Introduction

The concept of global burden of disease was first publicized in a landmark report commissioned by the World Bank (1993). The measure developed in that report to operationalize the definition of disease burden was designed to assess the gap in the health of a population, taking into account not only mortality but also the non-fatal consequences of injury and disease. This was accomplished by creating a single summary measure that combined the number of years lost due to premature mortality with the number of years “lost” due to living with disabling non-fatal conditions. As a continuation of that work, the World Health Organization (WHO) and Harvard University published the Global Burden of Disease (GBD) study (Murray & López 1996) in an effort to provide systematic estimates of the leading causes of death globally and to combine these estimates with the leading causes of disability. The GBD study took exhaustive measurements of the disability-adjusted life years (DALYs) lost due to more than 100 diseases and 19 risk factors. The first publication of the GBD study estimated that in 1990 unipolar major depression was the fourth leading cause of the loss of DALYs worldwide (3.7%), exceeded only by respiratory infections (8.2%), diarrheal diseases (7.2%), and perinatal conditions (6.7%). Projections estimate that unipolar major depression will be the number one leading cause of total disability worldwide by the year 2030 (World Health Organization 2008). Of those, 39% corresponded to direct medical costs (due to the use of professional services, medical interventions, and medication), 13% to other direct non-medical services, and almost half (48%) to indirect costs (those incurred due to sick leave, early retirement, and premature death) (Gustavsson et al. 2011). Affective disorders, and especially unipolar depression, alone accounted for more than half of the indirect costs, indicating the considerable toll such disorders place on European social productivity.

The World Mental Health surveys approach to the burden of mental disorders

Initiated a decade after the GBD study, the WHO World Mental Health (WMH) surveys, with over 121,000 respondents surveyed across 24 different countries, is the largest ongoing cross-national series of community epidemiological surveys of mental disorders ever carried out (Kessler & Üstün 2008). The WMH surveys represent an important contribution to frequency (one-year prevalence), risk of mortality, and disability associated with 10 mental disorders (Eaton et al. 2007). In that review, the one-year prevalence of major depressive disorders (median of 42 studies) was 5.3% of the adult population, with a median excess risk of mortality of 70% (OR = 1.7) and a disability weighting between 0.35 (0 [worst] to 1 [best]) and a Sheehan Disability Score of 58 (0 [worst] to 100 [best]). Because of their high prevalence and associated significant disability, the review estimated that the cost of mental disorders in Western countries were huge. In Europe, the total cost of mental disorders in 2011 was estimated to be €461 billion (nearly €1,000 per inhabitant) (Gustavsson et al. 2011).
Section 1: Introduction

the body of knowledge on the global burden of mental disorders, as they assess the prevalence of these disorders using the most comprehensive and sophisticated instrument available, the WHO Composite International Diagnostic Interview (CIDI) version 3.0 (Kessler & Üstün 2004) and thoroughly and comparably evaluate disabilities across many countries. (At the time of the publishing of this volume, additional WMH surveys have been completed and others are under way or planned in other countries, but the data are not yet ready for presentation.)

The WMH surveys have some particular strengths in terms of their contribution to the body of knowledge on the burdens of mental disorders, including the large size and geographical representativeness of their samples, the exhaustive and well-standardized evaluation of disorders and health outcomes, and the use of sophisticated analytical approaches capable of accurately estimating the population distribution of the consequences of disease. As detailed in Chapter 2 of the present volume, respondents from 24 countries covering all six WHO world regions have been studied. Using common well-established measures and strictly standardized data collection procedures, the community-based epidemiological surveys carried out within the WMH project can be used to estimate diminished functioning and negative long-term consequences attributable to a wider range of mental disorders than considered in the GBD study. In addition, while the GBD study focuses on decrements in current health and mortality associated with the health conditions, the WMH data allow for the consideration of a much wider range of adverse outcomes. For example, the WMH examines the long-term effects of early-onset mental disorders on educational attainment and earnings as well as on marital timing, stability, and quality.

