

A household panel as a tool for cost-effective health-related population surveys: validity of the "Healthcare Access Panel"

Ein Haushalts-Panel als kosteneffektive Grundlage für bevölkerungsbezogene Gesundheitssurveys

Abstract

Background: Random sample surveys of the population are time consuming and expensive, particularly if international sampling is planned.

Method: The Healthcare Access Panel was developed as an alternative to face to face or telephone health survey interviews to estimate prevalence or even incidence rates of health-relevant variables in the population. It is the objective of this paper to demonstrate the validity of health-related data obtained with the Healthcare Access Panel compared with results from other, population-based data sources. The example is Germany, where the Panel consists of more than 78,000 individuals aged between 0 and 79 years.

Results: The Healthcare Access Panel reflects the population concerning age, sex, and regional structure with a good correlation. The hospitalisation rate obtained with the Panel matches the official National Hospital Discharge Statistics. Annual consultations with major medical disciplines were found to be almost identical in the Healthcare Access Panel as compared with the German National Health Survey (GNHS). The Healthcare Access Panel data matched the GNHS prevalence results of self-reported medical conditions/diseases. Advantages and disadvantages of the Healthcare Access Panel compared with specially designed population field surveys are discussed.

Conclusion: It is worthwhile to consider the Healthcare Access Panel approach as a cost-effective alternative to other population-based data collection methods under many circumstances, i.e. considering the specific methodological pros and cons as necessary for any other method.

Zusammenfassung

Hintergrund: Zufallsstichproben aus der Allgemeinbevölkerung sind zeitaufwendig und teuer, insbesondere wenn internationale Studien geplant sind.

Methode: Das Healthcare Access Panel (HCAP) wurde als Alternative zu face-to-face oder telefonischen Gesundheitssurveys entwickelt. Ziel ist die Abschätzung von Prävalenz- oder sogar Inzidenzraten von gesundheitsrelevanten Merkmalen in der Bevölkerung. Es ist das Ziel dieses Beitrags, die Validität von gesundheitsbezogenen Informationen zu belegen, die mit dem Healthcare Access Panel gewonnen wurden. Dazu werden Vergleiche mit anderen bevölkerungsbezogenen Datenquellen zugezogen. Das Beispiel stammt aus Deutschland, wo ein Haushalts-Panel mit mehr als 78.000 Personen im Alter zwischen 0 und 79 Jahren besteht.

Ergebnisse: Das Healthcare Access Panel bildet die Grundgesamtheit in Hinsicht auf Alters-, Geschlechts- und Regionalverteilungen gut ab. Die Häufigkeit von Krankenhausaufenthalten stimmt mit der amtlichen Krankenhausdiagnosestatistik gut überein. Die Inanspruchnahme nie-

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dergelassener Fachärzte war mit den entsprechenden Ergebnissen des Bundesgesundheitsurvey (BGS) fast identisch. Auch die Prävalenz subjektiv wahrgenommener und berichteter Krankheiten zeigt gute Übereinstimmung mit dem BGS. Die Vor- und Nachteile des Access Panels im Vergleich zu speziellen Gesundheitssurveys werden diskutiert. **Schlussfolgerung:** Es lohnt sich, das Healthcare Access Panel bei der Studienplanung als eine kosten-effektive Alternative zu anderen bevölkerungsbezogenen Erhebungsformen in der empirischen Gesundheitsforschung in Betracht zu ziehen.

Introduction

Household Panels are becoming increasingly important as a data source in international social research. The most prominent European example is the European Household Panel which started in 1996 in the then 12 member countries [1]. In 2003 the European Statistics on Income and Living Conditions (EU-SILC) was based on the same sampling method [2].

As far as we know, no published reports on the application of the Household Panels methodology for health surveys are available, despite the successful application of Household Panels in social research [3]. The present paper shall bridge this gap.

The Healthcare Access Panel (HCAP) was developed primarily as a multi-purpose database with information about chronic diseases and healthcare utilization in Germany. The sample should be large enough to contain sub-samples of persons with low prevalent diseases in sufficient numbers for special analyses. The follow-up of respondents with defined characteristics, e.g. symptoms or illnesses, should be possible. And data collection should not exceed affordable costs.

