With the increase in life expectancy and a decrease in birth rate, the proportion of older people in Western societies shows an impressive increase and will continue to rise in the nearby future. To investigate whether increasingly longer lives are accompanied with ill health or with relative good health and functional independency, insight into the health status of older people is needed. A simple and pragmatic tool that researchers often use to measure overall health status is self-rated health (SRH), a one-item measure of people’s own health evaluation. SRH gained interest in particular after it was identified as a predictor of mortality. However, there is ongoing debate on whether SRH should be used as a measure of overall health. A seeming contradiction exists between on the one hand people’s physical health, which often declines with increasing age, and on the other hand their level of subjective health, also known as the ‘paradox of ageing’. There is a need for more specific recommendations for the ‘where and how’ SRH should be used in population health research, and recommendations for its use in longitudinal and trend studies in particular have been missing.

The primary goal of this thesis was to investigate the ability of SRH, as a simple and pragmatic measure, to reflect overall health in the older population. Data from two cohort studies were used: 1) the Longitudinal Aging Study Amsterdam (LASA), studying a representative sample of Dutch people aged 55 and over, and 2) the Finnish Vitality 90+ Study, an investigation among people aged 90 and over. In LASA, data from six measurement waves were used, spanning a period of 17 years. From the Vitality 90+ Study, four measurement waves, spanning a period of nine years, were used. We operationalised overall health status in both studies as the number of chronic diseases and functional limitations.

*Chapter 2* investigated the ability of SRH to reflect the number of chronic diseases people reported, i.e. whether the impact of new chronic diseases on SRH depends on the presence of existing diseases or not. A nonlinear association between multimorbidity and SRH was found: the effect of having a single disease was larger than the additional effects of co-occurring chronic diseases. From the second disease onward, each additional co-occurring disease was associated with a cumulative decline in SRH. This finding suggests that having a single chronic disease increases the chance of poor health more than each co-occurring chronic disease, possibly due to adaptation mechanisms. In addition, we found that SRH at one point in time reflects the number of chronic diseases fairly well.

In *Chapter 3*, the susceptibility of SRH to changes in health was examined in nonagenarians (those aged 90 and over). In view of the high prevalence of chronic diseases and poor functioning, a remarkably high percentage (37%) rated their health as fairly good or very good. Within two years, most people (56.3%) had unchanged SRH, but declined SRH (22.3%) was associated with worse baseline functioning and declined functioning during follow-up. Clear declines in SRH were found after six and nine years and were explained by an increased number of chronic diseases and declined functioning during follow-up. The impact of chronic diseases and functioning was smaller in institutionalised people than in people living independently. From these results we concluded that SRH in nonagenarians was still sensitive to changes in
number of chronic diseases and functioning, although more pronounced on the longer than on the shorter term.

These two studies provided evidence for the ageing paradox, and additionally showed that existing health problems moderate the impact of new health problems on SRH. Age differences in the evaluation of health may thus result from adaptation to these existing health problems.

Chapter 4 applied response shift theory to investigate which adaptation mechanisms contribute to stable SRH ratings despite apparent health declines. It was investigated if reprioritization, reconceptualization and recalibration response shifts occur in the measurement of SRH in older people. We selected important predictors of SRH in four domains: physical health, psychosocial, cognitive and lifestyle domains. These domains were similarly predictive for SRH at both waves, providing no evidence that respondents changed their concept of health during follow-up. We did find indications for recalibration response shift. In the subgroup that reported identical SRH both waves, participants who experienced incident chronic diseases were three times more likely to retrospectively overrate health at the first wave with the then-test (‘how was your health three years ago?’), suggesting that they lowered their health standard in response to health declines.

