

# **Impact measurement as a mean to improve the accountability of nonprofit organizations**

**An impact measurement study of the Netherlands Heart  
Foundation on the burden of disease of AMI-patients**

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## **PREFACE**

This document presents the findings of the research done in order to finalize my master program Entrepreneurship, Governance, Organization and Strategy at the Economics Faculty of the Erasmus University in Rotterdam. This research has been conducted between March and November 2008. For this thesis Paulien Booijink and I got the opportunity to do research for the Nederlandse Hartstichting (NHS) as part of a more extensive research project conducted by the Economics Faculty. It has been a difficult and challenging experience in which we have had help of many people, which we owe gratitude.

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## SUMMARY

During the last decades public scandals surrounding charitable nonprofit organizations have increased public scrutiny and criticism. Inappropriate high executive compensation and excessive administration and fundraising costs are among the many criticisms the public has. This has resulted in an increased demand for accountability of charities and other nonprofit organizations. Accountability is related to enduring public scrutiny. It includes both the hierarchical model of mandatory accountability and the voluntary disclosure of performance related information of nonprofit organizations to various external stakeholders of the organization. The essence of accountability is that the party accepting certain responsibilities commits to account for the way it has acted and the results that were obtained.

The concept of accountability within economic literature often focuses on the asymmetrical relationship between a principal and an agent. Principal-agency theory focuses on how principals can hold agents accountable for performance that meets the principals' expectations. The principal is trying to get the agent to act in the principals' best interest, but in many situations the interests of the agent do not correspond with the interests of the principal and the principal might be uncertain as to whether the agent adequately implements its wishes. Besides this general accountability issue, other specific nonprofit accountability difficulties are related to identification of stakeholders, the accountability mechanisms, what kind of information to be accountable for and to what extent should they be hold accountable.

Accountability is a process of public disclosure on results and the way the organization contributes to society. Reporting performance is necessary in order to be accountable for the organizations' performance. Performance reporting is more difficult in nonprofit organizations than in for-profit organizations since no profitability information can be communicated. Nonprofits therefore tend to focus on other concepts to define performance; mainly efficiency, effectiveness, social value and impact. The main theory on nonprofit performance is described in the Organizational Effectiveness literature. Within the Organizational effectiveness literature the focus is mainly on effectiveness, which can be defined as the level of results, referring to both outputs and outcome measures. Within this literature several models defining effectiveness in different ways are described. One often mentioned model is the goal-attainment model which emphasizes the attainment of organizational goals. Difficulties in all effectiveness theories are related to their actual operationalization and implementation in practice.

Recently impact assessment has been suggested as a way to measure nonprofit organizational performance. This concept is related to the effectiveness concept of goal attainment, but goes one step further and focuses on impact rather than mere outcomes.

Impact can be defined as *'any change resulting from an activity, project, or organization. It includes intended as well as unintended effects, negative as well as positive, and long-term as well as short-term'* (Wainwright, 2003; Wainwright, 2002). Impact assessment entails both qualitative impact demonstration and quantitative impact measurement. Using impact measurement as a performance measure is also surrounded by difficulties as are effectiveness concepts. Difficulties arise both in measuring the impact in a specific field of attention and in attributing part of the impact to a specific organization. Impact measurement has been suggested mainly because of the meaningfulness of this concept, as compared to traditional performance measures, it can be used as an original and meaningful way to increase accountability.

In this thesis a first attempt is made to measure the impact of a specific Dutch nonprofit organization, the Nederlandse Hartstichting (NHS). The impact of the NHS is estimated on the costs related to AMI patients in the working population. This is done by first estimating the changes in the costs related to AMI, the so-called change in economic burden. Direct health care costs and indirect non-health care costs (i.e. productivity costs) are taken into account. Second, a specific part of this change in costs is attributed to the NHS. The economic burden of AMI under the working population is estimated for the Netherlands for the period 1980-2005. By looking at the factors behind the decline in economic burden the impact of the NHS on this change of AMI-related costs is assessed.

The results of the case study show that the economic burden of AMI under the working age population in 2005 was approximately 234,2 million euros. The costs of AMI would have been 331,0 million euros if the incidence and death rates of 1980 would not have decreased in time and would still have been the same in 2005. On the total decrease in economic burden the NHS has an impact of approximately 7,55- 8,72 million euros, a relative contribution of 7,58- 8,76% This impact has been attained by financing scientific research on AMI, prevention and education activities.

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# 1. INTRODUCTION

Are Dutch charitable nonprofit organizations failing to effectively and efficiently conduct their activities and achieve their missions? Are the accountability mechanisms surrounding these organizations not sufficient to prevent public scandals? During the last decades public scandals surrounding charitable nonprofit organizations have increased public scrutiny and criticism. Scandals in the United States were numerous, but have also affected the Dutch nonprofit sector. In 2004 the Nederlandse Hartstichting (Netherlands Heart Foundation) was criticized for remunerating their CEO with a salary of 170.000 euro, the highest salary ever for paid to a charity CEO within the Netherlands. In the same year Artsen Zonder Grenzen (the Dutch variant of Medecins Sans Frontieres) paid a ransom of half a million euro in order to set free an employee who was taken hostage in the course of his job. In both these situations the public reacted shocked about the way these organizations spend their money, money that in a sense belongs to all of us. Both organizations had to endure public criticism and lost public trust, which resulted in the loss of volunteers and donors. Not only these two organizations were faced with a decline in trust, it seems that public trust in charitable organizations in general has decreased and a demand for increased accountability of these organizations has risen (Ebrahim, 2003; Hofer, 2000; Young et al., 1996). Distrust in one nonprofit does also affect other nonprofits. Although a lot of people are still willing to support charities that affect them personally or they think are serving important causes, even on the basis of limited information, this support cannot be taken for granted. Public trust is fading and strong negative views about the activities of these organizations are only partially offset by favourable opinions about the aims and role of charities in society. The demand for increased accountability should be taken seriously and cannot be ignored.

## *1.1. Problem definition*

The research on nonprofit accountability has been incorporated in the research field of accountability in general and is often related to ethics, internal management, organizational assessment and performance measurement and reporting (Speckbacher, 2003; Campbell, 2002; Ospina et al., 2002; Lawry, 1995). Within this research performance measurement and reporting to external stakeholders of nonprofit organizations is central. Reporting information concerning the performance of the organization is an important way to be accountable to external stakeholders. Considering that nonprofit organizations have only limited resource availability and an increasing number of organizations are competing for funding, accountability is important in order to survive. Reporting on the performance of the organization can increase trust, loyalty and support of essential stakeholders. This thesis addresses these accountability and performance measurement issues. Performance measurement is looked at from an external accountability perspective.

The main research question that will be central within this thesis is the following:

*How can nonprofit organizations improve their external accountability and in which way can impact assessment contribute to this?*

This research question demarcates a specific research area; although performance measurement in general will be discussed the focus will be on impact assessment. As mentioned before this will be discussed from an accountability perspective.

### ***1.2. Scientific and practical relevance***

It seems that a noble disposition and mere promises of nonprofit organizations are no longer sufficient, outcomes and results are the criteria used by many stakeholders when criticizing charities. Next to the increased demand for performance accountability in general, research focuses more and more on extending performance measurement beyond the traditional emphasize on financial information. There is a growing interest in developing tools to enable nonprofits to demonstrate the wider impact of their work (Yates, 2004). Impact assessment in nonprofit organizations is one of the possible responses of nonprofit organizations to increased external pressures from stakeholders. It is also a response to the desire of various nonprofits for more meaningful performance measurement. Nonprofits can use impact assessment not only as a mean to improve both internal and external accountability, but also as a marketing tool and as a strategy instrument.

Impact assessment has only recently been connected with the nonprofit sector in a more practical way (Yates, 2004; Collis et al., 2003; Wainwright, 2003; Wainwright, 2002). Before nonprofit literature sometimes mentioned impact assessment, however few practical applications of this concept were undertaken. Impact assessment was mainly used within the field of Health Impact Assessment (HIA) and Environmental Impact Assessment (EIA) (Wood, 2007; Lewis, 2003; Muttamara, 1996). Within the field of HIA the impact of government policies, programs and projects on public health are estimated (Lewis, 2003). The purpose of EIA is to provide an analysis of the potential significant environmental effects associated with different proposals for policy changes and projects (Wood, 2007). Impact assessment as an instrument to measure impact of nonprofit organizations is a rather new and challenging research field that has not yet developed itself as strongly as the fields of HIA and EIA have. In applying impact assessment in a practical case study an attempt is made to contribute to the field of nonprofit impact assessment.



### ***1.3. Methods***

In order to answer the research question a literature review is conducted. The focus is on nonprofit accountability and performance measurement and reporting. These issues will be connected and compared with for-profit accountability and performance issues. Next a case study is conducted in which an attempt is made to explore and quantify part of the impact the Nederlandse Hartstichting (NHS) has on the Dutch society. Specifically, the impact the NHS has had on the Dutch societal costs of return to work after myocardial infarction between 1980 and 2005 will be explored. This attempt is made in order to go beyond traditional performance measurement and to measure the actual wider impact the NHS has on the Dutch society. It is an attempt to use impact measurement in a practical way that goes beyond merely describing the concept, process and difficulties of impact measurement and actually applies impact measurement on a Dutch charity. Within the existing literature these attempts have been limited (Wainwright, 2003; Collis et al., 2003).

### ***1.4. Outline***

The remainder of this thesis is structured as follows: Chapter 2 provides an overview of the existing literature on nonprofit accountability. The concept and definition of accountability will be explained and several specific issues related to nonprofit accountability will be examined. Finally, questions concerning the desirable boundaries to nonprofit accountability are raised. Further theoretical insights in nonprofit performance measurement and reporting for accountability objectives are discussed in chapter 3. Here the difficulties of defining nonprofit performance will be discussed. The emphasis will be on effectiveness as the defining criteria of performance and the content of Organizational Effectiveness theory will be described and the difficulties in the operationalization of performance in nonprofit organizations. At the end of this chapter impact assessment as a way to measure performance that is recently under increased attention will be discussed. In chapter 4 an introduction to the empirical case study concerning the NHS is given. Here the NHS is introduced; the organization, mission, activities and the environment in which it operates are shortly described. Next a specific research question for the case is presented and an outline is given on the scope of the case. A short outline on the methods used in the case study is given here as well. Research results from the cost of illness study are presented in chapter 5. Here the data used and the assumptions made in the calculations are presented as well as the actual outcomes of these calculations. Chapter 6 presents the results of the impact measurement. The methodology used and the assumptions made are described and the outcomes of the impact measurement are given. Chapter 7 concludes, discusses the research results and gives some recommendations for further research.

## 2. ACCOUNTABILITY OF NONPROFIT ORGANIZATIONS

In the last decades accountability and transparency have become major issues in the nonprofit sector. All around the world nonprofits are increasingly confronted with rising public expectations and frequent criticism on their results. Alleged failings of nonprofit organizations manifesting in self dealing, inappropriate high executive compensation and excessive administration and fundraising costs are among the many criticisms the public has. Occasional sensational stories in the media about these abuses fuel public distrust and the demand for greater accountability (Ebrahim, 2003; Hofer, 2000; Young et al., 1996).

### 2.1. *Accountability*

Within literature the concept of accountability is often used, however a clear definition seems to be lacking. In the simplest way the term accountability means responsibility or liability, someone who is accountable is responsible for something. The term accountability is also often used as “*a concept covering the institutions, techniques and language of performance measurement, reporting and evaluation in public and private organizations*” (Cutt and Murray, 2000). According to Lawry (1995) accountability implies “*a willingness to endure public scrutiny, an invitation for the public to scrutinize the behaviors of the organization’s leadership.*” This willingness to endure public scrutiny is inherent to the case study presented in chapter 4 and following. By measuring the impact of the NHS and reporting the results to the public at large, external stakeholders are given the opportunity to scrutinize the NHS.

Accountability, the process of holding an individual, group of persons or an organization responsible for its behavior and performance, cannot be clearly defined without further insight into the specific context of the accountability relationship (Ebrahim, 2003). This relationship exists of at least two parties; at least one party that allocates responsibilities and at least one party that accepts these responsibilities. The essence of accountability is that the party accepting certain responsibilities commits to account for the way it has acted and the results that were obtained. This is translated into an obligation or the choice to disclose information. A complete accountability framework includes information on both prospective and retrospective activities. Depending on the stage of the accountability relationship the accountability manifests itself as information in plans, budgets, performance reports and evaluations. However, disclosing and communicating information is not a goal on itself, it concerns the process of generating and communicating information to support evaluation and decision making of the party who receives the information (Cutt and Murray, 2000).

Accountability relations can be distinguished between internal and external accountability relationships (Ebrahim, 2003; Leat, 1996). Internal accountability can be defined as the means through which individuals and organizations take responsibility for continuously shaping and scrutinizing organizational mission, goals and performance. It exists of accountability relationships between hierarchical levels within the organization (Ebrahim, 2003). Examples are individual employees rendering account to their managers and managers rendering account to the Chief Executive Officer (CEO). External accountability exists of rendering account from, often, the highest level of the organization to external parties (Cutt and Murray, 2000). External accountability relationships include the accountability of the CEO to the external governing body. Often the formal hierarchical model of accountability has been extended by recognizing a broad range of constituents or stakeholders with an interest in information disclosure (Cutt and Murray, 2000). Reporting to these external stakeholders is often by choice were internal reporting mainly manifests itself within hierarchical relationships and is more likely to be obligated.

Accountability relations exist within and around every organization. Governmental organizations, for-profit businesses and nonprofit organizations all face obligations and expectations to disclose information about their conduct and results. However, the accountability concept within nonprofits is far more complex than the accountability of governmental and for-profit organizations. In this research, accountability is defined to include both the hierarchical model of mandatory accountability and the voluntary disclosure of performance related information of nonprofit organizations to various external stakeholders of the organization (Cutt and Murray, 2000). Although the comprehensive term ‘nonprofit accountability’ is most often used within literature, the focus in this thesis is specifically on the accountability of charities within the nonprofit sector.

## ***2.2. Principal-agent theory***

The concept of accountability within economic literature often focuses on the asymmetrical relationship between a principal and an agent (Speckbacher, 2003; Ebrahim, 2003; Bogart, 1995). Principal-agency theory focuses on how principals can hold agents accountable for performance that meets the principals’ expectations (Brown and Moore, 2001). The principal is trying to get the agent to act in the principals’ best interest. However, in many situations the interests of the agent do not correspond with the interests of the principal and the principal might be uncertain as to whether the agent adequately implements its wishes (Ebrahim, 2003). The general solutions to principal-agent problems are to align the interests of the two parties or to monitor the activities of the agent. The alignment of interests can be obtained by devising incentive schemes, for example performance-based compensation of managers. In for-profit organizations managers are often rewarded with stock options which are, because of the nondistribution constraint, for nonprofit organizations not possible. However, other performance based contracts can still be used (Bogart, 1995).

Monitoring the activities of the agent is another solution. The disadvantages of monitoring are that it requires expenditure of valuable resources by the principal and may negatively influence the incentives and motivation of the agent (Ebrahim, 2003; Bogart, 1995). Difficulties in creating effective incentive schemes and monitoring causes risk for the principal. It can lead to underinvestment or to avoid altogether a situation in which a principal-agent relationship comes into existence (Bogart, 1995).