A particular innovation of the WMH analyses reported in this volume is the assessment of the consequences of mental disorders at both the individual and societal levels. While the first level allows inferences to be made about those who suffer from a particular disorder, the second level, which also takes into account the prevalence of the disorder, provides information more closely related to public health. The inclusion of both levels in the analysis should make this volume an important empirical contribution to public health decision-making. A final significant feature of this volume is that for a good part of the health consequences assessed, a broad range of both mental disorders and chronic physical conditions were analyzed. The inclusion of both types of health problems represents quite a unique opportunity to identify the disorders that are most closely linked to impairments at the community level, as well as the domains of functioning and long-term consequences.

Three compilations of the results of the WMH surveys have already been published. The first described epidemiologic information on mental disorders, including prevalence and use of services (Kessler & Üstün 2008). The second focused on the epidemiology of coexisting mental and physical disorders, covering risk factors, consequences, and implications for research (Von Korff et al. 2009). The third presented and discussed a wealth of data on the prevalence, onset, persistence, risk, protective factors, and treatment of suicidal behaviors (Nock et al. 2012).

In this volume we describe and discuss a wide range of consequences associated with mental disorders across the life course of the individuals who have participated in the WMH surveys. Many relevant outcomes that are affected by mental disorders are considered in the domains of personal disadvantages, productivity losses, disability, and worsened perceived health (Figure 1.1). Each end of the figure depicts the main variables of interest in our analyses (i.e., mental disorders and the relevant outcomes). The figure also includes some of the possible intermediate variables that the vast body of literature suggests may play a role in the association between the two.

In Section 2 of this volume, we assess the extent to which early-onset mental disorders impact the individual and give rise to long-lasting personal disadvantages. To do so we considered only mental disorders with onset prior to the outcome of interest and apply a survival analysis approach to the data. Chapter 3 provides new information concerning how parental psychopathology is related to mental disorders in offspring: most of the parental disorders examined are indeed associated with an increased risk for every class of offspring mental disorder. This pattern is evident even after controlling for the presence of comorbid parental disorders, as well as for number of parent disorders. Chapter 4 shows that early-onset mental disorders are associated with a decreased likelihood of satisfactory educational attainment at each of the educational periods (primary, secondary, and college entry and termination). These results suggest that some of the later-life effects attributed to lower educational attainment should be considered, at
least in part, consequences of early-onset mental disorders. Chapters 5 and 6 describe how early-onset mental disorders affect marital status and quality. Our results suggest that mental disorders reduce the amount of time people spend in marital relationships both by reducing the likelihood that they will marry and, more importantly, by increasing the likelihood that they will divorce or separate after marrying. No single disorder or group of disorders accounts for the majority of this pattern of associations, but many different disorders are involved. The second of these two chapters also reveals that mental disorders developed prior to marriage are associated with a significantly elevated risk of marital violence in most of the countries studied. The final chapter in Section 2, Chapter 7, expands the analysis of life-course consequences of early mental disorders by showing that these are associated with a significantly elevated risk of marital violence in most of the countries considered in the WMH surveys.

The next section of the volume, Section 3, is devoted to another important set of consequences of mental disorders: productivity loss. Frequently under-evaluated, productivity loss is a major disease burden, which, from a purely economic point of view, might justify intense investments in health restoration (Suhrcke et al. 2008). Chapter 8 focuses on the reduction of individual earnings among those with serious mental disorders. Our data show that individuals with serious mental illness earn, on average, almost one-third less than others in the population (29% in high-income countries to 31% in low/lower-middle-income countries). Chapter 9 presents data documenting a strong association of common early-onset mental disorders (in this particular case defined as disorders present before completion of educational attainment) with current household income, after adjusting for education. This association is considerably stronger in high-income than in upper-middle-income countries, and not significant at all in low/lower-middle-income countries. Chapter 10 estimates the population-level contribution of both serious mental and serious physical conditions to the family burden associated with the full range of health problems affecting first-degree relatives. We consider both the psychological burden (e.g., worry,
embarrassment) and the objective burden. The latter is defined in terms of time and finances devoted to informal caregiving activities. As the chapter shows, these objective burdens are substantial and mental disorders greatly contribute to them. As a whole, the results in Section 3 provide compelling evidence of the considerable decreases in productivity associated with mental disorders.