In Chapter 5, we compared the predictive value of a retrospective change measure of SRH for mortality using the then-test (which is assumed to be less prone to changes in health standards) with a prospective change measure. Results showed that declined SRH was associated with higher mortality risk, as expected, but only when measured prospectively. After adjustment for a single SRH measure at the second wave, neither change measure predicted mortality. Results were similar in subgroups that did and did not experience incident chronic diseases or limitations between the two waves. Thus, adding information on changes in SRH, obtained from a then-test, did not improve the prediction of mortality. It seems that computing longitudinal change from a measure that is so broad- including all health aspects imaginable and possibly also past and future changes therein- may not produce a reliable estimate of changes that actually occurred between follow-up measurements.

These studies showed that people potentially lower their standard of good health in the face of health decline. When evaluating the impact of new, incident chronic diseases on SRH in longitudinal studies, a then-test may have certain advantages. But the then-test has some shortcomings as well. For example, recall bias may have influenced then-test scores. This might have accounted for the lack of association between change in SRH obtained with the then-test and 5-year mortality. Future studies are needed to disentangle the different sources of bias in the estimation of change in SRH.

Chapter 6 took a different perspective. Changes in SRH were now studied in the older population in same-aged groups across different years. There was a stable trend in the prevalence of poor SRH and severe disability, while the mean number of chronic diseases (1.3-1.8) and the
prevalence of mild disability (20.5-32.1%) increased between 1992 and 2009. The association between poor SRH and chronic diseases became weaker, whereas the association between poor SRH and severe disability became stronger over time. Most unfavourable trends were observed in the older old and the lower educated. These results suggest that the seeming stability of poor SRH hides underlying increases in chronic diseases and disability: new generations of older people have come to attach more importance to different aspects of health when rating their overall health, as compared to previous ones.

The final study, described in Chapter 7, investigated the agreement between self-reported and general practitioner (GP) reported chronic diseases. Results showed that the self-reported prevalence of chronic diseases increased to a larger extent than the GP reported prevalence did. Over-reporting of chronic diseases (self-reported presence and GP reported absence of disease) became significantly more common while under-reporting (self-reported absence and GP reported presence of disease) became less common. Overall, this trend did not result in lower levels of agreement on specific chronic diseases between 1992-93 and 2008-09. Older olds were less accurate in reporting their diseases than younger olds. Under-reporting was also associated with male gender; over-reporting with female gender, worse SRH and worse physical functioning. The association between SRH and over-reporting indicates that response bias possibly influenced the reported associations between chronic diseases and SRH: both measures may be influenced by respondents’ beliefs about their own health. Additional analyses showed that the impact of most self-reported chronic diseases on SRH was similar to that of GP reported chronic diseases. Thus, the extent to which our results have been influenced by response bias may have been only limited.

Conclusions
This thesis addressed the ability of SRH to reflect the overall health status of older people. First, it was found that existing health problems moderate the impact of new health declines on SRH. Still, SRH measured at one point in time has the potential to reflect underlying health status, even in groups with a high morbidity level, such as nonagenarians. Second, the mechanism through which adaptation to health declines leads to changes in health ratings was examined. It was found that after health decline, older people may lower their standard of good health, but no evidence was found that they select different health aspects when rating their health. Third, when studying trends in health on a population level, changes in the prevalence of chronic diseases and functional limitations may not bring about changes in SRH: slight reprioritizations of health aspects were found to occur over historic time.

Based on these results, recommendations on the use of SRH in studies on ageing were provided. A single measure of SRH is a consistent predictor of mortality and it has the potential to differentiate between those in poor and those in good health. This characteristic is highly valuable for screening populations and deciding which subgroups have the highest risks for mortality, institutionalisation or other consequences of poor global health status. In longitudinal studies, measuring SRH trajectories alongside changes in other measures of health may be
useful to indicate people’s inability to adapt to health declines. To estimate the health decline itself SRH does not seem to be a useful tool: older people may change their health standards in response to health decline, which results in stable SRH ratings. When studying trends in health on a population level, changes in the prevalence of chronic diseases and functional limitations may also not bring about changes in SRH: more recent generations may attach more importance to different health aspects compared to previous ones. Thus, when researchers are interested in changes in health in ageing individuals longitudinally or on a population level over time, they should include specific, more objective, indicators of morbidity in their studies.