The objective of this paper is to demonstrate the validity of results obtained with the Healthcare Access Panel approach, as compared with results from other population-based data sources. The example of the German population is being used for this purpose. Since this Population Panel is accessible any time at comparably low cost, it might be an alternative approach to expensive cross-sectional random sample surveys or longitudinal population studies designed for one objective upon time, at least under many circumstances.

Methods

The Healthcare Access Panel was based on a large household sample in Germany. The existing national Access Panel of the TNS Infratest group in Germany comprises a database with 73,100 households and 167,300 persons who agreed to participate in future surveys. In Europe further Household Panels in Italy, UK, Spain, the Netherlands and France with 221,300 households and in the US with 600,000 households exist within the TNS research network. The first survey in nine countries on four continents was conducted in 2002.

Households are recruited for the Healthcare Access Panel via different channels, e.g. address publishers,

email-contacts or snowball-systems. The sample is evaluated continuously and underrepresented cells, e.g. defined by region or age-group, are complemented by quota recruitment. The Panel members receive small incentives for their cooperation and the Panel compliance is very high.

Beginning in 1999 (Healthcare Access Panel 1999; HCAP 1999) and then following in 2002 (HCAP 2002) questions concerning the 12-month-prevalence of selected chronic diseases and healthcare utilization were included in a large sample of the Healthcare Access Panel. A mailed questionnaire was used for fieldwork. In 1999 responses for up to five and in 2002 for up to four persons per household could be reported. The Healthcare Access Panel 1999 comprises responses of 78,609 persons and 54,300 persons in 2002. The characteristics of the two samples are given in Table 1.

Sociodemographic information about the respondent from the database could be combined with the healthcare data on an individual level. Since all persons agreed to future participation, follow-up studies with persons suffering from special diseases can be done.

The individual cases were given weight factors to optimize the sample structure with respect to age, sex and region. The next data collection for the Healthcare Access Panel is planned for the year 2004.

The members of the Healthcare Access Panel declared their long-term voluntary cooperation. So this is not a random sample, but a sample of volunteers. Since no bias-free population sample can be assumed a priori, comparisons with known, reliable population data are essential to demonstrate that the Panel of volunteers could reflect the true population data in their distribution.

Results

Regional and age structure of the Panel

The regional distribution of the Healthcare Access Panel as compared with the data of the Statistical Yearbook of Germany [4] is shown in Table 2. The distribution of the Healthcare Access Panel matches the distribution of the German population in the administrative regions, as calculated by the Federal Agency for Statistics, very well. All deviations are less than 1.5% - except for Lower Saxony (3.1%). This has been compensated subsequently by a weighting process.

Table 1: Characteristics of the Healthcare Access Panels 1999 and 2002

	Healthcare Access Panel	
	1999	2002
Number of contacted households	40,038	44,977
Number of participating households	29,884	29,322
Max. number of persons per household	5	4
Number of participating persons	78,609	54,300
Age range	0 bis 79 years	20 bis 79 years
Number of listed chronic conditions (12-months-prevalence)	15	20
Number of listed healthcare services	7	22

Table 2: Comparison of the sample structure according to Federal States (Bundesländer)

Administrative region (Bundesland)	HCAP 1999	German population;		Difference in %
		Statistical Yearbook ¹		
	Absolute numbers	%	%	
Baden-Wuerttemberg	9,127	11.6	12.7	1.1
Bavaria	12,272	15.6	14.7	-0.9
Berlin	2,532	3.2	4.2	1.0
Brandenburg	9,127	2.8	3.1	0.3
Bremen	610	0.8	0.8	0.0
Hamburg	588	0.7	2.1	1.4
Hesse	5,973	7.6	7.4	-0.2
Mecklenburg-Western Pomerania	1,289	1.6	2.2	0.6
Lower Saxony	9,950	12.7	9.6	-3.1
North Rhine-Westphalia	16,835	21.4	21.9	0.5
Rhineland-Palatinate	3,741	4.8	4.9	0.1
Saarland	1,543	2.0	1.3	-0.7
Saxony-Anhalt	2,506	3.2	3.3	0.1
Saxony	4,192	5.3	5.5	0.2
Schleswig-Holstein	3,182	4.0	3.4	-0.6
Thuringia	2,092	2.7	3.0	0.3
		100	100	

¹ Source: Statistisches Bundesamt 1999 [4]

Similarly good correspondence can be seen for the age structure (Table 3). As expected, the older age groups are somewhat underrepresented in the Healthcare Access Panel, although frequent in absolute numbers. This refers to both genders (data not shown). Weighting or standardisation of the data is therefore recommended whenever appropriate. Moreover, sufficient numbers of participants are available for separate analysis of age strata.