From this perspective accountability may be defined as the principals' right to require an account from the agent and the right to impose sanctions if the account or the actions accounted for are inadequate (Ebrahim, 2003; Leat, 1996). Describing nonprofits' accountability in terms of principal-agency theory is more complex than in case of for-profit organizations. In the principal-agency theory it is generally assumed that only two parties are involved. However, in the situation of nonprofits often there are much more principal-agent relationships that can be distinguished and need to be navigated, making the accountability framework increasingly difficult (Benjamin, 2008). Monitoring systems and incentive contracts are not easily applied within the context of nonprofits. A conventional argument is that the nondistribution constraint of nonprofits removes part of the incentive for efficiency. Considering that nonprofit managers cannot claim a part of the residual earnings, they will be inclined to use their managerial skills less efficient (Galaskiewicz and Bielefeld, 2003). These and comparable lines of thought can be an argument for using monitoring and incentive systems. Monitoring might be difficult to transfer to nonprofit organizations though. Because of the lack of owners it is not clear who should invest in monitoring activities. Besides this, defining tasks and learning whether these tasks were performed properly is more difficult within a nonprofit organization (Speckbacher, 2003). Incentive contracts require clearly definable and enforceable tasks and the results of these tasks need to be captured by the incentive schemes, which causes difficulties in the situation of nonprofit organizations (Speckbacher, 2003). On the other hand, it can be argued that managers of nonprofit organizations need less monitoring and external incentives because they are more committed to their organizations missions and do not have the tendency to behave opportunistically (Benjamin, 2008). In practice it seems that this line of thought cannot be true, as various scandals within the voluntary sector seem to prove the opposite.

### ***2.3. External accountability***

For businesses the answer to the question to whom the organization is accountable is easy. For-profit organizations are accountable to their owners. In the situation of nonprofit organizations the answer to this question is not unambiguous. Nonprofit organizations are established for a wide range of purposes and missions and often large number of stakeholders exist.

The most evident external accountability relationship of nonprofit organizations include the hierarchical accountability of the CEO to the governing body, which is the board of directors or board of trustees, and the accountability to governmental and regulation institutions. These types of hierarchical accountability are typically obligations framed within a legal context and those to whom accountability is obligated generally have strong powers to act, restore and sanction after failure to comply with their demands (Mordaunt, 2006).

External accountability for nonprofit organizations implies that external constituencies or groups to whom the organization owes compliance are identified. Constituencies or stakeholders in this case comprise those groups to which an organization perceives itself, or is perceived to be, accountable (Wood, 1996). Often these accountability flows can be characterized as proactive or voluntary accountability flows, rather than required accountability flows. Voluntary or offered accountability results from the belief that the organization should in its actions and working methods consciously seek to align itself with certain interest groups. Here the organization is not strictly obliged to be accountable but chooses to be accountable (Mordaunt, 2006; Leat 1988). External stakeholders in case of nonprofit organizations typically exist of the service recipients and their families, volunteers, public and private funders, the city or community of which the organization is perceived to be a part of, the media and the public at large (Balsler and McClusky, 2005; Wood, 1996). Being accountable towards these stakeholders is extremely important in gaining and sustaining public trust towards the organization, specifically in the situation of charities.

#### ***2.4. Accountability mechanisms***

It seems that, besides the image or public relations problem, nonprofit organizations need to deal with a general lack in public confidence in the mechanisms available to hold a nonprofit organization to account (Young et al., 1996). Nonprofit organizations are in a specific position; between the public and private sector. In the private sector businesses are accountable to their shareholders and their customers through market mechanisms. Public organizations are accountable to funders and users through democratic political processes (Leat, 1996; Chisolm, 1995). In the literature on nonprofit accountability difficulties arising from a lack of shareholders and democratic processes is central.

In theory nonprofit organizations are neither hold accountable by a flexible market mechanism or by democratic political processes. But still, nonprofit organizations are accountable in multiple ways, through government regulation, through the media and through the “markets” for clients, donors, grants, volunteers and resources (Young et al., 1996). Formal (governmental) regulatory mechanisms can be a way of holding a nonprofit organization accountable. Laws, codes and regulations can be imposed by governments.

A key aspect of regulation is the reporting requirements nonprofit organizations are facing. It can be claimed that existing reporting mechanisms, particularly for charities, should be strengthened. Suggestions have been made that charities should provide more comparative information. This would increase transparency by making it possible to make comparisons between charities (NCVO, 2004). Regulation in the form of strengthening accounting standards codified in company- or charity law and more intensive oversight by keener watchdogs are other ways of increasing supervision over nonprofits. However, it is questionable whether it is appropriate to hold independent organizations accountable to such an extensive extent (NCVO, 2004). It can be argued that stricter regulation is actually counterproductive focusing on short term achievements and meeting the administrative requirements, rather than focusing on long term commitment and the actual achievement of the mission (Lawry, 1995). Other issues at stake are the innovativeness, independency and autonomy of the organization (Ebrahim, 2003).

The above described mechanisms are examples of external approaches to accountability. According to Ebrahim (2003) external approaches, like laws and regulations, in themselves are inadequate as mechanisms of accountability since they represent only a minimum common behavioral standard. He claims that internal organizational mechanisms are just as relevant. Examples of these mechanisms are creating clearer expectations, self-regulation, performance assessment, self-evaluation and participatory decision processes (Ebrahim, 2003; Holland, 2002). On the part of nonprofit organizations this desire to demonstrate their integrity, legitimacy and good practice has become increasingly important (NCVO, 2004). Self regulatory schemes overseen by independent bodies can increase public confidence in good practice. An example in the Dutch charity sector can be seen in the quality mark given by the Centraal Bureau Fondsenwerving (CBF). The quality mark is given by the CBF to Dutch charities that meet specific criteria related to supervision by the board, organizational policy, funding information and communication, resource expenditure and accountability. The charitable organizations are free to decide whether or not to apply for the quality mark, however 280 Dutch charities have actually applied and are currently authorized to use the CBF quality mark.

### ***2.5. Accountable for what?***

After the identification of institutions and stakeholders to whom the organization is obligated or willing to render an account, the question arises what kind of information needs to be communicated. Information of organizational strategy and conduct translated into budgets and plans and programs can be part of the information communicated. Stakeholders are specifically interested in the question how well the organization is serving the interests of their specific group of stakeholders (Bogart, 1995). Nonprofits need to render account for the issues that the constituencies are most interested in; how money is raised and spent, how much of their donations actually reach beneficiaries and what is achieved (NCVO, 2004).

For example, are foundations only passive intermediary through which philanthropy is channeled? Or are foundations really able to use their limited resources effectively and to create social value (Porter, 1999)? In the end it is creating social value and achieving the mission of the organization for which the organization is responsible and should be held accountable for.

Different types of accountability are distinguished regarding the question for what an organization is held accountable. Leat (1996) distinguishes between fiscal accountability, process accountability, program accountability and accountability for priorities. Fiscal accountability requires rendering an account for the proper use of money, process accountability for the use of proper procedures, program accountability for the quality of work and priority accountability for the choice of priorities and relevance of their work (Leat, 1996). Ospina et al. (2002) distinguish between three aspects of accountability by which an organization gets judged; accountability for finances, fairness towards stakeholders and performance. Accountability for finances is concerned with the preparation of financial statements. Accountability for fairness towards stakeholders is related to good faith and setting standards of honesty, fairness and reasonableness. Accountability for performance, also mentioned in the literature as results-based accountability, focuses on the actual results and achievements of the organization.

In the last decades an increased demand for performance-based accountability can be seen (Campbell, 2002). This type of accountability focuses on the actual results and achievements of nonprofit organizations. It focuses on results and consequences of actions undertaken in the past or the lack thereof. In order to communicate information about the achievements of the organization it is necessary to assess the results and outcomes. This raises questions how outcomes can be measured. If organizations want to communicate information about their performance some definition of performance should be formulated. The accountability that nonprofit organizations face does not translate into clear expectations. Serving the public good can be interpreted in many ways, depending on the specific group of stakeholders and their expectations. Because of the different expectations stakeholders have, responsiveness to their varying and perhaps even conflicting expectations can raise problems (Balser and McClusky, 2005). Definitions of 'good performance' vary for different stakeholders. The specifics of performance measurement as an accountability tool are described in more detail in chapter 3.

## ***2.6. The consequences of (not) being accountable***

The central idea behind holding an organization accountable is that there are behavioral implications (Cutt and Murray, 2000). Organizations communicate information to external stakeholders in order to support them in decision making. For example decisions about whether to proceed, limit or end donating to a certain charity organization.

If an accountability framework has no real consequences on the programs- or individual level it would be nothing more than a meaningless, costly administrative activity (Cutt and Murray, 2000). Accountability comes with liability and liability indicates consequences. These consequences can be both positive, e.g. rewards, and negative, like sanctions.

In situations in which stakeholders are satisfied with the account given by the organization this often ensures the viability of the relationship, resulting in a continuing relationship. It is also possible that organizations do not account at all for their activities and achievements or do account but those to whom the organization is accountable are not satisfied. What are the decisions that can be made and the sanctions that can be imposed by those to whom accountability is required? Strong accountability requires both oversight and the likelihood of sanctions or adverse reactions (Ospina et al., 2002). Leat (1996) distinguishes between three different types of accountability. First responsive accountability, this is the weakest type of accountability, requiring only that those who are accountable take into account or respond to the views of those to whom they are accountable. Second, explanatory accountability requires giving an account and to describe and explain the conduct and performance of the organization. However, in both situations those to whom accountability is required do not have the power to impose sanctions other than public criticism. Third, accountability with sanctions. This type of accountability involves the right to impose formal sanctions or adverse reactions if the account required or the actions accounted for are unacceptable. Sanctions in this situation can be more tangible than public criticism, for example the loss of funding (Leat, 1996).

As mentioned above accountability frameworks require consequences. If the communicated information does not have effects accountability is useless. Consequences help establish authority, drives fulfillment of responsibility and improvement of performance. Establishing consequences and not following through with them has the counter-effect of obstructing the meaning and importance of accountability (Artley, 2001). However, if accountability does have consequences the fear can exist that outcome assessments and other information communicated will have severe, often punitive, consequences for the organization. Unrealistic standards and less from perfect 'performance' indicators can lead to decisions with a large negative impact on, for example, the income generated by funders. This pressure can cause the organization to align their practices with funders' expectations to avoid losing their support (Benjamin, 2008; Campbell, 2002).

### ***2.7. Too much accountability?***

The increased demand for accountability of nonprofit organizations raises difficult questions. As much as the concept of a transparent and accountable organization appeals to society critical notes have to be made. If nonprofits are held to account in a strict manner, regardless of the means by which this is done (e.g. stronger formal regulation, self regulation or media attention) this may have its drawbacks.



An important variable to consider is the costs of accountability. Depending on the number of constituencies and their information requests and the form and level of accountability, costs arise. Time and resources are sacrificed in order to be accountable. It can be argued that feedback in the form of, for example, funder reports, annual reports, news-sheets and thank-you letters to donors are important as a means of good public relations (Leat, 1996). However, time and resources that otherwise could have been spent directly on beneficiaries are spent on accountability, which can raise ideological questions. It can be seen as a sign of organizational inefficiency, of being self-interested rather than altruistic (NCVO, 2004). To what extent should funds be used for administrative activities instead of activities directed at realizing the mission? It seems that being accountable can be in conflict with the idea of spending as much money on direct services to the beneficiaries and as little as possible on administration.

Besides costs related to accountability the preservation of autonomy and creativity of the organization can be arguments for a strict demarcation of the boundaries of accountability. If the accountability requirements imposed by regulators and constituencies are very extensive this can have a negative effect on the creativity and independence of nonprofits (Ebrahim, 2003). The autonomy and creativity of nonprofit organizations is at stake. Stricter accountability requirements along with more punitive power to act in case of unacceptable results can cause risk adversity. Organizations might become increasingly active in realizing the expectations of the most influential stakeholders which might actually impede mission accomplishment (Ebrahim, 2003). Specifically in the situation in which influential external stakeholders demand and expect certain behavior and results that are not necessarily seen as in the best interest of the organization and the public at large.

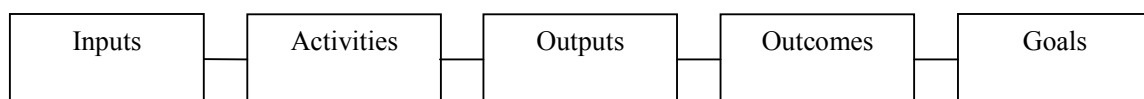
### 3. NONPROFIT PERFORMANCE MEASUREMENT AND REPORTING

An important part of strategic management is assessing performance. While performance measurement and reporting was originally most important for for-profit organizations, accountability in the evaluation of performance and outcomes has during the last decades become a major issue in the nonprofit sector as well, mainly for accountability reasons. Accountability is a process of public disclosure about results and the way the organization contributes to society. Reporting performance is necessary in order to be accountable for the organizations' performance. In the literature and in practice a diversity of performance concepts have been described that can be used for accountability purposes, often emphasizing on effectiveness criteria. These different conceptualizations of nonprofit performance have been translated into various performance measures.

#### 3.1. Performance measurement of nonprofits

Performance measurement and reporting are the activities of documenting the activities and accomplishments of programs. It is about reporting the real achievements instead of the intentions an organization has (Berman, 2006). Greiling (2006) emphasizes the process of generating performance data and specifically performance measurement as an accountability tool; performance reporting as a means to deploy performance measurement as a control and monitoring tool. Moxham and Boaden (2007) also focus on the aspect of ensuring accountability, specifically for the use of public money by nonprofit organizations. Though performance measurement and reporting have been traditionally activities in the for-profit sector, within the nonprofit literature and practice performance is a term often used as well. What exactly is meant with the term performance when related to nonprofit organizations is often not defined. For defining the term performance it is important to understand the forces underlying the processes leading to actual results and goal achievements. A general "logic model" has been developed in order to describe the process towards expected and actual outcomes of (nonprofit) activities and programs (Berman, 2006; Buckmaster, 1999).

**Figure 1 Outcome measurement model, source Berman (2006)**



The idea is to define measures and to collect data for each of these phases within the model. First inputs, the resources provided to the program or organization in order to achieve the mission. These inputs will be used in activities and programs that will lead to certain outputs. Secondly, outputs are the direct and immediate consequences of the activities undertaken.

Third, outcomes which are, unlike inputs and outputs, much more comprehensive and are translated to the extent that the goals of the organization are achieved. Outcomes are “those benefits or changes for individuals or communities after participating in the programs of non-profit organizations” (Buckmaster, 1999). An example of the difference between outputs and outcomes can be seen in the use of a certain medicine. Output can be measured by the amount of medicines provided; outcome measures the actual health effects users of the medicine encounter. Outcomes are often distinguished between initial, intermediate and long-term outcomes (Buckmaster, 1999).

Definitions and measurement of nonprofit performance are often related to the abovementioned model, emphasizing either on inputs, outputs or outcomes. Effectiveness, efficiency, activity and capacity are some concepts that have been used as measures of performance (Moxham and Boaden, 2007; Sawhill and Williamson, 2001; Herman and Renz, 1997). Porter (1999) relates the concept of performance of philanthropic foundations to creating social value; undertaking activities that generate social benefits that go beyond the mere purchasing power of their required expenditures. Superior performance is then considered to achieve a greater social impact per dollar expended than any other organization with the same objective. This concept of performance is inherently related to effectiveness as the defining criteria of performance. Within the Organizational effectiveness literature and research the focus has also been mainly on effectiveness. Effectiveness can be defined as the level of results, for example the number of service recipients. It refers to both outputs and outcome measures (Berman, 2006). Effectiveness is a relative and subjective term with different meanings for different people, all of whom can have different ideas about desirable results. Effectiveness is often used to define nonprofit performance (Moss Kanter and Brinkerhoff, 1981).

