Self-rated health
From epidemiology to patient encounter

Göran Waller
To Ulla
“It is worse than useless to put to sea
To fish for truth if you haven’t got the skill,
Because you don’t come back as you set out”.

Dante, The Divine Comedy, Paradiso XIII 121.
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Abstract

Background: In epidemiology self-rated health is often measured as people’s subjective answer to a question “How is your health in general?” or “How is your general health compared to persons of your own age?”. The answers have a strong association with significant medical outcomes such as death, diabetes, coronary heart disease, functional ability and depression, medical diagnoses and how these are perceived. The overarching aim of this thesis was to investigate if and how a use of the epidemiologists’ tool of self-rated health might aid GPs in practising medicine with a holistic perspective, contextually sensitive and taking into account the patients’ medical and personal histories.


Results: In Paper I, I found “health” in questionnaires being understood not through definitions of health but through associations of the word “health” with “sense relations”, that are important connotations of the word “health”. Age-comparative self-rated health was semantically clearer as it pointed towards comparison with a reference group. In Paper II, emotions of anxiety or depression and discontent with personal economy were associated with lower self-rated health and were common in the population. Paper III established self-rated health as an independent risk factor for myocardial infarction when adjusted for standard risk factors. In the qualitative Paper IV, self-rated health affected consultations, increased patients’ speaking time in relation to doctors’ when discussing self-rated health and elicited reactions, sometimes with strong language. Reflections ensued that could give vivid descriptions of function, life circumstances and resources or obstacles in handling symptoms and illnesses.

Conclusion: Comparative self-rated health constitutes a feasible tool in general practice, particularly in taking account of patients’ medical and personal histories. It is holistic, sensitive to psychosocial factors. It is useful to solicit information on risk and the patient’s feelings related to an
illness/disease, and to encourage the patient’s active reflection on functional abilities, life situation, health and health strategies. However, self-ratings are not to be seen as a standard procedure in all consultations.

**Keywords:** general practice, self-rated health, semantics, epidemiology, risk, myocardial infarction, consultations, qualitative method
Enkel sammanfattning på svenska

Självskattad hälsa: Från epidemiologi till patientmöte

**Bakgrund:** Självskattad hälsa används främst inom epidemiologin (läran om sjukdomars spridning i en befolkning) för att följa en befolknings hälsotillstånd. Frågan som ställs i enkäter kan formuleras som ”Hur bedömer du ditt allmänna hälsotillstånd” och svaret lämnas ofta på en femgradig skala. Frågan kan också formuleras som ”Hur bedömer du ditt allmänna hälsotillstånd i förhållande till personer av din egen ålder?” Svaret ges då ofta som ”bättre”, ”lika” eller ”sämre”. Svaren har en stark association till framtida viktiga medicinska tillstånd som bl. a. död, diabetes, hjärtväderssjukdom, funktionsförmåga och depression. Självskattad hälsa är också beroende av ålder, utbildningsnivå, socialt kapital (grad av tillit som människor visar varandra i det omgivande samhället), smärta, funktionsförmåga, känslor av oro och uppgivenhet, medicinska diagnoser och hur dessa uppfattas. Det övergripande syftet med denna avhandling är att undersöka om, och i så fall hur, användandet av det epidemiologiska verket självskattad hälsa kan vara av värde för en allmänläkare. Kan självskattad hälsa bidra till att vård bedrivs med ett helhetsperspektiv, känsla för patientens sammanhang, livssituation och med hänsyn till patientens medicinska och personliga erfarenheter?


**Resultat:** I delarbete I beskrev jag hur ”hälsa” i enkäter uppfattas, inte utifrån definitioner utan genom de bibetydelser och associationsfält som är knutna till ordet. Åldersjämförd självskattad hälsa var semantiskt tydligare då det uppmanade till jämförelse med en referensgrupp av jämnåriga. I delarbetet II framhölls att känslor av oro, depressivitet, hopplöshet och
missnöje med egen privatekonomi var associerade till lägre åldersjämförd självskattad hälsa och var vanliga i befolkningen. I delarbete III visades att självskattad hälsa är en självständig, oberoende riskfaktor för hjärtinfarkt vid sidan av klassiska riskfaktorer för hjärtkärlsjukdom. Det kvalitativa delarbete IV visade att en fråga om åldersjämförd självskattad hälsa påverkade konsultationerna, patientens taltid ökade i förhållande till doktorns taltid när frågan diskuterades. Frågan utlöste ibland emotionella reaktioner, av och till med svordomar vilket eljest inte förekom i konsultationerna. De efterföljande reflektionerna kunde ge livliga beskrivningar av patientens funktionsförmåga, levnadsförhållanden och resurser eller hinder för att hantera symtom och sjukdom.

# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>Comparative SRH</td>
<td>Self-rated health, age-comparative. In the Northern Sweden MONICA Project formulated as: “How would you assess your general health condition compared with other persons of the same age; better, worse, similar?”</td>
</tr>
<tr>
<td>General SRH</td>
<td>General or global self-rated health. In the Northern Sweden MONICA Project formulated as: “How would you assess your general health condition; good, bad, or somewhere in between?” From 1999, in the Northern Sweden Monica Project the response alternatives were very good, pretty good, somewhat good, pretty poor, and poor. Through all years the Västerbotten Intervention Programme used the question “How do you consider your general state of health last year?” Response alternatives were the same.</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>HR</td>
<td>A measure of the relative tendency to contract a disease or to die when two groups are compared. The ratio is calculated as the quotient between two hazard rates. If the HR is close to 1, the groups have similar hazard rates.</td>
</tr>
<tr>
<td>Odds</td>
<td>A measure of the tendency for a certain event, i.e. to contract a certain disease or to die. The odds can be calculated as the quotient between the probability that the event will occur and the probability that the event will not occur. A high number tells that the event is more likely to happen.</td>
</tr>
<tr>
<td>OR</td>
<td>Odds ratio, a measure of the relative odds for an event when two groups are compared, which is calculated as the quotient between the odds in the two groups. An OR far from 1 tells that the event is more likely in one of the groups.</td>
</tr>
<tr>
<td>SRH</td>
<td>Self-rated health</td>
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List of original papers

This thesis is based on the following papers:


Prologue

To search for truth, Dante said, is a troublesome venture.

Why I set out.
After 30 years of work, mainly in General Practice, I have gathered lots of observations, met thousands of patients and followed many of them for decades. I have seen individuals. But my training in University was almost entirely grounded on knowledge based on groups of patients, defined in one way or another. It took me several years of General Practice to rethink group perspective as perspective on individuals. And yet, all doctors need knowledge based on large groups. Empirical knowledge, founded on thorough observations, is a legitimate and sound basis for practice. But it has to be paired with an understanding of and an ability to see patients and medical problems in a contextual frame. This is also legitimate and sound. After decades with individual patients the question eventually rose: could I make use of my experience as a GP and in a scientific way look upon both individuals and groups of patients?

To set out on a venture is not only a question of a mind-set. It is also dependent on circumstances in life and practical arrangements. Umeå University’s allocation of medical education to other cities in the north of Sweden and the support of this by my County Council of Norrbotten gave the economic foundation and a possibility to set out.

How I set out.
My colleague, Annika Forssén, who is also a GP and a teacher at the medical faculty at Umeå University, pointed out to me that there is a question which outmatches most of our biomedical measurements when it comes to prognosis and risk of poor outcomes. “It is a question which asks persons to rate their own health,” she said. This stirred my interest. How can such a subjective and highly circumstantial assessment perform such a miracle? Is this really true? Why haven’t I heard anything about this in medical training including continuous medical education? Is not subjective health at the core of my medical practice? I had long ago recognised that the problem in medical practice was not always the medical problem in itself. It was the subjective side of the matter, the patient’s ideas and possibilities of handling the situation of illness, disease and functional impairment that were the challenges. None of this was in focus in my continuous medical education. Could self-rated health be a way of exploring the subjective side of the matter and also bring scientific rigour and vigour to the task? I set out reading Benyamini’s meta-analysis of 27 studies associating SRH with mortality.¹
soon found myself in an ocean of publications discussing all sorts of aspects of SRH, mainly epidemiological.

How I came back.
I think I did reach the shore after some years of exploratory journeys. The worth of my catch has to be evaluated by others. I did not come back the same as I set out. I have come to appreciate and admire scientific work and come to realise the vast amount of effort, intellectual power, strenuous work, patience and endurance behind scientific publications. I now can put arguments in a better way for expanding medicine to feelings, social dimensions, subjective matters, culture and context of living. Medicine must safeguard against biological narrow-mindedness.

What is truth? Did I come back with a catch of truth? I think so. I think of truth as trustworthiness, not as an eternal, context-free knowledge. I find the results trustworthy, firmly anchored in the sphere of human activity and language. I also hope my colleagues in medical practice will recognise the usefulness and trustworthiness of the approach to medical practice underlying this thesis and the results presented here.
Background

What is health?

Everybody knows what health is and can give a rapid and spontaneous answer to questions about their own health. There seems to be a common and shared understanding of the word health. But it becomes complicated when you are to explain the meaning of the word or to define health. Should you use an understanding stemming from medical conditions and diagnosed disease, from sickness, from functional ability, from feelings or from what? Several attempts have been made to delineate health. Health, according to encyclopaedic definitions is, “the level of functional or metabolic efficiency in living organisms. In humans it is the general condition of a person’s mind and body, usually meaning to be free from illness, injury or pain.” Such a definition raises questions about what illness is.

As this is a struggle with concepts, efforts have been made within philosophy, anthropology of medicine and medical sociology to make clear distinctions between disease, illness and sickness. Bjørn Hofmann has commented on a discussion between two philosophers, Twaddle and Nordenfelt, about this triad. Disease has been defined as a health problem that consists of physiological malfunction that results in an actual or potential reduction in physical capacities and/or reduced life expectancy. Epistemologically (according to theory of knowledge) it is measurable by objective means. Illness has been defined as a subjectively undesirable state of health and sickness as a social identity constituting a new set of rights and duties. A disease can thus result in illness and sickness, but these entities can be at hand separately or more or less overlapping. Disease does not have to be accompanied by illness and is not always apprehended as sickness. On the other hand, sickness can be present without disease, as in Molière’s play *The Imaginary Invalid*. Illness can be present without identifiable disease and is not accepted as sickness (as a social identity by others). The triad of disease, illness and sickness represents different perspectives on ailments, namely the professional, the individual and the societal perspectives. The triad has been criticised as inadequate as it only describes unhealth. The critic Lennart Nordenfelt wanted a general concept of health based on disability as the primary concept. A general concept of health is however difficult to conceptualise according to Hofmann. The usages of the concepts in the triad function despite the lack of an overarching theory of health according to the examples given by Hofmann. We are more ready to define negative notions (disease, illness sickness) than positive (health), Hofmann argues, citing Tranøy. Citing another philosopher, Hans-Georg Gadamer, Hoffman argues that health as the aim of medicine is not a definable concept. In fact, using the term health as a
conceptual term for treating human ailments is both problematic and unnecessary. Not all lack of health is a matter for the “health care” system, but disease is and thereby puts limits on what the medical profession can be expected to do and what it should do, Hoffman contends.\(^3\)

A somewhat different view is taken by Bircher and Kuruvilla, who suggest a definition of health as "a state of well-being emergent from conducive interactions between individuals’ potentials, life’s demands, and social and environmental determinants. Health results throughout the life course when individuals’ potentials and social and environmental determinants, suffice to respond satisfactorily to the demands of life".\(^8\) The model was developed in response to challenges of promoting individuals’ and populations’ health beyond 2015. They see health as an interaction between what is biologically given and what is personally acquired. Health is seen as a complex adaptive system where social resources and environmental factors in a dynamic system interact with the individual’s resources. Bircher and Kuruvilla see health in this broader sense as fundamental to achieve advances in the health of individuals and populations. There are however difficulties in operationalising the terms.

Bircher and Kuruvilla take their starting point in the most widely known definition of health, the World Health Organization’s definition from 1946: “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”.\(^9\) This definition has been criticised for being too utopian and because of the impracticability of understanding “complete” and operationalising the terms “physical, mental and social well-being”.

Another approach to health is given by the phenomenological philosopher Martin Heidegger, who defined health as home-like-being-in-the-world.\(^10\) This enigmatic formulation has to some extent been used and clarified by the hermeneutic philosopher Hans-Georg Gadamer in his book *The Enigma of Health*.\(^7\) The title of the original book in German, *Über die Verborgenheit der Gesundheit*, could also be translated as “About health that can’t be seen”. Health, according to Gadamer’s philosophy, is a state of equilibrium. This state is the natural state and does not allow itself to be objectified in the same way as disease can be objectified. “If health really cannot be measured, it is because it is a condition of inner accord, of harmony with oneself that cannot be overridden by other, external forms of control. It is for this reason that it still remains meaningful to ask the patient whether he or she feels ill”.\(^11\) The closest Gadamer gets to a definition of health is: “[Health] is the rhythm of life, a permanent process in which equilibrium establishes itself.”\(^12\) This balance is not only an equilibrium in the body itself but includes an equilibrium in the totality of being – being in the world – including
being together with others, nature, and the totality of being. This idea of wholeness is closely tied to every medical treatment (treatment here conceived not just as medical and technical interventions but also how persons are listened to and taken care of – treated, in its broader sense). Gadamer’s concern is in “that hidden harmony which we must seek to recover and in which we discover both the miracle of reconvalescence and the mystery of health.”

The above examples of definitions of health illustrate the difficulties in defining health. There are definitions but all definitions must be interpreted in their context and according to the purpose for which the definitions are tailored. A pertinent question is of course what “health” is in questions of self-rated health. But first, what is self-rated health?

**What is self-rated health?**

Self-rated health was introduced 1958 by Suchmann, Phillips and Streib. Firstly it was used as a conversational way to open up health issues in questionnaires. It was not until 1982 that Mossey and Shapiro clearly demonstrated the value of this question in predicting mortality. This sparked off intense research in the field and researchers re-analysed previously collected data and confirmed the findings of Mossey and Shapiro. In 1983 Kaplan and Camacho wrote that poor perceived health may be a common feature which links adverse psychosocial states such as social isolation, negative life events, and job stress, suggesting that self-ratings of health held the key to understanding other psychosocial influences on health. Their investigation into “The Human Population Laboratory Cohort”, however, also established an independent role of perceived health. The initial research of SRH aimed at testing the connections between psychosocial influences and mortality. Today (February 2015) the research using SRH is extensive. Searching PubMed, Title/abstract for self-rated health yielded 4,066 articles. There is thus a vast literature on the subject. I have focused my reading on four aspects of SRH. First; associations with outcomes and SRH. Second; associations of determinants and SRH. Third; the properties of SRH. Fourth; SRH in clinical practice.

Some variants of SRH questions are frequently used. Most used is a question about general or global SRH, formulated as something like “How would you rate your general health? Very good; pretty good; somewhat good; pretty poor; poor?” Another wording often used is called comparative SRH, “How would you assess your health compared to persons of your age? Better? Similar? Worse?”

**Relation to outcomes**

Mortality
In Sweden, attention was drawn to the association between perceived health and mortality by the renowned researchers in family medicine and social medicine, Kurt Svärdssudd and Gösta Tibblin in 1990. They had followed men from Gothenburg, aged 60 and enrolled in 1973. After 15 years’ follow-up, the estimate of perceived health was related to all-cause mortality and also cardiovascular mortality. Svärdssudd and Tibblin did not refer to the emerging international literature on the subject. Six community studies reporting association between self-rated health and mortality had been published prior to 1990. Svärdssudd and Tibblin did not refer to the emerging international literature on the subject. Six community studies reporting association between self-rated health and mortality had been published prior to 1990. In 1997 Idler and Benyamini were able to report the results from 27 community studies on the subject. They concluded: “[The significant effect of self-rated health] is impressive, regardless of whether it operates as an indicator of some unmeasured process or simply as a most effective summary of all the other measures... We would argue that the global rating represents an irreplaceable dimension of health status and in fact that an individual’s health status cannot be assessed without it.” In 1999 Idler and Benyamini reported on 19 additional studies on the subject. The review confirmed previous findings. In their seminal review they proposed further directions for research. First, study other outcomes than mortality. Second, study special populations. Third, use qualitative approaches. Fourth, study cognitive/cultural processes associated with judgements of self-rated health. This could include investigations into the survey instrument itself and reference group comparisons.

