne Tschertter (senior researcher, project lead SwissPedRegistry and Swiss-CP-Reg).

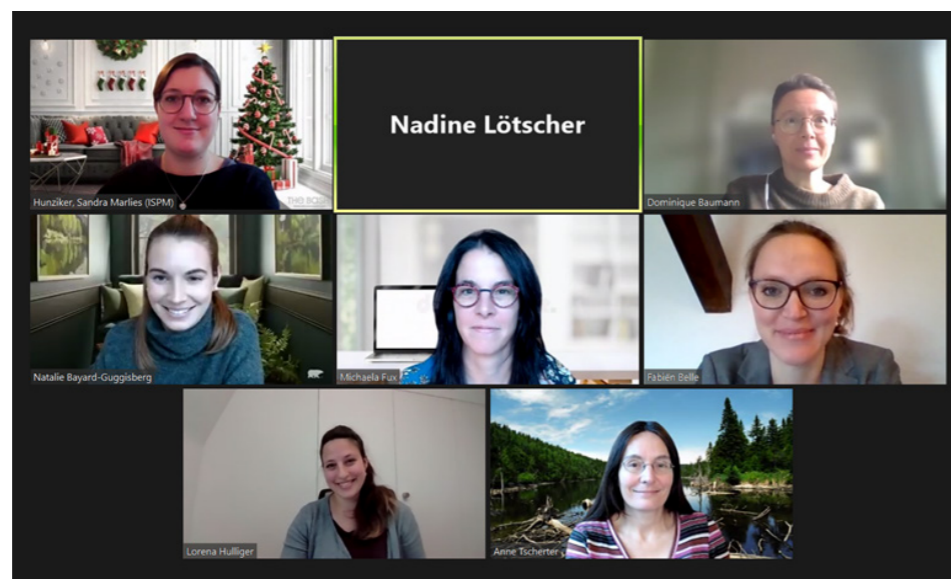
### Selected publications

**Belle FN, Hunziker S,** Fluss J, Grunt S, Juenemann S, Kuenzle C, Meyer-Heim A, Newman CJ, Ramelli GP, Weber P, **Kuehni CE, Tschertter A.** **Cohort profile: the Swiss Cerebral Palsy Registry (Swiss-CP-Reg) cohort study.** Swiss Med. Wkly, under review; pre-print on medRxiv.

Hofer S, Bauder F, Capone Mori A, Chan A, Dill P, Garcia-Tarodo S, Goeggel Simonetti B, Hackenberg A, Kalsner J, Maier O, Schmid R, Strozzi S, **Bigi S.** **Management of acute demyelinating attacks in the pediatric population: a Swiss consensus statement.** Clin. Transl. Neurosci. 2021;5(2):17.

Jaboyedoff ML, Rakic M, Bachmann S, Berger C, Diezi M, Fuchs O, Frey U, Gervais A, Glücksberg AS, Grotzer M, Heining U, Kahlert CR, Kaiser D, Kopp MV, Lauener R, Neuhaus TJ, Paioni P, Posfay-Barbe K, Ramelli GP, Simeoni U, Simonetti G, Sokollik C, **Spycher BD, Kuehni CE.** **SwissPedData: Standardising hospital records for the benefit of paediatric research.** Swiss medical weekly. 2021;151:w30069.

Rakic M, Jaboyedoff M, Bachmann S, Berger C, Diezi M, do Canto P, Forrest CB, Frey U, Fuchs O, Gervais A, Gluecksberg AS, Grotzer M, Heining U, Kahlert CR, Kaiser D, Kopp MV, Lauener R, Neuhaus TJ, Paioni P, Posfay-Barbe K, Ramelli GP, Simeoni U, Simonetti G, Sokollik C, **Spycher BD, Kuehni CE.** **Clinical data for paediatric research: the Swiss approach.** BMC Proceedings. 2021;15(S13).



The Paediatric and Rare Diseases Registries group attending a Zoom meeting during the pandemic



**Bretscher-Fonds – Oeschger Centre for Climate Change Research:** Revisiting heat stress: assessment of the combined effect of humidity and heat on health from an epidemiological perspective; funds cover a three and a half year PhD position. (CHF 170,000; PI: Ana M. Vicedo-Cabrera; 02/2022–08/2025).

#### Internal and external collaborations

**Internal collaborations:** Jakob Zscheischler (Climate and Environmental Physics, University of Bern); Stefan Brönnimann (Climatology, University of Bern); Olivia Romppainen-Martius (Department of Geography; University of Bern); Thomas Müller (Psychology Unit, University of Bern); and Sandra Eckert (Centre for Development and Environment, University of Bern).

**External collaborations:** Swiss Tropical and Public Health Institute (Martina Ragettli); ETH Zurich (David Bresch and Erich Fischer); London School of Hygiene and Tropical Medicine, UK (Antonio Gasparrini and Sir Andy Haines); Yale University, USA (Kai Chen); Centre for International Climate and Environmental Research, Norway (Jana Sillman and Kristin Aunan); Norwegian Institute of Public Health (Shilpa Rao); University of Valencia, Spain (Carmen Iñiguez); and University of Bristol, UK (Dann Mitchell and Eunice Lo).

#### Key team members

Marvin Bundo (PhD student); Evan de Schrijver (PhD student); Ana M. Vicedo-Cabrera (head of research group)



Ana Maria  
Vicedo-Cabrera



Marvin Bundo



Evan de Schrijver

Valencia CDLC, Overcenco A, Houthuijs D, Ameling C, Rao S, Di Ruscio F, Carrasco-Escobar G, Seposo X, Silva S, Madureira J, Holobaca IH, Fratianni S, Acquotta F, Kim H, Lee W, Iniguez C, Forsberg B, Ragettli MS, Guo YLL, Chen BY, Li S, Armstrong B, Aleman A, Zanobetti A, Schwartz J, Dang TN, Dung DV, Gillett N, Haines A, Mengel M, Huber V, Gasparrini A. **The burden of heat-related mortality attributable to recent human-induced climate change.** *Nature Climate Change.* 2021;11(6):492–500.

Zhao Q, Guo Y, Ye T, Gasparrini A, Tong S, Overcenco A, Urban A, Schneider A, Entezari A, **Vicedo-Cabrera AM**, Zanobetti A, Analitis A, Zeka A, Tobias A, Nunes B, Alahmad B, Armstrong B, Forsberg B, Pan SC, Iniguez C, Ameling C, De la Cruz Valencia C, Astrom C, Houthuijs D, Dung DV, Roye D, Indermitte E, Lavigne E, Mayvaneh F, Acquotta F, de'Donato F, Di Ruscio F, Sera F, Carrasco-Escobar G, Kan H, Orru H, Kim H, Holobaca IH, Kysely J, Madureira J, Schwartz J, Jaakkola JJK, Katsouyanni K, Hurtado Diaz M, Ragettli MS, Hashizume M, Pascal M, de Sousa Zanotti Stagliorio Coelho M, Valdes Ortega N, Ryti N, Scovronick N, Michelozzi P, Matus Correa P, Goodman P, Nascimento Saldiva PH, Abrutzky R, Osorio S, Rao S, Fratianni S, Dang TN, Colistro V, Huber V, Lee W, Seposo X, Honda Y, Guo YL, Bell ML, Li S. **Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study.** *Lancet Planet Health.* 2021;5(7):e415–e25.

#### Selected publications

**Bundo M, de Schrijver E,** Federspiel A, Toreti A, Xoplaki E, Luterbacher J, **Franco OH,** Muller T, **Vicedo-Cabrera AM.** **Ambient temperature and mental health hospitalizations in Bern, Switzerland:** A 45-year time-series study. *PLoS One.* 2021;16(10):e0258302.

**de Schrijver E, Folly CL,** Schneider R, Royé D, **Franco OH,** Gasparrini A, **Vicedo-Cabrera AM.** **A comparative analysis of the temperature-mortality risks using different weather datasets across heterogeneous regions.** *GeoHealth.* 2021;5(5):e2020GH000363.

Sera F, Armstrong B, Abbott S, Meakin S, O'Reilly K, von Borries R, Schneider R, Roye D, Hashizume M, Pascal M, Tobias A, **Vicedo-Cabrera AM,** Network MCCCCR, Group CC-W, Gasparrini A, Lowe R. **A cross-sectional analysis of meteorological factors and SARS-CoV-2 transmission in 409 cities across 26 countries.** *Nat Commun.* 2021;12(1):5968.

**Vicedo-Cabrera AM,** Scovronick N, Sera F, Royé D, Schneider R, Tobias A, Astrom C, Guo Y, Honda Y, Hondula DM, Abrutzky R, Tong S, Coelho MdSZS, Saldiva PHN, Lavigne E, Correa PM, Ortega NV, Kan H, Osorio S, Kysely J, Urban A, Orru H, Indermitte E, Jaakkola JJK, Ryti N, Pascal M, Schneider A, Katsouyanni K, Samoli E, Mayvaneh F, Entezari A, Goodman P, Zeka A, Michelozzi P, de'Donato F, Hashizume M, Alahmad B, Diaz MH,

## Community Health and Health Care Systems

*To promote and improve community health, we use theory-driven social science methods to understand and explain contextual conditions of health. We apply the knowledge we gain to influence social determinants of health and policymaking, so healthy choices will become the easy choice for all and particularly for members of vulnerable groups.*

### Key scientific activities

The Community Health and Health Care Systems research group was established in May 2021 when Annika Frahsa started as group leader and assistant professor with a Lindenhof Foundation endowment. We collaborate with the WHO Enhanced Wellbeing Unit and partners in five countries to analyze governance, intersectoral cooperation, and civic engagement for health, equity, and wellbeing. We continue to research the contribution of participatory approaches to regional health promotion structure development with partners in Germany. We also conduct research on physical activity promotion through organisational development in long-term care facilities for older people. Several of our studies analyze organisational readiness, options and barriers for PA promotion, as well as the applicability of participatory research methods in long-term care facilities. The latter focuses on the impact of COVID-19 in this setting. Our group also contributes to the Swiss Health Study pilot by conducting focus groups with participants. These focus groups provide insight into their demands and needs, as well as their perception of health issues.

### Key academic activities

**Students:** Two PhD candidates started their PhD projects on science-policy interaction (Sophie Meyer) and migrant health and smoking (Kris Schürch). Three medical students worked on their MD theses/master theses. Annika Frahsa co-supervised two PhD students at University of Tübingen, Germany.

**Teaching:** Regular teaching with lectures and tutorial activities for undergraduate and postgraduate students at the University of Bern (medical training and MPH program) by Annika Frahsa, Sophie Meyer, and Nathalia González. External guest lectures and seminars by Annika Frahsa.