### ***3.2. Organizational Effectiveness theory***

Literature on organizational effectiveness reveals a diversity of models defining effectiveness in different ways and giving directions in assessing effectiveness (Seashore, 1983; Zammuto, 1982). Variations in models of effectiveness derive from different conceptualizations of organizations, e.g. open systems, coalitions of powerful constituencies, information-processing units, social contracts (Cameron and Whetten, 1983). Each of these conceptualizations of organizations highlights one or more specific phenomena of organizations and introduces different meanings of effectiveness. Three of these effectiveness models are described below.

#### *Goal-attainment approach*

An obvious and frequently used approach is to evaluate if an organization has reached its goals, i.e. the goal model. The goal-attainment approach is based on the assumption that organization’s goals are identifiable and unambiguous (Forbes, 1998). An organizations’ effectiveness can then be represented by the attainment or progress towards the organizational goals (Seashore, 1983).

This approach views an organization as an entity controlled to serve the purpose of key influentials, inside and outside the organization, who have the controlling power in defining the goals of the organization. Difficulties lie in the fact that nonprofit organizations often do not have clearly defined goals or that these goals are intangible. The goal of a nonprofit organization to fight poverty or child abuse for example, is rather unspecific and it is difficult to measure if progress is made. Unofficial but still important goals are not included and the goals that are included are often not prioritized. Often goals cannot be translated into specific and objective measures that measure the extent to which a goal is attained. Other problems may occur because of the fact that data to assess whether the goals have been accomplished may be hard to collect (Forbes, 1998; Herman and Renz, 1997).

#### *System resource approach*

Another approach mentioned in the literature is the system resource approach. This approach defines effectiveness as viability or survival (Forbes, 1998). An organization is referred to as effective if it has the ability to exploit resources from their environments and to sustain their own functioning. Adaptation to the environment is seen as critical in this approach and extra-organizational issues are taken into account (Moss Kanter and Summers, 1987). Survival can be seen as an indicator that the community is satisfied since funders continue to financially support the organization. Limitations in the approach are the “liability of newness” and the fact that survival can be artificial in the way that a specific benefactor can bring about the survival of an organization. Finally, survival as the ultimate goal can lead an organization to lose sight of the reason it exists, that is accomplishing the mission. Mission accomplishment might actually lead to termination of the organization instead of continuing existence (Moss Kanter and Summers, 1987).

#### *Multiple constituency model*

The multiple constituency model is often regarded as a modification of the goal model. The model focuses on constituent definitions of effectiveness. It recognizes that an organization comprises multiple stakeholders or constituents with different expectations and evaluation criteria (Herman and Renz, 1998). Different constituents have different goals and this should be taken into account when assessing and reporting effectiveness. When the criteria set by constituents are met an organization is said to be effective. It is therefore important to interpret the nature of stakeholders’ expectations, which can vary widely and even conflict among different groups of stakeholders and even within the same group. Deciding on which of these expectations to focus is often related to the power that different stakeholders have (Campbell, 2002). Funders for example often have a lot of influence, since private funding is crucial for nonprofit organizations. However, it is also important to weight the appropriateness of these expectations against the organizational values and the mission. Responsiveness toward stakeholders should be balanced against the beliefs about appropriate activity that exist within the organization (Balser and McClusky, 2005).

### ***3.3. Operationalization and implementation of performance measures***

All of the abovementioned models of assessing organizational effectiveness of nonprofit organizations only give directions about *what*, and not about *how* effectiveness, should be measured. These conceptualizations of effectiveness still need to be operationalized into specific measures. Definitions of effectiveness vary for different stakeholders and therefore require multiple criteria of effectiveness. Managers might prefer structural measures of organizational characteristics because they control these factors, while clients and customers might prefer outcome measures because they want results instead of mere promises or effort (Moss Kanter and Summers, 1987). Considering the subjective character of the term effectiveness, the criteria used to assess effectiveness are various. Within empirical work commonly used criteria of effectiveness are adaptability, flexibility, (fundraising) efficiency, productivity, customer satisfaction and public support (Ritchie and Kolodinsky, 2003; Zammuto, 1982). Moreover accessibility, income dependence, innovativeness and volunteers and staff are assessed as components of performance measurement (LeRoy et al., 2004). Moss Kanter and Brinkerhoff (1981) classify the various criteria underlying effectiveness concepts in three categories: First, task effectiveness or goal attainment, including criteria like output, results and efficiency. Second, appropriate organizational structure and process, including organizational characteristic, motivation, member satisfaction and communication. Third, the environmental adaptability, including flexibility and resource acquirement and dependence.

In for-profit organizations financial measures, e.g. profitability, stock performance and market share, are most often used when measuring performance. These measures are relatively easily measured and often a good test of market-satisfaction and the effectiveness of the organization. Profit making, often the main goal of organization, is objectively and directly measured by profits. Financial performance measures like profitability and stock performance are not available for nonprofit organizations. Still nonprofits often try to use some sort of objective non-financial ratio or financial measure to assess their efficiency and effectiveness. Performance measures are typically qualified as being absolute or relative. Absolute when performance is assessed against some previously defined criteria, relative when compared to a standard performance or a comparable aspect of another institution's performance (Berman, 2006). By using objective measures and ratios the attempt can be made to compare the performance of different nonprofit organizations. Performance measures used when measuring the effectiveness criteria described above for performance reporting are for example; number of sources of income adjusted for average size of the donation, percentage of revenues provided by the largest revenue source, annual surplus, revenue increase, investments and costs per project, numbers of staff and volunteers and their turnover and number of clients served (LeRoy et al., 2004).

These measures may be highly objective and reasonably comparable, but are often not the optimal type of performance measures for measuring the effectiveness of nonprofits. Because of their specific legal and financial status these common performance measures for for-profit organizations are less

useful is the situation of nonprofit organizations (Forbes, 1998). Nonprofit organizations have defined themselves not around goals on financial return and profit but around their mission. So, the above mentioned performance measures cannot capture the entire picture. Is a nonprofit organization with rapidly growing revenues really more effective than one that is cutting back? Is an organization with low fundraising expenses more effective than one with moderate or high expenses? Or is an organization that spends 8% instead of 4% of the annual revenues on administrative expenditures less efficient? Other performance measures emphasizing the number of staff and volunteers, their turnover and number of clients served again may be simplistic and objective measures. However, these measures are not necessarily good measures for an organization's success and often lack intrinsic information value.

#### ***3.4. Impact assessment: measuring the unmeasurable***

Among charitable nonprofits a growing interest in developing tools to enable them to demonstrate the wider impact of their work can be seen (NCVO, 2004). The focus of nonprofits is increasingly on extending performance measurement and reporting beyond the traditional exclusive focus on financial information. Assessing the social impact of nonprofits has been suggested as another meaningful measure, making it possible to assess aspects of performance tied to their social missions. Impact assessment is therefore strongly related to mission accomplishment as a criteria of effectiveness (Sheehan, 1996). One could argue that what really determines the effectiveness of nonprofits is the extent to which missions are being achieved and an actual impact on society is created (Herman and Renz, 1998). Social impact might be a less objective measure, but does have more intrinsic value.

Impact is more broadly defined than goal-attainment. It refers to a long term influence on the community and the state of the environment surrounding the organization and the consequences of an organization's actions or inactions (Seeley, 1998; Moss Kanter and Summers, 1987). Impact includes intended as well as unintended effects, negative as well as positive effects and both long term and short term effects (Wainwright, 2002). A distinction can be made between measuring and demonstrating impact, both aspects of an impact assessment. Measuring impact has a quantitative connotation, while demonstrating impact is more qualitative. Impact measurement gives an overview of quantifiable achievements but is considered less helpful in identifying the soft outcomes and unanticipated impact. However, impact demonstration does not address the central question of efficient resource allocation (Collis et al., 2003). Impact can be assessed at various levels including the individual, organizational, neighborhood or community and policy level (Yates, 2004). Impact assessment has a number of dimensions; impact might be economic, environmental, social or political. The economic impact of organizations has received most attention based on the fact that this type of impact is most easily quantified. For example, social impacts like confidence and esteem or community safety are more difficult to quantify.

Within the literature on nonprofit performance measurement impact assessment, and specifically impact measurement has been given much attention during the last decades. The National Council for Voluntary Organisations (NCVO) for example, has publicized several reports on impact measurement, focusing on the possibilities rather than the impossibilities of measuring impact and on developing guidelines to measure impact. These reports underline the importance of developing and adjusting frameworks for individual nonprofit organizations, rather than the sector as a whole (NCVO, 2004, Yates, 2004; Wainwright, 2002). There is a need for a wide range of methodologies tailored to the requirements of different types of organizations, depending on their type, size, activities, objectives and the aspects of impact they want to measure. There is no single tool or method that can capture the whole range of impacts or can be applied to the entire voluntary sector (Collis et al., 2003). As Clark (2007) mentions, there are several methods which can be used to measure impact, e.g. social return assessment, cost-benefit analysis, Acumen Fund Scorecard. However, there are several difficulties and limitations in using these methods. Within the literature and research often the emphasize is on describing and explaining the difficulties, rather than empirical research that actually undertakes attempts to measure the impact.

Difficulties in measuring impact are numerous. Regardless of method used, identifying causality in the relationship between a particular activity and a particular outcome is often difficult and sometimes impossible. The activities of an organization or sector might be only one of the many factors affecting the outcomes. Therefore attributing a particular change or impact to a specific organization is difficult, as the following citation points out:

*'It is hard to say I feel more self-confident and it's 70 percent due to planting trees with Groundwork and 30 percent due to a Women's Institute Course I went on'* (Walker et al.,2000).

Specifically when the impact does not occur shortly after the activities but takes years to come into existence, establishing to what extent change can be attributed to a specific activity and not to other external factors is difficult (Wainwright, 2002). Establishing which part of the outcomes and realized change happened as a result of the activity of the organization, above and beyond what would have happened anyway is also problematic (Clark et al., 2004). Unintended or unanticipated impact is difficult to identify and research requires long time scales in order to measure long term impact (Collis et al., 2003). Organizations whose main purpose is the prevention of something, for example child abuse or teenage pregnancies, may find difficulties in measuring positive impacts, partly because success is something not happening and it is often difficult to identify exactly who the beneficiaries are. For example, identifying the teenagers who would have gotten pregnant without the prevention program is likely to be impossible. In the case study presented in the following chapters the difficulties of attributing impact to a specific organization will come across as well.

## **4. DEFINITION OF THE CASE**

Walking through a city in the Netherlands, waiting for a bus or train it is impossible to deny the large campaign of the Nederlandse Hartstichting (NHS): A large, red heart calling out: 'Help too!' This campaign is a national wide campaign to make the Dutch population aware of the fight against heart and vascular diseases in which the NHS takes a leading role. Besides creating awareness the NHS is also active in the area of cardio and vascular diseases in many other ways. Regardless of the activities and efforts and of the NHS, the identification of the actual results and impact is recognized to be increasingly important.

### ***4.1. The mission and activities of the NHS***

The Nederlandse Hartstichting (NHS) was founded in 1964 in order to decrease cardiovascular and heart diseases. Cardiovascular and heart diseases were increasingly recognized as concerning the entire Dutch population instead of being a disease of age. After a rough start, from the seventies onwards the presence of the NHS in fighting cardiovascular and heart diseases in the Dutch society could not be denied. During the last decades a lot of progress has been made within the field of cardiovascular heart diseases, progress that is still going on today. Some examples of revolutionary developments are coronary bypass surgery, thrombolytic therapy and statins. Although this progress cannot be denied heart diseases still amount to the most important cause of death in the Netherlands. In 2005 44.119 people died of cardiovascular diseases. This amounts to 32% of the total deaths in the Netherlands in 2005. Each day approximately 121 people in the Netherlands die of cardiovascular heart diseases. Within the category of cardiovascular heart diseases the acute myocardial infarction is the second cause of death (behind stroke) causing 9.502 deaths in 2005.

In today's society the NHS still has the mission to decrease the prevalence of cardiovascular and heart diseases in the Dutch society. In order to do this the NHS invests in research, initiates improvements in prevention and patient care and educates the Dutch population on healthy lifestyles. Research, prevention and education and patient care are the main fields of attention. The main expenditures of the NHS are in the field of research. In 2005 35% of their total funding was used for research, compared to 20% on prevention and education and 25% on patient care. Research is conducted in order to determine the exact causes of cardiovascular and heart diseases and to develop new and improved treatments in order to improve the quality of life of cardiovascular and heart disease patients. This research is not conducted within the NHS itself, but the NHS acts as an intermediary that divides the funding it receives among different research projects by means of research grants. Prevention and education are increasingly used in order to fight cardiovascular and heart diseases. The focus is on early discovery within population groups at risk and improving preventive care.



Improving patient care is also a core activity of the NHS. On a national level for example the activities of the NHS are directed towards reducing waiting lists for treatments. Other activities are related to nursing, assistance in dieting and patient (and family) support organizations.

#### ***4.2. The organization and environment of the NHS***

Today the organization of the NHS exists of more than 130 employees, a management team existing of a chief executive officer (CEO) and three managers, each managing one of three departments; Marketing and communication, Knowledge and innovation and Operations. External to the organization numerous stakeholders can be identified. First, the board of directors. The board exists of six members of which two form the audit commission. In reaching the mission the NHS structurally cooperates with Dutch and worldwide partners like the Nederlandse Reanimatie Raad, the Nederlandse Vereniging voor Cardiologie, the European Heart Network and the World Heart Foundation. In several projects, e.g. prevention programs, the NHS works together with various foundations, insurance companies and the government as well. Within the field of research the NHS works with individual researchers and other organizations within the field of cardiovascular diseases. Besides the cooperation with professional organizations the NHS has over 5.000 active volunteers supporting the organization in various ways. Each year over 80.000 collectors of donations support the NHS in obtaining donations. The biggest share in funding is provided by private donors. Several other channels provide for funding as well, e.g. the for-profit sector, inheritances and lotteries. Other self-evident external stakeholders are patients of cardiovascular and heart diseases, they are the main services recipients, and their families. Of course the NHS also has the media and the public at large to consider as important stakeholders.

#### ***4.3. Defining the scope of the case***

For the NHS, as any charity organization, it is very important to be accountable to external stakeholders. The increased public scrutiny of charitable nonprofit organizations has affected the NHS as well, specifically after the scandal of the extremely high remuneration of their CEO in 2004. The general tendency towards more emphasize on performance accountability in charitable organizations is a trend the NHS does not want to ignore. Using impact measurement as an application of performance measurement and reporting is important for reasons of accountability and transparency. Impact measurement is also important in decision making regarding the future strategy directions. These matters have led to an extensive research project conducted by the Economics Faculty of the Erasmus University Rotterdam. That research project has the aim to conceptualize and measure the impact of the NHS on the Dutch society. The NHS is interested in the actual impact of their organization on the Dutch society.

This kind of information can be used in the communication and reporting to both internal and external stakeholders. Impact assessment can also create awareness and insight in the social impact of the investments the NHS makes, making it possible to adjust future (investment) strategies.

The case study presented in this thesis focuses only upon a specific delineated part of this extensive research topic. The following sub- research question is defined:

*What is the impact of the NHS on the economic burden of acute myocardial infarction of the working population in the Netherlands?*

Impact in this research is defined as *'impact is any change resulting from an activity, project, or organization. It includes intended as well as unintended effects, negative as well as positive, and long-term as well as short-term'* (Wainwright, 2003; Wainwright, 2002). Within this research a part of the societal impact the NHS has is measured, i.e. quantified, rather than demonstrated. This research question already demarcates a specific research area; the impact measurement is presented by an economic monetary value, not taking in account other possible impacts, e.g. quality of life, social inclusion, confidence and esteem. Second, the impact of the NHS is confined to the labour market, more specifically the process of return to work. Hereby the impact is measured for the Dutch population between the age of 15 and 65 years old. Third, the impact is measured for the specific heart disease acute myocardial infarction (AMI) only, hereby not considering the impact on other diseases. These demarcations have been made because of time and resource limitations. Capturing the communitywide impact of a specific organization is an extremely difficult and time consuming task. Specifically since the research field of measuring impact of nonprofit organizations is still in its early days. The increased public demand for accountability and the interest in reporting more meaningful performance measures than the measures traditionally used by charities, show the relevance of research within the field of impact measurement.