Comparisons with health-relevant population data

The following examples are to show whether and to what extent the evaluations of the Healthcare Access Panel data lead to results that are comparable with population-based health data.

Table 3: Comparison of the sample structure according to age groups

Age Groups	HCAP 1999		Germany; Statistical Yearbook ¹	Difference in %
	abs.	%	%	
0 - 9 years	9,742	12.4	10.8	-1.6
10 - 19 years	13,270	16.9	11.5	-5.4
20 - 29 years	8,291	10.5	13.3	2.8
30 - 39 years	18,124	23.1	17.8	-5.3
40 - 49 years	15,271	19.4	14.5	-4.9
50 - 59 years	7,244	9.2	13.3	4.1
60 - 69 years	4,838	6.2	11.3	5.1
70 - 79 years	1,829	2.3	7.5	5.2
		100	100	

¹ Source: Statistisches Bundesamt 1999 [4]

Table 4: Hospitalisation rates by age groups

Age groups	HCAP 1999	National hospital discharge statistics 1997 ¹	
	Hospitalisation rate per subject	absolute number	per inhabitant
0 to 14 years	0.12	1,427,768	0.11
15 to 24 years	0.12	1,129,899	0.13
25 to 34 years	0.17	1,979,247	0.15
35 to 44 years	0.13	1,633,262	0.13
45 to 54 years	0.15	1,666,009	0.17
55 to 64 years	0.21	2,484,428	0.23
65 to 79 years	0.31	3,436,771	0.35
0 to 79 years total	0.17	13,757,384	0.17

¹ Source: Statistisches Bundesamt 1999 [5]

(a) Hospital admissions

Rather extensive information is available from the National Hospital Discharge Statistics, annually published by the German Federal Office for Statistics [5]. The number of annual hospital admissions/discharges is related to the respective population. Therefore comparable with the information from the Healthcare Access Panel, which documented the number of hospital stays of the Panel participants during the past twelve months. Restricting the official population-based hospital discharge statistics to the age range up to 79 years (as in the Healthcare Access Panel), the resulting frequency per inhabitant is 0.17 - as found with the Access Panel (Table 4). No important variations occur in the individual age groups. Only the higher age groups show a somewhat higher discharge rate. This may be due to the fact that certain subgroups, which for example live in nursing homes, are included in population-based national statistics and are not included in the Healthcare Access Panel.

There is also a good congruence of the gender-specific rates of hospital discharge statistics and the rates estimated by the Healthcare Access Panel (data not shown).

The comparability of the rates, determined by the Healthcare Access Panel and by the official hospital discharge statistics, is similarly good across all German Federal States (Table 5). The maximal difference in the hospitalisation rate is 0.01 in 12 of the 16 administrative regions. Somewhat more variation, but not alarming differences, can be seen in the four administrative regions with a small population size: Hamburg, Brandenburg, Saxony, and Thuringia.

(b) Claim of outpatient services

Figure 1 shows a comparative evaluation of contacts with different outpatient physicians, i.e. the percentage of persons who had at least one out-patient consultation with the respective medical discipline. The data obtained with the HCAP and those observed in the most recent German National Health Survey [6] were found to be very close, i.e. with some random oscillation.