Cardiovascular disease
In 1998, a study from Copenhagen was published. The study included 1,052 persons followed for 16 years with 50 incident cases of coronary heart disease. The group stating their self-rated health as “miserable” had a marked increased risk of coronary heart disease even after controlling for conventional risk factors and other potential confounders. A case control study from 1998 suggested interaction, i.e. a greater impact of conventional risk factors for myocardial infarction when persons also had lower self-rated health. Self-rated health did not, however, keep significance in multivariable testing among standard risk factors. The association between self-rated health and coronary heart disease has been confirmed in a cohort of elderly >70 years free from cardiovascular disease at baseline. In a case control study, 473 cases of incident strokes were investigated. Self-rated health had a statistically significant association to stroke at least for men. A cohort study of 47,942 middle-aged women with 200 cases of incident stroke showed a significant association between self-rated health and stroke although the associations were considerably weakened after adjustment for stroke risk factors. Cohort studies have often used combined outcomes of different cardiovascular diagnoses, thus having more incident cases. The
drawback is in losing accuracy in diagnoses and outcomes. For example, using a hospital discharge diagnosis of angina pectoris poses difficulties in assessing how the diagnosis was reached. Furthermore, you cannot rule out that persons with anxiety and hence low self-rated health tend to seek hospital care to a larger extent than others, thus putting bias on the association of self-rated health and cardiovascular disease. To meet this challenge validation studies have been used to ascertain the correctness of diagnosis. In such a population-based cohort of 20,941 persons aged 39–74 years, self-rated health was found to be a strong predictor of cardiovascular disease even after adjustment for socio-demographic, clinical and behavioural risk factors.29 A similar association was seen in 900 women with suspected myocardial ischemia with major cardiovascular disease as the outcome.30 However, functional impairment seemed to explain much of the association in that study.

Diabetes
Low self-rated health is associated with higher risk of developing diabetes type 2.31, 32 Trajectories of repeated estimates of self-rated health in diabetics have shown worse functional ability with repeated low estimates of SRH or changing estimates of SRH compared to persistent good SRH.33 The conclusion was that not only SRH is of interest but also changes in SRH over time. In another study, low SRH was associated with increased mortality in individuals with diabetes after controlling for established risk factors.34 The authors of this study concluded that in patients with diabetes and low SRH, the physician should consider a more detailed consultation and intensified support.

Psychiatric disease
In elderly, SRH predicted 1-year depression diagnosis.35 When adjustment for initial depression, however, SRH did not independently predict depression at follow-up, thus implying that depression is significant for the initial SRH assessment. However, SRH was independently associated with functional status outcomes and mortality even after adjustment for initial depression. Low self-rated health increased the risk of poor long-term depression outcomes.36 In diabetes type 2, self-rated health might be a predictor of major depressive disorder.37 In a study from the USA, self-rated health, but not poverty or race, was a predictor of anxiety and depression in adult women aged 27–33.38

Cancer
Low self-rated health is associated with development of lung cancer, but not mammary, prostate or colon cancer.39 However, in a late midlife cohort self-rated health was not associated with cancer morbidity.31
Other outcomes
Latham and Peek also described significant associations between self-rated health and subsequent morbidity in arthritis and lung disease. Functional impairments were associated with previous assessments of self-rated health.

Associations to determinants
Main factors
A great number of studies investigating associations with possible determinants of SRH have been carried out. The main factor influencing self-rated health has been identified as age, sex, disability, medical health status and functional ability. However, further studies included additional determinants such as distress, smoking, not consuming vegetables, obesity, underweight in young individuals. In a cross-sectional population study from the Stockholm area, functional health, physical health and mental health including general emotional state contributed most to the SRH construct, but lifestyle and psycho-social factors also played a role. Similar results have been obtained in other studies which also focused on genetic aspects and insurance coverage. Education, measured as years of schooling, is related to SRH. Comparing individuals in the lowest quintile of schooling with those in the highest quintile, those in the lowest quintile were twice as likely to report poor health. Qualitative studies have investigated what factors people think of when assessing their own health. Some persons consider specific health problems or general physical functioning or health behaviours and combinations of these, sometimes also including coping dimensions. In elderly, self-ratings of health are influenced by biomedical criteria, social activities, psychological, emotional and spiritual characteristics, but also of the faculty of “going and doing.”

Social capital, income, wealth
Epidemiological research, including multilevel analyses, has observed a link between social capital (individuals cooperating in social networks) and self-rated health. Low income, low education smoking and unemployment were also associated with poor SRH. Income has been postulated as an important factor associated with SRH. The evidence is limited, however. Household wealth had a stronger association with SRH than income. Income inequality in a country may adversely affect the population’s SRH.

Working conditions and employment
Individuals’ possibilities and abilities to make decisions about the way they work and use their skills (job control) are associated with SRH. Temporary employment has adverse effect on SRH, though low cash margin and job insecurity may mediate the association.
Biological factors
In 2004 researchers found an association between circulating levels of cytokines and SRH in women.62 Even after controlling for age, education, physical health and diagnoses, self-rated health was an independent and more robust predictor of cytokine levels than physician-rated health.62 Allostatic load, a combined measure of biological dysregulation operationalised as a summary indicator of biological challenge in multiple bodily systems, is related to SRH.63 In a longitudinal study from Norway allostatic load was measured as a score based on systolic and diastolic blood pressure, heart rate, cholesterol, high-density cholesterol, triglycerides, waist-hip ratio, diabetes risk profile, glucose, C-reactive protein and body mass index.64 The study showed that SRH in adolescence predicted allostatic load in young adulthood. The authors argue that SRH formed early in life may be an important determinant of long-term health. The concept of poor health from adolescence might heighten feelings of distress and fear of pain, physical disability and impairment of functioning. On the other hand, an apprehension of good health may represent a resource in a person’s daily living.65 In a cross-sectional study, allostatic load was operationalised in a similar way but also including dehydroepiandesterone and prolactin.65 Poor SRH was associated with a high allostatic load. There was also an association between high allostatic load and age, education and working in the health care sector compared to the IT/media sector.65

Properties of SRH
Stability
The individual’s assessment of SRH is a stable construct. It is established in adolescence and remained relatively stable during a 4-year and an 11-year follow-up.64, 66 In the 11-year follow-up 57% gave identical ratings in young adulthood as in adolescence. Only 3% changed their rating of SRH by two steps or more on a four-grade scale.64

In adults, SRH has been proposed as a spontaneous assessment or as an enduring self-concept.67 These conceptions were investigated in a study comparing physical-mental and social well-being before and after total joint replacement for hip or knee osteoarthritis.68 SRH was found to be stable after joint replacement although considerable improvements were reached in physical and social well-being. This finding favoured the idea of SRH being an enduring self-concept. It was also noted that changes in mental well-being were reflected in individuals’ assessment of SRH.68 Studies of test-retest reliability have shown a fair to good reliability.69, 70
Gender differences
Women generally assess their SRH as worse than men do. The association between SRH and mortality is however stronger in men than in women. This has led to the notion of men and women using different concepts of health in assessment of SRH. Women may put emphasis on more prevalent health problems or comparisons with other women, while men may put emphasis on diseases affecting longevity. It has been proposed that women’s SRH judgements may be based on a wider range of health-related factors and non-health-related factors than are men’s. This could lead to women responding more accurately to questionnaires in health surveys, giving less room for self-rated health to cover up for items not specified so well. When performing multivariable analyses, important factors are more fully accounted for by women and the association between self-rated health and mortality is thus weakened. The gender difference could also, at least partly, be explained by different trajectories of women’s’ and men’s’ health. Women live longer but experience more years of disease and impaired functioning. When investigating survival, this leads to, men’s hazard ratio being higher than women’s as men live shorter lives. The gender differences regarding mortality, however, are not entirely consistent among studies.

Qualitative studies of what factors women and men consider when self-rating health have failed to show a significant difference.

Wording, cultural and language differences
Idler and Benyamini found in their review of 27 community studies from 12 countries a similar association of SRH questions with mortality, regardless of differences in wordings in the particular native language and minor details in the formulation of the question. In a longitudinal study comparing a Lithuanian and a Dutch male population with respect to mortality, poor self-rated health was associated with total mortality in the Dutch population but not in the Lithuanian. Comparative SRH was however associated with mortality in the Lithuanian sample, and on the verge of being statistically significant in the Dutch sample. The distribution of answers to the general SRH question was markedly different, poor being the most frequent answer in Lithuania whereas good was the most frequent answer among Dutch males. The differences were less marked in the answers to the comparative SRH question.

Both the general and the comparative SRH question are associated with mortality. The comparative question has to be adjusted to age to yield a statistically significant association with mortality. The most striking differences between the two measures is that general SRH decreases with growing age whereas comparative SRH gets better with growing age. Associations to determinants have been found to be somewhat different comparing global and
The overall impression is that different measures of SRH represent parallel assessments of subjective health, but the measures to some extent reflect different aspects of health.

**Self-rated health in clinical practice**

In 1973 Maddox and Douglass published a paper comparing physicians’ assessment of health and self-rated health. They found a congruency between the two types of ratings. Whenever there was an incongruence in the ratings, the tendency was for the individual to overestimate his health compared to physicians’ estimate. Self-rated health was a better predictor of future physicians’ ratings than the reverse. This line of research was developed. Oddly, comparative SRH got better with growing age, but at the same time physical health got worse. In addition to the tendency to overestimate self-rated health compared to specified health problems, the researcher found a link between overestimation of general health and survival. In a population-based study from Stockholm, the researchers found that SRH added information beyond a physician’s ordinary clinical evaluation. A measure of physical health on a 5-point graded scale was constructed and compared to the patients’ SRH. Comparisons of the two ratings with possible determinants showed that mental health problems, psycho-social problems and women’s somatic health problems explained more of the variance of SRH than the physical health rating. In a study from Copenhagen, 606 patients were investigated one year after a diagnosis of diabetes mellitus type 2. Low SRH correlated strongly with symptoms but also with higher HbA1c levels. The researchers concluded that, as symptom control is an important part of diabetes care, SRH should be included in the standard care for diabetic patients.

In a qualitative study, patients estimating their health over 50 on a scale 0–100 had a dialogue with the General Practitioner (GP) about how, despite their obvious medical problems, they could maintain a positive self-rating of their health. This, according to the researchers, brought new perspectives to the doctor and patient on the patient’s health problems and the doctor was able to contribute to patient empowerment by exploring and recognising the patient’s view of his/her general health. Such knowledge is at the core of clinical practice.

In a study, SRH predicted outcomes of knee osteoarthritis. The researchers concluded: “The use of self-rated health as a simple and efficient clinical assessment has potential for clinical utility because of its predictive capability and association with multiple health domains.” In chronic pain, elements of depression and powerlessness worsen SRH to a greater extent than pain or pain-related disability according to a multivariable analysis of variance. Interventions designed to improve mood and power are suggested, on the basis of this model, to
have an impact on health greater than interventions aimed at pain and disability.86

The literature is sparse on the use of SRH in actual consultations in clinical work. Most recommendations about the use of SRH in clinical work are based on epidemiological associations of SRH with outcomes or as a global assessment, summing up a multitude of different factors associated to SRH.

What is general practice?
As this thesis sets out to discuss self-rated health in general practice, some delineations of general practice are needed.

General practice is the first line of a medical healthcare system. This means that general practice is performed in close connection with a population. The actual location of a health care centre and the general practice performed at this centre is dependent on the context of its population and the patients’ context coming out of this population. This entails that the practice is dependent on situated knowledge regarding labour market, local history, families, personal circumstances, etc.

The scope of general practice is broad, covering medical conditions also relevant to all other medical specialities. Symptoms presented to a GP are varied, many symptoms not yet interpreted. In order to interpret the patients’ symptoms, the GP somehow has to interpret the person who presents the symptoms. Who is this person? How does she use the language with which she describes her symptoms? What is her situation in life? How is her economy? What are her possibilities to deal with symptoms and to manage? What are her beliefs?

Furthermore, the GP has to interpret the patient’s biology including diseases, hereditary conditions, results of tests and physical examinations, the patient’s appearance and way of moving etc. In short, at the moment of consultation, the GP and the patient are at a crossroads where biology, sociology, psychology, language, personal life story, culture, existential and other matters interact.

All this interpretation has to be done in a short consultation. To aid the GP, sometimes for better or worse, consultations are repeated over time, symptoms and/or diseases evolve or dissolve over time, disease gradually becomes overt and a relation to the patient may be established over time.

Some of these conditions and requirements are applicable to other medical disciplines as well. General practice is not unique in this respect. Nor is there an
exclusive set of theories, scientific methods or diseases that pertain solely to
general practice. The way to practise medicine, the societal commission to deliver
first-line medical support and the closeness to patients and population over time
put general practice in a context and way of looking at medical practice which is
its own. There are questions that arise in this context. One of these is touched
upon in this thesis: How to perform the task to do general practice? More
specifically, can the patient’s own self-perspective aid the doctor and patient to
comprehensively grip some of what is important for future health?

The commission delivered to GPs and primary care has also come to include
health in a broader sense. The scope of the mission is vast. It seems to me that
assistance can be gained by integrating knowledge from epidemiology with the
way of practising medicine that has evolved from the contextual setting of medical
practice and the outlook of the GP. To the largest extent, the patient herself might
hold the key to an integrated, contextual understanding of her own health and
ways to affect future health.
Aim of the thesis

The overarching aim of this thesis is to investigate if and how the use of the epidemiologists’ tool of self-rated health might aid GPs in practising medicine with a holistic perspective, contextually sensitive, taking account of patients’ medical and personal histories.

Knowledge of self-rated health mainly stems from epidemiological research. Using self-rated health in clinical encounters in general practice, however, seems to need some additional light of knowledge relating to the clinical situation and the needs of GPs. Viewed from this angle, some questions seem important to me. These questions are also the specific aims of the papers included here.

I. What is the meaning of “health” in questionnaires?
   a. Are there differences in the distribution of the answers to the two formulations of the question?
   b. Does the context of the question influence the answers given?
   c. What are the semantic meanings of a general SRH question and of an age-comparative SRH question, and how do these meanings differ?

II. What are the associations between age-comparative self-rated health and diagnoses of stroke, myocardial infarction or diabetes; biological risk-factors for those diseases; self-reported social and lifestyle factors; and self-reported occurrence of negative emotions or anxiety?

III. How is the relationship between self-rated health, both general and comparative, adjusted for standard risk factors and the outcome of fatal or non-fatal myocardial infarction?

IV. What happens in a consultation when a question of age-comparative self-rated health is posed?
Methods and results
An overview of papers, study design, study population, data sources and analyses used is given in table 1.