#### **4.4. Methodology**

The impact of the NHS on the economic burden of AMI in the working population in the Netherlands is measured using two steps. First a cost of illness study is performed to quantify the economic burden of AMI and secondly part of the impact on the change in economic burden gets assigned to the NHS. For both steps interviews have been conducted in order to identify the available data and to get advice on the research methodology. Data has been collected from various sources, including the Nederlandse Hartstichting, Rijksinstituut voor Volksgezondheid en Milieu (RIVM) and Centraal Bureau voor Statistiek (CBS).

#### 4.4.1. A cost of illness study

The economic burden of acute myocardial infarction (AMI) is quantified for the Netherlands over the period 1980-2005 using five year time periods. To determine the economic burden of AMI, a cost of illness study is performed. Cost of illness studies are used to get an indication of the financial impact for society (Hodgson and Meiners, 1982). A cost of illness study is a cost description in which all relevant costs related to AMI are taken into the calculation. A cost or burden of illness study estimates the resources consumed in disease prevention, detection and treatment (Liu et al., 2002). Four categories of costs are distinguished and need to be considered in a comprehensive cost of illness study: Direct health care costs, indirect health care costs, direct non-health care costs and indirect non-health care costs (College voor Zorgverzekeringen, 2006). An overview and examples of these types of costs can be seen in table 1.

**Table1 Cost categories**

<i>Cost category</i>	<i>Examples</i>
Direct health care costs	All medical costs resulting from treatment, e.g. costs of hospitalization, emergency transport, surgeries, medication.
Indirect health care costs	Informal care costs, costs occurring after treatment as a result of life years gained, e.g. lifelong use of cholesterol lowering drugs and periodical medical checkups.
Direct non-health care costs	Modifications at home because of permanent disability, travel expenses of patient and family, time loss.
Indirect non-health care costs	Mainly productivity losses because of absence or decreased productivity. Also juridical and educational costs.

The impact of AMI in the Netherlands is estimated focusing on direct health care costs and the indirect non-health care costs related to acute myocardial infarction. Within the category of indirect non-health care costs only the productivity costs are considered. Indirect health care costs and direct non-health care costs are not taken into account at all.

The cost of illness study is performed from a national, societal perspective, using a top-down approach. A bottom-up approach, using data at the individual patient level, was not possible because of a lack of data. The top-down approach estimates the economic costs by using aggregate data from mortality, hospital admissions, duration of hospital stay and other indicators. The advantage of the top-down approach is that it uses national data which is often well-structured and more readily available. A disadvantage related to a top-down approach is that the research is based on rough data making it necessary to use various assumptions because no data on the patient level is used. The data used to establish the economic burden of AMI is longitudinal (1980-2005) and sex- and age specific. In this research use is made of age categories of the working age population, namely with a ten year range. In the Netherlands the working population consists of 15-65 year old people.

Both the direct health care costs and the indirect non-health care costs (i.e. productivity costs) during 1980-2005 are calculated using the 2005 price level. Direct health care costs and indirect non-health care costs in 1980 are assessed by calculating the costs that would have occurred in case the incidence and mortality scenarios of 1980 had occurred in 2005. Because of this methodology used, no discounting was required and therefore in this study no use is made of discounting costs at the standard health care studies discount rate of 4%.

#### ***4.4.2. Impact measurement***

To decide on the role the NHS played in the decrease of the economic burden of AMI, the impact of NHS is determined by means of an impact measurement (see paragraph 4.3. for the definition of impact). An impact measurement is a quantitative method in which the impact of a specific organization on a community wide aspect (for example poverty) is translated into usually a monetary value. The impact can be measured at different levels; the individual, organizational, community and policy level. In this study the communitywide impact of the NHS is translated into a monetary value. Estimating the impact using a quantitative method is still controversial, because part of a communitywide change gets assigned to a specific organization and this impact is translated into a monetary value. This controversy might be the reason behind the fact that on the methodology of the impact assessment still no consensus has been reached.

In this study the underlying reasons for the change in economic costs related to AMI in the working population between 1980 and 2005 are identified. These reasons are the starting point for the impact measurement of the NHS. The factors that have influenced these developments are identified using existing literature. Next, the efforts of the NHS related to these driving forces are identified and compared against the total efforts in the Netherlands. Here use is made of comparisons based on expenditures to estimate the impact of the NHS on the driving forces behind the decline in economic costs. Using expenditures is only one way to estimate the relative impact of the NHS. Other methods that can be used to estimate this relative impact are using estimations of external stakeholders, the Delphi method<sup>1</sup> or comparisons based on the relative size of revenues. The decision to compare the expenditures of the NHS against total national expenditures, rather than international expenditures, is explained in more detail in chapter 5.

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<sup>1</sup> The Delphi method is a systematic, interactive forecasting method which relies on a panel of independent experts. Answers to a question are given anonymously in several rounds. After each round summaries are provided of the answers from the previous round of all other experts as well as the reasons for their judgments. Participants are encouraged to revise their earlier answers in light of the replies of other members of the group. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer.

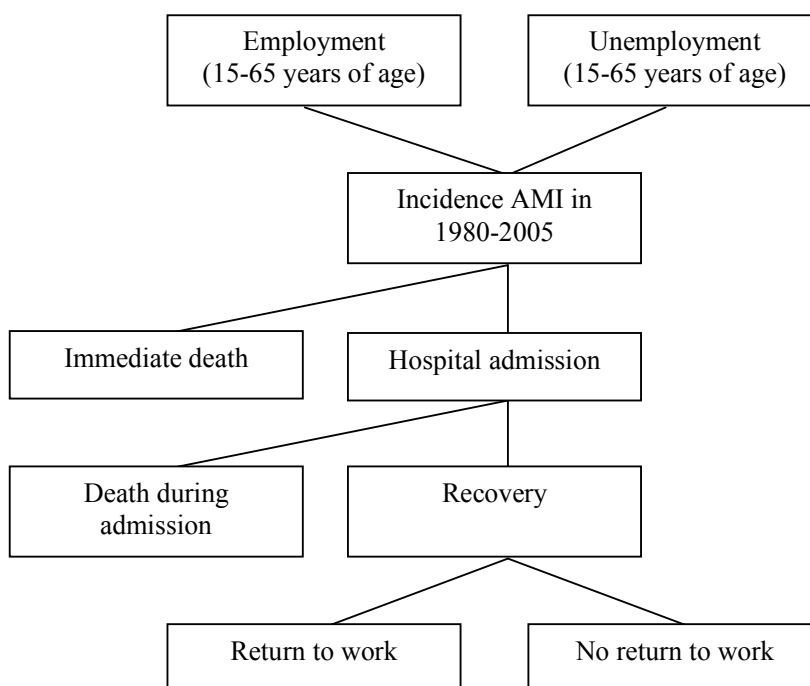
## 5. RESEARCH RESULTS COST OF ILLNESS STUDY

In this chapter the economic burden of AMI is quantified for the working population in the Netherlands over the period 1980-2005. The impact of AMI in the Netherlands is estimated focusing both on direct health care costs and indirect non health care costs. In the Netherlands, no earlier studies are performed analyzing and calculating the costs of illness of coronary heart diseases, let alone the more specific disease AMI. Costs of illness studies have been executed on coronary heart diseases in the UK, Finland and Japan (Liu et al., 2002; Maniadakis and Gray, 2000). By estimating the overall economic impact of AMI a more accurate and comprehensive assessment of the impact of AMI on society can be achieved.

### 5.1. Data

In figure 2 an overview is given of the consecutive steps before and after having an AMI. To measure the productivity losses related to AMI it is necessary to get insight into the employment status of people before and after an AMI. Only for people who were previously employed a productivity loss is calculated. An AMI can be followed by immediate death or by an admission to the hospital. Once people get discharged from the hospital a recovery period begins after which they either return to work or do not, mainly for the reason of disability.

**Figure 2 Steps before and after an AMI**



Various sources of epidemiological data on AMI in the Netherlands are used. The data necessary for this cost of illness study are records on the employment status prior to AMI, the incidence and mortality rates of AMI, hospital admissions and data on how many patients return to the workforce after enduring an AMI. Because not all the needed data is available assumptions are made to fill in the gaps. The assumptions are made based on existing literature and on expert opinion.

### ***5.1.1. Employment status***

National aggregated data from the national statistical registration system Centraal Bureau voor Statistiek (CBS) is used to determine the distribution of the Dutch population on the employment/unemployment status. This data is sex- and age specific. Data from 1980-1987 was available from the 'Arbeidskrachtentelling', for which every two years a large inquiry about the employment status of the Dutch population is performed. From 1987 onwards the data was taken from the follow-up method of Arbeidskrachtentelling, namely the 'Enquête Beroepsbevolking'. Both inquiries are performed by the CBS.

Individual information on employment status prior to the acute myocardial infarction was not available and therefore the assumption was made that patients with a myocardial infarction are evenly distributed among employed and unemployed people (Koopmanschap et al., 1995; Koopmanschap and Ineveld, 1992). This implies that employment status does not influence the risk of getting an acute myocardial infarction (Koopmanschap et al., 1995). Another assumption made is that the severity of the infarction, the risk of dying and the recovery time after the infarction are also not influenced by a patient's employment status prior to the infarction.

These assumptions might contradict previous research results stating that job pressure and job strain are positively associated with cardiovascular disease morbidity and mortality (Price, 2004; Hellerstedt and Jeffery, 1997; Chandola et al., 2008). The relationship between work related stress and acute myocardial infarction seems to be positive, however this relationship has not always been found and has not been proven to be causal (Chandola et al., 2008). Research shows that other risk factors, e.g. high cholesterol level, obesity and lack of exercise, are more important factors explaining trends in incidence of acute myocardial infarction (Unal et al., 2005; Unal et al., 2004; Ades, 2001).

### ***5.1.2. Incidence***

This study uses an incidence-based approach, in contrast to prevalence-based studies, using only new cases in a single year. This way the moment of disease occurrence is included. In recent literature the incidence of acute myocardial infarction (AMI) is identified using hospital discharges or first hospital admission records and primary cause of death records (Alfredsson et al., 1982; Hammar et al., 1994;

Linnertsjo et al., 2000; Hämäläinen et al., 2004). In this study the incidence of acute myocardial infarction is identified using the records of hospital admissions and the records of primary cause of death (being ICD 10 I20.0 – I25.0). In the Netherlands the registration systems are based on anonymity, this implies that it is not possible to make use of first acute myocardial infarction hospital admissions and/or discharges. The consequence is that the incidence numbers can be biased and overestimated; one person can be admitted for acute myocardial infarction several times during his/her working life. Next to this a potential overlap exists in data on hospital admissions and data on primary cause of death. One person submitted in the hospital, who dies some time after the discharge is counted twice in the incidence data.

Only in recent research has the junction of hospital admissions/records and personal data taken place. In commission of the NHS a cohort study has been executed in which records of the national registration for hospital admissions (Landelijke Medische Registratie van ziekenhuisopnamen (LMR)), the national statistical registration system (Centraal Bureau voor de Statistiek (CBS) and the community records (Gemeentelijke Basisadministratie) are combined. The research follows patients who were admitted in the hospital in 2000 for the first time. From these patients the available data is used to see whether these patients were admitted earlier in the period 1995-2000. By looking at the number of deaths caused by AMI outside the hospital and seeing whether these persons were admitted to the hospital in the years 1995-2000, an estimation of total first incidence in 2000 is made. This cohort study creates a valid manner to follow AMI patients in the Netherlands longitudinal, making it possible to provide nationwide incidence estimates of first AMI's in the Dutch population in the future. Because this cohort study has only been executed between 1995 and 2000 it is not used within this research.

### ***5.1.3. Mortality***

A distinction is made between immediate death caused by acute myocardial infarction and death during a hospital admission following an AMI. Data indicating death within one year of the first AMI is only available from 2000 onwards. From 2000 onwards data from CBS shows death rates within a year after hospital admission with an average of 5% for patients between 25-49 and an average of 8% for the people between 50-65 years old. Because of lack of data on the death rates after hospital discharge the assumption is made that all mortalities within the first months after discharge belong to the category of patients that do not return to work. As a consequence the category that does return to work is not affected by mortalities during their recovery period and this does not influence the productivity costs of this category.

#### 5.1.4. Hospital admissions

The incidence data in the registration systems in the Netherlands is based upon anonymity. The hospital admissions include all hospital admissions of the myocardial infarction patients. Due to the anonymity of the aggregated data, it is not possible to indicate whether patients are admitted to the hospital several times. This implies that the number of hospital admissions can be biased upwards. The actual number of persons with heart problems might be lower than the total number of hospital admissions, due to the fact that people can be admitted to the hospital several times. The length of the hospital stay is calculated for men and women of different age categories both on an aggregated level and on the average admission length of the hospital stay.

#### 5.1.5. Return to work

For the people surviving myocardial infarction the assumption is made that all people who were employed prior to the infarction will start rehabilitation in order to return to work. Research on return to work after heart diseases, and myocardial infarction specifically, shows wide divergence in the rates of return to work (Perk and Alexanderson, 2004). In table 2 an overview is given of the existing research estimations regarding return to work.

**Table 2: Return to work**

<i>Author(s) and year</i>	<i>Country</i>	<i>Period</i>	<i>% return to work</i>
Bengtsson (1983)	Sweden	1973-1975	85%
Boudrez et al. (1994)	Belgium	1983-1988	85%
Dennis et al. (1988)	USA	1978-1980	51,8%
Hedbäck and Perk (1987)	Sweden	1978-1980	60%
Herlitz et al. (1994)	Sweden	1986-1987	49%
Maeland and Havik (1987)	Norway	1978-1980	72,7%
Smith and O'Rourke (1988)	USA	1987-1989	72%
Soejima et al. (1999)	Japan	1992-2006	82,9%
Wiklund et al.(1985)	Sweden	1978-1980	75%

Important limitations of these studies are that most of them are only conducted among a small group of patients, and often only among male patients (Perk and Alexanderson, 2004). The results of European studies show rates of return to work, within a year after acute myocardial infarction, to be approximately between 62-92% (Hall et al., 2002). In this research a return to work percentage of 75% is used. This percentage is also used by the Gezondheidsraad (Gezondheidsraad, 2005).

Myocardial infarction is one of the most important causes for long-term sickness absence, accounting for high numbers of disability pensions and sickness absence (Perk and Alexanderson, 2004). Research on return to work after heart diseases shows a wide divergence in recovery time. There are no clear guidelines regarding the optimal duration and degree of sick leave for patients that suffered from a myocardial infarction.



Many factors influence the recovery period. Physical characteristics, psychosocial, demographic and social factors all influence the recovery period (Perk and Alexanderson, 2004). This makes it difficult to make a claim about average recovery time and the moment patients return to work. Reliable (longitudinal) data on recovery time of Dutch acute myocardial infarct patients is not available. Work resumption often requires adjustments regarding the content of their jobs and the amount of hours to start with. However, in case of no specific complications, patients should be able to return to work within six to eight weeks after hospital discharge. Nowadays, full resumption of work should be possible after ten to twelve weeks (Gezondheidsraad, 2005). Due to lack of objective data on recovery duration in the eighties and nineties it is difficult to state specific recovery times in the decades. It is however reasonable to assume that the recovery time has decreased since the 1980s, considering developments in law<sup>2</sup>, the decrease in average hospital admissions, the better treatments and rehabilitation possibilities. Based upon expert opinion<sup>3</sup> the recovery time until return to work, part-or fulltime, in the 1980s is set on 6 months. The average length of recovery in 2005 is estimated to be 2,5 months<sup>4</sup>.