The largest section in this volume, Section 4, compares the relative importance of mental disorders and selected chronic physical conditions for disability and perceived health. Disability is comprehensively assessed and analyzed in this section, with the objective of evaluating the contribution of mental and physical disorders as thoroughly as possible at both the individual and the societal level. Comorbidity (i.e., the co-occurrence of disorders) is carefully taken into account in each of the chapters in this section. In an attempt to capture significant disability, Chapter 11 considers only the number of days that respondents reported that they were totally unable to perform their primary activities. Neurological disorders and several mental disorders (e.g., bipolar and post-traumatic stress) are responsible for a high number of days out of role at the individual level, while at the societal level pain conditions are the main contributors. In Chapter 12 we consider “partial” disability (that is, days performing normal activities in lesser amounts, or performing them worse and/or with extreme effort), where we found similar results. In all, the mental disorders considered in the WMH surveys can be considered responsible for about 15–17% of disability at the societal level. Next, Chapter 13 describes the interference with daily functioning of each particular disorder using the Sheehan Disability Scale (SDS) (Leon et al. 1997). The SDS assesses activities in four role domains (home management, ability to work, social life, and ability to manage personal relationships) and our results show that interference ratings are generally higher for mental disorders than for physical disorders, due to a higher degree of social interference. Importantly, the same chapter describes how the use of health services among sufferers from mental and physical disorders is considerably lower among those with mental disorders, even when their disability is more severe; these trends are common in both high- and low-income countries. Chapter 14 presents data suggesting that when disabilities are measured with a comprehensive instrument, such as the World Health Organization’s Disability Assessment Schedule 2.0 (WHODAS 2) (Üstün et al. 2010), mental disorders are found to contribute to more than 25% of disability at the societal level, in particular in middle- and higher-income countries. The final two chapters of the section deal with the impact of mental disorders and chronic physical conditions on perceived health. Chapter 15 shows that, in general, physical conditions are more strongly associated with perceived health than mental disorders, especially when societal distribution is considered. Chapter 16 attempts to establish the mediating role of disability in the association between disease and perceived health. More than a third of the effect of disease on perceived health is mediated by the WHODAS disabilities. Importantly, mediating subdomains are different for the health effects of mental disorders (mediated by role function but also by social influences and stigmas) than for the health effects of chronic physical conditions (mediated by role functioning and mobility).

The final section of this volume, Section 5, is devoted to considering several of the implications of our results. Chapter 17 looks at the similarities, differences, and complementarity of our data with the burden information from the GBD study, in particular the 2010 edition. It underlines the respective strengths and limitations of each study in terms of their contributions to the field of public health. While the WMH study is more comprehensive at the population level and more methodologically homogeneous, the GBD study is more comprehensive at the disorder level and yields data on epidemiological estimates other than prevalence, such as incidence, remission, duration, and excess mortality. In Chapter 18 we identify the most relevant implications of the results presented in this volume for mental health policy and service practice. These implications include the need to invest in mental health services worldwide and to apply a more thorough understanding of the burdens of mental disorders to improving the planning, organization, provision, and evaluation of health services devoted to mental health problems.

**Strengths and limitations of the WMH surveys**

As mentioned above, the WMH surveys have several strengths that make them a unique source of information on the epidemiology of mental disorders across the globe. Some general strengths include the large size of the overall sample, which results in greater precision
Chapter 1: Burdens of mental disorders: the approach of the WMH surveys

When analyzing relatively rare phenomena such as some of the less prevalent disorders studied in this volume, and the geographical amplitude and representativeness of the samples surveyed, which allow for international comparisons to be made. In this volume, data are shown not only for the overall participating sample, but also for three broad categories of countries according to their income level, in keeping with the classification of the World Bank (2008): low/low-middle-, upper-middle-, and high-income countries. International comparisons are of particular value since the epidemiological evidence about common mental disorders is mostly based on studies conducted in Western countries. Finally, the WMH surveys use exhaustive and well-standardized evaluations of disorders and health outcomes, as discussed in detail in Chapter 2. This standardization process, which encompasses everything from survey design to data collection methods, database implementation, and data analysis, represents an unprecedented contribution to the validity and interpretability of the epidemiology of mental disorders across the globe.