Setting
The setting of this thesis is the two northernmost counties of Sweden, Västerbotten and Norrbotten. The area has about 510,000 inhabitants, of which some 20,000–30,000 are Sami. Sami people were living in the area from the first millennium and lived by nomadic reindeer keeping. From the beginning of the 20th century the nomadic form of Sami life was dissolved. Nowadays the Sami are settled and to a large extent integrated into the majority society. The mortality among Sami people is the same as among Swedish inhabitants. On the border with Finland, in the valley of the Torneå River, the population is mixed Swedish-Finnish with a strong connection to Finland. The predominant language there is Meänkieli, a dialectical form of Finnish. Meänkieli, like the Sami languages, is an approved minority language in Sweden. The coast of the Gulf of Bothnia is more densely populated than the inner parts of the region, with a written history from medieval times. The land was colonised by settlers from more southerly parts of the country, the inland from coastal regions. Farming was the main resource. From the 18th century ironworks were established in the counties of Norrbotten and Västerbotten as large forests were able to supply wood needed for manufacture. The inner part of the counties relied on traditional agriculture, were slowly colonised and sparsely populated. Industrialisation started late, at the beginning of the 20th century. Large finds of iron in the mountains in the inland were exploited, a large plant for the production of iron was established in Luleå, on the Gulf of Bothnia. Large finds of copper, zinc and gold led to a similar development in Skellefteå, a major town in Västerbotten. Umeå grew as an administrative and educational centre for the region. A university was established in the 1960s. Pulp factories, paper mills and sawmills were other important industries. Famines hit the region in the 1860s and at the end of the First World War. From the 1920s onwards there has been a rapid progress in standards of living, economy, education, food, communication, industry and health care. The counties of Norrbotten and Västerbotten have been homogeneous from a linguistic and cultural perspective. Economic, social and educational differences were small in this region as in Sweden as a whole.87 There were few immigrants in the period 1990 to 2009. In the 2010s the region is one of the leading regions in Sweden, with relatively low unemployment.
Table 1. Overview of included papers, design, study population, data sources and analyses.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Design</th>
<th>Population</th>
<th>Data sources</th>
<th>Analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Cross-sectional study.</td>
<td>Altogether 7,500 persons were randomly selected from the general population, and stratified for sex and age from the counties of Västerbotten and Norrbotten, Sweden. 5,314 answers were analysed. Persons were aged 25–74 years.</td>
<td>Northern MONICA questionnaire 1999, 2004, 2009.</td>
<td>Ordinal regression analyses with comparative self-rated health as dependent variable, associations with self-rated health studied.</td>
</tr>
<tr>
<td>III</td>
<td>Cohort study.</td>
<td>All inhabitants of Västerbotten County were invited to participate on reaching 40, 50 or 60 years of age, from 1990 to 2004. After exclusions 72,530 persons remained for analysis.</td>
<td>Västerbotten Intervention Programme 1990–2004. Swedish national inpatient register until 2009, Swedish death certificate register until 2008.</td>
<td>Cox regression with fatal or non-fatal myocardial infarction as outcome and standard risk factors, self-rated health, education and physical activity as independent variables.</td>
</tr>
<tr>
<td>IV</td>
<td>Qualitative study.</td>
<td>33 patients at health centres in Norrbotten and Västerbotten, aged 18 or older, attending their GP for diabetes, pain or unclear symptoms.</td>
<td>Audio-recordings from actual consultations transcribed verbatim. Short questionnaire from GPs.</td>
<td>Qualitative analyses using systematic text condensation, speaking time and GPs’ assessments.</td>
</tr>
</tbody>
</table>
The health situation in the north was a concern to authorities from the 1930s onwards.\textsuperscript{88} The diet was described as very low in both quality and quantity.\textsuperscript{88} Cases of obesity were hardly to be seen. Autopsy studies indicated that arteriosclerosis was lower in the north than in the south.\textsuperscript{89} Umeå Central Hospital and its chief physician Ekvall reported in the 1950s that morbidity from acute myocardial infarction was “definitely lower” compared with certain other areas and particularly low among the “population in the countryside”.\textsuperscript{90} Ekvall published statistics from the Central Hospital of Umeå from 1939 which showed an increase of persons admitted to the hospital with myocardial infarction. He interpreted the findings as due to a better knowledge of the disease and an increase in morbidity in the population especially from the urban parts.\textsuperscript{90}

The Swedish mortality statistics in the mid-20\textsuperscript{th} century showed a downward trend in total mortality but a rising trend in deaths caused by cardiovascular disease.\textsuperscript{91} This deviated from the general course of health development in Sweden. Research programmes were launched aiming at clarifying regional differences and the epidemiology of cardiovascular disease. It was not until the 1970s, however, when researchers visited all municipalities and health care centres in Västerbotten and comparisons were made between the cardiovascular disease burden in the municipalities of Västerbotten that the epidemiology of cardiovascular disease in the region was mapped.\textsuperscript{92, 93} Eventually, the picture emerged: cardiovascular disease was more common in Västerbotten and Norrbotten provinces than in the country as a whole. This insight led the County Councils of Västerbotten and Norrbotten to enter the WHO project MONICA (Multinational Monitoring of Trends and Determinants in Cardiovascular Disease), forming the Northern Sweden MONICA Project. It was launched in 1985. In the same spirit the Västerbotten Intervention Programme started the same year. Most MONICA centres in the world stopped collecting data in the mid-1990s but the Northern Sweden project is ongoing. Both projects were carried out as research projects and attracted much attention in the mass media. They were therefore well known to the local population. Their medical character was tied to the local health-care system. The projects were an invitation to a randomly selected population sample in the MONICA study and to all inhabitants reaching the age of 30, 40, 50 and 60 in the Västerbotten Intervention Programme to participate in research of wider importance.
The Northern Sweden MONICA Project
The Northern Sweden MONICA Project consists of two parts; event registration of acute myocardial infarctions and strokes; and population risk-factor surveys. Surveys were made in 1986, 1990, 1994, 1999, 2004 and 2009. The two first surveys invited 2,000 persons aged 25–64 years, randomly selected to participate. In the following surveys the age limit was extended to 25–74 years and 2,500 persons were invited, after stratification with 250 persons of each sex and in intervals of age by each 10-year stratum. The participation rate was 69–81%. The questionnaires of the risk-factor surveys were divided into two parts. Part 1 was answered at home and returned by post. Part 2 was answered in combination with a medical investigation and sample testing at the nearest health care unit. Forty units were involved. Analyses of non-participants have been performed. Of the 771 non-participants in the 2009 survey, 485 answered a basic questionnaire. Non-participants were on average younger, more likely to smoke or report diabetes. Non-participants were less likely to have a university education or to be married or cohabiting. The use of antihypertensive medication or lipid-lowering drugs did not differ, and body mass index (BMI), based on self-reported height and weight, was similar in the two groups.

The Västerbotten Intervention Programme
The Västerbotten Intervention Programme began in the late 1980s and is still running. It was designed to prevent premature cardiovascular disease and diabetes among the middle-aged population of Västerbotten County, Sweden. In short: all Västerbotten’s residents were invited to participate in the Västerbotten Intervention Programme upon reaching the age of 40, 50 or 60. Individuals aged 30 were invited to participate until 1995. Participation is voluntary and the participation rate gradually increased and was a mean 60% between 1990 and 2004. A dropout rate analysis in 1998 indicated only a small social selection bias. The programme was conducted by specially trained medical personnel at local health centres. Participants completed a questionnaire and then met a nurse with whom they discussed their own risk of future cardiovascular disease on the basis of measurements of biochemical and behavioural cardiovascular disease risk factors. Participation was free of charge during the first years of the programme. Later on a fee of 100–200 Swedish crowns (SEK) was charged (about 10–20 euros).

Methods and results in papers I–IV
For a full account of methods and results please consult the original papers I–IV. The research questions can be answered by the results presented here. However, the overarching question about the meaning of “health” in questionnaires and in
consultations needs an extended discussion which will come under the heading “Discussion”.

**Paper I**

In paper I data from cross-sectional surveys of the MONICA project in Northern Sweden, issued in 1990, 1994, 1999, were used. The global SRH question with response alternatives good, bad or somewhere in between was used in 1990 and 1994. The comparative SRH was used in 1990, 1994 and 1999. Since answers to both SRH questions were separated into three alternatives for those years, they could be used without regrouping the primary data. The response patterns were analysed statistically. A frequency calculation was carried out on answers to the SRH questions, and the Spearman rank-ordered correlation coefficient calculated using SPSS 18.

In brief, the results are summarised in Figures 1 and 2. It shows how the difference in wording divides the spectrum of self-assessment in different ways. I investigated self-rated health in relation to educational background. Education is here, as often in epidemiology, used as a proxy for social class. The correlation of the global and comparative question was calculated according to the Spearman rank-order as 0.48. This means that the two questions correlate to some extent but do not overlap. This is also seen in Figures I.1 and I.2. The relationship to educational level is also shown.

![Graph](image)

**Figure I.1.** General self-rated health in relation to educational level in men and women aged 25–64 years. n = 3086. Confidence interval 95%. Northern Sweden MONICA project 1990, 1994.
Research question I.a, “Are there differences in the distribution of the answers to the two formulations of the question?” can now be answered. **Yes there are. The findings are expected and align with previous research.**

The answers from questionnaires in 1994 and 1999 were used to study the influence of a different context for the comparative SRH question, since this had been changed in the meantime. The global SRH question was not analysed as it was reformulated in 1999 to a five-grade scale, making comparison with previous years less meaningful. Statistical significance was estimated with chi-2 test.

In 1994, the SRH questions were placed in the section that was sent out by post and answered at home. The SRH questions followed each other in the questionnaire, and were placed in a context concerning diseases and cardiovascular mortality of close relatives. A drawing implying old grandparents accompanied the questions. In 1999, the SRH questions were moved to the section that was completed in combination with the visit to the health care unit for medical investigation. The drawing of grandparents was removed and the SRH questions were opening questions, implying that the other questions – which might have reminded the respondents of negative health outcomes or hereditary disease in the family – had less influence on how the SRH questions were understood and answered.

The response distribution to the comparative SRH question changed significantly between 1994 and 1999. The response rates were 77% and 73% in 1994 and 1999.
respectively. The proportion selecting the alternative “better” increased from 15% to 22%, i.e. a 7 percent unit increase, between the two years (Chi-2 test 41.0 df2, p < 0.001). A comparison with the same question in the Västerbotten Intervention Programme, where no contextual change in the questionnaire took place, showed only a small increase.

Research question I.b, “Does the context for the question influence the answers given?” can now be tentatively answered. The changed response distribution between 1994 and 1999 to the comparative self-rated health question indicates that the answers might have been influenced by the considerable change in the context that had taken place between those years.

For the semantic analysis a basic semantic methodology was employed. Semantics is a method for understanding the meaning of words and sentences. The overriding philosophical framework is influenced by Ludwig Wittgenstein’s theory of language as expressed in his later works. Wittgenstein asserted that the relationship of a word to an underlying reference is not fixed but depends on social and cultural practice at that time. The analysis performed involved: the social and practical context for the questionnaire; similarities and differences between the questions depending on their principal words.

The global and comparative SRH questions have some shared principal words. Table I.1 gives an overview of possible denotations and sense relations of these words. A words denotation is close to the dictionary definition of a word. The term “sense relations” gives a broader understanding of the word, its relationship with other words, linguistic expressions, and areas of application.
Table I.1. Principal words, examples of their denotations and sense relations.

<table>
<thead>
<tr>
<th>Primary word</th>
<th>Examples of denotation</th>
<th>Examples of sense relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess</td>
<td>Determine the amount or value of something</td>
<td>Legal assessment, somewhat well-considered valuation</td>
</tr>
<tr>
<td></td>
<td>Make a valuation</td>
<td>Competition, judgement, certificate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Count points, place on a scale etc.</td>
</tr>
<tr>
<td>Health</td>
<td>State of well-being, freedom from disease with full bodily</td>
<td>Functioning capability, youth, beauty</td>
</tr>
<tr>
<td></td>
<td>functioning</td>
<td>Habits, lifestyle, diet, exercise, gym, advertising claims etc.</td>
</tr>
<tr>
<td>General</td>
<td>Concerning all, or almost all</td>
<td>Comprehensive, vague, imprecise, uncertain</td>
</tr>
<tr>
<td></td>
<td>On the whole</td>
<td>Abstract</td>
</tr>
<tr>
<td></td>
<td>Ignoring details</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unspecific</td>
<td></td>
</tr>
</tbody>
</table>

Table I.1. From Northern Sweden MONICA project 1990, 1994.

The sense relations coupled to “general” are extremely wide. The effect on meaning of combining the adjective “general” with “health” is therefore an additional emphasis on not being specific.

How the adjectives “good”, “bad” and the adverb “in between” are used in the population and by the person answering the question affects the answers. Adjectives in valuations could be interpreted as propositional statements as well as expressions of feelings and attitudes. The use of adjectives makes the answers ambiguous.

The word “compared” is one essential difference between the two questions. The word “compare” has the denotation of assessing (something) in relation to (something else) to find the similarities or differences. Its sense relations are coupled to words like grading, order, assessing, and classifying. The word “persons” directs attention to individuals, not an anonymous group of people. The direction to compare with other people of one’s own age leads to domains of significance such as social comparison, performance, profession, income, and achievement in life. Such comparisons are coupled to ranking, and the creation of
hierarchies and value structures. Comparisons are used frequently in both everyday speech and writing. Comparative SRH provides the respondents with a reference system, namely “compared with other persons of the same age”. This gives the answers a more determinate character and provides less room for purely subjective evaluation. The alternative replies to the comparative SRH question consist of the comparing adjectives, “better”, “worse” and “similar”. Thus, the answer is influenced by the double challenge to compare, firstly what is given by the question itself, and secondly by the alternatives provided.

Research question I.c, “What are the semantic meanings of a general SRH question and of a comparative SRH question, and how do these meanings differ?” can now be answered. The general SRH question did not directly imply comparison whereas the comparative SRH question did, both directly and by the response alternatives given. The comparison involved “sense relations” coupled to the word “health”. The word “persons” steered the question towards concrete comparisons. Both words, “health” and “persons”, might, in this context, imply a comparison involving a stratification of social status, which are well-known to influence health. The answers to the general SRH question depended on the way the adjectives (bad; in between; good) were used, whereas the answers to the comparative SRH question depended on a consideration of one’s own health in relation to other persons and the use of comparative adjectives.

The investigation was carried out within the approval for the Northern Sweden MONICA study by the Research Ethics Committee of Umeå University. All subjects gave informed consent to participate.

**Paper II**

MONICA data from cross-sectional surveys in 1999, 2004 and 2009 were used.

Assessment of covariates

The investigation included measurements of systolic and diastolic blood pressure, weight, height and cholesterol. Questions were asked concerning history of heart infarction, stroke, diabetes, smoking habits, physical activity, perceived risk of unemployment and education. Educational level was classified according to the highest attained level of education. Nine years at compulsory school was classified as low, 12 years of school as medium, postsecondary education as high education. Satisfaction with personal economy was measured with a 7-grade Likert scale with the instruction “Mark on the scale your satisfaction with your situation”, with a scale ranging from “very bad” to “excellent, could not be better”. Anxiety
and depressive emotions were assessed by yes/no answers to the questions “During the last month, have you had emotions of nervousness, anxiety or uneasiness?” and “During the last month, have you often felt in a bad mood, depressed or felt that the future looking gloomy?” Job strain was measured using the demand-control model elaborated by Theorell & Karasek. From the answers, respondents’ working situation was characterised as active, relaxed, passive or tense.

Outcomes
Comparative self-rated health was measured on a three-grade ordinal scale by the question “How would you assess your general health condition compared to persons of your own age?” with the alternatives “better/worse/similar”.

Statistical analysis
The statistical analysis were performed as ordinal regression analyses with the support of the statistical package SPSS 18. Ordinal regression is a variant of logistic regression which uses an ordinal scale of outcomes instead of only two possible outcomes as in logistic regression analysis. The odds ratio (OR) represents a change in odds when moving to the next category in an independent category/factor (such as having had a myocardial infarction or not) or when changing one step in an independent scale/covariate (such as a Likert scale). The reference value for the determinants was set as the anticipated most favourable situation. This means that values >1 indicate an increased odds of assessing a lower level of comparative self-rated health.

Study population
The participation rate was 73% with 5,457 persons completing the survey. As 143 persons had missing answers on comparative self-rated health, this left 5,314 persons for analysis. The sex distribution was 51% women, 49% men.

Results
As seen in table II.1, nervousness/anxiety, depressive feelings and discontent with economy were common in the population.

