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The economic value of depression treatment in the Netherlands

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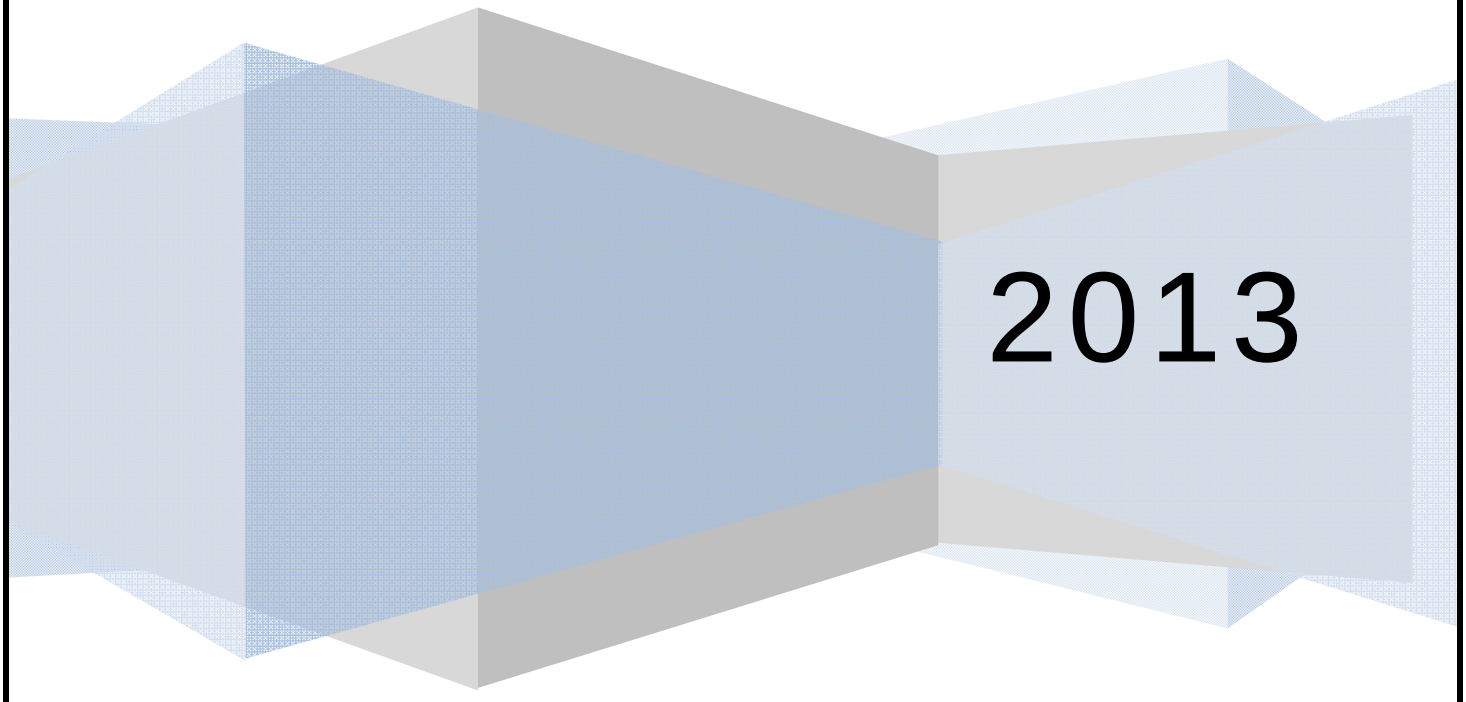

Title:

The economic value of depression treatment in the Netherlands

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Abstract

Background: The value of our mental health is reflected in the resources that we invest in mental health care. The spending on treatment for mental disorders is €15,9 billion per year. Most studies suggest that the indirect costs of mental disorders (because of an increase in sick days and a reduction in productivity) are significantly higher.

Problem statement: Almost a billion Euro per year is spend on depression treatment in the Netherlands, but there is a lack of insight in the actual economic benefits of treatment. While studies have shown that certain treatments are cost-effective and lead to better work outcomes, it is not known what the beneficial effects of depression treatment are on a national level. Measuring the benefits of depression treatment is difficult because there is a lack of information on the economic effects of depression when no treatment takes place. Therefore it is not known what effects are due to treatment en what effects are part of the natural course of depression.

Research question: What are the economic effects of depression treatment in a work context?

Methods: A combination of a Delphi method en the System-Cost Effectiveness model is applied. Professionals whom have sufficient experience with employees with depression and its treatment function as respondents. They receive information on findings in other studies and are asked to estimate the effects of depression treatment on absenteeism and presenteeism (productivity) in the Netherlands. The independent variable is whether or not there is adequate treatment. Dependent variables are the number of sick days and productivity. Furthermore, respondents are asked to estimate the distribution of depression severity and the rate of adequate treatment. They estimate these effects based on experience within their own patient population. N=37.

Results: There is no significant effect of depression treatment on the number of sick days. There is a significant positive relationship between depression treatment and productivity. Furthermore a significant effect is found between *depression severity* and the *rate of adequate treatment*.

Discussion: The lack of a significant effect between treatment and the number of sick days can be caused by national regulation that protects the employee, practitioners who feel that absence of work is beneficial, methodological issues (including a low number of respondents) or employees with the lowest amount of sick days who do not have contact with respondents.
The positive relationship between adequate treatment and productivity was expected. Most of the national economic benefits are yielded through increased productivity. In total this accumulates up to €436 million in economic benefits per year under conservative assumptions.
The rate of adequate treatment varies between 50,7% (mild) and 77,6% (severe) depending on depression severity. The more severe the depression, the more likely it was that the employee would receive adequate treatment ($p<0.05$).
Main limitation is uncertainness on validity and reliability of the data. Further studies are required to strengthen confidence in any conclusions.

Conclusion: The two main accomplishments in this thesis are the development of a method to differentiate between the effects of adequate treatment compared to no (adequate) treatment, and arriving at a concrete number for the current economic benefits of depression treatment. (€436 million). Furthermore, the reasons for the large portion of inadequate treatment should be explored. If all employees would receive adequate treatment, the benefits of depression treatment would rise to €653 million annually. A final recommendation that was mentioned repeatedly by respondents is that the focus on work resumption within treatment should be stronger. It is worth mentioning that the current economic benefit of €436 million is based on a limited group. It cannot be directly compared to the costs of direct treatment (€966 million). It is promising that the economic benefit within this limited area of work and depression is already responsible for such a large recuperation of the spending on treatment for depression.

List of tables, boxes and figures

Abbreviations

DALY	Disability-Adjusted Life-Year
DSM	Diagnostic and statistics model for mental disorders
GDP	Gross Domestic Product
HCE	Health care expenditure
NedKAD	Nederlands Kenniscentrum Angst en Depressie (Dutch knowledge centre on fear and depression)
OECD	Organization for Economic Cooperation and Development
QALY	Quality-Adjusted Life-Year
QoL	Quality of Life
WHO	World Health Organization
UWV	Uitvoeringsinstituut Werknemersverzekeringen (Executive institute for employee insurances)

Table of Contents

1. Introduction – The societal value of health

This thesis is about the economic value of depression treatment in the Netherlands. Before we progress it is important to understand why and in what manner health is considered valuable (chapter 1.1.) and to elaborate on the concept and effects of mental health care (chapter 1.2). When this is clear a specific research question can be constructed (chapter 1.3).

1.1 Health – Why so valuable?

> ***"The greatest wealth is health" ~ Virgil***

Good health is widely considered to be one of the cornerstones for a long and fulfilling life. Proverbs such as "you can't put a price on health" are regarded common sense. Good health and general well-being allows us to do what we want, when we want. Whether that is work, travelling, or any other activity. Health is pivotal for a high quality of life.

However, merely defining the concept of *health* has been the topic of much debate. The classic definition of health is constructed by the World Health Organization (WHO):

> **"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" ~ World Health Organization (1948)**

Although there is some criticism on the definition (for example, some claim that better describes the concept *happiness* than *health* (Saracci, 1997)), it is generally accepted as the reigning paradigm.

Because good health is perceived to be so important, a lack of good health is considered a great burden. First and foremost because ill-health interferes with our daily functioning. It has negative physical, emotional and mental consequences. We take less pleasure in our daily activities and our quality of life (QoL) drops (Weehuizen, 2008). The value that we attribute to health because it reduces our QoL is referred to as the intrinsic value of health. We value health for its own sake (and not because it can be traded in for something else, as is the case with money for example).

There is however, a second effect of poor health that has severe negative consequences. In general, each of us participates and contributes to society. As our health worsens this becomes increasingly difficult. This is noticeable in many life-areas and one of these areas is work.

Poor health interferes with the ability to perform well at work. It causes sickness related absence and a drop in productivity in a variety of sectors (Lerner & Henke, 2008). In doing so, it reduces the economic contribution to organizations and ultimately to society as a whole. In more economic terms, poor health reduces the human capital in a society and results in a diminished economic contribution. This is consistent with findings from Nobel prize winner Fogel, who found that the state of a nation's health is related to its economic growth (Fogel, 1994, 2004; Well,

2007). This economic contribution to society represents the extrinsic value of health. It is about the instrumental value of health. Or in other words, extrinsic value is not about the value of health itself, but rather it is based on the other things for which health can be used. This will be referred to as the extrinsic value of health (Box 1.1).

Box 1.1 – The intrinsic and extrinsic value of health

- **Intrinsic:** The value we attribute to health for its own sake because of its "inherent qualities rather than because of any benefit those objects offer them" (Sagoff, 2009, p. 643).
- **Extrinsic:** "[Extrinsic values] are those that contribute to productivity and can, at least in principle, be measured in monetary terms" (Herrman, Saxena, & Moodie, 2005, p. 56). Also known as *material value* or *instrumental value*.

Because of the severe negative consequences of poor health, governments and citizens are willing to spend massive resources on a healthcare system that is accessible and reliable, and provides high-quality care. In 2011, €90 billion, or 14,9% of the Gross Domestic Product (GDP), was invested in the Dutch healthcare system (CBS Statline, 2012). While a more narrow definition of health care expenditure (HCE) is often used for international comparisons, there is a general consensus that practically all developed countries dedicate a significant portion of their public spending on health care (Organisation for Economic Cooperation and Development, 2013b).

Because of numerous demographic, technological and societal developments[1] there is a general expectation that HCE will continue to rise (both absolute and relative to GDP) in the foreseeable future (Idenburg, van Schaik, & Zuiderveld, 2010). Increased HCE is a global problem which has ignited a discussion on the sustainability of healthcare systems worldwide[2] (Thomson, Foubister, & Mossialos, 2009).

Because of these developments, there is increasing pressure on the healthcare sector to demonstrate cost-effectiveness. However, demonstrating cost-effectiveness is difficult in a sector where the main performance outcome is such an intangible and abstract concept as *health*. Quantifying health gains is problematic and according to some even unethical (Cohen, 1983).

Despite these objections several reports have been published, advocating that in order to maintain the current quality of health care only a certain amount of money should be spend per gained Quality-Adjusted Life-Year (QALY – see Box 1.2.) (Mastenbroek & Doeschot, 2012). Treatments that fail to meet the selected criteria should not be reimbursed.

[1] Such as an aging population, increasing frequency of complex and chronic illnesses, the medicalization of society, and the cost of the development and construction of new medical health care technologies.
[2] Other related causes for the sustainability discussion are a shortage in health care professionals, changing societal norms and values regarding medicalization, increased frequency of co-morbidity, and widening differences in health between socio-economic groups (Idenburg et al., 2010)

Box 1.2. – Defining a QALY

A QALY stands for Quality Adjusted Life-Year. It takes both the quantity and quality of remaining life into consideration. For example one year lived in perfect health is equal to one QALY. Three years lived in a health state equal to 50% of perfect health is 1,5 QALY. The health state is often measured through a subjective rating scale (Random Guess) or by questionnaires that ask respondents how much life they would be willing to give up in order to avoid living in a certain physical state.

In the Netherlands this discussion led to a report which advocated that the threshold for care should be set at €80.000 per gained QALY Raad voor de Volksgezondheid en Zorg (2006). The discussion reached new heights when medicine for Fabry disease (College voor Zorgverzekeringen, 2012a) and Pompe disease (College voor Zorgverzekeringen, 2012b) would no longer be reimbursed because they did not meet cost-effective criteria[3]. This led to a public debate and eventually new guidelines were set up in which further exceptions for the €80.000 per QALY guideline were specified.

Within this discussion the emphasis lies on the intrinsic worth of health (for example, as we just saw the Raad voor de Volksgezondheid en Zorg estimated the worth of one QALY to be €80.000) and the potential economic contribution of individuals (the extrinsic value of care) [4] is often forgotten or ignored.

Ignoring the extrinsic value leads to a skewed discussion on the cost-effectiveness of health. Any discussion on the amount of (economic) resources we are willing to spend should take the possible economic benefits into account. However, as we just saw, this is often not the case.

This is particularly true for mental health. The effects of mental disorders are often less visible than those of somatic diseases, but their consequences on the QoL and on the societal participation are in many cases equally severe.

This chapter described the importance of health. It made a distinction between the value that we attributed to health for its own sake (the intrinsic value of health) and the value of health because of its effects on other areas of life such as work participation (the extrinsic value of health). Subchapter 1.2 will focus on mental health and mental disorders and their societal effects.

[3] Treatment costs were very high because of the rarity of the diseases. Cost-effectiveness for Fabry disease was found to be €3,3 million per gained QALY and the cost-effectiveness for Pompe disease was between €0,3 – €0,9 million per QALY (with the classical type of Pompe disease) or around €15 million per QALY (with the non-classical type of Pompe disease)

[4] By no means is it implied that economic benefits should outweigh health gains. It is merely stated that economic benefits are (or should be) a relevant factor in policymaking.

1.2 Mental health and mental disorders – Now more than ever

> **"It's a cruel illness, because you can't see it and you can hide it so well" ~ *Sarah Lancashire***

The previous chapter explained why health is so valuable to individuals and to society. It described the value we intrinsically attribute to health and the value that health represents because it allows us to contribute to society (extrinsic value). This sub-chapter will focus on mental health and its growing importance for society.

1.2.1 Defining mental health

Definitions are necessary to clarify any concept. Especially when dealing with intangible, broad concepts, such as *health* and *mental health*. However, defining mental health is not simple. The World Health Organization (WHO) even goes as far as to say:

> **"From a cross-cultural perspective, it is nearly impossible to define mental health comprehensively" ~ Srinivasa Murthy et al. (2001, p. 5)**

Mental health is defined by society's culture. What is considered abnormal behavior in one society is considered acceptable in another. This study focuses on mental health in the Netherlands. The definition that is most often applied for mental health in developed countries is the one proposed by the WHO. This definition will be applied throughout this thesis.

> **"A state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their communities" (World Health Organization, 2003)**

It is apparent that mental health, much like health in general, is not a simple variable to measure. This definition alone raises numerous questions. What are *normal stresses of life*? What is meant by *recognizing their abilities*? And is *being able to make a contribution to their communities* really a determinant for mental health? These issues, interesting as they may be, are not the focus of this thesis. They are merely mentioned to address the abstract nature of mental health and its multifaceted nature.

1.2.2 Defining mental disorders

In the same sense that one can have poor physical health, one can also have poor mental health. One major cause for mental ill-health is mental disorders. Defining mental disorders is important because care professionals judge and act according to these definitions (Bolton, 2004). Concerning mental disorders the Diagnostic and Statistical Manual of Mental Disorders (abbreviated to *DSM*) is the absolute standard. The most recent version is the DSM-V which was released on May 18, 2013. However, the version that is used most in practice is the revised 4th

edition from 2000 (American Psychiatric Association, 2000)[5]. Mental disorders in the DSM-IV-TR can be defined by the points as shown in Box 1.3.

Box 1.3 – Conditions for a mental disorder (American Psychiatric Association, 2000, p. xxxii)

A. A clinically significant behavioral or psychological syndrome or pattern that occurs in an individual

B. Is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more important areas of functioning) or with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom

C. Must not be merely an expectable and culturally sanctioned response to a particular event, for example, the death of a loved one

D. A manifestation of a behavioral, psychological, or biological dysfunction in the individual

E. Neither deviant behavior (e.g., political, religious, or sexual) nor conflicts that are primarily between the individual and society are mental disorders unless the deviance or conflict is a symptom of a dysfunction in the individual

Other considerations

F. No definition adequately specifies precise boundaries for the concept of "mental disorder"

G. The concept of mental disorder)like many other concepts in medicine and science) lacks a consistent operational definition that covers all situations

In the same manual however, it is also stated that "*… although this manual provides a classification of mental disorders, it must be admitted that no definition adequately specifies precise boundaries for the concept of 'mental disorder.*'" (American Psychiatric Association, 2000, p. xxxi). So while this definition is important, it remains crucial to focus on the individual patient and his or her specific situation.

1.2.3 Stigma

For a long time, mental disorders were not recognized as serious health issues. People with mental disorders suffered from stigmatization and had trouble finding their place in society (Srinivasa Murthy et al., 2001). Stigmatization can be defined or explained in a variety of manners (Brohan, Slade, Clement, & Thornicroft, 2010) but in essence it refers to problems in knowledge (ignorance), attitudes (prejudice), and behavior (discrimination) (Thornicroft, Rose,

[5] The two editions are mostly similar (although the latest edition has caused some turmoil on a number of points). For the purpose of this study the DSM-IV-TR edition will be applied since it is the edition that is used by most practitioners. When the two editions differ this will be specified.

Kassam, & Sartorius, 2007). Although perception and awareness of the problem have changed in the last decade, stigmatization of patients with mental disorders still takes place in the Netherlands (Stienstra & Bruins, 2008) and in other developed countries (see table 1.1)

Patients suffering from mental disorders may not seek treatment because of fear for stigmatization. Similarly the mental healthcare sector must continuously defend its interests by showing the severe negative effects of mental disorders and the effectiveness of treatment.