A second set of strengths is related to the use of sophisticated analytical approaches which result in an accurate estimate of the population distribution of the consequences of disease. The analysis of the effects of lifetime mental disorders on role transitions has shown that lifetime disorders are *time-varying*; that is, a given disorder may have started at different ages for different respondents. As a result, in order to maintain the temporal sequence between predictors and outcomes, timing must be taken into consideration in estimating risk-factor models. This is done in the discrete-time survival analysis by coding each year of each respondent’s life separately for each lifetime disorder. Another innovative approach of the WMH surveys is the inclusion of comorbidity (both mental and physical) in the analysis of the association between disorders and the various outcomes addressed in this volume. In particular, whether comorbid conditions have an additive or a *sub-additive effect* (i.e., that the level of association between a specific disorder and an outcome increases with each additional coexisting disorder, but it does so at a decreasing rate) has been tested in a number of analyses. Chapters 11–16 use this type of approach. These analytic methods are described in more detail in Chapter 2.

Along with these strengths, a number of limitations call for necessary caution in the interpretation of the results of the WMH surveys presented in this volume. While limitations specific to particular topics are addressed in each chapter concerned, an overall review of the major general limitations is presented below.

WMH data were collected retrospectively, relying on respondent recall, rather than prospectively. Recall bias of the occurrence of mental disorders would generally tend towards under-reporting, as some respondents cannot remember well enough to respond accurately and in full (Wells & Horwood 2004). Recall bias also affects the age-of-onset of mental disorders parameter (Simon & Von Korff 1995), which is relevant for several of the chapters in Section 2 of this volume, dealing with individual disadvantages associated with mental disorders starting early in life (early-onset mental disorders). The task of recalling symptoms over the course of a lifetime is more difficult for older respondents than for younger respondents, simply because they have to remember across longer periods of time. In addition, respondents whose current mental health is poor may be more likely to report having had poor mental health in the past than respondents whose current mental health is good. Due to this recall bias, the respondents who report disorders are more likely to have more severe and persistent disorders compared to the actual group of people with a lifetime disorder in the general population. These biases may result in overestimating the impact of mental disorders on the outcomes of interest, such as educational attainment or chronic physical conditions. Also, reporting accuracy may differ across countries, because of differences in the extent to which mental disorders are stigmatized.

A source of bias that limits the analyses which include both mental and physical disorders is that they were differently assessed. While mental disorders were thoroughly evaluated with the CIDI 3.0, chronic physical conditions were assessed using self-report condition checklists. Although there is generally good agreement between self-reporting of medical diagnoses and physician or medical-record confirmation of those diagnoses (Kriegsman et al. 1996), bias assessment cannot be ignored. The direction of such bias is unclear, and there may also be variations across countries.

It is important to note that only a restricted set of the most common mental and physical conditions was included. In particular, some burdensome conditions, such as dementia and psychosis, were not included. Some infectious diseases that are serious and prevalent in many countries were not included among the physical conditions checklist. While the physical and...
mental conditions considered in this volume are amongst those most commonly reported in previous population studies, an expansion and disaggregation of these conditions is clearly needed in future studies. At any rate, the burdens of mental disorders included in this volume should be considered an underestimation of the real overall account.

Other limitations involve participation rates and the particular assumptions of the analysis undertaken in this volume, which are extensively discussed in Chapter 2. While the WMH surveys are not free of limitations, the researchers are deeply convinced that these limitations do not override the results as reported here, as considerable caution has been exerted in their interpretation.

Global perspectives

This volume is the result of the countless, continued efforts of a large consortium of researchers, many other collaborating professionals, and, above all, a large cohort of survey participants. Its goal is to improve our knowledge of the many ways mental disorders impose different burdens on human beings. It is our deepest hope that this volume provides clear and relevant new information and that it helps strengthen arguments for the importance of developing interventions to lower the individual and societal burdens of mental disorders throughout the world.