We compared also the number of consultations by General Practitioners per person (Figure 2). The most recent representative German National Health Survey (GNHS) was used again as reference [4]. The figure shows that the frequency estimated by the HCAP and the representative random sample survey is very close to each other,

Table 5: Hospitalisation rates across German Federal States (Bundesländer) in the age range 0 to 79 years

Administrative region (Bundesland)	HCAP 1999 hospital cases per all Panel subjects	National hospital discharge statistics 1997 ¹ per inhabitant *
Schleswig-Holstein	0.18	0.17
Hamburg	0.19	0.15
Lower Saxony	0.17	0.17
Bremen	0.16	0.17
North Rhine-Westphalia	0.18	0.18
Hesse	0.17	0.17
Rhineland-Palatinate	0.20	0.19
Baden-Wuerttemberg	0.15	0.15
Bavaria	0.18	0.17
Saarland	0.19	0.20
Berlin	0.16	0.15
Brandenburg	0.14	0.17
Mecklenburg-Western Pomerania	0.19	0.18
Saxony	0.14	0.16
Saxony-Anhalt	0.18	0.19
Thuringia	0.16	0.18
Germany	0.17	0.17

* aged up to 79 years (correction factor 0.92)

¹ Source: Statistisches Bundesamt 1999 [5]

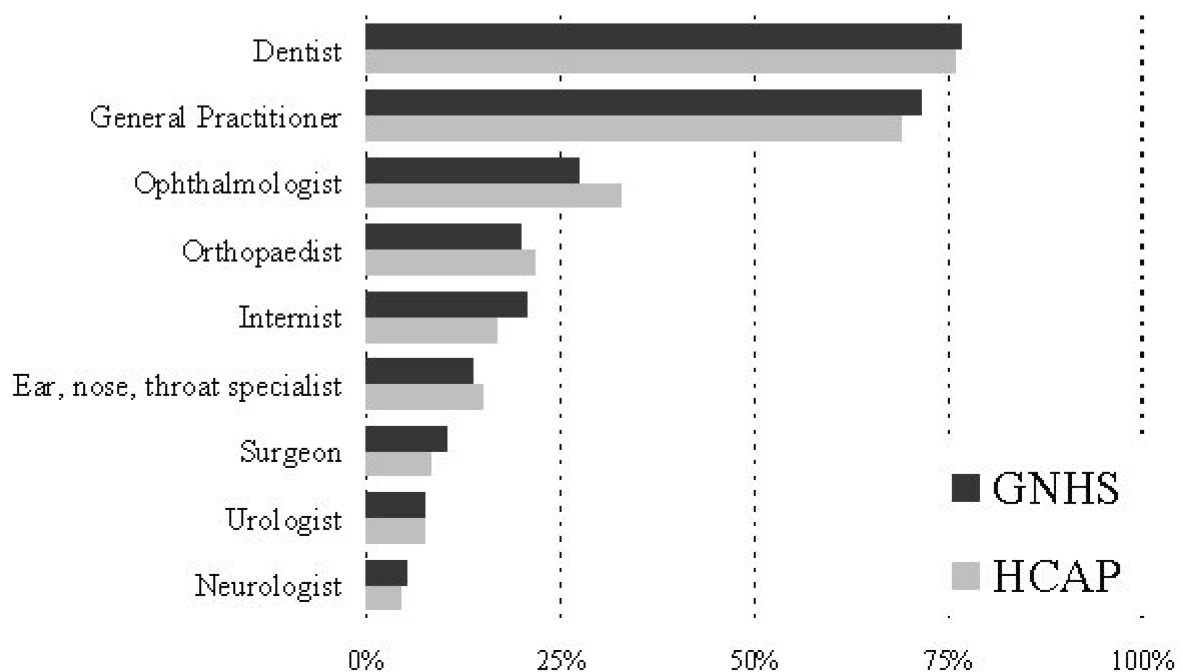


Figure 1: Percent of the study population with at least one out-patient contact with certain medical disciplines in the most recent year

Data obtained by the Healthcare Access Panel 2002 (HCAP) and the German National Health Survey 1998 (GNHS) [6]