## ***5.2. Trends in AMI in the Netherlands (1980-2005)***

Trends in incidence data show that the incidence of AMI has decreased significantly for both men and women. The decline has been especially strong for patients of 55-65 years old; within this group the incidence fell with 34% between 1980 and 2005. More specifically, within the age category 60-65, incidence fell with 44%. In younger age categories the decline is also significant. Looking at men and women together, the incidence of AMI has declined by 28% from 16.297 to 11.777 patients (unstandardized). This decline in incidence was strongest for men. The data showed a decline of 31% in registered incidence between 1980 and 2005 for men in the working population, against a decline of 10% for women. An overview of the age- and sex-specific trend in incidence can be found in appendix A-1.

The mortality rates of myocardial infarction between 1980 and 2005 show a decline of 65% for men and 57% for women in the working population. Both immediate death and death after admission in a hospital have declined with approximately these same percentages (Appendix A-2). The decline in mortality is strongest attributable to a decline in incidence and more specifically to a decline in immediate death following an AMI.

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<sup>2</sup> In 2002 the law Wet Verbetering Poortwachter became effective. This law states the binding rules for the employers and employees on what to do in case of long lasting absence due to sickness.

<sup>3</sup> Drs. J. van Dijk, medical officer at Arbo Management Groep and a member of the Revalidatie Commissie.

<sup>4</sup> Because of data limitations the recovery periods after 1980 are estimated to be decreasing linearly until 2005.

Between 1980 and 2005 hospital admissions of patients with AMI have declined with approximately 19% (Appendix A-3). This decline is especially strong for men, in all age categories the admissions for men declined. For women the decline was often smaller and, especially for the categories of younger women a rise in admissions is shown by the data (33% rise in hospital admissions for women in the age category 45-54). Data on both men and women show a strong decline, 27% and 19%, in hospital admissions for patients between 55-64 years old.

The length of hospital admissions has steadily decreased since 1980. The average hospital duration in 1980 was 17 days for men and 18,1 days for women (Appendix A-4). In 2005 the average length of the hospital admission was 6,8 days for both men and women, this comes down to a 60% decrease for men and 63% decrease for women. This decline in the length of the hospital stay is the strongest for the age category 25-34 year olds. The age of patients does not seem to exert a substantial influence on the length of the admission. The length of the admissions for patients in the different age categories is approximately the same.

### ***5.3. Estimation of direct health care costs***

As is done in a comparable cost study on the direct health care costs of coronary heart diseases in the UK (Liu et al., 2002), direct health care cost estimates are obtained by assessing the resources used across the different health care providers to prevent, detect and treat AMI patients. Main resources for estimating the direct health care costs in this study are aggregate data from CBS and the Rijksinstituut voor Volksgezondheid en Milieu (RIVM)<sup>5</sup>.

In a large study ‘Costs of illness in the Netherlands 2005’ by RIVM (Poos et al., 2008), the total health care costs spend in the Netherlands are analyzed. In this RIVM study the health care costs expenditures are characterized by age, gender, diagnosis, sector and financier. In the Netherlands a total of 68,5 billion euros was spend on the health care costs in 2005. In 2003 the total health care costs summed up to 57,5 billion euros, meaning an increase in costs of 19,1%.

The diagnosis coronary heart disease (ICD10 I20.0-25.0) is a diagnosis used by the RIVM to which the total health care costs are attributed. According to the World Health Organization AMI (ICD 10 I21.0) belongs to this category. Total health care costs for coronary heart diseases amounted to 1.290 million euros in 2005 of which 41,4% was spend on health care for patients within the age category 15-64. This total of 534,7 million euros (399 million for men and 135,7 million for women) is spend on the prevention, detection, treatment and recovery of coronary heart diseases.

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<sup>5</sup> RIVM is the Dutch National Institute for Public Health and the Environment. It is a recognised leading centre of expertise in the fields of health, nutrition and environmental protection.

In table 3 the resources used for coronary heart disease care within the age category 15-64 are shown by the different sectors of health care costs. Hospital care and the use of medical goods attribute substantially to the total health care costs (319,9 million euros on hospital care and 151,9 million on medical goods).

**Table 3: Sectors health care costs coronary heart diseases 2005, age category 15-65 (mln.)**

<i>Sector</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>
Hospital care	250,9	69,1	319,9
Elderly care	2,1	0,9	2,9
Ambulance care	8,8	4,2	12,9
Care for the disabled	0,0	0,0	0,0
Mental health care	0,0	0,0	0,0
Medical goods	102,9	49,1	151,9
Transportation	8,6	3,8	12,5
(Company) medical officers	7,1	2,4	9,6
Administration	18,8	6,4	25,1
Nursing care	0,0	0,0	0,0
<b>Total</b>	<b>399,0</b>	<b>135,7</b>	<b>534,7</b>

In the study executed by RIVM there are no specific costs attributed to acute myocardial infarction. Therefore an assumption is made about the segment of costs for coronary heart diseases that can be attributed to the disease AMI. A comparison is made between the average length of the hospital stay for coronary heart diseases in general and the average duration in the hospital for AMI patients. Making use of the data for average hospital duration has the advantage over other methods (comparisons based on incidence based or hospital admissions) that this method incorporates the seriousness of the disease and takes into account the potential reoccurrence of an AMI.

Based on the data on duration of the hospital stays from LMR and CBS in this study the assumption is made that 33,3% of the direct health care costs of coronary heart disease is accounted for by care of AMI patients<sup>6</sup>. The total health care costs for AMI patients, according to age and sex specific categories, sum up to 178,3 million euros in 2005 (133,1 million by men, 45,2 million by women). As to be expected 60% of these costs are made within the age category 60-65 year old, while only 10% of the total costs are made by 15-44 year old (table 4).

#### *Outcomes*

Dividing the total costs of direct health care for AMI by the incidence of every age- and sex specific category leads to the average costs per incidence of an AMI. Using this incidence based approach, the direct health care costs for the years 2000, 1995, 1990, 1985 and 1980 are calculated (table 4).

<sup>6</sup> In 2005 596.889 days were spent by coronary heart patients in hospitals. AMI patients spent 189.653 days in the hospital. Making the comparison leads to a segment of approximately 33% of AMI in total coronary heart diseases.

By means of this methodology the calculation should be interpreted as looking at how much the cost for direct health care working with the incidence level of 1980 are in today's society. The incidence of AMI in 1980 was 1,38 times as high as it was in 2005. Based on the relative costs of 2005 this means that the costs of direct health care of AMI would be 244,1 million (193,9 million by men, 50,2 million by women). Thus, the direct health costs for AMI have decreased by 27% since the 1980s.

**Table 4: Estimated direct health care costs AMI (mln.)**

	<i>1980</i>		<i>1985</i>		<i>1990</i>		<i>1995</i>		<i>2000</i>		<i>2005</i>	
	<i>M*</i>	<i>F*</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
<b>15-24</b>	0,4	0,2	0,1	0,3	0,9	0,1	0,1	0,3	0,2	0,5	0,2	0,1
<b>25-34</b>	1,9	0,6	1,2	0,7	1,6	0,3	1,4	0,7	1,8	0,7	1,3	0,6
<b>35-44</b>	12,4	2,1	14,9	2,0	14,5	1,9	13,5	3,2	12,3	4,0	11,2	3,3
<b>45-54</b>	57,8	11,2	57,0	11,1	51,7	8,2	50,7	11,6	50,0	14,3	40,2	12,9
<b>55-64</b>	124,5	38,6	133,7	44,0	121,1	30,6	96,9	36,7	83,2	29,5	80,1	28,2
<b>15-64</b>	193,9	50,2	203,3	54,7	187,0	39,0	162,9	50,8	149,1	49,1	133,1	45,2

*M\*=men, F\*= women*

#### *Sensitivity analysis*

Sensitivity analysis was used to explore the effects of altering the assumptions used in the estimation of the direct health costs and productivity costs. The segment of direct health care costs for AMI in total costs of coronary heart diseases was varied to 27% (based on a comparison of number of hospital admissions) and to 28% (based on a comparison of incidence) (Appendix B). In this sensitivity analysis the results of a segment in total direct health care costs based on a comparison of number of hospital admissions (27%) led to the strongest decline in costs. Based on this assumption total direct health care costs were estimated to be 199,8 million euros in 1980 and 144,4 million euros in 2005.

#### **5.4. The indirect non-health care costs**

In order to calculate the indirect non-health care costs, i.e. the productivity costs, a further explanation of the methodology used is required. Two currently accepted methodologies can be used.

##### **5.4.1. Methodology**

The indirect non-health care costs are defined as “costs associated with production loss and replacement costs due to illness, disability and death of productive persons” (Brouwer et al., 1997). Production losses can be the consequence of temporary absence from work, permanent disability and (premature) death. The production losses due to a lower productivity of people who return to work at a suboptimal level are not taken into account because of a lack of information.

For the calculation of the total productivity losses there is also no distinction made between people returning to fulltime employment or with adapted working hours.

There are two methods that can be used in calculating the costs resulting from loss of productivity; the human capital method and the friction cost method (College voor Zorgverzekeringen, 2006). Although traditionally the human capital method was mainly used, the friction cost method is currently considered to give the best approximation of the real costs to society (College voor Zorgverzekeringen, 2006; Brouwer and Koopmanschap, 2005; Koopmanschap et al., 1995).

Traditionally the human capital method is used in calculations of productivity losses due to illness. This method estimates the value of potentially lost production or income as a consequence of disease (Koopmanschap et al., 1995). The potential loss of productivity is quantified in terms of forgone earnings, this assuming full productivity (Hodgson, 1994). In case of permanent disablement or premature death at a specific age, the total productive value or earnings from that age until the age of retirement is counted as indirect costs. To give an example; if a person would suddenly die or become permanently disabled at age 28 earning 50.000 euros per year at that time, the human capital method counts his wage (sometimes a prediction of average wage, since wage tends to rise during one's career) of 50.000 euros times the number of years that he would have worked until retirement if he were still alive. This would result in a productivity loss of 1.850.000 euros in total for this single AMI-patient. The concept underlying the human capital method is that the value of a person's labour activity is equal to the earnings of that person for work delivered (Hutubessy et al., 1999).

In the literature the human capital method has been criticized because it may overestimate the actual production loss to a considerable extent (Koopmanschap et al., 1995; Koopmanschap and Ineveld, 1992; Brouwer et al., 1997). A more recently developed approach is the friction cost method (Koopmanschap et al., 1995). The friction cost method takes into consideration that an absent worker can be replaced. The essence of the friction cost method is that absent workers will be replaced after an adaptation period (the friction period), thereby preventing further production loss. Replacement of the worker takes place from the internal labour market or by an unemployed individual.

The friction cost method distinguishes between a friction period in which productivity loss occurs and a further period when the sick employee has been replaced (Brouwer et al., 1997). The friction cost methods limits the costs to the friction period. The only period that productivity costs occur is within the friction period, the time between the absenteeism and the replacement. According to the friction cost method, a friction period exists in case of immediate death of an employee or when an employee is absent from work. The length of the friction period is dependent on the average vacancy duration. Factors determining the average vacancy duration are the level of unemployment within society, the education level necessary for the vacancy and the efficiency of the labour market matching labour demand and supply (Koopmanschap et al., 1995). The production losses are calculated for the period of absence from work when this period is shorter than the friction period. When the absence from work exceeds the friction period, the production loss is limited to the length of the friction period.

Thus, after the friction period has elapsed there are no additional productivity costs, except longer term macro-economic costs (Brouwer et al., 2002). The value of the lost production during (part of) the friction period is measured by multiplying the number of sick days due to absenteeism by income and elasticity of annual labour time versus labour productivity (Hutubessy et al., 1999).

At the core of the friction cost method, is the concept of replacement of employees. A sick employee can be replaced by a former unemployed individual. This individual sacrifices his/her leisure time to perform the work, while the sick employee gains leisure time. Implicitly in the friction cost method it is stated that the absolute amount of leisure time stays about the same due to the trade-off. The difference of enjoyment of the leisure time is measured in QALY and is not quantified in monetary value (Brouwer and Koopmanschap, 2005).

The estimates for productivity costs calculated using the friction-cost method are substantially lower than when using the human capital approach, the main reason being that the friction cost method restricts the costs to the friction period, while the human capital approach calculates all the costs regarding the remaining years of the productive life (until retirement age of 65 year old). In this study the friction cost method is followed.

#### ***5.4.2. Estimation of the productivity costs***

A friction period occurs in case of immediate death and in case of absence because of myocardial infarction. Premature death while one is absent from work does not induce an additional friction period if the work absence is longer than the friction period.

The length of the friction period is estimated on the basis of the average vacancy duration, which depends on the level of unemployment and the efficiency of the labour market (Koopmanschap et al., 1995) The friction period is generally longer than the vacancy duration, because time may elapse between the emergence of a productivity loss and the creation of a vacancy. In addition, time passes between filling a vacancy and the moment the new employee starts working. Due to lack of data, the necessity exists to assume a homogeneous labour market. Therefore no distinction is made between the different segments of the labour market, for example according to education level. Furthermore, in this study no differences in unemployment levels for high and low educated people and differences between sectors are taken into account. The friction period in this research is estimated at a period of three months. This is in accordance with comparable studies estimating productivity costs (Leal et al., 2006; Luengo et al., 2006; Allender et al., 2008).

Temporary absence from work may lead to production loss or extra costs to continue production at the preceding level. Complete insight in the consequences for indirect costs requires firm specific information. According to Koopmanschap et al. (1995) generally speaking absence from work reduces

the effective labour time. However, a reduction of annual labour time causes a less than proportional decrease in labour productivity per year. In this study the estimated elasticity for annual labour time versus labour productivity was estimated to be 0,8, as is done in the study of Koopmanschap et al., (1995), indicating that when labour time decreases with 10% productivity will decrease with 8%.

The value of the lost production is then calculated assuming the costs to be 80% of the average value of production per employee. The average value of production per employee was approximated by using age- and sex specific average gross national wages including overtime and before deduction of employee insurance- and pension contributions (CBS). The costs of absence shorter than the friction periods were calculated as being 80% of the production value during the period of absence. The costs of absence equal to or longer than the friction period were calculated as being 80% of the production value during the friction period.

Productivity costs related to AMI are strongly decreased during the timeframe of 1980-2005. In 2005 total productivity losses counted up to an amount of 55,9 million euros compared to an amount of 87 million euros for the 1980 situation (table 5). This 36% cost decrease is mostly accounted for by men, 96% compared to 4% by women. However, men still cause most of the costs related to productivity losses, over the years their share in total costs has only decreased mildly from 90% to 87%. Men account for this extremely high share in total costs because of higher incidence and mortality rates, higher rates of employment and higher wages compared to women.

Both for 1980 and 2005 the share of total costs of productivity are highest due to temporary absenteeism of patients that returned to work after a recovery period. However, this share in total costs increased for 2005. This increase is related to the strong decline in the share of costs related to losses because of premature death. In 1980 premature death accounted for 32,8% of total productivity costs, in 2005 this is only 17,2%. The 31 million euros decrease in costs between 1980 and 2005 exists for 53% of a decline in costs related to death (an absolute decline of 16,4 million euro), indicating that the steep decline of AMI mortality has accounted for the largest part of the decrease in productivity losses (see Appendix C).

