

# The Israel National Health Survey: Issues And Methods

Daphna Levinson, PhD,<sup>1</sup> Ari Paltiel, MA,<sup>2</sup> Michal Nir, MA,<sup>3</sup> and Tzahi Makovki, MA<sup>4</sup>

<sup>1</sup> Ministry of Health, Mental Health Services Division, Jerusalem, Israel

<sup>2</sup> Central Bureau of Statistics, Demography and Census Department, Jerusalem, Israel

<sup>3</sup> Central Bureau of Statistics, Survey Unit, Jerusalem, Israel

<sup>4</sup> Central Bureau of Statistics, Statistical Methods Sector, Jerusalem, Israel

**Abstract:** *Objective:* The Israel National Health Survey — World Mental Health Survey (INHS) was designed to collect data on (a) the prevalence of mental disorders; (b) the prevalence of impairments and disabilities; (c) chronic conditions, disability, physical health, health services utilization and out-of-pocket medical expenditure which might be associated with mental disorder; and (d) socioeconomic and demographic correlates of mental disorder. This paper presents an overview of the methods used in this survey. *Method:* The INHS was a cross-sectional survey based on a representative sample of 5,000 adults, 21 years or older, from the general population of Israel. The Composite International Diagnostic Interview (WMH-CIDI) was administered in face-to-face interviews at the respondents' homes between May, 2003, and April, 2004, using computer assisted personal interview (CAPI) technology. *Results:* The overall response rate was 72.6%. *Conclusion:* The methodology and the quality control procedures used have made the INHS database a unique source of information about the prevalence, disability burden and unmet health needs of people suffering from common mental disorders and substance disorders in Israel.

## Introduction

Before this survey, available data on the burden of mental health disorders and care-seeking patterns were limited to particular segments of the population or to specific psychiatric disorders and associated disabilities (1–10). The Israel National Health Survey (INHS) project was designed to fill some of the gaps, the initiative for the survey having come from the Israel Ministry of Health, and it was developed and implemented in collaboration with Israel's Central Bureau of Statistics (CBS).

The main objectives of the survey were:

1. To establish 12-month and lifetime prevalence rates for common mental disorders;
2. To estimate the extent of disability associated with a psychiatric diagnosis and with symptoms not meeting the diagnostic criteria for psychiatric disorder;
3. To investigate the associations between psychiatric diagnoses or symptoms and demographic/socioeconomic variables and utilization of services;
4. To identify help-seeking patterns both within and outside the health service sector; and

5. To compare Israeli prevalence rates with those obtained by analogous studies in other WMHS countries, in order to identify general and specific factors that could explain local findings.

This paper presents an overview of the methods deployed in the survey, including the instruments for case identification and diagnosis, the sampling methodology, data collection procedures, quality control measures, weighting and estimation method, and the level of participation achieved. This survey is part of the WHO World Mental Health (WMH 2000) Surveys Initiative (11).

## The Sample

### The survey population

The population of the INHS comprised adults aged 21 and above, living in households, and meeting the status of resident *de jure*. The sampling frame excluded people living in institutions, with the exception of institutions where residents live in a household setting, such as immigrant absorption centers, student accommodations and sheltered housing for the elderly. Also excluded were those liv-

ing outside recognized localities, persons whose registered address was a Bedouin tribe, immigrants residing in Israel for less than six months and legal residents who during the survey period were abroad for one year or more.

### The sampling frame

The sampling frame was the National Population Register (NPR), updated to April, 2002. The NPR comprises citizens and permanent residents, among whom are persons not belonging to the survey population, such as individuals living permanently outside the country or in long-term-care institutions. Conversely, the NPR does not include persons living in the country who are not entitled to the status of permanent resident (such as foreign workers). We took a number of steps to remove from the NPR file persons not belonging to the survey population, in order to reduce over-coverage in the sampling frame, which would have reduced the efficiency of the fieldwork, increased costs and inflated sampling error in the estimates.

