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DOCTORAL DISSERTATION

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Abstract

A preventive home visit (PHV) is a health intervention used to promote health and prevent risks among older persons. During the last four decades a major focus for PHVs has been on individual risk prevention. However, to create conditions for older persons to maintain or improve health, a comprehensive multilevel approach including both health promotion and risk prevention on individual and societal levels is essential. Hence, a better understanding of health-promoting aspects of the PHVs both on an individual and a societal level is needed.

Aims and methods

The overarching aim of this thesis was to develop knowledge of possible health-promoting aspects of PHVs for older persons (≥77 years old without home care) from an individual and a societal perspective. In paper **I** the aim was to determine which factors are associated with good self-rated health among older persons. In paper **II** the aim was to identify physical factors that can hinder older persons from taking part in social contexts. These papers had cross-sectional designs and utilised register data collected within a PHV project. Data was analysed with descriptive and analytic statistics. In paper **III** the aim was to explore older persons' experiences of the benefits gained from the support and advice given during the PHV. Individual interviews were performed and analysed with content analysis. In paper **IV** the aim was to get a deeper understanding of the perceptions of persons in leading positions of the usability of the information compiled during the PHVs for promoting health among older persons on a societal level. Focus group discussions were used to get an understanding of their perceptions.

Results

From the individual perspective, health can be promoted during the PHVs by identifying mental, physical and lifestyle factors, and this can turn absence of risk into an asset (**I**). In addition, from the questions asked during the PHV, hindrances to social participation could be identified, such as pain, impaired endurance, and use of a mobility device (**II**). Moreover, health can be promoted by giving support and advice during the PHV, which can be ways to empower and recognise the person (**III**). From a societal perspective the information from the PHVs could be used on a societal level as an aid in monitoring determinants of health and enabling an exchange of information (internally, externally and with older persons), which can in turn enable an inclusive society (**IV**). However, the inclusion was influenced by obstacles with interpreting and communicating the information (**IV**).

Conclusions

This thesis shows that the PHV has the potential to become a comprehensive multilevel intervention which promotes health among older persons. From an individual and a societal perspective, PHVs can enable an inclusive society, identify individual and societal assets, and prepare older persons and society for the future. At an individual level health can be promoted during the PHVs by empowering and recognising the person, discussing factors associated with good health and factors indicating the absence of risks, and considering the interrelation between physical hindrance and the ability to take part in social contexts. At a societal level, information from the PHVs can be used to enable an inclusive society by monitoring health determinants and exchanging information, and thereby taking actions which promote older persons' health.

Key words Aged, Health promotion, Home visits, House calls, Local government, Older adults, Older people, Preventive health services, Preventive home visit, Risk assessment, Risk prevention, Society

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To mum, dad, and Axel.

Table of Contents

Abbreviations and definitions of concepts

Abbreviations and definitions of concepts as they are used within this thesis.

Age-friendly society: 'Society' is defined as the environment around the person (e.g., housing, participation, infrastructure, norms, polices, and governance). 'Age-friendly' means that society considers older persons' perspectives, and is designed according to older persons' values and needs.

Ageing: Ageing is viewed as a process of change which occurs through a person's life. Changes can be both positive and negative, for example gaining wisdom, or a decline in physical functions, depending on which perspective the process assumes (e.g., biological, social, functional, or psychological). The changes happening during the ageing process are heterogeneous, irreversible, cumulative, and inevitable (Tornstam, 2011).

CI: Confidence interval

Comprehensive multilevel intervention: 'Comprehensive' refers to including both health promotion and risk prevention aspects. 'Multilevel' refers to actions taken on an individual and a societal level.

COVID-19: Coronavirus Disease 2019

Empowerment: Empowerment is almost equivalent to the concept of health promotion, and it is defined as gaining control over one's life (Zimmerman & Rappaport, 1988).

Health: Health is defined as "the ability to adapt and to self-manage" (Huber et al., 2011, p. 2).

Health intervention: A health intervention "is an act performed for, with or on behalf of a person or a population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions" (World Health Organization [WHO], 2020b, p. 6). Preventive home visit is one example of a health intervention.

Health promotion: Health promotion is defined as "the process of enabling people to increase control over, and to improve, their health" (WHO, 1986, p. 1). In addition, actions can be taken on different levels both at an individual and on a societal level to increase a person's control.

Healthy ageing: Healthy ageing is defined according to WHO's definition: "the process of developing and maintaining the functional ability that enables well-being in older age" (WHO, 2015, p. 28). Functional ability means having the capabilities to be and

do what you have reason to value. The theoretical framework for healthy ageing involves both intrinsic capacities (e.g., the ability to see, talk, walk) and environmental characteristics (e.g., relationships, policies, values, governance), which can support healthy ageing.

Individual level: 'Individual level' refers to aspects related to the person, such as actions taken with or by the person. The individual perspective represents older persons' subjective experiences.

Information from the PHVs: 'Information' refers to descriptive statistical data compiled during the preventive home visits, older persons' thoughts expressed during the visits, and the visitors' observations made during the visits.

Older persons: Older persons in focus in this thesis are persons around 77 years old without home care.

OR: Odds ratio

Persons in leading positions: Persons in leading positions refers to chairs in political health and welfare committee within the municipalities, heads of departments for health and welfare, and heads of unit for preventive home visits.

PHV: Preventive home visit. A preventive home visit is a health intervention offered to older persons with the purpose of promoting health and preventing risks (Tourigny et al., 2015).

POR: Positive odds ratio

Pre-H: The research and collaboration project 'Preventive home visits to seniors'. Within the Pre-H project municipalities offer preventive home visits to older persons without home care, with the purpose of promoting health and preventing risks. One visit is offered by a health professional (visitor) from the municipality; the visit lasts for two hours, and a dialogue is created based on a structured questionnaire; and during the dialogue support and advice are given.

Risk prevention: Risk prevention deals with risk factors (e.g., fall risk, malnutrition, cognitive decline) (Bauer et al., 2006), to reduce its occurrence, or prevent the occurrence, stop the progress and reduce the consequences of disease (WHO, 2021).

SD: Standard deviation

SDGs: Sustainable Development Goals

Social participation: Social participation is a broad concept and focuses "on the person's involvement in activities that provide interaction with others in society" (Levasseur et al., 2010, p. 7). In the present thesis, *social participation* is equivalent to

taking part in a social context, and *participation in social activities*. Therefore, these three terms are used interchangeably.

Societal level: 'Societal level' is the level which makes a public health response and deals with actions that can benefit the whole population. Action on a societal level refers to activities taken within society by persons in leading positions. The societal perspective is an overarching perspective taken by persons in leading positions at the societal level.

Support and advice: Support is defined as to encourage a person to flourish (Cambridge Dictionary, 2021b). The concept is inspired by social support, meaning assistance or protection given by another person. Support can have emotional characteristics such as empathy, trust, and value or instrumental characteristics such as offering service or tangible goods (Langford et al., 1997). Advice on the other hand refers to an opinion about how to act or what to do in a particular situation (Cambridge Dictionary, 2021a).

Visitor: Refers to the person who conducts the preventive home visits. The visitor is employed by the municipality (e.g., district nurse, nurse, or assistant nurse).

WHO: World Health Organization

List of papers

The following papers are included in this thesis, within the text they are referred to by their respective roman numerals. The original versions of the papers are appended to the end of the thesis.

I. Nivestam, A., Westergren, A., Petersson, P., & Haak, M. (2020). Factors associated with good health among older persons who received a preventive home visit: a cross-sectional study. *BMC Public Health, 20*(1), Article 688. https://doi.org/10.1186/s12889-020-08775-6

II. Nivestam, A., Westergren, A., Petersson, P., & Haak, M. (2021). Promote social participation among older persons by identifying physical challenges – An important aspect of preventive home visits. *Arch Gerontol Geriatr, 93*, Article 104316. https://doi.org/10.1016/j.archger.2020.104316

III. Nivestam, A., Petersson, P., Westergren, A., & Haak, M. (2021). Older person's experiences of benefits gained from the support and advice given during preventive home visits. *Scand J Caring Sci, 35*(4), 1096-1103. https://doi.org/10.1111/scs.12923

IV. Nivestam, A., Haak, M., Westergren, A., & Petersson, P. (2021). Give older persons a voice in the society—by using information compiled during preventive home visits on a societal level. *Int J Environ Res Public Health, 18*(14), Article 7433. https://doi.org/10.3390/ijerph18147433

Preface

> "Older people are our past and our future, guardians of our memory, and mirrors of our becoming" (Cerasoli, 2020, p. e11).

My interest in older persons and ageing started when I was a child. I grew up in the countryside in the northeast part of Skåne, Sweden, and my closest friend and neighbour was Agnes (on the front page you can see the house where she lived). She was about 77 years old when we met for the first time. I never thought about her age, she was just a person with a higher chronological age than me. She was living on her own, with no toilet or shower inside her home, a very primitive house filled with love and generosity. Agnes had lots of social contacts and we met almost every day, playing cards, painting, picking mushrooms, and I was always invited to her knitting meetings with her friends. She was a "superwoman" and a role model for a young girl.

Agnes lived in one of the municipalities which today offer one preventive home visit (PHV) to persons without home care aged 77 years or older. She could have represented any of the persons who receive a PHV, a capable and resourceful woman in my eyes. By offering her a PHV, her capabilities and resources could have been supported in a dialogue, and thereby her ability to maintain or improve her health could have been developed. However, to promote health and prevent risks among older persons, which is the purpose of a PHV, there is also a need to consider the environment and society around the person. The picture on the front page symbolises this approach towards the PHV: the importance of recognising the person within the house but also the surroundings and having a society which can enable health for older persons.

Between 2010 and 2015 I studied at the Faculty of Medicine, Lund University. First, I became a registered nurse in 2013, and in 2015 I received a master's degree in public health. After and during my education I worked as a registered nurse in nursing and residential care, home care and rehabilitation in different municipalities. In my work as a nurse, I have experience of working on health promotion, prevention, and medical care with older persons. Early on, I felt I wanted to educate myself and gain more knowledge about how I could create better conditions for older persons also on a societal level, which is why I studied public health science. In addition, I could see in my daily work as a nurse that the supportive dialogues I had with my patients made them secure and thereby increased their ability to self-manage, which in turn decreased the need for health care. It made me curious, and I wanted to know more about this;

how can health professionals work with prevention and promotion that fits older person's needs.

A couple of years before I became employed as a doctoral student, I came into contact with the project 'Preventive home visits to seniors' (Pre-H). I was working as a nurse, had a master's degree in public health and was thinking a lot about what to do next. One day my husband came home from a day of lectures in Malmö. He said, "Anna have you heard about the Pre-H project? That is something you could get involved in". I did some searches on Google and figured out that Kristianstad municipality was involved in Pre-H. I was by then working at a nursing home for persons in need of care and rehabilitation after hospital care in Kristianstad. I talked about the Pre-H project with my manager; however, time went by and the need for nurses at the nursing home became more urgent. After a while I saw an announcement about a post as a doctoral student in the Pre-H project. I applied for that employment, and I got it.

Since autumn 2018 I have been a doctoral student at the Faculty of Medicine, Lund University and I became employed at the 'Research platform for collaboration for health' at Kristianstad University. I had the opportunity to be involved in a research project that suited my interests perfectly, since it focused on promoting good health for older persons, from an individual and a societal perspective.

When I started to get more familiar with the Pre-H project my pre-understanding developed. I thought that a PHV was mainly about prevention (e.g., reduce the occurrence of risk factors). I asked myself; how could I find aspects of health promotion (creating conditions for persons to increase control over, and to improve, their health) in this project? I also questioned whether one visit could make any difference? Do persons who receive a visit remember the support and advice they get? Could information that is compiled during the PHV be utilised on a societal level to promote health among older persons? During the research process for the thesis many questions came to my mind, and I could see that the whole thesis and choice of studies reflected my interests and my background as a nurse interested in public health science.

Finally, I think that Agnes and other older persons I enjoyed spending my time with have inspired me to work with older persons' health. For everything they taught me about life and ageing, I will contribute research that can be used in practice to maintain or improve health among older persons.

Introduction

Promoting health permeates the sustainable development goals (SDGs) set up by the United Nations in 2015 (United Nations, 2015; World Health Organization [WHO], 2017b). In goal number three it is emphasised that health should be promoted to everyone at all ages (United Nations, 2015). However, depending on age, different prerequisites for health exist. Ageing offers increased experience and wisdom; on the other hand, ageing implies health challenges such as decline in physical functions (Tornstam, 2011). In this thesis Huber et al.'s definition of health is used, focusing on the person's "ability to adapt and to self-manage" (Huber et al., 2011, p. 2). One way of promoting health in old age could be to offer health interventions (Daly et al., 2019). According to the scientific literature, PHV is a health intervention for older persons, which has been used on an individual level to promote health and prevent risks (Tourigny et al., 2015). However, research shows that a comprehensive multilevel intervention is needed to promote health (Allegrante, 2015; Beard & Bloom, 2015; Stokols et al., 1996), but usually only one level is considered, the individual level (Seah et al., 2019). In addition, research which takes its starting point in the individual level has focused on risk prevention and lacks a health promotion perspective (Duplaga et al., 2016; Fagerström et al., 2009). Interventions focused on prevention (e.g., vaccinations) can save lives, which can be seen during the COVID-19 pandemic (Kampmann & Jack, 2021). Nevertheless, the vaccination does not per se, enable a good life and a life the person values. To do so, health promotion is needed, which can enable persons to take control over their health (WHO, 1986) and the perceived control can result in maintained or improved health (Robinson & Lachman, 2017), and thereby enable healthy ageing.

The purpose of the PHV is usually to prevent risks and promote health among older persons (Tourigny et al., 2015). However, the name of the PHV includes the concept of prevention, which directs the mind towards prevention activities. In theory there is a difference between the two terms, prevention and promotion (Tengland, 2010). However, in practice the terms can be difficult to separate (Tengland, 2010), and the terms they are sometimes used carelessly and interchangeably. I agree that the terms are difficult to separate in practice, and it might not always be necessary to separate the two. However, I believe that PHV has the potential of becoming more than a prevention intervention and I will therefore highlight health-promoting aspects in this thesis.

I now turn to the structure of the thesis. This thesis aims to develop knowledge of possible health-promoting aspects of PHVs for older persons from an individual and societal perspective. To take you through this journey I will start with a background section, to clarify some concepts and justify the need for more research. Since this is a thesis on gerontology, I start the background by describing older persons. Furthermore, I describe ageing, which is an aspect to consider in the process and pursuit towards healthy ageing. Thereafter, the focus turns to health, which is one of the most essential concepts in this thesis, before moving on to health promotion and risk prevention, concepts which are essential in the theoretical model (the health development model) used in the thesis. Then the theoretical point of departure will be discussed. Moving on to the section where I describe the development and previous research about PHVs, and the rationale for developing knowledge of possible health-promoting aspects of PHVs from an individual and a societal perspective. Thereafter I turn to the aims and the method section. In the method section I present the study design, context, samples, procedures, data collections, analyses, and ethical considerations. Thereafter, in the results I present health-promoting aspects of the PHV from an individual and a societal perspective and based on the two perspectives I present a synthesis of the results. Then in the discussion I focus on the major insights gained during this research journey, and the methodological considerations. Finally, at the end of the thesis, you can read about conclusions and further research.

Background

Older persons and ageing

Different terms can be used for older persons, however, already, in 1995 the United Nations suggested the use of the term 'older persons' in favour of for example 'elderly' (United Nations, 1995). More recently the American Psychological Association suggested using the term 'older persons' to avoid discrimination. The American Psychological Association stated that terms such as 'seniors', 'elderly' and 'the aged' should be avoided because they disconnect these persons from society and increase the risk of ageism (American Psychological Association, 2020). Furthermore, to emphasis the person, and variations within the population (different personal values and needs) the plural version 'persons' is used instead of 'people'. Therefore, the term 'older persons' is used in the present thesis.

