Methodological notes:
Developing SDH Indicators for observatories on health inequities: The Brazilian experience

WP4: Research capacity building: research methodology and SDH

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National Institute of Public Health – Mexico (INSP)
Nelly Salgado de Snyder
Germán Guerra y Guerra

Fundação Oswaldo Cruz – FIOCRUZ
Alberto Pellegrini Filho
Silvia Rangel dos Santos
Jacques Levin
Elis Borde

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# Table of Contents

Presentation .................................................................................................................. 2

Introduction .................................................................................................................. 2

1. Indicators: basic concepts and construction .......................................................... 3

2. Interagency Network of Health Information (RIPSA) ............................................. 5
   2.1 RIPSA: an intersectoral and cooperative initiative ............................................ 5
   2.2 The strengthening of Brazil’s information systems under RIPSA initiative and output products .......................................................... 7

3. Mapping sources and indicators availability ......................................................... 8
   3.1 Mapping of data sources ................................................................................. 9
   3.2 Selection of proxy variables of social stratification ........................................... 10
   3.3 Challenges found during mapping of available sources and indicators: the persistence of fragmentation and non-compatibility .................................................. 11

4. Definition of a core set of indicators .................................................................... 11

5. Construction of selected indicators ....................................................................... 15

6. Final considerations ............................................................................................... 17

References .................................................................................................................... 18

Cited references .......................................................................................................... 18

Websites ....................................................................................................................... 19

Other useful resources ............................................................................................... 19

Appendix I .................................................................................................................... 21
Presentation

This document presents the experience of the Brazilian Observatory on Health Inequities, particularly the methodological aspects involved in gathering, organizing, developing and publishing indicators on health inequities provided by different data sources in Brazil. This document has the purpose of serving as a methodological reference for low and middle income countries (LMIC) that wish to develop similar initiatives within their own possibilities –particularly on their health information systems and health policy framework– with the final purpose of generating accurate and timely information on SDH and health inequities at national level to develop programs and policies in order to improve the health of the population.

Introduction

Among the difficulties faced by the policies aimed to promote health equity in different countries, stand out the weakness of regular information systems to gather and analyze information that allow the identification of trends and determinants of health inequities. There is also a shortage of systems for monitoring and evaluation of impact of interventions on Social Determinants of Health (SDH).

Recognizing the importance of information and evidence to support interventions on SDH, the 62nd World Health Assembly of the World Health Organization (WHO) in 2009 adopted the resolution "Reducing health inequities through action on the social determinants of health". This resolution recommends that member states should "develop, use and, if necessary, improve health information systems and research capacity in order to monitor and measure the health of national populations with data disaggregated by age, gender, ethnic origin, race, caste, occupation, education, income and employment, where national laws and the context permits, so that health inequities can be detected and the impact of policies on health equity can be measured" (World Health Organization, 2009).

There are several country experiences showing the importance of the creation of instances located at the interface between information systems and policy making processes to promote mutual reinforcement, namely, strengthening information systems and providing evidence basis for the definition of policies. Health observatories are examples of this type of instances, and can be defined as “a policy-oriented virtual-based national center aimed at performing systematic and ongoing observation on relevant issues about population health and health systems, in support of effective and evidence-based health policy, planning, decision-making and action in public health and health systems. The ultimate goal is to contribute to the preservation and improvement of health of the population, including the reduction of inequalities”. (Gattini, 2009, p.11)

Taking into consideration the recommendations mentioned above, the Center for Studies, Policies and Information on Social Determinants of Health (CEPI-DSS) of the National School of Public Health (ENSP/FIOCRUZ) in Brazil, created an Observatory on Health Inequities (BOHI) in 2010. The general objective of BOHI is to monitor health inequities, analyze their trends and determinants, and evaluate policies and programs aimed at tackling such disparities, in order to support the definition, implementation, and reorientation of public policies dedicated to the promotion of
health equity. The data, information, and analyses produced by the BOHI are published in the SDH Portal at http://www.dssbr.org.

This document presents the experience of the BOHI. It emphasizes on the methodological aspects involved in gathering, organizing, developing, and publishing indicators on health inequities provided by different data sources in Brazil. This document is divided into six parts. In the first section we enlist some of the basic concepts and general uses of indicators and their main characteristics that assure the relevance and purpose of indicators in health inequities. We finish this section with a summary of the three-stage stepwise methodology that was followed while designing and implementing the BOHI.

In the second part we present a brief narration of the Interagency Network of Health Information (RIPSA) as the fundamental predecessor that helped the development of the BOHI. RIPSA provided a relevant experience that is important to summarize in order to show how this cornerstone initiative influenced the development of BOHI.