The data in the NPR file were updated to 15 months before the middle of the survey period. To achieve maximum coverage of immigrants who had lived in the country for six months, before starting fieldwork a supplementary sampling frame was compiled, including immigrants who arrived after the "updated" date.

### Sampling method

Four demographic variables defined the design groups for the sample: two *ethnic* groups, Jews and Arabs, with the Jews subdivided into two *immigration* groups (Jews born in Israel or who immigrated before 1990 and Jews who immigrated from 1990 on); seven *age* groups, 21–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75 and over; and *gender*. This resulted in 42 design groups.

A net sample size of 5,000 respondents was planned, allocated to the 42 design groups in proportion to their size, avoiding the over-sampling of any sub-population.

However, gross sample size was corrected to allow for expected differential response rates and for differential probability of death or transfer to an institution (removing a person from the survey popu-

lation to the "out-of-scope" population). These adjustments were based on information from administrative sources, such as mortality records, previous surveys, as well as from specific assessments made for the INHS. The ratio of the gross sample allocated to the total of persons in each group was the planned sampling probability for the stratum. These probabilities were not identical since they expressed the expected differential likelihood of non-response and "out-of-scope persons" in each design group. The inverse of the sampling probability ranged from 413 to 725, the average being 617. These initial probabilities were later corrected at the weighting and estimation stage to account for actual response in the survey (see below).

In localities with at least 9,300 inhabitants, which in most cases were localities with 20,000 or more persons of all ages, we planned to sample 15 individuals or more. A one-stage stratified sample was taken for these localities, each design group constituting a sampling stratum, whose sampling probability was that of the particular group. In each stratum, a systematic random sample of persons was drawn after the file had been sorted geographically by district and locality. About 80% of the overall sample was drawn in this way.

For localities with less than 9,300 inhabitants in the sampling frame, a two-stage sample was drawn. At the first stage, a sample of localities was taken from geographical strata, defined by type of locality and district. For each stratum a number of localities were sampled, proportional to stratum size, and within each stratum localities were chosen with probability proportional to size. Altogether, 89 localities were chosen at this stage. At the second stage, for each locality sampled a systematic random sample of persons was chosen. For this purpose, the file records in each locality were sorted by design group characteristics. The sampling method at the second stage was designed to ensure that the final sampling probability for a person would be that of the design group, and that 15 sampled persons would be obtained in the locality.

The total number of persons sampled was 7,075. Table 1 shows the breakdown of the survey sample by various characteristics.

Table 1. *Sample breakdown by selected characteristics*

Sample characteristics		Total	Males	Females
Sample		7,075	3,474	3,601
Type	Main sample (from NPR 4/2002)	7,040	3,458	3,582
	Supplement of immigrants arriving after 4/2002	35	16	19
Type	One-stage sample	5,737	2,800	2,937
	Two-stage sample	1,338	674	664
Population groups	Arab-Israelies	793	403	390
	Immigrated in 1990 and later	1,442	670	770
	Jews: Israel-born or immigrated in 1989 and earlier	4,840	2,401	2,439
Age groups	21–24	696	371	325
	25–34	1,643	830	813
	35–44	1,266	657	609
	45–54	1,198	616	582
	55–64	834	411	423
	65–74	664	286	378
	75+	774	303	471

### Sample allocation

To account for seasonal variation the sample was scheduled for interview by quarters (three-month groups) according to the following criteria: The sample for each locality was divided into monthly interviewer workloads by geographical proximity and size of workload. To ensure that the sample in each quarter was representative of the total annual sample by socioeconomic characteristics, these portions were assigned to quarterly allocations proportional to geographic groupings, defined by the socioeconomic characteristics of the locality and its location.