Worldwide, the number of older persons is growing (Foreman et al., 2018), which can be seen both as a challenge and a success. The United Nations has set a chronological age of 65 years and above as a definition for older persons (United Nations, 2020). Currently, 703 million persons are 65 years or older and in the year 2050 this group is expected to reach 1.5 billion (United Nations, 2020). In Sweden in the year 2020, two million persons were 65 years or older and in the year 2070 the population is projected to reach 3.2 million (Statistics Sweden, 2021). Life expectancy in Sweden in the year 2020 was 84.3 years for women and 80.6 years for men. The demographic picture is changing rapidly and will probably accelerate in the coming decades. In 2070 the life expectancy for women may increase to 89.8 years and 87.7 years for men in Sweden (Statistics Sweden, 2021). This development can be viewed as a challenge for the older person and society, because with increased age the risk of diseases (e.g., respiratory, cardiovascular, and cognitive) tends to increase (Chang et al., 2019). These challenges can have an impact on the person's life, for instance limiting mobility, and a negative impact on daily activities (Maresova et al., 2019). From a societal perspective an increase in life expectancy can result in more demand on health services and thereby rising costs (Bloom et al., 2015). However, the increase in life expectancy must be viewed as a success story. Older persons can be seen as an asset within society (Foster & Walker, 2015; WHO, 2020a) if they are given the possibility to take part. For the older person, ageing can be a positive experience of, for example, personal growth and

emotional stability (Diehl et al., 2020). Nevertheless, health is an important factor to consider in order to take advantage of the increase in life expectancy and be able to live the life a person value (Beard et al., 2016). To support this successful development and to meet the challenges, health interventions that promote older persons' health are needed.

The older population in focus in this thesis is persons around 77 years old without home care. Among persons around 77 years old it is relatively uncommon to have home care (Socialstyrelsen, 2021), which potentially indicates that these persons are resourceful and have the ability to self-manage. The scientific literature shows that older persons can be viewed as an asset within society, contributing for instance, to informal caregiving (Cylus et al., 2019; Sahlen et al., 2012). In this population health interventions could focus on maintaining or improving health and thereby creating conditions for healthy ageing. However, previous research shows that in this presumptive resourceful population, persons with different risk factors could be found (Fjell et al., 2018, 2020), which indicates that this population is diverse. Nevertheless, by offering health interventions to this population it is possible to detect risks and challenges at an early stage. Thus, health interventions with a focus on both risk prevention and health promotion seem to be feasible in this population. Previous research shows that a health intervention like PHV, which this thesis emphasises, can postpone mortality if it is offered to older persons around 77 years old and before the onset of functional decline (Huss et al., 2008; Stuck et al., 2002). Yet it is challenging to describe the characteristics (e.g., health, assets, and challenges) of this population around 77 years old without home care, because ageing looks so different for different persons.

To create health interventions that target older persons there is a need to take ageing into account. According to Tornstam (2011), ageing is a process of changes; however, the direction of the changes can be both positive and negative. To give an example, ageing can contribute to an increase in knowledge and experiences, but also a decline in physical functions. Moreover, ageing can be both a *cause* and an *effect* of something, such as a *cause* of functional decline, and the fact that the skin is ageing comes as an *effect* of for example sunlight on the skin. Furthermore, Tornstam (2011) describes ageing as a heterogeneous and cumulative process with irreversible and inevitable changes. The heterogeneity tends to increase and accumulate with age (Beard & Bloom, 2015) and inequalities present at a young age increase and are even more distinct in old age (Beard & Bloom, 2015; Ferraro & Shippee, 2009). To better understand ageing it can be seen from different perspectives.

As a gerontologist or profession working with older persons' health it is important to be aware of the complexity of ageing and different perspectives on it, to be able to

support a person or a population in maintaining or improving their health. Ageing has been described from many different perspectives and usually chronological age is used as an index of time to count the number of years since birth (Erber, 2020). One perspective on ageing is the psychological, which considers abilities to easily adopt to different circumstances with the help of cognitive, personal, and social skills (Erber, 2020). In addition, the psychological processes can also involve the development of intellectual abilities, for example by gaining wisdom and experience (Tornstam, 2011). Yet another perspective is the social, which is constructed by persons living in society. From the social perspective, different transitions occur during a lifetime (Erber, 2020). For instance, when a person retires from work, this is a social transition which can be recognised as an event in the ageing process. From a bio-gerontological point of view, ageing can be described as multiple complex biological changes of maintenance, repair and stability which keep the body in homeostasis (Rattan, 2014). At a certain point there is an increased risk of stress, damage, and reduced remodelling of biological functions (Rattan, 2014). From another perspective, ageing can be described as a functional process, which is usually context-bound and concerns the ability to do things (e.g., drive a car, prepare a meal), and judgements of abilities in comparison with peers of the same chronological age are made (Erber, 2020). The different perspectives on ageing reflect both personal characteristics (e.g., abilities and skills) as well as societal characteristics (e.g., norms and regulations). Later in the thesis, in the *Theoretical point of departure,* to further emphasise the person's and society's role on ageing I will describe the process of *ageing well* (healthy ageing).

Health in old age

This thesis focuses on health as a subjective experience described by older persons. Older persons have described health as being independent, managing symptoms, accepting the situation, having social connections, and having energy (Song & Kong, 2015). In this thesis, Huber et al.'s (Huber et al., 2011, p. 2) definition of health is used, which is "the ability to adapt and to self-manage". This definition illustrates how health can be experienced despite health challenges and it reflects how older persons have described health, as being independent and managing symptoms (Song & Kong, 2015). The WHO stated a general definition of health in 1948 "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948, p. 100). However, WHO's definition of health does not fit persons with physical, social or mental challenges. With WHO's definition it is difficult for any person not in a 'complete state' to experience health. In old age the

risks of physiological challenges such as muscle weakness, cognitive decline, and a weaker immune system (Clegg et al., 2013) tend to increase, which makes this definition hard to use. Therefore, alternative definitions of health will suit the older population better, such as the definition given by Huber et al. (2011). Furthermore, this thesis views health as something positive and focuses on assets and capabilities that contribute to good health. Nevertheless, this does not mean that the challenges persons meet can be neglected. To promote the ability to adopt and self-manage, challenges must be dealt with, or the person must adapt to them.

Health can be assessed based on subjective experiences and with the help of objective measurements (Cleary, 1997). First, the subjective experience is based on the person's own values and feelings about health (Jylhä, 2009) and can be described as a continuum going from poor health to good health (Eriksson & Lindström, 2008). This type of experience can be captured in a dialogue with the person (Gadamer, 1996), and in research the item self-rated health is commonly used to measure the experience of health (Garbarski, 2016). The person is asked to rate their health on a Likert scale for example, one to five, where one indicates poor health and five is excellent health. The item 'self-rated health' is well researched and has been shown to be a valid measure (Bowling, 2005; Fayers & Sprangers, 2002), which can predict, for example, mortality (Idler & Benyamini, 1997) and functional decline (Takahashi et al., 2020). Second, in contrast to the subjective experience and self-evaluation, health can be objectively measured, for instance by conducting physical screenings, taking blood samples, looking for signs and symptoms to identify diseases or something pathological (Wuorela et al., 2020). Research has compared self-rated health as a single item with rigorous objective measures of health and has found out that self-rated health is at least as good as objective measures to predict future health (Lima-Costa et al., 2011; Wuorela et al., 2020). Thus, a dialogue about the person's experience of health is important in order to promote health and not just identify the present health status or predict future health.

Assessing health by asking about the person's subjective experience and at the same time have a dialogue about health could visualise the complexity of health and contribute to good health. When a person is asked about their health, a reflective process starts (Jylhä, 2009), which per se can have a positive impact on health. The German philosopher Hans-George Gadamer highlighted in his book *Enigma of health* (Gadamer, 1996), that it is only the person themselves who can define their health. In the case of good health, the person does not usually reflect on it; it is just there. Gadamer (1996) also argued that a dialogue per se could contribute to good health, by giving support and cure. Therefore, it is essential to discuss health, to be aware of it and be able to take reflective actions to maintain or improve it. However, what the person bases the subjective rating of health on is not clear. A model which describes the person's cognitive evaluation of

their own health has been developed by Jylhä (2009). Jylhä (2009) argues that the evaluation is based on the person's own review of medical diagnoses, functional status, bodily sensation, signs of illness, and their health in comparison to age, other persons, and previous health status. Based on this self-evaluation, the person then gives an answer to the question: 'How is your health in general?' In addition, societal and cultural aspects influence the person's judgement of their health. Thus, to answer the question about self-rated health requires a comprehensive evaluation to be made by the person, where a dialogue about health can clarify the complexity and possibly promote the person's health.

Health promotion and risk prevention in old age

Health promotion and risk prevention are activities which in theory are different; however, in practice they can be difficult to separate. Health promotion was defined in WHO's *Ottawa charter for health promotion, 1986*. In this Charter, health promotion was defined as "the process of enabling people to increase control over, and to improve, their health" (WHO, 1986, p. 1), and promoting health was highlighted as a responsibility for the whole society (WHO, 1986). In general terms, promotion has been described as an activity that brings about a positive change, by increasing something that is already done (do more physical activity), starting to do something that is not currently done (start exercising) or maintaining something which is already done (keep on exercising) (Tengland, 2010). In contrast to health promotion, risk prevention deals with risk factors (e.g., fall risk, malnutrition, cognitive decline) (Bauer et al., 2006), to reduce its occurrence, or prevent the occurrence, stop the progress and reduce the consequences of disease (WHO, 2021). Risk prevention can be a complement to health promotion and in practice the two are difficult to separate and are sometimes used interchangeably (Tengland, 2010). Moreover, research shows that health interventions often focus on both health promotion and risk prevention (Duplaga et al., 2016).

The development from general health promotion to a focus on older persons

Risk prevention has a longer history than health promotion, starting off in modern history in the 19th century with well-known persons such as Louis Pasteur and Florence Nightingale who were engaged in the science of hygiene to prevent diseases (Curtis, 2007). However, in the last five decades, health promotion has gained increased awareness in international health policies. In the seventies, the *Lalonde report* was presented, which recognised the importance of a comprehensive perspective on health,

including the four pillars of biology, environment, lifestyle, and healthcare (Lalonde, 1974). The *Lalonde report* was a starting point for a new view of health, where health was not merely a question for the health care sector, but also society as a whole (Lalonde, 1974). This was further emphasised in the *Ottawa charter for health promotion, 1986*, where the concept of health promotion was further elaborated on. Health promotion stressed the importance of increasing the person's ability to take control of and improve their health. Nevertheless, to do so, different prerequisites for health must be in place, such as food, shelter, economy, social justice, and education (WHO, 1986). These factors were later described by Dahlgren and Whitehead (1991) as determinants of health. Determinants of health are factors that have an impact on persons' health status, both individual determinants and environmental determinants, that is, material and social conditions, support from social networks and individual lifestyle factors (Dahlgren & Whitehead, 1991). Thus, the importance of considering health-promoting aspects on both an individual and a societal level has been emphasised for decades. However, not much attention was paid to older persons' prerequisites for health and promoting health in old age. However, since the beginning of the 21st century the awareness of health promotion in old age has increased. WHO has in different reports emphasised the need for promoting older persons' health in reports such as *Active ageing: a policy framework* (WHO, 2002), *Global age-friendly cities: a guide* (WHO, 2007), *World report on ageing and health* (WHO, 2015). With this history of health promotion, insights have emerged about the need for health interventions which target older persons. For example, the *World report on ageing and health* highlighted that health promotion to older persons is "not business as usual" (WHO, 2015) and research also stressed that general health promotion interventions cannot be directly transferred to older persons (Daly et al., 2019; Golinowska et al., 2016). Therefore, there is a need to better understand health-promoting aspects of health interventions offered to older persons.

Aspects of health promotion

Concentrating on health-promoting aspects, meaning activities that contribute to good health, can involve both individual and societal factors. On an individual level, aspects that have a positive impact on health can consist of mental, physical, and social factors. Examples of mental factors that can enhance health are positive feelings (Pressman & Cohen, 2005) and feeling of control (Robinson & Lachman, 2017). The physical factors relate to physical functions in the human body, for instance doing physical activities (Bajraktari et al., 2020). Examples of social factors relate to the social context around the person, relationships (Rook & Charles, 2017), and participation in hobbies or associations (Bruggencate et al., 2018). Social participation seems to be an important factor for promoting health in old age (Douglas et al., 2017), and involves activities on

a continuum, from being by oneself (e.g., watching TV) to actively engaging with others (e.g., politics) (Levasseur et al., 2010). Furthermore, mental, physical, and social factors are interrelated (Bauer et al., 2006). To give one example, physical and mental factors can have an impact on a person's ability to take part in social contexts (Townsend et al., 2021). One could argue that these aspects of health promotion could be generic and applied to all persons. However, by clarifying health-promoting aspects important in old age and the interrelation among mental, physical, and social factors, more targeted actions could be taken to improve or maintain health.

Moreover, on the societal level, aspects of health promotion relate to the determinants of health described by Dahlgren and Whitehead (1991). In research, societal aspects such as closeness to green spaces (de Vries et al., 2003), and a walkable neighbourhood (Van Cauwenberg et al., 2016) have been identified as aspects that can promote health among older persons. However, older persons have different abilities and might need different types of support from society to maintain health, for example, help with transportation (Shrestha et al., 2017), and accessible housing (Iwarsson et al., 2016). Therefore, these aspects need to be considered by persons in leading positions to promote health and to create a society which helps older persons to take control over their health.

Health promotion on a societal level places demand on persons in leading positions. The responsibility of persons in leading positions for health promotion work has been highlighted in several international policies recently. For instance, WHO's 9th Global Conference on Health promotion in Shanghai, 2016 (WHO, 2017b), in the United Nations' SDGs for 2030 (United Nations, 2015), and one of the action areas in the *Decade of healthy ageing 2020-2030* is to "ensure that communities foster the abilities of older people" (WHO, 2020a, p. 6). Thus, the importance of a comprehensive perspective on health promotion as a responsibility for the whole society remains. And concepts such as an age-friendly world, age-friendly cities, age-friendly environment, and age-friendly communities have been developed in recent years (van Hoof et al., 2021). In this thesis, the emphasis is on an age-friendly society since the point of departure is the whole society, from the closest environment to politics. Therefore, to give guidance on the development towards an age-friendly society a deeper understanding of the perceptions of persons in leading positions about how health can be promoted on a societal level is needed.

In the Swedish society, national, regional, and local levels have different responsibilities to promote health. This thesis is focused on the local level, which means the municipality. However, the results are not limited to the municipality and can go beyond that to include aspects on a regional and national level as well. Therefore, the term 'society' is used in order to emphasise that health promotion for older persons has

to be viewed as a need for the whole society to consider. According to Swedish legislation, the Social Services Act (*Socialtjänstlag*, SFS 2001:453), the municipality must, among other responsibilities, take actions in reaching out to persons to monitor and promote good living conditions. Furthermore, the municipality should create safe and social environments, enable older persons to take an active part in society and give support and advice to live a meaningful life. Moreover, the municipality should cooperate with different organisations within society to promote good living conditions. Furthermore, municipalities in Sweden are responsible for welfare that supports persons in the municipality. Examples of support which the municipality can provide to persons in need are home care and adjustment of accommodation due to physical or cognitive limitations. Furthermore, the municipality has a responsibility to work with risk prevention according to the Health and Medical Services Act (*Hälso- och sjukvårdslag*, SFS 2017:30). As an aid to meet these requirements set up by the legislation the municipality could consider health interventions that are focused on promoting health and preventing risks among older persons.