Table II.2 gives crude bivariate OR of determinants. Being a woman increased the OR of assessing lower comparative self-rated health. Neither blood pressure >140/≥90 nor cholesterol had any significant correlation with comparative self-rated health. Body mass index and physical activity were associated with comparative self-rated health. Having had myocardial infarction, diabetes or stroke or answering yes to questions concerning anxiety or depressive emotions all gave crude OR of order 2-4. Economic satisfaction was also significantly associated with comparative self-rated health, as was risk of unemployment.
Table II.1 Distribution of variables according to comparative self-rated health categories.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Worse (n=731)</th>
<th>Similar (n=3343)</th>
<th>Better (n=1240)</th>
<th>p (χ²-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 65–74*</td>
<td>128 (13.8%)</td>
<td>686 (58.5%)</td>
<td>358 (30.5%)</td>
<td></td>
</tr>
<tr>
<td>Age 45–64*</td>
<td>340 (15.2%)</td>
<td>1339 (60.0%)</td>
<td>552 (24.7%)</td>
<td></td>
</tr>
<tr>
<td>Age 25–44*</td>
<td>263 (13.8%)</td>
<td>1318 (69.0%)</td>
<td>330 (17.3%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Women</td>
<td>427 (58.4%)</td>
<td>1752 (52.4%)</td>
<td>531 (42.8%)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>304 (41.6%)</td>
<td>1591 (47.6%)</td>
<td>709 (57.2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Blood pressure &gt;140/=&gt;90</td>
<td>239 (32.7%)</td>
<td>1002 (30.0%)</td>
<td>398 (24.3%)</td>
<td></td>
</tr>
<tr>
<td>Blood pressure normal</td>
<td>492 (67.3%)</td>
<td>2341 (70.0%)</td>
<td>842 (32.1%)</td>
<td>0.194</td>
</tr>
<tr>
<td>Chol. &gt;7 mmol/l</td>
<td>85 (11.7%)</td>
<td>446 (13.4%)</td>
<td>172 (13.9%)</td>
<td></td>
</tr>
<tr>
<td>Chol. 6-7 mmol/l</td>
<td>173 (23.7%)</td>
<td>825 (24.8%)</td>
<td>330 (26.7%)</td>
<td></td>
</tr>
<tr>
<td>Chol. &lt;6 mmol/l</td>
<td>471 (64.6%)</td>
<td>2059 (61.8%)</td>
<td>734 (59.4%)</td>
<td>0.209</td>
</tr>
<tr>
<td>Body mass index &gt;30</td>
<td>258 (35.6%)</td>
<td>633 (19.1%)</td>
<td>145 (11.8%)</td>
<td></td>
</tr>
<tr>
<td>Body mass index 25-30</td>
<td>253 (34.9%)</td>
<td>1405 (42.3%)</td>
<td>534 (43.1%)</td>
<td></td>
</tr>
<tr>
<td>Body mass index &lt;25</td>
<td>214 (29.5%)</td>
<td>1284 (38.7%)</td>
<td>559 (45.2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Smoking</td>
<td>136 (18.6%)</td>
<td>467 (14.0%)</td>
<td>142 (11.5%)</td>
<td></td>
</tr>
<tr>
<td>No smoking</td>
<td>595 (81.4%)</td>
<td>2876 (86.0%)</td>
<td>1098 (88.5%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No myocardial infarction</td>
<td>53 (7.3%)</td>
<td>82 (2.5%)</td>
<td>25 (2.0%)</td>
<td></td>
</tr>
<tr>
<td>No diabetes</td>
<td>670 (92.7%)</td>
<td>3240 (97.5%)</td>
<td>1204 (98.0%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes</td>
<td>70 (9.6%)</td>
<td>131 (3.9%)</td>
<td>32 (2.6%)</td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>43 (6.0%)</td>
<td>55 (1.7%)</td>
<td>17 (1.4%)</td>
<td></td>
</tr>
<tr>
<td>No stroke</td>
<td>677 (94.0%)</td>
<td>3268 (98.3%)</td>
<td>1212 (98.6%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physically inactive (step 1–2)</td>
<td>254 (35.2%)</td>
<td>635 (19.2%)</td>
<td>128 (10.4%)</td>
<td></td>
</tr>
<tr>
<td>Physically active (step 3-6)</td>
<td>467 (64.8%)</td>
<td>2669 (80.8%)</td>
<td>1098 (89.6%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Economic satisfaction (step 1–3)</td>
<td>168 (23.2%)</td>
<td>406 (12.3%)</td>
<td>85 (7.0)</td>
<td></td>
</tr>
<tr>
<td>Economic satisfaction (step 4-7)</td>
<td>557 (76.8%)</td>
<td>2889 (87.7%)</td>
<td>1138 (93.0%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Risk of unemployment</td>
<td>86 (23.3%)</td>
<td>416 (19.1%)</td>
<td>112 (14.8%)</td>
<td></td>
</tr>
<tr>
<td>No risk of unemployment</td>
<td>281 (76.7%)</td>
<td>1767 (80.9%)</td>
<td>646 (85.2%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Low education</td>
<td>181 (25.0%)</td>
<td>760 (22.9%)</td>
<td>302 (24.6%)</td>
<td></td>
</tr>
<tr>
<td>Medium education</td>
<td>395 (54.6%)</td>
<td>1708 (51.4%)</td>
<td>571 (46.5%)</td>
<td></td>
</tr>
<tr>
<td>High education</td>
<td>147 (20.3%)</td>
<td>857 (25.8%)</td>
<td>355 (28.9%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Anxiety</td>
<td>331 (45.8%)</td>
<td>851 (25.7%)</td>
<td>228 (18.6%)</td>
<td></td>
</tr>
<tr>
<td>No anxiety</td>
<td>392 (54.2%)</td>
<td>2462 (74.3%)</td>
<td>1001 (81.4%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Depressive emotions</td>
<td>276 (38.2%)</td>
<td>441 (13.3%)</td>
<td>99 (8.1)</td>
<td></td>
</tr>
<tr>
<td>No depressive emotions</td>
<td>446 (61.8%)</td>
<td>2881 (86.7%)</td>
<td>1126 (91.9%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Karasek 1 Tense</td>
<td>172 (47.4%)</td>
<td>873 (40.0%)</td>
<td>253 (33.7)</td>
<td></td>
</tr>
<tr>
<td>Karasek 2 Active</td>
<td>47 (12.9%)</td>
<td>212 (9.7)</td>
<td>83 (11.1)</td>
<td></td>
</tr>
<tr>
<td>Karasek 3 Passive</td>
<td>70 (19.3%)</td>
<td>507 (23.3%)</td>
<td>164 (21.8)</td>
<td></td>
</tr>
<tr>
<td>Karasek 4 Relaxed</td>
<td>74 (20.4%)</td>
<td>588 (27.0)</td>
<td>251 (33.4)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table II.1. Data from Northern Sweden MONICA Project 1999–2009. Participants from population register, aged 25–74. * % calculated by the row.
<table>
<thead>
<tr>
<th>Comparative self-rated health</th>
<th>OR</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 65–74</td>
<td>0.57***</td>
<td>0.50–0.67</td>
</tr>
<tr>
<td>Age 45–64</td>
<td>0.81**</td>
<td>0.71–0.92</td>
</tr>
<tr>
<td>Age 25–44</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Female (ref=male)</td>
<td>1.49***</td>
<td>1.34–1.66</td>
</tr>
<tr>
<td>Blood pressure &gt;140/≥90</td>
<td>0.99 ns</td>
<td>0.88–1.11</td>
</tr>
<tr>
<td>Chol. &gt;7 mmol/l</td>
<td>0.87 ns</td>
<td>0.74–1.02</td>
</tr>
<tr>
<td>Chol. 6–7 mmol/l</td>
<td>0.88 ns</td>
<td>0.77–1.00</td>
</tr>
<tr>
<td>Chol. &lt;6 mmol/l</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Body mass index &gt;30</td>
<td>2.61***</td>
<td>2.23–3.05</td>
</tr>
<tr>
<td>Body mass index 25–30</td>
<td>1.15*</td>
<td>1.01–1.29</td>
</tr>
<tr>
<td>Body mass index &lt;25</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Smoking (ref=no)</td>
<td>1.41***</td>
<td>1.20–1.65</td>
</tr>
<tr>
<td>Myocardial infarction (ref=no)</td>
<td>2.67***</td>
<td>1.95–3.67</td>
</tr>
<tr>
<td>Diabetes (ref=no)</td>
<td>2.55***</td>
<td>1.96–3.33</td>
</tr>
<tr>
<td>Stroke (ref=no)</td>
<td>3.22***</td>
<td>2.23–4.65</td>
</tr>
<tr>
<td>Physical activity (6-step scale)</td>
<td>1.68***</td>
<td>1.59–1.76</td>
</tr>
<tr>
<td>Economic satisfaction (7-step scale)</td>
<td>1.34***</td>
<td>1.29–1.40</td>
</tr>
<tr>
<td>Risk of unemployment (ref=no)</td>
<td>1.28*</td>
<td>1.02–1.60</td>
</tr>
<tr>
<td>Low education</td>
<td>1.20*</td>
<td>1.02–1.40</td>
</tr>
<tr>
<td>Medium education</td>
<td>1.34***</td>
<td>1.17–1.53</td>
</tr>
<tr>
<td>High education</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Anxiety (ref=no)</td>
<td>2.22***</td>
<td>1.96–2.53</td>
</tr>
<tr>
<td>Depressive emotions (ref=no)</td>
<td>3.77***</td>
<td>3.22–4.41</td>
</tr>
<tr>
<td>Karasek 1 Tense</td>
<td>1.61***</td>
<td>1.35–1.92</td>
</tr>
<tr>
<td>Karasek 2 Active</td>
<td>1.36*</td>
<td>1.05–1.76</td>
</tr>
<tr>
<td>Karasek 3 Passive</td>
<td>1.28*</td>
<td>1.05–1.56</td>
</tr>
<tr>
<td>Karasek 4 Relaxed</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001; ns=non-significant

Table II.2. Data from Northern Sweden MONICA Project 1999–2009. Participants from population register, aged 25–74. Values >1 indicate worse self-rated health compared to reference category.
Table II.3 Odds ratios for assessing comparative self-rated health. Multiple ordinal regression.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>CI 95%</th>
<th>Model 2</th>
<th>CI 95%</th>
<th>Model 3</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.97***</td>
<td>0.96–0.97</td>
<td>0.98***</td>
<td>0.98–0.99</td>
<td>0.98***</td>
<td>0.97–0.98</td>
</tr>
<tr>
<td>Sex (ref=man)</td>
<td>1.50***</td>
<td>1.34–1.68</td>
<td>1.35***</td>
<td>1.16–1.57</td>
<td>1.36***</td>
<td>1.21–1.54</td>
</tr>
<tr>
<td>Blood pressure &gt;140/≥90</td>
<td>1.07 ns</td>
<td>0.93–1.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholesterol</td>
<td>1.00 ns</td>
<td>0.95–1.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body mass index</td>
<td>1.07***</td>
<td>1.06–1.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking (ref=no)</td>
<td>1.15 ns</td>
<td>0.97–1.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction (ref=no)</td>
<td>3.10 ***</td>
<td>2.17–4.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes (ref=no)</td>
<td>2.27***</td>
<td>1.69–3.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke (ref=no)</td>
<td>3.25 ***</td>
<td>2.17–4.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity (6-step scale)</td>
<td>1.67***</td>
<td>1.58–1.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low education (ref=high edu.)</td>
<td></td>
<td></td>
<td>1.37*</td>
<td>1.05–1.78</td>
<td>1.15 ns</td>
<td>0.96–1.38</td>
</tr>
<tr>
<td>Medium education (ref=high edu.)</td>
<td></td>
<td></td>
<td>1.26**</td>
<td>1.06–1.50</td>
<td>1.11 ns</td>
<td>0.96–1.28</td>
</tr>
<tr>
<td>Economic satisfaction (7-step scale)</td>
<td></td>
<td></td>
<td>1.15***</td>
<td>1.08–1.23</td>
<td>1.16***</td>
<td>1.11–1.22</td>
</tr>
<tr>
<td>Anxiety (ref=no)</td>
<td>1.50***</td>
<td>1.25–1.80</td>
<td>1.48***</td>
<td>1.28–1.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive emotions (ref=no)</td>
<td></td>
<td></td>
<td>2.28***</td>
<td>1.78–2.89</td>
<td>2.28***</td>
<td>1.89–2.74</td>
</tr>
<tr>
<td>Risk of unemployment (ref=no)</td>
<td></td>
<td></td>
<td>1.11 ns</td>
<td>0.92–1.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karasek 1 Tense (ref=relaxed)</td>
<td></td>
<td></td>
<td>1.27*</td>
<td>1.05–1.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karasek 2 Active (ref=relaxed)</td>
<td></td>
<td></td>
<td>1.03 ns</td>
<td>0.84–1.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karasek 3 Passive (ref=relaxed)</td>
<td></td>
<td></td>
<td>1.03 ns</td>
<td>0.79–1.34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001; ns=non-significant

Table II.3 Data from northern Sweden MONICA Project 1999–2009. Participants from population register, aged 25–74. Values >1 indicate worse self-rated health compared to reference category.
In table II.3, model 1 shows that smoking lost its statistically significant association with comparative self-rated health, model 2 shows attenuation of most factors where risk of unemployment, “Karasek active” and “Karasek passive” lost their statistically significant associations. If the Karasek variable and/or “risk of unemployment” variable are inserted in model 3, confidence intervals for diabetes, stroke and myocardial infarctions widen considerably (data not shown) and myocardial infarction loses its statistically significant association with comparative self-rated health. See further in “Methodological discussion” Paper II. Model 3 (table II.3) shows how educational levels lose statistically significant associations. Age, sex, stroke, myocardial infarction, diabetes, body mass index, physical activity, economic satisfaction, anxiety and depressive emotions retain their statistically significant association. Research question II “How are the associations between age-comparative self-rated health and diagnoses of stroke, myocardial infarction or diabetes; biological risk factors for those diseases; self-reported social- and lifestyle factors; and self-reported occurrence of negative emotions or anxiety?” can now be answered. *Anxiety and depressive emotions were associated with comparative self-rated health in the same magnitude as having suffered a heart attack or stroke or having diabetes. The absolute number of persons reporting anxiety was almost nine times the number of persons reporting heart attack. The calculated OR for scoring lower on comparative self-rated health by the seven-step “satisfaction with economy” scale would rise considerably, going from the most to the least content answer as each step increases the odds of reporting lower self-rated health by 1.34 as crude value and 1.16 according to the model. Body mass index and physical activity were also associated.*

The investigation was carried out within the approval for the Northern Sweden MONICA study by the Research Ethics Committee of Umeå University. All subjects gave informed consent to participate.

**Paper III**

Data from the cohort formed by the Västerbotten Intervention Programme were used. Date of entry into the cohort is the date when the questionnaire was completed. Paper III is based on data obtained 1990–2004. The programme is described in detail elsewhere.96 The Swedish national inpatient register was followed until 31 December 2009 and the Swedish death certificate register until 31 December 2008.
Assessment of covariates
Covariates were assessed at baseline during a visit to the local healthcare centre. Systolic blood pressure, total cholesterol, BMI, smoking, diabetes, age and sex were considered as standard risk factors. We added education as it is a proxy for social class and physical activity as it is a modifiable risk factor. For educational status, nine years of compulsory school was classified as low, 12 years of school as medium, post-secondary education as high education. Physical activity was assessed as sedentary if respondents never exercised, went cycling or walking during leisure time less than 2–3 times per week, used car or bus for commuting to work, or cycled or walked to work less than 2 km each way; active if they trained at least 2–3 times per week or went cycling or walking to work more than 5 km per way.

Outcomes and ascertainment of diagnoses
Outcome was defined by the combination of hospital discharge diagnoses of first myocardial infarction or a death certificate with the underlying cause of death as myocardial infarction without known prior myocardial infarction. Diagnoses ICD9 410, ICD10 I21 were used. A total of 1,825 incident first cases of myocardial infarction were registered and 335 myocardial infarction deaths, totalling 2,062 cases of the combined endpoint of fatal or non-fatal myocardial infarction. Diagnoses from hospital discharges have a high validity, as does the Swedish death certificate register.

