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Strategic plan for the strategic research area (SRA) "*Epidemiology for Health*" (EpiHealth) for the period 2020-2025

This **strategic 5-year plan** is based on the previous plan for the years **2017-2021** adopted by the board of SRA EpiHealth according to the minutes of the board meeting on January 26, 2017. The basics of this strategic research plan largely correspond to the previous research plan for the period 2010-2019.

SRA EpiHealth today and where the environment is within the next 10 years

Epidemiology for Health (EpiHealth) is a strategic research area (SRA) at Lund University, which aims to achieve and maintain national and international excellence in the field of epidemiological research in collaboration with Uppsala University. The intention is to further develop existing resources in national and international collaboration within the three main areas in which SRA EpiHealth operates. The first area covers (a) *basic epidemiological research*, which aims to clarify the causal relationship between disease and ill health in the population based on the influence of genetic and environmental factors, and the interaction between them. This also concerns the influence of epigenetic factors ("imprinting") as well as the exposure of stressors in human lifestyle, social conditions and the external environment, and the extent to which these 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 group 80 years and older will increase from 500,000 to 800,000 people. There are large knowledge gaps around the causal relationship for the group of multi-sick fragile elderly people. Secondly, EpiHealth intends to (b) expand the necessary *infrastructures* for epidemiological research, e.g. concerning 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 studies and existing metadatabases, development of metadatabases and also in the form of collaboration with other national biobanks (UK biobank), and the recently started network between Swedish cohort studies (www.near-aging.se) which includes 15 cohort studies and approx. 200,000 people over the age of 60. Development of omics constitutes a new research front where a greater complexity increases the need for subgrouping 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 deals with (c) *clinical epidemiology* ("clinical epidemiology"), which is a broad field of research containing components of patient-centered epidemiological research (quality registers, treatment research, and prognosis of clinical processes), but also the development of computerized medical records systems for epidemiological information (primary care and inpatient care) as well as health economic analyzes. An important sub-area is to build up collaboration with the new patient administration systems that are under construction in e.g. Region Skåne (SDV), Västra Götaland and Stockholm. These allow monitoring

and follow-up of preventive measures, risk factors and the course of chronic diseases as well as access to biobanks with samples from the population to monitor changes over time, such as seropositivity for defined infectious agents (e.g. in maternal health biobanks) and environmental exposures. Connection with mobile phones provides the opportunity 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, as epidemiological methods are also widely used in other scientific fields. Examples of this, where collaboration with EpiHealth is developed, are *economics* (with health economics, economics, economic demography and economic history, e.g. regarding demographic transition and historical trends in disease panoramas), *technology* (with research on environmental exposures and development of IT support) and *sociology* (both social risk factors for ill health and health factors). It is of particular importance to EpiHealth to develop contacts with the surrounding community. Examples of this are close contacts with Jönköping University (Institute for Gerontology with Twin Studies and Cognitive Epidemiology) and strengthened contacts with epidemiological researchers at Karolinska Institutet (e.g. LifeGene, Swedish Snus Collaboration, NEAR National e-infrastructure for research on aging) and Umeå (e.g. Västerbotten project, MONICA). It can also be about contacts with *companies* (including Astrazeneca, biotechnology companies), *authorities* (National Board of Health and Welfare, Statistics Sweden; Statistics Sweden, SKL), *regional health authorities* (Region Skåne, Region Uppsala) and *other colleges and universities*, BIS biobanks in Sweden (biobanksverige.se), and SciLife lab. Within the framework of quality registers, there is collaboration with the register center in Gothenburg (e.g. the National Diabetes Register) and with the Swedish National Data Service (SND) at the University of Gothenburg. In addition, there are a large number of international contacts in the Nordic countries, Europe, and in the USA, e.g. with the Broad Institute, Boston, Stanford University and Framingham. We also want deeper collaborations with other SRAs at LU, especially EXODIAB (diabetes epidemiology, and with mutual board representation), BIOCARE / LU Cancer (cancer epidemiology) and MULTIPARK (neuroepidemiology) and develop collaborations with e.g. the Center for Pharmaceutical Epidemiology and the Faculty of Dentistry, Malmö University.

