

Strategic plan for the Strategic Research Area (SRA) "Epidemiology for Health" (EpiHealth) during the period 2020-2025

The current **5-year strategic plan** is based on the previous plan for the years **2017-2021**, endorsed by the Board of SRA EpiHealth in accordance with the minutes of the board meeting on January 26, 2017. The basis of this strategic research plan is to a large extent consistent with the previous research plan for the period 2010-2019.

SRA EpiHealth today and where the environment stands within 10 years

Epidemiology for Health (EpiHealth) is a strategic research area (SRA) at Lund University, which in collaboration with Uppsala University aims to achieve and maintain national and international excellence in the epidemiological research field. The intention is to further develop existing resources in national and international collaboration within the three main areas that SRA EpiHealth operates. The first area covers (a) the *basic epidemiological research* ("basic epidemiology") which aims to clarify the causal links for disease and ill health in the population based on the influence of genetic and environmental factors, and in the interaction between them. This also affects the influence of epigenetic factors ("imprinting") and exposure to stress factors in people's lifestyle, social conditions and external environment, and to what extent they can interact with genetic factors, e.g. regarding genetics, diet and microbiota patterns. Particularly vulnerable groups are children and the elderly, and within 10 years the 80+ year group will increase from 500,000 to 800,000 people. Large knowledge gaps exist regarding the causal risk conditions for the group of multi-ill frail elderly people. Secondly, EpiHealth intends to (b) develop necessary *infrastructures* for epidemiological research, including: national biobanks, research databases and human resources (biostatistics, informatics, pedagogy). This can be done locally at LU and UU, e.g. through support for ongoing cohort surveys and existing metadata databases, development of meta-data databases and also in the form of collaboration with other national biobanks (i.e. the UK biobank), and the recently started network between Swedish cohort studies (<http://www.near-aging.se/>) which includes 15 cohort studies and approx. 200,000 people over the age of 60. The development of omics represents a new research front where greater complexity increases the need for sub-classification of diseases, family studies and well-defined replication studies. Lifestyle changes over time and multimorbidity place demands on longitudinal studies. The third leg of EpiHealth is about (c) *clinical epidemiology*, which is a broad research field containing components of patient-related epidemiological research (quality records, treatment research, and prognosis of clinical events), but also the development of computerized medical surveillance systems for epidemiological information (primary care and outpatient care), as well as health economic analyses. An important sub-area is to build collaboration with the new patient administration systems that are under development in, among other things. Region Skåne (named

SDV), Västra Götaland and Stockholm regions. These allow monitoring of preventive measures, risk factors and the course of chronic diseases, and the access to biobanks with samples from the population to monitor changes over time, such as seropositivity for defined infectious agents (e.g. within maternal health care biobanks) and environmental exposures. Technical linkage with mobile phones allows for a new type of information retrieval with geodata that can be integrated with cohort studies.

The activities within SRA EpiHealth are not limited to the traditional medical field because epidemiological methods are widely used in other scientific fields as well. Examples of this, where collaboration with SRA EpiHealth is developed, are *economics* (with health economics, economic demographics and economic history, e.g. regarding demographic transition and historical trends in the disease panoramas), *technology* (with research on environmental exposures and development of IT support) and *sociology* (both social risk factors for ill health and health-promoting salutogenic factors). Of great importance to SRA EpiHealth is to develop contacts with the surrounding community. Examples of this are close contacts with the University of Jönköping (Institute of gerontology with twin studies and cognitive epidemiology) and strengthened contacts with epidemiological researchers at the Karolinska Institute (e.g. LifeGene, Swedish Snus Collaboration, NEAR National e-infrastructure for research on aging) and Umeå (ex. Västerbotten project, MONICA). It may also include contacts with *companies* (including Astrazeneca Ltd., biotechnology companies), *authorities* (the National Board of Health, Statistics Sweden; Swedish Communes and Regions), *regional health officials* (Region Skåne, Region Uppsala) and *other universities*, BIS biobanks in Sweden (biobanksverige.se), as well as the SciLife lab. Within the framework of quality registers, there is ongoing collaboration with the register centre in Gothenburg (ex. The National Diabetes Register) and with the Swedish National Data Service (SND) at the University of Gothenburg. To this is added a large number of international contacts in the Nordic countries, Europe, as well as in the USA, for example with the Broad Institute, Boston; Stanford University; and the Framingham Heart Study. We also want to deepen collaboration with other SRA's at LU, especially with. EXODIAB (diabetes epidemiology, involving mutual representation of board members), BIOCARE / LU Cancer (cancer epidemiology) and MULTIPARK (neuroepidemiology) and to develop collaboration with e.g. Center for Medical Epidemiology and Biostatistics (MEB), Karolinska Institute, and the Faculty of Dentistry, Malmö University.