Study population
Figure III.1 shows exclusions from the original dataset. Exclusions were made to ascertain that the cohort was as free as possible from cardiovascular disease and major disease at inclusion into the cohort. Major disease and death close to inclusion into the cohort could have affected both rating of health and time to outcomes. In this thesis data are also presented on results based on comparative self-rated health. These data are not in the published paper III. Tables III.1a, III.2a, III.3a and fig III.2a present results of the analysis of the general SRH question. Tables III.1b, III.2b, III.3b and fig III.2b show results of the analysis of the comparative SRH question. These tables and figure are based on answers from 56,294 respondents with 1,460 outcomes. Cases with missing values are 16,236 persons.

Statistical analyses
Variables were tested with Cox proportional hazard regression method. Log minus log diagrams were used to ascertain the proportional hazard assumption. HR adjusted for age and sex were calculated for variables. Interaction terms were calculated between self-rated health and variables. A multivariable analysis with
age, sex, systolic blood pressure, serum cholesterol, BMI, daily smoking of cigarettes, manifest diabetes physical activity, education and self-rated health was finally calculated (table III.2a,b). Interaction was also assessed by stratification of self-rated health on age-sex-adjusted HR for each variable (table III.3a,b).

Results
The mean follow-up time for fatal or non-fatal myocardial infarction was 13.2 years (SD 3.9). Baseline data and outcomes in relation to self-rated health are presented in table III.1a,b. Persons in the “Better”, “Pretty good” and “Very good” categories were better off. They had higher education, lower systolic blood pressure, were leaner, fewer were daily cigarette smokers and diabetics, and there were relatively fewer fatal or non-fatal myocardial infarctions in this groups. All variables differed statistically significantly in relation to self-rated health categories when tested with χ² test or ANOVA.

Table III.2a,b displays crude HR for sex and age and separate Cox regression models for each risk factor adjusted for sex and age. The proportional hazards assumption was not violated. HRs for self-rated health “Poor” and “Worse” were 2.03, and falling according to self-rated health categories. In the most complex model the multivariable analysis, showed all categories of self-rated health remaining statistically significant except “pretty poor”.

Table III.3a,b shows HRs for variables in the multivariable analysis of standard risk factors stratified by self-rated health category. No notable difference could be seen except for manifest diabetes, where HR was 5.55 (95% CI 2.42–12.68) in the category poor. The interaction term for “poor” and manifest diabetes was significant, p = 0.011. Figure III.2a,b illustrates graphically the Cox regression line related to time in months from entry into the study.
Fig. III.1 Exclusions from the original data set of the Västerbotten Intervention Programme. Recruitment period 1990–2004.
Table III.1a. Baseline data and outcomes in relation to general self-rated health.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Poor (n=964, 1.3%)</th>
<th>Pretty poor (n=3790, 5.2%)</th>
<th>Somewhat good (n=15276, 21.1%)</th>
<th>Pretty good (n=33543, 46.2%)</th>
<th>Very good (n=18600, 25.6%)</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean.</td>
<td>48.1 (8.9)</td>
<td>48.2 (9.3)</td>
<td>48.2 (9.8)</td>
<td>46.3 (9.7)</td>
<td>45.7 (9.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men.</td>
<td>368 (38.2)</td>
<td>1460 (38.5)</td>
<td>7118 (46.6)</td>
<td>16411 (49.9)</td>
<td>9185 (49.4)</td>
<td></td>
</tr>
<tr>
<td>Women.</td>
<td>569 (61.8)</td>
<td>2330 (61.5)</td>
<td>8158 (53.4)</td>
<td>17132 (51.1)</td>
<td>9415 (50.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Systolic BP mm Hg mean.</td>
<td>128.4 (18.7)</td>
<td>128.4 (18.4)</td>
<td>128.7 (18.4)</td>
<td>126.5 (17.5)</td>
<td>124.9 (16.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total cholesterol mmol/L mean.</td>
<td>5.7 (1.3)</td>
<td>5.7 (1.2)</td>
<td>5.7 (1.2)</td>
<td>5.6 (1.2)</td>
<td>5.5 (1.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI kg/m² mean.</td>
<td>26.7 (4.9)</td>
<td>26.5 (4.7)</td>
<td>26.4 (4.4)</td>
<td>25.5 (3.9)</td>
<td>24.9 (3.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Smoking, cigarettes daily, yes.</td>
<td>225 (23.8)</td>
<td>785 (21.1)</td>
<td>3067 (20.4)</td>
<td>5921 (17.9)</td>
<td>2595 (14.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes mellitus, yes.</td>
<td>54 (6.0)</td>
<td>212 (6.0)</td>
<td>837 (5.9)</td>
<td>1101 (3.5)</td>
<td>423 (2.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High educational level, yes.</td>
<td>195 (20.5)</td>
<td>826 (21.9)</td>
<td>3027 (20.0)</td>
<td>7929 (23.8)</td>
<td>5224 (28.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physically active, yes.</td>
<td>135 (14.1)</td>
<td>419 (11.1)</td>
<td>1556 (10.2)</td>
<td>4328 (12.9)</td>
<td>3621 (19.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antihypertensive treatment, yes.</td>
<td>137 (14.2)</td>
<td>512 (13.5)</td>
<td>2000 (13.1)</td>
<td>2689 (8.0)</td>
<td>713 (3.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fatal or non-fatal myocardial infarction.</td>
<td>37 (3.8)</td>
<td>120 (3.2)</td>
<td>578 (3.8)</td>
<td>921 (2.7)</td>
<td>406 (2.2)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table III.1a. Västerbotten Intervention Programme. Recruitment period 1990–2004. BMI, body mass index. High education level is post-secondary education. Physically active – training at least 2–3 times per week or walking or cycling to work more than 5 km per way.
Table III. 1b. Baseline data and outcomes in relation to comparative self-rated health.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Worse n=4385 (7.8)</th>
<th>Similar n=44666 (79.3)</th>
<th>Better n=7241 (12.9)</th>
<th>p-value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean.</td>
<td>48.9 (9.3)</td>
<td>46.4 (9.6)</td>
<td>49.1 (9.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men.</td>
<td>1761 (40.2)</td>
<td>20978 (47.0)</td>
<td>4111 (56.8)</td>
<td></td>
</tr>
<tr>
<td>Women.</td>
<td>2625 (59.8)</td>
<td>23688 (53.0)</td>
<td>3131 (43.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Systolic BP mm Hg mean.</td>
<td>130.1 (18.6)</td>
<td>126.6 (17.6)</td>
<td>126.4 (16.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total cholesterol mmol/L mean.</td>
<td>5.8(1.3)</td>
<td>5.6 (1.2)</td>
<td>5.6 (1.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Smoking, cigarettes daily, yes.</td>
<td>838 (19.4)</td>
<td>7793 (17.7)</td>
<td>865(12.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes mellitus, yes.</td>
<td>353 (8.7)</td>
<td>1553 (3.7)</td>
<td>189 (2.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High educational level, yes.</td>
<td>816 (18.8)</td>
<td>10322 (23.2)</td>
<td>2255 (31.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physically active yes.</td>
<td>389 (8.9)</td>
<td>5013 (11.3)</td>
<td>1976 (27.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antihypertensive treatment, yes.</td>
<td>137 (14.2)</td>
<td>512 (13.5)</td>
<td>2000(13.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fatal or non-fatal myocardial infarction.</td>
<td>167 (3.8)</td>
<td>1131 (2.5)</td>
<td>163 (2.3)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table III.1b. Västerbotten Intervention Programme. Recruitment period 1990–2004. BMI, body mass index. High education level is post-secondary education. Physically active – training at least 2–3 times per week or walking or cycling to work more than 5 km per way.
Table III.2a. Hazard Ratios in relation to outcome fatal or non-fatal myocardial infarction. General self-rated health.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Separate Cox regression adjusted for sex and age.</th>
<th>Multivariable analysis, Standard risk factors.</th>
<th>Multivariable analysis, including education and physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR (95% CI)</td>
<td>HR (95% CI)</td>
<td>HR (95% CI)</td>
</tr>
<tr>
<td>Sex (female ref)</td>
<td>3.20 (2.90–3.50)</td>
<td>3.27 (2.94–3.63)</td>
<td>3.24 (2.91–3.61)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>1.088 (1.082–1.094)</td>
<td>1.068 (1.061–1.074)</td>
<td>1.065 (1.058–1.072)</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>1.014 (1.011–1.016)</td>
<td>1.011 (1.008–1.013)</td>
<td>1.011 (1.008–1.013)</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>1.32 (1.28–1.37)</td>
<td>1.28 (1.23–1.32)</td>
<td>1.27 (1.23–1.32)</td>
</tr>
<tr>
<td>Smoker, daily cigarette (ref never smoker)</td>
<td>2.65 (2.37–2.95)</td>
<td>2.63 (2.34–2.96)</td>
<td>2.58 (2.29–2.91)</td>
</tr>
<tr>
<td>Manifest diabetes (ref no diabetes)</td>
<td>2.14 (1.85–2.48)</td>
<td>1.73 (1.48–2.02)</td>
<td>1.71 (1.46–2.01)</td>
</tr>
<tr>
<td>BMI</td>
<td>1.05 (1.04–1.06)</td>
<td>1.02 (1.012–1.04)</td>
<td>1.02 (1.01–1.04)</td>
</tr>
<tr>
<td>Self-rated health last year poor</td>
<td>2.03 (1.45–2.84)</td>
<td>1.61 (1.13–2.31)</td>
<td>1.55 (1.08–2.23)</td>
</tr>
<tr>
<td>Self-rated health last year pretty poor</td>
<td>1.56 (1.27–1.91)</td>
<td>1.26 (1.01–1.57)</td>
<td>1.18 (0.94–1.48)</td>
</tr>
<tr>
<td>Self-rated health last year somewhat good</td>
<td>1.60 (1.41–1.82)</td>
<td>1.36 (1.19–1.56)</td>
<td>1.32 (1.15–1.52)</td>
</tr>
<tr>
<td>Self-rated health last year pretty good</td>
<td>1.27 (1.13–1.43)</td>
<td>1.17 (1.04–1.33)</td>
<td>1.14 (1.01–1.30)</td>
</tr>
<tr>
<td>Self-rated health last year very good</td>
<td>1 Ref</td>
<td>1 ref</td>
<td>1 Ref</td>
</tr>
<tr>
<td>Education low (ref. high)</td>
<td>1.65 (1.43–1.89)</td>
<td>Ref</td>
<td>1.23 (1.06–1.43)</td>
</tr>
<tr>
<td>Physical activity, sedentary (ref active)</td>
<td>1.62 (1.37–1.91)</td>
<td>Ref</td>
<td>1.23 (1.02–1.47)</td>
</tr>
</tbody>
</table>

Table III.2a. Västerbotten Intervention Programme. Recruitment period 1990–2004. Separate Cox regression models for each risk factor together with sex and age and two models with multivariable analysis. BMI, body mass index. High education level is post-secondary education, low is compulsory school. Physically active – training at least 2–3 times per week or walking or cycling to work more than 5 km per way; physically sedentary – never exercising, done cycling or walking during leisure time less than 2–3 times per week, used car or bus for commuting to work, or cycled or walked to work less than 2 km each way.
Table III.2b. Hazard Ratios in relation to outcome fatal or non-fatal myocardial infarction. Comparative self-rated health

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Separate Cox regression for each risk factor adjusted for sex and age.</th>
<th>Multivariable analysis, standard risk factors</th>
<th>Multivariable analysis, including education and physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (female ref)</td>
<td>HR (95% CI)</td>
<td>HR (95% CI)</td>
<td>HR (95% CI)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>3.20 (2.90–3.50)</td>
<td>3.30 (2.91–3.75)</td>
<td>3.28 (2.89–3.73)</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>1.088 (1.082–1.094)</td>
<td>1.073 (1.064–1.081)</td>
<td>1.071 (1.062–1.079)</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>1.014 (1.011–1.016)</td>
<td>1.010 (1.007–1.013)</td>
<td>1.010 (1.007–1.013)</td>
</tr>
<tr>
<td>Smoker, daily cigarette (ref never smoker)</td>
<td>1.05 (1.04–1.06)</td>
<td>1.02 (1.01–1.04)</td>
<td>1.02 (1.01–1.04)</td>
</tr>
<tr>
<td>Manifest diabetes (ref no diabetes)</td>
<td>1.05 (1.04–1.06)</td>
<td>1.02 (1.01–1.04)</td>
<td>1.02 (1.01–1.04)</td>
</tr>
<tr>
<td>Self-rated health worse (n=4385)</td>
<td>2.03 (1.63–2.52)</td>
<td>1.51 (1.20–1.91)</td>
<td>1.47 (1.16–1.87)</td>
</tr>
<tr>
<td>Self-rated health similar (n=44666)</td>
<td>1.48 (1.26–1.75)</td>
<td>1.25 (1.05–1.47)</td>
<td>1.23 (1.03–1.48)</td>
</tr>
<tr>
<td>Self-rated health better (n=7241)</td>
<td>1.0 ref</td>
<td>1.0 ref</td>
<td>1.0 ref</td>
</tr>
<tr>
<td>Education short (ref=long)</td>
<td>1.65 (1.43–1.89)</td>
<td>1.62 (1.37–1.91)</td>
<td>1.19 (0.996–1.41)</td>
</tr>
<tr>
<td>Physical activity, sedentary (ref active)</td>
<td>1.62 (1.37–1.91)</td>
<td>1.48 (1.26–1.75)</td>
<td>1.14 (0.91–1.42)</td>
</tr>
</tbody>
</table>

Table III.2b. Västerbotten Intervention Programme. Recruitment period 1990–2004. Separate Cox regression models for each risk factor together with sex and age and two models with multivariable analysis. BMI, body mass index. High education level is post-secondary education. Short education is compulsory school, 9 years or shorter. Physically active – training at least 2–3 times per week or walking or cycling to work more than 5 km per way; physically sedentary – never exercising, done cycling or walking during leisure time less than 2–3 times per week, used car or bus for commuting to work, or cycled or walked to work less than 2 km each way.
Table III.3a. Stratification by general self-rated health on risk factors for fatal or non-fatal myocardial infarction. HR adjusted for age and sex (95% CI)

<table>
<thead>
<tr>
<th>Self-rated health</th>
<th>Systolic blood pressure</th>
<th>Total cholesterol</th>
<th>Smoker, daily cigarette</th>
<th>Manifest diabetes</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>1.014 (0.995–1.032)</td>
<td>1.29 (1.0–1.64)</td>
<td>2.70 (1.01–7.24)</td>
<td>5.55 (2.42–12.68)</td>
<td>1.01 (0.95–1.08)</td>
</tr>
<tr>
<td>Pretty poor</td>
<td>1.010 (1.000–1.020)</td>
<td>1.41 (1.23–1.60)</td>
<td>1.75 (1.12–2.75)</td>
<td>1.94 (1.13–3.34)</td>
<td>1.05 (1.01–1.09)</td>
</tr>
<tr>
<td>Somewhat good</td>
<td>1.014 (1.010–1.018)</td>
<td>1.27 (1.19–1.35)</td>
<td>2.90 (2.33–3.61)</td>
<td>2.10 (1.64–2.69)</td>
<td>1.03 (1.01–1.05)</td>
</tr>
<tr>
<td>Pretty good</td>
<td>1.013 (1.009–1.016)</td>
<td>1.28 (1.22–1.35)</td>
<td>2.29 (1.94–2.70)</td>
<td>2.06 (1.65–2.59)</td>
<td>1.05 (1.04–1.07)</td>
</tr>
<tr>
<td>Very good</td>
<td>1.014 (1.008–1.020)</td>
<td>1.48 (1.37–1.60)</td>
<td>3.35 (2.62–4.28)</td>
<td>1.52 (0.96–2.39)</td>
<td>1.04 (1.01–1.07)</td>
</tr>
</tbody>
</table>


Table III.3b. Stratification by comparative self-rated health on risk factors for fatal or non-fatal myocardial infarction. HR adjusted for age and sex (95% CI)

<table>
<thead>
<tr>
<th>Self-rated health</th>
<th>Systolic blood pressure</th>
<th>Total cholesterol</th>
<th>Smoker, daily cigarette</th>
<th>Manifest diabetes</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worse</td>
<td>1.013 (1.005–1.021)</td>
<td>1.13 (1.01–1.28)</td>
<td>2.79 (1.85–7.22)</td>
<td>2.96 (2.00–4.38)</td>
<td>1.02 (0.99–1.05)</td>
</tr>
<tr>
<td>Similar</td>
<td>1.011 (1.008–1.014)</td>
<td>1.33 (1.27–40)</td>
<td>2.45 (2.11–2.85)</td>
<td>1.77 (1.44–2.18)</td>
<td>1.05 (1.03–1.06)</td>
</tr>
<tr>
<td>Better</td>
<td>1.017 (1.008–1.026)</td>
<td>1.37 (1.21–1.55)</td>
<td>3.23 (2.16–4.84)</td>
<td>2.09 (1.12–3.91)</td>
<td>1.03 (0.99–1.08)</td>
</tr>
</tbody>
</table>


Research question III, “What is the relationship between self-rated health, both general and comparative, adjusted for standard risk factors and the outcome of fatal or non-fatal myocardial infarction?” can now be answered. **Self-rated health is an independent predictor of fatal or non-fatal myocardial infarction among standard risk factors. Adjusting for standard risk factors in a multivariable analysis attenuates HRs but a substantial relationship between self-rated health and fatal or non-fatal myocardial infarction remains. The dose-response relationship between self-rated health and the outcome adds strength to the connection between self-rated health and the outcome. Self-rated health is not an effect modifier of standard risk factors for myocardial infarction except for diabetes and poor general self-rated health. No such interaction was seen between worse comparative self-rated health and diabetes.**

All participants gave written consent and the study was approved by the ethical review board at Umeå, Dnr 08-131M.