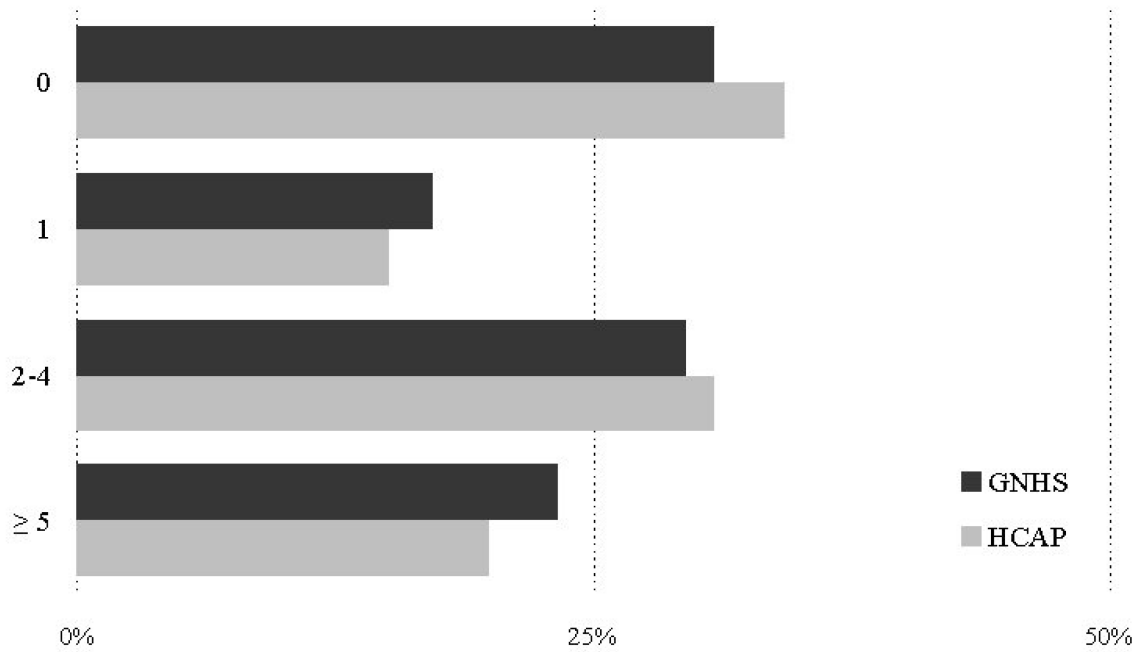


Figure 2: Number of General Practitioner consultations per year per percentages of patients in whole of each study population
 Data obtained by the Healthcare Access Panel 2002 (HCAP) and the German National Health Survey 1998 (GNHS) [6]

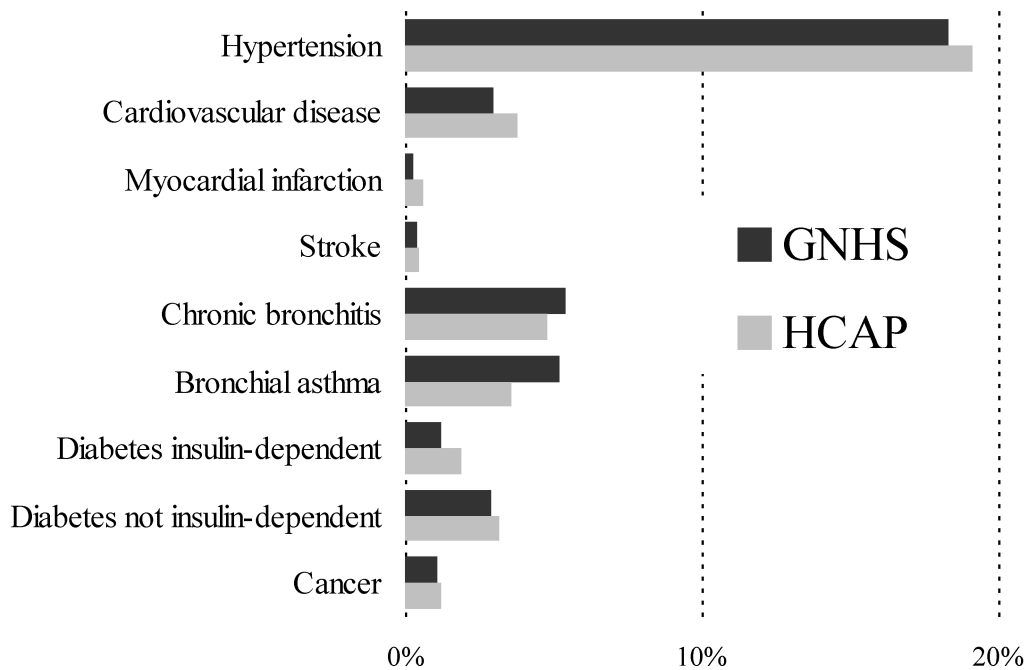


Figure 3: 12 months prevalence of self-reported conditions in % of patients in whole of each study population
 Comparison of data from the German National Health Survey 1998 (GNHS) [6] and the Healthcare Access Panel 2002 (HCAP)

i.e. with the expected random oscillation. At least no systematic over- or underestimation was observed.