Aspects of risk prevention

Over the years, extensive research has been conducted on risk prevention in old age. Risk prevention in old age can include a diverse range of activities, such as medical, environmental, and behavioural. Medical aspects of risk prevention could be prevention of high blood pressure with medication (Alhawassi et al., 2015), vaccination against the seasonal flu (Grohskopf et al., 2020), and screening programmes for atrial fibrillation (Svennberg et al., 2021). Another aspect of prevention is more environmentally-oriented for example, preventing falls by modifying the home environment (Gillespie et al., 2012; Tricco et al., 2017). More examples of risk prevention are interventions targeting behavioural changes in lifestyle factors such as quitting smoking (Jordan et al., 2017), reducing alcohol use (Bareham et al., 2020), and improving nutritional status (Ahmed & Haboubi, 2010). Among older persons, focus has been on assessment of risks, and individual recommendations are given in accordance with the risks detected (Gusdal et al., 2021; Neziraj et al., 2021). Usually, one or several risks such as malnutrition, fall risk (Gusdal et al., 2021), and oral health issues are assessed (Bellander et al., 2021; Chalmers & Pearson, 2005). However, the scientific literature suggests a comprehensive geriatric assessment is needed (Ellis et al., 2017), which has shown effects on costs and increased life expectancy (Lundqvist et al., 2018). With a comprehensive geriatric assessment, a multi-disciplinary team identify medical, mental, and functional issues, and create a care plan to treat the issues (Ellis et al., 2017). From the scientific literature, it is relatively clear which risks could be prevented among older persons, while less attention has been given to persons with no risk present and how they could be supported to maintain or improve their health.

Research on risk prevention has focused on older persons in specific settings or with health care needs. For example, older persons in hospital settings (Ellis et al., 2017), at nursing homes (Gusdal et al., 2021) or living at home with home care (Neziraj et al., 2021). One study showed that among persons who have a regular care need, the vast majority have risks of falling and malnutrition (Neziraj et al., 2021). To minimise the risks detected, activities such as assistance with personal care and enrichment of food are offered (Gusdal et al., 2021). However, such risk prevention activities might not suit persons without home care and with no risks present. At the same time, it might be good to be aware of the risks before their onset and thereby increase the chance to postpone the period at risk. Most appropriate for the population without a present care need might be a balance between risk prevention and health promotion, tailoring the intervention towards the person's needs.

To conclude, a vast majority of health interventions to older persons focus on prevention activities on an individual level. In a systematic review health-promoting aspects were highlighted in different health interventions, which included a range of activities from individual to societal level (Seah et al., 2019). However, it was less likely that one single intervention covered health-promoting aspects on an individual and a societal level. Moreover, the most common type of intervention offered was education (Duplaga et al., 2016; Seah et al., 2019), followed by behavioural changes, health communication (Duplaga et al., 2016) and health assessment, with advice related to the assessment (Seah et al., 2019). Still, these interventions were focused on the individual level, and interventions with a focus on policies and societal changes were less frequent. In addition, the interventions tended to be focused on primary prevention and specific diseases (Duplaga et al., 2016). In a more recent review, it was shown that studies that report interventions that focused on health promotion to older persons increased by approximately 100% in the period 2015-2019; however, the general focus was still disease-oriented (Chiu et al., 2020). Hence, there is a need to address health-promoting aspects on both an individual and a societal level.

Theoretical point of departure

To promote health and thereby increase the chances of *ageing well* this thesis takes its theoretical point of departure in the *health development model* (Bauer et al., 2006) and *healthy ageing* (WHO, 2015). The *European community health promotion indicator development model* (the health development model) (Bauer et al., 2006) is a comprehensive multilevel approach and focuses on developing a person's health (maintaining or improving health), for example with health-promoting actions.

However, to my knowledge this model has never been applied in gerontological research before. In the scientific literature, different theoretical models are used to promote health (e.g., the health belief model and the trans-theoretical model); but, they operate on an individual level (Nutbeam & Harris, 2004). The most well-known health promotion theory that operates on both an individual and a societal level is the social-ecological model (Hughes et al., 2016), which is integrated into the health development model (Bauer et al., 2006). Generally, there is a lack of health promotion theories targeting older persons that describe the interaction between the individual level and the societal level (Hughes et al., 2016). Meanwhile, it remains unclear how a person's needs can be considered to stimulate action for health promotion on a societal level. Therefore, the present thesis considers comprehensive multilevel actions to maintain or improve health with the help of the health development model. Furthermore, to emphasise the gerontological focus of the thesis and the effort towards healthy ageing, I will also theoretically discuss the process of ageing well. The two theoretical models, the health development model and healthy ageing, are interrelated; a person in good health (with ability to adapt and self-manage), has an increased ability to age well. Therefore, promoting health can facilitate the process of ageing well.

I start with the theoretical description of the *health development model* (Bauer et al., 2006) (see Figure 1). At the centre of the model is the person's health, and the model describes the relationships among the person's own health status, individual and environmental determinants of health, health promotion, health protection, prevention, and health care, and considers how these concepts impact on the development of health. The model describes the development of health as an ongoing process of maintaining or improving health in the given socio-ecological environment. For example, a person's health status is determined by individual factors (e.g., physical activity, sense of coherence, social participation), and environmental factors (e.g., available social networks, education, economy, health service, governance) and is dependent on the previous health status. Thus, the current health status can predict the coming health status and is dependent on determinants of health. Furthermore, the model describes how the health status depends on three domains: mental, social, and physical. For instance, if a person has good physical functions, it can affect the social functions and enable a person to connect with others, which in turn affects a person's health.

The health development model is based on a system theory that is exemplified in the constant interaction between the person and the socio-ecological environment. The person's health status affects their ability to have an impact on the socio-ecological environment and in turn the environment affects the person's health. This means that different persons have different abilities to have an impact on society, dependent on

their health status and society's level of friendliness (e.g., in terms of accessibility and inclusiveness in decision-making). The socio-ecological environment includes various levels; local, regional, national, and global, and in this thesis the socio-ecological environment is represented in the term 'society'. The model further describes that this interplay can be affected by health promotion activities and prevention activities. Health promotion activities can have an impact on the person and society and thereby develop a person's health, meaning that activities can operate both on an individual level and a societal level. According to the model, health promotion takes a salutogenic perspective and focuses on how a person's resources could support the development of good health. Operating complementarily, simultaneously, and interactively with the salutogenic perspective the pathogenic perspective, which focuses on how risk factors can develop poor health. In this thesis, the term 'risk prevention' is used, which includes the terms 'prevention' and 'health protection' described in the model and represents actions to prevent poor health.

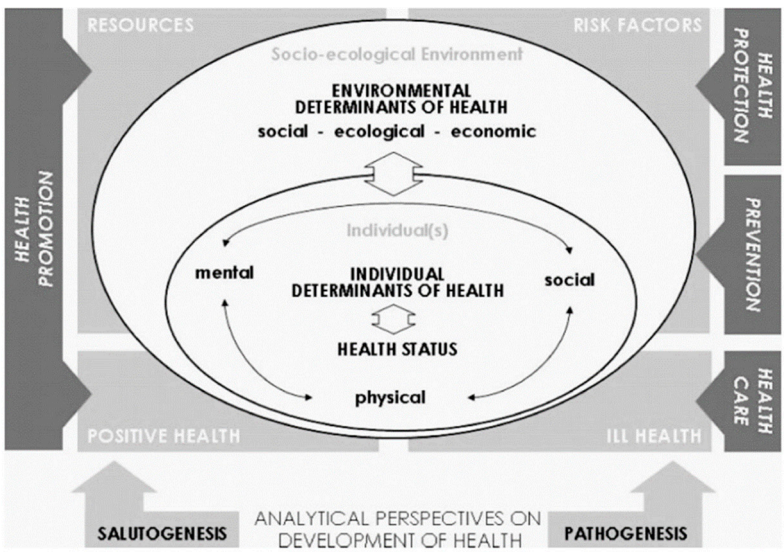

Figure 1 The health development model. From "The EUHPID health development model for the classification of public health indicators," by G. Bauer, J. K. Davies, and J. Pelikan, 2006, *Health Promot Int, 21*(2), p. 155 (https://doi.org/10.1093/heapro/dak002). Copyright 2006 by Oxford University Press. Reprinted with permission.

To summarise, use of the health development model is a comprehensive multilevel approach, which focuses on maintaining or improving a person's health. The model is comprehensive in that it considers both health promotion and risk prevention, and multilevel actions could be taken on both an individual and a societal level to maintain or improve health.

Now I will turn to theoretically discuss the process of *ageing well*. In the section about *Older persons and ageing* I described how ageing can take different perspectives, and an additional perspective to ageing is the process of ageing well.

There are many gerontological theories which have tried to describe the process of ageing well. Among the most well-known are 'successful ageing' (Rowe & Kahn, 1997), 'active ageing' (WHO, 2002), and 'healthy ageing' (WHO, 2015). However, the content and definitions of the theories differ greatly. Successful ageing has been defined in various ways involving biomedical and psychosocial aspects, and subjective and objective measures (Urtamo et al., 2019). The most well-known definition of successful ageing was introduced by Rowe and Kahn (1997) and includes three properties. First, low probability of disease and disability. Second, high cognitive and physical function, and third, active engagement in life (Rowe & Kahn, 1997). Later, the concept of active ageing was widely acknowledged when WHO released the report about *Active ageing: a policy framework* in 2002 (WHO, 2002). In this report, active ageing was defined as "the process of optimising opportunities for health, participation and security in order to enhance quality of life as people age" (WHO, 2002, p. 12). The perspective shifted from successful ageing which excludes persons with diseases and disabilities from ageing well to a more inclusive concept of active ageing. However, active ageing can be problematic because it focuses strongly on older persons as productive and contributors in society (Foster & Walker, 2015; Zaidi & Howse, 2017), and that might not be what all value doing. Therefore, to be more inclusive and fit a diverse older population healthy ageing has been introduced. In 2015, WHO shifted from the concept active ageing to healthy ageing, which is used in this thesis and defined as "the process of developing and maintaining the functional ability that enables well-being in older age" (WHO, 2015, p. 28).

The theoretical properties of healthy ageing were described in WHO's *World report on ageing and health* (WHO, 2015). The core part of the definition is 'functional ability' and means having the capabilities to be and do what you have reason to value. What a person value is up to the person to decide, but it could include meeting basic needs, learning new things, personal development, making decisions about life, being able to move around, maintaining relationships, and contributing to society. The functional ability is composed of a person's intrinsic capacity and the societal environmental characteristics. Intrinsic capacity is defined as a person's mental and physical capacities such as the ability to see, walk, talk, and think. In addition, the intrinsic capacity is affected by a person's health characteristics (fixed or social constructed) such as health behaviours, illness, or increased age, and genetic inherited factors. Environmental characteristics on the other hand are found in the environment around the person and involve multiple factors such as the home environment, the environment within the

municipality, but also other persons, relations, attitudes, values, and policies. Healthy ageing can thereby be enabled by supporting a person's intrinsic capacity and by providing an age-friendly environment (same as, age-friendly society).

To conclude, by promoting a person's health, it is possible to have an impact on the process of ageing well. In this thesis the health development model is used to reason about health-promoting actions. If health-promoting actions could result in better health, the person then has a greater chance to move up the continuum of healthy ageing and thereby improve their functional ability, which in turn means that the person can do the things they value.

Four decades of preventive home visits

Generally, PHV is a health intervention which aims to promote health and prevent risks (Tourigny et al., 2015). However, reviews of PHVs have highlighted that the major focus is on risk prevention, and there is a lack of research about aspects of health promotion in relation to the PHVs (Fagerström et al., 2009; Markle-Reid et al., 2006). More recent studies have also focused on aspects of risk prevention of the PHVs, for example related to medication (Lagerin et al., 2014), nutrition, falls (Hammarlund et al., 2016; Westergren et al., 2014), and cognition (Fjell et al., 2018; Seiger Cronfalk et al., 2017). However, in the last decade, a few studies have focused on health-promoting outcomes of the visits such as ability to live well and a feeling of being valued (Behm et al., 2013; Tøien et al., 2015). Still, to develop knowledge of possible health-promoting aspects of the PHVs there is a need for research about what particular aspect of the visit can promote positive health outcomes.

The scientific literature describes different professions conducting the visits, who the visit is targeting, and number of visits offered in different types of models for PHVs. In most cases the visits are conducted by a nurse, but there are also examples of other professions conducting the visits (Tourigny et al., 2015). One example is from Finland where a multi-professional team with social workers, physiotherapists, and nurses conduct the PHVs (Liimatta, Lampela, Laitinen-Parkkonen, et al., 2019). The target population is usually the general older population, but in some cases specific subgroups have been targeted (Tourigny et al., 2015), for example, older persons with morbidities such as heart failure, or who are newly discharged from hospital (Tappenden et al., 2012), persons who are frail (van Kempen et al., 2012), and an ethnically diverse population (Kristiansen et al., 2020). The age of the persons who are offered the PHVs varies; the mean age described in the scientific literature was 75 years (Tourigny et al., 2015), although the age span ranges between 65 years and 85 years (Mayo-Wilson et

al., 2014). The number of visits varies between one and 30 (Grant et al., 2014), and one visit can last from 30 minutes to two hours (Markle-Reid et al., 2006).

Moreover, models for PHVs use different procedures. The general procedure of the PHVs follows a geriatric assessment (Tourigny et al., 2015) where multiple aspects of health are assessed. For instance, social participation, daily activities, economy, mental health (Kono et al., 2014), physical health, nutrition, cognition, and polypharmacy (Seiger Cronfalk et al., 2017). Besides the assessments, advice (Kono et al., 2014) and information, for example about social services, financial support, and physical exercise are given (Liimatta, Lampela, Laitinen-Parkkonen, et al., 2019). Another procedure described in the literature, which is used in Norway, is a thematic guide. The guide focuses on the person's situation and its purpose is to stimulate a dialogue (Tøien et al., 2014). The thematic guide includes aspects such as life history, physical, mental, and social health, functional ability, safety, and nutrition (Tøien et al., 2014, 2018). However, no matter whether the procedure follows a geriatric assessment or a thematic guide the interrelationship between for instance physical and social factors considered during the PHVs has to be highlighted to promote health.

The challenge with the mixture of PHV models that exists has been described in many reviews of the subject (e.g., Grant et al., 2014; Markle-Reid et al., 2006; Tourigny et al., 2015). Despite the diversity, systematic reviews have shown that PHVs can reduce mortality and increase functional ability (Tourigny et al., 2015). Stuck et al. (2002) highlighted, in a systematic meta-analysis, favourable effects of the PHVs. For example, a comprehensive geriatric assessment and multiple visits or follow ups can have positive effect on physical function (Stuck et al., 2002). Furthermore, a recent review suggests decision-makers to implement PHVs due to their positive effects on daily activities and their association with reduced admission to nursing homes (Bajraktari et al., 2020). In contrast, Mayo-Wilson et al. (2014) showed in a meta-analysis that PHVs did not have any convincing positive effects. Due to the ambiguous effects, an ongoing systematic review will investigate PHVs' effect on quality of life among older persons (Tay et al., 2021). The heterogeneity of the PHVs makes it difficult to compare results between studies and draw valid conclusions.

