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Data Resource Profile: Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey for adults in Brazil (Vigitel)

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Data resource basics

The Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey (Vigitel) is a population-based cross-sectional survey conducted by the Brazilian Ministry of Health (MoH) aiming to continuously monitor the prevalence and distribution of major risk and protective factors for noncommunicable diseases (NCD) among adults in the country.[1–3] The survey integrates the National Health Information Surveillance and Monitoring System, implemented in 2003 after the creation of a specific Department for NCD surveillance in the Secretariat of Health Surveillance, Ministry of Health.[1,4]

Since 2006, Vigitel annually collects self-reported health information (mainly about food consumption, physical activity, smoking, alcohol consumption, cancer prevention and, NCD morbidity) from a sample of adults (aged 18 years or older), living in households with at least one landline, in the 26 Brazilian state capitals and Federal District.[3] Since it is based on telephone interviews, Vigitel shows important advantages over traditional household surveys, such as lower cost per interview and faster data collection.[5]

The system establishes a minimum sample size of approximately 2000 interviews in each locality (that is 27 localities, totalling approximately 54 000 per year) to ensure the frequency of any factor in the adult population with a 95% confidence interval and a maximum error of 2%.[6] Due to the similarity between the proportions of men and women in the survey sample, maximum errors of 3% are expected for certain data frequency estimates reported by sex.[3,6] Smaller samples are accepted in locations where landline coverage is less than 40% of households and where the absolute number of households with a landline is less than 50 000. In this case, estimates for the adult population admit a maximum error of 3%, and 4% for sex-specific estimates.[3,6] Based on these parameters, a probabilistic sample of the adult population living in households served by at least one landline is drawn annually in each city.

Between 2006 and 2019, Vigitel completed 14 editions with 730 309 interviews, reaching the position of the largest and most well-maintained health survey in the country.[3] In this period, response rates were always kept over 60% [this rate is calculated by considering the number of

Key Features

- Vigitel is a population-based cross-sectional telephone survey aiming to continuously monitor the frequency and distribution of major risk and protective factors for noncommunicable diseases among adults in Brazil.
- Between 2006 and 2019, Vigitel completed 14 editions, reaching the position of the largest and most well-maintained health survey in the country. Vigitel annually collects individual-level self-reported health information from a sample of approximately 54 000 adults (aged 18 years or older), living in households with a landline, in the 26 Brazilian state capitals and Federal District.
- Vigitel completed 730 309 interviews and the response rates were always kept over 60%.
- A range of self-reported risk and protective factors for noncommunicable diseases information was collected. Each year has a core set of topics: sociodemographic characteristics and health behaviours related to chronic diseases.
- Reports and microdata are openly available through the Brazilian Ministry of Health website at [https://antigo.saude.gov.br/saude-de-a-z/vigitel]

completed interviews divided by the number of eligible lines (ineligible lines or those for which eligibility could not be verified were not included)][7] (Table 1).

The Vigitel survey was approved by the National Ethics Committee for Research on Human Beings of the Brazilian Ministry of Health (project protocol number: 65610017.1.0000.0008), and informed consent was obtained orally from all participants before to the questionnaire administration.

Data derived from a source in the public domain. The data underlying this article are available at [https://antigo.saude.gov.br/saude-de-a-z/vigitel], the Brazilian Ministry of Health website.

Collected data

At the beginning of each year, a representative sample of residential landlines in each location was drawn based on phone registers provided by the main telephone companies in the country. Initially, a random sample of 5000 landlines per city was drawn. These lines were then reorganized into 25 sets of lines, each one reproducing the line distribution on the original list (and also the share of each phone company) to facilitate the verification of its eligibility. Each selected landline was contacted up to six times on distinct days and hours (from 9 a.m. to 9 p.m., including weekends and holidays). Non-residential lines, out-of-service lines and lines that did not answer to any attempt to contact were considered ineligible. Once eligible, the initial approach was taken to clarify the objectives of the Ministry of Health research. Then, when the intention to participate was confirmed, age and sex of each household member was listed and one adult was randomly selected and invited to participate in the survey.[1–3]

The interviews were conducted by a hired company with about 32 trained interviewers who were closely supervised by technicians from the MoH and two Brazilian universities.[3] Data were collected by a structured questionnaire that was prepared considering the instruments used in other risk factor monitoring systems such as the Behavioral Risk Factor Surveillance System (BRFSS)[8] and the World Health Organization STEPwise approach to surveillance.[9] This questionnaire was developed to operate through a standardized computer-assisted telephone interviewing (CATI) system.