### Continuous updating

Before each quarterly sample was released for interviewing it was checked against the mortality files. No substitution was made for the deaths of sampled individuals. All addresses of respondents not yet enumerated were updated comprehensively twice yearly, in addition to ongoing checks against the NPR and other available sources when necessary. In the course of the year the sample was updated for immigrants in Israel at least six months. These were assigned to existing sampling workloads. Individuals who changed address were transferred between sampling workloads, and if necessary, between quarterly allocations, in accordance with interviewing requirements.

### Fieldwork Organization and Procedures

#### Survey mode

The INHS was a face-to-face survey conducted in the respondents' home between May, 2003, and April, 2004. It was conducted on laptops using a computer-assisted personal interview (CAPI) written in Blaise (12), and carried out by professional survey interviewers employed and supervised by the Israel Central Bureau of Statistics (ICBS).

The face-to-face interview mode followed the protocol of the World Mental Health survey initiative (11), but was also deemed essential due to the unusual length and sensitive content of the questionnaire. Interviewers needed to gauge respondent fatigue, motivation and disposition and to employ means to relieve this burden. The face-to-face interview method made it possible to take a short recess to enable respondents to regain their focus and attention or to break off the interview and schedule a supplementary session. This was especially necessary with elderly respondents or those who had complex histories of psychopathology.

We decided to use the CAPI rather than the paper-and-pencil method for several reasons: 1) The interview schedule had many complex skip patterns that could potentially cause interviewer error. These were avoided as the CAPI program controls the skip

logic, and leaves no room for independent selection of questions by the interviewer; 2) An interviewer using CAPI can be prompted for missing or inconsistent responses while the interview is in progress, allowing these problems to be resolved immediately. The computerized questionnaire featured pre-planned error detection, requiring the interviewer to correct or confirm inconsistencies online as the data were being collected; 3) The CAPI method included a computerized management system which summarizes the daily reports sent in by interviewers (completed interviews or new information gathered while tracking interviewees) and also provides detailed ongoing information regarding the status of each of the interviews in the released sample. Administrative decisions, such as assigning a selected respondent to a different interviewer because of a respondent's change of address, could be made without delay; and 4) Our survey used Arabic, Hebrew and Russian as possible interview languages. The CAPI enabled bilingual interviewers to make online decisions as to which language to use for the interview. This made interviewer allocation easier since there was no need to know the interviewee's language in advance.

### Interview length

The considerable length of the interview had important implications for the training of interviewers and field procedures. The INHS interview schedule took a minimum of 45 minutes to complete among respondents who reported no lifetime disorders, and approximately two-and-a-half hours for older individuals or those with a history of disorders. The net time spent with respondents was, on average, 65 minutes.

In contrast to most countries participating in the WMH survey, the Israeli survey did not employ two versions: a short version (minimum number of questions administered to a "control group" of respondents not screened positive on any of the screening items) and a long version (full-length questionnaire administered to a "research group" of respondents screened positive on any one of the mental health screening items) of the instrument (11). For two main reasons, the INHS survey included *all* sections of the questionnaire: 1) Most sections of the questionnaire had never been administered in Israel to the entire population and it was important to collect

such data from a representative sample of the population; and 2) given the high cost of the survey, it was thought unwise to shorten further those interviews already expected to be shorter (i.e., the "control group" respondents).

The problem of interview length was addressed by reviewing each question to make sure it added value for Israel. This was done by a group of mental health experts who advised in the preparation stage and by checking meticulously for confusing phrases, double negatives and other linguistic obstacles that would slow responses and necessitate clarification.

### Data collection

The INHS fieldwork employed 35 interviewers who participated in every stage of data collection. The field staff was supervised by a team of five regional supervisors. Once every two weeks, each interviewer received a folder containing the identifying information needed to locate the individuals allocated to him/her for that period of time. The information was also sent electronically to the interviewer's laptop enabling each specific interview to be carried out and recorded properly.

The Experimentation on Human Subjects Committee set up in Eitanim-Kfar Shaul Hospital approved the survey and the field procedures in November, 2000. A few days before interviewers made their first contact attempt a letter signed by the Government Statistician was sent to each potential respondent, explaining the purpose of the survey, the respondent's rights, the expectations from them and providing a telephone number for respondents who had additional questions. On first personal contact with the respondent, the interviewer explained the survey again and obtained verbal informed consent.

