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THE BURDEN OF MENTAL DISORDERS IN THE EUROPEAN UNION

EU-WMH

The EU Contribution to the World Mental Health (WMH) Surveys Initiative

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Executive summary

Background

Epidemiological research on mental disorders systematically showed that mental disorders play an important role in society. First, they are common: between 10 and 25% of the adult general population in Western countries meet criteria for a DSM-IV mental disorder in a given year (Demyttenaere et al., 2004). Second, mental disorders have a large impact on daily life of those who meet criteria for a disorder (Alonso et al., 2004). The European ESEMeD and EPREMeD projects have shown that burden of mental disorders are associated with 70 to 140 days per year with significant work loss and impaired role functioning (Demyttenaere et al., 2006; 2007; Bruffaerts et al., 2008), making mental disorders amongst the most burdensome disorders in life (Murray & Lopez, 1996).

As the Green Paper “Improving the mental health of the population: Towards a strategy on mental health for the European Union” points out, mental health is poorly covered by existing health monitoring systems. Major efforts are needed to harmonize existing national and international indicators on mental health and disability in populations to create a comparable dataset across the EU. More data is required on the social, demographic and economic determinants of mental health, as well as promotion and preventive infrastructures, activities and resources.

Against this background, the longer aim of this report is the improvement of knowledge base of public mental health in a way that is useful for monitoring health policy reforms in Europe. By analyzing, interpreting, and synthesizing the data collected in the World Mental Health (WMH) surveys initiative in 10 European countries (i.e. Belgium, France, the Netherlands, Germany, Spain, Italy, Northern Ireland, Portugal, Bulgaria, and Romania), the project will produce new, representative, and focused knowledge on the burden of mental disorders and their distribution across relevant demographic groups. Results will translate into baseline indicators useful for elaborating, monitoring and evaluating public health policy reforms in the EU. Active dissemination among scientists and stakeholders will contribute to evidence-based mental health policies and mental health awareness. It will stimulate comparability and monitoring of mental health in Europe in the future.

The current report yields clear and concise up-to-date knowledge on distribution and burden of mental disorders throughout 10 European countries. Apart from providing prevalence estimates of mood, anxiety, and alcohol disorders, our aim is to identify individual and societal burdens of mental disorders. In more detail, we investigate different aspects of burden: quality of daily life functioning, the number of days out of role per month and per year, the number of days that persons with mental disorders are not able to perform their daily functioning, the effect of mental disorders on the workplace (in terms of absenteeism & presenteeism). We also investigate economic effects of the presence of mental disorders on the loss of or reduction in annual earnings and the loss of human capital. The data presented

in the current report is based on (a) a comprehensive literature review on burden of mental disorders and (b) descriptive and analytical analyses of the EU-WMH database, comprising country-representative mental health data from Belgium, France, the Netherlands, Germany, Spain, Italy, Northern Ireland, Portugal, Bulgaria, and Romania.

Policy implications

Representing about 246,000,000 adult inhabitants of Belgium, France, Germany, Italy, the Netherlands, Spain, Portugal, Romania, Bulgaria, and Northern-Ireland, this study is the first study ever that points to the magnitude of mental disorders in these countries: about 32 million people have experienced a mental disorder in the past year, of which more than 22 million experienced an anxiety disorder, more than 12 million a mood disorder, and almost 3 million people experiencing an alcohol use disorder.

In the EU, several countries face common challenges in responding to the need to prevent chronic mental disorders and care for persons with chronic conditions. As countries improve their mental health care services, they have unique opportunities to develop and maintain effective and efficient health care systems in order to optimize mental health management. Against this, we have identified 3 specific noteworthy implications: (a) when it comes to developing sustainable policies in treating the burden of mental disorders on a societal level, our findings suggest that the number of absenteeism days may be significantly reduced with 17-21% in the absence of mental disorders. Further, PTSD and depression may be a focus for prioritization for health care policies, both regarding prevention/treatment of these conditions and resource allocation. How this may effectively be done at local country levels remains an open question. Prevention, integrated treatment, and supportive services have been suggested, but the alleviation of this substantial burden of ill health, in both personal and economic terms, remains a significant challenge for policy makers. (b) Mental disorders are also very costly: they represent about 3-4% of the GDP. Except for anxiety disorders (where mixed findings were found), direct costs (of treatment) of mental disorders were lower than indirect costs. Against the light that public spending for mental disorders is generally lower than for other brain disorders (although mental disorders account for about two thirds of all brain disorders in Europe), our findings stipulate the necessity to specifying interventions on preventing and treating mental disorders. (c) An important question for both the European Union and the individual European countries is to evaluate the extent to which changes and investments in mental health care services (e.g. resource allocation) relate to changes and investments in educational, environmental, or economic fields, in both a short- and a long-term perspective. In making this evaluation, it is crucial to have information on the costs of both treating and not treating specific groups of mental disorders and to weigh and evaluate competing costs of alternate policy decisions.

Our findings that indirect costs accounting to mental disorders (e.g. substantial more presenteeism and absenteeism days, or significantly reduced earnings among those with a mental disorder) are in line with the thought that it is not only humane but also rational to

provide treatment for mentally ill inhabitants of a given country. Evidence of the relative impact of different mental disorders on role disability and earnings may also be of interest to employers, trade unions, professional associations, and related stakeholders, because they are forefront to implementing strategies to reduce workplace pre- and absenteeism among workers, coaching the reintegration process. Another focus may be the considerable association between serious mental illness and low(er) monthly earnings. Against the light that lower income may be specifically interpreted as a longer-term negative consequence of mental disorders, the issue could be raised to what extent job training and/or vocational rehabilitation may yield effects.

Key messages

From the comprehensive literature review it becomes evident that, **first**, the presence of a mental disorder is associated with four interrelated burdens: loss or reduction of quality of life (e.g. persons with mental disorders have about 4-8 additional days per month with significantly decreased role functioning), stigma, unemployment (e.g. persons with mental disorders are about two times more likely to be unemployed), and costs. The costs for mental disorders in the United States were estimated at \$148 billion. Depressive and anxiety disorders account each for about 30% of the total costs; alcohol disorders account for the remainder (or more) of the total costs. There is evidence for a 100% increase of costs of depression in an 8-year period. **Second**, indirect costs outline direct costs for any mental disorder, mood, and anxiety disorder. Comparable findings on anxiety disorders are mixed. **Third**, apart from the finding that mental disorders are common in the workplace, they are also associated with an additional of approximately 6 days with significant work loss per month. Both absenteeism and presenteeism are important because presenteeism may serve as a precursor of absenteeism. Likewise, **fourth**, mental disorders are also associated with significant reductions of earnings among workers: by-and-large, earnings are reduced with 25-32% among workers with either depressive or anxiety disorders. Although there is no consistent evidence for a direct association between the presence of alcohol disorders and lower income, alcohol disorders was found to be associated with lower earnings indirectly, e.g. by their negative effects on educational attainment or by postponing the age of graduation).

Based on statistical analyses of the EU-WMH database, a **fifth** key finding is that mental disorders are common in the European Union: about one in four persons meets criteria for a lifetime prevalence of any mental disorder. The 12-month prevalence is somewhat lower, about 13%. Major depression and specific phobia are the most common disorders. Disorders are mostly common in Northern Ireland and Portugal. A **sixth** key finding is that absenteeism is reported by 10% of the general and 9% of the working population (especially those above 50 years old), representing respectively 10 and 9 absenteeism days per year. Comparable figures for persons with mental disorders are 32 and 24 days per year. Absenteeism was systematically highest in persons with either panic or post-traumatic stress disorder. A

seventh finding is that, besides absenteeism, presenteeism (lower quantity of work, lower quality of work, or same quantity of work but with extreme effort) is an important addition to the study the burdens of mental disorders. Indeed, about one in the general population (and about 18% of the workers) in five reported some presenteeism day per month. In the general population, presenteeism days for persons without mental disorders range between 6-23 per year compared to 29-41 per year for those with mental disorder. Comparable figures for the working population were 5-18 presenteeism days for those without, and 22-29 days for those with mental disorders. An **eighth** key finding is that mental disorders also have, apart from individual effects, societal effects with population attributable risk proportions (PARP) ranging between 17 (for presenteeism) and 21% (for absenteeism). Anxiety disorders (as a group) and major depressive episode (as a single disorder) yielded the highest PARPs. The **ninth** and last key finding is that serious depressive and anxiety disorders are significantly associated with a decrease in earnings equal to 29% of the median within-country earnings in the separate EU-countries of the EU-WMH project.

1. INTRODUCTION

Epidemiological research on mental disorders systematically yielded consistent findings on the role of mental disorders in the society. A first consistent finding is that mental disorders are common: by-and-large, between 10 and 25% of the adult general population in Western countries meet criteria for a DSM-IV mental disorder in a given year (Demyttenaere et al., 2004). A second consistent finding is that these mental disorders have a large impact on daily life of those who meet criteria for a disorder (Alonso et al., 2004). Among others, the ESEMeD and EPREMeD projects have shown that burden of mental disorders is substantial (e.g. Alonso et al., 2004; 2008; Demyttenaere et al., 2006; 2007; Bruffaerts et al., 2008), leading to 70 up to 140 days per year with significant work loss and impaired role functioning. Often used measures to assess this impact are role functioning or role impairment, disability, or suicidality. These indicators have been proven to be valid and reliable individual-level measures of impact. However, against the light that mental disorders may have a large societal impact (Murray & Lopez, 1996), society-level studies of impact of mental disorders are strongly needed. There are three important society-level measures that are scarcely used to measure the impact of mental disorder on a society level: (a) the effects of mental disorders in adulthood on monthly income (Goldsmith et al., 1997), (b) the effects of mental disorders on full disability and partial disability among the general population (Alonso et al., 2010), and (c) the effects of existing mental disorders on full disability and partial disability among persons in regular working conditions (Kessler et al., 2008). The effects mental disorders yield on earnings is a relatively infrequent albeit interesting measure since it estimates the effects of mental disorders on both the individual- and society-level of productive human capital. Measures that have been trying to identify burden of mental disorders in the workplace are scarce. Moreover, to date, there are no consistent findings regarding the burden of mental disorders in newer European countries (Wittchen & Jacobi, 2005). Knowledge on burden of mental disorders in these newer European countries is strongly recommended (Korkeila, 2006; Padenu et al., 2006). Previous studies were performed in 'older' Western-European countries and have been measuring rather classical measures of burden of mental disorders (like disability or role impairment). Against the light of the overall limited approach of burden of mental disorders, two general objectives for the present report could be mentioned. A first objective is to estimate the prevalence of mental disorders in ten European countries (i.e. Belgium, France, the Netherlands, Germany, Italy, Spain, Northern-Ireland, Portugal, Romania, and Bulgaria). A second objective is to estimate the burden associated with mental disorders using a comprehensive literature review and using the database from the ten EU-countries of the World Mental Health surveys. In more detail, the specific aims of this report are : (a) to estimate the prevalence of mental disorders in ten European countries, (b) describing the effects of 12-month mental disorder (depressive disorders, anxiety disorders, alcohol disorders) on partial disability and full disability in both the general and the working population in terms of individual and societal effects, (c) investigating the effects of 12-month mental disorder on monthly wages in employed and

non-employed persons in the pooled general population sample, (d) describing country differences in prevalence and burden of mental disorders, and (e) to generate policy implications and directions for the future.

2. MATERIAL AND METHODS

2.1. Systematic literature review on burden of mental disorders

A comprehensive search was performed using the following keywords: mental disorders, impact, quality of life, functioning, partial disability, full disability, disability, burden, general population, working, income, wages, and salaries (see appendix 1 for more details). This search strategy was executed in PubMed. Specifications were drawn concerning the publication date of the articles found, namely from January 1990 until June 2010. The search was limited to the adult population (≥ 18 years old). The search was opened to studies developed in any region of the world. A total of 817 documents were extracted. We included also several documents from grey literature. We have been reviewing the output (reading articles' title and abstract) cleaning references according to the following criteria. We included (a) studies dealing with burden related to quality of life, the workplace (full disability and partial disability), and income in relevant mental health topics (mental disorders detection/diagnosis, prevalence/presence of mental disorders, comorbidity, hospital admissions, mental disorders onset) and (b) studies dealing with the following mental disorders (DSM-III-R, DSM-IV or ICD-10): major depressive disorder, dysthymia, panic disorder, social phobia, specific phobia, generalized anxiety disorder, posttraumatic stress disorder, or alcohol disorder. Excluded were (a) studies dealing with physical health issues, (b) studies on mental health problems among respondents with medical conditions (e.g. diabetes, AIDS, obesity, menopause), (c) studies on health services quality or quality improvement programs, or studies testing new interventions as main objective or other therapeutic treatment interventions, (d) studies on tobacco consumption/smoking, stress, drug use/problems (other than alcohol related problems), psychotropic medication use (without mention of associated mental disorder diagnosis), suicide (without mention of associated mental disorder diagnosis), personality traits or disorders, sexual dysfunctions/disturbances, schizophrenia, bipolar disorder, dementia, psychosis, domestic violence, ADHD, (e) studies performed with populations age 17 years or younger without follow-up (until at least 18 years old), (f) studies performed in populations such as: death row inmates, imprisoned/incarcerated, convicts, condemned to prison, veterans, homeless, gay/lesbian/transsexuals, and (g) studies on public policies and their impact on burden of mental disorders.

The Medline search yielded a total of 817 studies. Based on reading their title and abstracts, 98 studies were eligible for reading full text. Of these 98 studies, 32 were (literature) reviews and/or international studies, one was Australian, one was Asian, one was New Zealand, four were African, 41 were North-American, and only 18 were European. This overrepresentation of North-American studies accentuates the need for more studies across various culturally and economically diverse countries and situations in Europe and in neighboring countries with North/South, East/West contrasts. Every month we updated this literature search in

PubMed with the purpose of including the most recent publications in this review. Together with the grey literature (24), we have a total of 122 references used in this review.

2.2. Analysis of the EU-World Mental Health database on burden of mental disorders

Study design, sampling methods, and sample size

The EU-WMH Survey Initiative included 10 participating countries: Belgium, Bulgaria, France, Germany, Italy, the Netherlands, Northern Ireland, Portugal, Romania and Spain. All surveys were conducted face-to-face by trained lay interviewers using computer-assisted personal interviewing (CAPI), except for Bulgaria that used paper-and-pencil (PAPI). The CAPI version of the questionnaire was implemented with Blaise, a software package developed by Statistics Netherlands (Statistics Netherlands, 1999). Cross-sectional household interview surveys were conducted on probability samples of each country's population aged 18 years or older living in private households. Institutionalized individuals (i.e., those living in prisons, hospitals, hotels or other institutions), as well as those not able to understand the language of each country, were excluded from the study.

The WMH Survey Initiative established guidelines that set minimum standards for the sampling procedures, but allowed for country specific adaptations. For example, probability methods were required at all stages of sample selection, but country-specific implementation of these methods varied due to differences in the types of sampling frames available (e.g., individual, address, voter registries) or the geographical areas that could be feasibly surveyed.

The final sampling frames (i.e. the list or enumeration procedure that identifies all population elements and enables the sampler to assign non-zero selection probabilities to each element (Kish 1965) for the EU-WMH surveys were mainly of three types: a) a list of individual contact information provided in the form of national population registries, voter registration lists, postal address lists, or household telephone directories; b) a multi-stage area probability sampling; or c) combined uses of area probability methods in the initial stages and a registry or population list in the penultimate and/or final stages of sample selection. Most countries applied multi-stage probability sampling methods. The number of sampling stages used to obtain the final sample differed across countries, but in all countries the first primary sampling unit was selected after stratification. Germany, France and the Netherlands used a two-stage survey. In France and the Netherlands, households were selected at the first stage and in the second stage an adult was randomly selected from the household. In the Netherlands, the household addresses at the first stage were selected from postal registries. In Germany, the first primary sampling unit consisted of municipalities, and the second sampling unit consisted of individuals randomly selected from the registry. Belgium and Italy required an additional stage before the selection of the individuals to be interviewed. In Belgium and Italy, individuals were selected from the registry at the third stage. Spain used 4

sampling stages where the units selected at the first stage were municipalities, the second stage consisted on selections of census tracks, and households were selected at the third stage from which the individuals were selected at the final stage. Bulgaria, used a three-stage sampling stages, where the first stage included municipalities, selected at random on territorial basis, the second stage was selection of sections within municipality and the third stage was selection of households within the sections. Each section include 200 households in average. The population was stratified according to administrative distribution of the regions. As the interview was conducted by Paper and Pencil method, the selection of the individual to be interviewed within the household was drawn using Kish tables. Similar to Spain, a multistage sampling plan, in four steps, has been used in Romania. Based on data generated by the Population and Housing units Census of March 2002, the national territory has been divided into geographic areas made by a minimum of 3 adjacent census sections, called Primary Units (PU), and a sample of these PUs were selected in the first stage. The selected PU's contain research centers from the Multifunctional Sample of Territorial Zones (EMZOT), from where a number of research centers were randomly selected in the second stage. In the third stage, a sample of housing units were systematically selected (all household within each unit were selected). The final stage consist of eligible individuals from each household. To achieve an equal probability sample of dwellings and households in Northern Ireland, a three- stage area probability sample design was used, based on the Northern Ireland's 5200 Census Output Areas (COA). In the primary stage of the sample, wards were selected with probability proportionate to size (PPS) from the wards that cover Northern Ireland's land area and population. Within this primary stage sample of wards, a second stage sample of 2 COAs per ward was selected with PPS. Finally, a third stage sample of 10 dwellings was selected from each sample COA. In Portugal, a stratified four-stage clustered area probability household sample was used. A sample of localities of the country was selected in the first stage, followed by subsequent stages of geographic sampling to arrive at a sample of households. In the second stage, the selection of random-route starting points was made in each locality. In the third stage, the initial selection of households was created. Finally, in stage four, the listing of household members was created and one individual was randomly selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed.

It is important to note that none of the EU-WMH surveys used a non-probability method of sample selection, such as a convenience sample or an interviewer-managed quota sampling.

The total sample size achieved in all EU-WMH countries was $n=37,289$, ranging from 2,357 in Romania to 5,473 in Spain. Response rates in individual countries ranged from 45.9% in France to 78.6% in Spain, and the overall weighted response rate was 63.4%. Information on field dates, age range, sample size, response rate, and interview mode by country could be found in table 1. In all the countries, except for Romania, internal subsampling was used to reduce respondent burden by dividing the interview into 2 parts: **part 1** included the core diagnostic assessment, while **part 2** consisted of information about correlates and disorders

of secondary interest. All respondents completed part 1. Individuals who presented a number of symptoms of specific mood and anxiety disorders and a random percentage of those who did not were administered part 2. All participants from Romania completed part 1 and part 2.