Each section—from the third to the fifth—corresponds with the description of each one of the three-stage stepwise methodology for the development of the BOHI. In the sixth part we present the final considerations to take into account while designing and implementing an observatory on health inequities in LMIC.

1. **Indicators: basic concepts and construction**

The indicators are synthetic measures that contain relevant information about certain attributes and dimensions of the living conditions of the population. Its construction is based on their method of calculation and it can vary from simply directly counting the cases of a particular disease, to the calculation of proportions, ratios, rates or more complex indices, such as life expectancy at birth.

A health observatory must describe the differences and tendencies in health. To allow for an analysis and explanation of the situation of inequities in different population groups, it is important first to provide a description of the health situation of the population. In the best scenario, this information should focus on conceptual and empirical information about gradients and gaps. To accomplish this, it is necessary to use indicators that measure and allow to conduct quantitative comparisons of a particular aspect of the social reality, both for research purposes, and to inform the formulation, monitoring and evaluation of programs and policies public. We now enlist some of the most important characteristics to consider for any indicator to be included in a health inequities observatory.

- The inclusion of an indicator for an observatory in health inequities should be preceded by the discussion of its relevance. This can be done by asking how well does a given indicator echoes the health status and/or social realities a research group, policymakers or experts are interested in studying, describing or analyzing. As the Brazilian experience shows, the inclusion of indicators implied an extensive work and discussion around Brazil’s population health, done by thematic groups of experts. This had a crucial impact on the decision to
include selected indicators. The discussion around the relevance of indicators should stress their qualities.

According to RIPSA (2009), this means that:

- Any indicator should be evaluated in relation to its *validity* (ability to measure what is intended) and its *reliability* (produce the same results when applied in similar conditions). A valid indicator is further determined by its sensitivity (ability to detect the phenomenon analyzed) and specificity (ability to detect only the analyzed phenomenon).
- Other desirable attributes of an indicator must be included. For instance the *measurability* (based on data available or easy to achieve), *relevance* (answering health priorities) and *cost-effectiveness* (the results justify the investment of time and resources). It is expected that the indicators can be easily analyzed and interpreted, and that they are understandable to the information users.
- For a set of indicators, important quality attributes are: *integrity, completeness* (complete data) and *internal consistency* (values consistent and not contradictory). The quality and comparability of health indicators depend on the systematic application of operational definitions and standardized procedures for measuring and calculating.
- The selection of the core set of indicators –and their levels of disaggregation– must adjust to the availability of information systems, data sources, resources, priorities and needs in each region. Maintaining this set of indicators must rely on simple tools and methods to facilitate the extraction of the regular systems. To ensure the confidence of users in information produced, it is necessary to monitor the quality of indicators, periodically review the consistency of the time series, and regularly disseminate information. (p. 13).1

Finally, a three stepwise methodology should be follow in order to achieve the goal of creating an initial set of indicators for the observatory (see Figure 1).

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It should be noted that in 2013 the WHO published the “Handbook on health inequality monitoring: with a special focus on low- and middle-income countries” (available at: http://apps.who.int/iris/bitstream/10665/85345/1/9789241548632_eng.pdf?ua=1). The handbook derives from previous experiences of the WHO joint work with health ministries of LMIC for developing competencies in health inequality monitoring. It should be mentioned that the handbook not only emphasizes on the need for monitoring health inequities in LMIC, but also presents a five step methodology (namely: 1) identify relevant health indicators; 2) obtain data about the indicators; 3) analyse the data; 4) report the results; and 5) implement changes) that aim to the improvement of policies on health inequities. The data used for the handbook is retrieved and published in the WHO’s Global Health Observatory: Health Equity Monitor (http://www.who.int/gho/health_equity/en/).

Before describing each of the steps of the methodology it is important to mention the role of RIPSAs whose experience was the basis for the development of the BOHI, and can be considered as the kind of initiative required to build observatories on health inequities elsewhere. What follows is a summary of how RIPSAs was created.

2. Interagency Network for Health Information (RIPSAs)

2.1 RIPSAs: an intersectoral and cooperative initiative

The difficulty in obtaining basic data for the development of indicators for the analysis on living conditions and their trends at a national level became part of the institutional concerns of Brazil’s Ministry of Health (BMH) and the Pan American Health Organization (PAHO). Thus, these two institutions formed a working group for the development of Integrated Information Network for Health in Brazil (RIPSAs) in 1995, whose aim was to develop a common institutional ground advocated to the construction of standardized indicators with national coverage, using a methodology agreed upon by various institutions.
The project was based on the feasibility of partnerships between diverse organizations, such as those working on technical segments of data production and several national scientific communities engaged in the analysis and dissemination of data, with the common goal to systematize the most useful information for the understanding of the Brazilian health situation and its trends. RIPSA presupposes consensus on concepts, methods and criteria for use of databases in order to subsidize the processes of formulation and evaluation of policies and actions interest of public authorities, managers, collegiate bodies and social control of the Brazilian Unified Health System (SUS)\(^2\) entities technical- scientific and international organizations.