**Paper IV**

We (the authors of paper IV; GW, KH, AF), all GPs, invited eight experienced colleagues interested in consultation skills to participate. Six accepted; two of us (KH, GW) also participated. The participants received an outline of the study design and brought a recorded pilot consultation to an introductory meeting with all participating physicians. We presented the epidemiological background of self-rated health, the aim of the study and discussed how to perform it. The question was to be posed when convenient before the physical examination; the exact wording could be varied, but the words “assess”, “health”, and “compare with others your own age” were important. Emphasis was not to be on pinpointing comparisons, but on attentive listening to the patients.

The consultations were scheduled, non-emergency appointments with new as well as established patients. In keeping with previous research, we chose patients with diabetes mellitus type 2 and chronic non-malignant pain, while also adding patients with undiagnosed symptoms. Patients needed to be 18 or older and able to speak Swedish. We strove for a wide age spectrum and a balanced number of women and men, accomplished through feedback to the participating GPs. No further selection was deemed necessary. We judged 33 consultations as sufficient; the last recordings did not change our main findings.
Patients were informed that the study concerned how doctors can improve dialogue with patients. All patients gave written informed consent to participation.

The consultations were voice-recorded. The first author (GW) listed topics covered in each consultation and established which portions concerned the question. He measured consultation time as a whole and the overall apportionment of speaking time between doctor and patient and specifically during the discussion of self-rated health. Time used for administrative tasks such as writing prescriptions was not included. Decisions on how to delineate topics, and that pauses >1 second were signs of cognitive processes, were informed by the Roter interaction analysis system. The first ten consultations were transcribed in full. Otherwise only the discussion of self-rated health was transcribed.

The authors separately made a written summary of the portion of each transcript devoted to the question. The further analysis (performed by AF and GW) was informed by the method of systematic text condensation (STC). We edited the quotations slightly to make them readable.

Immediately after each consultation, the doctors filled out a questionnaire asking: “Did the question of self-rated health affect the consultation and/or your understanding of the patient’s health situation, yes or no? Describe how.” The answers to the “describe how” question were used in the final analysis as a means of mirroring the STC analysis of the transcriptions.

Results
Participants and speaking time
In the study, 33 patients participated, 17 women and 16 men, aged 18 to 83 and with a median age of 60.

<table>
<thead>
<tr>
<th>Main reason for consultation</th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>7</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Pain</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>16</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 1. Main reasons for participants to consult their GP.

Reasons for consulting are listed in Table 1. “Other” reasons included stomach problems, worries about heart disease, headache, dizziness, lung disease, exhaustion and weight problems.
The participating GPs, three men and five women, were aged 44 to 61 and had been working as physicians for 16 to 34 years. The consultations took place between May and November 2013 at community health centres in northern Sweden, located in towns as well as small municipalities. Time used for the consultations ranged from 12 to 46 minutes, with a median of 23 minutes. Time for engaging in discussion of self-rated health ranged from 30 seconds to 15 minutes, with a median time of 2 minutes. In the consultation as a whole the patients’ speaking time varied from 21 percent to 85 percent of the total speaking time. In the portions covering self-rated health their speaking time ranged from 49 percent to 90 percent. The increase was most prominent in the consultation where the patient had only 21 percent of the total speaking time. When discussing self-rated health, the patient’s speaking time rose to 64 percent. Generally, the apportionment of time was associated with the doctors’ consultation style.

An unfamiliar and unexpected question
In questionnaire responses, physicians stated that the question had affected the consultation and/or their understanding of the patient’s health condition in 30 of 33 consultations. On two occasions, incorporating the question and/or being recorded was experienced as distracting.

The question was often followed by silence lasting several seconds; sometimes the patient sighed or made a tentative attempt to respond. Some asked the physician to repeat the question.

*GP: What do you think... if you were to assess your health compared to others in your age group, what would you say?*
*Patient: (Silence.)*
*GP: Is it better, worse, or about the same?*
*Patient: Oh, goodness, that’s really hard to say.*

This exchange suggests that the question was unexpected. Once patients had understood it, many responded emotionally (referred to below as “reaction”), and subsequently more thoughtfully (referred to as “reflection”).

Reaction
Many patients interpreted the question as referring to lifestyle matters – diet, weight, and exercise – and for the majority this brought on feelings of guilt and shame. For instance, a 65-year-old man at his yearly diabetes check-up immediately responded, “Well, I do have a spare tyre”, followed by an embarrassed laugh. A woman of 20 who was worried about developing diabetes reacted similarly, quickly becoming defensive:
Patient: Maybe on the worse end (laughs).
GP: In what way?
Patient: Um, well, food, I guess.
GP: I see.
Patient: ... Sometimes it’s pizza, though we’re trying to cut back on that now... and eat better. And I went blueberry picking.

The questionnaire responses revealed that when patients conveyed guilt and shame physicians became more sensitive to discussions of lifestyle issues. Other patients, in contrast, reacted with pride and delight. They asserted that, unlike those around them, they did not have a "drinking problem" or that they felt stronger and were in better shape than others. The physicians experienced such responses as “lightening things up”.

Another emotion that came out was grief, sometimes expressed as anger and in strong language, whereas profanity did not otherwise occur in consultations. For example, a 71-year-old man exclaimed, “Some people just feel so damned good!” When a 60-year-old man answered “very bad” the conversation proceeded as follows:

GP: So you feel much worse than others?
Patient: Yes, but you see, it isn’t just the business of my heart and the diabetes. It’s my knees and my lungs and the whole goddamned thing.

Even with established patients, a powerful emotional reaction could make the physician view their situation more clearly: “Things were worse than I’d realised.” Other reactions provided entirely new insights. These might concern symptoms that were more debilitating than the physician had previously noted, or isolation – revealed when the patient had no peer group for comparison – despite an apparently normal social life.

There were also patients who clearly stated that they felt fine, that the current symptom or a chronic illness had little effect on their overall well-being. A 53-year-old woman with diabetes and a severe rheumatic disorder replied:

Patient: I don’t know, there’s sure to be someone who’s in even worse shape than I am.
GP: So you think there are others who are even worse off?
Patient: Yes, there are people who’ve had to amputate toes, even legs and such, so I’ve done pretty well.
According to the physicians, the patients’ emotional responses impacted the atmosphere in the room and the direction of the follow-up discussion. It gave an on-the-spot account of the patient’s situation.

Reflection
In the discussion that followed, the focus was on the patients’ thoughts and reflections about their health. They made comparisons to their own history and to those around them, conveyed information about their current lives and expressed insights that seemed to evolve or coalesce during the course of the conversation. The physicians responded with encouraging murmurs and by repeating or summarising what the patients had just said, making it easier for them to continue, especially those who had difficulty expressing themselves. The conversations focused on the patients’ functional ability, their ways of managing symptoms, illnesses and risks, and how their life circumstances affected their experience of ill health.

Functional ability
Illnesses and symptoms were more clearly correlated with functional ability in daily life after the question was posed. Some patients thought they felt better than before, physically, emotionally, or in general. Others began identifying what they were able to do in spite of everything and things they could enjoy and afford that brightened their lives. Comparisons with others who were more limited by their illnesses made them look more positively on their own situations, even those who initially had answered “worse”. An 83-year-old man who no longer could go hunting due to difficulty walking had first mentioned being “bitter” about this. Towards the end of the consultation the doctor returned to the question, to which the patient responded:

Patient: As I said at the beginning, I’m a bit handicapped because of my legs.
GP: Yes, right.
Patient: Don’t have much strength, not much at all, and...
GP: Mmm.
Patient: My balance is worse, and... But other than that, I think I’ve, I think overall I’m doing better than many... A lot of others are dead and... I’m clear in the head, after all.

This type of shift in perspective sometimes occurred quickly. A 75-year-old woman who had complained intensely about previous treatment before the question was posed and first responded “worse” went on to think out loud. To the astonishment of the doctor, she concluded that compared to before, she had better mobility and life had become much more enjoyable. This
reflection broke the pattern established earlier, before the question was posed, making it possible to continue discussing the patient’s resources.

Sometimes, however, illness and its negative consequences continued to be the central focus. A 32-year-old woman suffering from headaches and dizziness recalled how strong, energetic and physically active she had been – capabilities that now seemed remote:

*Patient:* Now I’m exhausted and worn out.
*GP:* Yes.
*Patient:* I usually have a lot of energy.
*GP:* You usually have a lot of energy?
*Patient:* Yes, energy to spare. I’m used to working my fingers to the bone and constantly being on the go.
*GP:* Oh.
*Patient:* But now I get tired emptying the dishwasher.

These exchanges could give physicians a deeper awareness of the patient’s problem, insight into the gravity of the illness and the risk of continued ill health. However, physicians also observed that the question only made some patients start “thinking even more about how miserable they were”.

Managing symptoms, illnesses and risks
In their reflections patients also addressed the ways they attempted to manage their ill health. Many described having begun, after great struggle and internal resistance, to accept their situation: ageing was inevitable, illnesses required medication, and they had to make the best of it. Reflections like this incorporated a degree of detachment or self-irony and occasionally the tone became joking.

Work and taking responsibility were among the resources and deliberate strategies that patients brought up. The man who had complained that others felt “so damned good” mentioned a bit later that he had started helping a friend at his firm, which made him “forget his troubles for a little while”. A woman suffering from chronic pain and agoraphobia after being raped described having realised that she had to face up to her fears for her child’s sake:

*Patient:* ... when I realised that my son and I never could go to the movies on our own, or go shopping or walk around town on our own...
*GP:* Mmm.
*Patient:* ...well, that’s when I pulled myself together and... it was then I started, what do you call it, working through it.
The physicians commented that conversations like this made both participants aware of the obstacles the patient had dealt with and surmounted. Other patients emphasised, in ways the physicians had not anticipated, being stubborn or “bull-headed” in their determination to overcome physical handicaps. This attitude could be useful when discussing treatment.

Lifestyle continued to be a central theme. Many patients emphasised their attempts to “live a more healthy life”, and some had succeeded. Others were well aware of what they needed to do but failed continuously and avoided looking ahead to consider the consequences. The burden of responsibility and inability to live up to it weighed heavily on them. A 60-year-old man, worn down by multiple illnesses, was asked what the healthcare system could do to help him, but he had lost his incentive:

Patient: They say I have to eat the right food, I have to exercise, I have to blah blah blah.
GP: Mmm.
Patient: And I suppose I might feel a little better and improve.
GP: Mmm. Well, we talked about this the last time you were here and came up with a plan. Do you remember?
Patient: Right, I was supposed to lose some weight, but I haven’t.
GP: You didn’t?
Patient: Nah.
GP: Mmm.
Patient: No point in weighing me, either, just a waste of time.
GP: (Laughs)
Patient: Nah... You know, I just don’t get around to it... it’s just that it’s so hard to deal with...

In situations like this physicians felt that when patients could express their sense of futility aloud it became easier to provide support.

Life circumstances
The patient’s circumstances in life and their impact, for better or worse, on symptoms and illness came up in many discussions. The 71-year-old man who helped out a good friend’s firm began reflecting on his isolation:

Patient: Well, I’ve been sitting and thinking about this, if it could be something like... having too little to do... that I spend too much time alone, and then, well, I brood about it consciously, or brood about it unconsciously, about my situation, I mean the way things are, you see.
The woman who described no longer having the energy even to empty the dishwasher worked as a long-distance truck driver, which required her to sleep in the vehicle during the week. The physician’s initial thought that this was the cause of her symptoms was proven wrong when the patient described feeling upbeat on Sunday evenings before the workweek began:

GP: So it feels OK for the workweek to start?
Patient: Sure, it’s fun.
GP: It even feels like fun?
Patient: It’s fun! I like packing my bag and driving off... since my job, it means everything to me!

Several women described difficulties in relationships with partners. The 20-year-old woman who initially mentioned trying to cut back on the family’s pizza consumption turned out not only to be taking care of her much older partner’s children, but also the partner himself, who demanded that she wait on him and was “like a baby”. Another woman was not taking her painkillers because her husband made disdainful comments about her dependence on them. Yet another woman with chronic pain enjoyed being at the stable with her daughter, but her pleasure was diminished because her husband “wasn’t so crazy about it”:

Patient: Well, it’s like he feels cut off or something (laughs).
GP: I see.
Patient: He’s like, “Oh, are you off to the stable again? When will you be back?”
GP: Right.
Patient: “We’ll be back in a couple of hours” is what I say then.
GP: Mmm.
Patient: ... it’s not as much fun.

The patients’ reflections about their life circumstances gave the physicians a more complete picture of them as individuals and the challenges they faced.

Research question IV, “What happens in a consultation when a question of age-comparative self-rated health is posed?” can now be answered. In most consultations, asking patients to self-rate their health compared to age-peers had an impact, including on the tone of the discussion. The patients’ speaking time increased, while the physicians’ role shifted to encouraging them to talk. The first reaction to the question, often spontaneously emotional, was followed by a reflective discussion in which patients weighed various reasons for their self-assessment. These reflections gave
a telling description of the patients’ functional ability, life circumstances, and resources or obstacles in managing symptoms and illnesses. The physicians could follow up these reflections. Almost all physicians thought the question had improved the consultation and their understanding of the patient.

The study was approved by the Regional Ethical Committee of Umeå, Sweden, Dnr 2012-484-31Ö.
**Discussion**

**Findings in relation to aim**

I found questions of self-rated health more relevant in general practice than I expected from the start of this research. According to the literature, self-rated health has the ability to comprehensively account for several domains relevant to health. This approach is essential in the task of GPs as described in the Background section of this thesis. A contextual approach and situated knowledge were asked for in general practice and an overarching aim was to investigate whether self-rated health might aid in achieving this.

Paper I describes how self-rated health and especially “health” has a semantic meaning anchored in sense relations in contemporary language, ways of living and is contextual. “Health” is also sensitive to alterations in meaning like most words, and can undergo change under the influence of time and altered living-conditions. Examples of sense relations of the word “health” were put forth, e.g. functioning capability, habits, lifestyle and diet. From the conceptual reasoning in Paper I, observations are made that favour use of the comparative self-rated health question in general practice. The exhortation to “compare” put the patient in his or her own context. The word “persons” steers the comparisons to persons in the patient’s vicinity. This can give glimpses of the lives the patients are living and thus give situated knowledge.