Table 1.1

Stigma is still widespread, but people know mental illness can be treated (Organisation for Economic Cooperation and Development, 2012, p. 33)

Proportion of people who totally agree or tend to agree to a number of attitudinal questions, according to the level of mental health of the respondent (severe/moderate/no mental disorder)

Mental health status of the respondent	People with mental health problems constitute a danger to others (2005)				It is difficult to talk to someone with a significant mental health problem (2010)				People with mental health problems never recover (2006)			
	Severe	**Moderate**	**None**	**Total**	**Severe**	**Moderate**	**None**	**Total**	**Severe**	**Moderate**	**None**	**Total**
Austria	15,8	23,6	34,6	32,4	34,1	29,8	25,8	27,0	25,8	19,8	24,5	23,9
Belgium	35,3	26,7	30,9	30,9	37,0	29,5	21,7	23,8	24,0	28,1	18,1	19,1
Denmark	33,3	38,4	46,3	44,5	30,6	22,0	20,5	21,3	16,7	15,3	17.0	16,8
Netherlands	18.9	20,0	26,6	25,4	13,0	25,0	15,8	17,0	13,5	12,9	13,4	13,3
Sweden	55,3	51,0	56,7	55,9	18,9	18,8	13,1	14,4	18,8	18,4	13,7	14,7
United Kingdom	36,1	30,2	43,3	41,7	23,9	17,6	21,3	20,8	19,5	11,1	16,1	15,8
Average (21)	**32,5**	**31,7**	**39,7**	**38,5**	**26,2**	**23,8**	**19,7**	**20,7**	**19,7**	**17,6**	**17,1**	**17,3**
Standard deviation	*(14,2)*	*(11,4)*	*(11,1)*	*(11,1)*	*(9,3)*	*(5,2)*	*(4,5)*	*(4,5)*	*(4,6)*	*(6,1)*	*(4,0)*	*(3,8)*

Note: The average refers to all 21 countries covered in the Eurobarometer.

Source: OECD compilation based on Eurobarometer 2005m and 2010.

1.2.4 Mental disorders: Prevalence, burden and cost

Stigmatization occurs even though mental disorders are very common and prevalent throughout all layers of society (de Graaf, ten Have, & van Dorsselaer, 2010). The Organization for Economic Co-operation and Development (OECD), reviewed multiple epidemiological studies and found that at any single point in time around 5% of the working-age population have a severe mental disorder (SMD), and another 15% have a common mental disorder (CMD) (Organisation for Economic Cooperation and Development, 2012). In another study that focused exclusively on the Netherlands, the lifetime prevalence of mental disorders in the population was a staggering 42,7%. The 12-month prevalence of mental disorders in the Dutch population is 18,0% (de Graaf et al., 2010).

So prevalence throughout society is high, but what about the burden that comes with mental disorders? Is the burden of mental disorders on individuals and society really that serious or is its significance exaggerated?

Studies indicate that is a very serious issue with far reaching consequences. Mental disorders are responsible for a large portion of the loss of disability adjusted life years (DALY – see box 1.4).

Box 1.4 – Defining a DALY

The DALY stands for a Disability-Adjusted Life-Year. It expresses years of life lost to premature death and years lived with a disability of specified severity and duration. One DALY is thus one lost year of healthy life (Murray & Lopez, 1996). It is the opposite of a QALY.

In high income countries, such as the Netherlands, unipolar depressive disorders are responsible for 8,2% of all DALY's. Contributing more DALY's than any other disease (World Health Organization, 2008, p. 44). Mental disorders are also a major part of the total costs in Dutch health care. Over one fifth off all medical costs (21,4% or €15,9 billion per year) is spent on mental disorders (Slobbe, Smit, Groen, Poos, & Kommer, 2011). In low and middle income countries mental disorders are the cause of 25,3% and 33,5% of all years lived with a disease related disability (Board, 2012).

The prevalence of mental disorders and its burden on health are very high. However, as is discussed earlier there are other indirect effects that cannot be forgotten in any discussion on the costs and benefits of mental health.

1.2.5 Indirect costs

There is no universally applied definition on the exact meaning of indirect costs. Generally it covers a wide range of aspects that are attributable to health problems. Among others, it includes aspects such as lost working days and lost life years due to premature death (Thomas & Morris, 2003), reduced productivity while at work (known as presenteeism) (Goetzel et al., 2004), and negative effects on education, housing, criminal justice, and social security systems (Knapp, 2003). In other words indirect costs in the field of health care can be defined as all the costs and negative effects that are related to health problems but that are not the direct medical treatment costs. These indirect costs can both be short- or long-term, and can be on the individual or societal level.

The wide variety and intangibility of some of these costs are difficult to measure in a reliable and valid manner. There are however, strong indications that the indirect costs of mental disorders are significantly higher than the direct medical costs of treatment (Organisation for Economic Cooperation and Development, 2012, p. 18). Conservative estimates put the total costs

(including both direct costs for treatment and indirect costs) of mental disorders at 3-4% of the gross domestic product (GDP) in the European Union (World Health Organization, 2007). The total economic cost (based on sick days and productivity) of all mental disorders in the Netherlands is estimated to be €2.7 billion annually (de Graaf, Tuithof, Van Dorsselaer, & Ten Have, 2011b).

From these numbers it should be clear that the burden on society is significant. Both from a health and an economic perspective.

Another interesting argument is that mental ill-health leads to a diminished experienced utility. As Weehuizen (2008) states:

> **"It is hard to enjoy your nice car and your fancy TV-set when you're depressed. If GDP growth would be 'corrected' for the loss of actual experienced utility due to mental problems, the resulting utility growth curve for the past decades might look quite a bit less impressive" ~ Weehuizen (2008, p. 6)**

To summarize, good mental health is a prerequisite for an individual's quality of life (QoL) and from a societal perspective it is a necessary component that has the potential to generate benefits such as a highly educated workforce, improved public safety, and increased productivity.

Thus, the high prevalence of mental disorders can cause severe negative effects on individuals and on society. An effective mental healthcare system that can prevent or treat mental disorders successfully has the potential to gain enormous benefits but measuring and quantifying these effects remains a challenge. A challenge that has to be met in order to convince the government and the public perception of the value the mental health care holds.

This chapter described the importance and the major societal effects of (poor) mental health. In the following chapter the framework and the research questions of this thesis will be set out.

1.3 Problem Statement – How does depression treatment affect work?

> **"*If I had one hour to save the world, I would spend 55 minutes defining the problem and only five minutes finding the solution*" ~ Unknown***

The previous section gave an introduction on the importance of health, and in particular on mental health. Not merely for the importance for an individual's quality of life, but also the importance for society through economic effects. The following section describes the current situation, the associated problem and the general research questions for this thesis.

1.3.1 Context

The mental healthcare sector has long been considered a *black box*. Resources were put in, but it was unclear what results came out. In 2008 a program was started for Routine Outcome

Monitoring (ROM) to remedy the situation (Laane & Luijk, 2012). While initiatives to create more transparency can only be encouraged, information on the actual effects of mental health care are still scarce. Because there is a lack of scientifically valid information on the effectiveness of mental health care, the discussion often centers on costs.

Furthermore, as we saw earlier, health care budgets are rising fast and the costs for the mental healthcare sector have risen fastest of all (Bijenhof, Folkertsma, Kommer, Slobbe, & Polder, 2013)[6]. Because of the sizable consequences of ill-health, and in particular those of mental ill-health, it is natural that society is willing to spend a significant portion of its budget on (mental) health care. However, with the European recession still taking place as a reinforcing factor, the government's focus is more than ever on costs.

While this is not by definition troublesome (it creates incentives for innovation and increases cost-effectiveness), continuous budget cuts without an underlying rationale may ultimately cost more than what was saved.

In order to have an appropriate public discussion on the cost of mental health care, there is a need for information on its effectiveness and societal benefits. There is very little knowledge on the positive effects of mental health care. Although the effectiveness of mental health care has been shown repeatedly (among many others (Fournier et al., 2010)), it has proved difficult to actually quantify the effects of mental health care on both direct health outcomes and on indirect outcomes such as job performance, education level, or public safety. Without accurate knowledge on the size of these effects it is not possible to make a well-informed decision on the effective allocation of resources.

There are a number of reasons for the lack of knowledge on mental health care benefits.

1. The topic of mental disorders has only been getting serious attention since the 1996 publication of the World Health Organization showed that mental disorders were among the main causes for the global burden of disease (Murray & Lopez, 1996). This is a relatively short period of time compared to other fields of research.
2. It is unethical to conduct a study using an actual experimental setup in which participants/patients are randomly divided among an experimental group that does receive treatment and a control group that does not receive treatment. As a result many studies compare new treatments to *treatment as usual* and the natural course of the mental disorder (the effects if treatment would not occur) is unknown.
3. There are methodological difficulties in measuring the indirect effects of mental disorders on areas such as work, public safety, education, or somatic diseases.

1.3.2 Research goal

Achieving insight in the aforementioned benefits within the Netherlands is the main goal of this thesis. There is strong political pressure on mental health care providers to justify the resources

[6] Although a recent study has argued that the costs of mental health care have not risen faster than those of health care in general. According to the author the discrepancy exists because early calculations included less figures than current calculations (Heijnen, 2013).

that are allocated to them. Due to the lack of knowledge they are often unable to do so. Even though there is a widespread conviction that the benefits actually outweigh the costs. Figures on treatment effects are very relevant and will be valuable for the political discussion.

1.3.3 Focus on depression and work

Ideally, this thesis would chart all societal benefits of mental health care. However, because of the large number of affected areas and the many mental disorders this is a utopia. Boundaries have to be set to set up a framework in which a concrete research question can be drafted.

There are currently over 400 mental disorders listed in the most recent version of the DSM-IV-TR (American Psychiatric Association, 2000). It should be mentioned that the successor, the DSM-V, is now available. However, it is not yet in full use. The mental disorder with the highest prevalence in the Dutch population is depression (de Graaf et al., 2010). The total costs of direct treatment are estimated to be €966 million per year. Furthermore depression has a significant influence on quality of life and is expected to be the single greatest cause of the global burden of disease in 2020 (Murray & Lopez, 1996). Patients suffering from depression are still facing strong stigmatization in society (Jorm & Reavley, 2013; McNair, Highet, Hickie, & Davenport, 2002), and finally, depression among employees is a major cause for sick days and reduced productivity and is responsible for €1.8 billion in economic costs for society (de Graaf, Tuithof, Van Dorsselaer, & Ten Have, 2011a). With these factors in mind, it is natural to choose depression as the key area for further study.

While 400 mental disorders to study seems to be an enormous amount, the number of possible areas that are affected by mental disorders is virtually unlimited. Mental disorders practically influence every aspect of our life. Whether it is work (Hoedeman & van de Pavert, 2012), somatic health (Seldenrijk, Van Hout, Van Marwijk, Diamant, & Penninx, 2011), quality of life, education, our environment, public safety, substance abuse, or any other aspect of our daily live. Everything we do is to some degree influenced by our state of mind.

However, the current political climate is focused on economical arguments, so it makes sense to take an economical perspective. The area of work in relationship with depression is therefore chosen as the topic of interest within this thesis. By no means does this imply that the economical effects of mental health care are considered more important than a patient's health outcomes. It merely implies that economic arguments are one of several relevant arguments in the political discussion of mental health.

1.3.4 Research objective

The main objective is to gain insight in the effects of depression on work within the Netherlands. This should lead to an overview of the benefits of depression care and helps to balance out the discussion on the costs of mental health care. Next to the practical value of this research, it also fills the gap in literature on the benefits of depression care in the Netherlands

1.4 Research questions

Based on the previous section, it is now possible to formulate the main research question:

What are the economic effects of **depression treatment** in **a work context**?

There are a two elements in the research question that need further specification.

Depression treatment entails all treatment for depression. It does not focus exclusively on specialist mental health care, but also includes general health care practices (such as GPs) and all other forms of treatment that focus on depression.

A work context implies that only those effects that directly affect work are included. Examples are the number of sick days, employee productivity and job turnover. Other effects such as the impact on ones quality of life are excluded.

Studies on depression usually focus on two broad areas of research:

- Is one treatment more effective than the other?
- What are the current costs of depression.

A focus on the benefits that depression treatment provides is surprisingly rare. In other words, while **there is an abundance of research on the current (negative) effects and cost of depression**, **there is a complete lack of knowledge on the actual benefits of depression treatment.**

However, as it is, the research question merely provides a general direction. More specific question are required.

1.4.1 Sub-questions

A lot of research has been done on the effects of depression and on the effectiveness of treatments although the number of publications on the effects of depression on work are more limited. Since this is our area of interest, the first question is:

1. **What is known about the effect of depression on work outcomes?**

There are many studies that focus on the current cost of depression. Because the focus of this thesis is not on the current costs, but rather on the current gained benefits we need to gain insight in the effects of depression treatment. Knowledge is required on the different effects between employees who do receive (effective) depression treatment and employees who do not receive treatment. These differences can tell us something on the value of depression treatment. Therefore two question arise.

2. **What is known about the consequences of depression on work outcomes when left untreated?**
3. **What is known about the consequences of depression on work outcomes when treated properly?**

Besides an overview of what *is* known, it is equally important to know what is *not known*. Since this thesis is done in cooperation with the (Dutch) branch organization for mental health care (*GGZ Nederland*), there is a wide range of professionals available who might be able to give an informed estimates on any gaps in knowledge. Furthermore, it is important to distinguish proper treatment with inadequate treatment. The operationalization will be done in the method section.

4. **What is <u>not</u> known about the consequences of depression on work outcomes?**
5. **Is it possible to give an accurate estimate on those gaps in literature?**

If all sub-questions can be answered then it will provide enough data to answer the general research question.

An overview of the research question and related sub-questions is shown in Box 1.5.

Box 1.5 – Research Question and sub-questions

Research Question:

- **What are the economic effects of depression treatment in a work context?**

Sub-questions:

1. **What is known about the effect of depression on work outcomes?**
2. **What is known about the consequences of depression on work outcomes when left untreated?**
3. **What is known about the consequences of depression on work outcomes when treated properly?**
4. **What is <u>not</u> known about the consequences of depression on work outcomes?**
5. **Is it possible to give an accurate estimate on those gaps in literature?**

This section described the research goals and research questions. The next chapter will give an overview of literature related to these questions.

2. Theoretical framework

> ***"Our progress as a nation can be no swifter than our progress in education. The human mind is our fundamental resource" ~ John F. Kennedy***

The following chapter gives an overview of the available literature on the key ideas that were outlined in the previous chapters. This will provide an overview of what is known on the relationship between depression, depression treatment and work.

The literature review will start off with section 2.1 on finding relevant literature. Chapter 2.2 is about the relationship between mental disorders and work. Section 2.3 will focus on the clinical aspect of depression, while 2.4 will focus on the costs of depression. Finally section 2.5 and 2.6 will give an overview of what is known and unknown.

2.1 Finding relevant literature

Literature was found using data from several sources. Most notably Scopus (which includes all major peer-reviewed science, medical, and technology titles) Google Scholar, Web-of-Science and the library of the University of Twente.

Keywords that were used are *depressi**, *producti**, *"reduced producti*", Randomized control trials (or RCT)*, *placebo*, *waiting list*, *presenteeism*, *absenteeism*, *cost-of-illness*, "*sick days"*, *labor, labor, "labor force", "labor force", "wor* population", "human capital", "resource-based view", "mental capital", "mental disorder", "mental health", indirect costs, disability*, *severity*, *treatment, "no treatment", "no intervention", " job loss", "job turnover", "work performance", "job performance", "employee"* and *"work outcomes"*. Slight variations of these keywords were also used as well as combinations of multiple terms. Furthermore, the references of each paper were checked for relevance and external institutions (such as 'Trimbos Instituut", UWV, NedKAP, GGZ Nederland, WHO, OECD, and others) were hand-sought for other relevant research. Special consideration was given to meta-studies such as Cochrane reviews, which are internationally considered to be of the highest standards. Papers were also found through discussion and collaboration with other professionals and researchers. While this thesis does not presume to provide a systematic literature review, an attempt has been made to give a comprehensive review of literature.

2.2 Why mental disorders affect work

Any paper that studies the effects of mental disorders on work should provide a clear explanation on the relationship between these concepts. This chapter will provide the theoretical background for the remainder of the study and will explain why mental disorders affect employees and ultimately an organization's results. The basic assumption within this thesis (which will be explained in further detail below) is that the quality of employees is an important input-source for organizations and that mental disorders directly affect an employee's ability to allocate their skills.

Organizations constantly strive for success. Whether this entails profit, public awareness, or environmental legislation issues. One influential theory that describes how organizations may be more successful than competitors is the resource-based view (RBV). Without diving deeply into the theory, it basically has three key points which organizations should adhere to in order to gain a competitive advantage. (1) Identify the firm's potential key resources. (2) Evaluate whether these resources are valuable, rare, inimitable, and non-substitutable. (3) Care and protect the resources that fulfill these conditions because they can improve organizational performance (Wernerfelt, 1984). There is strong evidence that supports the potential impact of the resource-based view (Crook, Ketchen Jr, Combs, & Todd, 2008).

One *resource* that has the potential to be valuable, rare, inimitable and non-substitutable is an organization's human capital. According to the Organization for Economic Cooperation and Development (OECD) human capital consists of the "***knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.***" (Healy & Côté, 2001, p. 18), although it is worth mentioning that there are a number of different interpretations (Stroombergen, Rose, & Nana, 2002). The main strength of the OECD's definition however, is that it approaches human capital as a multi-faceted concept instead of a one-dimensional concept (Klomp, 2013). Organizations enhance their human capital by recruiting and selecting talented employees or by training and developing their employees and human capital is strongly related with organizational performance (Crook, Todd, Combs, Woehr, & Ketchen, 2011).

Mental disorders affect human capital in two ways. They affect the accumulation of new abilities and they affect the use of existing abilities.

Research shows that mental disorders in childhood affect the accumulation of human capital (Eisenberg, Golberstein, & Hunt, 2009). In other words, people with mental disorders develop less knowledge, skills, competencies and attributes than those without mental disorders (E. R. Berndt et al., 2000; Tamura, 2006). With current practices of *lifelong learning* (Collins, 2009), this is more problematic than ever.

However, it does not explain how mental disorders affect the knowledge, skills, competencies and attributes that employees have already accumulated at an earlier stage in life.

Having accumulated certain skills and abilities at some point in life is a necessary condition, but not sufficient. An individual (or more specifically in this case: an employee) has to be able to effectively use his knowledge, skills, and abilities.

Research suggests that effectively utilizing existing knowledge, skills, and abilities is a separate quality. The quality to allocate certain knowledge, skills, competencies, abilities and attributes in an effective manner is labeled *mental capital*.

In other words:

> **"[Mental capital] determines the formation, optimal allocation and effective use of human capital. A high level of human capital with a low level of mental capital will not have much productive effect, just as a high level of physical capital does not have much effect without the necessary human capital to operate it and thereby realize its productive potential" (Weehuizen, 2008, p. 159).**

Another description is given by Cooper:

> **[Mental capital is] the totality of an individual's cognitive and emotional resources, including their cognitive capability, flexibility and efficiency of learning, emotional intelligence in the face of stress. The extent of an individual's resources reflects his/her basic endowment (genes and early biological programming), and their experiences and education, which take place throughout the life course (C.L. Cooper, Field, Jenkins, Goswami, & Sahakian, 2010, p. 3).**

Mental disorders have already been shown to have negative effects on other forms of capital (such as social capital (De Silva, McKenzie, Harpham, & Huttly, 2005)) and there are strong indications that mental disorders affect mental capital (Weehuizen, 2008). For example, depression is associated with a loss of concentration, reduced cognitive performance, tendency of social isolation and loss of intrinsic motivation (American Psychiatric Association, 2000). These are all factors that facilitate the effective use of our innate and learned abilities (Weehuizen, 2008).