Measures

Mental disorders. The World Mental Health Survey version of the WHO Composite Diagnostic Interview (CIDI 3.0) Both the PAPI and the CAPI versions were based on an updated version of the WHO Composite International Diagnostic Interview (CIDI 3.0) that was designed specifically for the WMH Survey Initiative (Kessler and Ustun 2004). The CIDI 3.0 is a fully-structured interview that is designed to be administered by trained lay interviewers and is used to generate diagnoses of commonly occurring mental disorders according to the definitions and criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994) and the WHO International Classification of Mental and Behavioural Disorders (ICD-10) (World Health Organization 1993). Clinical reappraisal studies carried out in 4 World Mental Health countries (United States, Italy, Spain, and France, with total n = 468) have provided evidence for a good concordance between CIDI 3.0 DSM-IV diagnoses, and diagnoses based on blinded re-interviews, with area under the receiver operator characteristics curve ranging between 0.73–0.93 for lifetime mood/anxiety disorders, and 0.83–0.88 for 12-month mood/anxiety disorders (Haro et al., 2006). The CIDI 3.0 included 41 sections. The first section is an introductory screening and lifetime review section which is administered to all respondents and includes diagnostic stem questions for all core diagnoses. The survey instrument includes 22 diagnostic sections that assess depressive disorders, anxiety disorders, substance-use disorders, childhood disorders, eating disorders and other disorders. Four additional sections assess various kinds of functioning and physical comorbidity. Two other sections assess treatment of mental disorders. Four sections assess risk factors. Six assess socio-demographic characteristics, and the final two sections collect methodological information. Kessler and Ustun (2004) provide additional information about the CIDI 3.0 instrument. Several of the sections were optional and not administered in all countries or were completed by a subsample of the respondents. The questionnaire was first produced in English and underwent a rigorous process of adaptation in order to obtain conceptually and cross-culturally comparable versions in each of the target countries and languages.

Compared to the previous versions of the CIDI, some of the modifications implemented in the CIDI 3.0 are: (a) In the previous versions of the CIDI a set of diagnostic stem questions was located at the beginning of each diagnostic section to determine whether a lifetime syndrome of a particular sort might have ever occurred. If so, additional questions assessed the specifics of the syndrome. If not, the remaining questions about this syndrome were skipped. In the CIDI 3.0, all of the diagnostic stem questions were asked near the beginning of the interview because it became clear that respondents quickly learned the logic of the stem-

branch structure and realized they could shorten the interview considerably by saying no to the stem questions. Moreover, in debriefing interviews, respondents said that their energy flagged as the interview progressed, making it much more difficult to carry out a serious memory search later in the interview than at the beginning. (b) The diagnostic sections of the CIDI were made more operational by expanding questions to break down critical criteria, including the clinical significance criteria required in the DSM-IV system. (c) The diagnostic sections were expanded to include dimensional information along with the categorical information that existed in previous CIDI versions. (d) The number of disorders included was increased.

Lifetime and 12-month mental disorder diagnoses according to the International Classification of Diseases (ICD-10) (World Health Organization, 1993) and the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV) (American Psychiatric Association, 1994) were obtained by means of computerized algorithms. Disorders in this report were assessed using the definitions and criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). Core diagnoses included anxiety disorders (panic disorder, agoraphobia without panic disorders, social phobia, specific phobia, generalized anxiety disorder, post-traumatic stress disorder), depressive disorders (major depressive disorder, dysthymic disorder), and alcohol disorders (alcohol abuse with or without dependence). Bipolar disorder was not included as a mood disorder because 6 of the countries did not assess it. Several other disorders such as separation anxiety were not asked in all countries or were administered to a subset of respondents, so they were not included in the broad categories of anxiety disorders. It should be noted that Portugal did not assess drug disorders, and ESEMeD countries had an error in the drugs section of the questionnaire that does not allow to obtain correct estimates of drug abuse or drug dependence disorders. For this reason, drug related disorders have not been considered throughout reports.

Projected lifetime risk as of age 75 years (or, lifetime risk of mental disorders) was estimated using the actuarial method (Hall & Rao, 1992) implemented in SAS software. The actuarial method differs from the more familiar Kaplan-Meier method (Kaplan, 1958) in using a more accurate way of estimating onset within a given year. This method assumes constant conditional risk of onset during a given year of life across the cohort. Estimated projections of cumulative lifetime probability of disorders are divided by the cumulative lifetime probability at age 75 to determine the age of onset percentiles.

Clinical calibration studies (Haro et al. 2006; Kessler et al. 2004) found the CIDI to assess mood and anxiety disorders with generally good validity in comparison to blinded clinical reappraisal interviews using the Structured Clinical Interview for DSM-IV (SCID) (First et al. 1995). Serious mental illness was defined conform criteria stipulated in the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) Reorganization Act. We used this classification of “serious mental illness” instead of “severe and persistent illness” since the number of ESEMeD respondents with severe and persistent mental illness was too small for

reliable analysis. “Serious mental illness” was considerably more prevalent and included severe and persistent mental illness plus either a 12-month suicide attempt with serious lethality intent, an impulse control disorder with repeated serious violence, or any other disorder that resulted in 30 or more days in which the respondent could not carry out daily activities as usual in the 12 months before interview. All other 12-month DSM-IV/CIDI mental disorders were included in a second category, while other lifetime mental disorders constituted a third category. Controls were included for 12-month and other lifetime DSM-IV alcohol abuse disorders, with or without dependence.

Measures of burden. *Absenteeism and presenteeism* were assessed with a modified version of the WHO Disability Assessment Schedule II (WHODAS-II) (Von Korff et al., 2008 – see appendix 2). The time frame of the WHODAS-II is the 30 days prior to the assessment. The interpretation of the number of absenteeism and presenteeism days goes beyond job productivity but focuses instead on the number of days with functional limitations in daily activities without being fully out of role. An absenteeism day was interpreted as a full disability day and assessed as a day in which the respondent was not able at all to work or carry out normal daily activities, assessed by the item: “*How many days out of the past 30 were you totally unable to work and carry out your normal activities, but had to cut down on what you did or not get as much done as usual because problems with either your physical health, your mental health, or your use of alcohol or drugs?*”. Similarly, a presenteeism day was interpreted as a partial disability day, and defined as a day in which respondents had either (a) to cut down on what they did (hereafter referred to as “quantity cut down days”), assessed by the following item “*How many days out of the past 30 were you able to work and carry out your normal activities, but had to cut down on what you did or not get as much done as usual because problems with either your physical health, your mental health, or your use of alcohol or drugs?*”, (b) to cut back on quality of what they did (hereafter referred to as “quality cut back days”), assessed by the following item: “*How many days out of the past 30 did you cut back on the quality of your work or how carefully you worked because of problems with either your physical health, your mental health, or your use of alcohol or drugs?*”, and (c) had extreme effort to perform as usual (hereafter referred to as “extreme effort days”), assessed by the following item: “*How many days out of the past 30 did it take an extreme effort to perform up to your usual level at work or at your other normal daily activities because of problems with either your physical health, your mental health, or your use of alcohol or drugs?*”. Good concordance of reported disability days has been documented both with payroll records of employed people and with prospective daily diary reports (Kessler et al., 2004).

Monthly income was assessed in all part 2 respondents. They were asked to report their personal earnings in the past 12 months, prior to taxes. Respondents were instructed to count only wages and other stipends from employment (i.e. not pensions, investments, or other financial assistance or income). As in most community surveys, the item-level non-

response rate for this question was non-trivial (with a range of 0.8–18.3% and an interquartile range of 2.2–7.0% across surveys in the global WMH surveys [Levinson et al., 2010]). Mean imputation was used to impute missing values. Serious mental illness was not significantly related to missing values on the earnings variable. This finding suggests that the decision about how to deal with these missing values (i.e. either by case deletion, imputation or introducing a control variable for having a missing value on this variable into the regression equations) would not meaningfully influence the magnitude of the serious mental illness coefficients in the regression analyses reported below.

Sociodemographic variables. The main sociodemographic variables used in this report are: *age, marital status, household income per capita, personal earnings, years of education, employment, occupation and urbanicity*. Education was assessed differently in France. Therefore, this country was removed from all the analyses whenever education was included. The sociodemographic variables were categorized as follows: (a) *Age*: 4 categories (18-34, 35-49, 50-64, 65+), (b) *Marital status*: 3 categories (Married/cohabiting, Separated/widowed/Divorced, Never Married), (c) *Income/Earnings*: Household income per capita: 4 categories based on the within-country median per capita income observed. Low income defined as less than half the within-country median, low-average income as up to the median, high-average income as up to twice the median, and high income as greater than twice the median. Personal earnings: 5 categories based on the within-country median personal income observed in the sample. None, low earnings defined as less than half the within-country median among those with any earnings, low-average earnings as up to the median, high-average earnings as up to twice the median, and high earnings as greater than twice the median. In some analysis, personal earnings were studied in their continuous form, but divided by the median income within the country to obtain a standardized value comparable across countries. (d) *Education*: 4 categories based on educational milestones (Primary incomplete, Complete primary, Complete secondary, Higher education), (e) *Employment*: 3 categories (Employed, Unemployed/disabled, and Other - including housewives, students and retired-), (f) *Occupation*: 5 categories based on prestige. None includes respondents not currently occupied, Elementary occupations include sales and services; agricultural, fishery and related laborers; laborers in mining, construction, manufacturing and transport. Low-average occupations include office clerks, customer service clerks, personal and protective service workers; models, salespersons, and demonstrators; market oriented skilled agricultural and fishery workers, subsistence agricultural and fishery workers; extraction and building trade workers, metal, machinery and related trade workers; precision, handicraft, printing and related trade workers; other craft and related trade workers, stationary plant and related operators; machinery operators and assemblers; drivers and mobile plant operators; and armed forces. High-average prestige occupations include physical and engineering science associate professionals; life science and health associate professionals; teaching associate professionals, other associate professionals. High prestige occupations include legislator and senior officials; corporate

managers, general managers, physical, mathematical and engineering science professionals; life science and health professionals, teaching professionals, other professionals. (g) *Urbanicity*: 3 categories based on number of inhabitants of the municipality (less than 10000 inhabitants, 10,000-99,999 inhabitants, 100,000 or more inhabitants)

Statistical methods used

We provide weighted percentages (%) and standard errors (SE) of the sociodemographic characteristics of the sample, monthly earnings, prevalence of mental disorders, and descriptive data on the number of days full and partial disability. All analyses were based on weighted data and implemented in SUDAAN (Research Triangle Institute 2002). Significance tests, standard errors and 95% confidence intervals were estimated using the Taylor Series method to adjust for the weighting and clustering of the data. All significance tests were made using two-sided tests evaluated at the 0.05 level of significance. Sample weights were employed in most of the analyses reported in the volume so that reported data provide unbiased estimates for the populations surveyed. Part I data were weighted to adjust for differential probabilities of selection within household and due to hard to reach individuals, and to match population distributions on sociodemographic and geographic information. The Part II sample was additionally weighted for the oversampling of Part I respondents with core disorders. Country weights to adjust for relative dimension of the population across countries were not applied.

Logistic regression analysis (Hosmer & Lemeshow, 2000) was used to estimate associations. The logistic regression coefficients were transformed to odds ratios (ORs) for ease of interpretation. Significance of each logistic regression effect was determined using a Wald X² test statistic. Simulation was used to estimate individual-level effects of mental disorders, i.e. the additional full or partial disability days associated with each condition for an individual who meets criteria for a specific disorder or condition. We did this by estimating disability based on the parameters from the final selected model and by considering the actual characteristics of the respondents (the base estimate). Then we calculated this outcome again but based on the assumption that none of the individuals in the sample had the disorder or condition being evaluated. Differences between these two estimates were averaged across all respondents with the disorder to obtain the individual-level effect of the disorders. Similarly, simulation was also used to estimate the societal effects of mental disorders, i.e. the proportion of full or partial disability days in the population attributable to each mental health condition. Model-based estimates of each of the four disability measures were calculated based on the actual data (base estimate) and under the counterfactual assumption that the disorder in question had been removed from the population (i.e., the binary indicator set to 0 for all respondents). We used the two estimates of predicted days with full or partial disability, and then averaged both estimates across the entire population, and computed the percentage difference between them. The same procedures were used to calculate total effects of any mental disorder.

Table 1. Sampling characteristics of the EU-WMH project

Country	Survey	Sample Characteristics	Field Dates	Age Range	Sample Size		Response Rate ⁵	Interview Mode
					Part I	Part II		
Bulgaria	NSHS	Stratified multistage clustered area probability sample of household residents. NR	2003-7	18+	5318	2233	72.0	PAPI
Romania	RMHS	Stratified multistage clustered area probability sample of household residents. NR	2005-6	18+	2357	2357	70.9	CAPI
Belgium	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households from the national register of Belgium residents. NR	2001-2	18+	2419	1043	50.6	CAPI
France	ESEMeD	Stratified multistage clustered sample of working telephone numbers merged with a reverse directory (for listed numbers). Initial recruitment was by telephone, with supplemental in-person recruitment in households with listed numbers. NR	2001-2	18+	2894	1436	45.9	CAPI
Germany	ESEMeD	Stratified multistage clustered probability sample of individuals from community resident registries. NR	2002-3	18+	3555	1323	57.8	CAPI
Italy	ESEMeD	Stratified multistage clustered probability sample of individuals from municipality resident registries. NR	2001-2	18+	4712	1779	71.3	CAPI
The Netherlands	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households that are listed in municipal postal registries. NR	2002-3	18+	2372	1094	56.4	CAPI
Spain	ESEMeD	Stratified multistage clustered area probability sample of household residents. NR	2001-2	18+	5473	2121	78.6	CAPI
Northern Ireland (UK)	NISHS	Stratified multistage clustered area probability sample of household residents. NR	2004-7	18+	4340	1986	68.4	CAPI
Portugal	NMHS	Stratified multistage clustered area probability sample of household residents. NR	2008-9	18+	3849	2060	57.3	CAPI
TOTAL EU-WMH					29614	12842	61.6	
					37289	17432	63.4	

¹The World Bank. (2008). Data and Statistics. Accessed May 12, 2009 at: <http://go.worldbank.org/D7SN0B8YU0>

²NSHS (Bulgaria National Survey of Health and Stress); RMHS (Romania Mental Health Survey); ESEMeD (The European Study Of The Epidemiology of Mental Disorders); NISHS (Northern Ireland Study of Health and Stress); NMHS (Portugal National Mental Health Survey).

³Most WMH surveys are based on stratified multistage clustered area probability household samples in which more subsequent stages of geographic sampling (e.g., towns within counties, blocks within towns, households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. These household samples were selected from Census area data in all countries other than France (where telephone directories were used to select households) and the Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, Italy) used municipal resident registries to select respondents without listing households.

⁴Romania did not have an age restricted Part II sample.

⁵The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey.

3. RESULTS

3.1. Systematic literature review on the burden of mental disorders

The burden of mental disorders in the general population

There is a substantial amount of research on the epidemiology and impact of mental disorders. A first consistent finding is that mental disorders are common: lifetime prevalence in Europe is estimated at one fourth of the general population. Mental health problems are as relevant in low-income countries as they are in middle- and high-income countries, cutting across age, gender, and social strata. A second consistent finding is that mental disorders contribute heavily to estimates of country-specific and global burden of disease. Both in general populations and clinical samples, the experience of a mental disorder is associated with a wide range of self-reported short- and long-term professional and role impairments, including unemployment, low work productivity, increased absences, reduced performance when at work, or reduced educational attainment. Burdens associated with mental disorders generate a significant secondary cost of burden for employers, social insurances, caregivers, and society in general. For example, US national population surveys found that mental disorders accounted for approximately one-third of all disability and that mental disorders (especially alcohol use disorders and major depression) rank among the most burdensome of all conditions both at the individual and population levels (Dewa et al. 2004; 2007; WHO 2004; 2001; Pincus et al. 2001; Paykel et al. 2005; Sobocki et al. 2007; Goetzl et al. 2002; Henry et al. 1997; Chisholm et al. 2003; Lerner et al. 2010; 2004; Diefenbach et al. 2004; Kessler et al. 2003; 2009; Tolman et al. 2009; Fehm et al. 2005; Wittchen et al. 2003; 1996; 2005; Bryant et al. 1993; Balakrishnan et al. 2009; Baumberg et al. 2006; Stoller et al. 1994; Léger et al. 2001; Lim et al. 2008; Isohanni et al. 2001; Ovuga et al. 2006; Druss et al. 2009; Ormel et al. 1994; Alonso et al. 2007). Burden of mental disorders refers to a quite heterogeneous, complex, and multidimensional term that has been defined as “a concept encompassing a broad range of physical and psychological characteristics and limitations which describe an individual’s ability to function and to derive satisfaction from doing so”. Burden of mental disorders can be subdivided into five major areas: loss of quality of life, stigma, unemployment (including social underachievement and social decline), and monetary burdens of mental disorders: direct costs (including expenses of treatment) and indirect costs (including the effects of mental disorders on work productivity, monthly income, educational attainment, or occupational choices).

Loss of quality of life

In general, the presence of mental disorders is consistently associated with reporting lower quality of life. This association is suggested to be consistent across countries. There is general agreement that individuals with mental disorders showed an important deterioration compared to those without mental disorders, more specifically on their physical quality of life, but also in social, and emotional domains (Sobocki et al. 2007; Nordt et al. 2007; Lim et al.

2008; Alonso et al. 2004a; 2007; 2009; Greener et al. 2005; Henry et al. 1997; Léger et al. 2001; Dewa et al. 2004; WHO 2004; 2001; Pincus et al. 2001; Paykel et al. 2005; Goetzl et al. 2002; Chisholm et al. 2003; Lerner et al. 2010; Fehm et al. 2005; Katzelnick et al. 2001a; 2001b; Wittchen et al. 2003; 2000; 1996; Bereza et al. 2009; Volk et al. 1997; Roth et al. 2009; Ozminkowski et al. 2007; Daley et al. 2009; Stoller et al. 1994; Bolge et al. 2009; 2010; Doi et al. 2003; Gureje et al. 2007; Bryant et al. 1993; Balakrishnan et al. 2009; Baumberg et al. 2006; Kessler et al. 2003). For example, according to the WHO Global Burden of Disease Study, depressive disorder is the third leading cause of burden of disease with 65.5 million DALY's (Disability Adjusted Life Years) (4.3% of total). In low-income countries, unipolar depression takes position at the eighth cause of burden. By comparison, this disorder appears to be the primary cause of burden in middle- and high-income countries. Predictions from the WHO point to the importance of depression the coming decade as the second most burdensome condition worldwide. But also when other measures are used, there is consistent evidence worldwide that mental disorders are associated with decreased quality of life. Some recent contributions have shown that, in Europe, persons with mental disorders reported between 6 and 10 days out of role per month (as measured with the Work Loss Days index of the World Health Organization Disablement Assessment Scale-2 [WHO-DAS-2]), compared to approximately 2 days per month in persons without mental disorder (Alonso et al., 2004). This implies that those with a mental disorder reported an additional 4 to 8 out of role days per month. Investigations with the SF-12 point to similar findings (Alonso et al., 2004).

Stigma associated with mental disorders

Furthermore, another important issue concerning intangible costs of mental disorders is stigma. Persons with mental disorders must not only cope with their emotional and or psychiatric symptoms, but also with the stigma that is oftentimes associated with mental disorders: feeling discriminated, feeling embarrassed regarding impairments, perceptions of attitudes of others by persons experiencing illness, treatment-related stigma and internalization of these attitudes by the patient (Alonso et al., 2008). Stigma may have specific negative consequences for the treatment of mental disorders, including delay in seeking care or less adequate care (Corrigan, 2004; Arboleda-Florez, 2003). But also an overall decline in quality of life, lower education, a higher proportion of Work Loss Days (WLDs), and unemployment could be consequences of feeling stigmatized, and thus indirectly related to the presence of mental disorders. The impact of stigma is understood to be so pervasive that the World Health Organization (WHO) and the World Psychiatric Association have identified stigma associated with mental disorders is identified amongst the most important challenges facing the mental health field today (Stuart, 2008).