Whenever the interviewer had difficulty contacting the person or the interviewee was reluctant to participate, repeat attempts to obtain consent were made by the interviewer and the regional supervisor, at varying times during the day and the week. At the end of the fieldwork additional telephone and mail efforts were made to persuade as many as possible of unresolved cases to be interviewed.

Interviewers had to send their work at the end of each day via the internet to the CBS, both completed

interviews, as well as new information gathered while tracking interviewees. CBS interviewers were paid by the hour, making it easier to get their full cooperation to obtain more interviews and discouraging them from rushing through long interviews.

### **Interviewer training**

Each CBS interviewer had to complete an initial eight-day training program before starting field work. A successful written test on general interviewing procedures was a prerequisite for entering the training program. The classroom component lasted six days. It covered laptop and Blaise program use, a description of the survey questionnaire, and interviewing techniques. Special attention was given on how to conduct the interview; namely, how to present the survey, handle sensitive questions, encourage interviewees to complete the interview. A variety of training techniques were utilized, i.e., role-playing, mock interviews and group discussions. The seventh day covered training in administrative tasks, such as data transmission via the internet. On the eighth day the interviewer started fieldwork, accompanied by a supervisor who gave detailed feedback and suggested improvements.

During the data collection year, training and supervision continued in two forms: group meetings and telephone sessions. The group meetings consisted of six one-day meetings of the interviewers in each region. The meetings opened with a free discussion to air difficulties, successes and failures during the fieldwork. Then survey managers gave feedback (on the quality of the data collected, the response rate, etc.) and discussed related topics. The regional supervisors had frequent telephone contact with interviewers to review progress, discuss problems and provide feedback based on study of the interviewers' output. Occasionally they accompanied interviewers to observe interviews.

### **Fieldwork quality control**

The CAPI system featured tracking software, which recorded several parameters useful for field quality control. CBS field procedures called for every day's work completed by the interviewer, including telephone or in-person contact attempts with respondents or other informants, to be recorded, along with the date, time and outcome of each item of work, and

sent to supervisors electronically. This allowed managers to subject fieldwork to daily quality control checks. Where problems were detected, interviewers were told what changes to make.

The reports produced by the CAPI administrative system enabled supervisors to review the work of individual interviewers: follow their daily movements between respondents; check the time they started work; the length of interviews; reasons for non-response; and review the progress made on sample releases (number of initial contacts made, number of non-sample cases, number of interviews completed, etc.). The key purpose of this tracking was to identify early on interviewers with low response rates or high error percentages.

Central office managers also telephoned a random 10% of respondents. In these calls they repeated factual questions from various sections of the interview. A higher proportion of an interviewer's work was checked during the early part of the data collection period, but the overall rate of verification across the entire period was at least 10%. Written records of the verification process were kept by the CBS.

### **The INHS interview schedule**

The INHS interview schedule was a version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) developed for the WHO World Mental Health (WMH) Survey Initiative (11). This instrument is referred to as the WMH-CIDI (11).

The interview schedule consisted of 30 sections: 24 sections came from the World Mental Health survey (WMH-CIDI) and 6 were unique to Israel. The WMH-CIDI includes fully structured questions on the presence, persistence and intensity of clusters of psychiatric symptoms, followed by probes for age of onset and lifetime course (13). It provides, by means of computerized algorithms, lifetime and current (12-month and 1-month previous to the interview) diagnoses as per the International Classification of Diseases (ICD-10) (14) and the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV) (15). The paper-and-pencil version of the CIDI has been shown to be reliable and valid (16, 17). The mental disorders that we assessed were: mood disorders (major depression, dysthymia, mania, bipolar); anxiety disorders (generalized anxiety disorder, agora-



phobia with or without panic disorder, panic disorder, post-traumatic stress disorder); alcohol use disorders (alcohol abuse, alcohol dependence); and drug use disorders (drug abuse, drug dependence). The assessment of mental disorders included, when appropriate, organic exclusion criteria.