**Table 5: Productivity costs AMI (mln.)**

	<i>1980</i>		<i>1985</i>		<i>1990</i>		<i>1995</i>		<i>2000</i>		<i>2005</i>	
	<i>M*</i>	<i>F*</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
<b>15-24</b>	0,04	0,005	0,01	0,006	0,01	0,003	0,01	0,008	0,03	0,01	0,02	0,003
<b>25-34</b>	1,2	0,2	0,7	0,2	1,0	0,1	0,9	0,2	0,8	0,2	0,7	0,2
<b>35-44</b>	8,6	0,6	10,0	0,6	9,8	0,7	9,3	1,0	6,6	1,3	6,9	0,9
<b>45-54</b>	33,0	2,6	31,0	2,5	28,3	2,3	28,7	2,6	21,9	3,4	20,3	2,7
<b>55-64</b>	52,3	6,4	51,9	7,0	49,7	6,6	41,7	6,1	27,9	5,1	30,2	4,3
<b>15-64</b>	78,1	8,8	77,7	9,3	72,7	8,9	65,8	9,0	47,7	9,3	48,4	7,5

*M\*= Men, F\*=Women*

### *Sensitivity analysis*

The effects of changes in estimated recovery periods of half a month decrease and increase and friction periods varying from 2 to 5 months were evaluated. Because of the divergence in rates of return found in recent research the return to work rate was varied from 62-92%. The elasticity for labour time versus labour productivity was evaluated for values ranging from 0,6-0,9 (see Appendix D). In these sensitivity analyses the results were most sensitive to changes in friction period length. These results estimated total productivity costs to range between 58- 145 million euros in 1980 and 48,2- 71 million euros in 2005.

### **5.5. Summary**

The total direct health care costs for AMI patients sum up to 178,3 million euros in 2005. The costs of direct health care of AMI would have been 244,1 million if the incidence rate of 1980 would not have decreased in time. However, because of declines in incidence, hospital admissions and hospital duration due to improvements in medical treatment, higher awareness of the risk factors of AMI and overall better care of AMI, the actual health care costs related to AMI in 2005 decreased by 27%.

The costs related to productivity losses due to AMI have also decreased tremendously during the 25 years timeframe of this research. This decline is for the most important part accounted for by men, specifically by the decline in mortality rates of men in the working age population. Women account for only a small portion of the costs decrease, however women's share in total costs is still much smaller compared to men. The total productivity losses sum up to 55,9 million euros in 2005, compared to 86,9 million euros in 1980; a decrease in total costs of 35,7%.

**Table 6: Summary of costs**

	<i>1980</i>	<i>2005</i>	<i>% change</i>
<b>Direct health care costs</b>	244,1	178,3	-27,0%
<b>Indirect non-health care costs</b>	86,9	55,9	-35,7%
<b>Total</b>	331,0	234,2	-29,2%



## **6. RESEARCH RESULTS IMPACT MEASUREMENT**

In the previous chapter the economic burden of AMI under the working population in 2005 was established at 234,2 million euros. In 1980 the economic costs related to AMI were 331,0 million euros, a decline of 29,2%. The lower mortality rate, the lower incidence rate and the shorter time span after which people go back to work are the main causes for this decline in the economic burden. In this chapter the reasons and explanations behind these leading causes are examined. This is done to be able to measure the role the NHS played in the decline of the costs of illness related to AMI, by means of an impact assessment.

### ***6.1. Methodology***

In order to measure the impact of the NHS it is necessary to get insight into the factors explaining the decline in economic burden. The decline in incidence and mortality rates and the faster return to work after an AMI are the main reasons behind the decline in economic costs. These reasons are therefore the starting point to assess the impact of the NHS. In the literature there are studies done in which the changes in mortality and incidence rates of a disease (including AMI and coronary heart diseases) are analyzed. There is a vast amount of literature available on the estimation of the extent to which changes in the major cardiovascular risk factors and medical treatments and developments can explain the observed decline in mortality of coronary heart diseases. In most research it comes forward that changes in these two factors (the risk factors and medical developments) are responsible for the change in the mortality rate of coronary heart diseases. Estimations of the extent to which risk factors and medical developments are accountable for this decline differs within the literature. In the assessment in this study use is made of the explanatory power of the risk factors and medical developments for coronary heart disease concluded from existing literature. (Capewell and O'Flaherty, 2008; Ford et al., 2007; Bennett et al., 2006; Laatikainen et al., 2005; Unal et al., 2005; Unal et al., 2004; Bots and Grobbee, 1996; Vartiainen et al., 1994).

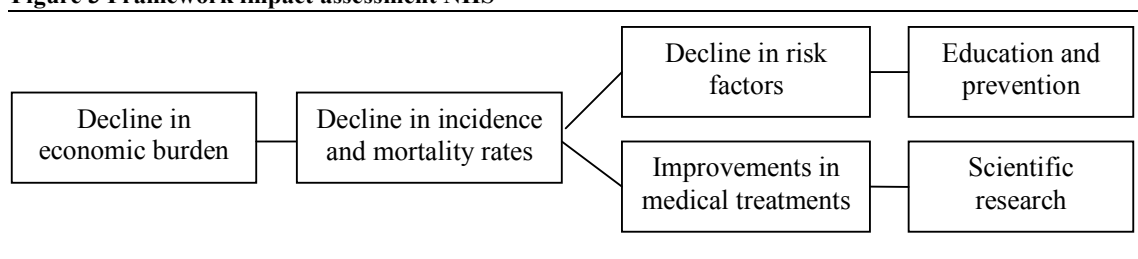
The developments and reasons causing the shorter time span after which people go back to work are not taken into account. This has two reasons. The first reason is that part of the causes behind the shorter time span (decrease of the average length in the hospital, better care and treatment, professionalism of the rehabilitation) is contributable to the better medical care and treatment. These reasons do not offer a full explanation, the Wet Verbetering Poortwachter, national alarm number, the increase in arrival time of the ambulance due to traffic are some of the reasons outside the developments in medical treatment. The fact that there is no quantitative manner to establish the role of the NHS, even a qualitative description is difficult, makes reason number two.

Data and literature on acute myocardial infarction is rare, most of the recent research has the subject of coronary heart diseases. Foregoing aspects and developments in the past specifically important for AMI (coronary angioplasty and new drugs treatments like fibrinolytic agents and antithrombins), the assumption is made that the reasons and factors behind the decline in mortality of coronary heart diseases are the same for AMI. This assumption comes out of necessity, since there is a lack of data and literature on AMI.

Thus, the developments in the risk factors and medical treatment are the underlying causes for the decline in mortality and incidence rates of AMI. The next phase in the research design is the determination of the factors causing the mentioned developments. In this research it is stated that the changes in the major cardiovascular risk factors can be attributed exclusively to prevention and education. Thus investments in the prevention and education of AMI to increase the awareness of the risk factors on people's health contribute to the decline in incidence of AMI and mortality due to AMI. The investments in scientific research are responsible for the improvements in medical care and treatment.

In figure 3 an overview is given of the consecutive steps in measuring the impact of the NHS.

**Figure 3 Framework impact assessment NHS**



## 6.2. Assumptions

The developments in medical care and treatments and the modified lifestyle associated with the risk factors of CVD (e.g. blood pressure, smoking, cholesterol, obesity, physical inactivity and diabetes) are the factors that account for the decline in incidence and mortality of coronary heart diseases (Capewell and O'Flaherty, 2008; Bennett et al., 2006; Ford et al., 2007; Unal et al., 2005; Laatikainen et al., 2005; Unal et al., 2004; Bots and Grobbee, 1996; Vartiainen et al., 1994). From the 1980s new cardiological treatments were increasingly used to treat coronary heart diseases. Major breakthroughs have changed and substantially improved care and treatment, including the use of thrombolysis, coronary-artery bypass grafting, coronary angioplasty, angiotensin-converting enzyme inhibitors and other medications for secondary prevention (Ford et al., 2008; Laatikainen et al., 2005). Also substantial decreases in the prevalence of major cardiovascular risk factors have taken place, including smoking, cholesterol and blood pressure.

In the research regarding the explaining of the decline in incidence and mortality of coronary heart diseases the IMPACT model<sup>7</sup> is the most used methodology to come to a conclusion about the role of medical treatments and risk factors in the decrease in CVD- related deaths. In table 7 the conclusion from the found literature is shown. From this table it can be seen that the improvements in medical treatments are accountable for approximately 40-47% of the decrease in mortality, while risk factor changes are even more important (44-72%). Approximately 5-10% of the decreased mortality stays unexplained in the research conducted.

**Table 7: Explaining factors decreased mortality**

<i>Author(s) and year</i>	<i>Country</i>	<i>Period</i>	<i>% explained by risk factors</i>	<i>% explained by medical treatments</i>
Ford et al. (2007)	USA	1980-2000	44%	47%
Bennett et al. (2006)	Ireland	1985-2000	48,1%	43,6%
Laatikainen et al. (2005)	Finland	1982-1997	53-72%	23%
Unal et al. (2004)	England, Wales	1981-1990	58%	42%
Capewell et al. (2000)	New Zealand	1982-1993	54%	46%
Capewell et al. (1999)	Scotland	1975-1994	51%	40%
Hunink et al. (1997)	USA	1980-1990	54%	43%
Bots and Grobbee (1996)	The Netherlands	1978-1985	44%	46%

Based on these studies the assumption is made to attribute 45% of the decline in incidence and mortality to the improvement in medical treatments and 50% to the changes in risk factors.

To quantify the impact of the NHS it is necessary to take the analysis one step further and determine how the medical treatment and risk factors improved. In this study a one-on-one relationship is assumed between the improvements in the medical treatment and investments in scientific research. Another one-on-one relationship is assumed between the positive developments in the risk factors and the resources used on prevention and education. No difference is made in which party makes the investment, meaning that every investment has the same effectiveness. The modification in lifestyle and the improvements in risk factors are postulated to be caused by a higher awareness of the consequences of each risk factor (e.g. smoking, high blood pressure, obesity). This higher awareness is created by education and prevention measures. Implicitly it is stated that prevention and education activities, for example anti-smoking campaigns, do indeed affect the lifestyle of the Dutch population.

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<sup>7</sup> The IMPACT model is a statistical model which can be used to explain the observed decrease in deaths from coronary heart disease. The model estimates the CHD mortality reduction per unit decrease in a risk factor in the population. It uses beta coefficients derived from regression-analyses. Each coefficient quantifies the expected decline in CHD mortality from the observed reduction in risk factors. The deaths prevented or postponed from reduction in each risk factor are then computed.

For prevention and education the choice has been made to focus on investments in prevention and education of the Dutch society. The investments of the NHS in prevention and education are compared to national investments in prevention and education. This choice is made since the awareness of the risk factors is established by using commercials, programs and information campaigns aimed at the Dutch population. The effects of these national activities are considered to exist only at a national scope.

Scientific research is also compared at the national investment level in scientific research. This is contrary to the fact that scientific research in coronary heart diseases and AMI mainly operates at the international level. Research results are publicized and accessible to other scientists; knowledge about improved medical treatments spills over to other countries. Therefore a comparison on the international level would be more satisfactory. However, data on aggregated international research expenditures is not available<sup>8</sup>. Comparing the magnitude of expenditures of the NHS versus international expenditures is therefore not an option. In this research the expenditures of the NHS are assessed against national expenditures on research. In favour of this methodology; the Netherlands produces qualitative research results and invests relatively high amounts in scientific research compared worldwide. This statement is grounded on two different findings. First, by comparing the investments of the NHS vis-à-vis the investments of other Heart associations worldwide, the relative magnitude of the NHS investments can be established. Comparing these expenditures on cardiovascular research shows that the NHS is investing heavily compared to other European countries<sup>9</sup>. In table 8 an overview is given of the expenditures on research by several national heart foundations. Second, the citation index shows that research financed by the NHS is cited above average. Between 1993 and 2007 the NHS published 1.399 articles in various research areas. The main attention of the NHS is within the area of cardiac and cardiovascular systems (22.5% of the publications (NHS, 2008)). The CPP/FCSm citation indicator<sup>10</sup> shows that the impact of the research financed by the NHS in the field of cardiac and cardiovascular systems in the period of 1993-2007 is classified as 'above average' (1,85).

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<sup>8</sup> The European Heart Network (EHN), shortly before the director Susan Logstrup was contacted, had send out an email to their members asking them to give an overview of the investments in scientific research of their organization and of their country. This information was not available for the EHN, nor did the EHN know of any institute that did have this information. Most of the members responded that this information was not accessible or known to them.

<sup>9</sup> Only the investments in cardiovascular research were available from the annual rapports of the different heart foundation. The more specific data on research on coronary heart disease (and thus AMI) was not available.

<sup>10</sup> This CPP/FCSm indicator measures the relative impact of the published papers as compared to the mean of citations in the field. It is calculated as the number of citations per publication (CPP), divided by the mean number of citations per publication in the field to which the publication belongs (FCSm). Outcomes above 1,2 are classified as 'above average'.

**Table 8 Investments scientific research 2005**

<i>Heart Foundation</i>	<i>Revenues (mln.)</i>	<i>Research expenditures (mln.)</i>	<i>% of revenues spend on research</i>
American Heart Association*	496,4	105,56	21,6%
British Heart Foundation*	214,9	87,9	40,9%
Danish Heart Foundation*	3,0	10,0	30,5%
Dutch Heart Foundation (NHS)	29,9	11	36,8%
German Heart Foundation	5,6	1,0	18,6%
Irish Heart Foundation	4,5	0,2	4,3%

\* The currencies are converted into euros using the exchange rates of 31 December 2005

The comparisons of the magnitude of investments, both in prevention and education and research, are made for one year only; again due to lack of data. For prevention and education this is the year 2003, for research investments the comparison is based on 2005. This causes the limitation that the impact of the NHS can only be assessed at the end of the time span used in the calculation of the economic burden (1980-2005). An additional limitation is caused by the time-lag that occurs before the investments in prevention, education and scientific research have effect in the society. Due to these limitations it is not possible to say anything about potential changes of the impact of the NHS during 1980-2005 and implicitly is assumed that this impact has been the same during these 25 years.

### **6.3. Estimation of the impact of the NHS**

By making the assumptions described above it is possible to assess the role of the NHS in the decline of the mortality rates and incidence level and thus the role in decreasing the economic burden of AMI in the Netherlands.

#### *Explaining factors*

Following the literature, in this research the decline in mortality and incidence are attributed for 50% to the improvement in the risk factors and 45% to the developments in medical treatment. Therefore 49,8 million euro of the decrease in the economic burden between 1980 and 2005 calculated before is attributed to improved risk factors and 44,8 million to developments in medical treatments.

#### *Prevention and education*

In the assessment of the expenditures of the NHS on prevention and education the definition of prevention used is by the RIVM: *'the total number of measures, both inside and outside the health care, with the goal to guard, stimulate and improve healthiness by preventing sickness and health problems'* (De Bekker-Grob et al., 2006). This definition includes the measures of prevention aimed at preventing new cases of a disease, thus aiming at the reduction and/or decrease of the causes of the disease. It also includes the expenditures on discovering a disease in the earliest stages upon early treatment with a better prognosis for the patient.

Prevention entails three important areas; health protection measures, disease prevention and health promotion. This classification entails several methods of prevention. Health protection measures aim at the reduction of exposure to dangerous environmental aspects by means of law, regulation, control and action. Disease prevention aims at the prevention and early discovery of diseases by means of medication, vaccination and screening. Health promotion includes education; stimulating a healthy life style and healthy life by means of education, information and personal advice (De Bekker-Grob, 2006).