Moving on to the research about older persons' experience of the PHVs. Taking persons' experience of health interventions into account will increase the likelihood of tailored interventions (Jansen et al., 2010), and give guidance to health professionals on how to optimise the visits. From listening to the voices of the older persons themselves it has been found that they are in general positive towards PHVs. The visits were appreciated, the dialogue had good quality and created trust towards the visitor. After the visit, older persons experienced increased awareness of risk factors, and had information on where to turn if needing help (Tøien et al., 2014). Furthermore, older

persons said that the visit made them visible, and they felt secure (Behm et al., 2013; Tøien et al., 2015). However, some older persons stated that they did not need the visit due to good health status (Tøien et al., 2014) or because they were too ill (Behm et al., 2013). Research has focused on the experience of the visit as such; however, to generate positive outcomes, older persons' experience of the support and advice given has to be explored.

Besides the potential individual benefits as outcomes from the PHVs, economic evaluations of PHVs show positive effects on health service costs. Research has shown that PHVs can be cost-effective (Sahlen et al., 2008; Zingmark et al., 2019). However, another study showed no significant effects on health service costs when offering one PHV (Brettschneider et al., 2015). Additionally, a systematic review by Liimatta et al. (2016) and a study (Liimatta, Lampela, Kautiainen, et al., 2019) concluded that PHVs did not increase the total cost for health services, nor did they reduce the costs. Studies included in the review did show a reduction in nursing home admission and days in hospital. Again, the different procedures make it hard to generalise the results to other PHVs. For example, the number of visits and health professionals involved in the visits varied between interventions. It is therefore difficult to compare the costs and effects. Although, these evaluations give an indication of potential positive benefits from the PHVs when it comes to costs for health services.

PHVs have a long history and have been around for decades, both in health policies and as a focus for research. Denmark was one of the first countries to conduct research about PHVs in the 1980s (Hendriksen et al., 1984). More recently, research can be found from many other countries, for example, Finland (Liimatta, Lampela, Laitinen-Parkkonen, et al., 2019), Norway (Tøien et al., 2018), the United Kingdom (Tappenden et al., 2012), Canada (Tourigny et al., 2015), and Japan (Kono et al., 2016). Guidance about the procedure and an attempt to systematise the visits can be found in both Norway (Helsedirektoratet, 2019) and Denmark (Sundhedsstyrelsen, 2020). PHVs have been part of national policies in Denmark since 1996 (Vass et al., 2007). More recently in 2020, a report from the Danish Health Authority emphasised that PHVs should be offered to older persons who are living alone and are at least 70 years old, all 75- and 80-year olds and then every year to those aged 82 years or older (Sundhedsstyrelsen, 2020). Thus, PHVs are legislated in Denmark, and in Norway the government is recommending municipalities to offer PHVs (Helse- og omsorgsdepartementet, 2016; Helsedirektoratet, 2019). Furthermore, PHVs have been the subject of many theses, from the Scandinavian countries (e.g., Behm, 2014; Fjell, 2021; Liimatta, 2019; Tøien, 2018;). However, neither the scientific literature nor the policies have taken a comprehensive multilevel perspective on the PHVs.

In Sweden, PHVs were introduced widely in 1999 (Socialstyrelsen, 2002). This was because the *National board of health and welfare* allocated money for municipalities that offered PHVs for older persons during the years 1999-2002. This was a starting point for the development of PHVs on a more general front in Sweden, and PHVs were introduced in 21 municipalities (Socialstyrelsen, 2002). Since then, research on different outcomes of the PHVs has been conducted in different parts of Sweden (e.g., Behm et al., 2016; Löfqvist et al., 2012; Sahlen et al., 2006). However, today in Sweden no legislation, recommendations, or guidance about PHVs exists from the authorities, although the Swedish authorities had a research review done in 2020 by the *Swedish agency for health technology assessment and assessment of social service* about PHVs from an international context (Statens beredning för medicinsk och social utvärdering, 2020). This review did not unanimously favour the PHVs; instead, it highlighted the lack of evidence about which aspects of the visits foster good health outcomes. Thus, more research is needed regarding PHVs. Therefore, to give guidance to health authorities and persons in leading positions that are responsible for PHVs, health-promoting aspects of the visits have to be addressed, which could be the starting point for national guidelines about PHVs in Sweden.

To sum up, the main focus for research on PHVs has been on measuring potential effects of the visits, regarding, for example, mortality, functional ability, admission to nursing homes, and hospitalisation (Grant et al., 2014; Tourigny et al., 2015). Scientific reviews have identified a lack of health-promoting aspects of the visits and found that the focus during the visits has been on identifying risk factors (Fagerström et al., 2009; Markle-Reid et al., 2006). However, I believe that PHVs have the potential to be more than that. In later years a more health-promotive approach has been taken on PHVs, which focuses on maintaining and improving older persons' health (Behm et al., 2013; Tøien et al., 2015, 2018, 2020). Nevertheless, which aspects of the visits can contribute to positive outcomes is not clear. And in enabling older persons to take control of their health and thereby maintain or improve it, society plays a key role. Therefore, to be able to develop knowledge of possible health-promoting aspects of the PHVs and thereby enable actions on multiple levels, there is a need to take an individual as well as a societal perspective into account.

Rationale

To maintain or improve health among older persons without home care a comprehensive multilevel approach is needed, which includes both risk prevention and health promotion on an individual and a societal level. PHV is a health intervention which can possibly take such a comprehensive multilevel approach. However, to apply a comprehensive multilevel approach towards the PHV, knowledge not only about risk prevention but also health-promoting aspects of the visit from an individual and a societal perspective is needed. Health promotion and risk prevention are two concepts that are difficult to separate in practice, and to access health-promoting aspects in the context of PHVs, elements of prevention become difficult to avoid. Much of the existing research about PHVs has focused on risk prevention on an individual level whereas this thesis strives to grasp health-promoting aspects on both an individual and a societal level, and considers the interrelation between the levels.

Aims

The overarching aim of this thesis was to develop knowledge of possible health-promoting aspects of PHVs for older persons from an individual and a societal perspective.

Specific aims

I. To determine which factors are associated with good self-rated health among older persons.

II. To identify physical factors that can hinder older persons from taking part in social contexts.

III. To explore older persons' experiences of the benefits gained from the support and advice given during the PHV.

IV. To get a deeper understanding of the perceptions of persons in leading positions of the usability of the information compiled during the PHVs for promoting health among older persons on a societal level.

Methods

Overall study design

This thesis encompasses both quantitative and qualitative research designs. Different designs were used to develop knowledge of possible health-promoting aspects of the PHVs from an individual and a societal perspective. Table 1 gives an overview of the papers included in the thesis. Papers **I-III** have an individual perspective, as these papers are based on older persons' subjective experiences. In papers **I** and **II** older persons have given subjective answers to structured questions, and in paper **III** to semi-structured questions. Paper **IV** has a societal perspective, since it reflects the perceptions of persons in leading positions of the usability of the information from the PHVs on a societal level for promoting health. However, the results from an individual perspective (**I-III**) could potentially be considered at a societal level as well.

Table 1 Overview of papers included in the thesis. Papers **I-III** (green area) are based on an individual perspective and paper **IV** on a societal perspective (blue area).

Paper	Aim	Design	Sample	Data collection	Analysis
I	To determine which factors are associated with good self-rated health among older persons.	Cross-sectional study.	Persons who received PHVs, January to September 2018, mean 80.6 years old (SD 2.2) (n=619).	Register data. Structured interview questions covering demographic, mental, physical and lifestyle factors.	Bivariate analysis: chi-square, Fisher's exact test, t-test. Logistic regression.
II	To identify physical factors that can hinder older persons from taking part in social contexts.	Cross-sectional study.	Persons who received PHVs, October 2018 to February 2020, mean 78.8 years old (SD 1.8) (n=1,245).	Register data. Structured interview questions covering demographic and physical factors.	Bivariate analysis: chi-square, t-test. Logistic regression.
III	To explore older persons' experiences of the benefits gained from the support and advice given during the PHV.	Qualitative study.	Persons who received PHVs, median 77 years old (range 77-91) (n=13).	Semi-structured individual interviews.	Qualitative content analysis.
IV	To get a deeper understanding of the perceptions of persons in leading positions of the usability of the information compiled during the PHVs for promoting health among older persons on a societal level.	Qualitative study.	Persons in leading positions within the municipalities (heads of department, heads of unit for PHVs and politicians) (n=12).	Focus groups.	Focus group analysis.

SD=standard deviation; PHV=preventive home visit.

Study context

Preventive home visits in northeast Skåne

Skåne is a county in Sweden with 33 municipalities (Regionfakta, 2021b), and of those, seven municipalities in the northeast part offer PHVs in accordance with a common model. In total, almost 200 000 persons live in this part of Skåne (Regionfakta, 2021b). The northeast part is the most sparsely populated (23-78 persons per km^2) area in Skåne (Regionfakta, 2021b). The number of persons ≥65 years old ranges between 21% to 25% in the seven municipalities (Regionfakta, 2021a). The municipalities included in the thesis have a variation in the size of the population between 75-79 years. In the smaller municipalities, in 2019, it ranged between 340 and 690 persons and in the larger ones between 2,600 and 3,800 (Statistics Sweden, 2019).

The municipal organisation responsible for preventive home visits

Sweden consists of 290 municipalities, which are self-governed according to the Local Governmental Act (*Kommunallag*, SFS 2017:725) by politicians elected every fourth year. The structure for the municipal organisation and the name of the departments differs in different municipalities. However, the general municipal organisation structure consists of the municipal assembly, which is the highest decision-making body within the municipality. Elected by the municipal assembly is the executive committee, which is responsible for preparing decisions for the municipal assembly and enforcing decisions. The executive committee has in turn different committees with different responsibilities (e.g., childcare and education, health and welfare). In turn, every committee has a department with employees who handle decisions made by the politicians and which supports the committee in preparing for new proposals. In this thesis, the term 'health and welfare organisation' is used. Included in the 'health and welfare organisation' are politicians in the committee and employees in the department responsible for health and welfare. Within the present context it is the 'health and welfare organisation' in each municipal organisation that has the responsibility for the PHVs.

Preventive home visits to seniors

This thesis is grounded in the context of the research and collaboration project Pre-H. This project aims to create a model for PHV (see Figure 2) and started in 2016 as a joint project between five municipalities in northeast Skåne. Since then, two more municipalities have joined. The Pre-H model was created through a collaboration among researchers, older persons, and health professionals.

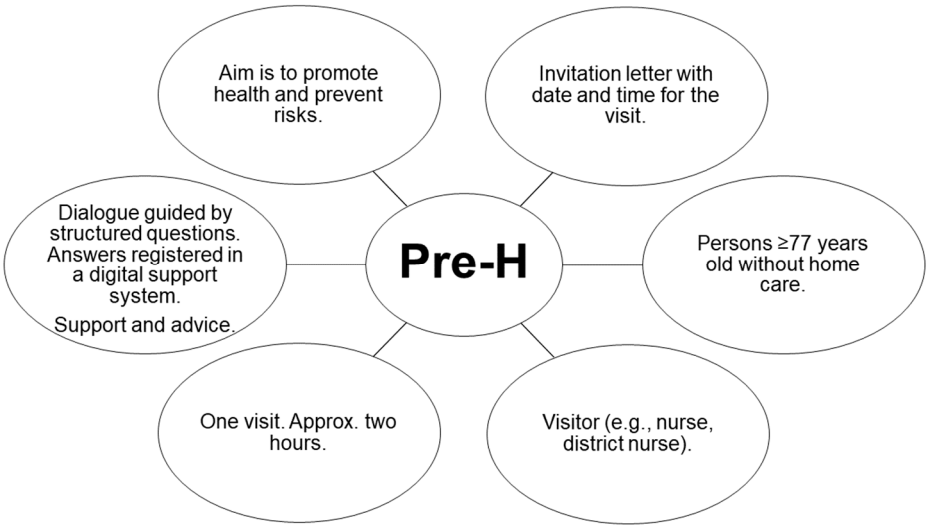

Figure 2 Illustration of the Pre-H (Preventive home visits to seniors).

The project is led by a steering committee, which consists of persons from the seven municipalities, the county council, and from Kristianstad University. In this committee, heads of unit for the PHVs in each municipality, nurses, public health workers, physicians, occupational therapists, physiotherapists, and researchers are involved. The steering committee takes decisions about the project and has a dialogue with other persons in leading positions (e.g., heads of department, politicians) in the municipalities about the PHVs. Furthermore, one working group with persons who conduct the PHVs, that is, visitors, is included in the project. The visitors are health professionals, for example, district nurses, nurses, assistant nurses. Each municipality employs the person who is most appropriate for the job as a visitor. New visitors are introduced to the model for PHV by a colleague with previous experience, and they join the working group in Pre-H. No joint formal education is offered. The project leader for Pre-H is a researcher from Kristianstad University, who coordinates the actions and convenes meetings. Twice every semester the steering committee and the working group with visitors meet at the university to discuss the progress and share experiences from the other municipalities. In the working group, practicalities about the visits are discussed and visitors get help and inspiration from each other. Furthermore, they discuss challenging situations and how to handle matters encountered during the visits.

Over a period of two years a structured questionnaire was created within the steering committee and the working group. This questionnaire was developed through an

interactive process between the researchers and practitioners, based on different previous questionnaires used for PHVs in four municipalities, and research. Furthermore, older persons from different pensioner organisations were involved in the development process and asked about input on the relevance of the questions. Thereafter, questions within the questionnaire have been constantly developed throughout the project. Questions have been added and taken away, mainly based on the experiences of the persons who conduct the visits. Questions asked during the visit cover the following areas: housing and finance, functional ability and activity, physical health, well-being and participation, cognition, and nutrition, making a total of approximately 140 questions. Of these questions, around 35% are follow-up questions. For example, the question 'Do you feel satisfied with your life in general?' is followed by questions about e.g., sadness and anxiety if the person's answer is 'Fairly' or 'Not satisfied'. However, the questions that have follow-up questions have changed during the development process of the Pre-H model. For instance, the questions about anxiety and sadness were first questions asked to everyone, and then they became follow-up questions.

Answers to the questions asked during the visit are registered by the visitor in a digital support system during the visit. In October 2018, all seven municipalities started using a common digital support system. Before that, only two municipalities digitally recorded answers to the questions. The register contains answers given by the older persons to structured questions, answers to a few open questions (not included in this thesis), and a few observations made by the visitor (e.g., cognition, walkability, and blood pressure) (not included in this thesis).

Persons ≥77 years old, with non or minimal home care (e.g., alarm) are offered a PHV. The invitation procedure differs among the municipalities. The most common procedure is that invitation letters with a time and date for the visit are sent to older persons eligible for a visit. If the person does not want the visit, they cancel it by phone. The visit is free of charge and optional. Acceptance rates are not registered by the municipalities; however, according to the visitors it varies between 50-95%. The visit lasts for approximately two hours.

The model for PHV created within the Pre-H project aim is to promote health and prevent risks. Health is promoted in a dialogue which strives to enable older persons to maintain or improve their health by giving support and advice. During the dialogue, an assessment of the person's health, behaviour and home environment is made with the help of the questions, with the possibility to detect risks. Furthermore, in the digital support system, 'highlights' are given to the visitors about important aspects to discuss with the person. For example, advice about referrals to health care if needed, information about physical activity or modification of the home environment to avoid falls. Support during the visit could be to recognise healthy behaviours of physical activity or social

activity. In addition, the suggested purpose of the registered data is to use it in the municipalities as a tool to improve awareness of this population's living conditions and in research. In the present thesis, information from the PHVs refers to descriptive statistical data compiled during the PHVs, older persons' thoughts expressed during the visits, and general observations made by the visitors during the visits.