In Paper II, the focus is on relations between some possible factors influencing self-assessments of health. This puts the patient’s self-assessment of comparative health within a statistical frame. This may aid the GP to important areas affecting subjective health. Common associations with lower self-rated health are bad economy and feelings of depression and anxiety. These are important factors that may go unnoticed in a consultation. Knowledge about this frame of associations can help in giving a contextual understanding of the patient’s health. If the situation so requires, possible associations with diverse factors affecting health in the patient’s actual situation can be sorted out by the patient and GP in collaboration.

GPs make quite an effort in estimating the risk of cardiovascular disease. But do standard risk factors hold the whole truth about the risk of coronary disease? Paper III is an investigation into this, where self-rated health is something of a comprehensive summary of factors, summing up whatever associations there may be, that lie within the self-assessment. It is astonishing, as I see it, that a subjective assessment conveyed in words can contain so much information. This is the field so well researched in
epidemiology. But how does the self-assessment come out in comparison with standard risk factors for myocardial infarction? It seems plausible to assume that a great deal of the association is due to interaction, self-rated health working by enriching the magnitude of risk attached to standard risk factors. This is not generally the case as I interpret the findings in Paper III.

The risk could also be explained by other risk factors being to a greater degree apparent among persons of low self-rated health or explained by lower socio-economic possibilities. This is however not the whole explanation. Self-rated health is a risk factor on its own. This should encourage the GP to have confidence in patient’s assessment of own health, not only as a courtesy, but as a solid, important factor for future health. Paper III presents findings in relation to general self-rated health. The thesis also presents findings based on comparative self-rated health. Worse self-rated health is present in 7.8% of the population and poor self-rated health in 1.3%. The risk attached to “poor” and “worse” is equal. By using the comparative self-rated health question, where the “worse” category is used, one can identify more people at risk. This seems to favour the use of comparative self-rated health in general practice.

Paper IV tackles the question that is most prominent when using self-rated health in general practice. What happens in a consultation when a question of age-comparative self-rated health is posed? Reactions often including emotional components and reflections take place. The reactions could affect the tone of the consultation. Patients came to reflect and this reflection seemed to influence some patients’ own perception of their situation. Frequent reflections on lifestyle matters such as diet or physical activity were made and concrete persons to compare health with were not seldom sought for. The question is dialogue-enhancing. That this was to happen was in line with findings in Paper I from the conceptual investigation.

**Methodological discussions**

**Paper I**

Jylhä pointed out that self-rated health constitutes a crossroads between the social world and psychological experiences on the one hand, and the biological world on the other. In the middle of the social world is language. To the best of my knowledge, semantic perspectives in medical papers are rare. As neither qualitative nor quantitative methods often used in medical research suffice to investigate semantic meaning, I saw the need to take recourse to linguistics. Linguistics (the scientific study of language) and especially the aspect of linguistics studying meaning (semantics) give tools for a conceptual investigation of meaning. Semantics is a broad field including study of words, text, narratives and semiotics. I have here
employed basic linguistics and emphasised aspects put forward by Ludwig Wittgenstein. This may seem pretentious, but Wittgenstein himself, in his late years, retreated from former attempts to look in to the deep structure of language. He instead put emphasis on the surface of language, on spoken language. In his last book, Philosophical Investigations, he does not put forward a set of rules. Instead he introduces the concept of language games. He gave examples to demonstrate that a word’s significance depends on how it is used, and in what context. In this way, Wittgenstein asserted that the relationship of a word to an underlying reference is not fixed but depends on social and cultural practice at that time. Words are not to be seen as ostensive signs (meaning by pointing out examples) with clear references to objects, denotations. The meaning of the word chair is not always the object chair. According to context it could also mean “bring that chair”, “sit” etc. Language meaning is contextual and influenced primarily not by denotations but by sense relations, the broad reference of possibilities attached to a word in a living, spoken language but also in texts.

These quite obvious conceptions are important to bear in mind in research. The researcher using questionnaires must be aware of the influence of these factors when interpreting answers. The researcher and the respondent may have quite opposite ideas of the meaning of words. The researcher presumably favours a definition, a lexical definition, a clear denotation for a word such as health. It is not at all certain that the respondent shares the researcher’s conception of the meaning of the word. It is more probable that the respondent understands the word based on its ordinary use in spoken language with all its associations – sense relations. The analysis performed in Paper I involved: the social and practical context for the questionnaire; similarities and differences between the questions depending on their principal words; the context of the actual questions in the questionnaire. The way of performing analyses of meaning may seem speculative to persons using only empirical data and having empirical science as the norm for research. The method of semantic interpretation belongs to the field of the Human Sciences, where reasoning and use of concepts are central.

Objections can be raised to these conclusions. The conclusions are not reached in purely empirical ways. On the other hand, I contend their firm anchorage within established methods in linguistics and semantics. I can see few other methods that can take up the challenge of investigating meaning.

**Paper II**

The methodological discussion on Paper II concerns the choice of statistical method, the population, and the choice of independent variables. Studies of determinants often transform the ordinal categories of self-rated health to
numerical values and treat the dependent variable as a numerical variable.\textsuperscript{45} Using multiple linear regression methods, variance explained by determinants is stated. The argument for transforming an ordinal variable into a numerical one is that different ways of treating the self-rated health variable yield the same results.\textsuperscript{45} Methods based on self-rated health with four categories suggest that self-rated health forms a continuum.\textsuperscript{108} A similar conclusion was drawn from the 1994 Finnish survey on Living Conditions: “The study suggests that self-rated health forms a continuum from poor to good health when risk factors and indicators of ill health are considered.”\textsuperscript{109} I find this way of reasoning unsatisfactory. Treating a variable on an ordinal scale as continuous is questionable. This applies especially since there are methods to deal with regression models where the outcome is an ordinal variable, namely the extension of logistic regression called ordinal regression. An ordinal outcome is not a numerical outcome. The meaningfulness of calculating variance explained, as can be done in a linear regression model can be discussed. It could mislead both the researcher and the reader of scientific papers to misconceive statistical proportions of variance being explained as equal to the amount of biological or social causative mechanisms being explained.

Using the ordinal regression method, however, poses other question. As with most statistical methods, there are assumptions which have to be fulfilled, and the critical part in the case of ordinal regression is called the proportionality assumption. According to this assumption the lines plotting the cumulative percentage distribution of response in each category (independent variable) must not cross each other and the distance between the lines should be of the same magnitude throughout the ordinal scale. There are formal tests of this in the statistical package used, SPSS 18. The proportionality assumption is fully attained in the variables age, sex, high blood pressure, cholesterol, BMI, smoking, diabetes, economy, risk of unemployment and the Karasek scale. I consider using ordinal regression technique a methodological strength.

Much research on determinants in epidemiology is based on general self-rated health and sub-groups of populations.\textsuperscript{45} The population in Paper II is a sample from a whole population selected as to be representative. It is also reasonably large. This is of value in general practice where closeness to a given population is a given condition. On the other hand, applying these figures of associations to other populations could be misleading.

The reason for omitting the variable “Karasek” and “risk of unemployment” form model 3 in table II.3 is based on lack of statistical power. These variables are based on 3310 and 3294 answers respectively. If these variables
are inserted with myocardial infarction, a variable with 5274 answers, the multiple regression system loses statistical power to the extent of myocardial infarction losing its significant association with comparative self-rated health. This is not a plausible finding. Confidence intervals for “diabetes” and “stroke” also widened considerably. In order to retain statistical power we thus excluded the “risk of unemployment” and “Karasek” variable from model 3.

**Paper III**
The use of the Cox proportional hazard method is straightforward. The choice of outcome variable contained several alternatives. The outcome could have been definitions of cardiac heart disease or other cardiovascular diseases. The large dataset with 72,530 persons gave the possibility to choose the most well-defined outcome criteria I could conceive, myocardial infarction. The use of fatal and first non-fatal myocardial infarction also facilitated the use of the long timespan in the cohort from 1990 to outcomes in 2008 or 2009. Myocardial infarctions that were fatal in 1990 may have been non-fatal in the later part of the timespan due to advances in treatments. Thus adding both fatal and non-fatal myocardial infarctions in the outcome facilitates comparisons over the timespan used. A drawback is the lack of any autopsy data.

The study is population-based, which gives firm anchorage in the population of Västerbotten, but the results may be different in another population. On the other hand, the hazard ratios for standard risk factors are as expected which favours the notion of generalisability of the results. The Västerbotten Intervention Programme is an intervention programme. Effects of the intervention may have affected the results. Whether the intervention had an impact on the relation between self-rated health and the outcome has not been evaluated in this study.

**Paper IV**
In Paper IV, the qualitative study, the selection of patients is strategic. We chose what type of patients we wished to see, attending for diabetes, pain or unclear symptoms. We strove for an even distribution of sex and ages. The selection is thus not representative for a population and not even for patients at a health centre. The aim of a qualitative study is not representativeness but rather transferability and diversity. The patients are representative only for themselves but at the same time possible examples of what may “happen in a consultation”.

The audio-recorded consultations form the basis of the study. The audio-recording made minimal intrusion in the consultation process as delicate
matters such as alcohol abuse, depression and consequences of sexual violence were subjects discussed. It was as if the audio-recorder was present only as a silent ear, listening to the consultation. The method used for analysis of the transcripts, systematic text condensation, is not primarily a method intended for analysis of dialogues although the method has previously been used as a tool for analysing consultations. In a dialogue there is interplay between the dialogue partners with nuances which may elude analysis with text condensation. We (AF, GW) nevertheless tried to overcome these difficulties by triangulating what was said with the comments given by the doctor and by measurements of speaking time. We were informed on how to delineate topics and to consider pauses >1 second long as markers for cognitive processes and to look for verbal dominance by the Roter interaction analysis system. The audio-recordings allowed for accurate measurements of speaking time, apportionment of speaking time between doctor and patients in different phases of the consultation. The speaking time, an easily quantifiable variable in the consultation, made the assessment of verbal dominance more accurate. In addition to what we could see in the excerpts of dialogues, measurement of speaking time, the GPs’ own comments were available for analysis. All three methods gave a firm basis for our qualitative appraisal of “what happened” in the consultation.

A question of transferability of our findings to other settings can be raised. Consultation times are somewhat longer in Sweden than internationally presented figures of consultation time. However, the consultations we investigated were not representative of ordinary consultations; rather they were expected to be of a more complex character due to the selection criteria of chronic non-malignant pain, diabetes or unclear, not yet diagnosed symptoms.

Findings in relation to the literature

Paper I

I have found no paper addressing the semantics of self-rated health in questionnaires. Question order and contextual effects on answers have however been addressed. Researchers found, when comparing a quality of life questionnaire SF36, from different investigations that differences were likely to reflect question order and contextual effects of the questionnaires. In a review of issues of data quality and sampling methods, the role of the social setting for answers in a questionnaire was noticed. Analysis of data from the Australian National Health Survey has shown that self-assessed health status does have some response instability when repeated in the same questionnaire (before and after other questions about health), although this might also reflect the biasing effect of question order. This is in line with our finding of a possible influence of the changed context for the question of
comparative self-rated health in the questionnaire of 1999 compared to the questionnaire in 1994. The statistical distribution of answers to the self-rated health questions are in line with what has been previously reported.

**Paper II**
The literature on emotions as determinants of self-rated health (general or comparative) is sparse, although 34% of people in Sweden and 31% in the US have reported troublesome nervousness, uneasiness and anxiety. In the US study this also correlated to a sense of poorer health, combined with increased risk-behaviour such as smoking, binge-drinking, not using seatbelt in a car, etc. Our findings underscore that not only anxiety disorders or depressive disorders but also such emotions should be considered, when trying to interpret self-rated health.

Based on data from two large cohort studies, the British Whitehall and the French Gazel, Manoux et al. concluded that measures of mental and physical health status contributed most to the self-rated health construct. Measures of mental health were “minor psychiatric morbidity” (Whitehall), and “emotional reactions” as part of psychosocial factors (Gazel). The studies included employees aged 33–55 years, 71% of whom were men. Despite the great differences in study populations as well as measures, these findings support ours on the association between emotions and self-rated health. Similar associations are reported in other studies, mostly in the US, but study populations were small or selected.

In a cohort study from Northern Sweden (the same area as ours), Waernerlund et al. demonstrated that job insecurity, low cash margin and, to some extent, high job strain (Karasek) were contributing factors for suboptimal self-rated health in temporary employees. These employees also more often reported emotions such as anxiety, panic, nervous problems, restlessness or concentration problems during the previous year. The findings are in line with our results, as are also the associations on the Karasek scale. Job insecurity, indicated by the answer yes to the question of risk of unemployment, also showed an association with self-rated health in our study. Thus, our findings are supported by others. Our study has the merits of being representative of a population, using comparative self-rated health and a method of analysing associations that takes account of the outcome being of ordinal nature.

**Paper III**
Paper III confirms findings in previous studies. In a study from Copenhagen in 1996, 50 cases of coronary heart disease were investigated in a 16-year follow-up cohort study. In this small study, multivariable Cox regression showed miserable self-rated health, cholesterol, insulin level and
systolic blood pressure to be statistically significantly related to the outcome of coronary heart disease. As the number of outcomes was small, the study did not allow for testing of interaction. Latham and Peek reported in 2012 on associations of self-rated health and coronary heart disease. The outcomes were based on self-reports in questionnaires. A number of self-reports of socio-economic characteristics were included in the analysis. The authors state that “Risk factors were also measured as time-varying variables and included BMI, smoking status, physical activity...” The investigation on coronary heart disease was based on 691 respondents reporting a diagnosis of coronary heart disease. No testing of other standard risk factors was done. The Hazard Risk ratio for very good health was 0.80 compared to poor health. Van der Linde et al. reached similar results to ours when following 20,941 persons for 11 years. They used validated diagnoses of cardiovascular disease, expertly coded death certificates and excluded patient with prevalent disease at entry of the study. The participation rate was 33%. In a multivariable analysis adjusting for clinical risk factors they found increased HR for cardiovascular disease events compared to excellent good health by 1.4 for “Good”, 2.1 for “Moderate” and 3.2 for “Poor”. Paper III adds to the literature by its thorough investigation of interaction between self-rated health and standard risk factors and the strict and well validated outcome of myocardial infarction. The size of the cohort is among the largest accounted for.

**Paper IV**

Reaction and reflection

Self-rated health is a relatively stable construct, established early in life. We interpret the patients’ immediate reaction to the question as an activation of associations and emotions already present. In her review, Jylhä described quite exhaustively a process of reasoning leading to self-assessment of health and labelled it a cognitive process. Her description is well anchored in small pieces of research put together in a conceptual model. “Self-rated health differs from most indicators of health that in its origins lie in an active cognitive process that is not guided by formal, agreed rules or definitions”. Jylhä’s presentation of the process of self-assessment has met criticism. Huisman and Deeg objected that the process is not as cognitive, logical and conscious as Jylhä’s model depicts. The process is subject to external and internal influences that are not logical, nor under the individual’s control. They also raise the question whether the self-assessment starts at the moment people are confronted with a self-rated health item in a questionnaire or is based on judgements, experiences and processes throughout the life-course. Our findings give us reason to consider the assessment as an emotional process, rather than a cognitive process. This does not, of course preclude that a process like the one Jylhä described has
taken place and, in fact is continuously ongoing in an individual. Emotions are immediate, but this does not imply that they are illogical, or misleading. We saw emotional reactions in the consultations with the use of strong language and swearing when people were confronted with the question. As we see it, the swearing conveys anger, grief, and a sense of futility. Research on swearing is sparse. In a psychological experiment, participants were induced into a state of aggression. This decreased pain perception and the researchers saw this as a support for their theory that swearing could raise pain tolerance via an emotional response.122 Swearing can also be used as a psychological tool in the service of helping. Swearing may provide a channel of catharsis for aggressive drives and affects.123 Taking note of these emotions should be a priority in consultations.