Unemployment

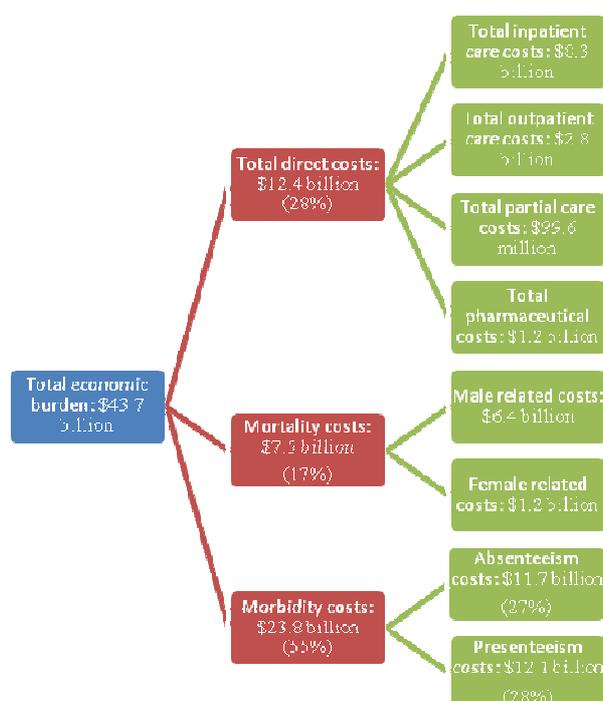
As mentioned, another major burden associated with mental disorder is unemployment. Most studies report unemployment rates between 80% and 90% among severely mentally ill patients. But also without differentiating in terms of severity of disorders, unemployment rates are still significantly higher among those with mental disorders and those without (odds ratios around 2). United States estimates point to the five to six million working-age adults that either lose, do not seek, or cannot find jobs because of their mental disorder (Dewa et al. 2007; Lim et al. 2008; Lerner et al. 2004). We can identify two distinct factors that could be held responsible for the increased unemployment rates among persons with mental disorders: 'social underachievement' and 'social decline'. First, 'social underachievement' refers to the associations between early-onset mental disorders and educational attainment. Educational attainment is the first phase of the pathway that leads to consolidated adult socio-economic status. As such, educational attainment is a first milestone that may be implemented in the presence of mental disorders during or prior to the period of education (Bruffaerts et al., 2008). The extent to which adults can successfully accumulate human capital is largely dependent upon both mental and physical health in the childhood years, adolescence, and young adulthood (Berndt et al. 2000). These developmental periods may be seen as 'critical periods' in which the presence and impact of mental disorders may be detrimental towards further developmental tasks and personal, social, and professional skills. There is substantial evidence that there is a temporal association between early-onset mental disorders and subsequent educational attainment. Students with mental disorders were up to 15 times less likely to obtain an academic degree compared to students without a disorder (Kessler et al., 1995). Moreover, in their prospective Children in Community Study, Vander Stoep et al. (2003) estimated the population attributable risk proportion on early-onset mental disorders on educational attainment at 46%. Lower PARPS were estimated in more recent studies, ranging between 5 and 14% (Lee et al., 2009; Bruffaerts et al., 2010). Among disorders, most consistent effects were reported for substance use and impulse control disorders (Fergusson & Woodward, 2002). Moreover, obtained educational levels have an unambiguous relation with national unemployment rates (Lindbeck & Snower, 1988). The implications are that early-onset mental disorders may have a longstanding detrimental effect on both educational attainment, and subsequently, on unemployment rates. In an older but interesting contribution reporting from the National Longitudinal Survey of Youth 1979 (NLSY79), an interesting association was found between educational attainment and earnings: the timing of obtaining an academic degree has a negative association with earnings as an adult. For women, per extra year needed to graduate from high school the study found a 1.1% reduction of earnings for female and 0.75% for male respondents. Second, 'social decline' delineates loss of employment following the onset of a mental disorder, subsequently accompanied by prolonged periods of unemployment because of sickness, and increased probabilities of reported difficulties to re-enter the labor market after full or partial remission (Renna et al. 2007; Isohanni et al. 2001; Nordt et al. 2007). This

phenomenon was found to be especially important in times of economic crises (Schnabel, 2010).

Direct and indirect costs: the monetary burdens of mental disorders

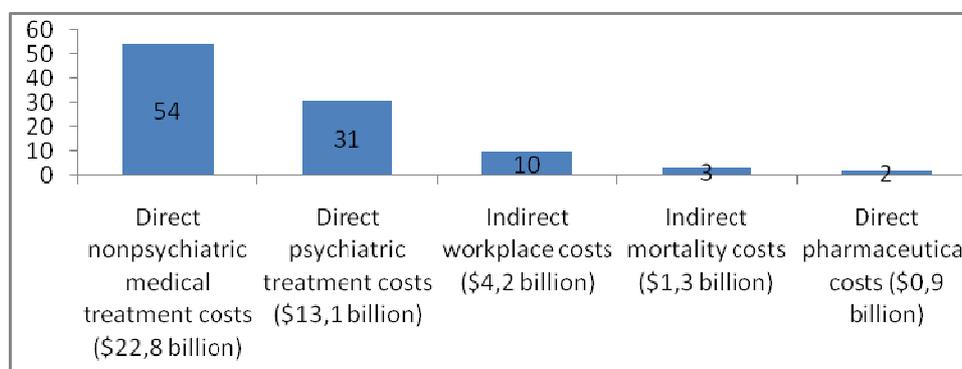
The overall cost of mental disorders is, on the European level, estimated at 3-4% of the gross domestic product (GDP) (Organisation of Economic Co-operation and Development, 2008). The total economic costs (including both direct and indirect costs) of mental disorders were extensively studied during the past decades, but especially in the United States (e.g. Greenberg et al. 2003a; 1993b; Marcotte et al. 2003; Sullivan et al. 2005; Langlieb et al. 2002; Lim et al. 2008; Sobocki et al. 2007; Johnston et al. 2009; Dewa et al. 2000; 2007; Goetzel et al. 2002; Baumberg et al. 2006; Prasad et al. 2004; Kessler et al. 1997; Booth et al. 1997). We found costs estimations for mental disorders as a diagnostic group, and for depressive, anxiety, and substance use disorders separately. The US National Advisory Mental Health Council (NAMHC) estimated the 1990 total cost for any mental disorder at \$148 billion. Overall, about two thirds of the costs were indirect, about one third were direct costs. After disaggregation for disorder group, depression and anxiety disorders account each for about 30% of the total cost. The total economic burden of depression was estimated to approximate \$44 billion in 1990, resulting in an equivalent of \$83 billion by 2000 (Greenberg et al. 1993b; 1993a; 2003a; Lerner et al. 2008; Langlieb et al. 2005; Greener et al. 2005) (Figure 1).

Figure 1. The total economic costs of depression in the united states in 1990 (Greenberg et al. 1993b)



A Swedish cost-of-illness study came to the conclusion that the economic burden of depression in Europe was increasing rapidly: costs were about twice as high in 2005 compared to figures from 1997 (Sobocki et al., 2007). The underlying explanation for this increase may lie in the increased indirect costs due to sick leave or early retirement. However interesting, the study found that the direct costs of depression remained quite stable over this 8-year period. By comparison, the annual economic burden of anxiety disorders approximated \$42 billion in 1990 (equivalent to \$63 billion in 1998). This study found that total direct costs were about \$37 billion and indirect costs were about \$5 billion (Greenberg et al., 1999 – see Figure 2). There is inconsistent evidence in research on the distribution between direct and indirect costs of anxiety disorders. Several cost-of-illness studies in the US pointed out that costs related to treatment of anxiety disorders were systematically less than one fourth of the total monetary burden. This is probably due to the fact that anxiety disorders consist of a quite heterogeneous group of specific disorders, ranging from generalized anxiety disorders to specific phobias. Indeed, one consistent finding was that both prevalence estimates and economic burdens vary significantly among the specific anxiety disorders (Kessler et al. 2003; Lépine et al. 2002; Greenberg et al. 1999; 2003a; Langlieb et al. 2005; DuPont et al. 1996; Diefenbach et al. 2004; Wittchen et al. 1996; 2005; Pincus et al. 2001; Dewa et al. 2002;; Booth et al. 1997).

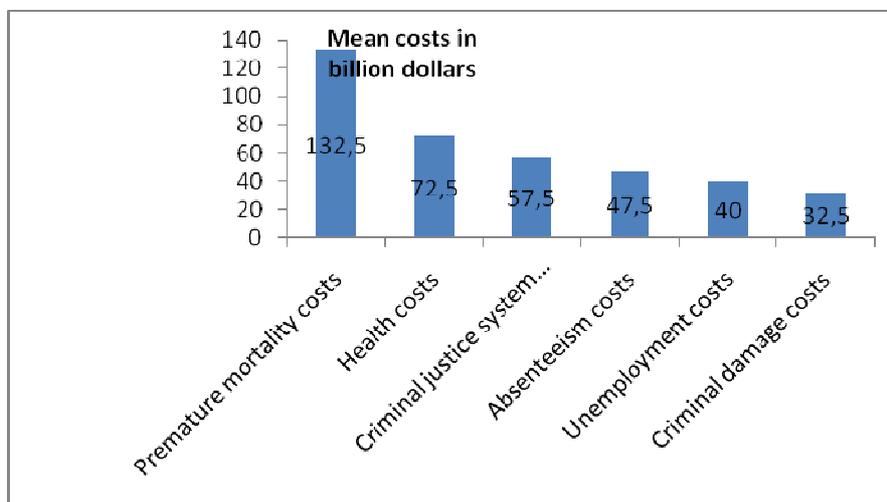
Figure 2. Annual economic burden of anxiety disorders in 1990 in the United States (Greenberg et al. 1999)



A vast number of studies unambiguously suggested that alcohol abuse may be the single most burdensome health problems in the United States. By-and-large, reported monetary costs of alcohol abuse were systematically at least twice as high as costs for either depression or anxiety. Annual costs estimates (including both direct and indirect costs) for alcohol abuse were all in the \$210 - \$650 billion range for the year 2002 (see Figure 3) (Bryant et al. 1993; Pincus et al. 2001; Stoller et al. 1994) . More recent contributions reported lower (generally in the \$85 - \$116 billion range) but still substantial costs for alcohol abuse (Balakrishnan et al. 2009; Baumberg et al. 2006; Kessler et al. 2003). Taken together, this review of literature strongly suggests that indirect costs of mental disorders systematically outline direct costs. Indeed, for any disorder we can say that direct costs are about 33% of the total costs; after disaggregation we can say that comparable figures were

25% for mood disorders and 20% for alcohol disorders. Findings on the distribution of direct and indirect costs in anxiety disorders are somewhat mixed.

Figure 3. Economic burden of alcohol in the United States in 2002 (Baumberg et al., 2006)



Associations between mental disorders and income

Early contributions to this topic include Bartel and Taubman (1979; 1986), reporting from the National Academy of Sciences--National Research Council twin sample and estimating that mental disorders (i.e. psychoses and neuroses) were associated with a 16-27% reduction of earnings, and neuroses separately with a 12-14% income reduction. Later studies were more or less in line with these early estimates: the study by Frank & Gertler (1991) reports about 21% lower earnings in individuals with mental disorders, and Ettler et al. (1997) disaggregated the effects for gender and found a 28% reduction of earnings for women with mental disorders, compared to 10% for men. In the National Comorbidity Survey-Replication, income was found to be 35-42% lower for respondents with serious mental disorders (Levinson et al., 2010). In a Belgian study of household residents using the same methodology (Bruffaerts et al., 2008), serious mental disorders were not related to reporting lower earnings among respondents who reported to have earnings at all, but instead, serious mental illness resulted in significant decreased odds of having any annual earnings at all (OR=0.32, $p < .01$). The economic impact of serious mental disorders was suggested to be higher for men than for women. One explanation for this finding may be that women with mental disorders were less likely to be in the workforce. However, an alternative explanation may be that this particular finding reflects the gender inequalities in earnings: women are still less likely to have equal earnings as men, even in the same occupational positions (Rose & Hartmann, 2004). The study by Bruffaerts and colleagues provides detailed country-specific estimates: the expected annual earnings of a respondents in the absence of serious mental disorders approximate 16,000€, compared to the mean observed earnings of around 10,000€ in those with serious mental disorders. This difference of around 6,000€ per year or

about 500€ per month is the estimated effect of serious mental disorders on annual earnings on the Belgian general population level. Similar findings appear when analyses were repeated among respondents with earnings. Again, estimated effects were higher for male than for female respondents. When extrapolations were made in order to yield societal effects of mental disorders, serious mental disorders were associated with a loss of approximately 1,800 million € in personal earnings per year, with again markedly higher society-level impact for males (about 1,300 million €) than for females (about 500 million €) (Bruffaerts et al. 2009). On a global level, the report from the World Mental Health Surveys (Levinson et al., 2010) provide crucial global data on the association between serious mental illness and monthly earnings. The results from this study indicate that serious mental illness is associated with a reduction in earnings equal to about one third of the median country earnings in worldwide. Again, the association is markedly larger among men than among women, but this finding only goes for men in high income countries. Apart from the specific effects of gender in the association between mental disorders and earnings, an interesting finding was reported by Nordt et al. (2007). They found that a lower age of onset of the mental disorder (i.e. age of onset below 26 years) was significantly associated with a lower income (i.e. 470euro/month lower) than an age of onset greater than 25.

The burden of mental disorders in the workplace

Approaches in studies on lost work productivity

Mental disorders are common among working adults. Data from the Office of National Statistics showed that about one in five of all persons in paid employment have one or more mental health problems (Cooper et al. 2008). Similar to the effects mental disorders yield on the societal effect, mental disorders are associated with a wide range of specific impairments in the workplace, ranging from absence from work, over safety incidents, increased employee turnovers, to losses in quality of production (Dewa et al. 2007; Dewa et al. 2000; Goetzal et al. 2002; Lim et al. 2008; Marcotte et al. 2003; Johnston et al. 2009; Sanderson et al. 2006).

Decreased work productivity can be measured using two different techniques, each defining separate components of low or decreased work productivity: the human capital approach and the friction cost approach. A human capital approach focuses on decreased or lost productivity like decreased or lost earnings or income due to a specific (mental) disorder. Basically, this approach is employee-based since it estimates changes in work productivity from the viewpoint of the individual employee. By contrast, a friction cost approach is based on employer costs which are not applicable to single individuals, but rather from the viewpoint of the employer. In more detail, this approach is based on the friction period, i.e. the time needed to (a) replace a absent worker and (b) reach the productivity level of the previous (well) worker (Lofland et al. 2004). The most common approach is the human capital approach. In the remainder of this report, we will entirely focus on this approach.

Presenteeism and absenteeism in the workplace: full disability and partial disability

Productivity losses due to mental disorders have been characterized oftentimes as full disability and partial disability days, counted per month or per year. Full disability is generally referred to as days individuals are absence from work. Absences from work due to mental disorders are dependent upon contextual factors like workplace absence policies or local norms regarding worker time-off behaviour. Full disability days are commonly measured via self-report by asking respondents to indicate the number of days they were absent from work (for reasons related to mental health, emotions, or 'nerves') and were unable to perform usual activities. Although this is the most common measure it may not be the most valid one. Indeed, as individuals with mental disorders or emotional problems are reluctant to be labeled with a mental disorder, a significant portion of the full absence days from work may be just labeled as due to "stress" rather than to a mental disorder or emotional problems. Partial disability is a concept used 'to designate the phenomenon of people, despite complaints and ill health that should prompt rest and absence from work, still turning up at their jobs' (Aronsson et al., 2000). Partial disability relates to notions of health and individual choices to cope with (mental) health problems. Up to a third of employees report that they had gone to work despite their feeling that they should have absent from work because of their health state (Aronsson et al., 2000). Many reasons can be found why individuals may choose to work through illness, going from internal psychological factors (such as stoicism or other specific personality traits) to external factors (such as workplace culture that discourages taking sick leave). A specific psychological factor that may be importantly related to the question why exactly individuals may not stay at home when they have emotional problems or mental disorders is the extent to which an individual attributes the emotional problems or mental disorder as the cause of the experienced lower health states (Lim et al. 2008; Dewa et al. 2000; 2002; 2004; 2007; Dew et al. 2005; Sanderson et al. 2006; 2007; Lerner et al. 2008; Koopman et al. 2002; Sullivan et al. 2005; Hemp 2004; Adler et al. 2004; Lofland et al. 2004; Mattke et al. 2007; Middaugh et al. 2007; Prasad et al. 2004; Trotter et al. 2009; Turpin et al. 2004; Yamashita et al. 2008; Esposito et al. 2007; Stoller et al. 1994; Wynne-Jones et al. 2009; Cooper et al. 2008; Kessler et al. 1997; Böckerman et al. 2009; Roelen et al. 2010).

In current and future studies, special attention may be given to partial disability days due to mental illness for three main reasons. First, at this point partial disability is just as common as full disability. There is evidence that it is estimated that the costs of productivity losses of partial disability are equal to or higher than the those of sickness absence (Roelen et al. 2010; Böckerman et al. 2009). Second, many workers who have been frequently absent from work have also been present at work several times while ill. Thus, emotional problems or mental disorders may cause both high (direct monetary) costs for the employer when the employee is absent and high (indirect) costs when the employee is at work, but at a lower

quality level compared to the well employees (Böckerman et al. 2009). Third, there is also a positive predictive association between partial and full disability: partial disability today predicts full disability tomorrow (Bergström et al. 2009). From a public health perspective, it is essential to study these disorders or conditions that may predict partial disability because when these disorders are identified, specific targeted approaches towards the management of these disorders may serve as primary or secondary preventive mechanisms that may eventually lead to a reduction of full disability.

Measures of lost work disability

The selection of appropriate instruments to measure productivity is challenging. An ideal measure of productivity is inexpensive, easy to administer, and minimizes bias while remaining valid and reliable (Prasad et al. 2004). An important caveat however is that the population within the labor force who meet criteria for a mental disorder may have different characteristics compared with the general population. Only using the worker's perspective implies, among others, that work disability caused by mental illness is likely to be underestimated (Dewa et al. 2002; 2004; Merikangas et al. 2007).

In recent studies, several constructs are used to estimate disability related to mental disorders. One common approach is the use of an overall measure or 'work loss'. For instance, Alonso et al., (2004) showed a positive association between 12-month mental disorders and the number of monthly work loss days, with consistency across the six European countries where the study was performed. The instrument used was the Work Loss Days-index of the WHO-DAS-2. In detail, work loss days were roughly between 2.0 and 2.6 days per month for respondents without mental disorders and between 4.4 and 12.5 days per month in individuals with mental disorders. They also found a dose-response relationship between the number of mental disorders and work loss days per month: work loss was progressively increased in individuals with one (about 6 days), two (about 7 days) or more (about 11 days) mental disorders, compared to respondents without 12-month mental disorder (about 2 days). However, this overall approach may underestimate disease burden because an overall measure may not be sensitive to grasp precise effects of disability (Alonso et al. 2004a; Bruffaerts et al. 2008; Dewa et al. 2000; Kessler et al. 1997). A more extended view on disability is used in the Ontario Health Survey (Dewa & Lin, 2000) where three specific measures were used: 'total disability' days (i.e. absence from work days), 'partial disability' (i.e. days in which the respondent reported not to be able to function normally) days and 'extra effort' days (i.e. days in which the respondent reported to function normally but with extreme effort). The most interesting finding was that mental disorders had a negligible effect on total disability days but instead a significant association with partial disability days (0.9 additional days, $p < .05$), and even the strongest association with extra effort days (2.3 additional days, $p < .05$). A recent addition stemming from the World Mental Health Surveys, is the disaggregation of work disability into days with cutbacks in quality, cutdown in quantity, days with extreme effort, and days with full disability. The very same

approach is used in the quantitative part of this report (see paragraph 3.2) and explained in the Material & Method section (see paragraph 2.2.2).