In 2006 RIVM published a large study on the expenditures in the Dutch society in 2003 on the prevention measures, both inside and outside the health care sector, broken down to broadly defined categories of diseases. One of these categories is coronary heart diseases. This study is used as comparison data for the investments of the NHS on prevention and education in 2003. From the study it comes forward that 940.8 million euros were spend on prevention measures for coronary heart diseases. This number includes the expenditures on health prevention by means of medication and vaccination (blood pressure reductors and cholesterol medication), which amounts to 902 million euro.

The NHS invested 9,56 million euros in 2003 in prevention and education, of which 3,2 million euros was spend on education, 1,3 million on general prevention projects and 1,8 million euros on prevention focused on the risk factors of AMI. The NHS does not invest in medication and vaccination. Making the comparison this means that the NHS is responsible for 1,02% of the investments and expenditures on prevention and education upon the Dutch society. The prevention and education expenditures of the NHS are not specified to age, therefore the percentage is not specific for the working population.

### *Scientific research*

A comparison of research expenditures is made on a national level. Since data on aggregated national research expenditures is unavailable a rough estimation of the relative magnitude has been made<sup>11</sup>. First, only basic scientific research is taken into account. This stage of research is followed by industrial research related to testing and implementation. The NHS is not involved in this second stage, which is primarily the field of pharmaceutical companies. This is not taken into account since basis scientific research is at the foundation of developments of new treatments. Without this basic research there would be no opportunity for industrial follow-up research to actually implement the developments. The total Dutch expenditures on basic scientific research are roughly estimated to be 60-70 million euros. This estimation is based on the opinions and expertise of insiders at the NHS. Other sources on the total investment in scientific research were not available.

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<sup>11</sup> In the Netherlands the University Medical Centres should know how much they invest in scientific research. However, at the time of this research the medical centres did not have this information gathered.

The expenditures of the NHS on scientific research in 2005 were 11 million euros (2003, 10,5 million euros). This expenditure is very broad and a specification into different research themes of diseases is difficult to make and not analyzed by the NHS. The percentage resulting from the comparison can be expressed as a range between 15,7%-18,3% (15%-7,5% 2003). It gives a very broad indication for the magnitude of the NHS related to investments in research in the Netherlands. Looking at the investments, the estimation is made that the NHS is responsible for spending approximately 15,7%-18,3% of the aggregated Dutch expenditures on scientific research related to coronary heart diseases.

#### *Outcomes*

The NHS attributed for 1,02% to the improvements of the risk factors under the Dutch population by means of investments in prevention and education. Due to the assumed one-on-one relationship between prevention and education and the risk factors of AMI, this means that the NHS reduced the economic burden of AMI under the working population by 0,5 million euros. Using the same reasoning; the improvements in medical treatment are caused by the findings of scientific research in the Netherlands. The NHS was responsible for 15,7%-18,3% of the funding of this research in the Netherlands. Due to these investments the economic burden of AMI decreased by 7,0-8,2 million euros. In total the impact of the NHS on the economic burden of AMI under the working population in the Netherlands can be quantified at 7,55- 8,72 million euros. In other words: the activities of the NHS, caused a relative decline of the economic costs of AMI of 7,58- 8,76% in the period 1980-2005.

#### *Sensitivity analysis*

Sensitivity analysis was conducted to explore the effects of altering the assumptions made. The explanatory power of risk factor changes was varied from 40-50%. And the explanatory power of developments in medical treatment from 45-55%. The effects of changes in the ratio of the expenditures of the NHS in the field of prevention and education against national expenditures varying from 0,5-1,5% were evaluated. Because of the rough estimation of the relative expenditures in scientific research this estimation was varied from 12-22% (Appendix E). In these sensitivity analyses the results were most sensitive to changes in relative size of research expenditures. These results estimated total monetary impact of the NHS to range between 5,9- 10,4 million euros.

#### **6.4. Summary**

In 2005 AMI under the working population posed an economic burden of 234,2 million euros on society; compared to 1980 a decrease of 29,2%. In 2003 the NHS invested 9,56 million euros in prevention and education and 11 million in scientific research. Based on the methodology and assumptions in this study, 7,55- 8,72 million euros of the decrease in economic burden can be attributed to the activities of NHS in the Dutch society. This means a relative impact of the NHS of 7,58- 8,76% on the reduction of the economic burden of AMI in the society.

## 7. CONCLUSION, DISCUSSION AND RECOMMENDATIONS

In this chapter conclusions are drawn upon the literature- and empirical research of the previous chapters. Next the research results are discussed and recommendations for further research are given.

### 7.1. Conclusion

Recent public criticism and scrutiny has increased the attention given to external accountability of nonprofit organizations in both literature and research. The central research question that has been guiding throughout this research is:

*How can nonprofit organizations improve their external accountability and in which way can impact assessment contribute to this?*

Literature on nonprofit accountability shows several ways in which nonprofit organizations can improve their accountability. The fact that nonprofit organizations do not have shareholders and are not subject to democratic political processes does not mean external accountability has to be poor and insufficient. Nonprofit organizations are accountable in multiple ways: through government regulation, through the media and through the “markets” for clients, donors, grants, volunteers and resources. External accountability can be improved both by using formal external regulations, laws and codes that are obligated on the nonprofit sector, e.g. stricter legislation on accounting standards. Another way to improve accountability is by using internal organizational mechanisms, e.g. self-regulation and self-evaluation. These initiatives coming from the organizations themselves can be said to be more appropriate, since the independency, autonomy and innovativeness are not affected and eroded. One way to show willingness to voluntarily endure public scrutiny is to report to external stakeholders on issues that are beyond the mere obligations to publicize. If reporting is accurate and complete, this can lead to improved trust and confidence and thereby strengthen the accountability relationship.

Questions concerning which stakeholders to address and what kind of information to report on need to be considered. These questions are interrelated since the decision to provide certain stakeholders with information is strongly connected to the type of information these stakeholders are interested in. Each group of stakeholders has specific interests and is interested in the question how well the organization is serving their interests. The object of accountability can be divided into various types, for example financial accountability and performance accountability. Recently a demand for performance accountability, focusing on actual results and achievements rather than only financial information, can be seen. Actual results, creating social value and achieving the mission of the organization is what the organizations are accountable for.



In order to communicate information about the achievements of the organization it is necessary to assess the results and outcomes. This raises questions how outcomes can be measured. If organizations want to communicate information about their performance some definition of performance should be defined. Difficulties arise in defining and measuring nonprofit performance. Serving the public good can be interpreted in many ways, depending on the specific group of stakeholders and their expectations. Because of the different expectations stakeholders have, responsiveness to their varying and perhaps even conflicting expectations can raise problems. Choosing which performance measures to use when reporting to external stakeholders raises difficulties. On one hand efforts to meet standards of objectivity, by using quantitative indicators, e.g. funding ratios, are vulnerable because of their lack of intrinsic value and limitations in capturing mission accomplishment. On the other hand efforts to be accountable by using performance assessments with high level of meanings, for example impact measurement, can be criticized for being subjective and intangible.

When a nonprofit organization is willing to report on its social value, actual results and mission achievement attempts to measure meaningful performance information should be undertaken. Impact assessment can be used to either demonstrate or to measure impact of the organization on society. Both these aspects of an impact assessment provide meaningful information. Measuring impact, rather than demonstrating impact, quantifies the impact, making it possible to present the impact in specific numbers which is extremely appealing to many stakeholders. The case study within this thesis demonstrates an example of impact measurement of the NHS. The central question in this part was:

*What is the impact of the NHS on the economic burden of acute myocardial infarction of the working population in the Netherlands?*

The impact of the NHS is estimated to be approximately 7,55- 8,72 million euros of the decrease in economic burden. This implies a relative impact of the NHS of 7,58- 8,76% on the reduction of the economic burden of AMI in the society between 1980 and 2005. Reporting this impact and the context of this outcome positioned within the limitations and shortcomings of the research can be used to improve the external accountability. Reporting the information resulting from this impact measurement, regardless of possible disappointment regarding these outcomes, shows a willingness to endure criticism. It can be used as an answer to public distrust related to stakeholders ignorance about the real achievements of nonprofits.

## **7.2. Discussion**

This thesis contributes to the research in the field of impact measurement. It is a first attempt to quantify part of the impact of the NHS. No Dutch study has evaluated the economic impact of acute myocardial infarction in a comprehensive cost study before.

Comparable studies are conducted in the UK and the European Union, for the costs related to cardiovascular diseases, and for rheumatism in the Netherlands. However, specific for this study is that the costs of one specific cardiovascular heart disease, acute myocardial infarction, are estimated. Next to this, this study is unique in the way that it compares the costs between 1980 and 2005, thereby making it possible to evaluate the economic effects of trends in acute myocardial infarction on various cost categories.

### ***7.2.1. Limitations***

Limitations in the research part on calculating the burden of disease are several and are mainly related to data. Limitations can be found in the lack of longitudinal and sex- and age specific data. A better registration of first time myocardial infarction patients and connected patient specific follow-up information on recovery time and return to work could increase the reliability of the estimations given in this study. In Finland for example, multiple registration systems exist recording on personal account the sick leave periods, the social insurances, days needed before returning to work. In the Netherlands these registration systems do not exist, leading to a deficiency in accurate research. The decision is made to compare the incidence and mortality scenario of 1980 with the situation in 2005, hereby costs are measured at the 2005 price level. Several assumptions had to be made in order to overcome these data limitations. Although these assumptions were based on existing literature, expert opinion and comparable studies done in Europe, USA and Japan, the accurateness of the estimation is reduced.

In this research the choice is made to use the friction cost method instead of the traditional human capital approach. The friction cost method probably leads to an understatement, while the human capital approach leads to an overestimate. The choice for the friction cost method is primarily based on the fact that this method is more commonly used nowadays and generally accepted to estimate the productivity costs more accurately than the human capital method (College voor Zorgverzekeringen, 2006; Brouwer and Koopmanschap, 2005; Koopmanschap et al., 1995). The viewpoint that employees are replaceable and that maintaining a specified production level is important for employers is plausible. On the other hand it can be claimed that calculating only three months of productivity loss is too short, assuming that not every employee is as easily replaced as another and that the death of employees incurs a higher burden on society than a temporary absentee. The decision to use the friction cost method has a severe impact on the estimated size of the economic burden. Where the decrease in economic burden within this study has been estimated to be approximately 100 million euros, the human capital method would exceed this estimation by far. Assuming productivity losses to occur until the age of 65 would lead to a strong increase in economic burden between 1980 and 2005. Although cost estimations calculated by using the human capital approach might lead to a large overestimation, the cost estimates in this study are likely to be an underestimate.

Further limitations in the cost study are related to the fact that several substantial cost categories are not taken into account. Costs related to patient travel expenses, informal care, decreased productivity after returning to work because of (temporary) part time employment or deteriorated physical or emotional condition and long term medical care costs are only some of the costs not taken into account. These costs categories are important in assessing the complete economic burden of AMI.

Regardless of the accuracy of the absolute size of the economic burden in 1980 and 2005 and the decrease in this economic burden, the impact on this decrease that can be attributed to the NHS is a separate issue. Both within methodology and data decisions assumptions were made that might be considered controversial and are subjected to critique. A complete overview of the causes of declines in incidence and mortality rates is not available. The relationships between research, prevention and education and these declines are assumed to be causal and to be the only influencing factors. The impact of the NHS is measured by comparing the expenditures of the NHS on research, prevention and education, against the total expenditures in the Netherlands within these areas. This method is only one of the possible ways to quantify the impact of the NHS at the community level. Agreement on the proper and most accurate way to measure impact of nonprofit organizations is lacking.

It is important to state that this study is only a first attempt in measuring the impact of the NHS. No claim is made to provide a complete impact measurement of the impact the NHS has on the Dutch society. The research is focused on a specific disease within a specific population group and not all cost categories that should be considered within a cost of illness study are taken into consideration. Next to measuring the impact of the NHS related to economic costs, the NHS also affects the society, and more specifically patients with AMI within the working population, in other ways. The impact of the NHS can be expected to manifest itself, among others, in improved quality of life of AMI patients, awareness creation, the effects of follow up care on the confidence and fear of patients and effects of education on healthy lifestyles promotion by the NHS on the decrease of other diseases (e.g. diabetes and cancer).

### ***7.2.2. Value and usefulness of this research***

Establishing the burden of acute myocardial infarction, despite the limitations mentioned above, can be of interest for numerous reasons. First, it depicts the costs related to acute myocardial infarction and creates awareness of the economic impact of this specific cardiovascular disease. Second, it can be used to make informed decisions on how to distribute research efforts. Has research and educational efforts proven to be successful in decreasing AMI costs? Or is there still work to be done in the field of AMI? If so, which areas (e.g. research, prevention, education) are most effective in improving incidence and mortality and should be given most attention?

Though a cost of illness study cannot be the sole basis for intensifying research efforts it can be an indication that a specific disease is a large burden for society. However this requires that comparable studies of various diseases would have to be conducted. From this research it can be seen that the developments in costs of AMI are positive, having led to a decrease in the economic and social impact on society. Even though AMI is still an important cause of death, the improved economic burden shows that progress is being made.

The estimation of the impact that the NHS had on the improvements in the cost of acute myocardial infarction attempts to attribute part of the improvements to the NHS. It can be claimed that the cost of illness study in itself provides evidence for the importance of research and educational efforts in the area of cardiovascular diseases. The fact that the costs investigated in this research, which were actually far from the complete costs related to AMI, still amounted to 178,2 million euros in 2005 shows in itself a reason for existence for the NHS. It shows the importance of a continuance or even an expansion of research, prevention and educational efforts. However, merely stating that AMI shows high incidence and mortality rates and that it causes a large economic burden on the Dutch society does not support the claim that the NHS has a right to exist. These issues could easily be addressed by other organizations or the government. The importance and value added by the impact measurement conducted is that it attributes impact to a specific organization, the NHS. Hereby it can be shown that the NHS has not only been addressing cardiovascular diseases in the last 44 years but has created an actual societal impact. Therefore it can be claimed that AMI should be an important field of attention for society in which both public and private investments are needed, but on top of that it can be argued that the NHS is indeed one of the organizations that should be addressing this issue.

Using impact measurement as conducted within this study in performance reporting goes beyond standard performance reporting of charities. It entails a practical example of the impact a particular charity organization has on a specific aspect of the Dutch society. Reporting impact means presenting extremely meaningful information that goes beyond traditional funding ratios, research expenditures etc. This kind of information appeals to external stakeholders like volunteers and donators and responds to pressures for more accountability and insight into the actual results of nonprofit organizations. Off course an impact measurement of the NHS in isolation, without the possibility for comparison against impacts of other Dutch actors within the field of AMI, is rather difficult to judge. Is the NHS really more effective in using its scarce resources than individuals, other organizations or the government? If the NHS did not exist, would their place in society and their activities be taken over by other organizations or the government just as effective or even more effective? The impact estimation in itself does not provide evidence for the superiority of the NHS in effectively addressing AMI. Comparing the estimated impact against the total or yearly expenditures of the NHS during its existence is also not representative for making any comment on the effectiveness of the organization as a whole.

The presence of knowledge, professional management, scale and time horizon within the NHS are some indications that the NHS can more effectively create benefits for society. Whether the NHS is fulfilling its potential, however, is an open question. The question that should be asked is whether the NHS needs to prove that it is optimally effective? Is that really what external stakeholders require by their demand for increased accountability? Considering that most performance reporting of charitable organizations does not exceed financial performance shows that reporting actual impact on society is probably enough to live up to the demand for increased accountability. In the end improving accountability of the NHS is not only strongly related to actual more transparent and meaningful performance reporting, but also to convincing external stakeholders that the NHS is serving their interests and deserves their support. This issue is strongly connected with public image and marketing is just as important in this matter as performance reporting.