These effects are even more prominent in today's society because the nature of work is shifting from industrial to knowledge-based, and from lifelong contracts to short flexible contracts (C. L. Cooper, 2009). The necessity for an intrinsic motivation to allocate internal resources effectively is higher in knowledge-based work than in industrial work (in which there is often a certain pace that is forced upon the employees through technology).

Concluding, mental disorders affect employees' mental capital and as a result they are not able to effectively utilize their own strengths (Gao, Gill, Schmidt, & Pratt, 2010). This reduces an organization's human capital, among others because of lower employee productivity (Shaw, Park, & Kim, 2013), and ultimately a firm's performance (I. M. Wang, Shieh, & Wang, 2008). Interventions that focus on mental health problems can therefore be seen as investments in human capital (P. S. Wang, Simon, & Kessler, 2008) and indirectly in firm performance.

Indeed, the loss of human capital results in productivity losses through absenteeism (increased sick days) and presenteeism (reduction in an employees' productivity). Often representing higher costs, than the costs for direct medical treatment (DuPont et al., 1996; R. C. Kessler et al., 2008; Knapp, 2003; Loeppke et al., 2009; Thomas & Morris, 2003; P. S. Wang et al., 2008). In a review of all internationally published cost-of-illness studies, it was found that the economic

consequences of mental disorders far outweigh the direct medical costs for treatment (Hu, 2006).

Most of these studies focus solely on absenteeism and presenteeism, but employees' with mental disorders can also become so disabled that they are unable to work. The most common reason for disability benefits is a psychological disorder (Gurmankin Levy, Maselko, Bauer, Richman, & Kubzansky, 2007).

With the theory and relationship between mental disorders and work explained we can now focus on depression.

2.3 Depression

> **"*Mild depression is a gradual and sometimes permanent thing that undermines people the way rust weakens iron*" ~ Andrew Solomon**

The previous section described the manner in which mental disorders affect work. The current section focuses on one mental disorder in particular, namely *depression*. Its effects, the prevalence among the (working) population, severity, associated costs, and effectiveness of treatment are explored.

Three of the sub-questions are explored here. These three are:

1. **What is known about the effect of depression on work outcomes?**
2. **What is known about the consequences of depression on work outcomes when left untreated?**
3. **What is known about the consequences of depression on work outcomes when treated properly?**

Before actually addressing these questions, some information is gathered to further clarify the concept of depression and its impact.

2.3.1 What is depression

The diagnosis of depression is set in fixed standards and criteria. In the Netherlands (and in the majority of developed countries) the *Diagnostic and Statistical Model of Mental Disorders* (DSM) is used for defining mental disorders. The most used edition is a text revision of the fourth edition. It is commonly referred to as the *DSM-IV-TR*[7].

The DSM-IV-TR lists several criteria that have to be met in order to qualify for the diagnosis *depression*. These are depicted in Box 2.1.

[7] Recently, the DSM-V has been released. However, its usage is limited as of yet. Therefore the criteria from the DSM-IV-TR are used in this thesis.

Box 2.1 - Criteria for depression

A. At least five of the following symptoms have been present during the same 2-week period and represent a change from previous functioning: at least one of the symptoms is either 1) depressed mood or 2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day, as indicated either by subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful)
2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated either by subjective account or observation made by others)
3. Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day
4. Insomnia or hypersomnia nearly every day
5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down)
6. Fatigue or loss of energy nearly every day
7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick)
8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)
9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or specific plan for committing suicide

B. The symptoms do not meet criteria for a mixed episode.

C. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

D. The symptoms are not due to the direct physiological effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition (e.g., hypothyroidism).

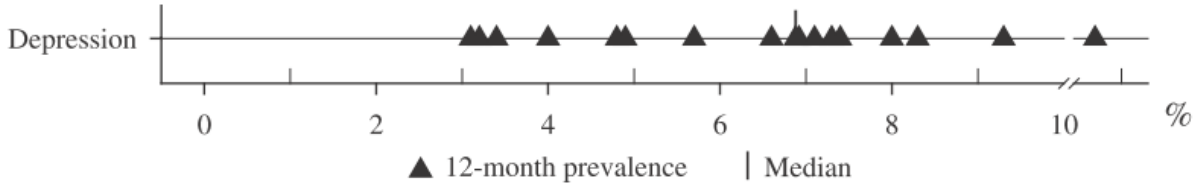
E. The symptoms are not better accounted for by bereavement, i.e., after the loss of a loved one, the symptoms persist for longer than 2 months or are characterized by marked functional impairment, morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms, or psychomotor retardation.

2.3.2 Prevalence of depression

International

Depression is a common mental disorder and is prevalent in a relatively large portion of the general population. While international findings on the 12-month prevalence vary (from 2,9% in Japan (Kawakami et al., 2005) to 9,3% in Finland (Lindeman et al., 2000)). Wittchen and Jacobi (2005) examined all national studies on the 12-month prevalence of depression they could find, and found a concentration of data around 6,9% (see figure 2.1). Each triangle represents one study. This corresponds with other studies that usually find a 12-month prevalence between 6-8% (Pirkola et al., 2005).

Figure 2.1 - Distribution and medians of published European 12-month prevalence estimates of mental disorders (Wittchen & Jacobi, 2005, p.365).



Depression is less common in the working population than in the general population (Organisation for Economic Cooperation and Development, 2012). Furthermore full-time employees are less often depressed than part-time employees, and although there are some significant differences between occupational categories (12-month prevalence among architects and engineers of 4,3% to 10,8% for employees in personal care and service (Substance Abuse and Mental Health Services Administration (SAMHSA) OoASO, 2007)), the disorder is widespread through all layers of society.

Furthermore there are indications that the global recession has given rise to an increase in the prevalence of depression in the working population. A study in Alberta (US) found that the 12-month prevalence of depression before September 1, 2008 was significantly lower than the 12 month prevalence at October 30, 2009. Respectively from 5,1% to 7,6% (J. Wang et al., 2010).

Netherlands

In the Netherlands the leading Dutch national longitudinal study that measures mental disorders on a national level, is labeled the ***Ne****therlands* ***Me****ntal Health* ***S****tudy and* ***I****ncidence* ***S****tudy* (NEMESIS). The most recent publication (NEMESIS-II) (de Graaf et al., 2010) studied Dutch mental health between 2007-2009. A third version is in progress which focuses on 2010-2015. Information on the prevalence of depression in the Netherlands is mostly derived from this publication.

In the Dutch population, 18,7% has a depression in their lifetime (de Graaf et al., 2010). The 12-month prevalence is estimated to be at 5,2% in the general population (de Graaf et al., 2010). The prevalence of depression is slightly lower than in other countries, but not exceptionally low.

Based on international findings we would expect the prevalence in the general population to be slightly higher than that within the work population. This is confirmed in a separate study on the same data NEMESIS-II is based on. The 12-month prevalence in the work population is 4,2% (de Graaf et al., 2011a). Earlier studies in the Netherlands on the 12-month prevalence had slightly deviating results. A study based on the Maastricht Cohort Study[8] found that 3,3% of the working population had a (sub)clinical[9] depression recently (in the past seven days) (Andrea, Bültmann,

[8] A study that has been running since 1998. Originally designed to measure the short-term effects of (general) health on work, but as follow-up time increased other issues such as the origin of depression in relation to the work-environment became relevant.
[9] A subclinical depression fullfills most, but not all of the necessary criteria for the diagnosis depression

van Amelsvoort, & Kant, 2009). While an earlier study by the same main author found that the 12-month prevalence in the workforce was 7,1% for males and 6,2% for females (Andrea et al., 2004).

While there are slight variations between studies, the 4,2% of 12-month prevalence within the working population which was found by the NEMESIS-II study is most relevant and methodologically sound (de Graaf et al., 2011a).

2.3.3 Natural course and duration

It is more difficult than one would imagine to determine the natural course and duration of mental disorders. Ideally (at least from a scientific point of view) one would setup an experiment in which a representative group of people with starting episodes of a major depressive disorder would be divided into a control group in which no treatment whatsoever would take place and an experimental group in which adequate treatment was administered.

However, this approach obviously has ethical objections. Therefore a naturalistic study design is often applied to measure the duration of depression. The main flaw with this method is that self-selection takes place. It is therefore not possible to say if individuals who did not receive treatment are similar in every aspect to the group of individuals that did receive treatment.

With these difficulties in mind, let us review the evidence on the duration of depression.

Stegenga, Kamphuis, King, Nazareth, and Geerlings (2012) followed a group of depressed patients for 39 months. From a group of 1338 respondents, they identified 174 patients with depression which they followed. After 39 months there were 100 patients left. From this group 43% (N=43) was completely remittent since the first measurement after baseline (which was after 6 months). A total of 17% (N=17) had been found to be chronically depressive even after 39 months. The remaining 40% (N=40%) had been intermittent. Occasionally meeting the requirements for depression and occasionally not meeting them. Half of this group (N=20) was currently not depressed at 39 months, while the other half (N=20) was depressed. Most striking from these findings is that while a large portion of respondent recovered (although some were merely intermittent) rather fast (58% after six months), almost 20% was chronically depressed.

A study in the Netherlands found similar results. Exactly 50% of the total group (N=250) recovered within three months. 63% recovered within 6 months and 76% recovered within twelve months. Similar to the previous study, 20% did not recover within a time-span of 24 months (Spijker et al., 2002).

A third study followed patients for over 23 years. The research population consisted of people who had their first depressive episode at the start of the study. They found that while about 50% of patients recovered without further episodes, another 15% did not have a single year free of episodes in a 23 year time period (Eaton et al., 2008)!

2.3.4 Treatment

Treatment - international

Depression is a treatable disorder (Fournier et al., 2010). However, there are many studies that find that a large portion of patients receives inadequate treatment (Kessler et al., 2003) or no treatment at all.

Not all depression care is adequate. Adequate treatment is understood as treatment based on the most recent scientific insights. This was illustrated by Kessler et al. (2003) who found that nearly 60% of diagnosed patients with depression did receive treatment, but only 21,7% received adequate treatment (see Table 2.1).

Table 2.1

Treatment and treatment adequacy in the past 12 months in the United States (%) (Kessler et al., 2003, p. 3102)

MDD cases with symptom severity (N=514)						
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**	**P**
Treatment rate						
All sectors	35,2	54,6	61,6	70,5	57,3	,005*
Treatment adequacy						
Specialist mental health care	37,0	61,0	63,5	83,5	64,3	,048*
General medicine	59,2	28,3	42,8	59,4	41,3	,17
Health care	38,4	32,9	43,7	57,6	41,9	,025*
All sectors	12,0	15,5	24,6	39,1	21,7	<0.01*

*Significantly related to symptom severity at the ,05 level, 2 sided test

Health care treatment is defined as making at least one visit for depression treatment in the past 12 months in either the specialty mental health sector or in the GM sector or using psychotropic medications in the past 12 months.

Next to outdated treatment practices, depression also goes completely untreated with many patients. Looking at the United States one study from 1999 found that only 39,9% of those diagnosed with depression received treatment (Zhang, Rost, Fortney, & Smith, 1999). A more recent study in the US found that this percentage had risen to over half (56%) of diagnosed patients Kessler, Merikangas, and Wang (2008)

However, the culture on mental disorders in the Unites States cannot be compared to the culture in Western Europe. Looking closer at home a fairly recent study found that a staggering 77,3% of patients with depressive symptoms in Germany did not consult with a physician (Berner, Kriston, Sitta, & Härter, 2008). Even more remarkable is that even in the category with the most severe symptoms of depression over half of the patients (57,9%) still had no contact with a physician.

Treatment - Netherlands

In the Netherlands, the NEMESIS-II study found that 58,5% of all patients receives some form of treatment for depression (de Graaf et al., 2010). Only 7,9% had an unmet need for care. The remainder of the group had depression, but did not perceive the need for treatment. Most likely this group consisted mainly from individuals with a mild form of depression.

An older study found that 32,8% of people with newly originated major depressive disorder received no professional healthcare (Spijker et al., 2002). It is not possible to compare the two studies because the earlier study focuses on professional health care, while the more recent study focuses on all forms of care, including informal care.

Adequate treatment in the Netherlands is often perceived to be treatment based on the guidelines set in the *Multidiscipline guidelines on depression – second edition* (Spijker et al., 2012) or in the standards set by the Dutch College of General Practitioners (van Weel-Baumgarten et al., 2012). There is no data on the number of professionals that apply these guidelines.

2.3.5 Severity

As with any disease or disorder, depression can vary in severity. However, most studies that focus on mental disorders or depression use a dichotomous scale and create a cut-off point (which is dependent on the measurement tool that is being used) to score 'depression' or 'no depression'. This is a simplification of reality. First of all because the treatment of depression is (co)dependent upon severity (Spijker et al., 2012), and secondly because the indirect economic effects of depression are correlated with severity (Ernst R Berndt et al., 1998).

Therefore, in order to display a realistic picture on the effects of depression and depression treatment, information on the severity distribution can be valuable. There are not many studies on the distribution of depression severity but the ones that were found are listed in table 2.2.

Table 2.2

Distribution of depression severity

Author	Mild (%)	Moderate (%)	Severe (%)	Country
R.C. Kessler et al. (2008)	62%		38%	U.S.
Olsen, Mortensen, and Bech (2004)	37%	29%	34%	Denmark
Spijker et al. (2002)	69.6%		30.4%	Netherlands

International

A study in the United States found that 38% of all respondents with a major depressive disorder in the past 12-months were classified as serious/severe. The remaining 62% was classified as mild and/or moderate (without making a further distinction) (R.C. Kessler et al., 2008).

A Danish study on the general population found a distribution of respectively 37% (mild depression), 29% (moderate depression), and 34% (severe depression) (Olsen et al., 2004).

Netherlands

A study in the Netherlands found that of all people diagnosed with a major depressive disorder 30,4% were classified as severe, and the remaining 69,6% were mild and moderate cases (no further distinction between the two was made).

The results from the study on the Dutch population are supported by other studies, but are over ten years old. Since then there has been a growing concern regarding depression and treatment rates might well have changed. This requires further examination.

2.4 Cost of depression

There are many studies on the cost of depression. Variables that are often measured are the direct treatment costs, lost workdays due to illness (absenteeism), reduced productivity while at work (presenteeism), mortality costs due to suicide, and the number of lost QALYs. In this section an overview of the literature will be given on the cost of depression at a societal level.

Greenberg et al. (2003) found that the total cost of depression in the United States in the year 2000 was over 83 billion dollar. The majority of these costs consisted of workplace costs, namely 51,5 billion (62%). A different study that took place in the US came to the conclusion that production losses due to depression resulted in a loss of 31 billion dollar per year (Stewart, Ricci, Chee, Hahn, & Morganstein, 2003) and 81% of this (>$25 billion) is caused by presenteeism. A Canadian study found similar results and showed that workplace costs are actually 3,5 times higher than direct medical treatment costs. (Lim, Jacobs, Ohinmaa, Schopflocher, & Dewa, 2008). In South-Korea is was estimated the costs of absenteeism are 2957 million dollar, compared to the direct treatment costs of only 152,6 million dollar (Chang, Hong, & Cho, 2012). An Australian study found "...77% of the depression cost was in lost productivity through total or partial inability to carry out normal functions." (Hawthorne, Cheok, Goldney, & Fisher, 2003, p. 371). The general tendency is that the societal costs due to depression are for the majority caused by productivity costs and treatment costs comprise only a smaller (but still significant) portion.

The current cost of depression in the Netherlands has also been studied. The cost of lost production (absenteeism and presenteeism) due to depression was €1.817.692.500 annually (de Graaf et al., 2011a). The total direct costs for the treatment of depression are €966 million (Slobbe et al., 2011). This ratio (about 1:2 regarding direct treatment costs versus indirect productivity costs) is somewhat comparable to the ratios that are found in international literature, although indirect costs (productivity costs) are often even a larger portion of total costs.

While the number of studies on the work-effects of depression on a national scale is limited, there are several studies that focus on the (work-)effects of individual forms of treatment. The findings are summarized.

2.4.1 Absenteeism

When an employee does not show up for work due to sickness it results in lost productivity. This is called absenteeism. The number of absent work days is nine times higher in patients suffering from a major depressive disorder than in a healthy comparison group. The number of missed partial workdays is over ten times as high in those suffering from MDD. This resulted in an annual absenteeism cost of $4405 in persons with MDD (comparison group: $725 per year) for citizens in Korea (Woo et al., 2011).

In a meta-study on the effects of treatment for depression on absenteeism it was found that there were very little relevant studies that actually measured the additional sick days due to depression. And the one study that measured differences between a placebo and a treatment group did not find significant effects. However, several other studies focusing on inter-treatment effects did find significant effects, indicating that treatment indeed does influence the number of sick days significantly (Nieuwenhuijsen et al., 2008).

Research in the Netherlands has shown that on average an employee with major depressive disorder has between 30 and 35 sick days (de Graaf et al., 2011a; Hoedeman & van de Pavert, 2012). Nine times more than the average employee (Hoedeman & van de Pavert, 2012). No distinction is made between severity or treatment status.

2.4.2 Presenteeism

As discussed the cost of depression for society is high. Especially reduced productivity while present at work (better known as presenteeism) is regarded as a major cost source. Presenteeism is “lost productivity that occurs when employees come to work but perform below par due to any kind of illness” (Levin-Epstein, 2005, p. 1). One study found that depressed employees were 7,2 times more likely to experience productivity losses at work than employees without depression (Druss, Schlesinger, & Allen, 2001).

Looking deeper into reduced productivity while at work (presenteeism), depression is highly associated with work limitations in time management, interpersonal and mental functioning, and overall output (Burton, Pransky, Conti, Chen, & Edington, 2004). While most measures of presenteeism are based on self-rating scales, empirical studies also show that workgroups with depression have poorer work performance (Harvey et al., 2011).

Another study made employees rate their own productivity over the past two years on a scale from 1 – 10 (with 1 being lowest and 10 highest). They found that employees with depression rated their productivity at 5,16 on average. Employees who never had depression rated their own productivity at 7,62 (Woo et al., 2011). Indicating that productivity of employees with depression is 22,18% lower than that of employees without depression.