The Work Limitations Questionnaire (WLQ) is a domain-based measure of partial disability offering several advantages over briefer measures, and is an important addition to existing measures and approaches assessing productivity loss and change over time in persons with mental disorders who are employed. The WLQ measures the percentage of time (in the prior two weeks) that the employee was limited in any of the following components: the job's mental and interpersonal component; physical component; time component; and output component (Lim et al. 2008; Dewa et al. 2000; 2002; 2007; Dew et al. 2005; Sanderson et al. 2006; 2007; Koopman et al. 2002; Sullivan et al. 2005; Hemp 2004; Adler et al. 2004; Lofland et al. 2004; Mattke et al. 2007; Middaugh et al. 2007; Prasad et al. 2004; Trotter et al. 2009; Turpin et al. 2004; Yamashita et al. 2008; Lerner et al. 2010) The WHO Health and Work Performance Questionnaire (HPQ) is also a common used self-report instrument, but developed to assess the indirect workplace costs of illness, asking about about days, hours of work, hours missed on workdays, extra hours of work, considering total hours absent for any reason (Kessler et al. 2004; Loeppke et al. 2009; Lofland et al. 2004; Mattke et al. 2007; Prasad et al. 2004; Turpin et al. 2004). Another measure is the Stanford Partial disability Scale to assess the associations between partial disability, specific health problems, and productivity in working individuals. Using only six items, the scale measures a worker's ability to concentrate and accomplish work despite the presence of health problems (Koopman et al. 2002; Lofland et al. 2004). The SPS actually combines two specific dimensions of partial disability: a work-related focus (process outcome of work) and a psychological focus (emotion, cognition, and behavior). The SPS has excellent psychometric properties that enable to scale to be used as an assessment tool for both worker health and productivity (Mattke et al. 2007; Turpin et al. 2004; Yamashita et al. 2008). A final but relatively uncommon used measure to be reported here is the Work Productivity and Activity Impairment (WPAI)-General Health Questionnaire that measures the effects of overall health and specific symptoms on productivity at work and beyond (Prasad et al. 2004; Trotter et al. 2009; Turpin et al. 2004).

The association between specific mental disorders and workplace disability

Depressive disorders

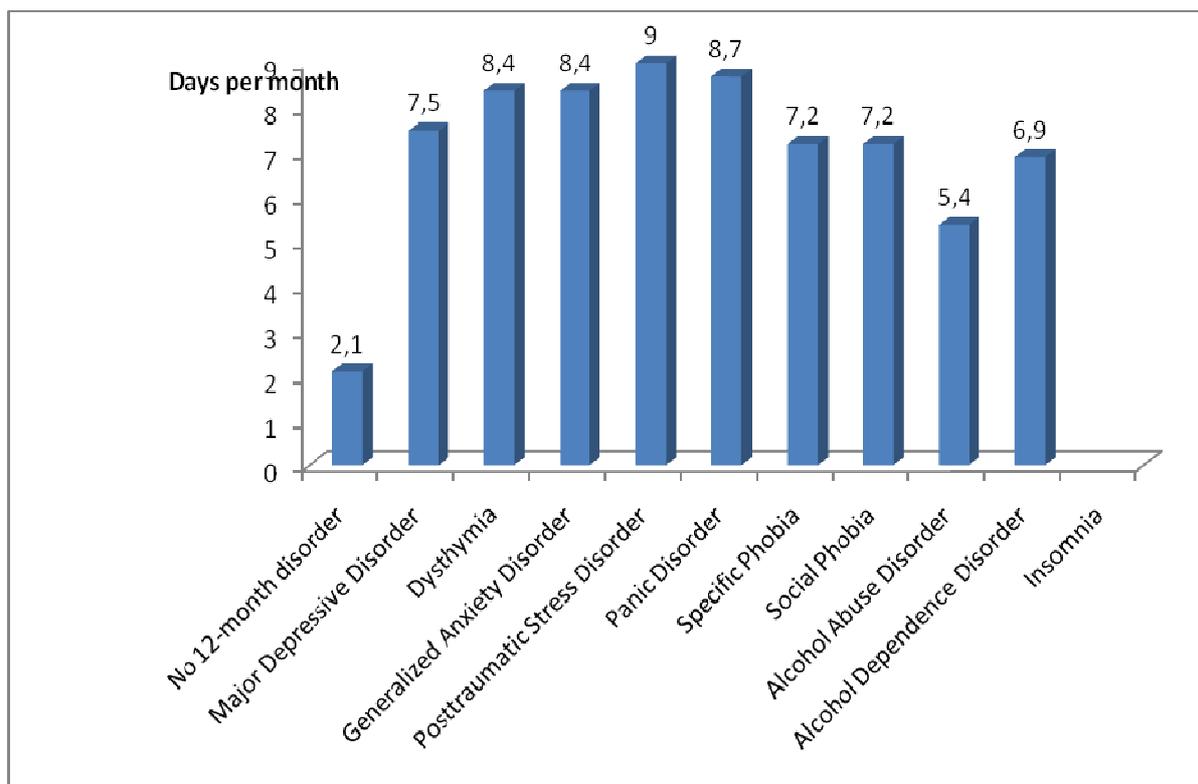
Prevalence. In a review covering several large population surveys, depression was the second most common disorder in the workplace. Among workers, prevalence estimates are all in the 4%-7% range. Major depressive disorders are twice as prevalent among women, more prevalent among middle-aged workers (40-45 years) (Lerner et al. 2008; Kessler et al. 2009; Sanderson et al. 2006; Goetzel et al. 2002; Greenberg et al. 2003a; Dewa et al. 2000; 2002; 2004; Stein et al. 2006; Sullivan et al. 2005). Using data from the National Comorbidity

Survey, it was calculated that, for depression, there were about 25 work loss days per month per 100 workers. After extrapolation, this data is equivalent to an annualized national projection of over 4 million work loss days in the US, and 109 work cut-back days per month per 100 workers is equivalent to an annualized national projection of 20 million work cut-back days (Kessler et al. 1997; Druss et al. 2001).

Work Loss. Depression is a major cause of lost work days worldwide (WHO). The underlying symptoms of depression (including reduced concentration, inability to become motivated to accomplish even routine tasks, moodiness, and fatigue) may all contribute to both absences from work and performance impairment at work. Both the Health and Work Study and the National Comorbidity Survey found that the average productivity loss of employees with depression was between five and 20%, compared to 2-4% for non-depressed employees (Kessler et al. 2009; Lerner et al. 2004; 2008; 2010). The European Study on the Epidemiology of Mental Disorders (ESEMeD) found that 12-month depressive disorders yielded 7.2 work loss days (WLD) per month in six European countries, compared to 2.1 WLDs for those without 12-month disorder (Figure 4) (Alonso et al. 2004a). When subdividing for the type of disability, the OHS found that affective disorders in workers only contributed significantly to (especially) extra effort days (11.6 additional days, $p < .05$) and (only minor to) total disability days (-0.3 additional days, $p < .05$), but not to partial disability days (Dewa et al. 2000).

In the United States, the portion of the costs attributable to workers suffering from depressive disorders sums to \$24 billion in morbidity costs associated with both full disability and reduced productive capacity at work. These findings imply that employers directly bear an annual cost of more than \$3,000 per depressed worker. Against the estimated prevalence of 6% in the general population, the annual cost of depressive disorders among workers approximates \$180 per employee (Greenberg et al., 1993). After disaggregation for full and partial disability, approximately \$12 billion are associated with full disability at work during episodes of mood disorder, and about \$12 billion in costs are associated with partial disability (i.e. reductions in productive capacity while at work) during each episode. Interestingly, more than 50% of the total cost associated with full disability was found in the 30-44 age respondent group, a demographic category with both highest prevalence of depression and the highest labor force participation (Greenberg et al., 1993b).

Figure 4. Work loss days associated with 12-month mental disorders in Europe (Alonso et al., 2004a)



Full disability. Estimates of full disability from work are higher among those with than among those without depression. The National Comorbidity Survey - Replication found that individuals with depression had about 8.7 full disability days per year at the individual level. At the societal level, persons with depression had about 72 million full disability days per year (Kessler et al. 2006). Across several studies, depressed workers were between 0.5 and 3.6 days per month more absent compared to others (Greener et al. 2005; Lerner et al. 2004; 2008; 2010; Dewa et al. 2004). Mean productivity loss associated with work absence is estimated at approximately 19% for depressed employees. By comparison, the same estimates for non-depressed employees ranges between 5 and 12%). Overall, about 2/3 employees with depression reported time off work (Greener et al. 2005; Dewa et al. 2002). However, this phenomenon seems to be related to the male gender only (Sanderson et al. 2006). Indeed, according to the Women's Employment Study (WES), depression among women was not significantly associated with percentage of months worked (Tolman et al. 2009). Another interesting correlate was that chronic depression was more likely to be associated with full disability than depression with a shorter duration of symptoms (Sanderson et al. 2007; Chisholm et al. 2003; Langlieb et al. 2002).

Partial disability. Depression is also significantly associated with partial disability, compared to no depression (Greenberg et al. 2003a; Sanderson et al. 2006; 2007; Lerner et al. 2004). Among employees, average loss of productivity due to depression was in the 8-9% range, compared with about 2% for non-depressed employees (Hemp 2004; Lerner et al. 2010). Major depressive disorder exact about 18 partial disability days per year at the individual level. When the total US labor force is accounted for in a societal perspective, depressed individuals had about 151 million partial disability days per year (Kessler et al. 2006). The weighted odds ratio for decreased effectiveness at work among employees with major depression was centered around 5 (Greener et al. 2005; Langlieb et al. 2002).

Dysthymia

The ESEMeD project found that respondents with 12-month dysthymia had a mean WLD-score of 0.28 or about 8 days with significant work loss per month (Alonso et al., 2004). The odds of having any day with work loss was only moderately increased (OR=1.15) in respondents with dysthymia compared to those without. In the NCS, dysthymia appeared to be unrelated to work loss days or work cut-back days (Kessler et al. 1997). Also data from the Health and Work Study confirmed the relatively low impact of dysthymia: the total number of days missed from work was higher among respondents with dysthymia, but however without reaching statistical significance (Greenberg et al. 1993b; Lerner et al. 2004). The effects of dysthymia on work loss remains unclear as some studies indeed shown specific effects. For instance, the mean productivity loss related to work absences was between 8% and 12% for employees with dysthymia, compared to employees without the disorder (between 5-8%). Somewhat lower estimates of productivity loss were reported using the WLQ Productivity Loss Index: on-the-job productivity loss was about 6% for those with dysthymia versus 2.8% for non-depressed employees (Adler et al. 2004). Also, employees with dysthymia (compared to those without) were more likely to cut back on the number of hours they effectively worked (41% versus 11%, $p < .0001$) (Adler et al. 2004; Lerner et al. 2004) In a review covering several observational studies, dysthymia was indeed associated with significantly higher risk of any loss days, but this was only the case in male respondents (Sanderson et al. 2006).

Anxiety disorders

The ESEMeD project found that any 12-month anxiety disorder had a mean of 7.2 days with significant work loss per month, compared to 2.1 work loss days in respondents without disorder (Alonso et al. 2004a). When subdividing work loss days into separate components, the following results appear. Respondents with anxiety disorders had 1.41 monthly work cut-back days ($p \leq 0.05$), but surprisingly there was no significant relationship with work loss days (Kessler et al. 1997). Dewa and colleagues (2000) reported from the Ontario Health Survey that anxiety disorders alone contributed significantly to both extra effort (0.8 additional days)

and partial disability days (0.9 additional days), but not to the total disability days. When disaggregating for separate disorders, the following appears. Persons with 12-month panic disorder had a mean monthly work loss of almost 9 days, compared to 2 days in those without a disorder (Alonso et al., 2004). Panic disorder increased the odds of having any monthly work loss day with three, compared to people without panic disorder (Greenberg et al. 1999; Wittchen et al. 2005). Work loss was especially accounted for by cutback days (Kessler et al. 1997). Specific phobia was the most common disorder in the workforce, with estimates around 3-5% (Sanderson et al. 2006). Associated work loss for this disorder was about 7 days per month. Persons with specific phobia are 2.8 times more likely of having any work loss day per month (Wittchen et al. 2005), especially cut-back days (Kessler et al. 1997). A literature review on burden of social phobia (Demyttenaere et al., 2004) reported that 28% of persons with social phobia were not able to perform as usual in at least 2 days per month. About 25% of the social phobics reported to have quit a job in the past year due to emotional or mental problems (Patel et al., 2002). The ESEMeD project found an average of 7 days per month with work loss (Alonso et al., 2004). Reports from the Epidemiologic Catchment Area study confirmed these findings: social anxiety disorder is associated with about 7 sick days in the prior 90 days to the assessment (Katzelnick et al. 2001b; Tolman et al. 2009). When we look at reductions in productivity, we can say that, by-and-large, more than 1/3 of all those with social phobia displayed marked and highly significant work productivity impairments.. In more detail, about 12% work productivity reduction is due to social phobia and one in four individuals with social phobia reported substantially impaired working performance because of social phobic symptoms (Wittchen et al. 2000). Generalized Anxiety Disorder (GAD) was associated with an average work loss of 8 days per month (Alonso et al. 2004). According to the NCS and the Australian National Survey of Mental Health and Wellbeing, GAD was associated with 3.11 work cut-back days, but not associated with work loss days. (Kessler et al. 1997; Sanderson et al. 2006). Female respondents with GAD systematically reported higher levels of impairment than their male counterparts (Bereza et al. 2009). Last, Post Traumatic Stress Disorder (PTSD) resulted in an average of 9 work loss days per month (Alonso et al., 2004), especially cutback days (Kessler et al., 1997). Individuals with PTSD were slightly more than two times more likely of having any days with significant work loss compared to individuals without (Wittchen et al., 2005).

Alcohol disorders

The misuse of alcohol by employees represents a considerable individual and societal issue because studies show that alcohol disorders may undermine employee productivity and employee safety (Frone, 2006). Despite the importance of alcohol use and impairment, relatively few data exist on prevalence among workers. Prevalence estimates vary widely, with all estimates between 2 and 29% (Frone, 2006; Ames & Grube, 1999; Newcomb, 1994). Alcohol abuse disorders were associated with about 5 work loss days per month; alcohol dependence disorder yielded an average of 7 days per month (Alonso et al., 2004). Alcohol

abuse was not significant associated with work loss days or with work cut-back days. (Kessler et al. 1997; Tolman et al. 2009). Individuals with either alcohol abuse/dependence were 2.5 times more likely to report any day with work loss in the past month (Wittchen et al. 2005).

3.2. The association between mental disorders and monthly income among workers

Depression

Persons with depression are systematically more likely to be unemployed than those without, a finding that stands for both men and women. In a study by Ettner et al. (1997), it was found that male respondents with depression were 12% less in employed status. The comparable figure for female respondents was 14%. The study by White (2003) came to the same conclusions, although for low-income women. There is consistent evidence that depressed employees earn less than their healthy counterparts, with features up to 25% less (e.g. Lerner et al. 2004; 2010; Adler et al. 2004). Marcotte and colleagues (2000) used the data from the NCS and investigated, among others, the association between major depression and dysthymia on the one and earnings on the other hand. They found that these disorders indeed impacted monthly earnings, but only in the female sample: yearly income was, on average, decreased with about 32%. Cseh (2008), using elevated statistics, reported decreases in earnings in the 12-15% for males and 2-6% for females. Expected future earnings of women with early-onset depression (under the age of 21) are reduced with about 12 to 18%, relative to women whose onset occurred after age 21 or not at all (Berndt et al. 2000). In the Health and Work Study it was found that one in three employees with depression who changed jobs took a lower paying job for health reasons. By comparison, this ratio was one in five for persons without depression. Similar results were found for dysthymia (Lerner et al., 2004). Looked at this finding from another angle, the proportion of persons with increased earnings after job change was significantly greater for persons without depression or dysthymia (both 50%) than for those with depression (40%) or dysthymia (35%) (Adler et al. 2004).

Anxiety disorders

Anxiety disorders also have a considerable impact on monthly earnings, for both men and women. In the study of Farahati et al., (2002), monthly earnings were reduced with about a third for those who met criteria for a 12-month DSM-III anxiety disorder. When subdividing for gender, earnings from male respondents decreased with 40%, compared to a reduction of 28% in female respondents. Anxiety disorders especially have significant negative effects on earnings for women at both the bottom and higher position in the earnings distribution, whereas for men the effects are also large but only at the bottom of the distribution (Marcotte et al. 2003). Demographic data also show that individuals with social phobia are less likely to

be in the highest socio-economic group and have lower employment rates and household income, compared to those without disorders (Demyttenaere et al. 2004). Reporting data from a health maintenance organization, Kitzelnick et al. (2001) found that social phobia was associated with a 10-19% lower wages.

Alcohol disorders

Alcohol related disorders may impact earnings in a negative way through several pathways, i.e. through a direct association with work productivity but also by increasing error rates, change of motivation, or even conflicts on the work floor (Harnois & Gabriel, 2000). Using data from the NLSY79 study, Renna et al. (2007) found that (for both men and women) alcohol abuse in high school did not have any effect on future labor market outcomes. But alcohol could still have a negative impact on earnings because alcohol delays the time of graduation. Indeed, the abuse of alcohol was found to increase the age of graduation by about 2 years for men and 2.5 years for women. Moreover, alcohol abuse in the senior year of high school lowers labor earnings by about 2% for males and almost by 3% for females (Renna et al. 2007). Another pathway may be that early-onset alcohol disorder may influence the level of educational attainment (Breslau et al., 2008). The indirect effect of alcohol disorders on income via education is estimated at 5% (i.e. about 1/3 of the direct effect (Mullahy et al. 1994). Surprisingly, not all studies find a negative association between alcohol disorders and earnings. Quite a few studies report a positive association between the use of alcohol and earnings. For instance, the Quality of Employment Survey of full-time US workers aimed to investigate, among others, the effects of the number of drinks. They found that the consumption of less than eight drinks per month was associated with lower wages, with reduced earnings between 8-13% for male respondents and between 21-26% for female respondents (Berger et al. 1988; Feng et al. 2001). According to the National Household Surveys on Drug Abuse (NHSDA), the use of alcohol is associated with approximately 7% ($p=.01$) higher wages for men and 4% ($p>.05$) higher wages for women. For men, the proportional differences between users and non-users were dependent upon the number of alcohol drinks: differences were about 7% for 1-5 drinks in the past month, 9% for 6-16 drinks per month, and 8% for 17-31 drinks per month. The differences were small but significant (Zarkin et al. 1998). By-and-large, we can say that the relationship between the use of alcohol and wages is rather indefinite. One interesting addition to this research question is to put the relationship between the use of alcohol and monthly earnings into a individual developmental perspective (Bryant et al., 1993). Initially, immediately after the onset of the use of alcohol, drinking and wages have a strong positive association. Over time, however, their relationship stabilizes, and eventually becomes negative as drinking increases and the negative effects become more salient.

The burden of mental disorders in the European Union: a quantitative approach based on the EU-WMH database

In this paragraph, our main aim is to depict the burden of mental disorders in the ten participating EU-WMH countries in a quantitative manner. We will systematically describe the EU-WMH sample in terms of sociodemographic characteristics (paragraph 3.2.1) and 12-month DSM-IV disorders (paragraph 3.2.2.), and will then present the results of the quantitative analyses of the sample in terms of absenteeism (paragraph 3.2.3), presenteeism (paragraph 3.2.4), and monthly earnings (paragraph 3.2.5). In each of the paragraphs in which different aspects of ‘burden’ are presented (i.e. absenteeism, presenteeism, and monthly earnings), we give basic descriptive results, bivariate, and multivariate approaches.