**Scientific talks and presentations:** Invited keynote at Swiss Summer Academy of Palliative Care Research, presentations at International Society for Physical Activity and Health Conference International, and 17th Congress of the European Association of the Association for the Sociology of Sport.

### Grants

**World Health Organization:** Research component of WHO special initiative on urban governance for health, equity, wellbeing (CHF 71,920; PI: Annika Frahsa, co-PIs: Thomas Abel and Oscar Franco; 2021).

**German Federal Ministry of Health Research (FKZ 2519FSB114):** Program on physical activity promotion (EUR 900,000; co-PI: Annika Frahsa; 06/2019–12/2022).

**German Techniker Krankenkasse:** Participatory evaluation in Healthy Regions Plus in Germany (EUR 100,000; PI: Annika Frahsa; 2018–2021).

### Internal and external collaborations

At the Institute of Social and Preventive Medicine, we collaborate with the Palliative Care and End of Life research group on community palliative care. At the University of Bern, we collaborate with the Institute of Sport Science on worksite health management and their PhD program on problem-oriented sport science, as well as the Institute of Political Science on societal polarization and COVID-19. Within Switzerland, we also collaborate with Unisanté and Université de Lausanne on the Swiss Health Study pilot and on urban resilience, as well as EPFL Fribourg and the Smart Living Lab on health, sustainability, and urban planning.

Internationally, we collaborate with the University of Tübingen, Germany on physical activity in nursing homes; FAU Erlangen-Nuremberg, Germany on physical activity promotion among women in difficult life situations; Karlsruhe Institute of Technology, Germany on social network analysis; the Department of Social Research at the University of Eastern Finland on capabilities and health. We also work with Matrix GmbH, Germany on regional health promotion structures. We also work with the International Collaboration for Participatory Health Research standing committee on social participation in old age; PartNet – a network for participatory health research; and WHO's Enhanced Wellbeing Unit in Geneva on health governance.

### Key team members

Rochelle Aberer (research fellow); Annika Frahsa (research group leader); Nathalia González (project manager); Sophie Meyer (PhD candidate); Kris Schürch (PhD candidate); Catalina Diaz Rios (research associate)



Annika Frahsa



Nathalia González



Sophie Meyer



Kris Schürch

### Selected publications

Altmeier D, Thiel A, **Frahsa A**. 'All we have to decide is what to do with the time that is given to us': a photovoice study on physical activity in nursing homes. *Int. J. Environ. Res. Public Health*. 2021;18(10):5481.

Fleuren T, Thiel A, **Frahsa A**. Identification of network promoters in a regional and intersectoral health promotion network: a qualitative social network analysis in Southern Germany. *Int. Journal of Environ. Res. Public Health*. 2021;18(16):8372.

**Frahsa A, Abel T, Gelius P, Rutten A**. The capability approach as a bridging framework across health promotion settings: theoretical and empirical considerations. *Health Promot Int*. 2021;36(2):493–504.

## Environmental and Spatial Epidemiology

*With a focus on cancer, we study potential effects of environmental exposures, such as ionizing radiation and traffic-related air pollution, on human health. We also explore spatial, spatio-temporal, and temporal variation in cancer incidence and mortality.*

### Key scientific activities

In the context of a Swiss National Science Foundation-funded project investigating the association between low-dose ionizing radiation and childhood cancer, we published a new exposure model of terrestrial gamma radiation in Switzerland. We based our model on an extensive dataset of airborne gamma-spectrometry measurements. Linking this map to data from the Swiss National Cohort study and the Childhood Cancer Registry, we estimated associations between incidence of childhood cancers and external background radiation.

As part of the EU Horizon 2020 project RadoNorm (<https://www.radonorm.eu/>), we are conducting a collaborative study with partners from Finland, Denmark, Norway, and France of natural background radiation and the risks of childhood leukemia and tumors of the central nervous system. Additionally, we published new results of childhood leukemia incidence in relation to birth characteristics and on childhood cancer risks associated with residential proximity to petrol stations. We also contributed greatly to collaborative efforts to standardize electronic health records in pediatric hospitals across Switzerland.

### Key academic activities

**Students:** In 2021 two PhD students, Antonella Mazzei in June and Christophe Folly in July, defended their theses and two medical students began their master theses.

**Teaching:** Regular teaching with lectures and tutoring for undergraduate and postgraduate students (University of Bern, SSPH+) by Ben Spycher and Christian Kreis.

**Scientific talks and presentations:** We presented results of a nationwide survey at the national UV-symposium "Schatten und Bildung zum Schutz der nächsten Generationen."

**Outreach and representation:** Ben Spycher is a member of the academic board of Public Health Weiterbildung.

### Grants

**Swiss Cancer League (KLS-5432-08-2021).** The epidemiology of cancer in adolescents and young adults (AYAs) in Switzerland (CHF 337,400; PI: Ben Spycher; 01/2022–12/2024).

**Multidisciplinary Center for Infectious Diseases.** menoBalance App: Use of AI methods to design a personalised chronic and infectious disease management medical device (CHF 956,890; co-applicant: Ben Spycher; 01/2022–12/2024).

### Internal and external collaborations

At the Institute of Social and Preventive Medicine, we collaborate with Swiss National Cohort; Swiss Childhood Cancer Registry; and Child and Adolescent Health and SwissRDL – Medical Registries and Data Linkage research groups. Within Switzerland, we collaborate with Unisanté; Université de Lausanne; Swiss TPH Basel; Swiss Paediatric Oncology Group; Swiss Federal Nuclear Safety Inspectorate; and Paul Scherrer Institute.

Outside of Switzerland, we collaborate with University of Tampere, Finland; French National Institute of Health and Medical Research (INSERM); Danish Cancer Society Research Center; UCLA Fielding School of Public Health, USA; Institute for Occupational Safety and Health of the German Social Accident Insurance; MRC Centre for Environment and Health of Imperial College London, UK; and Unité INSERM Centre Léon Bérard, France.

### Key team members

Jessica Laine Carmeli (postdoc); Christophe Folly (PhD student); Christian Kreis (postdoc); Antonella Mazzei-Abba (PhD student), Eleftheria Michalopoulou (statistician); Ben Spycher (head of research group)



Ben Spycher



Jessica Laine Carmeli



Christophe Folly



Christian Kreis



Antonella Mazzei

Eleftheria  
Michalopoulou

### Selected publications

**Folly CL, Konstantinou G, Mazzei-Abba A, Kreis C, Bucher B, Furrer R, Spycher BD.** Bayesian spatial modelling of terrestrial radiation in Switzerland. *J Environ Radioact* 2021;233:106571.

Jaboyedoff M, Rakic M, Bachmann S, Berger C, Diezi M, Fuchs O, Frey U, Gervais A, Glücksberg AS, Grotzer M, Heining U, Kahlert CR, Kaiser D, Kopp MV, Lauener R, Neuhaus TJ, Paioni P, Posfay-Barbe K, Ramelli GP, Simeoni U, Simonetti G, Sokollik C, **Spycher BD, Kuehni CE.** SwissPedData: Standardising hospital records for the benefit of paediatric research. *Swiss Med Wkly* 2021;151:w30069.

Lupatsch JE, **Kreis C, Konstantinou G, Ansari M, Kuehni C, Spycher BD.** Birth characteristics and childhood leukemia in Switzerland: a register-based case-control study. *Cancer Causes Control* 2021;32(7):713–23.

**Mazzei A, Konstantinou G, Kreis C, Diezi M, Ammann RA, Zwahlen M, Kühni C, Spycher BD.** Childhood cancer and residential proximity to petrol stations: a nationwide registry-based case-control study in Switzerland and an updated meta-analysis. *Int Arch Occup Environ Health* 2021;1–2. Online ahead of print.

**Mazzei-Abba A, Folly CL, Kreis C, Ammann RA, Adam C, Brack E, Egger M, Kuehni CE, Spycher BD.** External background ionizing radiation and childhood cancer: Update of a nationwide cohort analysis. *J Environ Radioact.* 2021;238–239:106734.

## Evidence Synthesis Methods

*The Evidence Synthesis Methods research group develops, applies, and disseminates methodology for synthesizing evidence from studies to answer important public health questions. We also work with prediction models to inform decision-making and support health technology assessments and guidelines.*

### Key scientific activities

We developed ROB-MEN – the first tool to assess the risk of bias due to missing evidence in network meta-analysis; it is implemented as an interactive Shiny app (<https://cinema.ispm.unibe.ch/rob-men/>).

We continue our work on dose-effect meta-analysis. We applied models to find the optimal dose of aripiprazole augmentation for antidepressant-refractory depression, and we wrote a tutorial article where we describe the models. We also applied the models to define the optimal dose of antipsychotics for relapse prevention among people with schizophrenia.

In a systematic review and network meta-analysis, we showed that alcoholic chlorhexidine gluconate halves the risk of infection in clean surgery when compared to commonly used iodine solution.

Combining prognosis research and network meta-analysis methods, we developed a two-stage model to predict individualized treatment effects under several treatment options. We developed an R-shiny app to show how this model may be used in clinical practice, using an example from relapsing-remitting multiple sclerosis (<https://cinema.ispm.unibe.ch/shinies/koms/>).

Within the MHCOVID project (<https://mhcovid.ispm.unibe.ch/>), we developed a set of online tools for screening and extracting data from thousands of papers, and we created a living systematic review of changes in mental health during the COVID-19 pandemic. We achieved this by using crowdsourcing methods to leverage the expertise of over 100 volunteers (i.e., the crowd), world-wide. The data extracted by our crowd are analyzed using Bayesian methods, and the results are presented online.

Using systematic literature reviews and meta-analyses and grading the quality of evidence with GRADE, we worked on evidence-based recommendations primarily related to the management of hospitalized adults with COVID-19. We discussed and agreed upon recommendations using the Evidence to Decision framework – a living guideline with its first update in progress.

### Key academic activities

**Teaching:** Members of the group teach postgraduate and undergraduate courses and contribute to undergraduate teaching at the University of Bern. We also participate in and organize international short courses.

**Conferences and events:** In June 2021, we organized the (remote) Annual Meeting of the Society for Research Synthesis Methodology (<http://www.srsm.org/>).

**Honors and awards:** 1st prize in The British Society for Surgery of the Hand virtual workshop in 2020.

### Grants

Our work continues to be funded by the European Commission (Horizon 2020 for the HTx project <https://www.htx-h2020.eu>) and the Swiss National Science Foundation (project funding; NRP78; Ambizione).

**Swiss Federal Commission for Scholarships.** Swiss Government Excellence Postdoc Scholarship. (supervisor: Georgia Salanti).