Samples and procedures

Consecutive sampling (Polit & Beck, 2016) was used in papers **I-III** and purposive sampling (Patton, 2015) was used in paper **IV**. In papers **I** and **II** anonymous data was collected from the Pre-H register. All persons who received a PHV from two municipalities, registered data in the Pre-H register from January to September 2018, and answered the question about self-rated health, were included in paper **I** (n=619 persons). The reason for including data from only two municipalities was that the project was about to change to a new digital system for registration. Only two municipalities had recorded data in the previous system used in paper **I**. A description of the sample included in paper **I** is presented in Table 2.

In paper **II**, the same register and procedure was used, but data was drawn from a new digital system for recording data, used by all municipalities in the project. Data was drawn from October 2018 to February 2020, from seven municipalities, and included all who answered the question about physical hindrances to social participation (n=1,245 persons). Characteristics of the sample in paper **II** are described in Table 2.

Table 2 Characteristics samples I and II (in papers **I** and **II** respectively).

Characteristics	Sample I (n=619)	Sample II (n=1,245)
Age, mean (SD)	80.6 (2.2)	78.8 (1.8)
Women, n (%)	341 (55.4)	683 (55.1)
Settlement rural, n (%)	431 (71.6)	245 (19.8)
Cohabitant, n (%)	413 (67.4)	782 (62.8)
Satisfied with accommodation, n (%)	590 (97.2)	1,196 (97.3)
Felt safe in the neighbourhood, n (%)	598 (98.7)	1,203 (97.7)
Not worried about finance, n (%)	591 (98.0)	1,195 (96.2)

SD=standard deviation.

In paper **III,** persons from five municipalities who had received a PHV were consecutively asked by the visitors, during April to May 2019, to take part in an interview study. The reason for including five out of seven municipalities, was that the two others had recently employed new visitors. Fifteen persons were recruited by the visitors and contacted by me, who scheduled an interview. Two persons cancelled the

interview before it started. Recruitment of participants ended when variation in the sample was reached and when no new experiences emerged from the participants. Characteristics of the sample for paper **III** were as follows: in total 13 persons (four men, nine women); median age 77 years old (range 76-91); highest education varied from no upper secondary school education to ≥3 years at university; two persons lived in rural areas, eleven in urban areas; number of days between the PHV and the interview was median 7 (range 7-32).

In paper **IV**, purposive sampling was used to recruit participants to the focus groups. Those invited by email to take part were the chair of the political health and welfare committee, the head of the department for health and welfare, and the head of unit for Pre-H from the different municipalities. Participants were identified through the municipality's official website (politicians, heads of department) and from the Pre-H steering committee (heads of unit for Pre-H in each municipality). In total nine politicians, seven heads of unit for Pre-H, and nine heads of department, were asked to take part in the focus groups. Nine politicians and heads of department were invited to take part since two of the municipalities had two committees and departments for health and welfare issues. Six politicians, five heads of unit for Pre-H, and four heads of department accepted the invitation. The day before and the same day as the focus group session with politicians, three persons dropped out before the session, with the result that the group with politicians dropped to three participants. Characteristics of the sample for paper **IV** were as follows: in total 12 persons; five men; seven women; median age 51 years old (range 44-60) (three missing values); highest education varied from upper secondary school education to ≥3 years at university; median years in current position was 5 (range 1-25).

Data collections

Questionnaire

Items used in papers **I** and **II** were drawn from the questionnaire within the Pre-H project. Over the years the questions included in the Pre-H questionnaire have been tested and used in the included municipalities to fit the dialogue during the PHVs. Questions included in the questionnaire were inspired by validated risk assessment tools such as FRESH screening, a short screening tool for frailty developed by the 'Frail elderly support research group' (Eklund et al., 2016), and the Short Form Health Survey SF-36 measuring physical and mental dimensions of health (Persson et al., 1998). In addition, the item self-rated health is included in the questionnaire, which is

a well-used question for rating general health (Bowling, 2005). Based on discussions among the authors who have experience from developing the questionnaire and practical expertise in nursing and occupational therapy, items were selected to be included in the papers. In paper **I**, 36 items were included, and 19 items in paper **II**. The 36 items used in paper **I** covered *demographic, mental*, *physical*, *lifestyle* factors, and the item self-rated health. The demographic, mental, physical and lifestyle factors included in paper **I** were as follows. *Demographic factors*: age, gender, settlement, habitation, accommodation, neighbourhood, finances (two items). *Mental factors*: safety, cognition, sleep, loneliness, sadness, anxiety, worried about the future, influence society and own situation (two items), satisfied with life, ability to do valuable things, energy. *Physical factors*: endurance, daily activities, physical problems hindering social participation, pain, urinary continence, digestive problems, vision, hearing. *Lifestyle factors*: physical activity, appetite, weight loss, alcohol, smoking/snuff, smartphone use, computer use. The 19 items in paper **II** covered *demographic*, *physical* factors, and the item physical problems hindering social participation. The demographic and physical factors included in paper **II** were as follows. *Demographic factors*: age, gender, born in Sweden, settlement, habitation, accommodation, neighbourhood, finances, transportation. *Physical factors*: endurance, pain, urinary continence, digestive problems, vision, hearing, mobility device, dizziness. In addition, 'life satisfaction' was used as an item indicating mental health (**II**). The previous items (e.g., sadness, anxiety) used representing mental factors have in this version of the questionnaire been assigned follow-up questions and replaced by the item 'life satisfaction'. The answers to the questions were in most cases yes or no, though this was not the case for gender, age, habitation, settlement, transportation, safety, loneliness, sadness, anxiety, influence, satisfied with life, ability to do valuable things, daily activities, physical activity, appetite, alcohol, smoking/snuff, self-rated health, which had more nuanced answers (e.g., all the time, sometimes, never).

Individual interviews

Data in paper **III** was collected through individual semi-structured interviews conducted by me over a period of two months in 2019. The participants chose the place for the interview, which resulted in all interviews being conducted in the older person's home. First, two pilot interviews were conducted to test the interview guide, which resulted in small modifications of the guide. The two pilot interviews were judged to be sufficiently good quality to be included in the analysis. In total, 12 interviews were conducted with 13 persons, and in one interview a partner participated. All who participated had received a PHV. Before the interview started, the participant was informed about the study and allowed to ask questions, and after the person signed

the informed consent, the interview started. The interview was audio-recorded after permission was received from the participant. Open questions about experience of the support and advice given during PHV and probing questions were asked during the interviews. Afterwards reflective notes were written by me to record interesting results and the context so that later in the analysis process the memory of the interview situation could be recalled. The interviews lasted between 26 and 95 minutes with a mean of 53 minutes. All interviews were transcribed verbatim, nine by a professional transcriber and three by me.

Focus groups

In paper **IV**, data was collected through three focus groups held during two months in the beginning of 2021. One focus group with heads of department, one with heads of unit for Pre-H and one with politicians. All focus groups were held online via a video communication platform that was known and used by the participants. The focus groups were moderated by an experienced researcher and co-author, and co-moderated by me. Taking up the participants' time by conducting a pilot session and practising the procedure is not recommended in the literature (Krueger & Casey, 2015). Therefore, before the actual focus group sessions, one pilot session was conducted with co-workers to test the procedure, and for me to be trained with practice and skills in moderating a focus group.

Before the actual focus groups started, the participants filled in the informed consents. The focus groups were audio- and video-recorded after permission was received from the participants. First, the moderator welcomed the participants, introduced the purpose of the focus group discussions and instructed the participants to have their microphone and video turned on. In addition, the role of the researchers was explained, and researchers emphasised that the participants were the experts on the phenomenon discussed, and the moderator and co-moderator's roles were to guide the dialogue and observe the discussions. As an introduction to the dialogue a five-minute vignette about Pre-H, previous research, and example data from Pre-H was presented by me. To guide the discussions a questioning route (a series of questions asked during the focus group session) (Krueger & Casey, 2015) was used, which had the following aspects: information content, utility, information transfer, benefits and drawbacks of PHVs. The focus groups lasted for approximately 90 minutes. After the focus group, the moderator and co-moderator reflected upon the discussions. All focus groups were transcribed by a professional transcriber. After analysing the results from the three focus groups all who participated were invited to a final seminar (member check) (Lincoln & Guba, 1985) where preliminary results were discussed and verified.

Analyses

Quantitative analyses

Item distributions were checked, and due to the low frequency of responses in answers (**I**) and to facilitate the interpretation (**II**), some items were dichotomised. Descriptive and analytic statistics were calculated in SPSS software version 24. The characteristics of the sample were described, and bivariate analyses were performed between dependent and independent items. Age was normally distributed; therefore, a t-test was used to compare the sample means. For comparisons of categorical items, between groups, chi-square test and sometimes Fisher's exact test (when the number of observations was under five) (Altman, 1991) were used. The significance level was set to the p-value <0.05. All items with a p-value ≤ 0.2 from the bivariate analyses were included in the logistic regressions.

In addition, the items included in the logistic regression models were tested for multicollinearity with linear regression (**I-II**). Problems with multicollinearity occur if tolerance <0.4 (Norman & Streiner, 2014) and variance inflation factor >2.5 (Glantz & Slinker, 1990). Internal dropouts for different items varied between 3- 156 (**I**) and 2-21 (**II**), except for the item age in paper **II,** which had 220 internal missing observations, and mean substitution (Westergren & Jakobsson, 2006) was therefore conducted.

With the help of logistic regression analysis Odds Ratios (ORs) were calculated to assess the association between the independent items and the dependent item (Norman & Streiner, 2014). To emphasise the positive aspects of the questions being asked during the PHVs, the Positive Odds Ratio (POR) (Ejlertsson et al., 2002) was calculated in the logistic regression models in paper **I**. Items in paper **I** were therefore positively coded, meaning that the negative answers to the questions were marked as a reference category in the analysis. This strategy results in the logistic regression model displaying a positive value on the OR (Ejlertsson et al., 2002). First (**I**), a logistic regression forward model was conducted then an enter model. Age and gender were forced into the enter model together with the items that remained significant from the later model. In paper **II,** ORs were calculated, with first a logistic regression enter model and then non-significant items were manually excluded one by one. Age and gender were forced into the final model to adjust the associations. In addition to the logistic regression model with the total sample in paper **II**, two separate logistic regression models were calculated, for men and for women, respectively. POR (**I**) and OR (**II**) with a 95% confident interval (CI) was used to determine significance. To determine model fit, Nagelkerke's R^2 was used, which explains the model's proportion of variance in the

dependent item, and Hosmer and Lemeshow's goodness-of-fit, which compares actual and predicted values and non-significant or small chi-square values indicate good model fit (Hair et al., 2019).

Qualitative analyses

In paper **III,** content analysis (Graneheim & Lundman, 2004) was used, and in paper **IV,** focus groups were analysed according to the approach described by Krueger (1988). NVivo software was used as an aid in the analyses to keep track of and sort the material. Furthermore, to strengthen and illustrate the results in the papers, quotations were selected from the individual interviews (**III**) and focus group discussions (**IV**). Both papers were discussed at scientific seminars, which contributed to clarifications and improved the vocabulary of the results.

Individual interviews

The individual interviews (**III**) were analysed according to Graneheim and Lundman (2004). First, I read and listened to the material from the interviews several times. Thereafter, content areas related to the aim were identified in the interviews. Then meaning units were identified from the content areas. This was done in separate interviews, by me and a co-author, and then our results were compared. Thereafter, I continued to identify meaning units in the rest of the interviews, and every meaning unit were given a code. Next, answers to the question: 'What do older persons experience as benefits from the support and advice given during the PHV?' were identified in the coded meaning units. The coded meaning units that answered the 'What' question were then sorted into categories representing the manifest level of analysis. In this phase comparisons between the codes were made to see similarities and differences, and similar codes were sorted into the same category. This was an interactive process between me and a co-author where we discussed and agreed upon the meaning units, codes, and categories. Verification of the codes and categories was done by another author not involved in the initial analysis. The question 'How do older persons experience the benefits from the support and advice given during the PHV?' represents the latent level of analysis and a deeper interpretation of the codes and categories. The answers to the 'How' question emerged during discussions among the authors, and the answers are represented in a theme, which reflects all the categories. Finally, all authors discussed and agreed upon the results.

Focus groups

In order to emphasise the discussions and the co-creation of knowledge, the focus groups (**IV**) were analysed according to Krueger (1988). In the analysis of focus groups,

the purpose is to identify discussions and highlight contents that evolve in the interplay between the participants. First, with the aim of the study in mind, the material was read and listened to several times to get an overview, observe trends, and patterns. Then, contents in the discussions from the focus groups were identified, related to the aim of the study. This process was implemented separately by me and a co-author, then results were compared. Thereafter, the contents of the discussions were synthesised into sub-categories and categories, answering the research questions 'Are there any obstacles to the potential use; if so, what are the obstacles?' and 'How can information be used to promote health among older persons on a societal level?'. From the last research questions a core category emerged representing a deeper understanding of the results. Furthermore, verification of results was done by the co-authors not involved in the initial analysis. Next, the member check was conducted, and the preliminary results were presented and discussed, which confirmed the results, and no new information emerged. Finally, all authors agreed upon the results.

Ethical considerations

Ethical considerations were taken into account and discussed throughout the research processes of the four papers. In all papers the Declaration of Helsinki (World Medical Association, 2018) was considered. The ethical review board in Lund, Sweden approved papers **I-III** (reference number 2018/849 and 2020-02343). According to Swedish legislation (*Lag om etikprövning av forskning som avser människor*, SFS 2003:460) there was no need for ethical permission in paper **IV**, since no sensitive personal data was collected and there was no obvious risk for any person who took part in the study.

Informed consent

Informed consent was considered in order to respect the persons who took part in the research, and to protect their rights to self-determination, and make sure the participation was voluntary (World Medical Association, 2018). In papers **I-II,** oral consent was obtained and recorded in the Pre-H register by the visitor. Before the visitor started registering answers in the register, the participants were given general information that answers to questions asked during the PHVs could potentially be used for research on a population level, if they consented. The visitor confirmed that the consent or decline to record answers for research would not affect their reception of the PHV, or any other care needed. In paper **III,** first after the PHV, the visitors informed presumptive participants about the study, and if they consented to participate, contact

information was transferred to me as a researcher. Thereafter, I phoned those who had agreed to take part, informed them again about the study, and asked if they wanted to participate. This repeated process of giving information and asking about consent gave the participants time to reflect about their participation. Before the interview started, I gave both oral and written information about the study, and if the persons agreed to take part, they signed the informed consent. In paper **IV,** the participants were informed about the study, first by email and phone, and then orally again before the focus group session started. In addition, written consent was obtained from the participants before the focus groups. Information given to the participants prior to the data collection phase (**III-IV**) included, for example, the purpose of the study, why they had been asked to participate, potential risks of taking part, how data was recorded and stored afterwards, contact information, whether they wanted data to be deleted and whether they had any other questions. Furthermore, the participants were informed about the voluntary nature of taking part and that they could withdraw whenever they wanted without saying why. Moreover, in paper **III,** participants were informed that taking part or not taking part in the research would not affect their reception of the PHV or any other care needed. However, there might always be a risk of a person feeling forced to take part; in order to avoid this, repeated opportunities to withdraw were given. To make sure the participants understood the information about the study and what it meant to take part they received both written and oral information about the study in advance, which allowed them to reflect and read the information. Furthermore, repeating the information before the interview and focus group started gave them a chance to ask questions about the study.