Description of the sample

The characteristics of the study sample are shown in table 3. Mean age was 47 years, with the majority of the respondents (30%) being under the age of 35. Males represented 46% of the sample. About 67% was married or living with someone, 55% was working at the time of the interview, and 34% of the sample had been in full-time education for more than 13 years. About 4 in ten respondents had no personal earnings. More details on the sample characteristics are found in table 2.

Table 2. Description of the EU-WMH sample

	Male		Female		Overall Sample	
	n	%(SE)	n	%(SE)	n	%(SE)
Age:						
. <= 34	4416	31.7% (0.4)	5110	28.7% (0.4)	9526	30.1% (0.3)
. 35-49	4871	28.8% (0.4)	5854	26.7% (0.3)	10725	27.7% (0.3)
. 50-64	4269	22.5% (0.4)	4945	22.1% (0.3)	9214	22.3% (0.2)
. 65+	3450	17.1% (0.3)	4374	22.6% (0.4)	7824	19.9% (0.3)
Country:						
. Belgium	1190	6.6% (0.2)	1229	6.4% (0.3)	2419	6.5% (0.2)
. Bulgaria	2430	14.2% (0.2)	2888	14.3% (0.2)	5318	14.3% (0.1)
. France	1329	7.7% (0.2)	1565	7.8% (0.2)	2894	7.8% (0.2)
. Germany	1660	9.6% (0.3)	1895	9.5% (0.2)	3555	9.5% (0.2)
. Italy	2321	12.6% (0.2)	2391	12.6% (0.2)	4712	12.6% (0.2)
. Netherlands	1032	6.5% (0.3)	1340	6.3% (0.2)	2372	6.4% (0.2)
. North-Ireland	1899	11.6% (0.3)	2441	11.7% (0.3)	4340	11.6% (0.2)
. Portugal	1632	10.4% (0.3)	2217	10.3% (0.2)	3849	10.3% (0.1)
. Romania	1092	6.3% (0.2)	1265	6.4% (0.2)	2357	6.3% (0.1)
. Spain	2421	14.6% (0.3)	3052	14.7% (0.3)	5473	14.7% (0.2)

	Male		Female		Overall Sample	
	n	%(SE)	n	%(SE)	n	%(SE)
Marital status:						
. Married/Cohabiting	11988	69.2% (0.4)	13086	65.5% (0.4)	25074	67.3% (0.3)
. Separated/Widowed/Divorced	1441	6.0% (0.2)	4009	16.8% (0.3)	5450	11.6% (0.2)
. Never married	3577	24.9% (0.4)	3188	17.7% (0.3)	6765	21.1% (0.3)
Per capita Income:						
. Low	2948	22.4% (0.5)	4204	25.5% (0.5)	7152	24.0% (0.4)
. Low-average	3661	27.8% (0.5)	4841	29.9% (0.5)	8502	28.9% (0.3)
. High-average	4224	30.9% (0.5)	4947	29.5% (0.5)	9171	30.2% (0.3)
. High	2744	18.8% (0.4)	2492	15.1% (0.4)	5236	16.9% (0.3)
Personal Earnings						
. None	4510	31.7% (0.6)	7939	49.2% (0.5)	12449	40.8% (0.4)
. Low	1489	12.1% (0.4)	2622	15.8% (0.4)	4111	14.0% (0.3)
. Low-average	2188	16.5% (0.4)	2897	17.3% (0.4)	5085	16.9% (0.3)
. High-average	3362	24.9% (0.4)	2126	12.4% (0.4)	5488	18.4% (0.3)
. High	2028	14.9% (0.4)	900	5.3% (0.2)	2928	9.9% (0.2)
Educational milestones:						
. No education/incomplete primary	1407	9.1% (0.3)	2155	12.7% (0.4)	3562	11.0% (0.3)
. Incomplete secondary	4005	25.3% (0.4)	4953	26.8% (0.4)	8958	26.1% (0.3)
. Secondary finished	4841	33.0% (0.6)	5487	30.8% (0.5)	10328	31.9% (0.4)
. Higher education	4551	32.6% (0.5)	5207	29.7% (0.5)	9758	31.1% (0.4)
Years of Education :						
. 0-12 years	10564	63.9% (0.5)	13154	67.1% (0.5)	23718	65.6% (0.4)
. 13+ years	5569	36.1% (0.5)	6213	32.9% (0.5)	11782	34.4% (0.4)
Employment status:						
. Working	9835	63.4% (0.5)	9342	47.4% (0.5)	19177	55.1% (0.4)
. Unemployed/disabled	1480	9.6% (0.3)	1870	9.7% (0.3)	3350	9.6% (0.2)
. Other	4818	27.1% (0.4)	8155	42.9% (0.5)	12973	35.3% (0.3)

The prevalence of mental disorders in the European Union

Table 3 shows that about one in four (i.e. 25.6%) of the respondents met criteria for a lifetime mental disorder, with approximately 13% experiencing a mental disorder in the past 12 months. Thirteen percent of respondents reported a lifetime history of any mood disorder,

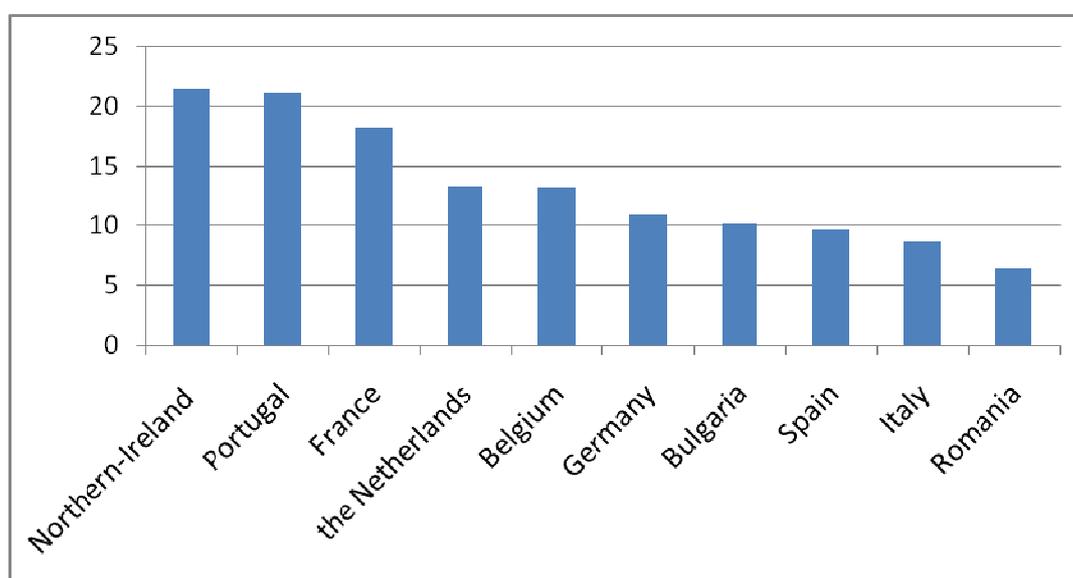
14.1% any anxiety disorder, and 5.5% a lifetime history of any alcohol disorder. Within the 12 months preceding the interview, 9.3% of the respondents met criteria for any anxiety disorder, 4.8% for any mood disorder, and 1.1% for any alcohol disorder. Major depression and specific phobia were the most common mental disorders: 12.4% reported a lifetime history of major depressive disorder, with 4.6% having major depression in the past 12 months. Slightly more than 7% reported an episode of specific phobia in their life, for 5.5% this disorder was present in the past 12 months. The next most common disorders were alcohol abuse and post-traumatic stress disorder for lifetime occurrence (4.4% and 3.4%, respectively) and PTSD and social phobia for 12-month occurrence (both 1.7%). Other mental disorders were less common for both 12-month and lifetime presence.

Table 3. Mental disorders in the European Union

	Overall %(SE)	Sex %(SE)		Age %(SE)			
		Male	Female	18-34	35-49	50-64	65+
12 month disorders							
Any mood disorder	4.9% (0.1)	3.1% (0.2)	6.6% (0.2)	5.2% (0.3)	5.1% (0.2)	5.5% (0.3)	3.6% (0.3)
. Major depressive episode	4.6% (0.1)	2.9% (0.1)	6.2% (0.2)	5.0% (0.3)	4.8% (0.2)	5.2% (0.3)	3.1% (0.2)
. Dysthymia	0.7% (0.1)	0.5% (0.1)	1.0% (0.1)	0.5% (0.1)	0.6% (0.1)	1.1% (0.1)	0.8% (0.1)
Any anxiety disorder	9.3% (0.3)	5.8% (0.3)	12.6% (0.4)	10.0% (0.6)	10.3% (0.5)	9.6% (0.5)	6.6% (0.6)
. Panic disorder	0.9% (0.1)	0.7% (0.1)	1.1% (0.1)	1.0% (0.1)	1.0% (0.1)	1.1% (0.1)	0.6% (0.1)
. Specific phobia	5.5% (0.2)	2.9% (0.1)	7.9% (0.2)	5.9% (0.3)	5.6% (0.2)	5.7% (0.3)	4.4% (0.3)
. Social phobia	1.7% (0.1)	1.2% (0.1)	2.1% (0.1)	2.2% (0.2)	2.0% (0.2)	1.6% (0.2)	0.6% (0.1)
. Agoraphobia without panic disorder	0.5% (0.0)	0.3% (0.1)	0.7% (0.1)	0.5% (0.1)	0.7% (0.1)	0.6% (0.1)	0.2% (0.1)
. Generalized anxiety	0.9% (0.1)	0.6% (0.1)	1.2% (0.1)	0.9% (0.1)	1.0% (0.1)	1.2% (0.1)	0.6% (0.1)
. Post-traumatic stress disorder	1.7% (0.1)	1.0% (0.1)	2.4% (0.2)	1.4% (0.2)	2.0% (0.2)	2.2% (0.3)	1.2% (0.2)
Any alcohol disorder	1.2% (0.1)	2.0% (0.1)	0.4% (0.1)	2.2% (0.2)	1.1% (0.1)	0.8% (0.1)	0.1% (0.0)
. Alcohol dependence	0.3% (0.0)	0.5% (0.1)	0.1% (0.0)	0.4% (0.1)	0.3% (0.1)	0.3% (0.1)	0.0% (0.0)
. Alcohol abuse	1.1% (0.1)	1.9% (0.1)	0.3% (0.0)	2.0% (0.2)	1.0% (0.1)	0.7% (0.1)	0.1% (0.0)
Any mental disorder	13.2% (0.3)	9.4% (0.4)	16.7% (0.5)	14.7% (0.7)	14.1% (0.6)	13.2% (0.5)	9.4% (0.6)
No Any mental disorder	86.8% (0.3)	90.6% (0.4)	83.3% (0.5)	85.3% (0.7)	85.9% (0.6)	86.8% (0.5)	90.6% (0.6)
Lifetime disorders							
Any mood disorder	13.1% (0.2)	8.8% (0.2)	17.1% (0.4)	12.3% (0.4)	14.6% (0.4)	14.8% (0.4)	10.4% (0.4)
. Major depressive episode	12.4% (0.2)	8.4% (0.2)	16.1% (0.3)	12.0% (0.4)	14.0% (0.4)	13.7% (0.4)	9.3% (0.4)
. Dysthymia	1.6% (0.1)	1.1% (0.1)	2.2% (0.1)	0.9% (0.1)	1.6% (0.1)	2.5% (0.2)	1.9% (0.2)

	Overall %(SE)	Sex %(SE)		Age %(SE)			
		Male	Female	18-34	35-49	50-64	65+
Any anxiety disorder	14.1% (0.3)	10.0% (0.5)	17.9% (0.5)	14.2% (0.7)	16.2% (0.7)	14.8% (0.6)	10.2% (0.6)
. Panic disorder	1.7% (0.1)	1.2% (0.1)	2.2% (0.1)	1.6% (0.2)	2.2% (0.2)	2.1% (0.2)	1.0% (0.1)
. Specific phobia	7.4% (0.2)	4.5% (0.2)	10.0% (0.3)	7.7% (0.3)	7.7% (0.3)	7.8% (0.3)	5.8% (0.3)
. Social phobia	2.7% (0.1)	2.1% (0.1)	3.1% (0.1)	3.4% (0.2)	3.2% (0.2)	2.7% (0.2)	0.9% (0.1)
. Agoraphobia without panic disorder	0.8% (0.1)	0.5% (0.1)	1.0% (0.1)	0.7% (0.1)	1.0% (0.1)	0.9% (0.1)	0.4% (0.1)
. Generalized anxiety	2.4% (0.1)	1.7% (0.1)	3.0% (0.1)	2.0% (0.2)	2.5% (0.2)	3.3% (0.2)	1.7% (0.2)
. Post-traumatic stress disorder	3.4% (0.2)	1.9% (0.2)	4.8% (0.3)	2.8% (0.2)	3.8% (0.3)	4.1% (0.4)	3.1% (0.3)
Any alcohol disorder	5.5% (0.2)	9.7% (0.3)	1.6% (0.1)	7.0% (0.3)	6.2% (0.3)	5.6% (0.4)	2.0% (0.2)
. Alcohol dependence	1.1% (0.1)	1.9% (0.1)	0.4% (0.1)	1.0% (0.1)	1.4% (0.1)	1.5% (0.2)	0.4% (0.1)
. Alcohol abuse	5.3% (0.2)	9.4% (0.3)	1.5% (0.1)	6.8% (0.3)	6.0% (0.3)	5.4% (0.3)	1.9% (0.2)
Any mental disorder	25.6% (0.5)	22.7% (0.7)	28.3% (0.6)	26.1% (0.9)	28.4% (0.8)	27.2% (0.8)	19.3% (0.8)
No Any mental disorder	74.4% (0.5)	77.3% (0.7)	71.7% (0.6)	73.9% (0.9)	71.6% (0.8)	72.8% (0.8)	80.7% (0.8)

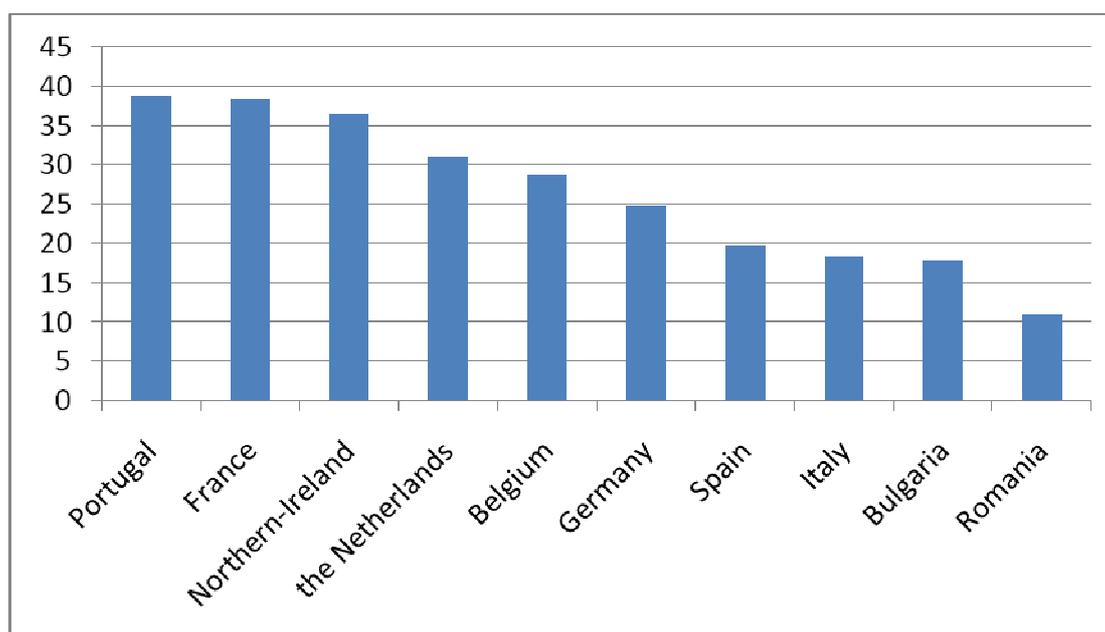
Figure 5. 12-month mental disorders in the European Union, per country



Regarding the prevalence estimates of lifetime mental disorders (figure 6), the median estimate is 24.8% for the ten participating countries in the EU-WMH project. Portugal, France, Northern-Ireland and the Netherlands all have lifetime rates higher than 30%. Italy, Bulgaria, and Romania have the lowest rates of lifetime disorders.

We found considerable inter-country differences in both 12-month and lifetime estimates of mental disorders in the European Union (figures 5 and 6). Overall, we can say that the median 12-month estimate of mental disorders is 12% in the European Union. Regarding 12-month estimates, figure 6 shows that both Northern-Ireland and Portugal have the highest rates of mental disorders (above 20% of the general population), followed by France. The Netherlands, Belgium, and Germany have percentages all in the 10-15% of 12-month mental disorders. Rates between 5-10% of mental disorders were found among respondents from Bulgaria, Spain, Italy, and Romania. A more detailed analysis of country differences is found in appendix table 1.

Figure 6. Lifetime mental disorders in the European Union, per country



Projected lifetime risk of mental disorders at age 75 based on the age-of-onset distributions (table 4) was 34.9% for any mental disorder: 22.1% for depressive disorders, 17.6% for anxiety disorders, and 6.9% for alcohol disorders. If we compare the lifetime prevalence estimates (table 5, column 3) with the projected lifetime risk estimates (table 4, column 4), we could see that, in absolute percentages, the most notable increase was found in depressive disorders (+8.0%). Overall, projected lifetime prevalence risk for any mental disorder is increased with more than 9% (25.6% to 34.9%). However, considering the relative (instead of the absolute) change between the lifetime prevalence estimates and projected lifetime risks for any mental disorder, the prevalence of any mental disorder is expected to increase with 36%. The largest increase is expected in dysthymia (+88%), PTSD (+79%), major depressive episode (+66%), alcohol abuse disorders (+25%), and specific phobia (+26.5%).

Table 4. 12-month and lifetime prevalence, and lifetime risk of mental disorders in the EU-WMH project

	12-month prevalence of mental disorders	Lifetime prevalence of mental disorders	Projected lifetime risk of mental disorders
Any mood disorder	4.9% (0.1)	13.1% (0.2)	22.1 (0.5)
. Major depressive episode	4.6% (0.1)	12.4% (0.2)	20.6 (0.5)
. Dysthymia	0.7% (0.1)	1.6% (0.1)	3 (0.2)
Any anxiety disorder	9.3% (0.3)	14.1% (0.3)	17.6 (0.5)
. Panic disorder	0.9% (0.1)	1.7% (0.1)	2.8 (0.2)
. Specific phobia	5.5% (0.2)	7.4% (0.2)	8 (0.2)
. Social phobia	1.7% (0.1)	2.7% (0.1)	3.1 (0.1)
. Agoraphobia without panic disorder	0.5% (0.0)	0.8% (0.1)	1.1 (0.1)
. Generalized anxiety	0.9% (0.1)	2.4% (0.1)	3.7 (0.2)
. Post-traumatic stress disorder	1.7% (0.1)	3.4% (0.2)	6.1 (0.5)
Any alcohol disorder	1.2% (0.1)	5.5% (0.2)	6.9 (0.2)
. Alcohol dependence	0.3% (0.0)	1.1% (0.1)	1.5 (0.1)
. Alcohol abuse	1.1% (0.1)	5.3% (0.2)	6.7 (0.2)
Any mental disorder	13.2% (0.3)	25.6% (0.5)	34.9 (0.7)

Absenteeism in the 10 EU-WMH countries

Absenteeism in the general population

Descriptives. As shown in table 5, the proportion of respondents in the general population reporting any absenteeism days in the previous month was estimated at 10.5% of the general population. Among those with at least one day of absenteeism, most frequently respondents reported between 3 and 5 days per month (or between 36 and 60 days per year) of being totally unable to work or to carry out normal activities.