### Internal and external collaborations

Within the Institute of Social and Preventive Medicine, we collaborate with the Sexual and Reproductive Health and the HIV, Hepatitis, and Tuberculosis research groups. We have numerous collaborators around the globe from many universities, such as University of Oxford and University of York, UK; University of Kyoto, Japan; University of Oulu, Finland and many more.

### Key team members

Konstantina Chalkou (PhD student); Virginia Chiocchia (PhD student); Orestis Efthimiou (postdoc); Matthias Egger (head of HIV, hepatitis, and tuberculosis research group); Tasnim Hamza (PhD student); Alex Holloway (computer scientist); Jacqueline Kolb (administrative assistant); Georgia Salanti (head of research group); Michael Seo (PhD student); Thomy Tonia (senior researcher).

A new member also joined our team: Chiara Gastaldon. Chiara is a psychiatrist who is developing a database of randomized controlled trials to perform a network meta-analysis of pharmacological and psychosocial treatments for obsessive-compulsive disorder among adults. Her postdoc is funded by a Swiss Government Excellence Scholarship.

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### Selected publications

**Chalkou K**, Steyerberg E, **Egger M**, Manca A, Pellegrini F, **Salanti G**. **A two-stage prediction model for heterogeneous effects of treatments.** *Stat Med.* 2021;40(20):4362-75.

**Chiocchia V**, Nikolakopoulou A, Higgins J, Page MJ, **Papakonstantinou T**, Cipriani A, Furukawa TA, Siontis G, **Egger M**, **Salanti G**. **ROB-MEN: a tool to assess risk of bias due to missing evidence in network meta-analysis.** *BMC Medicine.* 2021;19(1):304.

**Salanti G**, Cipriani A, Furukawa TA, Peter N, **Tonia T**, **Papakonstantinou T**, **Holloway A**, Leucht S. **An efficient way to assess the effect of COVID-19 on mental health in the general population.** *Lancet Psychiatry.* 2021;8(5):e14–e15.

Wade RG, Burr NE, McCauley G, Bourke G, **Efthimiou O**. **The comparative efficacy of chlorhexidine gluconate and povidone-iodine antiseptics for the prevention of infection in clean surgery: a systematic review and network meta-analysis.** *Ann. Surg.* 2021;274(6):e481–e88.

## HIV, Hepatitis and Tuberculosis

*Our research group examines the clinical and public health epidemiology of HIV and coinfections, including hepatitis B/C and tuberculosis (TB) with a focus on Southern Africa. We investigate antiretroviral therapy's clinical outcomes and their impact on HIV transmission and coinfections. We conduct field work, analyze large databases, develop mathematical models, and work on methodological issues.*

### Key scientific activities

Loss to follow-up is a major issue in HIV treatment and care programs in sub-Saharan Africa. In a multi-country cohort study using a standardized protocol, we examined outcomes of people living with HIV lost to follow-up. Dolutegravir (DTG) is an antiretroviral drug increasingly used in antiretroviral therapy. It is essential to understand how DTG-resistance emerges depending on HIV subtype and clinical setting. Our work on the Switch study continued with the recruitment of over 3,500 patients switching to a DTG-based regimen in Malawi and Zambia; recruitment in a smaller study in Zimbabwe also concluded (PhD project, Tinei Shamu). We obtained additional funding to extend the DTG work to other regions of the International epidemiological Databases to Evaluate AIDS (IeDEA).

Non-communicable diseases, such as diabetes and hypertension, as well as viral hepatitis coinfections are leading causes of mortality among persons living with HIV (PLWH) in Sub-Saharan Africa. Within a prospective cohort of approximately 300 PLWH and coinfecting with chronic hepatitis B, we monitor virological outcomes as well as changes in liver fibrosis stages and incidence of liver cancer. In a prospective cohort dedicated to the study of metabolic and cardiovascular risk factors in Zambia and Zimbabwe, we have enrolled more than 400 PLWH and over 500 HIV-uninfected individuals over the past two years (PhD project, Belinda Chihota). Preliminary analyses showed that over two-thirds of women included in the study had central obesity and approximately one-third had metabolic syndrome. In a multi-regional study including over 1,200 PLWH on antiretroviral therapy across Africa, Asia, and South America (Sentinel Research Network [SRN]), we found a prevalence of diabetes that ranged from 1.5% in Kenya to 17.5% in India. We showed that the use of non-fasting glycated hemoglobin or HbA1c measurements was reliable for diagnosing diabetes.

The "TB genomics" project on multidrug-resistant (MDR) tuberculosis (PhD project, Kathrin Zürcher) concluded with the final publication, showing that underdiagnosed drug resistance resulted in inappropriate treatment and higher mortality. The project contributed to WHO guidance on defining susceptibility and resistance to anti-tuberculosis drugs. The surveys on MDR TB treatment and diagnostic practices and on the impact of COVID-19 on HIV care made good progress. Preparations for the TB-SRN project, which will collect in-depth data from sentinel sites in IeDEA, is also well underway. The study on TB transmission in a South African township clinic, which used different devices to monitor patient movements, CO<sub>2</sub> levels, and the number of Mycobacterium tuberculosis particles in the air, inspired a successful grant proposal to the Multidisciplinary Center for Infectious Diseases at the University of Bern, adapting the approach to transmission of SARS-CoV-2 in Swiss schools. Further, the group investigated a SARS-CoV-2 outbreak in a retirement home, examined COVID-19 vaccination willingness and seroprevalence among health care workers, and analyzed socioeconomic inequalities in COVID-19 in Switzerland.

Regional and multi-regional analyses of the core IeDEA data were completed, such as a regression discontinuity analysis of the impact of the "Treat all" strategy on CD4 testing.



**Sharing our MHCVID project:** On August 28, we took part in the "Rendez-Vous Forschende im Gespräch" event in Waisenhausplatz in Bern (top left, bottom right). We were interviewed by Radio Bern (RaBe) about our MHCVID project (top right). Georgia Salanti presented initial results of our project at the Swiss Public Health Conference, which was held in Bern on August 25–26 (bottom left).

The analysis of the impact of COVID-19 on HIV care outcomes in the Malawi (PhD project, Thoko Kalua) was submitted for publication. Finally, the group contributed to the JAMA and BMJ publications of guidelines for reporting Mendelian randomization studies.

**Key academic activities**

**Students:** Several students defended their PhD theses: Kathrin Zürcher (“Tuberculosis among people living with and without HIV in lower-income countries: transmission, resistance, mortality”); Katayoun Taghavi (“Secondary prevention of cervical cancer in low- and middle-income countries”); Anthony Hauser (“Modelling HIV drug resistance in Southern Africa”); and Catrina Mugglin (“From acute to chronic – HIV care in the era of widely available antiretroviral therapy in low resource settings”). Delia Kläger received her MD for a thesis on “The HIV care cascade in sub-Saharan Africa: systematic review of published criteria and definitions.”

**Teaching:** The group contributed to undergraduate and postgraduate teaching, including problem-based learning, critical appraisal of studies, the epidemiology book club, biostatistics for medical students, advanced statistical methods for physicists, and courses for PhD and MPH students.

**Grants**

**National Institute of Allergy and Infectious Diseases (U01AI069924):** International epidemiology Databases to Evaluate AIDS – Southern Africa (leDEA-SA), (USD 16 million; PI: Mattias Egger; 2021–2026).

**National Institute of Allergy and Infectious Diseases (R01AI152772):** HIV-1 subtype, specific drug resistance in patients failing Dolutegravir-based 1st, 2nd or 3rd line regimens: the International epidemiological Databases to Evaluate AIDS (leDEA), (USD 2.4 million; PI: Mattias Egger; 2021–2024).

**Multidisciplinary Center for Infectious Diseases:** Preparedness for surveillance in school rooms in pandemic and epidemic situations: multiple measure approach to estimate transmission and interventions for COVID-19 and seasonal influenza (PI: Lukas Fenner).

**Multidisciplinary Center for Infectious Diseases:** Early detection for early action: integrating multiple data sources for monitoring the SARS-CoV-2 epidemic in near real-time (Co-applicant: Julien Riou).

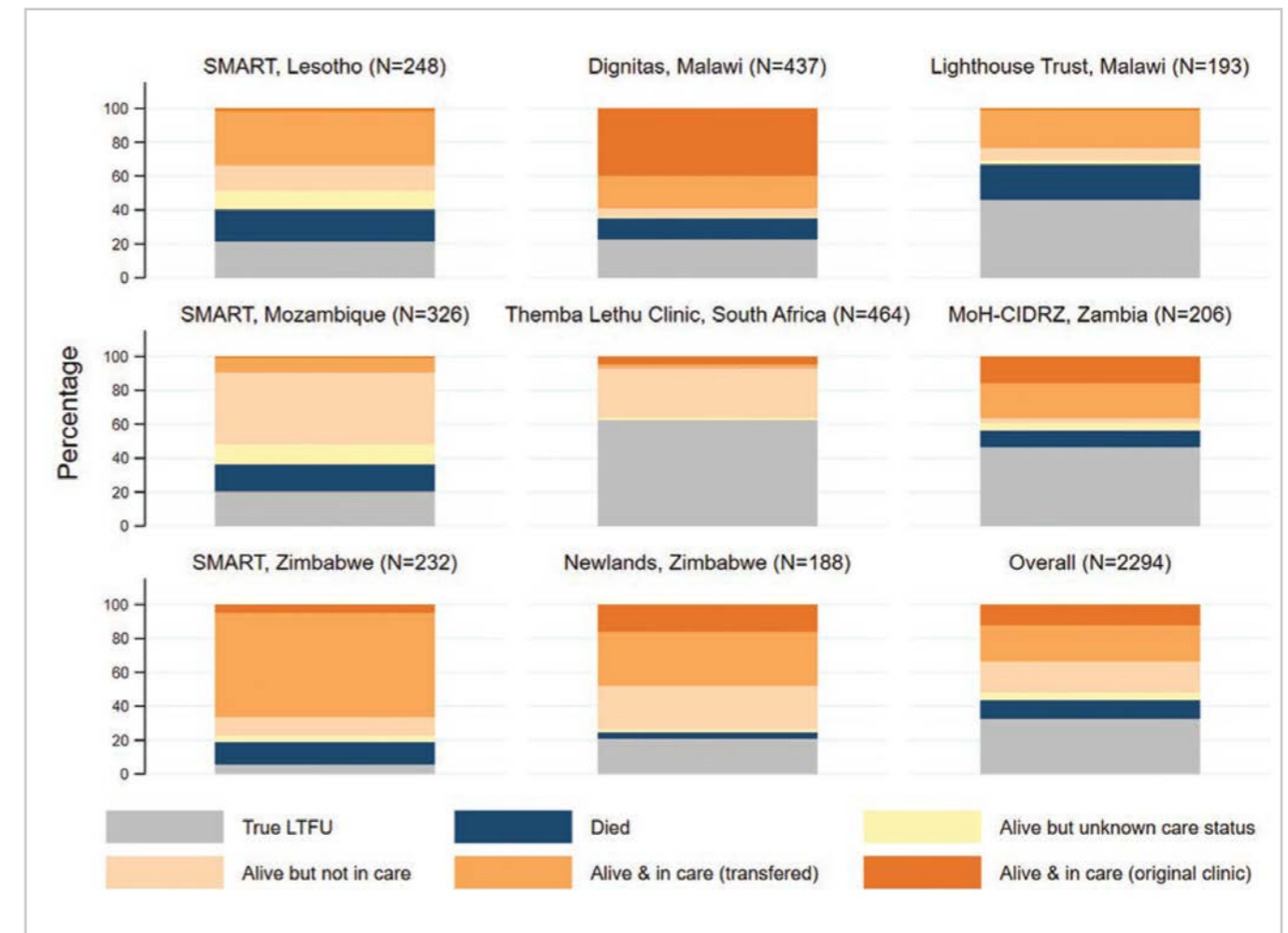
**Multidisciplinary Center for Infectious Diseases:** Core activity BReady cohort (Co-lead applicant: Gilles Wandeler, Nicola Low).