References


Methods of the World Mental Health surveys

Ronald C. Kessler, Somnath Chatterji, Steven G. Heeringa, Beth-Ellen Pennell, Maria V. Petukhova, Gemma Vilagut, and Alan M. Zaslavsky

The World Mental Health (WMH) Survey Initiative is a World Health Organization (WHO) initiative designed to help countries carry out and analyze epidemiological surveys of the burden of mental disorders in their populations (www.hcp.med.harvard.edu/wmh). Twenty-eight countries have so far completed WMH surveys, and others are in progress. The vast majority of these surveys are nationally representative, although a few are representative of only a single region (e.g., the São Paulo Metropolitan Area in Brazil) or regions (e.g., six metropolitan areas in Japan). Results from 25 surveys carried out in 24 of those countries are reported in this volume. These are all the surveys that have so far been completed and processed, and between them they interviewed a total of 121,899 respondents. The participating countries are grouped into three income levels according to the World Bank (2008). Six of these countries (seven surveys) are classified as low-income or lower-middle-income (Colombia, India–Pondicherry, Iraq, Nigeria, People’s Republic of China [PRC]–Beijing/Shanghai, PRC–Shenzhen, Ukraine), six are upper-middle-income (Brazil–São Paulo, Bulgaria, Lebanon, Mexico, Romania, South Africa), and twelve are high-income countries (Belgium, France, Germany, Israel, Italy, Japan, the Netherlands, New Zealand, Northern Ireland, Portugal, Spain, the USA). Some results in this volume are presented stratified by the three income levels.

All WMH surveys use the same standardized procedures for sampling, interviewing, and data analysis. They also all use the same diagnostic interview, the WHO Composite International Diagnostic Interview (CIDI) version 3.0 (Kessler & Üstün 2004, Haro et al. 2008). The CIDI is a fully structured research diagnostic interview designed for use by trained lay interviewers who do not have clinical experience. It generates diagnoses of mental disorders according to the definitions and criteria of both the International Classification of Diseases (ICD) and Diagnostic and Statistical Manual of Mental Disorders (DSM) systems, although only DSM-IV criteria are used here. Consistent WHO translation, back-translation, and harmonization procedures were used to modify the CIDI for use in each WMH country (Harkness et al. 2008). The same interviewer training materials, training programs, and quality-control monitoring procedures were also used across WMH surveys to guarantee cross-survey comparability of data (Pennell et al. 2008).

The use of these standardized procedures is key to the success of WMH, as the main mission of WMH is to allow countries that might not otherwise be able to implement mental health needs assessment surveys to do so by building on the existing WMH infrastructure. The use of standardized materials reduces costs for each country and makes it easier to implement high-quality surveys by building on tried and true procedures. This applies not only to instrument development and data collection but also to analysis, as WMH uses a centralized data processing and cross-national peer consultation model that allows less experienced collaborators to work with world-class psychiatric epidemiologists and statisticians to analyze, interpret, and write scientific reports about their data.

The current chapter presents information about these standardized materials and procedures. We begin by reviewing the WMH sample design. We then present an overview of the measures that are the focus of this volume. Field procedures are discussed next. The final section discusses the statistical methods used in this volume to assess the burdens of mental disorders.
The WMH sample designs

The sampling procedures used in the WMH surveys are closely related to those originally developed for the World Fertility Survey (WFS) program, one of the first and largest efforts to coordinate a global gathering of survey data (Verma et al. 1980). The decisions made in developing sample designs for the WMH surveys drew heavily on the lessons of the WFS experience. Like the WFS and more recent successful international programs of community survey research, the WMH surveys required collaborating countries to employ probability sample designs to select nationally or regionally representative samples of adults for the survey interview. The aim of sampling in the WMH surveys was to obtain a representative sample of the household population in the country or region under study. This usually involved drawing a multistage clustered area probability sample of households in the population and then selecting one, or in some cases two, respondents from each sampled household using probability methods without replacement. These sample designs were standardized across countries based on the principles of probability sampling, but with less emphasis placed on the specific probability sample design features employed across countries, in recognition of the fact that countries varied widely in the information available to develop a sample frame from which the WMH sample could be selected.