Measures and goals to maintain and strengthen the research environment

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

1. Striving for *long-term scientific excellence* in the field of epidemiological research. It must be possible to manifest this in prominent research projects leading to the benefit of the population as well as to publications in highly ranked international journals. We intend to strengthen the collaboration in order to be able to make better use of existing biobanks, registers and human resources, e.g. through collaboration across faculty and university boundaries. Researchers affiliated with SRA EpiHealth are

encouraged to indicate their participation in EpiHealth within the framework of applications to granting authorities and institutions and to state this under "Acknowledgments" for publications.

Goal: to be able to annually present at least 10 publications in highly ranked scientific journals where EpiHealth's employees and materials appear, as well as in collaboration between LU and UU.

Furthermore, we want to deepen the previous profile areas *reproductive epidemiology* and *genetics-nutrition epidemiology* where investments are made in the areas of basic and clinical epidemiology and develop new profile areas within *senior health and mental illness*. The intention is to do this in accordance with SDG2030 sub-goal 3 on sustainable development of health and well-being.

2. Strategic investments in new materials and methods as well as making existing data resources for epidemiological research visible and available. This refers to the continued construction of completely new population-based research cohorts with associated biobanks. The prime example of this is the prepared *screening cohort* of middle-aged and elderly people (n = 25,000) to identify predictors of healthy aging (EpiHealth-Elderly, www.epihealth.se), something that emerged from the original application that led to decisions on support for building by SRA EpiHealth. The work to deepen this study is ongoing with supplementary analyzes regarding proteomics, genomics and register data (2019/2020). 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 extraction to 19 different researchers [1-5]. Goal: to have at least 10 applications from new research projects using data from the cohort within 2 years, and to produce co-publications based on the other population cohort LifeGene (www.lifegene.se) at Karolinska Institutet.

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 page, e-learning) as well as a range of courses and seminars in advanced epidemiology in collaboration with the PhD programs within the medical faculties at LU and UU, which are given alternately in Lund-Malmö and in Uppsala. The intention is to offer excellence courses in the field for post-docs and senior researchers and to work for courses at master's level. EpiHealth can work for a renewal by strengthening networks and meeting places for researchers, for example Epihubben in Uppsala and as a bridge between preclinical, clinical research and epidemiological methodology. We also intend to support the development of young researchers and have a special priority for female researchers. In addition, we want to strengthen the content of basic education about epidemiology and its methods for satisfying new recruitment. Goal: (a) to conduct at least one researcher meeting annually (in the spring) in connection with the annual boarding school, as well as a course in advanced epidemiology (autumn); (b) to increase the proportion of female researchers in epidemiology and to promote the development and independence of young researchers with an epidemiological focus, so that the distribution of 50% of female researchers today can be maintained within SRA EpiHealth; (c) to

increase the competence of the coordinators of SRA EpiHealth 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 postgraduate education.

4. Of particular importance is the *development of collaboration and information with the surrounding society*, with authorities, companies, organizations, and institutions, such as HTA, SBU, Cochrane, but also with the public to popularize findings in epidemiological research which should be presented in balanced and non-alarmist ways to maintain confidence in research. For this purpose, we intend to continuously develop contacts with the media (TV, radio, press, IT) and to implement an initiative each year aimed at representatives of the surrounding society for information and discussion about collaboration. Goal: to annually carry out a campaign / collaboration day with the surrounding community and get a continuous media reporting of activities and research results emanating from SRA EpiHealth.