In their reflections, patients attempted to understand or explain their spontaneous responses. Sometimes, but not always, this prompted reconsideration of their situation. Opportunities for reflection are few in an ordinary GP consultation, which comprises informational discussion of care and treatment, social chit-chat or questions and answers.124, 125 The primary significance of such reflection is not to provide information to the doctor, but to provide room for the patients to think through their health situation and perhaps see possibilities or obstacles that might not otherwise be apparent.84, 126 This facility could contribute to patient empowerment by exploring and recognising the patient’s view of his/her general health according to a qualitative study from general practice.84

General practice is not psychoanalysis, but there are common features. Both in general practice and in psychotherapy there can be a wish to put the patient/client in a position that may transform the sense of the situation. Psychotherapists have identified three important components in such a transformative encounter.126 First, “external narrative mode” – telling what happened, second, “internal narrative mode” – describing feelings and reactions and third, “reflexive narrative mode” – which entails reflexive analyses of what has come up. In analogy, consultations in general practice contain quite large components of “telling what has happened”. There is also room for telling of feelings, modes and symptoms. But the component of reflection seems to be subordinate to other components. At best there is room for negotiation on how to proceed in planning care, what pills to take and other steps obtainable. Yet, reflection is the process which can transform the sense of the situation which in some consultations may be the main need. In paper IV we noted several instances of such reflective thinking promoted by the question of comparative self-rated health. In some, the patient’s sense of his/her situation seemed to be affected.
Time use
Discussion of self-rated health was incorporated within the time frame of regular consultations at Swedish healthcare centres, which ordinarily last 15 to 30 minutes.\(^\text{127}\) This is somewhat longer than figures reported in other European countries, ranging from 1 to 59 minutes with a median of 11 minutes.\(^\text{125}\) Consultations in our study were long, but not exceptionally so, and within the normal range for primary care in Sweden.\(^\text{127}\) Longer consultations presumably encompass several significant aspects of a patient’s care.\(^\text{128}\) Undén and Elofsson posit that a question about self-rated health could actually save time because it helps summarise a great deal of information.\(^\text{82}\)

**Overarching discussion**

**What is the meaning of self-rated health?**

The question can now be discussed in a broader sense than just semantic meaning. I will try to integrate some perspectives from the vast research on self-rated health with the experiences acquired during the work with this thesis.

Self-rated health is contextual. It is dependent on country, language and social systems.\(^\text{76, 107}\) It is dependent on cultural factors, and it is also contextual to the life story of individuals.\(^\text{107}\) It is a stable concept but can be altered during the life course.\(^\text{66}\) The most striking example of this is that age-comparative self-rated health grows better with increasing age. It is also contextual in the sense of comparison. Who do you compare with? What factors are compared? There is no general agreement on these issues. How persons compare is complex, integrated in the person’s personality and differs from person to person. In our Paper IV, we saw glimpses of different modes of comparison. In the author group we had lengthy discussions of how to formulate what we saw. Did we see different modes of coping strategies? Were the strategies tied to different assessments of health? We found the coping-concept hard to handle. Eventually, we agreed to formulate what we saw as “their ways of managing symptoms, illnesses and risks, and how their life circumstances affected their experience of ill health”. We considered this formulation to be less tied to prejudiced conceptions of ways of coping as valid explanations of outcomes. Ways to manage and reflect on disease and illness are individual and contextual, and listening to the patients’ ways of reasoning gave additional information about the patients’ situations.

Self-rated health is immediate and emotional. Emotions, their role and significance could be discussed at length but that would be beyond the scope of this thesis. The immediate character of self-assessment can be seen from
the fact that people manage to fill in questionnaires on these items rather quickly. The emotional side of self-ratings, however, is not touched upon in the literature concerning self-rated health. This aspect is evident when studying self-rated health in consultations. Emotions are integral parts of an individual’s personality, not only pertaining to cortical, cognitive processes but reflecting activity in deeper brain structures. Further investigations into this area might contribute to ways of understanding the integrative aspect of self-rated health and how these affections exert influence on cognition and physiological systems. In Paper IV we state: “Taking care of these emotions should be a priority in consultations.” But how this should be done is less than clear.

Self-rated health is statistically attached to psycho-social factors. Research on social factors has been extensive. Kaplan and Camacho wrote in 1983 that poor perceived health could be a common feature of unfavourable psychosocial circumstances. They raised the question whether the meaning of self-rated health is one of associations with demographic variables, social functioning, reflecting overall susceptibility or “true health status”. It is noteworthy that in Paper II, education as a proxy for social class loses most of its statistical significance in the final regression model, implying that there is no straightforward association between social class (education) and self-rated health, at least in a Swedish setting. It is also conceivable that psychological and other resources modify the effect of stressors.

A picture is emerging of the relation to biological factors. Kaplan and Camacho stated in 1983 that they would like to have findings from prospectively followed cohorts for better interpretation of the meaning of self-rated health. Such data are now available. Our Paper III is an example of how it takes more to reduce the association of self-rated health with fatal or non-fatal myocardial infarction to negligible levels than adjusting for standard risk factors. Self-rated health in itself is hardly the cause of a strict biological event such as death or myocardial infarction. It is rather a statistical predictor through its ability to comprehensively account for factors important to the outcomes. There must however be a biological causative link between self-rated health and hard biological outcomes. Direct bodily feelings such as anxiety, depression or stress could affect both self-rated health and the physiological state of the body. There is an association between elevated levels of inflammatory markers and self-rated health. The association noted was not accounted for by objective health diagnoses, medication use or health behaviours. Thus self-rated health provided unique information regarding inflammatory status above and beyond traditional objective health indicators. In another study, allostatic load, a combined measure of physiological dysregulation, was tied to self-
rated health. The researchers argued that self-rated health formed early in life might be an important determinant of long-term health, closely tied to physiological changes in the body. The authors seemed to convey a model where psychosocial strains from the “outside” are evaluated by the individual. Some individuals assess the strains as manageable, and to some persons the strains represent a greater threat, increasing bodily stress, operationalised as allostatic load. According to this hypothesis, there is a circular amplification where outer stressors are more difficult to handle for people seeing themselves as more vulnerable. Vulnerability is here expressed as low self-rated health. The stressors are thus amplified by the low self-rated health. This could be a way to explain how low self-rated health in adolescence could be predictive of allostatic load later in life. A more straightforward view is that outer stressors raise the stress response within the body. There is thus a link to psychological factors, both protective and harmful and psychosocial factors such as economic distress and unemployment or situation at work.

Kaplan and Camacho proposed that self-rated health could reflect an overall susceptibility of prospective significance. I find this line of research more sparsely investigated than other aspects. There could be positive resources giving resilience to bad outcomes. Existential health could be one such resource. In existential health concepts such as meaning, optimism, and religious activity are included. Self-rated health might be better understood by comparing these concepts and well-defined outcomes. Trust and its relation to mortality have been tested in this way. Undertaking research in these directions could help identify modes of resilience important for health. This is crucial as future threats to health might come from increasing levels of anxiety, low spirits and distress.

Health in practice
Rather than focusing on single disease-outcomes, medical practice, not least general practice, should pay attention to attaining the best possible health. This sounds like a utopian task, but “highest possible” is contextual and also has the meaning of achievable, taking into account the circumstances. Using self-rated health could be a means to aim at this goal. As one GP put it: “Let’s help people to be well, not just tell them they are sick.” Doctors can liberate patients and empower them to health rather than oppressing them with diagnosis, risk-factors and seeing problems. The health care system, as paradoxical it may seem, also has the potential of doing harm, of creating unhealth. “Primum non nocere” (First, do no harm) is one of the principal precepts in medical ethics. Using self-rated health might help shift the focus from disease, malfunction, chewing the cud of symptoms to strong sides of health, possibilities and ways of handling the situation. Even if this is not
achievable in all instances, this focus might relieve pain, given the opportunity to tell how terrible things are, and sometimes even relieve aggressive drives and affect by using strong language. There are several reasons for making self-ratings of health an option in a consultation in the GP office. I have argued for this use in an editorial in the *British Journal of General Practice* (see appendix).

Self-rated health is not a magic bullet. The GP could be. No question or method can in itself be sufficient. In an encounter there has to be a personal meeting, mutual respect, listening, and the doctor should not be worn out by too much work and worries. This thesis shows how self-rated health can be used, and how it can “make things happen” in the consultation. The context of the investigation in Paper IV is one of clinical research, ethical approval, consent to participate and some expectations of what will come out. This enhances attentive listening. The participating GPs were interested in the subject and prepared to take the extra trouble. No method will prove up to its potential with uninvolved participants. There is also a need for professional training in using self-rated health questions. Also needed is further research in general practice in different countries about comparative self-rated health and the effects of reflection on health and healthcare.134

Asking about comparative self-rated health constitutes a feasible tool in general practice, particularly to solicit information on risk and the patient’s feelings related to an illness/disease, and to encourage the patient’s active reflection on functional abilities, life situation, and health and health strategies. However, self-ratings are not to be seen as a standard procedure in all consultations.
Conclusions

- Semantic analysis brings insight into how questions of self-rated health could be interpreted.
- Health is not assessed primarily in terms of the dictionary denotation of health, but of its sense relations (associations).
- Comparative SRH and general SRH contain different information.
- Comparative SRH is semantically more distinct but both can be used in questionnaires.
- Contexts surrounding the questions in a questionnaire might be of importance for the answers.
- Asking patients about their comparative self-rated health and combining the answers with knowledge of common associations has potential for clinical utility in general practice, helping to focus on the patient’s own goals for health and function.
- Self-rated health, both general and age-comparative, can be included among standard risk factors of myocardial infarction.
- No major interaction between self-rated health and other standard risk factors has been found except for poor self-rated health and diabetes.
- The question about comparative self-rated health constitutes a feasible tool in general practitioners’ consultations.
- Comparative self-rated health might give information about feelings related to an illness/disease.
- Comparative self-rated health might invite the patient to active reflection.
- Comparative self-rated health might give varied and detailed information about the patient’s functional abilities and life situation.
- Comparative self-rated health might put health and health strategies within the scope of the consultation.

Implications for practice and research

- Further research into the use of self-rated health in general practice in different countries is needed.
- Demonstration that self-rated health adds predictive value in combined algorithms together with standard risk factors requires further research.
- Further research in general practice into the effects of reflection on health is desirable.
- Can interventions aimed at improving subjective health also affect important outcomes?
- There is a need for professional training in using self-rated health.
Language is full of wonders. Subjectivity and objectivity are both part of one and same reality.
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Editorials

Self-rated health in general practice:
a plea for subjectivity

I think many GPs with some experience recognise that a major problem in medical practice is not always the medical problem in itself. It is the subjective side of the matter, the patient’s ideas, and possibilities of handling the situation of illness, disease, and functional impairment that are the challenges. None of this was focused on in my medical training and continuous medical education. However, there is now a solid mass of research emphasizing the importance of the patient’s subjective side of the matter. Paying attention to the patient’s own assessment of health is important not only as a sign of interest and empathy, it can also be crucial in assessing prognosis, guide consultations to important questions, and guide efforts in handling diseases. All these are lessons learned from research on self-rated health. GPs can confidently use and adopt this research in clinical encounters and clinical research.

WHY?

Outcomes
Outcomes such as mortality, cardiovascular disease, stroke, lung disease, arthritis, functional impairment, depression, and developing diabetes type 2 and its prognosis are associated to self-rated health.1 2

Better than doctors’ ratings
Self-rated health is a better predictor of future health (good health assessed as no symptoms of disease or minimal impairment if symptoms present) than doctors’ ratings.4 It also adds information beyond a doctor’s ordinary clinical evaluation.5

Comprehensive
There are innumerable factors affecting patients’ health. Self-rated health is a comprehensive way to assess the patient’s situation. Self-rated health can guide doctors and their patients in the search for contributing causes of bad health. Are there disease problems, psychological illness, anxiety, bad economy, violence at home, or other causes at hand? Recently, in an article in the BJGP, self-rated health was proposed as an instrument in screening for cardiovascular risk factors and undiagnosed comorbidities.6

Bringing health as patients see it into focus
There are numerous recommendations for doctors to inform patients on a healthy lifestyle. The perspective is top down. Many doctors feel uncomfortable treating patients as people of little knowledge and acting as high priests of health. Self-rated health can change the perspective, starting with the patient’s own health situation. This starting point was proposed by GP Petra Jones and colleagues in their article “Coaching for health.” However, they proposed a more ambitious psychological approach not feasible in a GP surgery. Discussing self-rated health could be a way to coach for health within an ordinary GP consultation. This can be worthwhile as patients have a remarkable potential to help themselves.7 The aim could be to improve health or to maintain health even though there are medical diseases at hand.8 As one of my patients put it:

“They tell me you should do this or that, eat this and not that, exercise, quit smoking, and blah blah blah. It’s all a waste on me. It is not the problem. It’s the spark missing.”

For this patient, coaching for health meant focusing on “the spark.”

Sensitive to social determinants of health
Self-rated health is sensitive to social determinants of health such as education, household wealth, or living conditions.1 A doctor cannot use self-rated health and remain unaware of social determinants of health.

DOUBTS ON SUBJECTIVE HEALTH PERSPECTIVES

Is subjective health a reliable measure?
Yes it is. Self-rated health is a stable self-concept of health, formed in adolescence.10

It is impossible to know what self-rated health measures
This is indeed true. However, our patients do not live in a laboratory environment where there is a clear line between cause and effect. They live in a web of causes, interactions, and effect modifiers. The strength of self-rated health is its ability to sum up the net effect of multiple causes.

Lack of subjective health is not a diagnosis
Yet, for some patients this seems to be a greater problem than the diagnoses put on them by doctors. When this is the case it seems more appropriate to focus on subjective health rather than disease. In some instances this focus could even lead to new ways of assessing the patient. For too often we come to an end in our medical treatment options.

Good health has little to do with doctors
GP Daniel Edgarsumbe reminds us of the importance of the political arena on health issues.11 Health is not an end in itself. It is a means to accomplish the things you want in life. A certain amount of health and self-confidence is certainly needed if you are to act on the political arena and in society. Doctors can liberate patients and empower them to health rather than oppress them with diagnoses, risk factors, and seeing problems. Focusing on self-rated health can help to empower patients.

TIME TO IMPLEMENT

In practice
Questions of self-rated health are often formulated “How would you assess your general state of health?” with answers ranging in five steps from excellent to poor. This type of question is the one most often used in epidemiological research. A more dialogue-enhancing question, semantically clearer, is the age-comparative variant.
There is a biological basis that ties self-rated health to such hard core endpoints as death and cardiovascular disease.

How is your health compared to people of your age? Better, about the same or worse? In my experience this question often elicits an immediate reaction and then a vocal reasoning by the patients assessing their health in one way or another. This reasoning can be used by the patient and doctor together. How it is used is of course dependent on the context in the actual consultation. There are definitely consultations where it is inappropriate to raise the question. Asking about self-rated health is more of an option available when needed for understanding the patient or help the patient to reflect on their own situation.

In research there is a biological basis that ties self-rated health to hard core endpoints, such as death or cardiovascular disease. There is an association between elevated levels of inflammatory markers and poor self-rated health. The association between self-rated health and inflammation was not accounted for by objective health diagnoses, medication use, or health behaviours. Thus, self-rated health provides unique information regarding inflammatory status above and beyond traditional objective health indicators. Allostatic load, a combined measure of biological dysregulation is related to self-rated health. Self-rated health in adolescence predicted allostatic load in young adulthood. The researchers argue that self-rated health formed early in life may be an important determinant for long-term health closely tied to physiological changes in the body. Further research on the relation between physiological changes and self-rated health seems a promising path for understanding self-rated health and its relation to outcomes and function. An even more pertinent question is whether interventions aimed at improving self-rated health also can improve patient-related outcomes.

**SUMMARY**

GPs meet patients and the patient's assessment of their own health. The doctor's job is to understand and deal with this assessment. Is there a disease that can be treated or alleviated? Is there something else that the patient or doctor can do? Can something be done to maintain and strengthen a good subjective health? To disregard the patient's subjective view of health is equal to not using the most valuable piece of information there is in some consultations, when appropriate, a question of self-rated health can be posed. There is a massive scientific base for the usefulness of self-rated health.

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