In order to achieve the level of coordination in sampling required across countries, we established a WMH Data Collection Coordination Centre at the Institute for Social Research (ISR) at the University of Michigan in the USA. The Survey Research Center (SRC) at ISR is one of the leading academic survey research organizations in the world, with a long history of leadership in the development and implementation of large community surveys (www.src.isr.umich.edu). The Survey Sampling group at SRC, under the direction of Steve Heeringa, supervised WMH sampling, while the Survey Implementation group, under the supervision of Beth-Ellen Pennell, supervised WMH interviewer training and field implementation.

Focusing first on sampling, the SRC group began by developing a list containing a common set of requirements and performance standards that the probability sample design in each WMH survey was required to meet. Unique opportunities available in individual countries were then used to develop a sampling plan that achieved these requirements, and to meet the WMH standards. The staff of the WMH Data Collection Coordination Centre worked closely with local collaborators to develop these sample design plans. The plans were reviewed by a panel of technical experts and revised based on feedback from this panel. Once the design was finalized, day-to-day oversight of implementation was the responsibility of the local research team.

Most WMH countries developed a similar sampling plan that featured multistage area probability sampling. Several countries, however, adopted alternative probability sampling procedures, such as the use of a national registry or combined uses of area probability methods and registry sampling, to achieve the required probability sampling of the designated target population. All these samples, however, were probability samples. No WMH survey used a convenience sample, an interviewer-managed quota sample, or any other non-probability method of sample selection.

The target populations

Probability sample surveys are designed to describe a target population of elements that spans a specific geographic space during a specific window of time. Although it might seem obvious how to do this, a number of important considerations arise as soon as one begins to consider the possibilities. Should persons who were temporary residents, guest workers, or those who had legal claim to medical treatment or services be included in the sample? What about people who were incapable of participating in the survey because they were institutionalized, or cognitively or physically impaired, and people living in remote places that would require disproportionate amounts of survey resources to sample and interview? In the end, a decision was made to allow the answers to these questions to vary across countries within a range of options described as follows.

The survey population is defined as the subset of the target population that is truly eligible for sampling under the survey design (Groves et al. 2004). A decision was needed to decide what restrictions would apply in each participating WMH country to establish a survey population definition that would conform to the survey’s scientific objectives, available sample frames, and budget limitations. Multiple dimensions were included here. One of these involved the age range of the sample. WMH was designed to focus on adults. However, the age that defines adulthood (commonly referred to as the “age of majority”) varies across countries (most typically either 18 or 21 years old). In addition, some countries...
decided to impose an upper age limit on the sample (usually 65 years). Other dimensions that defined the survey population involved geographic scope limitations (most typically excluding otherwise eligible people who lived in remote areas of the country), language restrictions, citizenship requirements, and whether to include special populations such as persons living in military barracks and group quarters or persons who were institutionalized at the time of the survey (e.g., hospital patients, prison inmates). These varied somewhat across countries.

Table 2.1 provides a summary of the survey populations and samples for the WMH surveys included in this volume. Starting with the different age limits, the vast majority of the surveys had a minimum age of 18 years. The lowest minimum age was 16 (New Zealand) and the highest was 21 (Israel). For maximum age requirements, Colombia, Mexico, and the regional surveys carried out in Beijing and Shanghai mandated that respondents be no older than 65 or 70 years. Turning to the geographic scope of the survey population, 17 of the 25 surveys defined the geographic scope of their survey population as the entire country. Brazil, India, Japan, Nigeria, and the People’s Republic of China restricted their survey populations to specific regions, states/provinces, or cities. Colombia and Mexico conducted national surveys but limited their survey to populations in urban places above a specified population size (e.g., more than 2,500 persons in Mexico).

**Sampling frames**

Probability sampling requires a sampling frame that provides a high level of coverage for the defined survey population. The sampling frame is defined as the list or equivalent enumeration procedure that identifies all population elements and enables the sampler to assign non-zero selection probabilities to each element (Kish 1965). We carefully reviewed the available choices of sample frames with the collaborators in each WMH country before deciding on a final frame. Options could have included population registries, new or existing area probability sampling frames, postal address lists, voter registration lists, and telephone subscriber lists. The final choice of the frame for each country was determined by a number of factors, including the extent of coverage and statistical efficiency of available frame alternatives, the cost of developing and using the frame for sample selection, and the experience of the data collection organization in the use of the sample frame.