Table 5. Absenteeism in the general population of the European Union

	General population
	% (SE)
Any days totally unable to work or carry out normal activities	10.5% (0.3)
1 day	11.3% (1.0)
2 days	12.3% (0.9)
3-5 days	26.8% (1.4)
6-10 days	12.6% (0.9)
11-20 days	10.3% (0.9)
21-29 days	2.3% (0.6)
30 days	24.4% (1.4)
Mean (SE) days totally unable	1.3 (0.06)
Mean(SE) days totally unable, among those with any	12.1 (0.4)

Bivariate analyses. After disaggregation for sex, age, and country, two interesting differences appear (table 6, second column). First, the highest amount of absenteeism days were found among the oldest age groups, i.e. 50-64 and above 64. Second, the median number of absenteeism days is 1.2 per month (or about 14 days per year) for the total population, but we found notable country differences: lowest rates were found in respondents from Bulgaria and France (0.9 days per month – or 11 days per year) and highest rates were found in the Netherlands (1.8 days per month – or about 22 days per year) and Northern-Ireland (2.4 days per month – or approximately 29 days per year). The number of absenteeism days was not dependent upon gender. Country-specific data are found in appendix table 2.

The number of monthly absenteeism days was also dependent upon the presence of mental disorders. As shown in table 7, respondents who met criteria for a 12-month DSM-IV disorder (i.e. 25.6% of the general population of the EU-WMH countries) reported about 3.1 absenteeism days per month, compared to 1 day per month among those without a disorder. Within the mental disorders, highest mean days of absenteeism were reported by respondents with panic and post-traumatic stress disorders (5.5 and 5.7 days per month, respectively – or about 60 to 68 days per year). Mental disorders yielding the lowest absenteeism rates were the alcohol disorders, and especially a 12-month alcohol abuse disorder (2.1 absenteeism days per month). More detailed results are found in appendix tables 3 and 4.

Table 6. Absenteeism and presenteeism in the general population of the European Union: sociodemographic en country differences

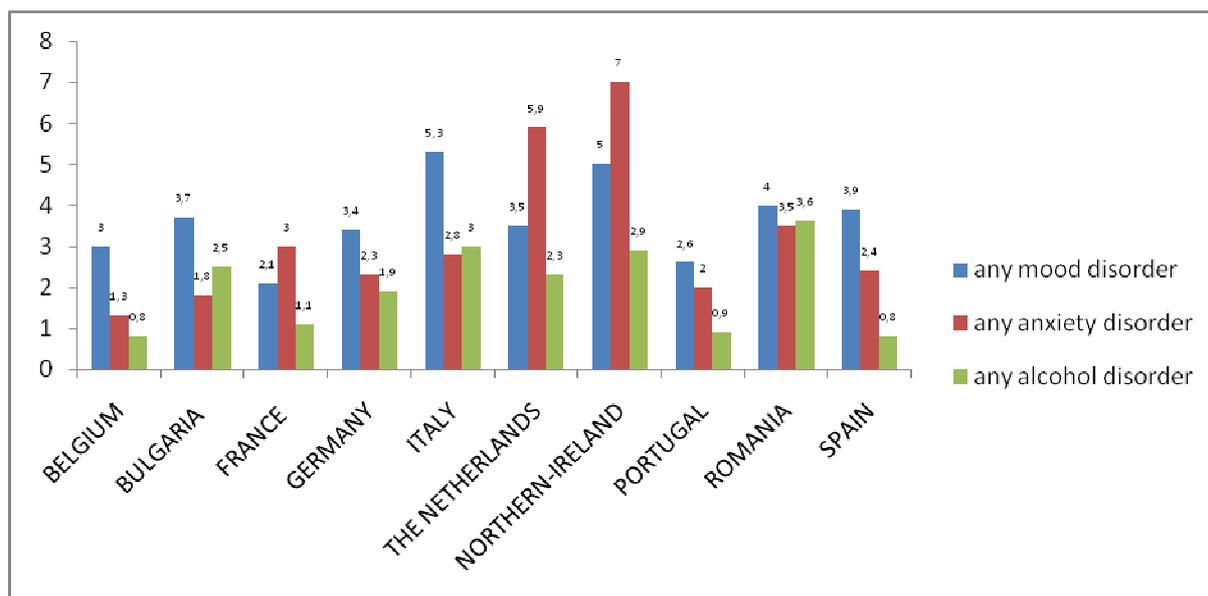
	Any absenteeism days (SE)	Cut down quantity Mean(SE)	Cut back quality Mean(SE)	Extreme effort Mean(SE)
Overall	1.3(0.1)	2.1(0.1)	0.9(0.0)	0.8(0.0)
Sex				
Male	1.2(0.1)	1.8(0.1)	0.7(0.1)	0.5(0.0)
Female	1.3(0.1)	2.3(0.1)	1.2(0.1)	1.0(0.0)
p-value	0.402	<0.001	<0.001	<0.001
Age				
18-34	0.7(0.1)	1.5(0.1)	0.6(0.1)	0.5(0.1)
35-49	1.1(0.1)	1.7(0.1)	0.7(0.1)	0.6(0.0)
50-64	1.6(0.1)	2.3(0.1)	1.1(0.1)	0.9(0.1)
65+	2.1(0.1)	3.1(0.2)	1.5(0.1)	1.3(0.1)
p-value	<0.001	<0.001	<0.001	<0.001
Country				
Belgium	1.3(0.3)	2.8(0.6)	1.0(0.2)	0.6(0.1)
Bulgaria	0.9(0.1)	3.5(0.2)	1.1(0.1)	1.0(0.1)
France	0.9(0.2)	3.9(0.3)	0.9(0.1)	0.4(0.1)
Germany	1.0(0.2)	1.2(0.2)	0.7(0.1)	0.6(0.1)
Italy	1.0(0.1)	2.2(0.3)	0.4(0.1)	0.4(0.1)
Netherlands	1.8(0.3)	3.1(0.4)	1.2(0.2)	0.9(0.1)
North-Ireland	2.4(0.2)	1.6(0.1)	1.4(0.2)	1.5(0.2)
Portugal	1.2(0.2)	1.2(0.1)	1.0(0.1)	1.2(0.1)
Romania	1.2(0.1)	0.8(0.1)	0.7(0.1)	0.7(0.1)
Spain	1.2(0.1)	1.7(0.2)	0.9(0.2)	0.4(0.0)
p-value	<0.001	<0.001	<0.001	<0.001

Table 7. Absenteeism and presenteeism in the general population of the EU-WMH countries, per 12-month mental disorders

	General Population			
	Mean number of absenteeism days (SE)	Cut down quality Mean(SE)	Cut back quantity Mean(SE)	Extreme effort Mean(SE)
Any mood disorder 12 month	3.7(0.2)	4.3(0.2)	3.3(0.2)	2.6(0.2)
. Major depressive episode 12 month	3.7(0.2)	4.3(0.2)	3.3(0.2)	2.7(0.2)
. Dysthymia 12 month	3.7(0.6)	4.9(0.6)	4.0(0.6)	3.1(0.6)
Any anxiety disorder 12 month	3.4(0.3)	3.3(0.2)	2.7(0.2)	2.6(0.2)
. Panic disorder 12 month	5.5(0.7)	3.5(0.5)	2.9(0.4)	2.7(0.5)
. Specific phobia 12 month	3.1(0.4)	3.2(0.3)	2.6(0.4)	2.5(0.4)
. Social phobia 12 month	3.9(0.5)	3.6(0.4)	3.1(0.4)	3.3(0.4)
. Agoraphobia without panic disorder 12 month	3.7(0.9)	4.4(1.2)	3.3(1.2)	3.3(1.2)
. Generalized anxiety 12 month	4.1(0.6)	4.2(0.5)	3.6(0.5)	3.3(0.4)
. Post-traumatic stress disorder 12 month	5.7(0.7)	4.9(0.6)	4.3(0.6)	3.9(0.5)
Any alcohol disorder 12 month	2.2(0.4)	1.8(0.3)	1.7(0.3)	1.5(0.3)
. Alcohol dependence 12 month	3.7(1.1)	2.2(0.6)	2.3(0.7)	2.4(0.9)
. Alcohol abuse 12 month	2.1(0.4)	1.8(0.3)	1.7(0.3)	1.5(0.3)
Any mental disorder 12 month	3.1(0.2)	3.4(0.2)	2.6(0.2)	2.4(0.2)
No Any mental disorder 12 month	1.0(0.1)	1.9(0.1)	0.7(0.0)	0.5(0.0)

After disaggregation for country (see figure 7), we could see that, in general, depressive disorders generate the highest number of absenteeism days in 7 out of the 10 countries of the EU-WMH project. Only in three countries (i.e. the Netherlands, Northern-Ireland, and France), anxiety disorders appear to be more associated with absenteeism days than either mood or alcohol disorders. More detailed country-specific data are found in appendix table 2.

Figure 7. Mean number of absenteeism days per month reported by respondents in the EU-WMH project, per mental disorder group and country



Multivariate analyses: the individual and societal effects of mental disorders on absenteeism in the total population. Table 8 shows the additional absenteeism days in respondents with a mental disorder, adjusted by age, gender, marital status, and country. Post-traumatic stress disorder (3.24 additional days), panic disorder (2.05 additional days), and agoraphobia (1.34 additional days) were the most disabling conditions. Table 11 also shows the population attributable risk proportion (PARP) of the number of absenteeism days caused by mental disorders. Post-traumatic stress disorder (PARP=4.26%), specific phobia (PARP=3.70%), and major depressive episode (PARP=3.42%) were the disorders that yielded the highest attributable risk in absenteeism days.

Table 8. Individual and societal effects of mental disorders on absenteeism

	individual effects		Societal effects		
	Overall sample	Rank	Overall sample	PARP	Rank
Major depression Episode	0.90 (0.35)	6	0.04 (0.02)	3.42 (1.31)	3
Dysthymia	0.38 (0.69)	8	0.00 (0.01)	0.23 (0.41)	8
Specific Phobia	0.83 (0.33)	7	0.05 (0.02)	3.70 (1.47)	2
Social Phobia	1.25 (0.55)	5	0.02 (0.01)	1.68 (0.76)	4
Generalized Anxiety Disorder	1.32 (0.71)	4	0.01 (0.01)	0.95 (0.51)	6
Agoraphobia without panic	1.34 (0.73)	3	0.01 (0.00)	0.50 (0.28)	7
Panic disorder	2.05 (0.70)	2	0.02 (0.01)	1.53 (0.55)	5
Posttraumatic Stress Disorder	3.24 (0.66)	1	0.05 (0.01)	4.26 (0.94)	1
Alcohol disorder	-0.46 (0.68)	9	-0.01 (0.01)	-0.43 (0.64)	9
Any Disorder	1.78 (0.27)	.	0.23 (0.04)	18.25 (2.68)	.
Mood disorder	0.95 (0.31)	.	0.05 (0.02)	3.83 (1.24)	.
Anxiety disorder	1.75 (0.24)	.	0.16 (0.02)	12.67 (1.74)	.

Absenteeism among working respondents

Descriptives. As reported previously, analyses carried out with the WHODAS-2 were repeated for the group of respondents who declared to be employed at the time of the interview. This was done in order to generate estimates of work absenteeism and work presenteeism. As shown in table 9, the proportion of workers reporting any absenteeism in the previous month was estimated at 8.8% of the working population of the countries included in the EU-WMH project. Among workers with at least one day of absenteeism, most frequently respondents reported between 3 and 5 days per month (or between 36 and 60 days per year) of being totally unable to work or to carry out normal activities.

Table 9. Absenteeism among employed respondents in the EU-WMH countries

	% (SE)
Any days totally unable to work or carry out normal activities	8.8% (0.4)
1 day	16.2% (1.8)
2 days	13.3% (1.5)
3-5 days	31.6% (2.5)
6-10 days	13.0% (1.6)
11-20 days	6.9% (1.2)
21-29 days	2.7% (1.3)
30 days	16.4% (1.8)
Mean (SE) days totally unable	0.8 (0.06)
Mean(SE) days totally unable, among those with any	9.5 (0.6)

Bivariate analyses. After disaggregation for sex, age, and country (see table 10, second column), we can see that the highest mean number of absenteeism days was reported by the oldest cohort (i.e. those above 64). Against the mean overall estimate of 0.8 absenteeism days per month among workers (or almost 10 days per year) it is interesting that we found considerable inter-country differences : absenteeism rates vary widely, from 0.3 days per month (or about 4 days per year) in Bulgaria up to 1.6 days per month (or approximately 19 days per year) in Northern-Ireland. We could not find gender differences in the mean number of absenteeism days among workers in the ten EU countries included in the project. Detailed data is found in appendix tables 5 and 6.

Table 10. Absenteeism and presenteeism among working respondents in the EU-WMH countries, per gender, age, and country

	Mean number of absenteeism days (SE)	Mean number of quantity cut down days (SE)	Mean number of quality cut back (SE)	Mean number of extreme effort days (SE)
Overall	0.8(0.1)	1.6(0.1)	0.6(0.0)	0.6(0.0)
Sex				
Male	0.8(0.1)	1.6(0.1)	0.5(0.1)	0.5(0.1)
Female	0.8(0.1)	1.7(0.1)	0.7(0.0)	0.7(0.0)
p-value	0.967	0.627	0.113	0.022
Age				
18-34	0.7(0.1)	1.4(0.2)	0.6(0.1)	0.5(0.1)
35-49	0.8(0.1)	1.6(0.1)	0.6(0.1)	0.6(0.1)
50-64	1.2(0.2)	2.0(0.2)	0.6(0.1)	0.6(0.1)
65+	1.4(0.4)	2.1(0.7)	1.2(0.6)	1.3(0.4)
p-value	0.027	0.194	0.683	0.250
Country				
Belgium	1.1(0.3)	2.8(0.6)	0.6(0.1)	0.5(0.1)
Bulgaria	0.3(0.1)	2.1(0.3)	0.4(0.1)	0.4(0.1)
France	0.9(0.2)	3.2(0.4)	0.7(0.2)	0.5(0.1)
Germany	0.8(0.2)	1.0(0.2)	0.4(0.1)	0.6(0.1)
Italy	0.6(0.1)	1.9(0.2)	0.3(0.0)	0.3(0.1)
Netherlands	1.3(0.2)	2.8(0.6)	0.8(0.2)	0.9(0.2)
North-Ireland	1.6(0.3)	1.1(0.1)	1.1(0.2)	1.2(0.2)
Portugal	0.7(0.2)	0.7(0.1)	0.6(0.1)	0.7(0.1)
Romania	0.4(0.1)	0.2(0.0)	0.2(0.1)	0.2(0.0)
Spain	0.8(0.1)	1.6(0.3)	0.6(0.3)	0.3(0.0)
p-value	<0.001	<0.001	<0.001	<0.001

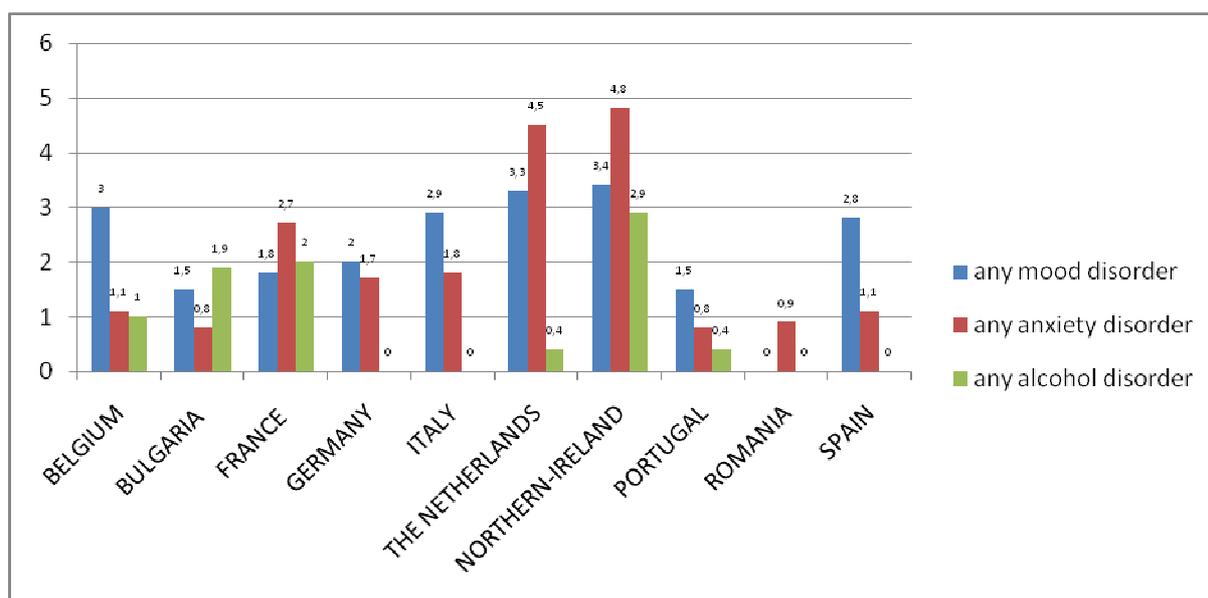
When turning to mental disorders (table 11, second column), it becomes clear that employed respondents who meet criteria for a 12-month mental disorder reported a higher number of absenteeism days compared to those without (i.e. 2.0 versus 0.7). Post-traumatic stress disorder (3.5 days per month, or 42 days per year) and panic disorder (2.8 days per month, or 34 days per year) were the two disorders that yielded the highest number of absenteeism days among workers.

Table 11. Absenteeism and presenteeism among employed respondents in the EU-WMH countries, per mental disorders

	Mean number of absenteeism days (SE)	Mean number of quantity cut down days (SE)	Mean number of quality cut back (SE)	Mean number of extreme effort days (SE)
Any mood disorder 12 month	2.5(0.3)	3.3(0.3)	2.4(0.3)	2.1(0.2)
. Major depressive episode 12 month	2.4(0.3)	3.3(0.3)	2.4(0.3)	2.2(0.2)
. Dysthymia 12 month	2.1(0.8)	4.0(0.9)	1.5(0.6)	2.0(0.7)
Any anxiety disorder 12 month	2.2(0.4)	2.2(0.2)	1.8(0.3)	2.2(0.4)
. Panic disorder 12 month	2.8(0.7)	3.2(0.6)	2.2(0.5)	1.4(0.3)
. Specific phobia 12 month	2.3(0.6)	2.1(0.2)	1.9(0.6)	2.2(0.6)
. Social phobia 12 month	2.2(0.5)	2.2(0.4)	1.4(0.3)	2.3(0.4)
. Agoraphobia without panic disorder 12 month	1.7(0.5)	2.1(0.6)	1.2(0.4)	1.4(0.5)
. Generalized anxiety 12 month	2.4(0.6)	2.8(0.4)	2.3(0.4)	2.7(0.5)
. Post-traumatic stress disorder 12 month	3.5(0.6)	3.3(0.5)	2.4(0.4)	2.5(0.4)
Any alcohol disorder 12 month	1.4(0.4)	1.6(0.3)	1.4(0.3)	1.4(0.3)
. Alcohol dependence 12 month	1.7(1.1)	1.9(0.6)	1.2(0.4)	1.9(0.6)
. Alcohol abuse 12 month	1.4(0.4)	1.6(0.3)	1.4(0.4)	1.4(0.3)
Any mental disorder 12 month	2.0(0.3)	2.4(0.2)	1.8(0.3)	2.0(0.3)
No mental disorder 12 month	0.7(0.1)	1.5(0.1)	0.4(0.0)	0.4(0.0)

In 6 out of 10 EU-WMH countries, working respondents with depressive disorders reported the highest number of absenteeism days. In France, the Netherlands, and Northern-Ireland, anxiety disorders were associated with the highest number of absenteeism days. Remarkably, in Bulgaria, respondents with alcohol disorders (and, after disaggregation for type of disorder, alcohol abuse) reported a considerable mean number of absenteeism days (figure 8)..