2.4.3 Job retention

Employees with depression are more likely to lose their job than the average employee. One study found that over a six month period 14 percent of employees with dysthymia, 12 percent of persons with major depression, and 15 percent of persons in the group with both dysthymia and major depression had become unemployed. In contrast only two percent of the healthy control group, and only three percent of persons in a rheumatoid arthritis (control) group had become unemployed (Lerner et al., 2004).

2.5 Does depression treatment lead to better work outcomes?

Studying whether depression treatment leads to better work outcomes is preferably done through randomized controlled trials (RCT). Unfortunately the offering of RCTs is very limited. The few RCTs that are available are discussed here.

Wells, Sherbourne, Schoenbaum, and et al. (2000) find that quality improved programs improve one-year job retention compared to *care as usual*.

Schoenbaum et al. (2002) compared an improved quality intervention with care as usual. They found that after six months, patients in the former group had better health outcomes, better quality of life, and higher rate of employment (72% vs. 53%). All results were significant at $p<0.05$.

Ernst R Berndt et al. (1998) divide their research population between a newer generation of antidepressant drug and an older generation antidepressant. However, they do not make a comparison between the two groups. They find that self-assessed work productivity is strongly related to a drop in depression related symptoms.

Simon et al. (2000) randomly divide patients over three forms of drugs. They find that patients with greater clinical improvement were more likely to maintain paid employment ($P=.007$) and reported fewer days missed from work due to illness ($P<.001$). They conclude that recovery from depression is associated with significant reductions in work disability and possible reductions in health care costs.

Burnand, Andreoli, Kolatte, Venturini, and Rosset (2002) compared a combination of clomipramine and psychodynamic psychotherapy with clomipramine alone. Both treatment groups had significant improvement. The combined group did not only have lower direct costs (costs for hospitalization, medicine, etc.), but also lower indirect costs due to the lower number of sick days.

Smit et al. (2006) focused on the prevention of depression. They found patients with a sub-clinical depression and gave the patients in the experimental group a self-help manual. The control group received care as usual[10]. Particularly relevant is the fact that the experimental group had far fewer sick days and increased productivity. The higher costs of treatment were well invested and on average the net gain was €2000 per case.

[10] While the authors did not specify *care as usual,* this probably implies doing nothing since there was not yet a clinical depression.

While valid research on depression and work is scarce, the outcomes point to the fact that depression treatment does lead to better work outcomes.

2.6 What don't we know?

As we have just seen most of these studies search for significant differences. From a health perspective, this is logical. Health professionals are interested in the most (cost-)effective treatment and want to know if there are significant differences and whether or not these differences are clinically relevant.

For an economic question, such as the one in this thesis, merely knowing whether or not differences are significant is insufficient. Information is needed on the effect-size of these differences.

From a health perspective, it is equally natural to compare one treatment to another treatment (often *care as usual*), since researchers want to know which of these is more effective. For our research question however, information is needed on the effects of depression treatment in comparison to *no treatment*. These kind of studies are missing. Or as Donohue and Pincus (2007) state:

> **"we do not know the economic burden of untreated and/or inappropriately treated versus appropriately treated depression" (Donohue & Pincus, 2007)**

In this thesis we will attempt to estimate the value of the missing data. While this will not be an empirical study, it will provide us with a first estimate to build upon.

3. Methods

"Being a scientist means living on the borderline between your competence and your incompetence. If you always feel competent, you aren't doing your job." ~ Carlos Bustamanta

The literature showed that there are several gaps in the current body of knowledge. There is a lack of data on the size of the differences in work-related outcomes between treated and untreated depression. In order to answer the research question, these gaps need to be filled.

Ideally, an empirical study that fulfilled all conditions for scientific research, including a representative sample of the population, random distribution between experimental and control groups, a sufficient time-period, etc. would be conducted. This is often not possible however. There are several practical complications, but the fundamental issue is that it is unethical to provide adequate treatment to a certain group (the experimental group) and to withhold it from another (the control group). This is a common problem and has resulted in many studies that compare new treatments to *care as usual*.

Since we are not searching for the effect of one treatment relative to another, but rather for the effect of treatment on a national level compared to the hypothetical situation of no treatment, a different approach had to be taken. A combination of two methods was devised to achieve this. These were the Delphi method (Linstone, Turoff, & Helmer, 1975) and the Systems Cost-Effectiveness method (Frank, McGuire, Normand, & Goldman, 1999).

The Delphi method was originally devised for predicting trends in technological development, but it has been used for many different functions since then. The main premise behind the Delphi method is an enrichment of results by allowing participants insight into each others' responses and the arguments behind them. They might then choose to alter their answers based on this extra information (Delbecq, Van de Ven, & Gustafson, 1975). In this thesis a variation on that method is used. Respondents still have access to the knowledge and arguments of others, but this knowledge does not come from other respondents, but rather from other studies focusing on similar topics. They are given a brief overview of the most important findings based on existing literature.

The method by Frank et al. (1999) focuses on measuring the effects of a hypothetical situation. In their research they focus on the health gains of depression care. Their hypothetical situation is the following:

One hundred patients all have a similar score on the Hamilton Depression Rating Scale[11]. The respondents are asked to indicate how many of these one hundred patients will have a severe, a

[11] A tool that is commonly used to measure the severity of depression (Hamilton, 1960)

moderate, a mild, or no depression after sixteen weeks of treatment[12]. When respondents have answered, they are given insight into all responses. Then they are allowed to answer ones again. The thought being that the combination of results and numbers will lead to a more accurate answer. This is consistent with recent findings on the wisdom of the crowd' which proposes that judgment of a large group of people is more accurate than the response of any single person. Research suggests that this is true only if the *crowd* consists of respondents who are very familiar with the topic (Kreijveld, 2012).

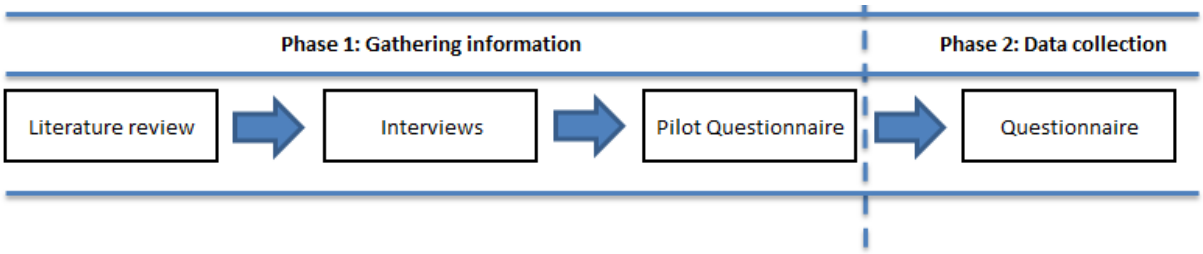
Based on these methods a questionnaire is spread under professionals who have sufficient experience with employees with depression and the effects of (no (adequate)) treatment. A very brief overview will be given per concept to inform the respondents on what is known on each subject in literature and they will then be asked to give their own judgment on the effects of treatment and of no (adequate) treatment on work outcomes.

The method was discussed with several people. Including health economists, psychiatrists, PhD students, policy makers, employers, patients and others. While there were several alternatives (see chapter 5.4) this method was perceived to be most effective and yield the most valid data.

Through the interviews it became clear that there were a number of occupations who were best suited to answer questions regarding employees with depression and the effect of treatment on work outcomes. These were occupational health physicians, social insurance physicians, labor experts, psychiatrists, psychologists, and employers.

Further interviews were held with representatives of each occupation to assess their knowledge on each concept (chapter 3.1). Afterwards, a pilot questionnaire was constructed (chapter 3.2) and finally the actual questionnaire was send out (chapter 3.3).

Figure 3.1 - Research design



3.1 Interviews

Interviews were held with occupational health physicians, social insurance physicians, employers, labor experts, psychiatrists and psychologists. Based on these interviews occupational health physicians and social insurance physicians were deemed most capable to answer questions on the distribution of depression severity within their own patient population, treatment adequacy,

[12] In the actual experiment it turned out that respondents were not able to adequatly answer this and the question was simplified. Resondents now only had to indicate what portion of patients would be depression-free after sixteen weeks of treatment.

and absenteeism. Labor experts were most capable in assessing the distribution of depression severity within their own patient population, treatments adequacy, and presenteeism. Finally, psychologists and psychiatrists were best able to answer questions regarding job retention among their patients.

Based on the input from interviews a questionnaire was developed and piloted.

3.2 Pilot questionnaire

The questions in the questionnaire are meant to fill in the gaps in literature. Therefore concepts that have been studied elsewhere and that are still relevant will not be asked again[13]. Findings from studies that are no longer up to date or that are from different cultures are given to the respondents as additional information, but they have to give their own estimate.

The pilot questionnaire addressed questions regarding the severity of depression, rate of (adequate) treatment, the number of sick days in employees with depression, reduced productivity in employees with depression (and the speed of productivity-recovery) and job turnover among employees with depression. A distinction between treated and untreated depression was made each time.

For the pilot questionnaire two actors per occupational group were asked to critically process the pilot. Based on their experiences three more changes were made.

- Each question could be answered per severity-level of depression instead of giving a single figure for an entire group.
- Each actor gave an estimate on the results in his/her own patient population instead of giving an estimate on the general effects of depression.
- Employers felt that they had too little experience to accurately answer questions on the distribution of severity or on the portion of adequate treatment. The other groups felt that they had sufficient experience to make an informed estimate.

3.3 Questionnaire

The questionnaire was taken among Dutch professionals. It was filled out by a number of experts from different occupations and focused on five topics. The severity of depression among the respondents' own patient population, the rate of adequate treatment, absenteeism, presenteeism and job retention.

3.3.1 Respondents

There were five categories of actors who were asked to fill in the questionnaire and one remainder group. Each occupation answered only those question with which they had sufficient experience (table 3.1).

[13] For example, the prevalence of depression among employees is an important variable. However this has recently been studied extensively (de Graaf et al., 2011a) and will therefore not be asked within this questionnaire.

Table 3.1

Relevant questions for each occupation

	Occupational health physicians	Social insurance physicians	Labor experts	Psychiatrists	Psychologists	Employers
Distribution of severity	✓	✓	✓	✓	✓	✗
Adequate treatment	✓	✓	✓	✗	✗	✗
Absenteeism	✓	✓	✗	✗	✗	✓
Presenteeism	✗	✗	✓	✗	✗	✓
Job retention	✗	✗	✗	✓	✓	✓

The questionnaire was sent to 105 professionals. The division of occupations can be seen in table 3.2. A reminder was sent after ten workdays. To prevent cluttering of data only those questions that were relevant for an occupation could be answered (table 3.1). Respondents were encouraged to send the questionnaire to other experienced professionals.

Table 3.2

Distribution of potential respondents across occupations

	Occupational health physicians	Social insurance physicians	Labor experts	Psychiatrists	Psychologists	Employers
# questionnaires send out	**28**	**14**	**39**	**12**	**6**	**6**

Participants from the questionnaire were found through a variety of means. Many of the potential respondents were contacted individually. A few other major sources came from contacts within the ArboNetwerk from GGZ Nederland, ArboNed, and the Dutch association of labor experts[14].

3.3.2 The distribution of severity

There are strong indications that severity is correlated with the size of productivity losses (Beck et al., 2011). Therefore experts are asked to evaluate the distribution between mild, moderate, and severe (with and without psychoses) within their own treatment population. Their expert opinions are of special interest and their experience with certain groups of patients is particularly important.

[14] In Dutch: De *Nederlandse Vereniging van Arbeidsdeskundigen*

The answers from occupational physicians and labor experts are believed to be representative for the Dutch working population since they are the first ones to be called in after the diagnosis depression.

Social insurance physicians, psychiatrists and psychologists on the other hand will most likely have more severe patients in their patient population. They do answer this question however, because it is necessary to know how much experience they have with each group. If a psychiatrist has no patients with mild depression, then his answers regarding mild depression are not included in the analysis.

Since most of the respondents do not differentiate between severity levels, they are given the formal criteria from the DMS-IV-TR (see Box 3.1) and then asked to judge based on their own experience.

Box 3.1 – Criteria for severity of depression (American Psychiatric Association, 2000)

Mild: Few, if any, symptoms in excess of those required to make the diagnosis and symptoms result in only minor impairment in occupational functioning or in usual social activities or relationships with others.

Moderate: Symptoms or functional impairment between "mild" and "severe. "

Severe*: Several symptoms in excess of those required to make the diagnosis, **and** symptoms markedly interfere with occupational functioning or relationships with others.

*The DSM-IV-TR makes a further distinction between *severe with psychoses* and *severe without psychoses*. In correspondence to most research on depression we do not make that distinction.

3.3.3 Rate of adequate treatment

As discussed earlier, depression is often not treated or not treated properly. However, the treatment rate varies strongly per country and treatment in the Netherlands appears to be rather high in comparison. In order to know the current benefits of depression treatment it is necessary to know the portion of people with depression who are actually receiving adequate treatment. The expert group can answer the question for their own treatment population or per category of severity since there are strong indications that the treatment rate is positively correlated with depression severity (Kessler et al., 2003).

Accurate treatment is defined as treatment based on the principles in the multidisciplinary guideline on depression (Spijker et al., 2012) or in the standards set by the Dutch College of General Practitioners (van Weel-Baumgarten et al., 2012), but similar to the question on

depression severity, respondents are encouraged to judge the portion of patients receiving adequate care based upon their experiences within their own patient population.

The answers from occupational physicians, social insurance physicians and labor experts are perceived to be representative for the entire Dutch working population since they guide the treatment of depressed employees and witness many care professionals. Psychiatrists and psychologists are expected to only have experience with their own form of treatment. It is unlikely that they will judge their own treatment to be inadequate.

3.3.4 Absenteeism

As discussed in chapter 2, depression is positively correlated with the amount of sick days (absenteeism). Knowing the positive effects of depression care can only be accomplished by knowing the difference in the number of sick days when depression is treated and the number of sick days when depression is not treated. Most literature that measures the cost of depression (including absenteeism) includes all depressed patients and does not distinguish between treatment or no treatment, making it difficult to quantify the effect size. The number of studies that actually compare a 'no treatment' case is low (Nieuwenhuijsen et al., 2008).

Only occupational and social insurance physicians are always involved with this aspect. Therefore, only their opinion is asked on this subject. Absenteeism is operationalized as the number of days in which an employee is not present at work. Occupational health physicians and social insurance physicians have strict guidelines on what counts as absenteeism and what does not.

The respondents are asked to give an estimation on the average additional number of sick days per year for an employee suffering from depression. There is the possibility to answer the question for the entire patient population or to answer it per category of depression severity. Next, the respondents are asked the same question, but now in a condition where no (adequate) treatment takes place.

The difference in sick days per year between the two conditions, is the reduction of sick days due to treatment. Since the number of people who are being treated with depression has been answered previously, a simple equation can be done to find the number of additional sick days that is being prevented with the current state of depression treatment.

3.3.5 Presenteeism

Measuring treatment effects on presenteeism has challenges similar to absenteeism. Furthermore, while sick days is a rather objective measurement, presenteeism is often more subjective (especially in the case of more complex work). It is often measured through self-report questionnaires. However, empirical studies have given strong indications that depression is indeed a cause of reduced productivity (P.S. Wang et al., 2007).

Only labor experts are asked to answer the question on productivity. Their regular function is to determine the taxability of employees after an illness. Taxability is considered to be a proxy of productivity. A number of questions are asked.

First, the respondents are asked how productive an employee with depression is as a percentage of the productivity of a healthy employee at the onset of depression (T_0). Second the question is asked how high productivity is one year later, assuming that adequate treatment has taken place (T_{1Tr}). Third, the same question is asked, but only in a situation where no (adequate) treatment has taken place (T_{1UTr}). All questions could be answered as a general average for all employees with depression or they could be answered per depression severity.

Information on the average productivity of employees pre-treatment and post-treatment gives an indication on the productivity losses. With added information on the number of weeks it took to reach post-treatment productivity it is possible to calculate productivity losses. The only item that is missing is the gradient of improvement with treatment. We do not know whether treatment effects are steeper at the beginning of treatment, at the end of treatment, or whether they are continuous throughout the process. Here the assumption is made that improvements occurred in a linear manner.

3.3.6 Job loss

Finally the expert group was asked to comment on the percentage of people who lost their job as a result of depression. Psychologists and psychiatrists gave estimates on the adequate treatment condition and for the no (adequate) treatment condition. Again, all questions could be answered for all depressed employees or per separate severity.

3.3.7 Remainder

The questionnaire ends with an opportunity to include additional thoughts and comments. Data was made anonymous as soon as possible.

3.4 Analysis

The results from the questionnaire are analyzed using IBM SPSS Statistics 20. The main independent variable is *adequate treatment* (*yes* or *no*). Main dependent variables are *rate of adequate treatment*, *number of sick days,* and *productivity*. The analysis of certain variables will be explained in more detail per variable in chapter 4.

4. Results

The questionnaire was send to 105 people and there were 37 responses. The response rate is 35.2%. However, professionals were encouraged to forward the questionnaire to other professionals who had sufficient experience with depression treatment and its effect on work outcomes. Therefore the actual response rate might be lower than 32,5%. The number of respondents per occupation is shown in table 4.1.

Table 4.1

Distribution of potential respondents across occupations

	Occupational health physicians	Social insurance physicians	Labor experts	Psychiatrists	Psychologists	Employers
# questionnaires send out	**10**	**5**	**14**	**5**	**3**	**0**

The number of respondents that answered each question is smaller because each question is only answered by those occupations that have relevant experience (see table 3.1 for an overview). This results in a small N and lowers chances of finding significant results.

However, it should be noted that each of the respondents has experience with many patients. Therefore the usual deviations that are common to empirical research, have already been integrated in their estimate on the average effect of treatment. This increases the possibility of achieving significant results when the respondents perceive a treatment effect.

Three statistical tests are applied (the *independent t-te*st, the *paired-sample t-test*, and the *One-Way Anova* test) in order to analyze the different variables. These were: *the rate of adequate treatment*, *the effect of depression on absenteeism*, and *the effect of depression on productivity*.

Significant effects were found in *the distribution of depression* severity, *the rate of adequate treatment* and *the effect of depression on productivity*.

Unfortunately, it was not possible for psychiatrists or psychologists to comment on job retention within their population treatment. Therefore this variable will not be discussed further. The detailed analysis of each topic is described below.