**Internal and external collaborations**

In Switzerland, we work with colleagues at University of Zurich, ETH Zurich, the Swiss Tropical and Public Health Institute. Within the Institute of Social and Preventive Medicine, we collaborate with the Cancer, Mental Health, Sexual and Reproductive Health, Interfaculty Platform for Data and Computational Science (INPUT), and Evidence Synthesis research groups. We collaborate with UNAIDS and WHO, the Centre for Infectious Disease Epidemiology and Research at the University of Cape Town, South Africa and many other collaborators within leDEA. Other collaborators are based at the University of Kwa-Zulu Natal in South Africa and the London School of Hygiene and Tropical Medicine and University of Bristol, UK.

**Key team members**

Nanina Anderegg (statistician); Marie Ballif (postdoc); Carole Dupont (scientific and administrative assistant); Matthias Egger (head of research group); Lukas Fenner (senior research scientist); Andreas Haas (head of mental health research group); Anthony Hauser (research fellow); Stefanie Hossmann (project manager); Cam Ha Dao Ostinelli (clinical data manager); Radoslaw Panczak (postdoc); Julien Riou (postdoc); Eliane Rohner (head of cancer research group); Yann Ruffieux (research associate); Lilian Smith-Wirth (project coordinator); Katayoun Taghavi (postdoc); Per von Groote (program manager); Gilles Wandeler (adjunct researcher); Anja Wettstein (PhD student); Veronika Skrivanekova Whitesell (research fellow); Elizabeth Zaniewski (project manager and epidemiologist); Kathrin Zürcher (postdoc); Marcel Zwahlen (director a.i.).



The figure shows the vital status and care outcomes among study participants lost to follow-up in HIV treatment programmes in sub-Saharan Africa traced using phone calls, home visits, or both. There was substantial variation in the distribution of outcomes across programs. The grey area represents patients who were not found by tracing.

## INPUT – Interfaculty Platform for Data and Computational Science

### Selected publications

**Ballif M**, Christ B, **Anderegg N**, Chammartin F, Muhairwe J, Jefferys L, Hector J, van Dijk J, Vinikoor MJ, van Lettow M, Chimbete C. **Tracing people living with human immunodeficiency virus who are lost to follow-up at antiretroviral therapy programs in Southern Africa: a sampling-based cohort study in 6 countries.** *Clinical Infectious Diseases*. 2022;74(2):171–9.

Brazier E, Tymejczyk O, **Zaniewski E**, **Egger M**, Wools-Kaloustian K, Yiannoutsos CT, Jaquet A, Althoff KN, Lee JS, Caro-Vega Y, Luz PM, Tanuma J, Niyongabo T, Nash D. **Effects of national adoption of treat-all guidelines on pre-antiretroviral therapy (ART) CD4 testing and viral load monitoring after ART initiation: A regression discontinuity analysis.** *Clin Infect Dis*. 2021;73(6):e1273–e81.

Riebensahm C, Chitundu H, Muula G, Chihota B, Sinkala E, Sunkutu V, Maurer MH, Dufour JF, Berzigotti A, **Egger M**, Bolton-Moore C. **Screening for hepatocellular carcinoma among adults with HIV/Hepatitis B coinfection in Zambia: a pilot study.** *Int J Infect Dis*, 2021. S1201–9712.

**Riou J**, **Panczak R**, **Althaus CL**, Junker C, Perisa D, Schneider K, Criscuolo NG, **Low N**, **Egger M**. **Socioeconomic position and the COVID-19 care cascade from testing to mortality in Switzerland: a population-based analysis.** *Lancet Public Health*, 2021;6(9):683–691.

**Zürcher K**, **Reichmuth ML**, **Ballif M**, Loiseau C, Borrell S, Reinhard M, **Skrivankova V**, Hömke R, Sander P, Avihingsanon A, Abimiku AIG, Marcy O, Collantes J, Carter EJ, Wilkinson RJ, Cox H, Yotebieng M, Huebner R, **Fenner L**, Böttger EC, Gagneux S, **Egger M**. **Mortality from drug-resistant tuberculosis in high-burden countries comparing routine drug susceptibility testing with whole-genome sequencing: a multicentre cohort study.** *The Lancet Microbe*. 2021;2(7):e320–e30.

*The Interfaculty Platform for Data and Computational Science (INPUT) is a collaboration between the Institute of Social and Preventive Medicine (ISPM) and the Center for Space and Habitability (CSH). We foster interdisciplinary research at the interface of statistics, data science, and computational science with applications in epidemiology, medicine, and the natural sciences. A major focus of our research concerns how the population biology of infectious diseases is affected by public health interventions, dynamic patterns of host immunity, and environmental changes.*

### Key scientific activities

In 2021, members of INPUT made significant contributions to understanding the spread of SARS-CoV-2 variants of concern (VOC). We estimated the increased transmissibility and/or the potential for immune evasion of different VOCs, which informed the public health response to the COVID-19 pandemic.

We successfully started the CoMix study in Switzerland – a longitudinal, multi-country social contact survey among representative panels of individuals in terms of age, gender, region of residence, and occupation. This groundbreaking study follows households across Europe in real-time over the course of the COVID-19 pandemic. The survey asks people about their awareness, attitudes toward vaccination, and behaviors in response to COVID-19 and measures how these change over time.

We also established an interdisciplinary collaboration to harness the multidimensional information in electronic health records from hospital patients for the purpose of infectious disease surveillance.

### Key academic activities

**Teaching:** an online course on infectious disease models and their use during the SARS-CoV-2 pandemic for the Swiss Epidemiology Winter School.

**Scientific talks and presentations:** presentations at the Swiss Public Health Conference in Bern.

**Outreach and representation:** Science communication and outreach activities related to the pandemic for various organizations, academic institutes, and the media.

### Grants

**Multidisciplinary Center for Infectious Diseases:** Early detection for early action: integrating multiple data sources for monitoring the SARS-CoV-2 epidemic in near real-time. (CHF 492,063 [of total 949,088] awarded to ISPM; PI: Christian L. Althaus)

**Swiss Federal Office of Public Health:** CoMix. (CHF 104,389; PI: Christian L. Althaus)

### Internal and external collaborations

INPUT continues as a collaboration between ISPM and CSH focusing on the development and application of computational methods in epidemiology, medicine, and the natural sciences. Our new Multidisciplinary Center for Infectious Diseases grant will allow us to expand our interdisciplinary collaborations with researchers at the ARTORG Center for

Biomedical Engineering Research and University Hospital of Bern, Inselspital. At ISPM, we successfully collaborated on mathematical modelling with members of the following research groups: Sexual and Reproductive Health and HIV, Hepatitis, and Tuberculosis.

Internationally, we had intensive collaborations with Nextstrain, our European partners from the EpiPose project, and researchers from the KwaZulu-Natal Research Innovation and Sequencing Platform in South Africa on the spread of new SARS-CoV-2 variants and other COVID-19-related research.

**Key team members**

Christian L. Althaus (head of research group); Simon Grimm (research fellow); Emma B. Hodcroft (postdoc); Martina L. Reichmuth (PhD student).



Christian Althaus    Simon Grimm    Emma Hodcroft    Martina Reichmuth

**Selected publications**

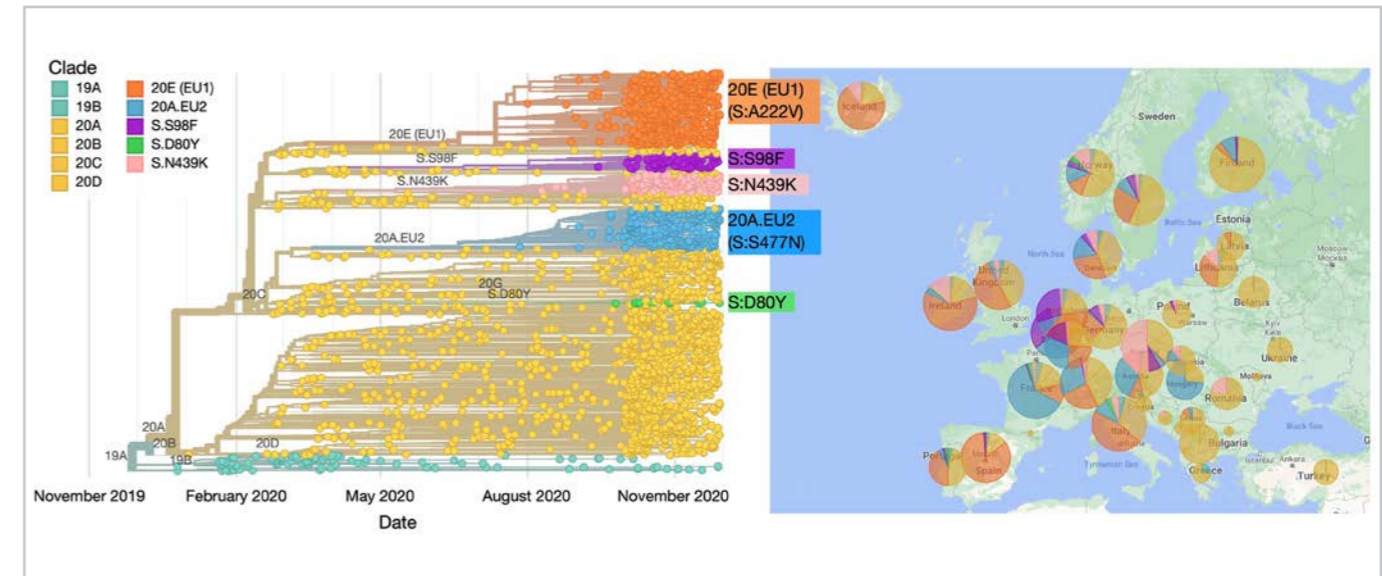
**Hodcroft EB**, Zuber M, Nadeau S, Vaughan TG, Crawford KHD, **Althaus CL**, **Reichmuth ML**, Bowen JE, Walls AC, Corti D, Bloom JD, Veessler D, Mateo D, Hernando A, Comas I, Gonzalez-Candelas F, Seq C-Sc, Stadler T, Neher RA. [Spread of a SARS-CoV-2 variant through Europe in the summer of 2020](#). Nature. 2021;595(7869):707–12.