Measures and objectives to maintain and strengthen the research environment

Against this background, SRA EpiHealth has formulated the following five strategic objectives for its operations:

1. The pursuit of *long-term scientific excellence* in the field of epidemiological research. This should be manifested in prominent research projects leading to the benefit of the population and to

publications in highly ranked international journals. We intend to strengthen the cooperation to better utilize existing biobanks, registers and human resources, among other things through collaboration across faculty and university boundaries. Researchers affiliated with SRA EpiHealth are invited to state their participation/membership in SRA EpiHealth within the framework of applications to granting authorities and institutions, and to state this under "Acknowledgments" in publications.

Objective: to be able to present at least 10 publications annually in high-ranking scientific journals, where EpiHealth's employees and materials appear, and in collaboration between LU and UU.

Furthermore, we want to deepen the previous profile areas of *reproductive epidemiology* as well as *genetics-nutritional epidemiology* where investments are made in the areas of basic and clinical epidemiology, but also to develop new profile areas in the *health and mental health of the elderly*. The intention is to do this in line with Sustainable Development Goals 2030 (SDG2030) sub-objective 3 on sustainable development of health and well-being.

2. *Strategic investments* in new materials and methods, as well as making visible and available existing computer resources for epidemiological research. This refers to the continued development of entirely new population-based research cohorts with associated biobanks. The prime example of this is the elaborated *screening cohort* of middle-aged and older people (n = 25,000) to identify predictors of healthy aging (the EpiHealth-Elderly cohort, www.epihealth.se), as evidenced by the original application that led to a decision on support for start of SRA EpiHealth. The work to deepen this study is ongoing with supplementary analyses regarding proteomics, genomics and registry linkages (2020/2021). Another way to make the cohort visible is to add metadata to the open source Maelstrom directory. To date, 25 publications have been based on the EpiHealth-Elderly database and 27 projects have been granted data samples to 19 different researchers [1-5]. Objective: Within 2 years to have at least 10 applications from new research projects using data from the cohort, and also to obtain co-publications based on the second large contemporary population-based cohort, LifeGene (www.lifegene.se) at the Karolinska Institute.

3. Development of *knowledge and human resources*. We intend to continue to develop and support various forms of knowledge transfer and information based on IT solutions (web-site, e-learning) and a range of courses and seminars in advanced epidemiology in collaboration with the doctoral PhD programs at the medical faculties at LU and UU. These courses are given alternately in Lund-Malmö and in Uppsala. The intention is to offer excellence courses for post-docs and senior researchers as well as courses at the master's level. SRA EpiHealth can promote renewal by strengthening networks and creating meeting places for researchers, such as the Epihub in Uppsala as a bridge between preclinical- and clinical research, as well as epidemiological methodology. We also intend to support the development of young researchers and to have a special priority for female researchers. In addition, we wish to strengthen the content of basic education about epidemiology and its methods for meeting the need of new recruitments. Objectives: (a) to conduct at least one research meeting (spring) annually in connection with the annual seminar for all members during the 5-year period, as well as a

course in advanced epidemiology (autumn); (b) increasing the proportion of female researchers in epidemiology and promoting the development and independence of young researchers with epidemiological orientations, so that the distribution of 50% of female researchers of today can be maintained within SRA EpiHealth; (c) increasing the competence of the SRA EpiHealth coordinators and their collaboration with the LU management; and finally (d) to strengthen the position of epidemiology in both undergraduate education (in collaboration with the Faculty of medicine) and in the postgraduate education.

4. Of particular importance is to develop *collaboration and information with the surrounding community*, with authorities, companies, organizations and institutions, such as Health Technology Assessment, SBU, and Cochrane, but also with the public to popularize findings in epidemiological research that should be presented in a balanced manner and a non-alarmist way to maintaining trust in the research. For this purpose, we intend to continuously develop contacts with the media (TV, radio, press, IT) and to carry out an initiative every year aimed at representatives of the surrounding community for information and discussion about collaboration. Objective: To conduct an annual campaign / collaboration day aimed at the surrounding community and to facilitate continuous media reporting of activities and research results emanating from SRA EpiHealth.

5. We intend to develop our *governance forms*, as well as systems for internal feedback. SRA EpiHealth differs from other strategic research areas by its transboundary nature as epidemiological research is represented in many different scientific disciplines and institutions. For outsiders, epidemiology may be most helpful as an auxiliary science, but our area is also in need of its own in-house method development. All this must be led in forms that are effective, but also characterized by democracy, participation and enthusiasm for the tasks. Not least, it is important to find forms for faculty-wide initiatives and to support applications for granting of additional funding and other resources (services, infrastructures) that benefit SRA EpiHealth. Objective: To have at least three telephone meetings annually for Board members of SRA EpiHealth (14 representatives from Lund and Uppsala University), and to develop a research network where Board members meet with other members of SRA EpiHealth when an open discussion is held about EpiHealth's focus and experiences. A smaller steering group (4 people) leads the work in between full Board meetings. In order to increase internal democracy, our goal is to continue to develop our website (<https://www.epihealth.lu.se/>) as an information channel and organizer of the business.