Confidentiality

In research it is important to protect the person's privacy and personal information; therefore, data material and contact information has to be handled confidentially (World Medical Association, 2018). In the papers with data from the register (**I-II**) no personal identification was transferred to the researcher; only the answers to every item included in the analyses. In papers **III-IV**, recorded data, transcripts and background information were handled only by researchers involved in the study and the person transcribing data handled audio-recorded data and transcripts. Contact information of the participants in papers **III** and **IV** was only handled by me and then destroyed directly after the data collections were completed. To respect the person's privacy, the decision was taken that one person should do all the interviews in paper **III**. Recording data via an online communication platform can violate the confidentiality due to security reasons with recording and being online at the same time. However, the focus groups did not handle any sensitive data, which minimised the risk of disseminating sensitive information. Directly after the focus group session the material was

downloaded to an external storage facility and deleted from the computer. Moreover, there is a risk that persons taking part in the focus group may violate the confidentiality by telling others about the discussions and who said what (Sim & Waterfield, 2019). However, aspects discussed during these focus groups might be beneficial to discuss in other contexts in order to utilise information compiled during the PHVs. To further consider the confidentiality, the transcripts were anonymised before being uploaded to the software programme used for sorting the material from the interviews and focus groups. When reporting the results and choosing quotes I was careful and reflected about confidentiality. Nevertheless, there is a risk of deductive disclosure, meaning that a person could be identified with the help of the quote; for example, if a person refers to something local or uses a typical expression, the person could potentially be identified by others knowing the local context (Sim & Waterfield, 2019).

Specific ethical considerations for the interviews and focus group discussions

The individual interviews have an increased risk of threatening participants' privacy by sharing thoughts and personal information. But the interview may also provide direct benefit to the participants. An interview always affects the person by evoking feelings and thoughts, and drives a reflective process, which could be both positive and negative (Patton, 2015). Therefore, I was attentive to negative feelings or whether the interview would evoke questions about participants' health. If needed I was prepared to give them guidance and referral information to health care. Furthermore, I let the person talk and made sure to not force them to tell things they did not want to share. Patton (2015) highlights, that the participants usually report a very good experience of being interviewed. My experience was that participants liked sharing their experiences with me and that they gained a feeling of meaningfulness by contributing their thoughts to research. In communication with the participants, I strived to establish a mutual relationship. There was reflection on the power embedded between the researcher and the participants (Karnieli-Miller et al., 2009). I strived to diminish this power, which can be frightening and may make the participants feel uncomfortable. To make the person more comfortable (**III**), I let the participants in the individual interviews decide when (by choosing the time and day for the interview) and where the interview would take place. In addition, to minimise the power between us and create a good atmosphere I had an informal chat with them before the interviews began. During the focus group discussions (**IV**), we (moderator and co-moderator) viewed ourselves as communicators who facilitated the communication of the message delivered and created by the participants, by letting persons discuss and be open to alternative thoughts. However, in relationships there are always power differences between persons (Tew, 2006). In the focus groups, unfriendly discussions could occur, for example if participants disagreed. Therefore, the moderator informed the participants about the voluntary nature of their

participation in the discussion and that if needed the moderator would interrupt the discussion. As researchers, we tried to communicate that it was the participant who was the expert in this context and about this subject under investigation, in an attempt to equalise any possible power imbalance.

Results

In the following section, results from papers **I-IV** are presented. First, health-promoting aspects of PHVs from an individual and a societal perspective are highlighted. Then, a synthesis is made to visualise the interrelation between the two perspectives.

Health-promoting aspects from an individual perspective

From an individual perspective health can be promoted during the PHVs by identifying mental, physical and lifestyle factors (**I**), and by giving support to persons with physical hindrances to social participation (**II**). Moreover, health can be promoted during the PHV from an individual perspective by the visitor giving support and advice that recognise and empower the person (**III**).

Paper **I** showed that older persons with good health who received a PHV reported significantly better mental factors. Compared to those with poor health they felt safer, had better sleep, less loneliness, less sadness, less anxiety, fewer worries about the future, were more satisfied with their lives, were able to do things that made them feel valuable, and did not have reduced energy. In addition to mental factors, physical factors seen in the group with good health were: not having impaired endurance, greater abilities in daily activities, no physical problems affecting participation in social activities, no pain, being urinary continent, and no digestive problems. Furthermore, lifestyle factors seen in the group with good health were: physically active several times per week, good appetite, no weight loss, rarely used alcohol, used smartphones and computers (**I**).

In paper **I**, POR was calculated for items associated with good health and adjusted for age and gender among older persons who received a PHV. The following items were significantly associated with good health: being able to do things that made one feel valuable, having no physical problems affecting participation in social activities, not feeling sad, not having reduced energy, and not having impaired endurance (see Table 3) (**I**).

Table 3 Logistic regression model, factors associated with good health. Total sample adjusted for age and gender (n=565) (results from paper **I**).

	Good health POR (CI 95%)
Age	1.02 (0.91–1.14)
Gender	0.85 (0.51–1.43)
Able to do things that make one feel valuable	5.72 (3.01–10.87)
No physical problems affecting participation in social activities	4.38 (2.38–8.06)
Not feeling sad	4.07 (2.31–7.15)
Not having reduced energy	3.44 (1.37–8.65)
Not having impaired endurance	2.91 (1.18–7.19)

CI=confidence interval, POR=Positive Odds Ratio. None of the items showed multicollinearity; tolerance 0.42–0.69 variance inflation factor 1.45–2.37. Hosmer-Lemeshow goodness-of-fit test, X^2=10.50, p=0.16; Nagelkerke R^2=0.46.

Since, having no physical problems affecting participation in social activities was associated with good health among older persons who received a PHV (**I**) this was important to identify in paper **II**. In paper **II**, those with physical problems that hindered them from taking part in social contexts also reported more challenges with physical factors (e.g., pain, impaired endurance, vision problems) than those not reporting that physical problems hindered them from taking part in social contexts. Among older persons who received a PHV the following items were significantly associated with physical problems hindering taking part in social contexts: having urinary incontinence, having pain, impaired endurance, and using a mobility device. Furthermore, not feeling satisfied with life, and not independently managing transportation were also associated with physical problems hindering taking part in social contexts (see Table 4). However, when separating men and women, urinary incontinence and not independently managing transportation were significant among women only (**II**).

Table 4 Logistic regression model, physical problems hindering social participation. Total sample adjusted for age and gender (n=1,197) (results from paper **II**).

	Physical problems hindering social participation OR (CI 95%)
Age	0.93 (0.84–1.03)
Gender	1.10 (0.79–1.52)
Not satisfied with life	2.38 (1.54–3.67)
Not independently managing transportation	2.20 (1.17–4.12)
Urinary incontinence	1.85 (1.28–2.68)
Pain	2.27 (1.63–3.18)
Impaired endurance	2.38 (1.66–3.42)
Mobility device	3.29 (2.31–4.68)

CI=Confidence Interval, OR=Odds Ratio. None of the items showed multicollinearity; tolerance 0.72–0.95 variance inflation factor 1.09–1.37. Hosmer-Lemeshow goodness-of-fit test, X^2=12.53, p=0.13; Nagelkerke R^2=0.28.

In paper **II**, mean substitution of missing values (n=220) for age did not change the outcome from the logistic regression analysis compared to when no mean substitution

was used. Thus, the items significantly associated with physical problems hindering taking part in social contexts shown in Table 4 are the result of a logistic regression model using the total sample with mean substitution for missing values on age (**II**).

Moving on to paper **III**, here older persons' experiences of the benefits gained from the support and advice given during the PHV were explored. Older persons described the benefits gained as feeling recognised, feeling of control, and feeling prepared. These feelings contributed to a holistic picture of the support and advice as creating conditions for the person to become empowered and recognised as a person.

The interviews revealed that older persons felt recognised due to the support and advice given in the dialogue during the PHV, based on the assessment of the person's health, behaviour, and the environment. Older persons experienced a feeling of being listened to; the supportive dialogue made them feel visible and generated a sense of inclusion. In addition, older persons said that the support generated a feeling of inclusion in society, which made them recognised as human beings. Another example of support given that created a feeling of being recognised was when the visitors told the person that they had the ability to master challenges.

In addition, the interviews showed that older persons became empowered by the support and advice given during the PHVs. Older persons said that the support made them reflect and increased their awareness about health, which brought about a feeling of control. For example, older persons expressed that they gained insights about healthy behaviour and about aspects, such as eating habits, that they could change to improve their health. The interviews highlighted that the support and advice generated insights, for example about nutritional aspects, which they had not thought about. Moreover, older persons felt reminded of healthy behaviours and that they were doing many things that were good for their health, which developed a feeling of control. The older persons described that information given about future possibilities related to for instance accommodation, assistance or aid they could get, created a feeling of preparedness for future events. Concurrently, the older persons said that because of the support and advice given during the PHV they felt boosted and gained energy to live as well as faith and hope for the future (**III**).

Health-promoting aspects from a societal perspective

From a societal perspective, health-promoting aspects were identified through focus group discussions with persons in leading positions (**IV**). The discussions revealed perceptions of how the information compiled during the PHVs could be used on a

societal level to promote health among older persons. The focus group discussions showed that by using the information from the PHVs on a societal level it was possible to enable an inclusive society. The inclusion was represented in discussions about how information could be used for monitoring determinants of health and enabling exchange of information. The focus group discussions visualised how information compiled during the PHVs could be used to identify assets, challenges, shifts, trends, and future needs in society. For example, identifying societal assets (good housing conditions) or challenges (unsafe environments), mainly from the statistical data compiled during the visits, enabled monitoring of health determinants. In addition, the focus groups revealed that the information from the PHVs could be used to help identify a future need of senior housing and to show how older persons would live.

Moreover, data could be utilised for an exchange of information in terms of internal communication, external communication, and participation of older persons. The focus group discussions gave examples of internal communication within the health and welfare organisation between visitors and persons in leading positions. An example of external communication was to use information in communication with persons working with infrastructure or construction, stakeholders, and politicians outside the organisation. In addition, the participation of older persons could be enabled by discussing the information compiled during PHVs with them. Another suggestion to enable the participation of older persons, highlighted in the focus groups, was to utilise older persons' opinions expressed during the PHVs on a societal level. Thus, using the information compiled during the PHVs for monitoring health determinants and exchange of information could possibly enable an inclusive society that would represent persons who did not usually participate in societal decisions.

However, the monitoring of health determinants and exchange of information was affected by obstacles. Obstacles to the use of the information compiled during the PHVs were described, as information tended to be retained by the own organisation, and there was a need for improved understanding of the statistical data. During the focus group discussions, they talked about a need for more qualitative information to gain a deeper understanding of the statistics, and quantitative analysis to investigate reasons for challenges visualised with the help of the data. Moreover, the focus groups stressed that it was difficult to transmit information concerning older persons' health outside the own organisation. They saw the value of the information, but highlighted hindrances to conveying the importance of the information to others not working with older persons' health (**IV**).

Inclusion, assets, and preparedness – three health-promoting aspects

From the individual and societal perspective, three health-promoting aspects have been developed based on a synthesis of the results; inclusion, assets, and preparedness (see Figure 3). The three aspects can be found in both perspectives. PHVs can potentially enable the inclusion of older persons in society (**II-IV**), identify individual and societal assets (**I, III, IV**), and prepare both the person and society for the future (**III-IV**).

First, PHVs could enable the inclusion of older persons in society. Inclusion of older persons could be seen in the individual perspective, in terms of older persons feeling included in society and recognised as human beings, from the support and advice given during the PHVs (**III**). Moreover, paper **II** visualises the interrelation between physical hindrance and social participation and by supporting this through the PHVs, inclusion could be enabled. From the societal perspective, inclusion within society could be enabled by using the information compiled during the visits on a societal level to promote health (**IV**), for example, by transmitting older persons' opinions and the compiled statistical data from the visits to persons in leading positions (**IV**). *Second*, both individual assets and societal assets could be identified with help of the PHVs. Individual assets could be identified through the questions asked during the visit, which highlight the absence of risks (e.g., not feeling sad, not having reduced energy) that could be turned into assets (**I**). Moreover, during the PHV, support could be given that emphasises healthy behaviours and the person's ability to master challenges, which could highlight individual assets (**III**). Societal assets present in this population could be identified in the information compiled during the PHVs, representing different health determinants (**IV**). *Third*, the PHVs could prepare both the person and society for the future. From the individual perspective, a feeling of preparedness could be generated, by giving support that makes older persons feel prepared for eventual future events (**III**). Finally, from a societal perspective, the opportunity is given to prepare for the needs of future generations by using the information from the visits to identify future needs in society (**IV**).

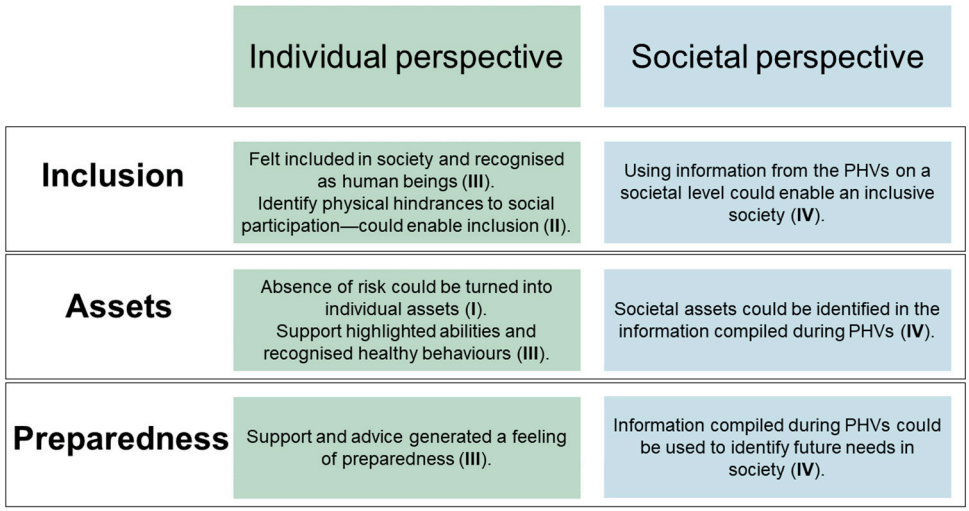

Figure 3 Three health-promoting aspects of preventive home visits (PHVs) for older persons, developed from the individual and societal perspective; inclusion, assets, preparedness.

Discussion

General discussion

From the four papers included in this thesis, knowledge of possible health-promoting aspects of PHVs for older persons from an individual and a societal perspective has been developed. The three different aspects (inclusion, assets, and preparedness) that emerged from the syntheses of the results will be discussed as the major insights from the thesis. First, the results from this thesis showed that PHVs can enable an inclusive society of older persons both from an individual and a societal perspective. Second, the results showed that with help of the PHVs individual and societal assets can be identified. Third, PHVs can prepare both the person and society for the future. Finally, I will discuss the possibility for the PHV to become a comprehensive multilevel intervention that promotes health among older persons.

First, PHVs can enable an inclusive society that promote health among older persons. The results from this thesis showed that PHVs can enable an inclusive society from an individual and a societal perspective. PHVs were described both by older person themselves (**III**) and persons in leading positions (**IV**) as an approach for increasing inclusion in society. From the individual perspective, older persons felt included in society when the visitors listened to their thoughts (**III**). The results also indicated that to further promote inclusion, the presence of physical barriers to social participation can be discussed with the older person during the visit (**II**). This is in line with the SDGs that also highlight the importance of reducing hindrances to social participation and enabling an inclusive society, which is important to promote health (WHO, 2017b, 2020a). Furthermore, the present results are in line with an interview study where older persons said that PHVs made them visible and part of society (Behm et al., 2013). In addition to the results shown from the individual perspective, the present results showed that from a societal perspective inclusion can be created by using the information compiled during the visits. For example, persons in leading positions can communicate the information from the visits, in terms of older persons' thoughts, to persons working on infrastructure and construction (**IV**). Thereby societal actions could be taken which benefit older persons. In international policies, inclusion is highlighted as an essential aspect to create a sustainable and age-friendly society that can promote health (United Nations, 2015; WHO, 2020a). For instance, SDG

number eleven focuses on "Make cities and human settlements inclusive, safe, resilient and sustainable" (United Nations, 2015, p. 21). In addition, the report *Decade of healthy ageing 2020-2030* highlights that persons in leading positions are encouraged to listen to and engage a diverse range of older persons to enable healthy ageing (WHO, 2020a). The present results showed that it is possible with the help of the PHVs to include a diverse range of voices in decision-making (**IV**). Thus, by considering PHVs as a health intervention for increased inclusion, a move towards an age-friendly society which promotes older persons' health is possible.