4.1 Distribution of severity

Depression severity within the professional's own treatment population was assessed. The respondents made a distinction between mild, moderate and severe depression. A division is made between two groups. The first group consists of occupational health physicians, social insurance physicians, and labor experts (group 1), and the second group consists of psychologists and psychiatrists (group 2). This division is based on the assumption that patients with more severe forms of depression are more likely to seek help with a psychiatrist or psychologist than patients with less severe depression. Occupational health physicians, social

insurance physicians, and labor experts are assumed to see a wide representation of employees with depression. Findings are shown in Table 4.2.

Table 4.2.

Distribution of depression severity among professional's own treatment population (%)[a]

	Mild depression		Moderate depression		Severe depression		N
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Occupational health physicians	36,7	9,55	31,2	7,1	31,1	7,2	10
Social insurance physicians	32	5,7	44,0	4,1	24,0	7,4	5
Labor experts	31,4	11,2	39,0	7,0	30,5	7,9	11
Group 1	**33,5*** **	9,9	**37,0*** **	8,1	**29,5**	7,7	**26**
Psychiatrists	9,0	12,5	55,0	15,8	36	15,1	5
Psychologists	8,3	5,8	70,0	8,7	21,7	2,9	3
Group 2	**8,8*** **	9,9	**60,6*** **	15,0	**30,6**	13,7	**8**

* P < 0.05 ** P < 0.01 *** P < 0.001

[a] The added numbers may deviate slightly from 100% because of rounding differences

An independent-samples t-test was conducted to compare the distribution of depression severity between group 1 and group 2.

There was a significant difference between group 1 and group 2 for the distribution of employees with mild depression (t (32) = 6.20, p < 0,001) and for employees with moderate depression (t (32) = -5.83, p < 0.001). There was no significant difference between the number of employees with severe depression (t (32) = -0.31, p = 0.76).

4.2 Adequate treatment

Respondents were asked to estimate the portion of depressed employees with care who receive *adequate treatment* (as operationalized in section 3.3.3) for their depression. The question was withheld from psychologists and psychiatrists because they would only be able to rate the adequacy of their own treatment. The other occupations had a broader view because they consulted with many patients who received care from different practitioners. Therefore, their judgment on treatment effectiveness was found to be more representative of reality. The results are shown in table 4.3.

Table 4.3

Percentage of employees with care who receive adequate treatment (%)

	Mild depression		Moderate depression		Severe depression		N
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Occupational health physicians	59.0	14.3	73.0	14.8	84.0	15.1	10
Social insurance physicians	55.0	14.1	70.0	7.1	85.0	7.1	2
Labor experts	42,3	16.8	53.2	17.8	71.4	17.5	11
Group 1	**50.7**	17,0	**63.3***	18.3	**77.6**	16.5	**26**

* P < 0.05 ** P < 0.01 *** P < 0.001

A One-Way Anova test was done to identify differences between occupations and their answers on the rate of adequate treatment for mild, moderate and severe depression.

In the case of mild depression there is not a significant effect of occupation on the rate of adequate treatment at the p<.05 level for the three occupations [F (2,20) = 3.102, p=.067]

In the case of moderate depression there is a significant effect of occupation on the rate of adequate treatment at the p<.05 level for the three occupations [F (2,20) = 4.169, p=.031]

In the case of mild depression there is not a significant effect of occupation on the rate of adequate treatment at the p<.05 level for the three occupations [F (2,20) = 1.650, p=.217]

To further identify the significant difference between occupations for employees with moderate depression an independent t-test is performed to investigate the difference. As can be seen in table 4.4 there is a significant difference between occupational health physicians and labor experts on the rate of adequate treatment for employees with moderate depression.

Table 4.4
Exploring the significant differences between occupations for adequate treatment with moderate depression

	t	df	Sig. (2-tailed)
Occupational health physicians vs. social insurance physicians	.273	10	.790
Social insurance physicians vs. labor experts	1.280	11	.227
Occupational health physicians vs. labor experts	2.762	19	.012*

* P < 0.05 ** P < 0.01 *** P < 0.001

Next to the differences in responses from different occupations, it is also interesting to know whether or not the differences between mild, moderate and severe depression are significant in themselves. The scores for mild, moderate and severe depression are not independent groups, but are related to each other because each respondent answers for each of the variables. Therefore the paired-sample t-test is applied to measure for significant differences.

As is shown in table 4.5 the effect that the three levels of depression severity have on the rate of adequate treatment are significant in all three cases (mild vs. moderate, mild vs. severe, and moderate vs. severe).

Table 4.5

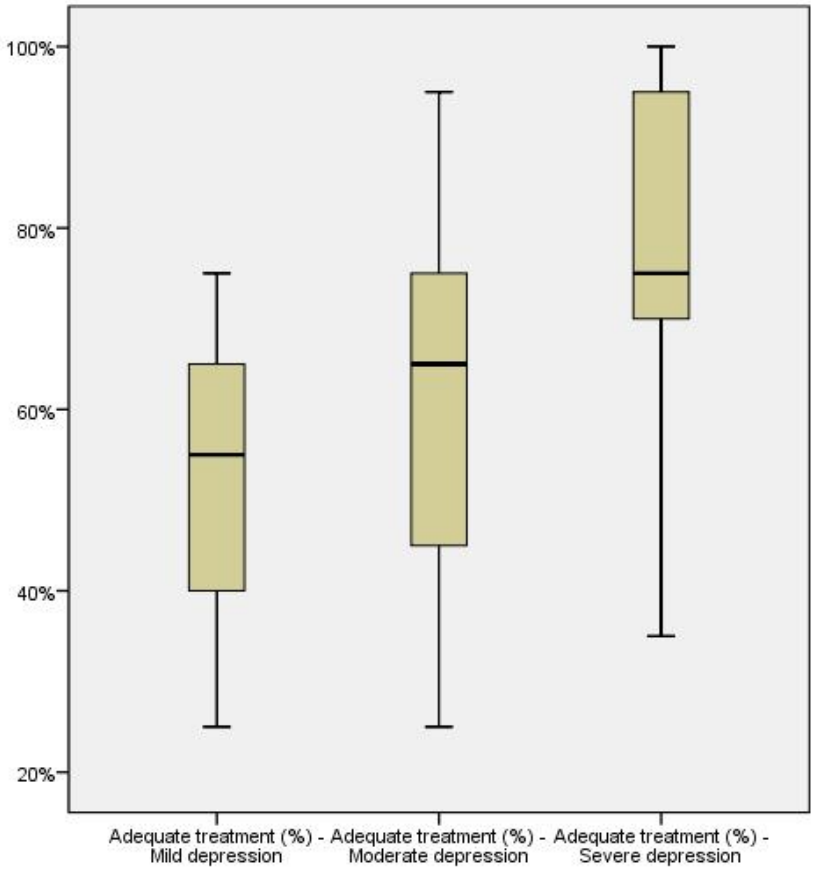
Differences in adequate treatment between mild, moderate and severe depression

	Mean difference	S.D.	t	df	Sig. (2-tailed)
Mild vs. moderate	-12.61	11.36	-5.319	22	< 0.001***
Mild vs. severe	-26.96	13.88	-9.316	22	< 0.001***
Moderate vs. severe	-14.35	11.51	-5.978	22	< 0.001***

* P < 0.05 ** P < 0.01 *** P < 0.001

The distribution of adequate treatment for employees who are receiving care has also been depicted graphically in Figure 4.1

Figure 4.1 - Percentage of employees with care who receive adequate treatment (%)



In conclusion, depression severity has a significant positive effect on the rate of adequate treatment.

4.3 Absenteeism

The respondents were asked to assess the effect of treatment on the number of sick days for employees with depression. They did this by estimating the number of sick days for employees with depression who received adequate treatment and by making the same estimate for employees with depression who were not receiving (adequate) treatment.

A one-way Anova test was applied to determine if there were significant differences between the condition *treated* and *untreated* on the number of sick days for different severity levels. A one-tailed test can be applied because it is assumed that treatment would lead to a reduction in sick days, thus increasing the power of the test. Although social insurance physicians had indicated on the pilot questionnaire that they were able to answer this question, they ultimately felt that they were not able to do so. Therefore only the occupational health physicians answered this question (N=10).

While the slight differences that were present were in favor of the treatment group (as in, employees under treatment were seen to have less sick days), these differences were not significant (at $p < 0.05$) for any severity level, even as a one-tailed test. The results are shown in table 4.6.

Table 4.6

Effect of adequate treatment or no (adequate) treatment on sick days

	F	df	Sig. (1-tailed)
Mild depression	.231	1, 18	.318
Moderate depression	2.586	1, 18	.63
Severe depression	.771	1, 18	.195

* P < 0.05 ** P < 0.01 *** P < 0.001

Since there is no significant difference between adequate treatment and no (adequate) treatment on the number of sick days the variable is not explored further.

4.4 Presenteeism

Respondents were asked to estimate the average effect of depression (at different severity levels) on employee productivity. They did this for two points in time, namely at diagnosis (T_0) and one year after diagnosis (T_1). At T_1 there was a distinction between two conditions, namely *treated* (T_{1Tr}) or *untreated* (T_{1UTr}).

The question was answered by labor experts (N=14). Results are shown in 4.6. A One-Way Anova test was applied to test for significance. Because it is assumed that productivity increases stronger in the *adequate treatment* condition than in the *no (adequate) treatment* condition, a one-tailed significance level can be applied.

Table 4.7

Effect of adequate treatment or no (adequate) treatment on productivity

	F	Df	Sig. (1-tailed)
Mild depression	5.470	1, 24	.014*
Moderate depression	13.402	1, 24	.0005***
Severe depression	8.813	1, 24	.0035*

* P < 0.05 ** P < 0.01 *** P < 0.001

As is shown in table 4.7 adequate treatment has a positive relationship with productivity for al depression severities. This is also shown in figure 4.2.

If we transform the categorical answers that were given into their average numerical variables (for example: the category 21-30% is changed into 25%, and 31-40% is transformed into 35%, etc.), then it is meaningful to calculate the mean production scores for T_0 and for T_{1Tr} and T_{1UTr}. These results are shown in table 4.8.

Figure 4.2 - Productivity at T0 and T1

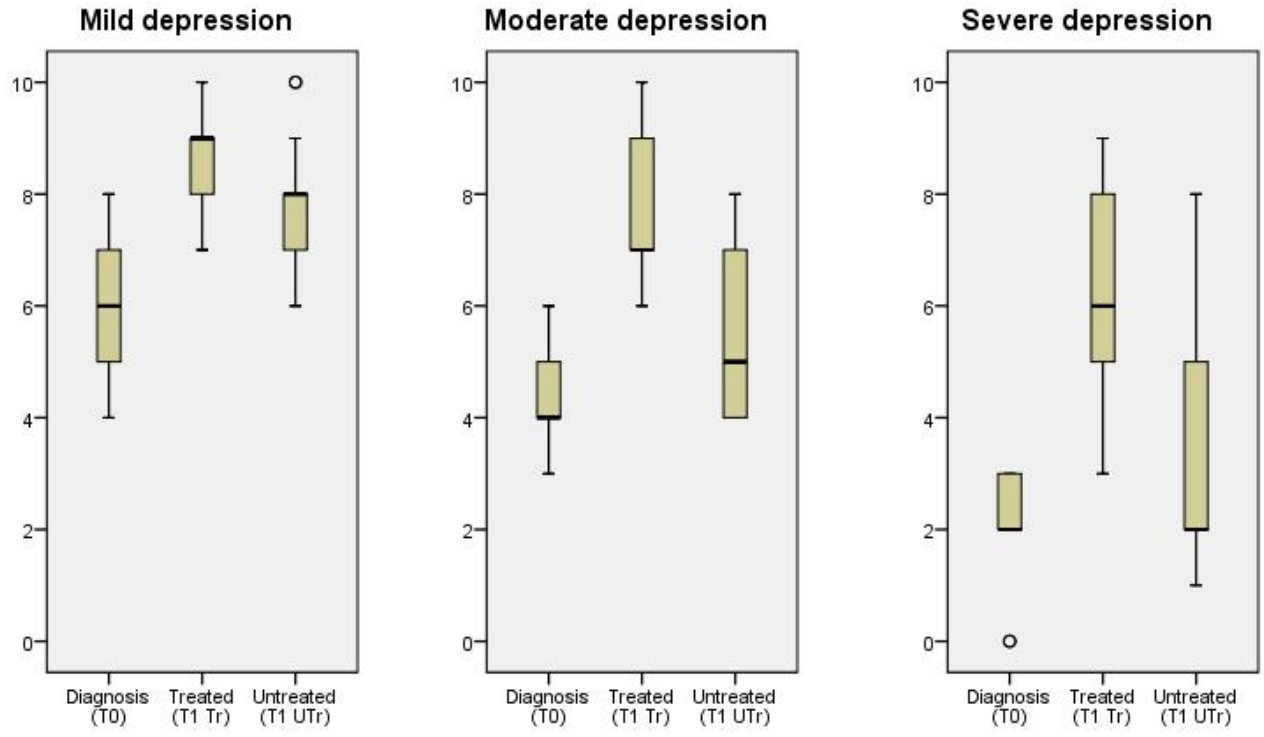


Table 4.8

Average productivity of employees with depression (%)

	T_0 - Diagnosis		T_{1UTR} - Untreated		T_{1TR} - Treated	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Mild depression	67,.31	12,4	81,15	12,4	91,54	7,7
Moderate depression	48,08	8,5	60,38	15,6	81,15	13,1
Severe depression	25,00	10,0	38,85	23,9	65,0	20,8

5. Discussion

"Data is not information, information is not knowledge, knowledge is not understanding, understanding is not wisdom" ~ Clifford Stoll

This thesis has made an attempt to contribute to the knowledge on the economic consequences of depression. Specifically on the economic consequences of depression treatment. The main research question was the following:

What are the economic effects of depression treatment in a work context?

It should be stressed that answers to this research question do **not** contribute to knowledge for individual (mental) health care practitioners or for patients. This thesis examined data on an aggregated (macro) level because this is inherent to the research question. Decisions regarding best practices or other matters that effect the care path of an individual should always be made on an individual basis by the professional and the patient.

5.1 Interpreting the results

The data from the questionnaire is shown in chapter 4, but data can only become valuable through interpretation. This chapter will discuss the interpretations and consequences.

5.1.1 Depression severity in the respondents' patient population

Earlier research showed that annually 4,2% of all employees suffer from depression (de Graaf et al., 2011a) and 58,5% off this group finds some form of treatment (de Graaf et al., 2010).

It is assumed that labor experts, occupational health physicians and social insurance physicians have the best perspective on the distribution of depression severity because their patient population is considered representative for the group of employees with depression who have sought care.

A previous study that measured the distribution of depression severity among all employees was done ten years ago. It found 69.6% had either a mild or a moderate depression and the remaining 30.4% had a severe depression (see table 2.1). However, because of its age, its relevance is questionable (Spijker et al., 2002). Furthermore the research population with Spijker et al. (2002) consisted of a sample that is representative for all employees. This study, in contrast, focuses on patients that have already sought care.

The respondents' estimates on the distribution of depression severity are fairly consistent with the afore-mentioned study by Spijker et al. (2002). This is somewhat surprising because of the different research populations. One could imagine that employees with severe depression would be more inclined to seek care than employees with mild depression and that they would therefore be overrepresented in this study in comparison to the study by Spijker et al. (2002), but this does not show in the data. The portion of patients with severe depression is consistent

with the earlier study. Since a distinction between mild and moderate depression was not made by Spijker et al. (2002), it is not possible to compare these categories separately.

These findings indicates that the distribution of depression severity within the professional's treatment population is representative for the entire work population. This implies that patients with more severe forms of depression are not more likely to seek care. This appears to be counter-intuitive.

A possible explanation lies in the inherent nature of depression. It is a disorder that causes a person to have less energy and a less positive outlook on things. One could argue that although those employees with severe depression have the highest need for care, they also face the biggest obstacles (in their own perception) to acquire care.

Further research on depression within the work population and on the distribution of severity should be performed before a more definitive statement can be made.

5.1.2 Adequate treatment

Table 4.3 shows that, according to occupational health physicians, social insurance physicians, and labor experts, a significant portion of depressed employees may receive some form of treatment, but not adequate treatment. Adequate treatment is in itself an ambiguous concept, but it is operationalized in section 3.3.3.

The interviews and the open comments on the questionnaire revealed that there are serious doubts on the portion of treatment that is actually appropriate. This is reflected in the questionnaire which indicates that half of all patients with mild depression and one quarter of patients with severe depression receive inadequate treatment (table 4.3). In other words, as depression severity lowers, it becomes less likely that patients receive adequate treatment. This is consistent with other (international) studies (Kessler et al., 2003).

The rather low rate of adequate treatment is somewhat surprising though. Guidelines prescribe a stepped care model in which patients with mild depression are often prescribed some form of psychotherapeutic therapy (Spijker et al., 2012; van Weel-Baumgarten et al., 2012) and a recent study examined the effectiveness of seven different forms of psychotherapeutic therapy and found that all therapies were equally effective (Barth et al., 2013).

One would assume that if health care professionals follow the guidelines, the rate of adequate treatment for patients with mild depression would be much higher. Yet our respondents answered that a relatively large portion of employees with mild depression receive inadequate treatment. This discrepancy might be explained in two ways:

1. Respondents held the opinion that certain psychotherapeutic treatments were not effective or adequate even though recent evidence suggests that they are (Barth et al., 2013)[15].
2. Employees with mild or moderate depression often receive forms of treatment that are not based on the latest scientific knowledge and/or guidelines. For example, patients with

[15] Which is not impossible, seeing as the meta-study from which these findings are derived was published after the questionnaire had taken place.

mild depression might receive antidepressant drugs too soon even though this is not considered adequate treatment.

Condition one would imply that the rate of appropriate treatment among patients with milder forms of depression is actually higher than perceived by the respondent group. If so, this would result in an increase of the national benefits provided by depression treatment.

Condition two implies that there is still much to be gained regarding depression treatment. If such large portions of patients are not receiving adequate treatment then the national benefits of depression care can (and should) be much higher than they currently are. Further research should determine why such a large portion of health care professionals delivers depression care that is perceived to be inadequate by the respondents.

Based on the interviews that were held with professionals, it appears that the general opinion among occupational health physicians, social insurance physicians, and labor experts is that condition two applies. A large portion of depression treatment appears to be inadequate.

5.1.3 Absenteeism

The literature review revealed that depression has a positive relationship with the number of sick days (absenteeism) (de Graaf et al., 2011a). It also showed that certain treatments have a negative effect on the number of sick days compared to *care as usual*. Although research that compared the effects of depression treatment to *no treatment* was scarce and inconclusive (Nieuwenhuijsen et al., 2008), the studies that demonstrated superiority for a certain treatment led us to hypothesize that depression treatment does have a negative effect on the number of sick days.