Summary

The strategic research area (SRA) EpiHealth has been operating for ten years (2010-2019), and during this time has already started, planned or implemented a number of activities (web-site, research institute, new governance, course activities, seminars, the screening cohort, and outreach for collaboration) and investigations aimed at strengthening the infrastructure and opportunities for registry-based research locally and nationally. In addition, SRA EpiHealth has gained national

attention (including collaboration with LifeGene). Finally, SRA EpiHealth is represented in international collaboration (EU networks, EU projects, and through bilateral or multilateral research networks, e.g. Broad Institute, Framingham and Stanford in the US, as well as with Cambridge and Oxford Universities in the UK). All in all, this provides very good conditions for the goals set in this new strategic plan 2020-2025 to be met. However, three essential factors must exist in order for the plan to be followed in accordance with the intentions described here. *Firstly*, the management structure must be developed with IT support and the development of good infrastructures (biobanks, registers, services); *secondly*, more financial resources must be provided locally, regionally, but most importantly nationally and internationally, as resources so far cannot suffice for the commitments that SRA EpiHealth strives for in accordance with the intentions of the 2008 Research Bill on strategic research areas that laid the foundation for the SRA initiative. *Thirdly*, collaboration must be developed with the management of Lund and Uppsala universities, with national governing bodies and with granting authorities. In the very long perspective (20-30 years), SRA EpiHealth intends to be able to contribute to the expansion of research and collaboration on a national scale to promote national resource utilization of biobanks (biobanksverige.se) and registers (COHORTS.se) as well as metadata databases (www.near-aging.se). An important step on the road is to coordinate activities and compiling data from the EpiHealth's screening cohort [1-5], LifeGene, and other national initiatives of similar type (The Swedish Heart and Lung Foundation screening cohort SCAPIS, Swedish National Study on Aging and Care, SNAC) based on information about individuals (lifestyle, social conditions, biomedical data), environmental exposures and register data (mainly Statistics Sweden and the National Board of Health and Welfare). The long-term and overall goal will be to develop, through new knowledge, methods to promote better health for the Swedish population, resulting in successful aging characterized by health, social participation and access to equal health care. These experiences and knowledge can also be of value from a global perspective to promote global health and follow the evolution of the medical transition in developing countries - from a disease panorama characterized by infections and poverty to one dominated by chronic diseases (cardiovascular, cancer, mental illness). . Epidemiological knowledge can form the basis for the development of preventative strategies at the individual, group and community level aimed at improving public health in a *life-course perspective*. Our work is being developed in line with SDG2030, reflecting sub-objective 3 on “*Health and Welfare*”, which is in common to several of the SRA’s that are led by LU.

Management

Directors for SRA EpiHealth, appointed by the Vice Chancellor of LU for the period 2020-2022: *Sölve Elmståhl*, professor, coordinator LU, *Marju Orho-Melander*, professor, assistant coordinator, LU, and with contact person for Uppsala University: *Lars Lind*, professor, UU

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References

1. Lind L, Elmståhl S, Bergman E, Englund M, Lindberg E, Michaelsson K, Nilsson PM, Sundström J. EpiHealth: a large population-based cohort study for investigation of gene-lifestyle interactions in the pathogenesis of common diseases. *Eur J Epidemiol*. 2013; 28(2):189-97.
2. Ohlsson B, Manjer J. Physical inactivity during leisure time and irregular meals are associated with functional gastrointestinal complaints in middle-aged and elder subjects. *Scand J Gastroenterol*. 2016; 51(11):1299-307.
3. Titova OE, Lindberg E, Elmståhl S, Lind L, Schiöth HB, Benedict C. Association between shift work history and performance on the trail making test in middle-aged and elderly humans: the EpiHealth study. *Neurobiol Aging*. 2016; 45:23-9.
4. Beijer K, Nowak C, Sundström J, Ärnlöv J, Fall T, Lind L. In search of causal pathways in diabetes: a study using proteomics and genotyping data from a cross-sectional study. *Diabetologia*. 2019; 62(11):1998-2006.
5. Lind L, Elmståhl S, Ingelsson E. Cardiometabolic proteins associated with metabolic syndrome. *Metab Syndr Relat Disord*. 2019; 17(5):272-279.