The final sampling frames for the WMH surveys were generally of three types: (1) a database of individual contact information provided in the form of national population registries, voter registration lists, postal address lists, or household telephone directories; (2) a multistage area probability sample frame (Kish 1965); or (3) a hybrid multistage frame that combined area probability methods in the initial stages and a registry or population list in the penultimate and/or final stages of sample selection.

**Complex sample designs for the WMH surveys**

The goal of all survey sample designs is either to minimize sampling variance and bias for a fixed total cost or to minimize total cost while meeting predetermined analysis objectives. The analysis objectives are typically formulated as fixed targets for the variance and bias components of the total survey error for (a) key survey estimates or (b) the parameter estimates for important population models. In the WMH surveys, there was no single path to this goal. The surveys shared a set of common analysis objectives, primarily centered on the estimation of the population prevalence and correlates of mental disorders. Survey cost structures were highly variable from one country to another, depending on factors such as availability and accessibility of survey infrastructure (government or commercial survey organizations), availability and costs for databases and map materials required to develop sample frames, labor rates for field interviewers and team leaders, and transportation costs for getting trained interviewers to distributed samples of households. Total funding for the surveys also varied widely across countries. In many cases, funding restrictions limited not only the total size of the interviewed sample but also the scope of the survey populations or the use of costly sample design options.

The individual WMH sample designs employed the full range of probability sampling techniques that survey statisticians can use to improve sample precision and reduce costs. Stratification of the samples by geographic regions and demographic characteristics was used to increase sample precision and control sample allocation. Multistage designs with modest clustering in the initial stages of sampling were used to control travel time and expenses. A version of the “double sampling” technique (Cochran 1977) was used in the vast majority of surveys to determine the subsample of initial CIDI respondents
Table 2.1 Sample characteristics by country income level. The WMH surveys.

<table>
<thead>
<tr>
<th>Field</th>
<th>Country</th>
<th>Survey</th>
<th>Sample characteristics</th>
<th>Age range</th>
<th>Field dates</th>
<th>Sample size</th>
<th>Sampling fraction (%) for FB</th>
<th>Part 1 Sample size</th>
<th>Part 2 Sample size</th>
<th>Couples Sample size</th>
<th>Family burden (FB) Sample size</th>
<th>Field size</th>
<th>Response rate</th>
<th>Total sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. All countries</td>
<td>Colombia</td>
<td>NSMH</td>
<td>All urban areas of the country (approximately 78% of the total national population)</td>
<td>18–65</td>
<td>2003</td>
<td>4,476</td>
<td>1,287</td>
<td>30</td>
<td>4,476</td>
<td></td>
<td></td>
<td></td>
<td>121,899</td>
<td>63,678</td>
</tr>
<tr>
<td>II. Low/lower-middle</td>
<td>Iraq</td>
<td>WMHS</td>
<td>Nationally representative</td>
<td>18–96</td>
<td>2006–7</td>
<td>4,332</td>
<td>1,233</td>
<td>98.8</td>
<td>4,332</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>India – Pondicherry</td>
<td>WMHI</td>
<td>Pondicherry region</td>
<td>18–51</td>
<td>2003</td>
<td>8–97</td>
<td>2,381</td>
<td>97</td>
<td>2,381</td>
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<tr>
<td></td>
<td>Iran</td>
<td>NSMHW</td>
<td>21 of the 36 states in the country, representing 57% of the total national population</td>
<td>8–70</td>
<td>2003–2004</td>
<td>6,792</td>
<td>2,248</td>
<td>33</td>
<td>6,792</td>
<td></td>
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<td>1,287</td>
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<td>M-NCS</td>
<td>All urban areas of the country (approximately 75% of the total national population)</td>
<td>18–65</td>
<td>2001</td>
<td>5,782</td>
<td>2,323</td>
<td>30</td>
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<td>18–96</td>
<td>2006–7</td>
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<td>1,233</td>
<td>98.8</td>
<td>4,332</td>
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<td>SASH</td>
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<td>2003</td>
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<td>1,233</td>
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<td>NSMH</td>
<td>São Paulo metropolitan area</td>
<td>18–93</td>
<td>2003–7</td>
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<td>1,572</td>
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