KNOWLEDGE VALORIZATION

The aim of this thesis was to investigate the role of modifiable risk and protective factors of dementia in the general population. This valorization paragraph addresses the societal relevance and implementation opportunities of the results described in this thesis.

Mrs. Robinson is a 50 year old woman, slightly overweight and a heavy smoker, who lives together with her husband in one of the suburbs of Maastricht. After a visit to her 90-year old aunt who suffers from dementia, she wonders about her own dementia risk. She realizes that her lifestyle is not that healthy and could potentially lead to cardiovascular problems, but she wonders whether there is also a relation between lifestyle and dementia risk. She makes an appointment with her general practitioner to discuss this issue.

Societal relevance

The steady increase in dementia incidence is one of the core challenges facing our aging society. Estimations show that the number of people living with dementia will double in the next 15 years and may even triple in the coming 35 years. Additionally, the costs associated with dementia are predicted to only rise further in the coming decades. If the global societal economic costs of dementia were the expenditure of a country, it would be comparable with a ranking in the 20 largest economies in the world. Next to societal costs, the impact on the quality of life of the person with dementia and their caregivers, families and friends are immense. For these reasons, the World Health Organization (WHO) made dementia a global public health priority.

Identification of risk and protective factors of dementia is of importance since there are no curable treatments for dementia at present. It is shown that targeting modifiable risk factors will potentially decrease the risk of dementia or delay its onset. Surveys in the United Kingdom and Australia among the general public have shown that most people are unaware that there is an association between modifiable risk and protective factors and dementia. The general idea is that there is nothing that one can do to decrease one’s own dementia risk. This seems to be a misconception based on the findings of recent studies. Seven modifiable risk factors (e.g. diabetes, midlife hypertension, midlife obesity, smoking, depression, low educational attainment and physical inactivity) are responsible for around 30% (9.6 million cases) of all dementia cases worldwide. Estimations show that a 10% reduction per decade in the prevalence of these seven modifiable risk factors could eventually lead to a reduction of the global prevalence of dementia of 8.3% in 2050 (8.8 million cases). Likewise, delaying the onset of dementia by 5 years would lead to reduce
the number of cases by a third and alleviate economic costs by 36%. In other words, there is a huge potential for dementia prevention.

Studies in this thesis identified (new) risk factors that can be used in dementia prevention programs. Additionally, more systematic evidence was provided for some risk factors for which more research was needed. Furthermore, findings in this thesis confirm that individuals with multiple health and lifestyle-related risk factors have an increased risk of dementia.

**Target groups**

The findings described in this thesis are relevant for the general public (and more specifically individuals at high risk for dementia), health care professionals, public health advocates, researchers and policy makers.

Our results are relevant for all people who are interested to know how they could reduce their own dementia risk. More specifically, persons at high risk (e.g. presence of more health and lifestyle related risk factors) of dementia could benefit most from these findings by making suitable lifestyle adjustments. Targeting risk factors in an early phase (e.g. midlife) is probably more feasible and most effective since this will decrease the duration of exposure to risk factors and its accumulated effects on the brain. Health care professionals (e.g. general practitioners, practice nurses) could also benefit from this knowledge since the link between modifiable risk factors and dementia risk is not generally known. Based on a patient’s risk factor profile they could give tailored lifestyle advice. This could eventually lead to substantial cost-reductions due to a reduction in the number of medical consultations and improved management of chronic disease like diabetes, stroke, coronary heart disease, obesity, depression and renal dysfunction.

The products emerging from this thesis as described below are relevant for researchers in the field of dementia prevention and dementia epidemiology. These can be useful for participant selection/risk stratification (who benefits most from prevention) and as intermediate outcome measurement (change in dementia risk score) in intervention studies. Policy makers must become aware that early identification and targeting of risk factors is important to decrease future dementia risk. Future public health campaigns have to incorporate the findings of this thesis into their messages.

**Products**

Based on the studies in this thesis, the ‘Lifestyle for BRAin Health (LIBRA)’ score was developed, an instrument that assesses an individual’s potential for dementia prevention. This multifactorial environmental risk tool consists of twelve modifiable risk and
protective factors that can be addressed by making lifestyle changes. The LIBRA score has been used as a personalized score of brain health in a European multicenter trial into dementia prevention as part of the In-MINDD (Innovative Midlife Intervention for Dementia Deterrence) project. Based on the LIBRA score, an on-line profiler and support environment was developed to calculate an individual’s dementia risk modification profile and to support access to health information and goal setting, respectively. The effects of the LIBRA score (as a proxy outcome) and online support environment has been tested in a lifestyle intervention feasibility trial in primary care across France, Ireland, the Netherlands and Scotland. The results of this trial are expected in the coming months.

Innovation
In comparison with already existing dementia risk indices LIBRA is based on evidence-based medicine and contains only modifiable risk factors instead of pre-determined risk factors like age and particular genotypes. Other risk indices are maximized for predicting who is at risk and not who benefits from prevention. Additionally, they are often developed based on a single dataset and in most cases have not been validated in external datasets. Currently, several validation studies with LIBRA are ongoing. International and national collaborations (including United States, Australia, United Kingdom, France and Sweden) have been started to investigate the predictive validity of LIBRA in large population-based datasets.

Implementation
In this thesis a strong case was made for an early start of dementia prevention. We have made the first steps to initiate a prevention campaign. The findings of this thesis will be implemented in the ‘MyBraincoach’ project that started very recently. In this project, a dementia awareness campaign will be launched in Limburg, a province in the south of the Netherlands, in collaboration with local authorities and municipal health services. The overall aim of this campaign is to communicate the message that dementia risk can be modified and that a healthy lifestyle supports long-term brain health. In tandem, an e-health application will be developed and tested to raise more public knowledge about dementia risk reduction. This e-health application can propose a personal action plan for improving individual brain health by taking into account an individual’s ‘room-for-improvement’ (based on the LIBRA score) and treatment preferences. Next, active e-coaching and local health service mapping will be implemented to attain individual goals.
Back to Mrs. Robinson. Based on the ongoing dementia awareness campaign by Maastricht University, her general practitioner became interested in the subject and asked for a copy of this thesis. He found out that his initial thoughts about the relation between lifestyle and dementia risk after years of suspicious were confirmed. He pointed her to the website of ‘MyBraincoach’, where she could discover more about her personal possibilities to improve her brain health and download an app to help her making sustainable lifestyle choices.