Surprisingly, the respondents did not confirm this (table 4.6). There were some differences in the average number of sick days, but these were not significant. Furthermore the average number of sick days was higher than the average 22,8 additional sick days that was found in the NEMESIS-II study (de Graaf et al., 2011a).

Some possible explanations for these discrepancies are:

1. The respondents indicated that depression treatment usually does not focus on job resumption. Rather the patient might even be suggested to take extra days off in order to recover completely before returning to work. Naturally, there are exceptions. Certain treatments see work resumption as part of the treatment process and focus on a rapid return to work (Hees, de Vries, Koeter, & Schene, 2011), but according to the respondents these forms of treatment are not being prescribed enough.
2. Employees in the Netherlands are well protected by law from job loss following disease. This might reduce pressure to return to work as soon as possible.
3. In order to keep the number of possible answers in the questionnaire limited, a cut-off point had to be selected. Since the number of additional sick days for the average employee with depression was estimated to be 22,8 (de Graaf et al., 2011a) in earlier research, *more than 75 days* appeared to be a suitable cut-off point. However, in retrospect a large portion of the respondents chose the final category (especially for moderate and severe depression). This is surprising as it contradicts earlier findings. While there might be significant differences, these could no longer be detected because respondents were not able to further specify above the 75 days mark.

4. It might be that employees with fewer sick days do not come into contact with the respondents' occupational groups. For example, they might use extra vacation days to recover instead of calling in sick.
5. The number of respondents (N=10) was rather low and this may well have had its impact on the results.

5.1.4 Presenteeism

Table 4.7 shows that the condition *adequate treatment* compared to *no (adequate) treatment* has a significant effect on productivity on all severity levels. It can be concluded that during the year after diagnosis (T_0), adequate treatment leads to a significantly higher productivity than no (adequate) treatment.

The productivity of employees with depression, is slightly lower than in other research (Woo et al., 2011). This might be explained by the fact that the respondents based their estimates on the experiences with their own patient population, while the other study did not make a distinction between patients who were already receiving care or not. As a result, the patients (employees) for whom depression had the smallest impact on work outcomes might not have reached the stage of receiving care and therefore the respondents in this study may have a patient population that has slightly more severe symptoms than those in the study by Woo et al. (2011).

The positive influence of depression treatment on productivity should be taken into account when the costs and benefits of depression care are being discussed. Knowing that adequate treatment has a positive effect on productivity is valuable information, but ideally we would come to a concrete figure on the actual economic benefits of treatment. This calculation has been made in Appendix A. It is based on data from the questionnaire and from other external sources.

The total economic value that is annually gained through depression treatment is estimated to be €436 million. A conservative approach was applied when assumptions had to be made.

It should be noted that the benefits of depression care are most likely higher than those calculated in Appendix A. There are a number of reasons for this.

- This thesis had a one-year perspective, but the benefits of treatment are likely to last longer.
- The number of patients with chronic depressive episodes is reduced by proper treatment (Eaton et al., 2008). Hence, treatment also has a preventive function for future costs.
- Only the benefits of adequate treatment are taken into account. There may be a large portion of patients who are receiving inadequate treatment that may not be optimally effective for them, but that does have some effect. These possible benefits are not included.

On a final note, it is interesting to calculate the benefits of depression treatment if all care was perceived to be adequate. This calculation is made in table 8.10 and it results in a total potential benefit of €653 million per year. An increase of €217 million. This implies that a significant improvement can be made by making sure that employees are receiving adequate care.

5.2 Implications

The findings from this thesis can contribute both to science and to practice.

5.2.1 Scientific implications

As of yet, there is a lack of scientific research into the benefits of treatment for mental disorders on the system (macro) level. The biggest obstacle is that there is hardly any information on the effects of mental disorders when there is no treatment (Donohue & Pincus, 2007). Consequently, because there is no "base-measurement" it is not possible to calculate the effects of mental health care.

This thesis has made an attempt to identify the effect of treatment at the national level. It has done so by combining parts of two existing methods (see chapter 3). This method has a number of strengths. Most notably is the utilization of the professionals who are best suited to make an educated estimate on the effects of depression treatment on work outcomes. Because of this, there is a certain face-validity.

The method does require further study before it should be applied for further studies, but if it is found to produce valid and reliable data then this opens up possibilities for further studies on the benefits of mental health care (see chapter 5.5 for information on future research). Chapter 5.4 elaborates on the current limitations of this methodology.

5.2.2 Practical implications

This thesis provided an overview of the existing literature on depression and work, and made an effort to value the current benefits of depression treatment. As of yet, our knowledge on the benefits of depression treatment (or any other form of mental health care for that matter) is scarce in comparison to information on the costs. By gathering additional data on the benefits of depression treatment, a more balanced discussion can be held. There has to come awareness that further budget cuts may well undermine the current value of depression treatment and have a counterproductive effect.

Furthermore, the findings of this thesis have been summarized in a (Dutch) factsheet that can be used as a tool to point out the severity of depression. The factsheet has been included in Appendix B.

5.3 Limitations

This study has several limitations. The main one being that it does not rely on empirical evidence, but rather on estimates made by professionals. Chapter 5.4 will elaborate on the methodology.

The diversity of tools used for diagnosis by professionals is another limitation. It results in the possibility of different definitions of depression. A patient who is diagnosed with depression, may not receive the same diagnosis with another instrument. However, these tools often have a common origin (the criteria in the Diagnostic and statistics model for mental disorders (DSM)) and the effects of using different tools for diagnosis should be minimal.

The number of respondents was rather low. As a results statistical analyses mare often not powerful enough to find significant effects . This is somewhat countered because respondents made an estimate on their entire treatment population. Anomalies and exceptions, which are common in empirical data, were therefore already integrated within the respondents' estimates on the average treatment effect. Nevertheless, a higher number of participants should be achieved for future research to confirm the findings.

5.4 Critical reflection on methodology

Chapters 2 and 3 discussed the difficulties in measuring the treatment effect of mental health care. Summarizing, it is problematic to differentiate between patients who receive adequate treatment and patients who do not receive adequate treatment or no treatment at all.

To overcomes these difficulties a combination of existing methods was devised (chapter 3). This method provided a tool to differentiate between adequate treatment and no (adequate) treatment by asking professionals to give their assessments. Since these professionals have experience with a multitude of both patients and practitioners, they are deemed to be most suited for making this assessment.

However, this method does have its limitations. and each of these will be discussed.

Most importantly is the validity of the data. Are respondents actually able to correctly identify the concepts that are being asked of them? This is particularly relevant for *adequate treatment*, and *presenteeism*.

Respondents who were occupational health physicians, social insurance physicians or labor experts were asked to estimate what portion of treatment was actually adequate treatment. Even though adequate treatment was operationalized as treatment according to the latest standards and guidelines (chapter 3.3.3), respondents had to base their estimate on their own experiences. It is questionable if respondents themselves are all aware of the latest guidelines and standards. If this is not the case, then they might not be able to give an accurate estimate for this question. Even though some reservations are required, this group of respondents is deemed to be best qualified for answering this question.

Presenteeism is a difficult concept to measure. The type of productivity differs per sector and it is difficult to operationalize the concept. Labor experts (the group of respondents that answered the questions on presenteeism) estimate the taxability of employees for their work. Taxability is perceived to be related to productivity and therefore capable of being used as a proxy.

During interviews labor experts deemed themselves capable of assessing the average productivity, though they admitted it would have to be a rough guess. Further research is required to assess whether or not labor experts are actually able to judge the effect of depression treatment on productivity.

There are several other issues of concern, besides the rate of adequate treatment and presenteeism. Most occupational groups do not make a distinction between depression severity.

Therefore their assessment was subjective. However, during interviews all respondents indicated that they were confident that they could make a reliable estimate on the distribution of depression severity. Although the opinion of the respondents is not sufficient to prove concept-validity, the results on the distribution severity are strengthened by their consistency with earlier studies in the Netherlands (table 2.1) (Spijker et al., 2002).

Another general area of concern is the accuracy of the respondents' estimates on the effect of no (adequate) treatment. Generally speaking the respondents will make sure that employees do receive treatment when they diagnose them with depression. Their knowledge on work outcomes when no (adequate) treatment is taking place is therefore questionable. The advantage of the current methodology is that it allows for a combination of the respondents experience and the information from earlier studies. Through this enriched knowledge source the risk of getting unreliable data is minimized.

A final area of concern is the possibility of bias. Although occupational health physicians, social insurance physicians and labor experts are mostly referrers and not practitioners themselves, it is expected of them that they do their best to return employees to work and have them function at their normal productivity level as soon as possible. Therefore, respondents might have an interest in overestimating the effects of treatment.

Experts were confronted with this potential source of bias during the interview phase. In general, respondents understood the rationale behind the argument, but argued that they did not feel that giving strong positive or negative feedback on treatment effect reflected on their own performance. Therefore they felt that they were able to answer the questions objectively without morale scruple or a tendency of bias.

Although these weaknesses are significant and should be studied further, the strengths of the method deserve to be highlighted as well. First of all, the respondents for each question are the professionals with most relevant experience. They are the ones who are best capable to judge these effects. By providing them with relevant findings, their knowledge on the concept is further enriched.

The main strength however, is that the methodology provides a way to differentiate between the effects of adequate treatment compared to no (adequate) treatment that appears to generate valid data (face validity[16]) and findings from other studies seem to be consistent with the results.

5.4.1 Alternative methods

During the process of this thesis many possible methods for measuring the effects of treatment were considered. One of these deserves special consideration.

This method is the one applied by Lokkerbol, Verhaak, and Smit (2011). Without diving too deep into the study itself, one of the main assumptions that was made, is that health loss has a direct correlation with productivity loss. For example, if depression has a DALY-weight of 0,56, then the

[16] A test has *face validity* if it is perceived that the study is measuring the concepts that it intends to measure.

assumption is made that employees with depression are on average 56% less productive than employees without health problems.

This assumption is rather rigorous. Although there is some research that points in the direction of a linear relationship (Beck et al., 2011), a method was devised that was not build upon this assumption. Therefore, instead of applying the one-on-one relationship with health loss, the current method of a questionnaire among professionals was applied to estimate effect sizes.

5.5 Future research

There are a number of areas available for further research. Most importantly is the validation of the current methodology.

It has to be determined to what degree the respondents are actually capable of providing accurate answers. Therefore small scale experiments could be set up that give indications on their accurateness. While these small experiments might not be able to prove the validity and reliability of the methodology at once, they can strengthen confidence in the findings.

For example, an observational study could be set up in which a number of employees who are diagnosed with depression are monitored for a year in order to measure presenteeism. There are instrument available for measuring productivity. If the outcomes of these instrument are consistent with the estimates given by labor experts then this strengthens our confidence in their ability to provide accurate data in the condition of adequate treatment. It does not give direct confirmation on their ability to judge the productivity of employees who do not receive (adequate) treatment, but it would be an indication that they are capable of assessing productivity in a valid and reliable manner.

A second area of future research is on the large portion of inadequate treatment according to the respondents. There is a lot of potential here. It is important to find out if the portion of inadequate care is large because respondents have a skewed perception or because practitioners are actually not giving the best possible treatment.

Finally, if the methodology holds up then it allows for research on any other mental disorder. What may be more interesting though, is to measure the effects of a mental disorder on a different concept. Most interesting would be to measure the health gains of treatment. After all, the ultimate goal of mental health care is to make people healthier and happier. If these health gains could be quantified it would be a big step in determining the complete value of treatment. The economic benefits because of work outcomes that were determined in this thesis are only part of the puzzle.

6. Conclusions

The goal of this thesis was to find out what the economic effects of depression treatment in a work context are. The major difficulty in answering this question lay in devising a methodology that was capable of discerning the effects of *adequate treatment* in comparison to *no (adequate) treatment* on work outcomes.

Through a combination of methods, a methodology was constructed that is perceived to be suitable. Basically, it involved the sharing of existing knowledge with professionals, who were then given the opportunity to make an educated assessment on the effects of depression treatment in the Netherlands. Their combined knowledge from literature and experience is believed to yield reasonably accurate results, but further study is required to confirm this. Through this method it was possible to differentiate between the effects of *adequate treatment* and *no (adequate) treatment*.

One surprising result was the lack of a significant relationship between adequate treatment and the number of sick days. One possible explanation for this finding is that depression treatment in the Netherlands is often not aimed at work resumption. It was repeatedly stated by professionals that they believe a stronger focus on job resumption would increase treatment effectiveness. This is supported by other studies (Hees et al., 2011).

As expected, a positive, significant relationship was found between adequate treatment and productivity. Adequate treatment was perceived to increase productivity for employees with mild, moderate, and severe depression. A rough calculation revealed that adequate treatment results in a total economic benefit of €436 million per year in additional production value.

To put this in perspective, the total costs for the treatment of depression were €966 million per year. These two numbers cannot be compared directly though.

The results in this study are based on the limited group of employees that receives adequate care, whilst the €966 million is based on every citizen that receives some form of treatment for depression. The productivity gains of €436 million are therefore only part of the total benefits of depression treatment. Furthermore, the effects of depression treatment are likely to last more than one year, indicating that this figure is actually very conservative.

Although the economic benefits of depression treatment are only taken into account for a limited population, they already recuperate half of the direct costs for depression treatment. It is promising that a study on the effect of depression on such a limited area (work) finds substantial gains of this magnitude.

One of the major points of attention is the large portion of employees who are receiving inadequate care according to the respondents. Half of the employees with a mild depression and one quarter of employees with a severe depression are receiving inadequate care. This may be due to erroneous perception from the respondents, but if their perception is accurate then there is an enormous potential to increase treatment effectiveness and the associated economic

benefits. If all patients would receive adequate care, the economic benefits of depression treatment due to its effect on work outcomes would rise to €653 million per year. A potential annual increase of €217 million.

Future research needs to focus on the validation of the methodology in order to strengthen confidence in these results. If the methodology is shown to produce valid and reliable data, then studies can be carried out on areas other than work. Most noteworthy would be a study on the gained quality of life (QALYs) through depression treatment. An increase in the health and quality of life is, after all, the original function of (mental) health care.

In conclusion, research has shown that there are many cost-effective treatments for depression that affect work outcomes. Currently, treatment for depression provides €436 million per year because of increased productivity. Through these economic benefits almost half of the costs for depression treatment are recuperated. This is positive, but there is a lot of room for improvement. Inadequate care is still common and treatments have yet to show an effect on the number of sick days. Addressing these issues will result in increased economic benefits for depression treatment.

7. References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th Edition, text rev.)*. Washington, DC: Author.

Andrea, H., Bültmann, U., Beurskens, A., Swaen, G., Van Schayck, C., & Kant, I. (2004). Anxiety and depression in the working population using the HAD Scale. *Social Psychiatry and Psychiatric Epidemiology, 39*(8), 637-646.

Andrea, H., Bültmann, U., van Amelsvoort, L. G. P. M., & Kant, Y. (2009). The incidence of anxiety and depression among employees - the role of psychosocial work characteristics. *Depression and Anxiety, 26*(11), 1040-1048.

Barth, J., Munder, T., Gerger, H., Nüesch, E., Trelle, S., Znoj, H., . . . Cuijpers, P. (2013). Comparative Efficacy of Seven Psychotherapeutic Interventions for Patients with Depression: A Network Meta-Analysis. *PLoS Med, 10*(5), 1-17. doi: 10.1371/journal.pmed.1001454

Beck, A., Crain, A. L., Solberg, L. I., Unützer, J., Glasgow, R. E., Maciosek, M. V., & Whitebird, R. (2011). Severity of Depression and Magnitude of Productivity Loss. *The Annals of Family Medicine, 9*(4), 305-311. doi: 10.1370/afm.1260

Berndt, E. R., Finkelstein, S. N., Greenberg, P. E., Howland, R. H., Keith, A., Rush, A. J., . . . Keller, M. B. (1998). Workplace performance effects from chronic depression and its treatment. *Journal of Health Economics, 17*(5), 511-535.

Berndt, E. R., Koran, L. M., Finkelstein, S. N., Gelenberg, A. J., Kornstein, S. G., Miller, I. M., . . . Keller, M. B. (2000). Lost human capital from early-onset chronic depression. *American Journal of Psychiatry, 157*(6), 940-947.

Berner, M. M., Kriston, L., Sitta, P., & Härter, M. (2008). Treatment of depressive symptoms and attitudes towards treatment options in a representative German general population sample. *International Journal of Psychiatry in Clinical Practice, 12*(1), 5-10. doi: 10.1080/13651500701330783

Bijenhof, A. M., Folkertsma, M. A., Kommer, G. J., Slobbe, L. C. J., & Polder, J. J. (2013). *Notitie Kostenontwikkeling GGZ*. Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu.

Board, E. (2012). Global burden of mental disorders and the need for a comprehensive, coordinated response from health and social workers at the country level: report by the Secretariat.

Bolton, D. (2004). Values in the definition of mental disorder. *Psychiatry, 3*(3), 2-4. doi: http://dx.doi.org/10.1383/psyt.3.3.2.30682

Brohan, E., Slade, M., Clement, S., & Thornicroft, G. (2010). Experiences of mental illness stigma, prejudice and discrimination: a review of measures. *BMC Health Services Research, 10*(1), 80.

Burnand, Y., Andreoli, A., Kolatte, E., Venturini, A., & Rosset, N. (2002). Psychodynamic psychotherapy and clomipramine in the treatment of major depression. *Psychiatric Services, 53*(5), 585-590.

Burton, W. N., Pransky, G., Conti, D. J., Chen, C. Y., & Edington, D. W. (2004). The association of medical conditions and presenteeism. *Journal of Occupational and Environmental Medicine, 46*(6), S38-S45.

CBS Statline. (2012). Gezondheid, leefstijl, zorggebruik en -aanbod, doodsoorzaken; kerncijfers Retrieved 26/10, 2012, from

http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=81628NED&D1=81-89&D2=a&VW=T

CBS Statline. (2013). Beroepsbevolking; kerncijfers provincie Retrieved 03-07-2013, from http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=71761ned&D1=1-4,7&D2=0,5-20&D3=69&HDR=T&STB=G1,G2&VW=T

Chang, S. M., Hong, J. P., & Cho, M. J. (2012). Economic burden of depression in South Korea. *Social Psychiatry and Psychiatric Epidemiology, 47*(5), 683-689.

Cohen, C. B. (1983). 'Quality of Life'and the Analogy with the Nazis. *Journal of Medicine and Philosophy, 8*(2), 113-136.

College voor Zorgverzekeringen. (2012a). Advies agalsidase alfa (Replagal®) agalsidase bèta (Fabrazyme®) bij de indicatie 'Ziekte van Fabry'. Op basis van het herbeoordelingsrapport van de CFH. Diemen: College voor Zorgverzekeringen.