The conceived cooperation strategy of RIPSA was focused on the representation and intersectoral participation of the main structures of the BMH and PAHO, along with key institutions of information on Health in Brazil such as the Brazilian Institute of Geography and Statistics (IBGE); the Brazilian Association of Collective Health (ABRASCO), the University of Sao Paulo School of Public Health, the Institute for Applied Economic Research (IPEA) and the Sao Paolo’s System of Data Analysis (SEADE), among many others.

The coordination of RIPSA is leaded by the BMH, with the support of a Technical Secretariat whose main task is to develop, propose and monitor the planning of RIPSA’s products and procedures. The Secretariat includes representatives from the above mentioned institutions and they gathered twice a year in a forum (Interagency workshop (OTI)).

OTI is responsible of the creation of the Interdisciplinary Thematic Committees (CTI) to further examine issues related to RIPSA’s Network. Their composition depends on the topic to be analyzed and may include interinstitutional representatives and experts. The committees have a mandate to examine methodological and operational issues relating to relevant information in order to: assess the consistency, uses and limitations of the indicators; clarify and establish consensus on concepts and methods of use data; facilitate the procedures for data compatibility and coordination between the agencies involved, including how to obtain the basic data; and recommend literature to support the production of information.

Some of the analyzed topics of the committees were:

- Training of the information system personnel
- Harmonizing systems and databases
- Indicators of inequality in health
- Analysis of spatial health data
- Information for management of the National Health Plan
- Population-based information
- Information on about accidents and violence

• Information about chronic and degenerative diseases
• Infant, perinatal and maternal mortality
• Standardization of clinical records
• Health status
• Health of the elderly
• Health and environment
• Health care insurance and employment
• Food and Nutrition Surveillance

Currently, according to RIPSA’s website (http://www.ripsa.org.br), its objectives are:

• to establish the basis of essential and consistent information for the analysis of health conditions in the country, easily accessible by multiple users and built by interinstitutional working process;
• to coordinate the participation of institutions that contribute to the production, review and analysis of data and indicators relating to health conditions;
• to implement support mechanisms for the continuous improvement of the production of data and information;
• to promote exchanges with other specialized subsystems of public administration;
• to contribute to the study of aspects of recognized importance for understanding the Brazilian health framework; and
• to induce mechanisms promoting the use of essential information to guide decision-making processes within the SUS.

2.2 The strengthening of Brazil’s information systems under RIPSA initiative and output products

The RIPSA initiative helped the BMH to improve the national information systems for births, deaths, disease notification, hospital care, outpatient and basic care, public health budget and others. It also promoted research activities on related topics, to such information systems, that were not systematically studied prior to RIPSA initiative. Other sources of information that were strengthened under RIPSA initiative were the censuses and population-based surveys of the IBGE because of its relevance to health topics covering demographic and socioeconomic aspects. The same applied to studies and analysis developed from the IPEA, for their focus on public policy efficiency. Finally, RIPSA initiative made extensive use of resources found at large databases of scientific and technical information accessible in the Virtual Health Library (VHL), supported by the Latin American and Caribbean Center Information in Health Sciences (BIREME).

RIPSA’s products resulted from a collective process of construction, where the partner institutions contributed with their professional, technical, and scientific expertise. The mechanisms of joint work were operated with resources defined by BMH and PAHO and this catalyzed other relevant national and international initiatives that contributed to the on-going processes of joint work. Each institution carried out specific activities whose costs and outputs were defined on an integrated action plan.
One of the most important products developed during the RIPSÁ era is the Basic Data and Indicators for Health – (IDB) (http://www.ripsa.org.br/php/level.php?lang=es&component=68). Its development began in 1998 by a working group which selected an array of indicators on health status and socioeconomic aspects of Brazil. Each indicator was described by: name, definition, calculation method, categories of disaggregation, and data sources. Even today, IDB is a tool of great value, since it is annually reviewed and published on the web.