### ***7.2.3. External demand for impact measurement?***

It can be claimed that the focus on impact assessment of nonprofits has been mainly driven by nonprofit organizations themselves and that impact assessment is not the way to be accountable. Is the public at large really interested in what part of impact is specifically attributable to a specific organization? Will this information actually increase (financial) support? Or is it sufficient to communicate information to stakeholders on the improvements that are made in the field of cardiovascular diseases? Are external stakeholders really requiring more informative performance information or are they satisfied with information communicated in recent years, e.g. expenditures on research and amount of money that is spend on administrative activities? In short: is impact measurement really the way to go for accountability aims of charitable nonprofit organizations? It seems that most scandals related to charitable organizations are related to the usefulness of the expenditures, e.g. excessive remuneration and administrative costs, rather than related to the lack of effectiveness and inability of charities to achieve their mission. Is impact measurement therefore not required to improve external accountability? Related to these questions Campbell (2002) mentions a paradox of accountability. According to him few nonprofit organizations have sufficient scope to be held accountable for changing communitywide indicators, such as the unemployment rate. On the other hand the project level outcomes for which they can be held accountable are typically so narrow that the public has no compelling accountable interest.

For the NHS a narrow scope is not the case. As can be seen the NHS does have a substantial impact on society, therefore impact measurement can be useful as an accountability tool. Obviously there is still a lot of work to be done to develop a comprehensive impact measurement framework and to improve the current impact measurement study. This requires investments both in data registration and in developing a more accurate impact measurement methodology. The mere fact that a comprehensive impact assessment is a costly activity should not be used as an excuse to minimize the accountability

efforts of the organization. An impact assessment can be a valuable accountability tool that can be used to measure performance over time, determining where and how it makes an impact, challenging the organization to continual improvement. This way the NHS can distinguish itself by means of transparency and accountability, which is crucial considering the NHS is operating within a society in which an increasing amount of charities are established. The argument that the demand for impact measurement might not be coming from external stakeholders, but is mainly internal driven, does not change the fact that impact measurement is a valuable way to increase accountability and creating awareness of this methodology among external stakeholders can also affect their future information requirements and lead to a demand for impact measurement specifically.

### ***7.3. Recommendations***

The research conducted is only a first attempt to quantify part of the impact the NHS has on the Dutch society. This attempt is subject to many data and methodology limitations and time and resource constraints. For improving the cost of illness study a better registration of various data types is required, e.g. previous employment status, recurrence of AMI, time of recovery until return to work. In order to make more accurate calculations of impact it is necessary to improve data availability as well. Again essential data, e.g. national research expenditures, were missing within this study and is important to make more of an effort to register various types of data related to research, prevention and education expenditures. Not only within the NHS, but also within the government and other organizations and research centers operating in the field of AMI.

Further research into the field of impact assessment within nonprofit organizations is necessary to improve this study as well. The chosen methodology in this research is only one way to measure impact, other methodologies might be more useful or accurate. A more comprehensive framework to assess the complete impact of the NHS on various aspects of society needs to be developed. Next to this, impact measurement should be applied more often in order to gain more insight in the different possibilities for practical use of impact measurement.

Further impact measurement of the NHS in other areas should be conducted as well. Hereby the impact within different areas on which the NHS focuses can be compared. By comparing the impact within different fields of attention strategic decisions can be made about the fields on which the NHS should focus in order to create the most value. Comparisons with impact studies in other nonprofit organizations would also be extremely valuable. This requires that comparable studies are conducted within other nonprofits as well. Finally, reflection of external stakeholders on the conducted impact measurement and conversations on the general concept of impact measurement are important. Especially if impact measurement is mainly used to increase accountability the opinions and recommendations of stakeholders should not be ignored.

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## **APPENDICES**

**APPENDIX A: Trends**

**APPENDIX B: Sensitivity analyses direct health care costs**

**APPENDIX C: Productivity costs**

**APPENDIX D: Sensitivity analyses productivity costs**

**APPENDIX E: Sensitivity analyses impact measurement**

## **APPENDIX A: Trends**

### **Trends**

- 1) Trends in incidence 1980 – 2005 (sex and age specific)**
- 2) Trends in mortality AMI 1980 – 2005 (sex and age specific)**
  - Immediate death**
  - Death after hospital admission**
- 3) Trends in number of hospital admissions 1980 – 2005 (sex and age specific)**
- 4) Trends in length of hospital admission 1980 -2005 (sex and age specific)**

**A-1. Trends in incidence AMI 1980 – 2005 (age and sex specific categories)**

Source: CBS

	<i>1980</i>		<i>1985</i>		<i>1990</i>		<i>1995</i>		<i>2000</i>		<i>2005</i>	
	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>
<b>15-24</b>	21*	3	7	4	5	2	8	5	13	7	13	2
<b>25-34</b>	224	57	149	60	182	35	174	63	213	59	161	57
<b>35-44</b>	1.272	184	1.528	178	1.437	199	1.392	277	1.270	344	1.152	287
<b>45-54</b>	4.500	708	4.435	702	3.843	637	3.945	733	3.887	909	3.125	820
<b>55-64</b>	7.510	1.819	8.063	2.074	6.888	1.846	5.846	1.727	5.020	1.391	4.833	1.327
<b>15-64</b>	13.526	2.771	14.183	3.019	12.355	2.719	11.365	2.805	10.403	2.710	9.284	2.493

\* Number of persons

**A-2. Trends in mortality AMI 1980 – 2005 (age and sex specific categories)**

Source: CBS

**- Immediate death**

	<i>1980</i>		<i>1985</i>		<i>1990</i>		<i>1995</i>		<i>2000</i>		<i>2005</i>	
	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>
<b>15-24</b>	4*	1	2	0	3	0	0	0	2	1	1	0
<b>25-34</b>	39	6	29	11	14	8	13	11	18	12	12	3
<b>35-44</b>	193	47	199	36	140	27	141	44	120	39	87	24
<b>45-54</b>	723	135	572	123	419	88	394	93	388	97	259	59
<b>55-64</b>	1.613	363	1.472	363	1.071	242	80	254	738	188	544	151
<b>15-64</b>	2.572	552	2.274	539	1.647	365	1.351	402	1.266	337	903	237

\* Number of persons

**- Death during hospital admission**

	<i>1980</i>		<i>1985</i>		<i>1990</i>		<i>1995</i>		<i>2000</i>		<i>2005</i>	
	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>	<b>Women</b>
<b>15-24</b>	1*	0	1	2	1	0	0	0	0	0	1	0
<b>25-34</b>	9	8	10	5	15	6	18	6	5	4	5	4
<b>35-44</b>	89	17	105	17	88	17	91	28	68	16	47	15
<b>45-54</b>	375	65	339	51	255	52	247	62	235	53	133	45
<b>55-64</b>	952	276	985	274	675	217	521	144	356	174	327	98
<b>15-64</b>	1.426	366	1.440	349	1.034	292	877	240	664	247	513	162

\* Number of persons

**A-3. Trends in number of hospital admissions 1980 – 2005 (age and sex specific categories)**

Source: CBS

	1980		1985		1990		1995		2000		2005	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
<b>15-24</b>	17*	2	5	4	2	2	8	5	11	6	12	2
<b>25-34</b>	185	51	120	49	168	27	161	52	195	47	149	54
<b>35-44</b>	1.079	137	1.329	142	1.297	172	1.251	233	1.150	305	1.065	263
<b>45-54</b>	3.777	573	3.863	579	3.424	549	3.551	640	3.499	812	2.866	761
<b>55-64</b>	5.897	1.456	6.591	1.705	5.817	1.604	5.043	1.473	4.282	1.203	4.289	1.176
<b>15-64</b>	10.954	2.219	11.909	2.480	10.708	2.254	10.014	2.403	9.137	2.373	8.381	2.256

\* Number of persons admitted in hospital

**A-4. Trends in length of hospital admission 1980 -2005 (age and sex specific categories)**

Source: CBS

	1980		1985		1990		1995		2000		2005	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
<b>15-24</b>	13*	10	13	9	6	11	9	21	6	6	7	37
<b>25-34</b>	16	17	13	11	11	9	9	12	8	8	5	6
<b>35-44</b>	17	16	13	14	12	12	9	10	13	9	6	6
<b>45-54</b>	17	18	14	15	12	12	10	10	8	10	6	6
<b>55-64</b>	17	18	15	16	12	13	10	11	9	10	7	7
<b>15-64</b>	17	18	14	15	12	13	10	12	9	10	7	7

\* Days



## APPENDIX B: Sensitivity analyses direct health care costs

### Sensitivity analyses direct health care costs

Sensitivity analyses are used for the assumption that the segment of AMI in coronary heart diseases is 33%, based upon the length of the hospital stay. First the segment is changed to both 27% based upon a comparison of hospital admissions for AMI and coronary heart diseases. Second, to 28% based upon a comparison of incidence for AMI and coronary heart diseases.

### Direct health care costs (mln. euros)

	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>
<b>Segment AMI 27%</b>	199,8*	210,9	184,8	173,7	160,7	144,4
<b>Segment AMI 28%</b>	207,2	218,7	191,6	180,1	166,7	149,7

\* Million euros

## **APPENDIX C: Productivity costs**

### **Productivity costs**

- 1) Productivity losses due to (premature) death 1980 – 2005 (age and sex specific)**
- 2) Productivity losses due to permanent disability / no return to work 1980 – 2005  
(age and sex specific)**
- 3) Productivity losses due to temporary disability / absenteeism of work 1980 – 2005  
(age and sex specific)**

**C-1. Productivity losses due to (premature) death 1980 – 2005 (age and sex specific categories)**

	1980		1985		1990		1995		2000		2005	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
<b>15-24</b>	9.959*	1.590	5.562	2.991	8.274	0	0	0	4.317	1.703	3.998	0
<b>25-34</b>	246.711	50.098	189.553	55.831	150.903	52.717	158.094	62.792	122.839	62.753	88.283	26.810
<b>35-44</b>	1.907.090	223.070	1.980.800	178.698	1.547.314	152.515	1.554.181	247.498	1.297.606	204.610	900.694	141.727
<b>45-54</b>	8.047.737	731.620	6.362.268	619.326	4.964.426	503.365	4.662.774	558.008	4.633.298	564.923	2.857.530	387.460
<b>55-64</b>	17.856.960	2.253.123	15.813.591	2.158.446	12.584.919	1.632.329	9.447.181	1.403.863	7.858.171	1.328.653	6.061.088	888.345
<b>15-64</b>	23.094.212	2.924.649	20.353.017	2.728.240	15.777.116	2.148.923	12.900.624	2.065.866	11.595.885	2.000.422	8.247.844	1.332.979

\* Euros

**C-2. Productivity losses due to permanent disability / no return to work 1980 – 2005 (age and sex specific categories)**

	1980		1985		1990		1995		2000		2005	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
<b>15-24</b>	7.968*	795	1.854	748	517	838	3.984	2.001	5.936	2.555	5.498	800
<b>25-34</b>	226.151	38.468	133.659	38.384	199.036	19.769	182.318	42.477	253.689	42.162	186.952	47.875
<b>35-44</b>	1.673.776	104.564	1.993.831	105.364	2.051.209	134.317	1.942.726	176.170	1.867.034	268.783	1.710.647	225.309
<b>45-54</b>	6.233.698	464.579	6.152.753	469.834	5.835.410	446.736	6.008.505	520.207	6.068.653	714.627	4.980.632	666.878
<b>55-64</b>	8.606.498	1.040.174	9.020.247	1.200.908	9.265.701	1.233.138	8.066.494	1.171.943	7.050.087	944.188	6.892.661	961.482
<b>15-64</b>	13.759.483	1.475.865	14.342.739	1.636.791	14.232.360	1.686.103	13.226.324	1.740.058	12.726.934	1.820.590	11.457.280	1.748.909

\* Euros

**C-3. Productivity losses due to temporary disability / absenteeism of work 1980 – 2005 (age and sex specific categories)**

	1980		1985		1990		1995		2000		2005	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
<b>15-24</b>	23.903*	2.384	5.562	2.243	1.551	2.513	11.951	6.003	17.807	7.665	13.745	2.000
<b>25-34</b>	678.454	115.404	400.978	115.151	597.107	59.307	546.955	127.430	761.067	126.486	467.379	119.687
<b>35-44</b>	5.021.327	313.692	5.981.494	316.093	6.153.628	402.951	5.828.177	528.511	5.601.103	806.350	4.276.616	563.273
<b>45-54</b>	18.701.095	1.393.737	18.458.258	1.409.501	17.506.231	1.340.209	18.025.514	1.560.622	18.205.960	2.143.881	12.451.580	1.667.196
<b>55-64</b>	25.819.493	3.120.522	27.060.742	3.602.725	27.797.103	3.699.413	24.199.483	3.515.830	21.150.260	2.832.563	17.231.652	2.403.706
<b>15-64</b>	41.278.449	4.427.594	43.028.218	4.910.372	42.697.079	5.058.309	39.678.972	5.220.174	38.180.803	5.461.770	28.643.200	4.372.272

\* Euros

## APPENDIX D: Sensitivity analyses productivity costs

### Sensitivity analyses productivity losses

Sensitivity analyses are used for the following assumptions:

- Recovery times varying between 6 months (1980) and 2,5 months (2005) (sensitivity analyses for +/- 0,5 and -/- 0,5 months)
- Friction period (sensitivity analyses for 2 and 5 months)
- Rate of return to work (sensitivity analyses for 62%-92%)
- Elasticity labour time vs. labour productivity (sensitivity analyses for 0,6-0,9)

### Productivity losses

	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>
<b>Recovery time -0.5 months*</b>	86.960.252**	86.999.377	81.599.890	74.832.017	67.422.147	49.199.389
<b>Recovery time +0.5 months</b>	86.960.252	86.999.377	81.599.890	74.832.017	71.786.404	62.405.577
<b>Friction period 2 months</b>	57.973.501	57.999.585	54.399.927	49.888.011	47.857.603	48.206.812
<b>Friction period 5 months</b>	144.933.753	144.998.961	135.999.817	124.720.028	119.644.007	70.993.824
<b>Rate of return 62%</b>	86.960.252	86.999.377	81.599.890	74.832.017	71.786.404	56.947.019
<b>Rate of return 92%</b>	86.960.252	86.999.377	81.599.890	74.832.017	71.786.404	54.305.782
<b>Elasticity 0.6</b>	65.220.189	65.249.533	61.199.918	56.124.013	53.839.805	41.851.862
<b>Elasticity 0.9</b>	97.830.283	97.874.299	91.799.876	84.186.019	80.759.704	62.777.793

\* The recovery periods after 1980 are estimated to be decreasing linearly until 2005

\*\* Euros

## APPENDIX E: Sensitivity analyses impact measurement

### Sensitivity analyses impact assessment

Sensitivity analyses are held for the following assumptions:

- Explanatory power of risk factor changes (sensitivity analyses for 40%-50%)
- Explanatory power of developments in medical treatments (sensitivity analyses for 45%-55%)
- Relative size of expenditures of the NHS on prevention and education (sensitivity analyses for 0,5%-1,5%)
- Relative size of expenditures of the NHS on research (sensitivity analyses for 12%-22%)

	<i>Impact NHS</i>
<b>Risk factors 45%*</b>	8.040.111**
<b>Risk factors 55%</b>	8.141.317
<b>Medical treatment 40%</b>	7.247.972
<b>Medical treatment 50%</b>	8.933.457
<b>Prevention and education 0,5%</b>	7.833.676
<b>Prevention and education 1,5%</b>	8.331.661
<b>Research 12%</b>	5.884.261
<b>Research 22%</b>	10.366.120

\*The relative size of expenditures on research is fixed on 16,9%

\*\*Euros