The assessment of mental disorders began with a screening section (a lifetime psychiatric screening instrument), which was administered to all respondents and contained screening questions for the specific mood and anxiety disorder. All participants responding positively to any of the screening questions had to complete the CIDI section on the specific disorder prompted by that question.

The sections on specific disorders incorporated additional measures based on standardized instruments. All the diagnostic sections included the Sheehan Disability Scale (18); the General Anxiety section included also the Hospital Anxiety and Depression Scale (HADS) (19); the Panic section included the Panic Disorder Severity Scale (PDSS) (20); and the Post-Trauma section included the Post-Traumatic Stress Scale (21).

Besides the diagnostic sections, the international survey included sections on the utilization of services for emotional reasons, the use of psychotropic medications, a self-report on chronic health conditions and disabilities, and a section on socio-demographic characteristics. These sections included also the World Health Organization Disability Assessment Schedule II (WHODAS-II) (22), the Short GHQ-12 Items scale (23), the migraine scale (24), the daytime sleepiness and nocturnal sleep onset scales (25), and the insomnia scale. (26)

The sections unique to the Israeli survey were: Army service — information on combat experience and injuries (severity and dates), Holocaust experience — for older respondents, their own experience, for the younger, their parents' experience; experiences under the former Soviet regime and place of residence at the time of the accident at the nuclear reactor in Chernobyl for immigrants from the former Soviet Union; consanguineous marriage between respondents' parents; and health insurance, utilization of general health services and health expenditures (during the previous two weeks), and a self-report on long-term impairments.

### Translations

The WMH-CIDI was translated from English into Hebrew, and all necessary adaptations were made. This included back-translations, a review by a panel of experts, and a complete pretest. The entire Hebrew questionnaire, including the additional Israeli sections, was then translated into Arabic and Russian. These versions were finalized after back-translations into Hebrew and a review of the discrepancies.

### The pretest

The purpose of the pretest was to identify any respondent or interviewer problems with the mental health questions in the survey, to check the CAPI for programming errors, and to assess the length of time required for a complete interview. The pretest was carried out using the same field procedures described above. Sixty respondents participated in the pilot: 50 selected at random from the NPR and 10 recruited from mental health clinics. Each interview was conducted by an experienced interviewer and observed by an experienced supervisor who recorded reactions, questions, and other verbal exchanges between the respondent and the interviewer.

The pretest produced valuable information that led to changes in the wording of questions. The reaction of respondents to questions about mental health issues was much more positive than had been expected and indicated that a national survey with a major mental health component would not trigger more refusals than other health surveys. The material collected during these interviews was used to rewrite question items and to review interviewers' guidelines.

### Fieldwork results

Responses were obtained from a total of 4,859 sampled persons, very close to the goal of 5,000. Table 2 presents the fieldwork results by selected characteristics.

Overall response rates did not differ between males and females. However, they did differ by reason of non-response. Women showed a greater tendency to refuse to be interviewed than men, but were easier to locate and less likely to be away from home when the interviewer arrived.