Kremer C, Torneri A, Boesmans S, Meuwissen H, Verdonshot S, Vanden Driessche K, **Althaus CL**, Faes C, Hens N. [Quantifying superspreading for COVID-19 using Poisson mixture distributions](#). Sci Rep. 2021;11(1):14107.

Menges D, Aschmann HE, Moser A, **Althaus CL**, von Wyl V. [A Data-Driven Simulation of the Exposure Notification Cascade for Digital Contact Tracing of SARS-CoV-2 in Zurich, Switzerland](#). JAMA Netw Open. 2021;4(4):e218184.

**Riou J**, **Dupont C**, Bertagnolio S, Gupta RK, Kouyos RD, **Egger M**, **CL Althaus**. [Drivers of HIV-1 drug resistance to non-nucleoside reverse-transcriptase inhibitors \(NNRTIs\) in nine southern African countries: a modelling study](#). BMC Infect Dis. 2021;21(1):1042.

Zeller M, Gangavarapu K, Anderson C, Smither AR, Vanchiere JA, Rose R, Snyder DJ, Dudas G, Watts A, Matteson NL, Robles-Sikisaka R, Marshall M, Feehan AK, Sabino-Santos G Jr, Bell-Kareem AR, Hughes LD, Alkuzweny M, Snarski P, Garcia-Diaz J, Scott RS, Melnik LI, Klitting R, McGraw M, Belda-Ferre P, DeHoff P, Sathe S, Marotz C, Grubaugh ND, Nolan DJ, Drouin AC, Genemaras KJ, Chao K, Topol S, Spencer E, Nicholson L, Aigner S, Yeo GW, Farnaes L, Hobbs CA, Laurent LC, Knight R, **Hodcroft EB**, Khan K, Fusco DN, Cooper VS, Lemey P, Gardner L, Lamers SL, Kamil JP, Garry RF, Suchard MA, Andersen KG. [Emergence of an early SARS-CoV-2 epidemic in the United States](#). Cell. 2021;184(19):4939–52.



Phylogenetic overview of SARS-CoV-2 in Europe up to the end of November 2020.

Left: Tree showing a representative sample of isolates from Europe. The SARS-CoV-2 variant 20E (EU1) – identified in Spain in early summer 2020 then subsequently spread across Europe – is shown in orange.

Right: Proportion of sequences belonging to each variant (up to the end of November 2020) per country.



## Lifestyle and Behaviour

*By taking a transdisciplinary and life-course approach, the Lifestyle and Behaviour group aims to understand complex associations between modifiable lifestyle factors and physical and mental health, as well as the role of the natural and built environment in securing healthy, sustainable aging for all.*

We strive to identify potential causal pathways underlying lifestyle-related chronic diseases for prevention by developing high-quality, evidence-based, targeted approaches tailored for multiple ethnicities, genders, and across socioeconomic contexts – collectively influencing human and planetary health.

### Key scientific activities

Broadly spanning traditional and emerging behavioral lifestyle factors, our group focuses on various research topics, such as healthy and sustainable aging, cardiovascular aging and cardiovascular diseases, mental health, planetary health, and sex and gender differences in lifestyle and health.

Our team has expertise across multiple fields, including experimental sciences, nutrition, public health, psychology, nursing, epidemiology, and medicine.

### Key academic activities

Our group has multiple projects about the role of lifestyle and behavior, including mitigating lifestyle and environmental factors for pregnancy-associated cardiometabolic disease among women and children and understanding complex air pollution mixtures associated with children's cardiometabolic and respiratory health. Our other projects involve multi-omics mechanisms of lifestyle and environmentally-driven diseases, as well as migrant health and smoking prevention. Further projects examine the association between Dietary Phytochemical Index (DPI) and cardiometabolic risk factors, cardiometabolic disease incidence, and all-cause mortality.

Other projects include three systematic reviews. One systematic review examines the association of physical activity on lifelong measures of life and health, such as life expectancy, disease- and disability-free life expectancy, disability-adjusted life years, and quality-adjusted life years among the general adult population. The second systematic review investigates the mental health of migrants exposed to armed conflicts. And the third systematic review looks at dietary factors that can modify the genetic risks of cardiovascular disease.

### Internal and external collaborations

Helius cohort study, Amsterdam University Medical Center, The Netherlands; Harvard School of Public Health, USA; Swiss Paraplegic Research, Switzerland; CoLaus study, University of Lausanne, Switzerland; Imperial College London, UK; Department of Epidemiology, Erasmus Medical Center, Rotterdam, the Netherlands.

### Key team members

Jessica Laine Carmeli (postdoc); Angeline Chatelan (postdoc); Zayne Roa Diaz (PhD student); Oscar H. Franco (head of research group); Annika Frahsa (head of community health and health care systems research group); Magda Gamba (PhD student); Marija Glisic (postdoc); Nathalia González (PhD student); Giorgia Grisotto (PhD student); Oche Adam Itodo (PhD student); Marilyne Menassa (PhD student); Cristina Mesa (PhD student).

### Selected publications

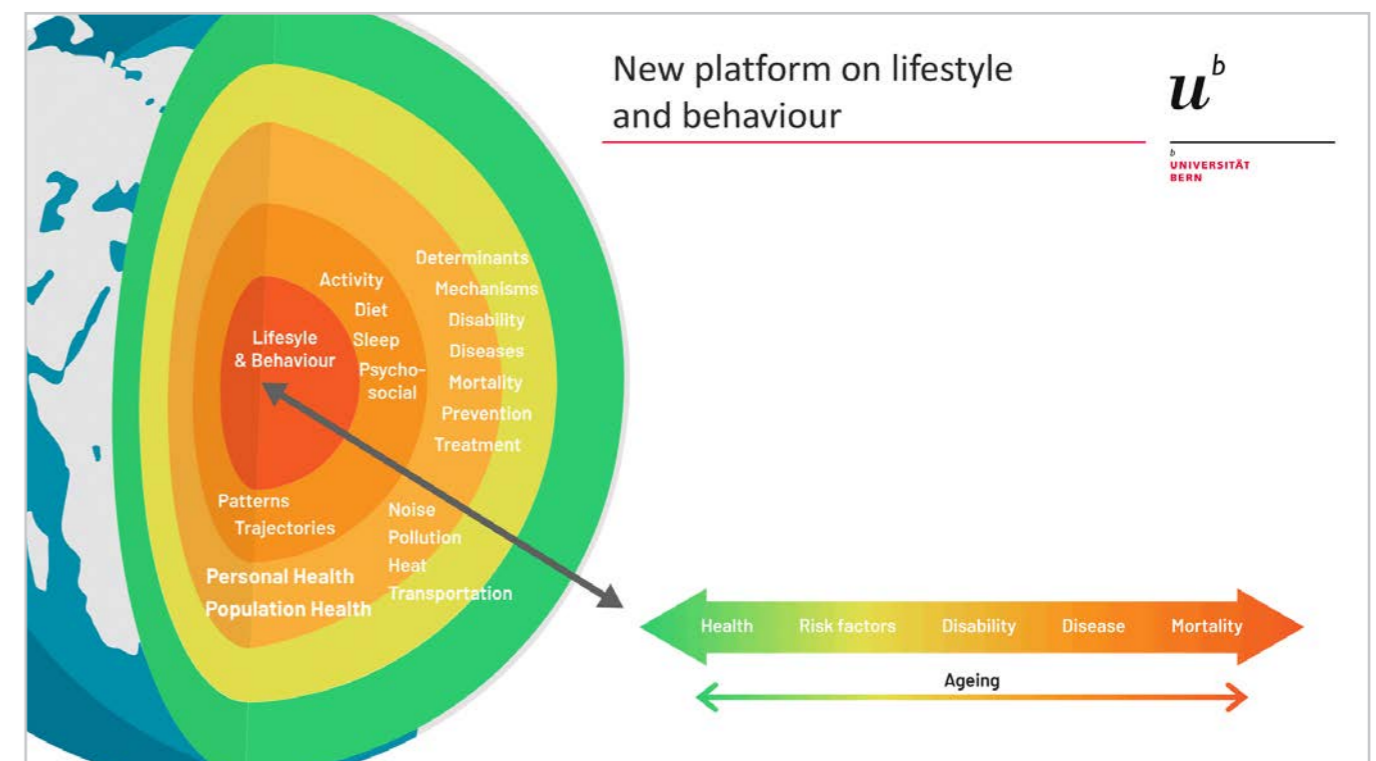
Aguirre Sanchez L, **Roa-Diaz ZM**, **Gamba M**, **Grisotto G**, Moreno Londono AM, Mantilla-Urbe BP, Rincon Mendez AY, Ballesteros M, **Kopp-Heim D**, **Minder B**, Suggs LS, **Franco OH**. **What Influences the sustainable food consumption behaviours of university students? A systematic review.** Int J Public Health. 2021;66:1604149.

Halpern B, Louzada MLDC, Aschner P, Gerchman F, Brajkovich I, Faria-Neto JR, Polanco FE, Montero J, Juliá SMM, Lotufo PA, **Franco OH**. **Obesity and COVID-19 in Latin America: A tragedy of two pandemics – Official document of the Latin American Federation of Obesity Societies.** Obesity Reviews. 2021;22(3):e13165.

**Mesa-Vieira C**, Grolmund J, von Känel R, **Franco OH**, Saner H. Psychosocial risk factors in cardiac rehabilitation: time to screen beyond anxiety and depression. Glob Heart. 2021;16(1):16.

Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Back M, Benetos A, Biffi A, Boavida JM, Capodanno D, Cosyns B, Crawford C, Davos CH, Desormais I, Di Angelantonio E, **Franco OH**, Halvorsen S, Hobbs FDR, Hollander M, Jankowska EA, Michal M, Sacco S, Sattar N, Tokgozoglul, Tonstad S, Tsioufis KP, van Dis I, van Gelder IC, Wanner C, Williams B, Societies ESCNC, Group ESCSD. **2021 ESC Guidelines on cardiovascular disease prevention in clinical practice.** Eur Heart J. 2021;42(34):3227–337.

Zhang YB, Chen C, Pan XF, Guo J, Li Y, **Franco OH**, Liu G, Pan A. **Associations of healthy lifestyle and socioeconomic status with mortality and incident cardiovascular disease: two prospective cohort studies.** BMJ. 2021;373.



## Mental Health

*The Mental Health research group studies 1) the epidemiology of mental illness; 2) interactions between mental illness and physical diseases; 3) the provision of mental health care; and 4) the influence of mental illness on the treatment of physical comorbidities.*

### Key scientific activities

Three ISPM research groups – HIV, Hepatitis, and Tuberculosis; Cancer; and Mental Health – received a grant from the National Institutes of Health to continue the International epidemiologic Databases to Evaluate AIDS – Southern Africa (IeDEA-SA) project for the next five years (2021-2026). Using IeDEA-SA data, we studied the treatment of mental disorders in South Africa's public and private health care settings. We estimated that over 90% of people living with HIV and a mental illness who are accessing HIV care in Cape Town's public primary care sector do not receive mental health care. Furthermore, we could show that the rate of hospital admissions and outpatient care consultations for mental health complications decreased substantially during the COVID-19 lockdown in South Africa; thus, widening the mental health treatment gap.

We also completed a cluster-randomized controlled trial to evaluate the effectiveness of a psychological intervention for persons living with HIV and mental health problems in rural Zimbabwe. The intervention – the Friendship Bench – trains laypersons to deliver evidence-based cognitive behavioral therapy. The intervention was feasible, acceptable, and reduced symptoms of common mental disorders. Key findings of the trial were presented at the international conference Adherence 2021 in Orlando, Florida, USA. Finally, Andreas Haas was awarded an SNF Ambizione fellowship to study causal pathways leading to lower life expectancy among people living with mental illness in South Africa.

### Key academic activities

**Students:** Anja Wettstein enrolled in the Graduate School for Health Sciences (GHS) PhD program at the University of Bern, studying the effect of mental health on morbidity and mortality in South Africa. Mpho Tlali enrolled in the School of Public Health and Family Medicine PhD program at the University of Cape Town, South Africa, studying the prevalence and treatment for mental health and substance use disorders among people living with HIV in South Africa. Raphael Lienhard started his MD thesis at the University of Bern, studying mental health, adherence to antiretroviral therapy, and viral suppression among adolescents and adults living with HIV in South Africa. Finally, Cristina Mesa Vieira completed the second year exam of her PhD thesis on psychosocial risk factors of cardiovascular disease at GHS at the University of Bern. These four PhD/MD students are co-supervised by Andreas Haas.

### Grants

**National Institute of Allergy and Infectious Diseases** (U01AI069924): International epidemiology Databases to Evaluate AIDS – Southern Africa (IeDEA-SA), (USD 16 million; PI: Mattias Egger; 2021–2026).

**Swiss National Science Foundation** (193381): Pathways from mental disorders to the burden of disease: Causal mediation analysis of big data from South Africa (CHF 924,952; PI: Andreas Haas; 07/2021–07/2025).

### Internal and external collaborations

We collaborate with several Institute of Social and Preventive Medicine research groups: HIV, Hepatitis, and Tuberculosis; Cancer; and Lifestyle and Behaviour. We also collaborate with the University of Bern's Clinical Trials Unit; International epidemiology Databases to Evaluate AIDS – Southern Africa; Centre for Infectious Disease Epidemiology and Research, University of Cape Town, Department of Psychiatry, University of Stellenbosch, Western Cape Provincial Department of Health, South Africa; Department of Psychiatry and New York State Psychiatric Institute, Columbia University, USA; SolidarMed, Friendship Bench, Zimbabwe.

### Key team members

Andreas Haas (head of research group); Raphael Lienhard (MD student); Yann Ruffieux (research associate); Anja Wettstein (PhD student), Veronika Skrivankova Whitesell (research fellow).

### Selected publications

**Haas AD**, Kunzekwenyika C, **Hossmann S**, Manzero J, van Dijk J, Manhibi R, Verhey R, Limacher A, **von Groote PM**, Manda E, Hobbins MA, Chibanda D, **Egger M**, IeDEA-SA. **Symptoms of common mental disorders and adherence to antiretroviral therapy among adults living with HIV in rural Zimbabwe: a cross-sectional study.** *BMJ Open.* 2021;11(7):e049824.

**Ruffieux Y**, **Efthimiou O**, Van den Heuvel LL, Joska JA, Cornell M, Seedat S, Mouton JP, Prozesky H, Lund C, Maxwell N, Tlali M, Orrell C, Davies MA, Maartens G, **Haas AD**. **The treatment gap for mental disorders in adults enrolled in HIV treatment programmes in South Africa: a cohort study using linked electronic health records.** *Epidemiol Psychiatr Sci.* 2021;30:e37.



A community health worker conducts a problem-solving therapy session with a young client on the Friendship Bench in Zimbabwe.

## Musculoskeletal Health and Rheumatology

*The Musculoskeletal Health and Rheumatology research group is involved in research projects on musculoskeletal disorders, especially osteoarthritis, giant cell arteritis, and osteoporosis. Our research includes studies on prevalence, incidence, diagnosis, and natural history, as well as systematic reviews and randomized controlled trials. We collaborate with the Clinic for Rheumatology and Immunology at the University Hospital of Bern, Inselspital.*

### Key scientific activities

We are establishing a new primary and secondary health care system-based registry on osteoporosis. We also established a register of patients with giant cell arteritis at the University Hospital of Bern, Inselspital and within the Swiss Clinical Quality Management in Rheumatic Diseases Registry (SCQM)—the first study was published in 2021.

We performed a 10-year follow-up of the inception cohort study (Sumiswald cohort) to understand the role of femoro-acetabular impingement in the development of osteoarthritis of the hip. To learn about development of hip pain and any surgical procedures performed during the previous 10 years, we rely on self-reported information from questionnaires; clinical examinations and MRI exams were finished in 2021. We have started in depth analyses.

Within the framework of a multi-center randomized controlled trial comparing arthroscopic hip surgery to physiotherapy-led care for femoroacetabular impingement, we evaluated morphological changes on hip X-ray in the Australian FASHIoN trial. The main trial results were published in 2021. We are also conducting a clinical trial on rapid induction of remission with high-dose glucocorticoids among patients with giant cell arteritis (GUSTO trial). We extended the follow-up in 2021.

### Key academic activities

**Teaching:** Regular teaching activities at the undergraduate and postgraduate levels, including seminars and talks.

### Internal and external collaborations

Within Switzerland, we collaborate with University Hospital of Bern (Inselspital); Swiss Institute for Translational and Entrepreneurial Medicine (sitem-insel); University of Bern, Clinical Trials Unit; and OsteoRheuma Bern (Dr. Judith Everts-Graber). Outside of Switzerland, we collaborate with the University of Sydney, Australia (Prof. David Hunter) and Boston University, USA (Prof. David Felson).

### Key team members

Zina Heg-Bachar (data manager); Christian Bangerter (research assistant); Roger Hilfiker (PhD student); Stephan Reichenbach (head of research group).

### Selected publications

Amsler J, Kysela I, Tappeiner C, Seitz L, Christ L, Scholz G, Stalder O, Kollert F, **Reichenbach S**, Villiger PM. **Vision loss in patients with giant cell arteritis treated with tocilizumab.** *Arthritis Res Ther.* 2021;23(1):1–8.

Everts-Graber J, **Reichenbach S**, Gahl B, Ziswiler HR, Studer U, Lehmann T. **Risk factors for vertebral fractures and bone loss after denosumab discontinuation: a real-world observational study.** *Bone.* 2021;144:115830.

Hanke MS, Schmaranzer F, Steppacher SD, **Reichenbach S**, Werlen SF, Siebenrock KA. **A cam morphology develops in the early phase of the final growth spurt in adolescent ice hockey players: results of a prospective MRI-based study.** *Clin Orthop Relat Res.* 2021;479(5):906–18.

Hunter DJ, Eyles J, Murphy NJ, Spiers L, Burns A, Davidson E, Dickenson E, Fary C, Foster NE, Fripp J, Griffin DR, Hall M, Kim YJ, Linklater JM, Molnar R, Neubert A, O'Connell RL, O'Donnell J, O'Sullivan M, Randhawa S, **Reichenbach S**, Schmaranzer F, Singh P, Tran P, Wilson D, Zhang H, Bennell KL. **Multi-centre randomised controlled trial comparing arthroscopic hip surgery to physiotherapist-led care for femoroacetabular impingement (FAI) syndrome on hip cartilage metabolism: the Australian FASHIoN trial.** *BMC Musculoskelet Disord.* 2021;22(1):697.

Seitz L, Christ L, Lötscher F, Scholz G, Sarbu AC, Bütikofer L, Kollert F, Schmidt WA, **Reichenbach S**, Villiger PM. **Quantitative ultrasound to monitor the vascular response to tocilizumab in giant cell arteritis.** *Rheumatology (Oxford),* 2021;60(11):5052–59.

## Palliative Care and End of Life

*The Palliative Care and End of Life research group explores topics in advanced care planning, care for the dying, and community palliative care. Through a double affiliation with the Institute of Social and Preventive Medicine and the University Centre for Palliative Care at the University Hospital of Bern, Inselspital, our interdisciplinary group combines clinical and methodological expertise in qualitative and quantitative methodologies to undertake clinical, psychosocial, and health services research.*

### Key scientific activities

In the second year of living with the COVID-19 pandemic, we continued to seek normality in our research activities. Although some of us remained in home office, most of our research staff continued to collect data at the bedside and at times via online channels. One of the biggest challenges we encountered was the difficulty recruiting research participants for some of our studies. The pandemic itself also continued to highlight the importance of many palliative care topics, not only at a societal level, but also in the direct care of patients and their families.

Our key research activities centered on 1) advancing our international study on the definition of a core outcome set for the care of the dying; 2) evaluating telemedicine in palliative care; 3) developing and testing a communication model for medical students about approaching death; 4) developing an advance care planning course with and for older adults; and 5) evaluating and establishing societal model procedures for proactive planning for the end of life.