College voor Zorgverzekeringen. (2012b). Advies alglucosidase alfa (Myozyme®) bij de indicatie 'ziekte van Pompe' Diemen: College voor Zorgverzekeringen.

Collins, J. (2009). Education techniques for lifelong learning: Lifelong learning in the 21st century and beyond. *Radiographics, 29*(2), 613-622.

Cooper, C. L. (2009). The changing nature of work: Enhancing the mental capital and well-being of the workplace. *Twenty-First Century Society, 4*(3), 269-275.

Cooper, C. L., Field, J., Jenkins, R., Goswami, U., & Sahakian, B. J. (2010). *Mental capital and wellbeing*. Oxford, United Kingdom: Wiley-Blackwell.

Crook, T. R., Ketchen Jr, D. J., Combs, J. G., & Todd, S. Y. (2008). Strategic resources and performance: A meta-analysis. *Strategic management journal, 29*(11), 1141-1154.

Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen, D. J. (2011). Does human capital matter? a meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology, 96*(3), 443-456.

de Graaf, R., ten Have, M., & van Dorsselaer, S. (2010). De psychische gezondheid van de Nederlandse bevolking. Nemesis-2: Opzet en eerste resultaten. Utrecht: Trimbos Instituut.

de Graaf, R., Tuithof, M., Van Dorsselaer, S., & Ten Have, M. (2011a). *Verzuim door psychische en somatische aandoeningen bij werkenden. Resultaten van de 'Netherlands Mental Health Survey and Incidence Study-2' (NEMESIS-2)*. Utrecht: Trimbos Instituut.

de Graaf, R., Tuithof, M., Van Dorsselaer, S., & Ten Have, M. (2011b). *Verzuim door psychische en somatische aandoeningen bij werkenden. Resultaten van de 'Netherlands Mental Health Survey and Incidence Study-2' (NEMESIS-2)*. Utrecht: Trimbos Instituut.

De Silva, M. J., McKenzie, K., Harpham, T., & Huttly, S. R. A. (2005). Social capital and mental illness: a systematic review. *Journal of Epidemiology and Community Health, 59*(8), 619-627.

Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (1975). *Group techniques for program planning: A guide to nominal group and Delphi processes*: Scott, Foresman Glenview, IL.

Donohue, J. M., & Pincus, H. A. (2007). Reducing the societal burden of depression: A review of economic costs, quality of care and effects of treatment. *PharmacoEconomics, 25*(1), 7-24.

Druss, B. G., Schlesinger, M., & Allen, H. M. (2001). Depressive symptoms, satisfaction with health care, and 2-year work outcomes in an employed population. *American Journal of Psychiatry, 158*(5), 731-734.

DuPont, R. L., Rice, D. P., Miller, L. S., Shiraki, S. S., Rowland, C. R., & Harwood, H. J. (1996). Economic costs of anxiety disorders. *Anxiety, 2*(4), 167-172.

Eaton, W., Shao, H., Nestad, G., Lee, B., Bienvenu, O., & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives of general psychiatry, 65*(5), 513-520. doi: 10.1001/archpsyc.65.5.513

Eisenberg, D., Golberstein, E., & Hunt, J. B. (2009). Mental Health and Academic Success in College. *B.E. Journal of Economic Analysis and Policy, 9*(1).

European Foundation for the Improvement of Living and Working conditions. (2010). Working time developments – 2009. Dublin, Ireland: author.

Fogel, R. W. (1994). Economic growth, population theory, and physiology: The bearing of long-term processes on the making of economic policy: National Bureau of Economic Research.

Fogel, R. W. (2004). Health, nutrition, and economic growth. *Economic Development and Cultural Change, 52*(3), 643-658.

Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Dimidjian, S., Amsterdam, J. D., Shelton, R. C., & Fawcett, J. (2010). Antidepressant drug effects and depression severity. *JAMA: The Journal of the American Medical Association, 303*(1), 47-53.

Frank, R. G., McGuire, T. G., Normand, S. L., & Goldman, H. H. (1999). The value of mental health care at the system level: the case of treating depression. *Health Affairs, 18*(5), 71-88.

Gao, N., Gill, K. J., Schmidt, L. T., & Pratt, C. W. (2010). The application of human capital theory in vocational rehabilitation for individuals with mental illness. *Journal of Vocational Rehabilitation, 32*(1), 25-33.

Goetzel, R. Z., Long, S. R., Ozminkowski, R. J., Hawkins, K., Wang, S., & Lynch, W. (2004). Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting US employers. *Journal of Occupational and Environmental Medicine, 46*(4), 398-412.

Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A., & Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: how did it change between 1990 and 2000? *Journal of Clinical Psychiatry, 64*(12), 1465-1475.

Gurmankin Levy, A., Maselko, J., Bauer, M., Richman, L., & Kubzansky, L. (2007). Why do people with an anxiety disorder utilize more nonmental health care than those without? *Health Psychol, 26*(5), 545-553.

Hakkaart- van Roijen, L., Tan, S. S., & Bouwmans, C. A. M. (2011). Handleiding voor kostenonderzoek. Methoden en standaard kostprijzen voor economische evaluaties in de gezondheidszorg. Geactualiseerde versie 2010. Diemen: College voor Zorgverzekeringen.

Hamilton, M. (1960). A rating scale for depression. *Journal of neurology, neurosurgery, and psychiatry, 23*(1), 56.

Harvey, S., Glozier, N., Henderson, M., Allaway, S., Litchfield, P., Holland-Elliott, K., & Hotopf, M. (2011). Depression and work performance: an ecological study using web-based screening. *Occupational Medicine, 61*(3), 209-211.

Hawthorne, G., Cheok, F., Goldney, R., & Fisher, L. (2003). The excess cost of depression in South Australia: a population-based study. *Australian and New Zealand Journal of Psychiatry, 37*(3), 362-373.

Healy, T., & Côté, S. (2001). The Well-Being of Nations: The Role of Human and Social Capital. Education and Skills. Geneva, Switzerlands: Centre for Educational Research and Innovation.

Hees, H. L., de Vries, G., Koeter, M. W. J., & Schene, A. H. (2011). Depression & Occupation: Intervention Trial. De effectiviteit van ergotherapie voor werknemers die verzuimen

wegens depressie. Amsterdam: Academisch Medisch Centrum (AMC), Universiteit van Amsterdam

Heijnen, H. (2013). Kosten GGZ stijgen minder hard dan voorgesteld. Uitgaven ggz stijgen in 2000-2010 nagenoeg overeenkomstig aan die van totale gezondheidszorg . Amsterdam: Heijnen Organisatieadviseurs

Herrman, H., Saxena, S., & Moodie, R. (2005). *Promoting mental health: concepts, emerging evidence, practice. A report of the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation and the University of Melbourne*. Geneva, Switzerland: World Health Organization.

Hoedeman, R., & van de Pavert, J. (2012). Meer en langer verzuim door depressiviteit: sturen op resources biedt nieuwe oplossing. Utrecht: 365.

Hu, T. (2006). Perspectives: an international review of the national cost estimates of mental illness, 1990-2003. *The journal of mental health policy and economics, 9*(1), 3.

Idenburg, P. J., van Schaik, M., & Zuiderveld, S. (2010). *Diagnose 2025*. Schiedam: Scriptum.

Jorm, A. F., & Reavley, N. J. (2013). Depression and stigma: from attitudes to discrimination. *The Lancet, 381*(9860), 10-11.

Kawakami, N., Takeshima, T., Ono, Y., Uda, H., Hata, Y., Nakane, Y., . . . Kikkawa, T. (2005). Twelve-month prevalence, severity, and treatment of common mental disorders in communities in Japan: preliminary finding from the World Mental Health Japan Survey 2002–2003. *Psychiatry and Clinical Neurosciences, 59*(4), 441-452. doi: 10.1111/j.1440-1819.2005.01397.x

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., . . . Wang, P. S. (2003). The epidemiology of major depressive disorder. *JAMA: The Journal of the American Medical Association, 289*(23), 3095-3105.

Kessler, R. C., Heeringa, S., Lakoma, M. D., Petukhova, M., Rupp, A. E., Schoenbaum, M., . . . Zaslavsky, A. M. (2008). Individual and societal effects of mental disorders on earnings in the United States: Results from the National Comorbidity Survey Replication. *American Journal of Psychiatry, 165*(6), 703-711.

Kessler, R. C., Merikangas, K. R., & Wang, P. S. (2008). The prevalence and correlates of workplace depression in the national comorbidity survey replication. *Journal of occupational and environmental medicine/American College of Occupational and Environmental Medicine, 50*(4), 381.

Klomp, J. (2013). The measurement of human capital: a multivariate macro-approach. *Quality & Quantity, 47*(1), 121-136.

Knapp, M. (2003). Hidden costs of mental illness. *The British Journal of Psychiatry, 183*(6), 477-478.

Kreijveld, M. (2012). *Samen slimmer: Hoe de 'wisdom of crowds' onze samenleving zal veranderen*. Den Haag: DeltaHage.

Laane, R., & Luijk, R. (2012). ROM en positie van de zorgverzekeraars. *Tijdschrift voor Psychiatrie, 54*(2), 135-139.

Lerner, D., Adler, D. A., Chang, H., Lapitsky, L., Hood, M. Y., Perissinotto, C., . . . Rogers, W. H. (2004). Unemployment, job retention, and productivity loss among employees with depression. *Psychiatric Services, 55*(12), 1371-1378.

Lerner, D., & Henke, R. M. (2008). What does research tell us about depression, job performance, and work productivity? *Journal of Occupational and Environmental Medicine, 50*(4), 401-410.

Levin-Epstein, J. (2005). *Presenteeism and paid sick days*. Washington, DC: Center for Law and Social Policy.

Lim, K. L., Jacobs, P., Ohinmaa, A., Schopflocher, D., & Dewa, C. S. (2008). A new population-based measure of the economic burden of mental illness in Canada. *Chronic Diseases in Canada, 28*(3), 92-98.

Lindeman, S., Hämäläinen, J., Isometsä, E., Kaprio, J., Poikolainen, K., Heikkinen, M., & Aro, H. (2000). The 12-month prevalence and risk factors for major depressive episode in Finland: representative sample of 5993 adults. *Acta Psychiatrica Scandinavica, 102*(3), 178-184. doi: 10.1034/j.1600-0447.2000.102003178.x

Linstone, H. A., Turoff, M., & Helmer, O. (1975). *The Delphi method: Techniques and applications*: Addison-Wesley Publishing Company, Advanced Book Program.

Loeppke, R., Taitel, M., Haufle, V., Parry, T., Kessler, R. C., & Jinnett, K. (2009). Health and productivity as a business strategy: A multiemployer study. *Journal of Occupational and Environmental Medicine, 51*(4), 411-428.

Lokkerbol, J., Verhaak, P., & Smit, F. (2011). *Op zoek naar een kosteneffectieve Basis GGZ: Scenario's voor zorginnovatie*. Utrecht: Trimbos-Instituut.

Mastenbroek, C. G., & Doeschot, R. G. P. (2012). Rapport Stringent Pakketbeheer. Diemen: College voor Zorgverzekeringen.

McNair, B. G., Highet, N. J., Hickie, I. B., & Davenport, T. A. (2002). Exploring the perspectives of people whose lives have been affected by depression. *Medical Journal of Australia, 176*(10), 69.

Murray, C. J. L., & Lopez, A. D. (1996). *The global burden of disease and injury series. Volume 1: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020*. Boston, MA: The Harvard School of Public Health.

Nieuwenhuijsen, K., Bultmann, U., Neumeyer-Gromen, A., Verhoeven, A., Verbeek, J., & van der Feltz-Cornelis, C. (2008). Interventions to improve occupational health in depressed people. *Cochrane Database Syst Rev, 2*(2).

Olsen, L. R., Mortensen, E. L., & Bech, P. (2004). Prevalence of major depression and stress indicators in the Danish general population. *Acta Psychiatrica Scandinavica, 109*(2), 96-103.

Organisation for Economic Cooperation and Development. (2012). Sick on the Job? Myths and realities about Mental Health and Work *Mental Health and Work*. Paris: OECD Publishing.

Organisation for Economic Cooperation and Development. (2013a). Average annual hours actually worked per worker Retrieved 06-06-2013, from http://stats.oecd.org/Index.aspx?DatasetCode=ANHRS

Organisation for Economic Cooperation and Development. (2013b). Social Expenditure Database (SOCX) Retrieved 02/05/2013, from http://www.oecd.org/social/soc/socialexpendituredatabasesocx.htm

Pirkola, S. P., Isometsä, E., Suvisaari, J., Aro, H., Joukamaa, M., Poikolainen, K., . . . Lönnqvist, J. K. (2005). DSM-IV mood-, anxiety-and alcohol use disorders and their comorbidity in the Finnish general population. *Social Psychiatry and Psychiatric Epidemiology, 40*(1), 1-10.

Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the

representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

Raad voor de Volksgezondheid en Zorg. (2006). Zinnige en duurzame zorg. Zoetermeer: author.

Sagoff, M. (2009). Intrinsic value: a reply to Justus et al. *Trends in Ecology and Evolution, 24*(12), 643.

Saracci, R. (1997). The World Health Organisation needs to reconsider its definition of health. *Bmj, 314*(7091), 1409.

Schoenbaum, M., Unützer, J., McCaffrey, D., Duan, N., Sherbourne, C., & Wells, K. B. (2002). The effects of primary care depression treatment on patients' clinical status and employment. *Health Services Research, 37*(5), 1145-1158.

Seldenrijk, A., Van Hout, H. P. J., Van Marwijk, H. W. J., Diamant, M., & Penninx, B. W. J. H. (2011). Depression, anxiety and subclinical vascular damage. *Depressie, angst en subklinische vaatschade, 42*(5), 114-117.

Shaw, J. D., Park, T. Y., & Kim, E. (2013). A resource-based perspective on human capital losses, HRM investments, and organizational performance. *Strategic management journal, 34*(5), 572-589.

Simon, G. E., Revicki, D., Heiligenstein, J., Grothaus, L., VonKorff, M., Katon, W. J., & Hylan, T. R. (2000). Recovery from depression, work productivity, and health care costs among primary care patients. *General Hospital Psychiatry, 22*(3), 153-162.

Slobbe, L. C. J., Smit, J. M., Groen, J., Poos, M. J. J. C., & Kommer, G. J. (2011). *Kosten van ziekten in Nederland 2007. Trends in de Nederlandse zorguitgaven 1999-2010*. Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu (RIVM).

Smit, F., Willemse, G., Koopmanschap, M., Onrust, S., Cuijpers, P., & Beekman, A. (2006). Cost-effectiveness of preventing depression in primary care patients Randomised trial. *The British Journal of Psychiatry, 188*(4), 330-336.

Spijker, J., Bockting, C. L. H., Meeuwissen, J. A. C., van Vliet, I. M., Emmelkamp, P. M. G., Hermens, M. L. M., & Balkom, A. L. J. M. (2012). Multidisciplinaire richtlijn Depressie (Tweede revisie). Richtlijn voor de diagnostiek, behandeling en begeleiding van volwassen patiënten met een depressieve stoornis. Utrecht: Trimbos-Instituut.

Spijker, J., De Graaf, R., Bijl, R. V., Beekman, A. T. F., Ormel, J., & Nolen, W. A. (2002). Duration of major depressive episodes in the general population: Results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *British Journal of Psychiatry, 181*(SEPT.), 208-213.

Srinivasa Murthy, R., Manoel Bertolote, J., Epping-Jordan, J., Funk, M., Prentice, T., Saraceno, B., & Saxena, S. (2001). Mental Health: New Understanding, New Hope. Geneva, Switzerland: World Health Organization.

Stegenga, B. T., Kamphuis, M. H., King, M., Nazareth, I., & Geerlings, M. I. (2012). The natural course and outcome of major depressive disorder in primary care: the PREDICT-NL study. *Social Psychiatry and Psychiatric Epidemiology, 47*(1), 87-95.

Stewart, W. F., Ricci, J. A., Chee, E., Hahn, S. R., & Morganstein, D. (2003). Cost of Lost Productive Work Time Among US Workers With Depression. *The Journal of the American Medical Association, 289*(23), 3135-3144.

Stienstra, J., & Bruins, G. (2008). Perspectieven op de GGZ. Rapportage van een kwalitatief verkennend onderzoek naar de kijk op de geestelijke gezondheidszorg en de reputatie van de GGZ in de samenleving.

Stroombergen, A., Rose, W. D., & Nana, G. (2002). *Review of the statistical measurement of human capital*. Quays, New Zealand: Statistics New Zealand.

Substance Abuse and Mental Health Services Administration (SAMHSA) OoASO. (2007). The NSDUH Report: Depression among Adults Employed Full-Time, by Occupational Category. Rockville.

Tamura, R. (2006). Human capital and economic development. *Journal of Development Economics, 79*(1), 26-72.

Thomas, C. M., & Morris, S. (2003). Cost of depression among adults in England in 2000. *The British Journal of Psychiatry, 183*(6), 514-519. doi: 10.1192/00-000

Thomson, S., Foubister, T., & Mossialos, E. (2009). *Financing health care in the European Union: challenges and policy responses*. Geneva, Switzerland: World Health Organization.

Thornicroft, G., Rose, D., Kassam, A., & Sartorius, N. (2007). Stigma: ignorance, prejudice or discrimination? *The British Journal of Psychiatry, 190*(3), 192-193. doi: 10.1192/bjp.bp.106.025791

van Weel-Baumgarten, E. M., van Gelderen, M. G., Grundmeijer, H. G. L. M., Licht-Strunk, E., van Marwijk, H. W. J., & van Rijswijk, H. C. A. M. (2012). NHG-Standaard Depressie (tweede herziening). *Huisarts & Wetenschap, 55*(6), 1-20.

Wang, I. M., Shieh, C. J., & Wang, F. J. (2008). Effect of human capital investment on organizational performance. *Social Behavior and Personality, 36*(8), 1011-1022.

Wang, J., Smailes, E., Sareen, J., Fick, G. H., Schmitz, N., & Patten, S. B. (2010). The prevalence of mental disorders in the working population over the period of global economic crisis. *Canadian journal of psychiatry. Revue canadienne de psychiatrie, 55*(9), 598.

Wang, P. S., Simon, G. E., Avorn, J., Azocar, F., Ludman, E. J., McCulloch, J., . . . Kessler, R. C. (2007). Telephone screening, outreach, and care management for depressed workers and impact on clinical and work productivity outcomes. *JAMA: The Journal of the American Medical Association, 298*(12), 1401-1411.