Second, older persons' health can be promoted by identifying important individual and societal assets with help of the PHVs. The results from the present thesis showed that questions asked during the visit could highlight the absence of risks. For example, 'not feeling sad' or 'not feeling impaired endurance' could be seen as assets and acknowledged in the dialogue during the PHVs (**I**). Moreover, in the dialogue support could be given that emphasises healthy behaviours and the person's ability to master challenges, which can contribute to a feeling of being recognised (**III**). In addition, societal assets could be identified in the information compiled during the PHVs, and health determinants are made visible by identifying societal assets (**IV**). In research, health assets have been defined as factors which enhance the ability to maintain health (Morgan & Ziglio, 2007). Moreover, previous research shows that different assets such as social network, financial resources, good housing conditions, and education can contribute to good health in old age (Hornby-Turner, 2017). However, the major focus in research and practice has been on identifying risks (Duplaga et al., 2016; Fagerström et al., 2009; WHO, 2017a); on the other hand, to promote health the focus needs to be on assets which can contribute to good health. In a recent study, the important role of health professionals as facilitators for understanding, identifying, utilising, and maintaining the person's assets was highlighted (Seah et al., 2020). However, to identify important assets, questions targeting assets have to be added to the questionnaire used in Pre-H. It might not be enough to turn questions focusing on risks into assets; there is a need for more direct health-promoting questions, identifying, and emphasising individual and societal assets. Previous research has shown that health assets can be identified at multiple levels, from the individual to the societal (Van Bortel, 2018). PHV is one example of a health intervention that gives the possibility to identify both individual and societal assets, which can be utilised both by the person and society, and can thereby contribute to maintained or improved health.

Third, with help of the PHVs, older persons and society can prepare for the future. The present result visualised that support and advice given during the visit could generate a feeling of preparedness (**III**). As an example, support in terms of information about future accommodation and the type of assistance older persons could get from the

municipality made them feel prepared for future challenges. This is in line with previous studies which showed that older persons experience the PHVs as a preparation for future challenges (Behm et al., 2013; Tøien et al., 2015). From a societal perspective, the present results showed that information compiled during the PHVs could be used as an aid to predict future needs of housing, and thereby prepare society for the future (**IV**). Previous research has shown favourable effects of planning for the future in old age, such as better mental health (Pinquart & Sörensen, 2002; Sörensen et al., 2012). The concept of proactive coping (Aspinwall & Taylor, 1997) has been used in the scientific literature. Proactive coping was defined by Aspinwall and Taylor in 1997 as actions taken by the person to modify or prevent possible future negative events. Further it is described as an approach used for the accumulation of general resources (e.g., financial, and social support networks) and skills for any potential future events (Aspinwall & Taylor, 1997). During different age-periods the preparation seems to have different focuses, such as physical activities, looking for hobbies, the age-appropriate housing situation and eventually care needs (Kornadt & Rothermund, 2014). The concept proactive coping could inspire and help the visitor during the PHV when supporting the older person with the preparation for future events. However, proactive coping does not discuss how society can prepare for future generations. PHVs offer the possibility to at the same time prepare both the person (**III**) and society for future challenges and needs (**IV**). Thus, preparation of both the older person and society might lead to coordinated actions, where the visitor prepares the person by giving information about future housing in the municipality. At the same time persons in leading positions have the possibility to prepare society for this generation in accordance with the population's needs.

Now, I turn to discuss PHVs' potential to adopt a comprehensive multilevel approach, which consider' health promotion and risk prevention both on an individual and a societal level. The health development model emphasises the importance of comprehensive interventions that address both risk prevention and health promotion to develop health (Bauer et al., 2006). Previous research has identified risk prevention aspects of the PHVs (e.g., Fjell et al., 2018; Hammarlund et al., 2016; Westergren et al., 2014) and the present results contribute important knowledge concerning health-promoting aspects of the PHVs (**I-IV**). The present results identified health-promoting aspects on both an individual and a societal level, and the interrelation between the levels is exemplified (**I-IV**). One example of this interrelation between persons who receive PHVs and society is when information is transmitted from the older person to persons in leading positions (**IV**). One factor identified in research, which makes it difficult to create a multilevel intervention, is the challenges with communication between levels (Schölmerich & Kawachi, 2016), which might be important if one wants

to establish an interrelationship. However, this thesis gives examples where information compiled during the PHVs could enable this communication between older persons and society (**IV**). Nevertheless, the present results showed obstacles to communicating information outside the health and welfare organisation (**IV**), and these have to be further addressed in the effort to create a multilevel intervention.

Moreover, the PHV could hypothetically act as a generator for health-promoting actions on an individual and a societal level. The person and society could take actions based on the health-promoting aspects identified from the different perspectives (**I-IV**). Actions taken by the persons and society could then result in maintained or improved health among older persons. Furthermore, health-promoting aspects identified from the individual perspective could lead to action on a societal level. To my knowledge, PHV has never been acknowledged as a multilevel intervention before, where health-promoting actions can occur on an individual and a societal level simultaneously. Previous research (Allegrante, 2015), and theories such as the social-ecological theory (Stokols, 1996), and the health development model (Bauer et al., 2006) emphasise the importance of multilevel interventions. However, interventions which simultaneously act at different levels have rarely been seen; more commonly, the intervention is focused on either an individual or societal perspective (Golden & Earp, 2012; Seah et al., 2019). Given the results from the present thesis it is possible to take health-promoting actions on different levels and stimulate an interaction between levels, with the help of the PHVs.

Methodological considerations

I now turn to methodological aspects worth considering in this thesis. A methodological strength of the thesis is its use of both qualitative and quantitative research designs, which gives broader perspectives of the phenomenon under study (Verhoef & Casebeer, 1997). The purpose of the research guided the choice of its design. By using different designs (qualitative and quantitative) in different papers, knowledge of possible health-promoting aspects of PHVs for older persons from an individual and a societal perspective were developed. I will now more explicitly discuss strengths and limitations of the quantitative and qualitative research. First, methodological considerations in the quantitative research (**I-II**) will be discussed with the help of the concepts of internal and external validity. Thereafter, the trustworthiness of the qualitative research (**III-IV**) will be discussed in relation to the themes of credibility, transferability, dependability, and confirmability.

Internal validity

Internal validity is defined as the ability to draw accurate conclusions about the data, which is dependent on events or decisions within the *study design*, *sample*, *items*, and *analyses* (Creswell & Creswell, 2018). The following discussion is structured in relation to the four properties considered in the method sections (study design, sample, items, and analyses) in papers **I-II**. *First*, I present a reflection about the choice of design. In papers **I-II,** cross-sectional designs were used. The strength of the cross-sectional design is that it gives a good overview of the items' frequencies, the relationships between the items, and clarifies the association between the independent items and the dependent item (Björk, 2019). Still, there are limitations with this design, for example nothing could be said about the causal relationship between dependent and independent items (Altman, 1991). With a cross-sectional design, dependent and independent items are measured at the same time, which makes it hard to be sure about the direction of the association (Altman, 1991). To illustrate, I assume that 'being able to do things that makes you feel valuable' is associated with good health; however, it could be the other way around as well. To consider such challenges, a longitudinal design is needed (Altman, 1991). Furthermore, the cross-sectional design gives a snapshot of the person's subjective experience, which can change fast and be affected by different circumstances, for instance, daily mood or a recent life-event, and the relationship between the visitor and the person can affect the experience.

Second, considerations about the sample included in the papers (**I-II**) will be discussed. Participants were consecutively asked to take part in the studies. This sampling strategy has the advantage of minimising the effect of seasonal differences (Polit & Beck, 2016). Furthermore, one can assume that a sufficient number of participants have been included in the papers (n=619 (**I**) and n=1,245 (**II**)), which strengthens the validity. Norman and Streiner, (2014) recommend 20 persons per item to get valid results from the logistic regression models. This recommendation indicates that the sample size in paper **I** was a little small, but in paper **II** it was sufficient. However, too many participants can result in a type I error, finding an effect which is not true (Norman & Streiner, 2014). On the other hand, if the sample is too small there is a risk of concluding that there is no difference in the sample, when there actually is a difference in the population, that is, a type II error (Norman & Streiner, 2014). However, the risk for a type II error in papers **I** and **II** is of less concern. The number of missing observations varied quite considerably between the items (from two to 220), which could decrease the validity of the results. On the other hand, when looking into the characteristics (such as age, gender, and habitation) of persons with missing observations they did not differ from the rest of the sample, indicating that the missing observations potentially did not decrease the validity.

Third, I will turn to considerations concerning the items included in the papers (**I-II**). The items extracted from the register are not primarily made for research; instead they are made to fit practice, which entails both strengths and weaknesses. A strength is that the questions asked are inspired by validated risk assessment tools; however, they are modified before being included in the questionnaire. On the other hand, the questions used in Pre-H were well used in practice by different municipalities before ending up in the questionnaire, which indicates increased face validity and relevance for practice. A weakness is that it could not be guaranteed that questions were asked in exactly the same way. The questions were asked in a dialogue with the older person and might have been asked differently depending on who was asking, which could have affected the internal validity and reliability (Creswell & Creswell, 2018). In addition, there might be a risk of random error when the visitor has to be attentive to the person and the dialogue, and at the same time must record the answers. However, by increasing the sample size, the risk of random errors diminishes (Altman, 1991). Another limitation is that the visitors did not get any training on how to ask structured questions used for research, which could have increased the reliability of the results. On the other hand, it could have affected the primary purpose of the visit if the visit had been too formal. Moreover, to increase the reliability, inter-rater agreement could be tested, where comparisons between two raters' registrations are made (Altman, 1991). However, most of the visitors had conducted PHVs for many years and shared their knowledge during the working group meetings, which is likely to have made their execution of the question process consistent.

Furthermore, items used in papers **I-II** have not been validated in this population, which makes it difficult to know if the persons interpreted the question as intended. On the other hand, presumptive persons to be offered PHVs were involved in the development of the questionnaire, which might increase the validity. Moreover, items appearing after one another in the questionnaire could affect the answers to the questions, which might result in the next answer being biased by the answer to the previous item. Furthermore, all questions are single items (e.g., social participation and self-rated health), which raises concerns about whether a single item can capture the intended phenomena. However, it has been shown in research that self-rated health as a single item is a good indicator of a person's health (Bowling, 2005). Asking one question instead of a whole battery of questions to assess one phenomenon reduces the burden for both the person asking as well as the person answering. Between papers **I** and **II** the questions asked did change. Questions asked to assess mental aspects of health were replaced by a question about life satisfaction. Therefore, in order to adjust for mental aspects that could affect the association between physical factors and participation in social context the item 'satisfied with life' was used. Since research has

highlighted associations between mental health and being satisfied with life (Lombardo et al., 2018), the item 'satisfied with life' seemed to be appropriate to use in paper **II** in order to adjust for mental aspects of health.

Fourth, considerations about the analyses used in the papers (**I-II**) will now be discussed. The choice of analyses and decisions taken in relation to analyses could have affected the validity. Before the analyses, some items were dichotomised in order to facilitate the interpretation of the results. However, by dichotomising the items there is a risk of missing nuances in the results (Manor et al., 2000). The selection of items to be included in the papers was based on discussions among the authors of the papers. Different criteria for selecting items to be included in the logistic regression model have been suggested in the scientific literature (e.g., theory, previous research, expertise, or statistics) (Chowdhury & Turin, 2020; Stoltzfus, 2011). The literature suggests basing the selection of items on statistics when there is a large number of items, and to include items with a p-value larger than 0.05 in the logistic regression. This procedure will reduce the risk of missing important items in the logistic regression model (Chowdhury & Turin, 2020; Stoltzfus, 2011). Thus, to select items for the logistic regression models, all items with a p-value ≤0.2 from the bivariate analyses were included, in order to minimise the number of items without losing any item of importance. However, to further increase the validity, the selection of independent items in paper **I** could be made based on a review of the literature (Stoltzfus, 2011). Nevertheless, the purpose was to determine which of the items used in the PHVs could be associated with good health. It was therefore appropriate to include all items that had a possible reason to be associated with good health from the questionnaire in the study.

Moving on to the logistic regression models, POR was chosen in paper **I** to clarify the positive aspects, and in paper **II** the focus was on challenges; therefore, OR which is normally used in logistic regression was chosen. Choosing to use POR and OR when more appropriate hopefully clarified and simplified the interpretation of the results. Moreover, different approaches to conducting the logistic regression models were chosen in the two papers. In paper **I**, first a logistic regression forward model and then an enter model were conducted. To use a forward model first seems to be appropriate for selecting items to be included in the final model; however, it could lead to the exclusion of important items (Chowdhury & Turin, 2020). Therefore, to improve control over the data, I manually excluded non-significant items in paper **II** and did not let the algorithm decide whether to include items or not. To test the fit of the logistic regression models, Hosmer and Lemeshow's test and Nagelkerke R^2 are recommended by Norman and Streiner (2014). The Hosmer and Lemeshow's test resulted in non-significant and small chi-square values in both papers **I** and **II**, which indicated good model fit (Hair et al., 2019). The proportion of total variance explained

by the model (Nagelkerke) was high in paper **I** and lower in paper **II**, which indicated that other factors not included in the models could explain the variations in the dependent items. In paper **II**, substitution of mean for age was carried out. However, the logistic regression models showed similar results with or without substitution, but a narrower CI after the substitution. By imputation of means for all persons with missing values for age the sample size included in the logistic regression model increased, which in turn made the CIs narrower, and increased the power of the analysis (Westergren & Jakobsson, 2006).

External validity

External validity is defined as the extent to which the results are applicable in the intended population, other contexts, and future situations (Creswell & Creswell, 2018). By using register data from the PHVs, these two papers (**I-II**) have created a better understanding, in terms of health promoting aspects of the questions asked during the visit. To situate the research in an existing project (Pre-H) and an established intervention (PHV), co-created, owned, and financed by the municipalities' own regime has advantages. By using data from the Pre-H project, the generalisability of the results to this population who receive PHVs increases. The results can probably be generalised to older persons living at home without home care, in the age span of 77-83 years old. However, there is no information about non-participants in Pre-H, which makes it hard to draw any conclusions about how or if these persons differ in any characteristics from the ones taking part. This contributes to an increased risk of selection bias (a systematic difference between those who take part and those who do not) (Björk, 2019). Previous research shows that persons who are financially secure (Yamada et al., 2012), with poor psychological health and high social participation (among women) (Avlund et al., 2008) are more likely to accept a PHV invitation. Moreover, persons from ethnic minority groups and from deprived areas have been recognised as persons who are hard to reach in health interventions (Liljas et al., 2017). However, it is difficult to draw any conclusions about the group who did not take part in Pre-H. Within Pre-H, on average 75% accept the invitation and receive a PHV; nevertheless, the acceptance rate varies between the municipalities. There are different hypotheses among the municipalities about what has an impact on the acceptance rate. For example, one idea is that persons around 77 years old are more active today; they are busy with activities and therefore decline to take part in a PHV. In addition, it seems that in smaller municipalities the older persons' positive experiences from the PHVs spread from "mouth to mouth" and increase the likelihood of older persons accepting the invitation to a PHV. Furthermore, there is reason to believe that how older persons understand the purpose and the relevance of the PHVs has an impact on

participation rate. This has been investigated in a qualitative study, which highlighted that the purpose of the visit might not be clear for the older persons (Tøien et al., 2014).