Figure 8. Mean number of absenteeism days per month reported by working respondents in the EU-WMH project, per mental disorder group and country



Multivariate analyses: individual and societal effects of mental disorders on absenteeism in the working population. Table 12 shows the additional absenteeism days in working respondents with a mental disorder, adjusted by age, gender, marital status, and country. Anxiety disorders (1.33 additional days), mood (1.12 additional days), and alcohol disorders (0.29 additional days) were the most disabling conditions. Table 13 also shows the population attributable risk proportion (PARP) of the number of absenteeism days caused by mental disorders among workers: anxiety disorders (PARP=14.52%) were the most disabling disorder, followed by mood (PARP=6.53%), and alcohol disorders (PARP=0.50%).

Table 12. Individual and societal effects of mental disorders on absenteeism among workers

Disorder	individual effects		Societal effects		
	estimate	Rank	effect	PARP	Rank
Mood disorder	1.12 (0.35)	2	0.05 (0.02)	6.53 (2.22)	2
Anxiety disorder	1.33 (0.42)	1	0.12 (0.04)	14.52 (4.48)	1
Alcohol disorder	0.29 (0.34)	3	0.00 (0.00)	0.50 (0.60)	3
Any Disorder	1.35 (0.28)	.	0.18 (0.04)	21.18 (4.24)	.

Presenteeism in the EU-WMH countries

Presenteeism in the general population

Descriptives. In the total sample, the mean number of presenteeism days per month was 1.7, with a range between 1.0 (quality cut back days) and 2.1 (quantity cut down days) (see Table 5). About one in five respondents (i.e. 19.3%) in the total sample reported any presenteeism days in the previous month (mostly cut down quantity days). Among those respondents who reported at least one day of presenteeism, the average number of days approximated 8.9 days per month (or 107 days per year).

Bivariate analyses. After disaggregation for sex, age, and country (see table 13, third through fifth column), it appears that female respondents systematically report a higher number of presenteeism days than male respondents, in each of the three presenteeism measures included. Similarly to absenteeism days, we also found the highest number of presenteeism days per month among the oldest age groups. By and large, the mean number of presenteeism days reported by the oldest cohort (i.e. respondents above 64) were 2 to 3 times higher than those reported by the youngest cohort (i.e. respondents between 18 and 34). When looking at country differences, we could see that respondents from France and Bulgaria reported the highest number of quantity cut down days (3.9 and 3.5, respectively) but respondents from Northern-Ireland reported the highest number of quality cut back and extreme effort days per month (about 1.4-1.5 per month). More detailed data is shown in appendix tables 7 and 8.

Table 13. Presenteeism days in the general population of the EU-WMH countries

Any days had to cut down quantity of work or normal activities	15.8% (0.4)
1 day	8.5% (0.7)
2 days	12.2% (0.9)
3-5 days	23.0% (1.1)
6-10 days	13.5% (0.9)
11-20 days	12.1% (0.7)
21-30 days	30.7% (1.3)
Mean (SE) days had to cut down quantity	2.1 (0.07)
Mean(SE) days had to cutdown quantity, among those with any	13.4 (0.3)
Any days had to cut back quantity	10.0% (0.3)
1 day	9.8% (0.9)
2 days	12.3% (1.1)
3-5 days	33.1% (1.6)
6-10 days	16.3% (1.3)
11-20 days	14.3% (1.0)
21-30 days	14.2% (1.2)
Mean (SE) days had to cut back quality	1.0 (0.04)
Mean(SE) days had to cut back quality, among those with any	9.6 (0.3)
Any days it took extreme effort	9.4% (0.3)
1 day	9.9% (1.0)
2 days	14.5% (1.0)
3-5 days	33.3% (1.5)
6-10 days	19.4% (1.3)
11-20 days	12.0% (1.0)
21-30 days	10.9% (1.1)
Mean (SE) days took extreme effort	0.8 (0.03)
Mean(SE) days took extreme effort, among those with any	8.6 (0.3)
Any days with any presenteeism problems	19.3% (0.5)
1 day	13.7% (0.7)
2 days	13.5% (0.9)
3-5 days	19.2% (0.9)
6-10 days	15.9% (0.8)
11-20 days	28.8% (1.1)
21-30 days	8.9% (0.6)
Mean (SE) days with any presenteeism problem	1.7 (0.05)
Mean(SE) days any presenteeism problem, among those with any	8.9 (0.2)

The number of monthly presenteeism days was also dependent upon the presence of mental disorders. As shown in table 8 (third through fifth column), respondents who met criteria for a 12-month DSM-IV disorder reported between 2.4 (extreme effort) and 3.4 presenteeism (quality cut down) days per month, compared to 0.5-1.9 presenteeism days per month among those without criteria for a 12-month mental disorder. We found two disorders that systematically yielded the highest number of presenteeism days per month: dysthymia and post-traumatic stress disorder. Respondents who met criteria for dysthymia (i.e. 0.7% of the general population of the EU-WMH countries) disorder reported a considerable high number of quality cut down days (i.e. 4.9 days per month – or 59 days per year), quantity cut back days (i.e. 4.0 days per month or 48 days per year), and extreme effort days (i.e. 3.1 per month, or 37 days per year). Respondents who met criteria for a 12-month post-traumatic stress disorder (i.e. 3.4% of the general population of the EU-WMH countries) reported similar number of monthly presenteeism days.

Multivariate analyses: individual and societal effects of mental disorders on presenteeism in the total population. Table 14 shows the additional days per month with presenteeism in respondents with a mental disorder. The presence of a disorder was associated with an additional 2.20 presenteeism days per month (or almost 27 days per year). PTSD (2.37 additional days), generalized anxiety disorder (2.10 additional days), and major depressive episode (2.06 additional days) were among the disorders with the highest additional partial disability days. When the impact of disorders was broken down in quality cut back, quantity cut down, and extreme effort days, depression, generalized anxiety disorder, and PTSD particularly affected cut down and cut back days. By contrast, extreme effort days were particularly associated with PTSD and agoraphobia (results shown in appendix table 9).

Table 14. Individual and societal effects of mental disorders on presenteeism

	Individual effects		Societal effects		
	Overall sample	Rank	Overall sample	PARP	Rank
Major Depressive Episode	2.06 (0.33)	3	0.10 (0.02)	5.56 (0.94)	1
Dysthymia	1.16 (0.85)	5	0.01 (0.01)	0.49 (0.36)	6
Specific Phobia	1.06 (0.31)	7	0.06 (0.02)	3.44 (1.00)	2
Social Phobia	1.53 (0.59)	4	0.02 (0.01)	1.44 (0.56)	4
Generalized Anxiety Disorder	2.10 (0.56)	2	0.02 (0.00)	1.05 (0.29)	5
Agoraphobia without panic	1.09 (1.33)	6	0.00 (0.01)	0.29 (0.36)	8
Panic disorder	0.89 (0.74)	8	0.01 (0.01)	0.44 (0.37)	7
Posttraumatic Stress Disorder	2.37 (0.76)	1	0.04 (0.01)	2.09 (0.70)	3
Alcohol disorder	0.30 (0.31)	9	0.00 (0.00)	0.20 (0.22)	9
Any Disorder	2.20 (0.20)	.	0.28 (0.03)	16.22 (1.52)	.
Mood disorder	2.14 (0.34)	.	0.10 (0.02)	6.12 (1.00)	.
Anxiety disorder	1.73 (0.31)	.	0.15 (0.03)	9.00 (1.61)	.

Table 14 also shows the population attributable risk proportion (PARP) of presenteeism days caused by mental disorders. Major depressive episode (PARP=5.56%), specific phobia (PARP=3.44%), and post-traumatic stress disorder (PARP=2.90%) were the disorders that yielded the highest attributable risk. Disorders accounted for 16.22% of all presenteeism days. When data were disaggregated for each of the three domains of partial disability (see appendix table 9), major depressive episode and post-traumatic stress disorder affected all three measures of presenteeism, whereas specific phobia affected cutdown and extreme effort days, and generalized anxiety disorder especially cutback days.

Work presenteeism in the European Union

Descriptives. In the total sample, the mean number of presenteeism days per month among those respondent who declared to be employed was 2.3, with a range between 0.6 (quality cut back and extreme effort days) and 1.7 (quantity cut down days) (see Table 15). Seventeen point eight percent of the total employed sample reported any presenteeism days in the previous month (quantity cut down days). Among those respondents who reported at least one day of presenteeism, the average number of days approximated 10.6 days per month (or about 127 days per year).

Table 15. Presenteeism days among working respondents of the EU-WMH project

Any days had to cut down quantity of work or normal activities	14.0% (0.5)
1 day	10.5% (1.1)
2 days	14.0% (1.3)
3-5 days	26.7% (1.9)
6-10 days	12.3% (1.4)
11-20 days	9.3% (0.9)
21-30 days	27.2% (1.8)
Mean (SE) days had to cut down quantity	1.7 (0.09)
Mean(SE) days had to cutdown quantity, among those with any	12.0 (0.5)
Any days had to cut back quantity	8.4% (0.4)
1 day	13.6% (1.5)
2 days	15.2% (1.8)
3-5 days	39.5% (2.4)
6-10 days	12.5% (1.3)
11-20 days	10.1% (1.4)
21-30 days	9.0% (1.9)
Mean (SE) days had to cut back quality	0.6 (0.05)
Mean(SE) days had to cut back quality, among those with any	7.2 (0.5)
Any days it took extreme effort	8.6% (0.4)
1 day	12.4% (1.5)
2 days	18.2% (1.5)
3-5 days	36.7% (2.3)
6-10 days	17.3% (1.7)
11-20 days	9.0% (1.3)
21-30 days	6.4% (1.5)
Mean (SE) days took extreme effort	0.6 (0.04)
Mean(SE) days took extreme effort, among those with any	6.8 (0.4)
Any days with any presenteeism problems	17.8% (0.6)
1 day	16.8% (1.1)
2 days	16.0% (1.4)
3-5 days	22.3% (1.3)
6-10 days	14.8% (1.1)
11-20 days	32.8% (1.8)
21-30 days	12.9% (1.0)
Mean (SE) days with any presenteeism problem	2.3 (0.10)
Mean(SE) days any presenteeism problem, among those with any	10.6 (0.3)

Bivariate analyses. After disaggregation for sex, age, and country (see table 10, third through fifth column), we could not find statistical differences in the distribution of presenteeism days with age (all $p > .194$). The only statistical significant difference we found in gender was that female respondents reported slightly more extreme effort days than their male counterparts ($p = .022$). Again, significant country-differences were found with regard to the mean number of presenteeism days: respondents from France (3.2 days per month, or 38 days per year), Belgium, and the Netherlands (both 2.8 days per month, or about 34 days per year) declared the highest number of quantity cut back days. By comparison, the Netherlands and Northern-Ireland were the countries where respondents reported the highest mean number of quality cut back and extreme effort days (see appendix table 10).

Mood and anxiety disorders were associated with reporting presenteeism days in working respondents. Regarding quality cut down days, those with a 12-month DSM-IV mood disorder reported 3.3 days per month (or approximately 40 days per year) in which they had to cut down the quality of their work. Specifically, dysthymia (4.0 days per month) and post-traumatic stress disorder (3.3 days per month) were the two disorders associated with the highest number of quality cutdown days. By comparison, the disorders that were found to be associated with quantity cutback days were especially major depressive episode (generating about 2.4 days per month with significant decreased quantity in role of working performance) and, again, post-traumatic stress disorder (about 2.4 days per month). More detailed information on the associations between presenteeism variables, mental disorders, and country differences is found in appendix table 11.

Multivariate analyses: individual and societal effects of mental disorders on presenteeism in the working population. Table 16 shows the additional days per month with presenteeism in working respondents with a mental disorder. The presence of a disorder was associated with an additional 1.65 presenteeism days per month (or about 20 days per year). Depressive disorders accounted for the highest number of additional presenteeism days among workers (1.86 additional days per month), followed by anxiety (1.20 additional days), and alcohol disorders (0.35 additional days per month). When the impact of disorders was broken down in quantity cut down, quality cut back, and extreme effort days (appendix table 12), depressive disorders had the highest impact for both additional cutback and cutdown days, whereas anxiety disorders were the disorders that generated the highest number of additional extreme effort days.

Table 16. Individual and societal effects of mental disorders on presenteeism among workers

Disorder	Individual effects		Societal effects		
	Overall sample	Rank	Overall sample	PARP	Rank
Mood disorder	1.86 (0.33)	1	0.09 (0.02)	6.84 (1.34)	2
Anxiety disorder	1.20 (0.34)	2	0.11 (0.03)	8.35 (2.37)	1
Alcohol disorder	0.35 (0.38)	3	0.01 (0.01)	0.40 (0.43)	3
Any Disorder	1.65 (0.24)	.	0.21 (0.03)	16.55 (2.45)	.

Table 16 also shows the population attributable risk proportion (PARP) of presenteeism days caused by mental disorders. The highest PARP was associated with anxiety disorders (PARP=8.35%), followed by mood (PARP=6.84%), and alcohol disorders (PARP=0.40%). Disorders accounted for 16.55% of all presenteeism days. When data were disaggregated for each of the three domains of presenteeism (see appendix table 12), anxiety disorders generated the highest PARPs for both cutback days (PARP=14.75%) and extreme effort days (PARP=24.15%). On the societal level, depressive disorders were the most impacting disorders on cutdown days (PARP=5.20%).

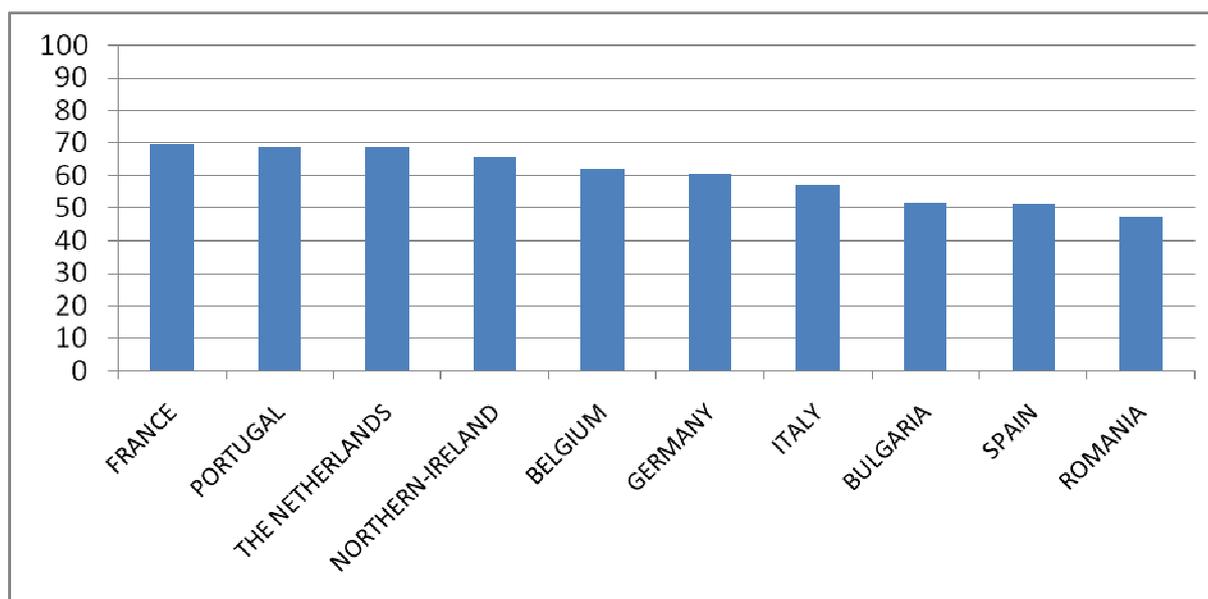
Monthly earnings in the ten EU-WMH countries

Description of the distribution of earnings in the EU-WMH sample

Table 17 shows the distribution of monthly earnings in the EU-WMH project. In general, 59.2% reported to have monthly earnings (mostly high-average), with a range between 47.3% (in Romania) and 69.5% (in France). Males were more likely to report monthly earnings than females ($p < .001$), as was the case for respondents between 35 and 49. Among respondents who declared to have monthly earnings, the largest proportion of male respondents reported to have earnings in the high-average range whereas the largest proportion of female respondents declared to have earnings in the low-average range of monthly income. The country-specific data on monthly earnings are found in figure 9.

Table 17. Distribution of monthly earnings in the ten participating countries in the EU-WMH project

	Any personal earnings %(SE)	Among those with any personal earnings				p-value
		Low %(SE)	Low- average %(SE)	High- average %(SE)	High %(SE)	
Overall	59.2(0.4)	23.7(0.4)	28.5(0.4)	31.1(0.4)	16.7(0.4)	
Sex						<0.001
Male	68.3(0.6)	17.7(0.6)	24.1(0.5)	36.4(0.6)	21.7(0.6)	
Female	50.8(0.5)	31.1(0.7)	34.0(0.7)	24.5(0.7)	10.4(0.5)	
Age						<0.001
18 - 34	69.9(0.7)	28.6(0.8)	31.8(0.8)	28.7(0.7)	10.9(0.6)	
35 - 49	78.8(0.5)	17.9(0.5)	25.6(0.7)	36.8(0.8)	19.7(0.6)	
50 - 64	55.8(0.7)	20.1(0.8)	25.7(0.8)	30.5(0.9)	23.7(0.8)	
65+	19.8(0.8)	39.4(1.7)	36.1(1.6)	15.1(1.4)	9.4(1.0)	
Country						<0.001
Belgium	62.3(1.6)	19.6(1.2)	32.9(1.4)	36.9(1.3)	10.5(1.1)	
Bulgaria	51.7(1.4)	25.5(1.9)	31.9(2.0)	23.3(2.1)	19.3(2.7)	
France	69.5(1.0)	27.3(1.5)	26.1(1.4)	33.4(1.3)	13.3(0.8)	
Germany	60.6(1.2)	26.0(1.2)	24.9(1.2)	28.0(1.1)	21.0(1.5)	
Italy	57.1(0.9)	20.9(1.2)	32.2(1.1)	36.5(1.2)	10.5(0.7)	
Netherlands	68.7(1.6)	27.3(1.8)	25.1(1.1)	30.3(1.4)	17.3(1.1)	
North-Ireland	65.7(1.7)	22.4(1.7)	27.7(1.8)	39.5(1.7)	10.4(1.5)	
Portugal	69.0(1.6)	30.6(1.8)	22.6(1.4)	24.4(1.6)	22.3(1.3)	
Romania	47.3(1.3)	23.5(1.6)	26.7(1.5)	13.0(1.4)	36.8(1.4)	
Spain	51.3(1.0)	18.4(0.9)	32.0(1.2)	34.0(1.1)	15.6(0.8)	

Figure 9. Proportion of the respondents with monthly earnings in the Eu-Wmh project

Bivariate associations between 12-month mental disorders and monthly earnings

Table 18 shows the bivariate associations between mental disorders and monthly earnings. In general, the proportion of respondents with versus those without mental disorders that declared to have earnings is quite comparable (60.4 versus 59.5%, respectively). Although the proportions of respondents with versus without earnings was quite similar, among those who reported to have any earnings, interesting differences were found with regard to the distribution of these earnings in terms of quartiles. Respondents without mental disorders are most likely to declare earnings in the high-average income category. By comparison, those with mood or anxiety disorders are more likely to be in the low-average income quartile. Moreover, the largest proportion of respondents who meet criteria for post-traumatic stress disorder are classified to have earnings in the lower quartile of the distribution. More detailed data is found in appendix table 13.