5. We intend to develop our ways of working including control forms and systems for internal feedback. SRA EpiHealth differs from other strategic research areas by its cross-border nature as epidemiological research is represented in many different scientific disciplines and institutions. To outsiders, epidemiology can be seen as an auxiliary science, but our area is also in need of its own interdisciplinary method development. All of this must be managed in forms that are both effective, but also characterized by democracy, participation, and enthusiasm for the tasks. Not least, it is important to find forms for cross-faculty initiatives and to support applications for the granting of additional financial resources and other resources (services, infrastructure) that benefit SRA EpiHealth. Goal: to have at least 3 telephone meetings annually in the collaboration board for EpiHealth (14 representatives from Lund and Uppsala universities), and a research boarding school where the board members meet each other, and other people connected to SRA EpiHealth when an open discussion is held about EpiHealth's focus and experiences. A small steering group (4 people) leads the work in between. To increase internal democracy, the goal for our website (<https://www.epihealth.lu.se/>) is to continue developing it as an information channel and organizer of the business.

Summary

So far, the Strategic Research Area (SRA) EpiHealth has operated for ten years (2010-2019), and during this time it has already started, planned, and completed several activities (web page, research boarding school, new forms of governance, course activities, seminars, screening cohorts, participation in investigations with the aim of strengthening infrastructure and opportunities for register research locally and nationally). In addition, EpiHealth has attracted attention in national contexts (including collaboration with LifeGene). Finally, EpiHealth is

Engaging in international cooperation (EU networks, EU projects, and through bilateral or multilateral research networks, e.g. Broad Institute, Framingham and Stanford in the USA, as well as with Cambridge and Oxford in the UK). All in all, this provides very good conditions for fulfilling the goals in this new strategic plan 2020-2025. However, three essential factors must exist so that the plan can be followed according to the intentions described here. First, the management structure must be developed with IT support and the expansion of good infrastructures (biobanks, registers, services), secondly, more financial resources must be provided locally, regionally, and above all nationally and internationally because existing resources may not be sufficient for the commitments that EpiHealth strives for according to the intentions in the Research Bill 2008 on strategic research areas that laid the basis for the SFO investment. 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 term (20-30 years), EpiHealth intends to be able to contribute to the expansion of research and collaboration on a national scale to promote national resource utilization in the form of biobanks (biobanksverige.se) and registers (COHORTS.se) and metadatabases (www.near-aging.se). An important step along the way is to coordinate activities and ensure a compilation of data from EpiHealth's screening cohort [1-5], LifeGene, as well as other national initiatives of a similar nature (Hjärt- och Lungfondens screening cohort SCAPIS, Swedish National study on Aging and Care, SNAC) which is 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 methods through new knowledge to promote improved health in the Swedish population resulting in an aging characterized by health, social participation, and access to equal health care. These experiences and knowledge can also be of value from a global point of view to promote global health and follow the development of the medical transition in developing countries from a disease panorama characterized by infections and poverty to one with dominance of the chronic public diseases (cardiovascular, cancer, mental illness). Epidemiological knowledge can form the basis for the development of preventive strategies at individual, group and societal level aimed at improving public health in a life-cycle perspective. Our work is developed in accordance with SDG2030, above all sub-goal 3 on "Health and Welfare", which is common to several the SFOs led via LU.

Management

Coordinators SRA EpiHealth, appointed by Vice Chancellor, 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

Contact information: solve.elmstahl@med.lu.se telephone 040 -39 13 20, 0708-53 86 45

Website: <https://www.epihealth.lu.se/> and <https://www.epihealth.lu.se/en> (web editor Miriam Sjö Dahl
Jakobsen: miriam.sjodahl_jakobsen@med.lu.se).

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, Ärnlov 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 Aug 24. doi: 10.1007/s00125-019-4960-8. [Epub ahead of print]
5. Lind L, Elmståhl S, Ingelsson E. Cardiometabolic proteins associated with metabolic syndrome. *Metab Syndr Relat Disord*. 2019 Jun;17(5):272-279. doi: 10.1089/met.2018.0123. Epub 2019 Mar 18