Wang, P. S., Simon, G. E., & Kessler, R. C. (2008). Making the business case for enhanced depression care: The national institute of mental health-Harvard work outcomes research and cost-effectiveness study. *Journal of Occupational and Environmental Medicine, 50*(4), 468-475.

Weehuizen, R. (2008). *Mental Capital. The economic significance of mental health.* Doctor, Universitaire Pers Maastricht, Maastricht.

Well, D. N. (2007). Accounting for the effect of health on economic growth. *The Quarterly Journal of Economics, 122*(3), 1265-1306.

Wells, K. b., Sherbourne, C., Schoenbaum, M., & et al. (2000). Impact of disseminating quality improvement programs for depression in managed primary care: A randomized controlled trial. *JAMA, 283*(2), 212-220. doi: 10.1001/jama.283.2.212

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal, 5*(2), 171-180.

Wittchen, H. U., & Jacobi, F. (2005). Size and burden of mental disorders in Europe—a critical review and appraisal of 27 studies. *European Neuropsychopharmacology, 15*(4), 357-376.

Woo, J. M., Kim, W., Hwang, T. Y., Frick, K. D., Choi, B. H., Seo, Y. J., . . . Lee, J. S. (2011). Impact of depression on work productivity and its improvement after outpatient treatment with antidepressants. *Value in Health, 14*(4), 475-482.

World Health Organization. (2003). Investing in mental health. Geneva, Switzerland: Author.

World Health Organization. (2007). Mental Health: Strengthening Mental Health Promotion Retrieved 02-06-2013, from http://www.who.int/mediacentre/factsheets/fs220/en/

World Health Organization. (2008). The global burden of disease: 2004 update. Geneva, Switzerland: Author.

Zhang, M., Rost, K. M., Fortney, J. C., & Smith, G. R. (1999). A community study of depression treatment and employment earnings. *Psychiatric Services, 50*(9), 1209-1213.

8. Appendices

8.1 Appendix A – The economic benefits of depression treatment

As was shown in table 4.7, depression treatment has a positive effect on work productivity. It is interesting to calculate the size of these effects. In order to do this it is necessary to start by calculating the number of employees who receive adequate treatment for their depression. This is done in table 8.1 and 8.2.

Table 8.1

Number of employees receiving any form of treatment

	Percentage	Total employees
Working population		7.392.000
Depression rate within working population	4,2%	310.464
Percentage receiving any form of care	58,50%	181.621
Total		**181.621**

* Small deviations may occur due to rounding differences.

Based on de Graaf et al. (2010), de Graaf et al. (2011a) & CBS Statline (2013)

Table 8.2

Number of employees receiving adequate treatment

Total number of employees receiving any treatment is 181.621

	Mild depression	Moderate depression	Severe depression
Severity distribution (%)	33,5%	37,0%	29,5%
Total # per severity	60.913	67.200	53.509
Percentage receiving adequate treatment	50,65%	63%	77,60%
Total number of employees receiving adequate treatment	**30.853**	**42.511**	**41.523**

Based on data from the questionnaire

Now that the number of employees who are receiving adequate treatment for depression is known, it is necessary to retrieve data on the average production of employees. This is done in table 8.3.

Table 8.3

Average productivity per employee per year

Average working days p/y	228
Average work hours p/y	1379
Average productivity p/h	€30,71
Average productivity p/y	**€42.349**

* Small deviations may occur due to rounding differences.

Based on figures from the Organisation for Economic Cooperation and Development (2013a), European Foundation for the Improvement of Living and Working conditions (2010) & Hakkaart- van Roijen, Tan, and Bouwmans (2011). The most recent average productivity per hour was based on 2009. It has been corrected for inflation.

Now that the production value of an average employee is known, we want to know the average production of an employee with depression who receives adequate treatment compared to the production value of those who do not receive (adequate) treatment. In order to this we first have to take into account the 22,8 additional sick days that employees with depression have compared to an average employee (de Graaf et al., 2011b). There was no significant relationship found between severity and the number of sick days so the 22,8 additional sick days is applicable to employees with mild, moderate and severe depression.

Table 8.4

Average working hours for employees with depression

Average working days p/y	228
Average work hours p/y	1379
Addition sick days per employee with depression	22,8
Remaining work days	**205,2**
Remaining work hours	**1241,1**
Average productivity p/y (if presenteeism is not yet taken into account)	**€38.114**

* Small deviations may occur due to rounding differences.

Based on de Graaf et al. (2011b)

Table 8.4 shows the average working hours for employees with depression. It also shows the associated production value if presenteeism is not yet calculated.

Studies show that depression treatment restores productivity. It is unclear at what pace this happens, but literature suggests that most recovery takes place in the first months after treatment. However, because the exact recovery rate is unknown, a conservative assumption is made. We assume that recovery takes place linear throughout the year.

In order to find the average productivity of employees, we first calculate the production value at T_0 (table 8.5). Then for T_1 without adequate treatment (T_{1UTr}) (table 8.6), and finally for T1 with adequate treatment (T_{1Tr}) (table 8.7). Percentages are based on table 4.8.

Table 8.5

Productivity at T_0 (diagnosis)

	Mild depression	Moderate depression	Severe depression
Productivity level at T_0	67,31%	48,08%	25,00%
Estimated productivity if productivity level remains equal across year	€25.654	€18.325	€9.528

* Small deviations may occur due to rounding differences.

Based in figures from the questionnaire

Table 8.6

Productivity at T_{1UTr} (Untreated)

	Mild depression	Moderate depression	Severe depression
Productivity level at T_{1UTr}	81,15%	60,38%	38,85%
Estimated productivity if productivity level remains equal across year	€30.929	€23.013	€14.807

* Small deviations may occur due to rounding differences.

Based on figures from the questionnaire

Table 8.7

Productivity at T_{1Tr} (Treated)

	Mild depression	Moderate depression	Severe depression
Productivity level at T_0	91,54%	81,15%	65,00%
Estimated productivity if productivity level remains equal across year	€34.889	€30.929	€24.774

* Small deviations may occur due to rounding differences.

Based on figures from the questionnaire

Now it is simply a matter of adding the estimated production values together for T_0 with T_{1Tr} and dividing them by two. This produces the average productivity for employees with depression who received adequate treatment. The same is done for those who do not receive (adequate) treatment. The results are shown in table 8.8.

Table 8.8

Average benefit per employee because of depression treatment

	Mild depression	Moderate depression	Severe depression
Average annual productivity if adequate treatment	€30,272	€24,627	€17.151
Average annual productivity if no (adequate) treatment	€28.292	€20.669	€12.167
Average benefit per employee because of depression treatment	**€1.980**	**€3.958**	**€4.983**

* Small deviations may occur due to rounding differences.

Now that the average benefit of depression treatment is known, it is rather simple to calculate the total benefit of depression treatment in the Netherlands. We multiply the average benefits per employee with the total number of patients who are receiving adequate treatment. The final result is shown in table 8.9.

Table 8.9

Total benefit of depression treatment in the Netherlands

	Mild depression	Moderate depression	Severe depression
Average benefit per employee because of depression treatment	€1.980	€3.958	€4.983
Number of employees receiving adequate treatment	30.853	42.511	41.523
Total benefit per severity	**€61.088.835**	**€168.263.965**	**€206.924.801**
Total benefit	**€436.277.602**		

* Small deviations may occur due to rounding differences.

It is interesting to calculate the total possible benefits of depression treatment in the Netherlands if everyone were given adequate treatment (table 8.10)

Table 8.10

Total potential benefit of depression treatment in the Netherlands

	Mild depression	Moderate depression	Severe depression
Average benefit per employee because of depression treatment	€1.980	€3.958	€4.983
Number of employees receiving some form of depression treatment	60.913	67.200	53.509
Total potential economic benefit per severity level	€ 120.609.744	€ 265.987.931	€ 266.655.672
Total potential economic benefit	**€ 653.253.347**		

* Small deviations may occur due to rounding differences.

If every employee with depression received adequate care, the total economic benefits would be €653 million per year. A potential increase of approximately €217 million per year compared to the current benefits.

8.2 Appendix B – Factsheet Depression (Dutch)

The next two pages show the factsheet that was constructed based on this thesis' research. It is in Dutch and its purpose is to direct attention the severity of depression on both the individual and national level.

De ernst van depressie. Stand van zaken in Nederland

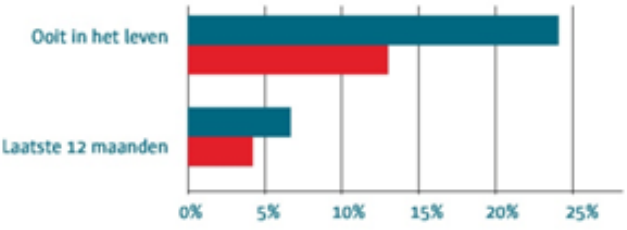
Van alle psychische aandoeningen komt depressie veruit het meest voor. Bijna 20% van alle Nederlanders krijgt er ooit in zijn leven mee te maken. Depressie is nationaal één van de grootste veroorzakers van gezondheidsverlies en kost jaarlijks bijna drie miljard euro aan directe en indirecte kosten. Hoewel ongeveer de helft van de mensen met depressie binnen drie maanden herstelt, ontwikkelt 15-20% een chronische depressie waar men langdurig (tot meer dan 20 jaar) periodiek last van houdt. Effectieve behandeling helpt niet alleen de hersteltijd te verkorten, maar beperkt ook het aantal mensen met langdurige depressie.

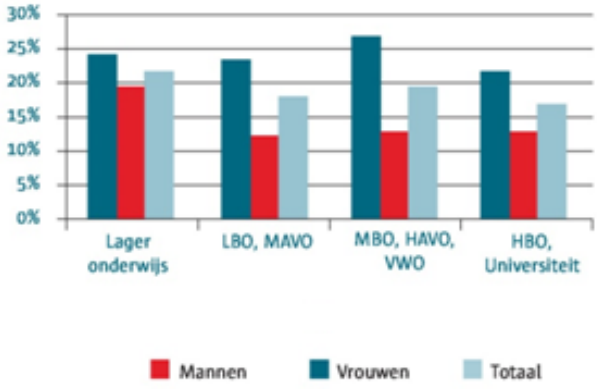
WAT IS DEPRESSIE?

Depressie wordt vaak gezien als weinig meer dan een neerslachtige periode, een gezond onderdeel van rouwverwerking of als een simpele dip, maar depressie is veel meer dan dat. Aan de diagnose depressie zijn strikte voorwaarden verbonden Het gaat om **een ernstige aandoening met grote gevolgen.** Onbehandeld leidt depressie in veel gevallen tot een langdurig verlies in kwaliteit van leven.

Zelfs wanneer de strikte voorwaarden voor de diagnosestelling in acht worden genomen, komt depressie veelvuldig voor. **Van alle Nederlanders krijgt 18,7% ooit in het leven te maken met een depressie en per jaar heeft 5,2% van de gehele bevolking een depressieve stoornis**[1]. Onder vrouwen komt het vaker voor dan bij mannen en hoewel het iets vaker voorkomt onder laag- dan onder hoogopgeleiden, is depressie aanwezig in alle lagen van de samenleving, ongeacht beroepsgroep, etniciteit of sociaal economische status.

Het vóórkomen van depressie





CRITERIA DEPRESSIE (VERKORT)

Vijf (of meer) van de volgende symptomen zijn binnen dezelfde periode van twee weken bijna dagelijks aanwezig en wijzen op een verandering ten opzichte van het eerdere functioneren; ten minste een van de symptomen is ofwel depressieve stemming ofwel verlies van interesse of plezier.

1. depressieve stemming gedurende het grootste deel van de dag
2. duidelijke vermindering van interesse of plezier in alle of bijna alle activiteiten gedurende het grootste deel van de dag
3. duidelijke gewichtsvermindering zonder dieet, of gewichtstoename of afgenomen of toegenomen eetlust.
4. insomnia of hypersomnia
5. psychomotorische agitatie of remming
6. moeheid of verlies van energie
7. gevoelens van waardeloosheid of buitensporige of onterechte schuldgevoelens
8. verminderd vermogen tot naderen of concentratie of besluiteloosheid
9. terugkerende gedachten aan de dood, terugkerende suïcidegedachten, of een (specifiek plan voor een) suïcidepoging

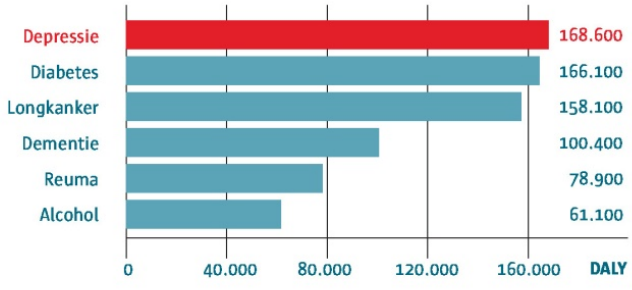
Zie voor de volledige uitgebreide criteria de DSM-IV-TR art. 296.xx

GEVOLGEN EN KOSTEN

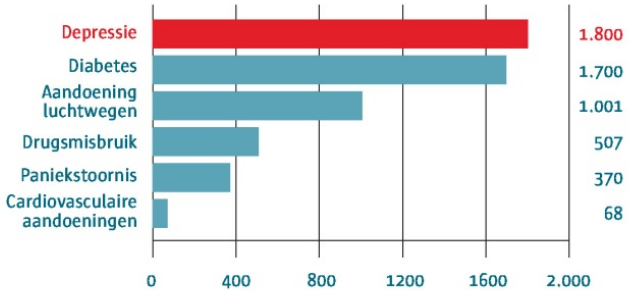
Depressie heeft grote gevolgen voor de kwaliteit van leven. Hoe ernstiger de depressie, hoe groter de gevolgen. Ongeveer de helft van alle patiënten herstelt binnen drie maanden[2], maar bij 15-20% ontstaat een chronische depressie waar mensen langdurig (tot meer dan 20 jaar) periodiek last van houden[3]. **In Nederland kost depressie jaarlijks 168.000 Disability Adjusted Life Years Daarmee is het negatieve effect van depressie op de nationale gezondheid groter dan dat van o.a. dementie, diabetes, of longkanker**[4]. De behandelkosten voor depressie bedragen bijna een miljard euro (€966 miljoen) per jaar[5].

GGZNEDERLAND

Aantal DALY per ziektebeeld



Jaarlijkse kosten van het totale werkverzuim en productiviteitsverlies in Nederland. (afgeronde bedragen x € 1.000.000)

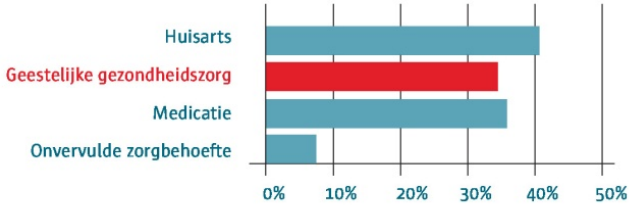


Een DALY (Disability Adjusted Life-Year) kwantificeert gezondheidsverlies en is opgebouwd uit twee componenten: jaren verloren door vroegtijdige sterfte en jaren geleefd met ziekte. Het concept komt uit de studie 'Global Burden of Disease' (GBD) van de Wereldbank en de World Health Organization.

Een depressie is (mede-)oorzaak van slechtere lichamelijke gezondheid. Het leidt tot een drie maal grotere kans op hart-en-vaatziekten en heeft mede daardoor een negatief effect op de levensverwachting. Bovendien zijn de behandelkosten van hart-en-vaatziekten hoog. Preventie of vroege detectie en tijdige behandeling van depressie kan helpen om de levensverwachting te verhogen en de ziektelasten te beperken[6].

Naast gezondheidsklachten heeft depressie ook financiële gevolgen. **Een depressieve werknemer heeft ca. 23 verzuimdagen meer dan collega's zonder depressie** en is ook minder productief wanneer hij wel op werk aanwezig is. Deze indirecte kosten van depressie worden geschat op **€1,8 miljard per jaar**[7]. Voor jongeren met depressie geldt dat ze minder presteren op school en eerder stoppen met hun opleiding. Zonder behandeling zouden de maatschappelijke kosten van depressie nog hoger zijn. Nog los van de individuele gezondheidswinsten blijkt uit schattingen dat de huidige depressiezorg tussen de €400 en €450 miljoen per jaar oplevert door gezondere en productievere werknemers[8].

Door wie worden mensen met depressie behandeld



Behandeling

Van alle mensen met een depressieve stoornis ontvangt 58,5% enige vorm van zorg. Van de groep die geen zorg ontvangt, heeft het grootste deel een milde vorm van depressie die na verloop van tijd vanzelf overgaat en daarom hebben zij geen behoefte aan behandeling. Signalering gebeurt voornamelijk door de huisarts. Meer dan de helft van mensen met een depressie wordt behandeld binnen de algemene gezondheidszorg, terwijl iets meer dan één derde in de specialistische geestelijke gezondheidszorg terechtkomt. Ook krijgt meer dan één derde antidepressiva.

Behandeling gebeurt via een zogenaamd stepped care model. De behandelaar start met de lichtste vorm van gepaste behandeling en evalueert het behandelbeleid regelmatig samen met de patiënt zodat er bij onvoldoende herstel tijdig overgestapt kan worden op een zwaardere interventie. Veelgebruikte eerste-stap interventies zijn cognitieve gedragstherapie (CGT) en farmacotherapie. Elk van deze methodes heeft zijn effectiviteit bewezen in wetenschappelijke studies[9].

Nog veel te winnen

Depressie komt vaker voor dan welke andere psychische aandoening dan ook. Voor individuen betekent het een groot verlies in kwaliteit van leven. Op nationaal niveau kosten depressieve werknemers miljarden euro's per jaar. Investeringen in effectieve depressiezorg zijn zinvol en verantwoord. Er worden grote besparingen gerealiseerd door de huidige depressiezorg, maar er valt nog veel te winnen.

Bronnen:
[1] de Graaf, De psychische gezondheid van de Nederlandse bevolking (2010); [2] Spijker, Duration of major depressive episodes in the general population (2010); [3] Eaton, Population-based study of first onset and chronicity in major depressive disorder (2008); [4] RIVM. Nationaal Kompas Volksgezondheid (2013); [5] Slobbe, Kosten van ziekten in Nederland 2007 (2011); [6] Seldenrijk, Depression, anxiety and subclinical vascular damage (2011); [7] de Graaf, Verzuim door psychische en somatische aandoeningen bij werkenden (2011); [8] van Geldrop, The economic value of depression treatment in The Netherlands (2013); [9] Spijker, Multidisciplinaire richtlijn Depressie (Tweede revisie) (2012)

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