Vigitel addresses a wide variety of self-reported risk and protective factor issues for NCD. Each year had a core set of topics: sociodemographic characteristics such as sex, age, education, race/skin colour, marital status and health behaviours related to NCD (Table 2). However, in some years, topics of current interest were addressed. In this sense, questions about H1N1 influenza and about dengue were asked in 2010 and 2012, respectively. In addition, in 2020, a complementary study was conducted by Vigitel to identify and describe the patterns of risk and protective behaviours for COVID-19.[23] It is worth mentioning that the number of questions included in the survey increased constantly, from 76 in 2006 to 132 in 2019. In the same direction, the average duration per interview also increased from 7 min in 2006 to 12 min in 2019.

Weighting factors are made available in order to account for unequal probability of selection and non-response, and to match the distribution of the population interviewed by Vigitel to that predicted for the entire adult population of each city in each year. The weighting procedure is executed in two stages. The first stage corrects the unequal probability of selection of households with more than one landline or with more than one resident. This factor is obtained by multiplying the inverse of the number of

Table 1 Response rates in Vigitel,[a] 2006 to 2019

Year	Interview period	Total phone numbers used	Eligible phone numbers[b]	Completed interviews	Response rate (%)[c]
2006	August to December	107 200	76 330	54 369	71.1
2007	July to December	138 600	75 876	54 251	71.5
2008	April to December	106 000	72 834	54 353	74.6
2009	January to December	118 200	71 081	54 367	76.5
2010	January to December	126 600	71 082	54 339	76.4
2011	January to December	111 200	80 470	54 144	64.9
2012	July 2012 to February 2013	135 000	70 045	45 448	64.9
2013	February to December	112 600	74 005	52 929	71.5
2014	February to December	101 200	62 786	40 853	65.2
2015	May to December	116 000	76 703	54 174	70.6
2016	February to December	127 200	77 671	53 210	68.5
2017	January to December	125 400	75 545	53 034	70.0
2018	January to December	172 800	73 648	52 395	71.1
2019	January to December	197 600	75 789	52 443	69.2

[a]Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey.
[b]Non-residential lines, out-of-service lines and lines that do not answer any attempt to contact are considered ineligible.
[c]Based on eligible phone numbers.

Table 2 Survey domains and measures included in Vigitel[a] 2019[b]

Domains	Number of questions	Measures	Number of indicators [c]
Core			
Sociodemographic	12	Sex; age; educational level; marital status; race/skin colour	0
Tobacco use	12	Current tobacco use; frequency of weekly and daily smoking; age of initiating smoking; experience of quitting smoking; exposure to second-hand smoke; illicit cigarette use	4
Body mass index (BMI)	2	Self-reported height and weight	2
Food consumption	38	Frequency and portions of fruit and vegetables consumption; frequency of beans and sweetened beverages consumption; natural and ultra-processed food groups consumption	6
Physical activity	22	Physical activity practice: frequency and time of practice; physical activity at work, commuting and home; sedentary behaviour	5
Alcohol use	9	Current alcohol use: weekly frequency; amount of monthly alcohol consumption	2
Health status	18	Self-rated health; self-reported chronic disease; drug treatment	5
Early detection of cancer in women	4	Lifetime mammography screening; most recent mammography screening; lifetime Papanicolaou test screening; most recent Papanicolaou test screening	4
Additional			
Traffic behaviours	8	Fines for speeding; breathalyser testing; mobile phone use during driving	0
Social programmes	3	Receipt and duration of the Bolsa Família cash transfer programme	0

[a]Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey.
[b]Additional domains and isolated questions not included in this table were used throughout the years. This table represents only the 2019 questionnaire. The complete questionnaire for each edition is available at the annual report produced by Brazilian Ministry of Health.[10–22]
[c]Measures calculated using the response to questions to estimate the prevalence of a disease or risk and protective factors.[9] These indicators were listed in an online Supplementary table (Supplementary Table S1, available as Supplementary data at *IJE* online).

telephone lines in the household by its number of adults. The second stage aims to match the distribution of the population interviewed in each city (by sex, age and education) to its entire population [based on the official projections for each year by the Brazilian Institute of Geography and Statistics (IBGE)], using raking methods[24] and accounting for the first-stage factor.