Table 2. *Fieldwork results by gender and estimations for population groups*

	Total population		Gender		Estimations for population groups		
	N	%	Male	Female	Jewish & Mixed localities	Immigrants 2000–3	Arab localities
Total	7,075	100.0	3,474	3,601	6,193	178	704
Percentage of Column Total							
In-scope	6,690	94.6	94.2	94.9	94.2	97.2	97.2
Out-of-scope	385	5.4	5.8	5.1	5.7	5.6	2.8
Thereof: Deceased	110	1.6	1.4	1.7	1.7	1.7	0.6
Abroad 1 year+	188	2.7	3.0	2.3	2.9	3.4	0.3
Other	87	1.2	1.4	1.1	1.2	0.6	2.0
Belonging to population	6,690	100.0	3,274	3,416	5,838	168	684
Percentage in-scope by column							
Respondents	4,859	72.6	72.7	72.6	71.0	69.6	87.6
Nonrespondents	1,831	27.4	27.3	27.4	28.9	33.3	12.4
Thereof: Refusal	929	13.9	13.0	14.7	15.2	8.3	4.2
Non-contact	562	8.4	9.9	6.9	8.8	10.1	4.2
Thereof: Absent	253	3.8	4.5	3.1	3.8	7.1	2.5
Not located	295	4.4	5.3	3.6	4.8	3.0	1.5
Other	340	5.1	4.4	5.8	4.9	14.9	3.9
Thereof: Permanent disability	185	2.8	2.7	2.8	2.7	1.8	3.5
Language difficulty	148	2.2	1.5	2.9	2.1	13.1	0.1

Analysis of the reasons for non-response among the different sectors of the population found that, as in other ICBS surveys (27), the refusal rate was lowest in Arab localities — 4% as opposed to 15% among the long-settled Jewish population and 8% among immigrants. In addition, the population in Arab localities is less mobile and therefore easier to locate and less likely to be absent when the interviewer arrived. Among immigrants, the main reason for non-response was language difficulties, accounting for about 40% of the non-response in this group.

### Weighting and estimation procedures

The data collected in the INHS come from a sample taken from the national population. In order to derive estimates for the whole country and for population sub-groups, a weight was determined for each survey respondent expressing the estimated number of persons in the population that he or she represented. The estimation method is dependent on the sampling method as well as on the particular charac-

teristics of the survey. A common problem is that not every sampled person responded and the characteristics of non-respondents are not necessarily the same as those of respondents, a problem known as “informative non-response.” The weights derived from the estimation method are intended to reduce biases and variances that may arise from four factors: informative non-response; under-coverage of the population; unequal selection probabilities in the sample design; and variability in sample size by important characteristics not featured in the sample design, such as labor-force characteristics.

The estimation method for the National Health Survey was iterative and at the end of the process complete comparability was achieved between the weighted distribution of persons in the survey and the distribution of persons in the Israeli Labor Force Survey (ILFS) by selected variables (28). The ILFS estimates are calibrated to the current estimates for different sub-divisions of demographic and geographic variables, making it possible to obtain ad-

justments for further characteristics estimated in the ILFS.

Differences in response rates and in major characteristics investigated in the survey were found between the urban and the rural population among persons living in Jewish and ethnically mixed localities. In order to deal with these differences a preliminary correction factor was calculated in those geographic estimation strata which had both urban and rural populations. At the next stage, adjustment groups were determined according to demographic and socioeconomic variables collected in the survey and estimated in ILFS. The interaction between these variables and major variables investigated in the survey was examined using logistic regression models. The final adjustment groups were subject to the constraint that in every group there should be a sample size sufficient to allow the convergence of the iterative process which determined the final weights.

The four sets of variables were: population group by household type (29 groups); population group by origin (5 groups); population group by labor-force characteristics (8 groups); population group by geographical group by gender by age group (144 groups).

The set of final weights was calculated by the raking method, by which the weighted distribution of the sample was adjusted sequentially to the distribution of external estimates for the four sets of variables. This method was implemented iteratively until convergence was achieved.

## Comment

The INHS is part of the WHO World Mental Health (WMH) Survey Consortium established in 1998 to enable cross-national comparisons in mental-health-related survey data. The INHS instruments and procedures were composed by the WMH Survey Consortium, so that data from 28 countries on five different continents could be pooled and analyzed as a body.

The INHS project is a complex population-based in-home interview survey. The challenges that it presented triggered innovations in the CBS, in questionnaire development and survey procedures.

The relatively high response rate achieved, the amount of new information and the ability to com-

pare results with developed and developing countries around the world has created a rich database from which answers to questions on disability and burden can be drawn.

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