### Key academic activities

**Students:** Valentina González and Monica Fliedner defended and successfully completed their PhDs. Valentina's thesis is entitled "Challenges and gaps delivering palliative care to patients with heart failure"; Monica's thesis is entitled "Early integrated palliative care in the acute care setting: impact on patients' and nurses' roles and responsibilities." Nadine Kleiner and Jelena Guyer completed their MD degrees, three medical students are working on their MD theses, and three students are completing their master's degrees: one in nursing, one in medicine, and another one in palliative medicine.

**Teaching:** We continue to teach all lectures and seminars on palliative medicine topics for medical students in years four to six, covering areas such as symptom assessment and management and psychosocial aspects, such as grief, as well as ethical aspects, such as euthanasia in older age and self-determination. We also support the teaching of courses in epidemiology for medical students. Since 2017, our Centre has also been responsible for the postgraduate certificate of advanced studies in Interprofessional Specialised Palliative Care at the University of Bern, graduating over 80 students so far. Furthermore, through our research we are developing and evaluating innovative teaching models for medical students, healthcare professionals, and for the general Swiss population.

### Grants

**Swiss National Science Foundation (SNF):** Eccellenza Professorial Fellowship: The risks and benefits of integrating emotions in end-of-life communication. (CHF 1,826,322; PI: Sofia Zambrano; 11/2021–11/2026).

**Lindenhof Foundation, Bern:** Plattform Palliative Care (CHF 1.48 million; PI: Steffen Eychmüller; 09/2020–08/2023).

**Horizon 2020 (825731):** I-LIVE: Living well, dying well. A research programme to support living until the end. (WP lead: Steffen Eychmüller; Sofia Zambrano) (EUR 394,750 [of 4,017,817] awarded to University of Bern; 01/2019–01/2023).

**Swiss National Science Foundation (407440\_167501):** PROAKTIV: A cluster trial of palliative needs assessment and care in general practice. (CHF 559,431; PI: Steffen Eychmüller; Maud Maessen; 02/2018–07/2022).

**Swiss Cancer Research foundation:** Communication with cancer patients and their families about approaching death: Scaffolding conceptual and practical learning for health professionals. (CHF 374,964; PI: Sissel Guttormsen; co-applicants: Steffen Eychmüller and Sofia Zambrano; 04/2019–04/2022).

**Gesundheitsförderung Schweiz:** Projekt «Co-Lab» Compassionate city. (CHF 125,000 [of total 300,000] awarded to University of Bern; PI: Claudia Michel; Steffen Eychmüller; 1/2020–12/2022).

### Internal and external collaborations

We conduct research in collaboration with an extensive network of local, regional, national, and international partners from a diverse range of areas and sectors. As an example, the iLIVE consortium is composed of 14 health and research institutions from 13 countries, including 11 European countries, Australia, New Zealand, and Argentina.

### Key team members

Barbara Affolter (research collaborator); Jelena Baumann (research assistant); Andri Christen (research coordinator); Andreas Ebnetter (research collaborator); Martina Egloff (research assistant); Steffen Eychmüller (research group co-head); Sibylle Felber (research collaborator); Monica Fliedner (postdoc); Monika Hagemann (research collaborator); Valentina González (postdoc); Maud Maessen (senior postdoc); Marina Maier (research assistant); Cornelia Stähli (research assistant); Sofia Zambrano (research group co-head).



## Sexual and Reproductive Health

### Selected publications

Arenas Ochoa LF, **Gonzalez-Jaramillo V**, Saldarriaga C, Lemos M, Krikorian A, Vargas JJ, Gomez-Batiste X, **Gonzalez-Jaramillo N**, **Eychmüller S**. **Prevalence and characteristics of patients with heart failure needing palliative care**. BMC Palliat Care. 2021;20(1):184.

**Eychmüller S**, Zwahlen S, Fliedner MC, Jüni P, Aebbersold DM, Aujesky D, Fey MF, **Maessen M**, Trelle S. **Single early palliative care intervention added to usual oncology care for patients with advanced cancer: A randomized controlled trial (SENS Trial)**. Palliat Med. 2021;35(6):1108–1117.

**González-Jaramillo V**, Arenas Ochoa LF, Saldarriaga C, Krikorian A, Vargas JJ, **González-Jaramillo N**, **Eychmüller S**, **Maessen M**. **The ‘Surprise question’ in heart failure: a prospective cohort study**. BMJ Support. Palliat. Care. 2021.

Kleiner N, **Zambrano SC**, **Eychmüller S**, Zwahlen S. **Early palliative care integration trial: consultation content and interaction dynamics**. BMJ Support. & Palliat. Care. 2021.

White N, Oostendorp LJ, Vickerstaff V, Gerlach C, Engels Y, **Maessen M**, Tomlinson C, Wens J, Leysen B, Biasco G, **Zambrano S**, **Eychmüller S**, Avgerinou C, Chattat R, Ottoboni G, Veldhoven C, Stone P. **An online international comparison of palliative care identification in primary care using the surprise question**. Palliat Med. 2021.

*Dominated in 2021 by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), our focus on the public health epidemiology of sexually transmitted and reproductive infections has grown to embrace emerging and re-emerging infections with pandemic potential. We examine questions about etiology, epidemiology, prevention and control, diagnosis, and social and cultural aspects of these topics in Switzerland and internationally. With commitments to living evidence and open science, our studies include field epidemiology, synthesis of published evidence, and methodological research.*

### Key scientific activities

Our research on SARS-CoV-2 focused on maintaining a database of living evidence to support researchers internationally through the COVID-19 Open Access Project (COAP). In 2021, we continued updating our own living systematic review of the occurrence and transmission potential of asymptomatic SARS-CoV-2 infection, rapid reviews of coronavirus disease 2019 (COVID-19) among children, and reviews of diagnostic test accuracy. The volume of research publications led us to crowdsource with a group of 20 international reviewers who work together with us online (coordinated by Mert Ipekci, Diana Buitrago-Garcia, Leonie Heron, and Hira Imeri).

The expanding evidence base has also resulted in increasing between-study heterogeneity in studies included in systematic reviews. Investigating heterogeneity in systematic reviews of observational epidemiological studies intersects with our investigations of the science of prevalence studies and the nature and influence of sources of bias (PhD project, Diana Buitrago-Garcia). We also contributed to analyses of data in Switzerland to investigate socioeconomic inequalities related to COVID-19 and an outbreak of the alpha variant of concern in Wengen.

We investigated the impact of sexually transmitted infections in pregnancy through primary research studies and an ongoing series of systematic reviews. However, the pandemic has affected study enrolment, progress, and analyses in the Women and Newborn Trial of Antenatal Intervention and Management (WANTAIM) in Papua New Guinea and for a cohort study (Philani Ndiphile, Be healthy and I will be healthy) in South Africa (MD-PhD project, Ranjana Gigi). Our systematic reviews of the etiological role of sexually transmitted infections in adverse pregnancy outcomes show potential associations with preterm birth for *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, and some genital mycoplasmas; however, inadequate control for confounding in the included studies reduces the certainty of evidence.

With an international interdisciplinary team, we continue to study global political prioritization of sexually transmitted infections by conducting policy analysis, estimating burden of disease, and using qualitative research. The global spread of SARS-CoV-2 has also affected our partners' qualitative fieldwork in Papua New Guinea and Zambia. We completed and are writing up findings from projects investigating the emergence of antimicrobial resistance in *Neisseria gonorrhoeae* in South Africa (Soushieta Jagadesh and Julien Riou) and on accelerated partner therapy for contact tracing of chlamydia infections (Christian L. Althaus and the UK-led Limiting Undetected Sexually Transmitted Infections to Reduce Morbidity [LUSTRUM] programme).

**Key academic activities**

**Students:** Ranjana Gigi passed her MD-PhD mid-term evaluation. A grant from the Multidisciplinary Center for Infectious Diseases will support a PhD student, Aziz Mert Ipekci.

**Teaching:** The group contributed to teaching for undergraduates in medicine and biomedical sciences, PhD students, and postgraduates studying for certificates of advanced studies. Teaching subject areas include writing for publication and protocol development, gender studies, infectious disease epidemiology, public health ethics, and global health.

**Outreach and representation:** Nicola Low continued contributing to the Swiss National COVID-19 Science Task Force. Diana Buitrago-Garcia is a student editor at the International Journal of Public Health.

Motivated by the COVID-19 pandemic, the Multidisciplinary Center for Infectious Diseases MCID was founded at the University of Bern in January 2021 to study health-care, societal, ethical, and economic risks from infectious diseases. With Nicola Low as chair of the epidemiology cluster and Christian L. Althaus and Julien Riou as members, the Sexual and Reproductive Health research group plays a key MCID role.

The epidemiology cluster leads the establishment of BReady – a population-based cohort of households in the canton of Bern – which will collect questionnaire and biological data as a resource for MCID members to enhance pandemic preparedness in Switzerland.

**Grants**

**Multidisciplinary Center for Infectious Diseases.** The BReady cohort. (CHF 1,800,000, PI: Nicola Low with Gilles Wandeler; 01/22–12/24).

**Multidisciplinary Center for Infectious Diseases.** Divided pandemic society and public health: polarization in the COVID-19 pandemic response in Switzerland. (CHF 720,000; PI: Annika Frahsa, co-applicant: Nicola Low; 01/2022–12/24).

**Swiss Cancer Research** (9346). Cervical pre-cancer treatment failure among women living with HIV in Zimbabwe: a cohort study. (CHF 372,100; PI: Eliane Rohner, co-applicant Nicola Low; 01/2022–12/2025).

**Swiss National Science Foundation** (320030\_197831). Influence of sexually transmitted infections, genital tract infections and the vaginal microbiome on preterm birth. (CHF 720,000; PI: Nicola Low; CHF 720,000; 10/2021–09/2025).

**European Commission Horizon 2020** (101003688). Epidemic intelligence to minimize COVID-19's public health, economic and social impact in Europe. (EUR 2,900,000; Co-applicants Nicola Low, Christian L. Althaus; 03/2020–03/2023).

**Swiss National Science Foundation** (IZ07Z0\_160909/1). r4d project: Improving neonatal and infant outcomes using point-of-care tests for STI in high prevalence settings. CHF 488,000; PI: Nicola Low; 03/2016–12/2023).

**Swiss National Science Foundation** (320030\_176233). Zika virus: causality, open science and risks of emerging infectious diseases. (CHF 700,000; PI: Nicola Low; 10/2017–12/2022).

**Swiss Network of International Studies** (19/63). Political prioritisation of the prevention and control of sexually transmitted infections: A global challenge. (CHF 246,000; PI: Nicola Low; 01/2020–06/2022).