Table 18. Bivariate associations between mental disorders and monthly earnings

	Any Personal earnings %(SE)	Among those with any personal earnings				Chi-sq test
		Low earnings %(SE)	Low average %(SE)	High average %(SE)	High %(SE)	
Any mood disorder	56.3(1.6)	31.5(2.0)	34.0(1.8)	24.1(1.7)	10.4(1.2)	16.82 (<0.001)
. Major depressive episode	57.5(1.7)	31.9(2.1)	33.9(1.8)	24.3(1.7)	9.9(1.2)	16.79 (<0.001)
. Dysthymia	48.4(4.0)	31.1(5.4)	37.2(5.0)	16.1(4.0)	15.6(4.9)	4.48 (0.004)
Any anxiety disorder	59.6(1.4)	30.7(1.9)	32.2(1.8)	26.3(2.0)	10.9(1.2)	15.33 (<0.001)
. Panic disorder	56.7(3.6)	34.0(4.8)	33.4(4.2)	19.7(3.4)	12.9(2.8)	3.62 (0.013)
. Specific phobia	58.0(1.4)	32.5(1.9)	31.3(1.8)	26.2(1.9)	10.1(1.1)	16.71 (<0.001)
. Social phobia	64.0(2.6)	31.1(2.9)	27.3(2.9)	28.2(3.2)	13.3(2.4)	2.48 (0.061)
. Agoraphobia without panic disorder	59.2(4.8)	28.5(5.5)	32.9(6.4)	28.0(6.8)	10.6(5.0)	0.78 (0.508)
. Generalized anxiety	62.0(3.0)	34.2(4.7)	35.9(4.4)	23.0(4.2)	6.9(2.5)	5.99 (<0.001)
. Post-traumatic stress disorder	58.4(3.3)	36.9(3.9)	29.4(3.2)	26.9(3.8)	6.8(1.6)	10.48 (<0.001)
Any alcohol disorder	75.4(2.8)	26.2(3.5)	29.2(3.3)	29.5(3.3)	15.1(2.7)	0.30 (0.822)
. Alcohol dependence	62.2(6.0)	24.0(7.2)	40.1(8.3)	28.0(6.3)	8.0(3.8)	1.60 (0.189)
. Alcohol abuse	75.6(2.9)	25.4(3.5)	29.8(3.3)	29.5(3.5)	15.2(2.9)	0.24 (0.868)
Any mental disorder	60.4(1.2)	29.6(1.5)	32.0(1.5)	26.2(1.5)	12.2(1.0)	16.53 (<0.001)
No mental disorder	59.5(0.6)	24.0(0.7)	27.1(0.7)	29.9(0.8)	19.0(0.6)	

Multivariate individual-level effects of serious mental illness and earnings

The model-based simulations estimate that serious mental illness is associated with a reduction in earnings equal to 29% of the median within-country earnings in the ten EU-WMH countries. (see table 19). The association is considerably larger among men than women in high-income countries (43 versus 22%). Decomposition shows that 37% of the total association (26% for male and 49% for female respondents) between serious mental illness and earnings is a result of the reduced probability of having any earnings among respondents with serious mental illness. A larger component of the total association (i.e. 52%) is a result of the lower mean level of earnings among respondents with than without serious mental illness who have any earnings. This component is larger for men than women (63 versus 41%, $p < .05$).

Table 19. Simulated associations of serious mental illness with reduced earnings at the individual level among male and female respondents in the EU-WMH project

	Total		Male		Female	
N_overall	684		200		484	
N_employed	388		124		264	
Overall association		S.E.		S.E.		S.E.
Association between SMI & earnings*	0,29	0,04	0,43	0,07	0,22	0,04
Component Effects						
SMI on Prob (Non-zero earnings)**	0,12	0,03	0,12	0,05	0,13	0,03
SMI on earnings earnings ¹⁰ *	0,26	0,05	0,41	0,09	0,17	0,05
Decomposition of overall effect						
Difference in prob (Non-zero earnings)	0,37	0,07	0,26	0,09	0,49	0,1
Difference in earnings earning ¹⁰	0,52	0,08	0,63	0,12	0,41	0,09
Interaction between two components	0,11	0,02	0,11	0,03	0,1	0,02

Multivariate country-specific, individual-level, and societal-level projections of the effects of serious mental illness on earnings

Societal-level estimates of the effects of serious mental illness on earnings were obtained by estimating coefficients in the best-fitting model separately in each of the 10 surveys (see table 20), and by expressing estimates in terms of mean median earnings, multiplying them by the prevalence of serious mental illness, and then multiplying this product by the population size of the country in the age range of the sample. Table 19 shows that serious mental illness is associated with a reduction in earnings in all 10 EU-WMH countries, with a statistically significant decrease in 6 out of 10 countries (i.e. Belgium, France, Germany, the Netherlands, Spain, and Ireland) ranging from 18% up to 33% decrease in mean earnings. At the societal level, the estimate ranges between 0.49 and 2.17% of all national earnings in the ten participating countries.

Table 20. Simulated associations between serious mental illness and reduced monthly earnings at the individual and societal level in the EU-WMH countries

Country	SMI Prevalence (%)	SE	Individual level	SE***	Society level	SE***	ind_num**	SE***	Soc_num**	SE***	Country Population	Country Mean Income
Belgium	4,89	1,04	22,52%	6,57%	1,10%	0,32%	189.701	55.322	58.968.734.650	17.196.334.047	6357961	842549,7
France	3,8	0,53	33,03%	9,79%	1,25%	0,37%	36.905	10.934	49.018.559.178	14.522.999.707	34980065	111721,95
Germany	2,67	0,45	32,04%	7,72%	0,85%	0,21%	11.929	2.872	16.852.688.588	4.057.108.715	52993168	37225,36
Italy	1,27	0,22	4,50%	8,43%	0,06%	0,11%	1.306.888	2.446.642	619.557.068.894	1.159.354.260.427	37197277	29017385,22
Netherlands	4,42	0,69	18,39%	7,46%	0,81%	0,33%	8.800	3.571	4.213.170.894	1.709.336.064	10835056	47858
Spain	1,89	0,3	25,85%	5,81%	0,49%	0,11%	509.311	114.483	255.434.559.643	57.417.128.423	26547451	1970067,8
Ireland	6,77	0,79	32,00%	5,12%	2,17%	0,35%	5.343	854	365.403.506	58.424.206	1010654	16699,84
Portugal	4,05	0,47	12,79%	7,93%	0,52%	0,32%	1.206	748	315.998.283	195.956.216	6470155	9430,27
Bulgaria	1,47	0,27	14,68%	16,42%	0,22%	0,24%	372	417	27.110.359	30.325.189	4962446	2536,26

Estimate significant at 0.05

* Results are expressed here in terms of mean earnings, whereas they were expressed in terms of median earnings in Table 3. The median was used in estimating the models in Table 3 because this transformation was considered the one that makes most sense as the basis for constraining model coefficients to be constant across countries. The mean is used here, in comparison, because it is the natural metric for interpreting the substantive meaning of results. To clarify the interpretation: if 4.4% of respondents in high-income countries have serious mental illness and serious mental illness is associated with a 21.7% reduction in earnings, then this level of loss in this segment of the population represents $0.2169 \times 0.44 = 0.96\%$ of all national earnings.

**Expressed in terms of national currency

*** JRR Standard Errors

3. DISCUSSION

3.1. *Prevalence of mental disorders*

The results of the EU-WMH project show that mental disorders are quite common in 10 European Union countries. About one in four respondents reported a lifetime history of any mental disorder according to DSM-IV. Major depression and specific phobia were the most common disorders, with estimated lifetime prevalence rates of 12.4%, and 7.4% respectively. The 12-month and lifetime prevalence of other mental disorders was considerably lower. About 13% reported any mental disorder in the 12 months preceding the diagnostic interview. Major depressive disorder and specific phobia seemed to be the most common 12-month mental disorders, with prevalence estimates of 4.6 and 5.5%. It was striking that only 1.1% reported a 12-month history of an alcohol abuse disorder. An interesting addition is the estimation of the lifetime risk of mental disorders (i.e. 35%); more than one third of the respondents of the EU-WMH project will eventually (at the age of 75) have met the criteria for a mental disorder. This underscores the high prevalence of mental disorders in the European Union. However, it should be noted that meeting criteria for a mental disorder does not necessarily imply that the disorder meets criteria for severity (Wang et al., 2007). By-and-large, we found a 12-month prevalence estimate of any mental disorder of approximately 13.2% and a similar (median) estimate of serious mental illness of 3.3%. This implies that about 25% of those respondents with a mental disorder could be classified as serious.

3.2. *The burden of mental disorders in the European Union*

The most important implication of this study is that we identified mental disorders as an important contributor of both absenteeism and presenteeism, both in the general population and in employed persons. Our data suggest strongly that lowering the impact of common and disabling conditions such as post-traumatic stress disorder, generalized anxiety, or depression may have major returns in terms of population health, productivity, and quality of life. These findings shed a light on the importance of prioritizing public health needs. To the extent that presenteeism predicts absenteeism (Bergström et al., 2009), our data underscore the importance of including both presenteeism and absenteeism when evaluating functional impairment. Our data clearly show that presenteeism (and, especially the disaggregation of presenteeism into three different aspects) may be a valuable and interesting methodological angle to study burden of mental disorders.

In accordance with studies published for separate countries (i.e. the United States [Harwood et al., 2000; Kessler et al., 2008; Rice et al., 1990], Belgium [Bruffaerts et al., 2009] or global approaches (Levinson et al., 2010), the data stemming from EU-WMH provide associations between mental disorders and income pertaining to the European Union. Our data strongly suggest that mental disorders are associated with significant losses of productive human capital, both in the general and the working population. For example, almost 9% of the employed respondents report at least one day of absenteeism in the past month

(corresponding to a figure of 9.6 days per year). Further, respondents with mental disorders report about 21 additional absenteeism days per year in the general population. Persons who are employed and have a mental disorder report 16 additional absenteeism days per year. Similar effects were found for presenteeism, both in the general as in the working population of the EU-WMH countries. Moreover, we estimate the population attributable risk proportion of mental disorders on absenteeism among working persons at 21%. This implies that (against the theoretical assumption that all cases of mental disorders could be reduced to zero [e.g. by treatment or by prevention]) the total amount of absenteeism days among working people could be reduced with 21%. Similar figures pertain to the study of presenteeism. Against reported cost estimates of brain disorders, depression (Sobocki et al., 2006), or anxiety disorders (Andlin-Sobocki & Wittchen, 2005), absenteeism days have a considerable monetary effect, estimated at (on average) 2% of the GDP in the countries of the EU-WMH, with ranges between 0.4% of the GDP (in Bulgaria) and 3.1% of the GDP (in Belgium) (European Foundation for the Improvement of Living and Working Conditions, 2010).

Our findings also add to previous estimates that have showed that mental disorders have a major burden in the society (see table 21). However, there was no study that estimated the decrease of income specifically in European countries. Moreover, the majority of earlier studies did not estimate societal effects of mental disorders. As this is the first European study that estimates the impact of serious mental disorders on earnings, it is impossible to rule out whether estimates found are comparable with other studies. If we look at individual mental disorders, both depression and PTSD in particular are of interest because their 12-month prevalence (4.6 and 1.7%, respectively) and lifetime risk (20.6 and 6.1%, respectively), their considerable effects on both absenteeism and presenteeism (between 11 and 25 additional days per year for depression, and between 28 and 39 additional days per year for PTSD), as well as their relatively high population attributable risk proportions (between 3.4 and 5.6% for depression; between 2.1 and 4.3% for PTSD – see table 20 for a summary of PARPs). From a public health perspective, PTSD and depression may be a focus for prioritization for health care policies, both regarding prevention/treatment of these conditions and resource allocation. How this may effectively be done at local country levels remains an open question. Prevention, integrated treatment, and supportive services have been suggested (European Foundation for the Improvement of Living and Working Conditions, 1997), but the alleviation of this substantial burden of ill health, in both personal and economic terms, remains a significant challenge for policy makers.

Table 21. Summary table of the societal effects of mental disorders on absenteeism and presenteeism

PARP absenteeism	General population	Working population
Depressive disorders	4%	6%
Anxiety disorders	13%	15%
Alcohol disorders	0%	1%
Any mental disorder	18%	21%
PARP presenteeism		
Depressive disorders	6%	9%
Anxiety disorders	9%	8%
Alcohol disorders	0%	0%
Any mental disorder	16%	17%

3.3. Policy implications

In this report, we estimate the burden of mental disorders in ten European Union countries, which has never been done before. Our aims were consonant with the frequently reported strong need for greater coordination and even standardization of methods to improve the quality and comparability of epidemiological data in the EU (Wittchen et al., 2005). In general, Europe is characterized by an immense diversity of mostly national studies with a considerable degree of clinical and methodological sophistication. This ‘richness’, however, has the considerable disadvantage of restricting possibilities in making direct comparisons between countries and estimating prevalence across all EU countries. This emphasizes the importance and relevance of this widespread European Union World Mental Health project. In developing and investigating innovative approaches in order to reduce burden of mental disorders, population-based data on distribution of mental disorders are especially important. After all, large international survey data sets are particularly useful in analyzing population data for policy input and decision making (Regier et al. 1998; Frank & Glied 2006). Representing about 246 000 000 adult inhabitants of Belgium, France, Germany, Italy, the Netherlands, Spain, Portugal, Romania, Bulgaria, and Northern-Ireland, this study is the first study ever that points to the magnitude of mental disorders in these countries. We estimate that about 32 million people have experienced a mental disorder in the past year, of which more than 22 million experienced an anxiety disorder, more than 12 million a mood disorder, and almost 3 million people experiencing an alcohol use disorder. In an era in which people’s health is no longer exclusively judged in terms of mortality statistics, disability (i.e. absenteeism and presenteeism) plays a central role in determining the (mental) health status of a population. In the Global Burden of Disease study by the World Health Organization

(Murray & Lopez, 1996), mental disorders were important components of people's health status. These accounted for over 15% of all burden of disease in established market economies. Given that an optimal mental health care policy aims to treat existing cases of mental illness and reduce future cases by means of developing preventive strategies, our findings highlight some important areas of concern for public mental health policy.

The high prevalence and substantial burden of mental disorders in both the general population as in the workplace may have long lasting implications for social and mental health policies. Quintessential is the question how much a given society can afford to guarantee its citizens in terms of mental health care (Kessler et al. 1997). Both developed and developing countries now face common challenges in responding to the need to prevent chronic mental disorders and care for persons with chronic conditions. However, resources available to meet these challenges are markedly different among countries. Some countries have more limitations in health care facilities and professionals available to manage the large and growing numbers of persons with mental disorders. As countries (e.g. Romania) improve their mental health care services, they have unique opportunities to develop and maintain effective and efficient health care systems in order to optimize mental health management. Against this, we have identified specific mental disorders that may be high priority when it comes to developing sustainable policies in treating the burden of mental disorders on a societal level.

An important question for both the European Union and the individual European countries is to evaluate the extent to which changes and investments in mental health care services (e.g. resource allocation) relate to changes and investments in educational, environmental, or economic fields, in both a short- and a long-term perspective. In making this evaluation, it is quintessential to have information on the costs of both treating and not treating specific groups of mental disorders and to weigh and evaluate competing costs of alternate policy decisions. Against this, we found that indirect costs of mental disorders (burdens associated with mental disorders on both individual and societal level) were systematically higher (about 3-5 times higher) than the direct costs (of treatment). An additional findings from this study was that costs accounting to mental disorders (e.g. substantial more presenteeism and absenteeism days, or significantly reduced earnings among those with a mental disorder) are in line with the thought that it is not only humane but also rational to provide treatment for mentally ill inhabitants of a given country (Kessler et al., 1997). Evidence of the relative impact of different mental disorders on role disability and earnings may also be of interest to employers, trade unions, professional associations, and related stakeholders, because they are forefront to implementing strategies to reduce workplace pre- and absenteeism among workers, coaching the reintegration process (European Foundation for the Improvement of Living and Working Conditions, 1997). Another focus may be the considerable association between serious mental illness and low(er) monthly earnings. Against the light that lower income may be specifically interpreted as a longer-term negative consequence of mental disorders, the issue could be raised to what extent job training and/or vocational rehabilitation may yield effects.

3.4. Limitations of the study

Although there has been many research that focused on burden of disorders, there is some important caution in interpreting the results from the present study. First, the data presented in this report on burden of mental disorders in the European Union are limited to those mental disorders included in the European Union database of the World Mental Health Surveys (i.e. mood, anxiety, and alcohol disorders) and to those countries included in the project. We expect that the estimated burden of mental disorders presented in the present report will be an underestimation because several more burdensome disorders (e.g. psychotic disorders or cognitive disorders such as Alzheimer's disease). Indeed, previous reports have strongly suggested that burden of psychoses (e.g. Saarni et al., 2010). Second, we should be cautious in interpreting mere associations as causations: it is problematic to identify whether mental disorders are causally related to specific aspects of burden or the other way around; whether an existing burden resulted in the development of a mental disorder. Third, although recent clinical calibration studies show good psychometric properties of the CIDI-3.0 diagnostic sections, the reliability, validity, and cross-national consistency of instruments assessing burden of mental disorders has not been sufficiently established yet. Indeed, there are several reservations regarding the conversion of self-reported disability measures to economic evaluation. The complex nature of 'disorder burden' systematically warrant caution when translating these into financial outcome. For instance, as the instruments of productivity are designed to be self-report assessments, they probably are also subjective instruments. There is an additional – although not commonly used – class of objective productivity instruments. Recent studies have attempted to quantify productivity in an objective and quantifiable way: in each study, investigators employed computer-based tracking systems to monitor and measure employee productivity (Cyr et al., 2007).

APPENDIX 1: LIST OF REFERENCES

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APPENDIX 2: KEY TERMS USED FOR THE SYSTEMATIC LITERATURE REVIEW

Impact
workplace
wages

mental disorders
disability
education

role functioning
earnings
costs

burden
salaries
cost analysis

APPENDIX 3: WHO-DAS-2 WLD

1. Beginning yesterday and going back 30 days, how many days out of the past 30 were
2. You totally unable to work or carry your normal activities because of problems with either your physical health, your mental health, or your use of alcohol or drugs? (WEIGHT 1.00) (full disability days)
3. How many days out of the past 30 were you able to work and carry out your normal activities, but had to cut down on what you did or not get as much done as usual because of problems with either your physical health, your mental health, or your use of alcohol or drugs? (WEIGHT 0.50) (partial disability cut down days)
4. How many days out of the past 30 did you cut back on the quality of your work or how carefully you worked because of problems with either your physical health, your mental health, or your use of alcohol or drugs? (WEIGHT 0.50) (partial disability cut back days)
5. How many days out of the past 30 did it take an extreme effort to perform up to your usual level at work or at your other normal daily activities because of problems with either your physical health, your mental health, or your use of alcohol or drugs? (WEIGHT 0.25) (partial disability extreme effort days)