(c) Prevalence of diseases in the population

We compared the self-reported 12-month-prevalence of selected medical conditions between the Healthcare Access Panel and the last nationwide representative random sample survey (GNHS). The medical conditions had been assessed in the GNHS by trained physicians on the basis

of structured personal interviews. Again, a convincing similarity was observed (Figure 3).

Even the age-specific distributions of hypertension and chronic bronchitis in the Healthcare Access Panel are very good, compared to the correspondence of the German National Health Survey (Table 6).

There is no suspicion of a systematic difference among both data sources of disease prevalence. This reconfirms that the Access sample is not materially biased if com-

Table 6: 12 months prevalence of hypertension and chronic bronchitis by age groups in %. Comparison of data from the German National Health Survey 1998 and the Healthcare Access Panel 2002

Age groups	12-months-prevalences in age groups			
	Hypertension		Chronic bronchitis	
	HCAP 2002	GNHS ¹	HCAP 2002	GNHS ¹
20-29	2,8	1,8	3,0	2,6
30-39	6,3	4,8	3,2	3,3
40-49	13,8	10,4	3,8	4,2
50-59	28,5	24,9	5,5	6,1
60-69	38,2	39,3	6,7	5,4
70-79	45,9	49,4	9,6	5,7

¹ Source: German National Health Survey 1998 [6]

pared with a good-quality representative random sample survey of the same source population - at least for that kind of information.

Advantages and disadvantages of an Access Panel Survey

Carefully planned surveys of random samples of the population are often necessary for various reasons. Just as often, however, will the results of analyses in the Access Panel be sufficient or even preferable concerning cost-effectiveness. This depends on the objective of a survey.

Advantages of the Access Panel approach might be:

- The results can be obtained in a relatively short period of time (a few weeks or months), at least as compared with a specific designed population-based survey.
- Usually, the result can be generalised for the source population.
- For a majority of social and health-related issues, matters of Health Services Research or e.g. drug utilisation, the results of the Access Panel will be usually sufficient to give valid answers.
- Surveys of very large groups are possible if rare phenomena have to be studied.
- Even for small sub-groups with specific characteristics sufficient numbers of participants will be available in most cases - which are often a problem difficult to overcome for planned population surveys due to the costs.
- The costs are considerably lower than for a planned cross-sectional random sample survey.
- Even follow-up studies are possible: If certain information has been documented years ago, changes over time can be monitored (historic cohort approach). Alternatively, prospective cohort studies can be performed.
- Comparisons among different countries are possible since Access Panels, using the same method, have been established in many countries of Europe and in other continents.

Disadvantages can be:

- The methodological design of the Access Panel cannot be changed, although some helpful minor modifications can be discussed for individual situations.

- Certain bias forms can be inherent in any self-selected cohort unless sufficient evidence for the contrary can be provided.

- Real response rates cannot be determined due to the self-selective nature of the Panel. Nonetheless, non-response rates of the Panel members are important to know.

- The representativeness for the source population needs to be specifically discussed when results of the Access Panel should be generalized. However, this is also the case, to a lesser degree, for planned population-based random sample surveys.

Conclusions

Surveys using the Access Panel are a valuable methodological supplement to the conventional health survey approaches to get rapid answers for most of the health-relevant issues. The Federal Statistical Office of Germany itself is working on a pilot study for testing an Access Panel approach [7].

The presented examples from Germany demonstrated a high degree of validity of Access Panel results, i.e. in comparison with population-based data sources (surveys as well as national statistics), even if age-specific distributions of chronic diseases are considered.

Since the data were collected by mailed questionnaires only self-perceived disease will be reported. But this is a common restriction of all kinds of health interview surveys.

However, methodological issues of self-selection of the Access Panel need to be discussed for every specific study.

The Access Panel Network is in a rapid development in order to facilitate comparative studies on a broad international level.

The conclusions about the cost-effectiveness of the Household Panel approach correspond very well with the experiences with the European Household Panel of Eurostat [2].

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