**Internal and external collaborations**

At the Institute of Social and Preventive Medicine, we collaborate with the Cancer; Child and Adolescent Health; Community Health and Health Care Systems; HIV, Hepatitis, and Tuberculosis; Interfaculty Platform for Data and Computational Science (INPUT); and Evidence Synthesis research groups. In Switzerland, we work with colleagues at the Berner Fachhochschule; University of Zurich and Swiss Tropical and Public Health Institute. We work internationally with the Foundation for Professional Development, South Africa; Papua New Guinea Institute of Medical Research; University of New South Wales and University of Melbourne, Australia; Hasselt University, Belgium; University College London, UK; London School of Hygiene and Tropical Medicine, UK; Shenzhen University, China; the Foundation for Innovative Diagnostics and WHO.

**Key team members**

Christian L. Althaus (head of INPUT research group); Diana Buitrago-Garcia (PhD student); Ranjana Gigi (PhD student); Leonie Heron (postdoc); Hira Imeri (research assistant); Aziz Mert Ipekci (PhD student); Soushieta Jagadesh (postdoc); Jacqueline Kolb (administrative assistant); Nicola Low (head of research group); Julien Riou (postdoc)

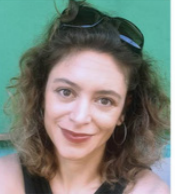


**Proportion of asymptomatic SARS-CoV-2 infections: a living systematic review**

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**Meet our review team**

























## Selected publications

Ashcroft P, Lehtinen S, Angst DC, **Low N**, Bonhoeffer S. [Quantifying the impact of quarantine duration on COVID-19 transmission](#). *Elife*. 2021;10:e63704.

Ipekci AM, **Buitrago-Garcia D**, Meili KW, Krauer F, Prajapati N, Thapa S, Wildisen L, Araujo-Chaveron L, Baumann L, Shah S, Whiteley T, Solis-Garcia G, Tsotra F, Zhelyazkov I, Imeri H, **Low N**, Counotte MJ. [Outbreaks of publications about emerging infectious diseases: the case of SARS-CoV-2 and Zika virus](#). *BMC Med Res Methodol*. 2021;21(1):50.

Richard A, Wisniak A, Perez-Saez J, Garrison-Desany H, Petrovic D, Piumatti G, Baysson H, Picazio A, Pennacchio F, De Ridder D, Chappuis F, Vuilleumier N, **Low N**, Hurst S, Eckerle I, Flahault A, Kaiser L, Azman AS, Guessous I, Stringhini S for the SEROCOVID-POP study group. [Seroprevalence of anti-SARS-CoV-2 IgG antibodies, risk factors for infection and associated symptoms in Geneva, Switzerland: a population-based study](#). *Scand J Public Health* 2021:14034948211048050.

**Riou J, Panczak R, Althaus CL**, Junker C, Perisa D, Schneider K, Criscuolo NG, **Low N**, **Egger M**. [Socioeconomic position and the COVID-19 care cascade from testing to mortality in Switzerland: a population-based analysis](#). *Lancet Public Health*. 2021;6(9):e683–e691.

Vallely LM, Egli-Gany D, Wand H, Pomat WS, Homer CSE, Guy R, Silver B, Rumbold AR, Kaldor JM, Vallely AJ, **Low N**. [Adverse pregnancy and neonatal outcomes associated with \*Neisseria gonorrhoeae\*: systematic review and meta-analysis](#). *Sex Transm Infect*. 2021;97(2):104–11.

## Social Environment

*Innovative contributions to theory and data in social inequality and health research. The research group closed in December 2021.*

### Key scientific activities

Theory and measurement development, mostly in the areas of social determinants of health, cultural capital and health, health literacy, and health care utilization. We focused on studies about the social determinants and consequences of the ongoing coronavirus pandemic.

### Key academic activities

**Teaching:** internal and external teaching.

**Scientific talks and presentations:** keynotes at major conferences.

**Outreach and representation:** research evaluation and assessment, advisory boards, and public health consultancy services. Implementation of the new professorship for community health and health care systems at the Institute of Social and Preventive Medicine. WHO urban governance for health and wellbeing steering board.

### Grants

**World Health Organization:** Research component of WHO special initiative on urban governance for health, equity, wellbeing. (CHF 71,920; PI: Annika Frahsa, co-PIs: Thomas Abel and Oscar Franco; 2021).

### Internal and external collaborations

Geneva and Zug, Switzerland (Young Adult Survey Switzerland [YASS] consortium); WHO special initiative on urban governance for health and wellbeing; Vancouver, Canada (cultural capital); Atlanta, USA (Oxford Bibliographies in Public Health); and Helsinki and Jyväskylä, Finland (capabilities and health).

### Key team members

Thomas Abel (head of research group); Richard Benkert (research assistant); Sophie Meyer (PhD student).



Thomas Abel



Richard Benkert



Sophie Meyer

## SwissRDL – Medical Registries and Data Linkage

### Selected publications

**Abel T, Benkert R.** “It is complex”: perception of uncertainty and inequality issues in the COVID-19 crisis. Results from a survey among university students in Switzerland [research note]. *SGS Bulletin*. 2020;157:7–13.

**Benkert R., Abel T.** *Kritische Gesundheitskompetenz: eine kritisch-konstruktive Bestandsaufnahme*. In: K. Rathmann, K. Dadaczynski, M. Messer, O. Okan, editors. *Gesundheitskompetenz*, Berlin/Heidelberg; Springer; 2021. p. 1–10.

Heinrichs K, **Abel T**, Matos Fialho PM, Pischke CR, Busse H, Wendt C, Stock C. *Critical Health Literacy in a Pandemic: A Cluster Analysis Among German University Students*. *Int J Public Health*. 2021;66:1604210.

Rüegg R, **Abel T**. *Challenging the association between health literacy and health: the role of conversion factors*. *Health Promot Int*. 2021:1–11.

Van de Velde S, Buffel V, van der Heijde C, Coksan S, Bracke P, **Abel T**, Busse H, Zeeb H, Rabiee-Khan F, Stathopoulou T, Van Hal G, Ladner J, Tavolacci M, Tholen R, Wouters E, consortium CI. *Depressive symptoms in higher education students during the first wave of the COVID-19 pandemic. An examination of the association with various social risk factors across multiple high- and middle-income countries*. *SSM Popul Health*. 2021;16:100936.

*SwissRDL is a research and service unit offering support for medical registries. Our work includes planning, setting-up, operating, and maintaining small regional, national, and international medical registries. To ensure high data quality, we offer support through monitoring visits and central data monitoring. Registry success is shown in detailed reports, statistical analyses, and publications.*



### Key objectives

In collaboration with external partners, such as medical associations and foundations, SwissRDL develops, implements, operates, and maintains national and international medical registries and multi-center outcome studies. We ensure high quality, secure data in our center by applying strict validation rules, monitoring data regularly, and monitoring on site.

The SwissRDL support team offers help for registry issues and data entry by phone, email, and webinars, and they are in contact with more than 180 hospitals in Switzerland. SwissRDL also develops and offers full range support for Patient Recorded Outcome Measures (PROMs) on tablets and websites. A team of statisticians and project managers create regular high-quality reports for the registries, such as quarterly reports for hospitals, annual scientific reports, operator-specific reports, implant reports for industry, and summaries for the public.

Another core area of SwissRDL excellence is data linkage. Our longstanding experience building large cohorts – where data are linked using probabilistic record linkage methodology – led to our expertise linking data where no unique identifier is available (and simple merging is not possible). We also developed and applied privacy-preserving methods for record linkage. Record linkage procedures are also applied for registry data to link with federal mortality data.

### Key scientific activities

SwissRDL creates high quality scientific reports, such as the report of the national hip and knee registry ([www.siris-implant.ch](http://www.siris-implant.ch)). Additionally, we produce benchmark reports for clinics, which allow comparison of core outcomes between hospitals using funnel plots. For medical device suppliers, we offer implant reports for specified products. Furthermore, our data managers and statisticians analyze data for scientific publications and posters.

We support national and international projects with our expertise in record linkage, and we participate in several research projects analyzing registry data and supporting the linkage of additional data. For example, SwissRDL has been involved in several data linkage projects in Africa, such as one linking HIV data with cancer registry data.

We have developed a comprehensive implant library which allows identifying and categorizing implants, such as hip and knee. SwissRDL also supports barcode scanner-based data entry and web services for direct data transfer from hospitals.

Due to the pandemic, SwissRDL reduced on-site monitoring visits. Instead, we invested resources into central data monitoring and data management. Since most operations in clinics were limited, some clinicians found time to check their operation forms, complete missing information, or contact SwissRDL for further support. Therefore, the pandemic helped improve the quality of some registries (e.g., orthopaedics), yet challenged colleagues in disciplines directly affected by the crisis.



### **Key academic activities**

**Teaching:** Adrian Spörri regularly teaches undergraduate and postgraduate students about medical statistical software, medical registries, and probabilistic record linkage methodology at the University of Bern and for international partner organizations. Christian Brand is involved in undergraduate teaching of biostatistics.

**Conferences and events:** We participate in International Society of Arthroplasty Registries meetings and conferences.

**Outreach and representation:** Through implant registries, we are in touch with medical device suppliers and offer scientific support for reports and studies. We are members of expert committees for the Swiss National Association for Quality Development in Hospitals and Clinics.

### **Grants**

**Swiss National Science Foundation.** The Swiss Pediatric Hematology/Oncology Metabank – a network for precision medicine research. (2019–2021).

**Bundesamt für Gesundheit/Federal Office of Public Health.** Schweizerisches Register für seltene Erkrankungen/Swiss Registry for Rare Diseases. (2020–2024).

### **Internal and external collaborations**

Within Switzerland, SwissRDL supports researchers at University Hospital of Bern, Inselspital to create and operate medical registries.

Additionally, we collaborate with medical associations and foundations to operate their registries, such as the SIRIS foundation ([www.siris-implant.ch](http://www.siris-implant.ch)) and their national hip and knee implant registry with more than 150 hospitals and Swissnoso ([www.swissnoso.ch](http://www.swissnoso.ch)) for surgical site infections with more than 170 hospitals delivering data to SwissRDL.

We also collaborate with the Swiss National Association for Quality Development in Hospitals and Clinics (<https://www.anq.ch/en/>). Supporting data management and reporting for more than 100 Spitex organizations, SwissRDL oversees the Home Care Data platform from Spitex Schweiz ([www.spitex.ch](http://www.spitex.ch)).

Outside of Switzerland, we are in close contact with international registry providers, such as the National Joint Registry, UK and the Endoprothesenregister Deutschland, Germany.

### **Key team members**

Lilianna Bolliger (project manager); Andreas Boss (project manager); Christian Brand (statistician); Martin Drees (software programmer); Stefanie Paerschke (administration); Kurt Schmidlin (research fellow); Adrian Spörri (head of SwissRDL).

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