Data resource use

The data collected by Vigitel supports the purposes of the *Strategic Action Plan to Tackle Noncommunicable Diseases in Brazil 2011–2022*, monitoring eight of the total health indicators included in the Plan, such as the prevalence of obesity, smoking, alcohol abuse, leisure-time physical activity, adequate consumption of fruits and vegetables and early detection of female cancer (screening). These indicators were used to elaborate national goals to promote development and implementation of effective and evidence-based policies for the prevention and control of NCD and their risk factors in Brazil.[25]

In addition, these data provide support for a large number of national and international scientific studies. Two examples demonstrate the wide-ranging potential of the survey. The first uses Vigitel to explore the use of multivariate techniques to understand how different risk and protective factors behave in the population. The second shows the possibility of analysing temporal trends in prevalence of the indicators monitored by Vigitel, in addition to exploring analyses stratified by sex, age and education.

Example 1

Data from Vigitel from the years 2009 and 2010 were used to identify behavioural patterns from a list of 12 protective and risk factors for NCD and to explore the association between these patterns and sociodemographic characteristics.[26] Two behavioural patterns were identified: the first one, the prudent pattern, involved mostly protective behaviours such as regular vegetable and fruit consumption, daily fresh fruit juice consumption, fat-reduced milk consumption, sufficient physical activity practice during leisure time, efficient protection against UV radiation and reduced regular soft drink consumption. The prudent pattern showed a positive association with being female, being from a less developed region, age and years of schooling. The second one, the risky pattern, involved essentially risky behaviours and was characterized by fat-rich meat consumption, excessive alcoholic beverage intake and current smoking habit. This pattern was negatively associated with being female, being from a less developed region, age and years of schooling.[26]

Example 2

Data from Vigitel between 2007 and 2016 were used to analyse time trends in sugar-sweetened beverages (SSB).[27] There was a reduction of regular consumption ($\geq$5 days/week) of SSB, from 30.9% to 16.5% (-1.28% age points per year, $p = 0.001$) in the period. Greater reductions were observed among men aged between 18 and 44 years and among individuals with a higher level of education, with a partner and living in a more developed region. However, the study showed that the observed trends should not lead to the conclusion that health risks are surpassed, since about one out of six adults (16.5%) still consumed SSB on a regular basis in 2016.[27]

Strengths and weaknesses

Vigitel is the leading Brazilian continuous health survey (considering the number of interviews and consecutive editions conducted up to the conclusion of the present study) serving as a comprehensive database of noncommunicable disease risk and protective factors annually updated. Its main characteristics are the low cost (when compared with household surveys) and the faster dissemination of results, with the great advantage of continuously monitoring the prevalence of indicators (Vigitel conducts interviews over the entire year to capture seasonal variations). Thus, one of the strengths is the agility in data collection, with the creation of the database automatically, which is publicly disclosed at the beginning of the following collection year.

Data collected in each year allow analyses stratified by sex, age and educational level. Health departments and researchers use the data for several purposes: proposing legislation for health; measuring progress towards national goals in line with global plans such as the *Strategic Action Plan to Tackle Noncommunicable Diseases in Brazil 2011–2022*; and creating programmes and policies to address the main risk factors for NCD.

Despite these strengths, the Vigitel sample was designed to represent the adult population of Brazilian capitals and Federal District who live in households with a landline. Although post-stratification weights are used to minimize differences, Vigitel results allow inferences only for the adult population of the capitals of Brazil and Federal District. In addition, the data collected by Vigitel are self-reported and such may result in underestimation or overestimation of the prevalence of the studied indicators. However, validity studies conducted so far indicate the good data accuracy obtained by the system[28,29] and the

comparison of the prevalence of Vigitel indicators with the results of the National Health Survey, a household survey with face-to-face questions, highlighted that the results were similar in most of the compared indicators.[30]

Data resource access

Published reports are electronically available in Portuguese through the official website of the Brazilian Ministry of Health. Vigitel reports and microdata are released annually and are openly available; the website [https://antigo.saude.gov.br/saude-de-a-z/vigitel] contains microdata archives, reports and research publications; databases from 2006-2019 are available in Excel format, which can be imported into statistical programs. It is noteworthy that Vigitel data should not be analysed in Excel (or similar program), considering the need to use weighting factors for data analysis. Respondents' personal information (such as name, telephone number, address) is not provided. Sample weights are available as well as data dictionaries. Additional information on data application and use is provided in Portuguese documents at the available link. Further information and enquiries can be made to the author Rafael Moreira Claro [rclaro@ufmg.br] or Luciana Monteiro Vasconcelos Sardinha [cgdant@saude.gov.br] at the Ministry of Health.

Supplementary Data

Supplementary data are available at *IJE* online.

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Conflict of Interest

None declared.

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