The target group for PHVs is older persons 77 years or older without home care. Generalisation beyond this population must be made with caution. The Swedish context and this specific model for PHVs can affect the generalisability to other health interventions, but patterns seen in the results could possibly be used in other contexts to promote good health among older persons. Furthermore, it is difficult to know about the future, and for how long the results would be sustainable. The ageing population is changing; take the use of technology as an example. In the future, technology might have a greater impact on the possibilities for promoting health. The pandemic situation (COVID-19) changed the world in many ways. One can for example assume that the use of technology among older persons increased and that the social participation during the pandemic decreased. Situations like this and the rapid technology development make it challenging to predict the sustainability of the results. However, since this research is situated in a transdisciplinary project one can assume that the sustainability of the results is sufficient (Knapp et al., 2019). Transdisciplinary projects are context-driven and involve collaboration between different scientific fields and non-academic partners (Knapp et al., 2019). Pre-H can be recognised as a transdisciplinary project where scientific fields such as health, caring, public health and medicine collaborate with practitioners working in the municipalities. One strength of transdisciplinary projects is that they enable for practice-based evidence to be acquired. Research conducted within an intervention that is established in practice can be more relevant, usable, and tailored towards practice (Green, 2008); however, it might have negative consequences for the generalisability beyond that particular context, because the research is situated within a specific context.

Trustworthiness

Trustworthiness in this thesis has been discussed in the light of Lincoln and Guba's book *Naturalistic Inquiry* (Lincoln & Guba, 1985). To establish trustworthiness, four concepts have guided the qualitative research processes in papers **III** and **IV**: credibility, transferability, dependability, and confirmability. Credibility entails asking the question; is this the truth of the results? Transferability concentrates on the applicability of the research; are the results applicable in other contexts and among other participants? Dependability considers the consistency in the research; if researchers repeat the studies with similar participants and in similar contexts would the results be the same? Confirmability, considers the neutrality in the research; are the results based on the data from the participants and not biased by the researchers' interests? In the

following section I will highlight a few important points which can increase or decrease the trustworthiness of the results. The structure for the considerations will start off in the broader context and then concentrate on decisions taken in relation to samples, data collections and analyses.

During my doctoral education I have engaged in many activities that increased my understanding of the context and made me familiar with the Pre-H model. I have participated in meetings with the steering committee and the working group of Pre-H. Furthermore, to understand more about Pre-H and PHVs I followed a couple of visitors in different municipalities to observe their visits. These activities have helped me understand the Pre-H model and how the visits are conducted. This engagement has also made it possible for me to describe the Pre-H model and the context in which the thesis is situated. Furthermore, it facilitated my interpretation of the results, and I could better understand what the participants talked about when I conducted the individual interviews. The engagement has also introduced me to the project culture, and I have created trustful and mutual relationships with the visitors in each municipality, where the visitors feel that they can contact me and discuss different issues, and I feel that I can contact them if I have questions about the project. I would say that this type of engagement could be considered as prolonged engagement, which is important for strengthening the credibility of the results. Furthermore, it could strengthen the transferability due to my ability in writing up thick descriptions of the contexts, which helps the reader to judge the degree of transferability of the results to other contexts.

Turing to methodological considerations regarding the samples in papers **III** and **IV**. Participants in paper **III** were consecutively asked to take part in an individual interview, and this might have increased the chance of getting a diverse sample. The sample became diverse in gender, level of education, and settlement. After conducting ten interviews no new information emerged, but to ensure this, three more interviews were conducted. Thereafter, the recruitment process stopped. Although no new information had emerged, there might be persons who do not experience the support and advice as positive as the participants did. However, it might be difficult to reach persons who dislike the PHVs and persuade them to accept a research interview. In paper **IV**, purposive sampling was used to reach persons who could discuss the research questions and who were rich sources of information about the subjects discussed. A decision was made to create groups that were heterogeneous (representing different municipalities) in order to get variation in the perceptions and dynamic discussions. The groups were also homogeneous (from the same leading position) in order to make the participants feel comfortable talking about and sharing their perceptions. Moreover, the groups become heterogeneous in characteristics such as level of education, year in

current position, and gender, and quite homogeneous in regard to age. Overall, the group compositions were satisfactory, and the discussions become lively and generated many perceptions, and ideas were built on one another, which was the aim of choosing focus groups instead of individual interviews. According to the member check conducted in paper **IV** the material was judged as extensive and varied, despite the quite low number of participants (n=12). Both in papers **III** and **IV**, participants from different municipalities were recruited, and in paper **IV**, persons from different leading positions. This could be recognised as one aspect of triangulation, that is, to use material from different sources, and it strengthens the credibility of the results.

Different data collection methods were chosen in papers **III** and **IV**. In the initial phase of the data collections, multiple debriefing sessions (peer debriefing) were held among the co-authors to develop the interview guide (**III**), the questioning route (**IV**) and the design of the studies. Furthermore, in paper **IV** the questioning route was tested with colleagues in the format of a tentative focus group, and after this session a debriefing seminar was held to evaluate the procedure, which helped to clarify it and improved the confidence of the moderator and co-moderator in the procedure. Individual interviews were chosen in paper **III** to allow persons to recount their individual experiences. On the other hand, in paper **IV**, focus groups were conducted, which was fruitful for generating new ideas. Conducting the focus group discussions via an online communication platform could have had an impact on the credibility. This procedure to collect data was chosen due to restrictions on meeting in person caused by the COVID-19 pandemic. Advantages seen when conducting the focus groups with the help of this platform were that it seems to save time for the participant to take part online. This might increase the likelihood of reaching persons who had not agreed to take part due to travel distance. Despite the online format the discussions were very lively, possibly due to the COVID-19 pandemic, the participants were used to communicating with one another online. However, the interaction between the participants can be affected by online sessions, for instance, it is difficult to keep eye contact, understand full body language, and acknowledge the person who is talking. An additional aspect of data collection is member checks, which can increase the credibility of the results. With such checks, one goes back to the participants and asks them about the preliminary interpretations of the results, and if they perceive them as correct. This was not done with the older persons in paper **III**. However, the first output from the analysis (**III**) was presented for the visitors and they confirmed that they experienced the same response from the persons they had visited as the results showed. Member checks can impose some ethical challenges (Karnieli-Miller et al., 2009), for example they require permission to save contact information so that the participants can be reached again. Another challenge with member checks is that not

all participants had the same experience. Meanwhile the results must represent diverse experiences from all participants; therefore, a member check can potentially be challenging if someone does not agree with the interpretation. In paper **IV**, the member check was more appropriate, because the purpose of focus groups is to find the collective perspective rather than individual aspects.

I now move on to methodological considerations regarding the analyses in papers **III** and **IV**. In paper **III**, content analysis (Graneheim & Lundman, 2004) was used to analyse the interviews. This approach made it possible to go from a manifest level of analysis to a latent level of analysis, and thereby explore individual experiences. The focus groups were analysed according to Krueger (1988). This approach was appropriate in order to focus the analysis on the discussions between the participants. To increase the probability of credible results, another type of triangulation was used in the analyses. The initial part of the analyses was carried out separately by the co-authors and then verified by co-authors not involved in the initial analyses. This approach made it possible for the co-authors to confirm or disagree with the interpretations, and made sure that they were not biased by our interest or pre-understanding. Furthermore, to increase the transparency and ability to assess the interpretations, the software programme NVivo was used to keep track of the codes (**III**) and discussion contents (**IV**). This made it easy to go back and forth from the raw data to the codes or discussion contents. NVivo also made it possible for all in the research team to read the transcripts, follow the interpretation back to raw data and judge the codes and categories created. Moreover, recording all interviews and focus group discussions allowed co-authors to check the interpretations against the original data, which made the analyses more transparent. Moreover, peer debriefing was conducted through scientific seminars, where colleagues mainly other doctoral students outside my project, asked probing questions and requested clarification of the interpretation of the results. To further increase the dependability, I wrote reflective notes during the research process. In the notes I wrote about my first impression and analysis from the interviews and focus group discussions. The reflective notes helped for me to recall when I conducted the analyses of the texts, which might increase the dependability and lower the risk of missing important issues. When presenting the results in the papers, quotes from the interviews and focus groups have been presented to help the reader to assess the confirmability.

Conclusions

The intention of this thesis was to develop knowledge of possible health-promoting aspects of PHVs for older persons from an individual and a societal perspective. The results shed light on PHVs from a novel multilevel perspective, showing how health-promoting actions can occur simultaneously on an individual and a societal level. In the syntheses of the results, health-promoting aspects of the PHVs were highlighted: PHVs can enable an inclusive society, identify individual and societal assets, and prepare older persons and society for the future. Furthermore, health-promoting aspects identified from an individual perspective could be considered on an individual level as well as at a societal level. Thus, the PHV has the potential to become a comprehensive multilevel intervention.

Implications for practice

In practice, the results from the present thesis can give guidance to health professionals and persons in leading positions concerning the development of PHVs. The results can be used at an individual and a societal level, as indicated below.

At an individual level:

- the PHV needs to take a comprehensive approach, which includes both health promotion as well as risk prevention. Questions asked during the visit should reflect both factors that can contribute to good health and risk factors which can lead to poor health.
- conducting an assessment of the person's health, behaviour, and home environment during the PHV seems to generate beneficial advice and support for older persons.
- the visitor should recognise the person and their assets in a supportive dialogue during the PHV. Questions asked during the PHV that are focused on risks could be turned into assets and possibly have a positive impact on older persons' health.
- conditions for the person to become empowered can be created with help of the support and advice given during the PHV.
- health could potentially be promoted during the PHV by having a dialogue about the person's possibilities to do things that they value and to participate in social activities.

- if the person experiences physical hindrances to social participation this could be discussed during the PHV to enable inclusion.
- the visitor should be aware of the interrelation between different factors assessed during the visit, such as between physical challenges and social participation.

At a societal level:

- information from the PHVs can be used by persons in leading positions to create a society that promotes older persons' health.
- by using the information, persons in leading positions within the municipality can enable an inclusive society that represents older persons who do not usually take part in decision-making.
- the information can be used for monitoring determinants of health and for information exchange, both internally (within the own organisation) and externally (outside the own organisation).
- obstacles exist to interpreting the information and communicating it outside the health and welfare organisation. These obstacles should be considered in future work on the use of the information compiled during the PHVs.

Further research

From the research included in this thesis I have gained many new insights; however, doing research gives rise to new questions, which generate a need for more research. Further research is needed to:

- clarify how to systematically compile and utilise the qualitative information (e.g., observations made by the visitor or older persons' thoughts expressed in the dialogue) from the PHVs on a societal level.
- identify what type of information older persons perceive as important for persons in leading positions to be aware of.
- optimise and develop the questions asked during the PHVs. How can the questions be kept up to date in order to be appropriate to the present and future generations and stakeholders interested in the data?
- evaluate and follow the work with the use of the information compiled during the PHVs on a societal level.
- investigate if health care centres and hospitals perceive the information compiled during the PHVs to be useful, and if so, in what ways. Could the information help the health care services be prepared for future events that happen this older population?
- investigate what type of education should be offered to visitors and persons in leading positions in order to reinforce a PHV which takes into account a comprehensive multilevel approach.
- support the authorities in giving national guidelines about the PHVs in Sweden. The present model for PHVs should be tested on a larger scale.
- position PHVs in relation to other health interventions offered to older persons; a systematic overview of different health interventions is needed.

Epilogue

I will now return to Agnes, who was mentioned in the preface of this thesis. Maybe I left you wondering about how the PHV could be helpful for her? She was a resourceful and capable woman already, and maybe you think that she had everything she needed to age well. However, I hope that the results from the present thesis gave you new insights about the importance of not leaving anyone behind and recognising persons with good and with poor health. I believe that the possibilities for health can always be optimised, no matter whether you are in good or in poor health. It is a never-ending process to move up the continuum towards better health, a process that cannot stop, because then the person gets "drawn back". And as I have mentioned before, the risks of physiological challenges and diseases increase with increased age. So even though a person is in good health today, tomorrow the situation could be different. Therefore, I believe that persons like Agnes can benefit from a PHV. Nevertheless, in order to make the visit attractive and valuable for persons who view themselves as healthy, health-promoting aspects of the visit have to be highlighted, which can further strengthen inclusion, the identification and utilisation of assets, and help the persons prepare for future events. Hopefully a PHV could have visualised Agnes assets, supported her challenges, made her feel included and prepared her for the future. The preparedness could have helped her when her capabilities and resources faltered.

Summary in Swedish

Antalet äldre personer i Sverige ökar i snabb takt. För att stödja denna positiva utveckling och skapa möjligheter för gott åldrande behövs insatser som främjar hälsa. Vetenskapliga teorier om hälsofrämjande aktiviteter och hälsosamt åldrade betonar vikten av insatser både på en individ- och en samhällsnivå för att ge de bästa förutsättningarna för god hälsa. Forskning visar dock att insatser främst fokuseras på den äldre personen och risker för ohälsa. Ett mer omfattande perspektiv behövs som lyfter fram hälsofrämjande aspekter, både utifrån ett individ- och ett samhällsperspektiv.

Förebyggande hembesök till äldre personer är en hälsointervention som ger möjligheten att främja hälsa och förebygga ohälsa. Men det saknas idag forskning kring hälsofrämjande aspekter av det förebyggande hembesöket utifrån ett individ- respektive samhällsperspektiv. Det är därför av stor betydelse att utveckla kunskap om hälsofrämjande aspekter av det förebyggande hembesöket utifrån ett individ- och ett samhällsperspektiv.

I avhandlingen har faktorer som kan ha ett samband med god hälsa identifierats hos äldre personer som erhållit ett förebyggande hembesök, samt vilka fysiska utmaningar som finns för att delta i sociala sammanhang. Avhandlingens resultat visade att kunna göra saker som får en att känna sig värdefull och att inte ha några fysiska problem att delta i sociala sammanhang har ett samband med god hälsa. Resultaten visade emellertid att fysiska utmaningar så som smärta och behovet av förflyttningshjälpmedel kan utgöra ett hinder för att delta i sociala sammanhang.

Vidare har intervjuer med äldre personer identifierat hälsofrämjande aspekter av de råd och det stöd som ges vid besöket. Avhandlingens resultat visade att råd och stöd kan stärka och ge äldre personer bekräftelse. Resultatet visade även att äldre personer upplevde en ökad kontroll över sin hälsa, de kände sig också rustade för framtida utmaningar genom de råd och det stöd de fick.

Vid gruppdiskussioner med ledande personer från kommunen diskuterades den information som samlas in vid hembesöken. Resultatet från diskussionerna visade att äldre personer kan inkluderas i samhället. Exempelvis genom att ledande personer kommunicerar den information som äldre personer delger vid besöket till andra personer inom och utanför kommunen, med syftet att skapa ett samhälle som främjar

äldre personers hälsa. Vidare kan informationen från de förebyggande hembesöken identifiera samhällsutmaningar och hjälpa samhället rusta för framtida behov. Resultatet visade dock att informationen tenderar att fastna i den egna organisationen och att det finns ett behov av en djupare förståelse för den statistiska information som samlades in.

Sammantaget kan slutsatsen dras att förebyggande hembesök kan främja hälsa hos äldre personer genom både insatser på en individ- och en samhällsnivå. Dels genom att i dialogen under besöket bekräfta personen och reflektera kring hälsofrämjande aspekter tillsammans med den äldre personen. Dels kan åtgärder för att främja hälsa göras på samhällsnivå utifrån den information som samlas in vid besöken.

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