For each indicator RIPSÁ defined the following categories of disaggregation:

- geographical (from Major Regions to state and metropolitan areas, down to the municipal level where applicable)
- age distribution (required to meet all of the indicators, as specified for each of them)
- sex
- area of residence (urban or rural), when applicable and available.
- time period of indicator (year or five years)
- education (considering the number of years of schooling as a proxy for social status)

RIPSÁ began to publish in brochures and Internet (http://www.datasus.gov.br/idb) indicators and basic data for health in Brazil, distributed in six thematic subsets: demographic, socioeconomic, mortality, morbidity and risk factors, resources and coverage. The electronic database of indicators, including the raw data used, is provided with easy access to users. IDB maintains time series of indicators dating back to the 1990s, according to data availability.

The construction of the indicators set for the BOHI was based on the experience accumulated in the development of RIPSÁ and in accordance with its recommendations. BOHI made an extensive use of IDB as a repository of existing indicators. It can be inferred that the creation of RIPSÁ was a predecessor of the BOHI, and this experience shows how important is to have an empirical background on information system strengthening and interinstitutional joint work as a prerequisite for the development of any observatory on health inequities.

3. Mapping sources and indicators availability

The degree of complexity in the construction of indicators greatly varies, depending on the characteristics of each indicator. The formula for its calculation can be anything from a simple ratio to a sophisticated rate. However, almost all of the indicators of interest to the BOHI have simple formulas. What makes the calculation complex is the need to combine data from different sources that may not be compatible because of its periodicity of publication, disaggregation, concepts and definitions, etc. Also, the growing amount of data it is collected, processed and organized under different logics. Information is distributed in several databases, and it tends to be fragmented and vertically structured. This hinders the use of information produced by the various systems in the construction of the indicators. For this reason, there is a need for diverse committees of experts working on data generation and utilization that can also carry out an initial mapping of available data sources.
3.1 Mapping of data sources

Brazil has a long tradition in the production of national statistics. The first population census dates back to the last quarter of the nineteenth century and it has been replicated ever since on a regular basis. Also, a series of economic censuses (covering commerce, services and manufacturing) started in the 1940’s and were repeated every five years, while annual sample surveys updated that can generate long run tendencies. Periodically, several surveys are made available, focusing on some specific social, demographic or economic topics.

Most information on Health in Brazil is under the administration of two information systems. Firstly, information is linked to the National Statistic System (Sistema Nacional de Estatística - SEN), which is coordinated by IBGE, with the participation of third party data producers. Secondly, the information collected and disseminated by the SUS that is intended to adequately respond to the health promotion, protection and recovering tasks, as well as to the administration and operation of the corresponding services.

The information linked to the SEN mainly comes from surveys (household, economical or sectoral surveys) and most of them are produced by IBGE, which is also responsible for the Brazilian Demographic Census. The Ministry of Health sponsors other surveys, carried out by IBGE or other institutions.

IBGE produces:

- Demographic Census: performs a thorough data collection of all households nationwide. Since the demographic census only takes place every ten years, other intercensal estimates are made, fulfilling the needs for data and population estimates.
- National Sample Household Survey - PNAD: the main intercensal survey, which annually produces data on demographic and socioeconomic characteristics of the population and, in some years, has special supplements, focusing on specific sectors, such as nutrition, education, internet access and health. The health supplement is applied every five years, and collects data about access, utilization, health conditions and risk factors.

Other IBGE surveys were used for the calculation of indicators:

- Survey of Health Facilities - AMS
- Consumer Expenditure Survey - POF
- National Demography and Health Survey - PNDS
- National Survey on Health and Nutrition - PNSN
- Monthly Employment Survey - PME
- National Survey of School Health - PeNSE

The main national information systems specific to the health area are operated under the management bodies of the Ministry of Health, particularly the Secretariat of Health Care (SAS) and the Secretariat of Health Surveillance (SVS). The created data is stored in databases that are maintained and disseminated by the Department of Informatics of SUS (Datasus).
The chosen systems and databases selected for their importance in the construction of indicators for analyzing health inequalities in Brazil and the BOHI are:

- Information System on Compulsory Notification of Diseases - SINAN (Sistema de Informação de Agravos de Notificação)
- Information system on live births - SINASC (Sistema de Informações de Nascidos Vivos)
- Mortality Information System - SIM (Sistema de Informações sobre Mortalidade)
- Hospital Information System - SIH/SUS (Sistema de Informações Hospitalares do SUS)
- Ambulatory Care Information System - SIA/SUS (Sistema de Informações Ambulatoriais do SUS)
- National Directory of Health Care Establishments - CNES (Cadastro Nacional de Estabelecimentos de Saúde)

The Information System of Beneficiaries, driven by Supplementary Health National Agency (ANS), was also considered because of its information as the regulator agency of private health insurance plans in Brazil. Also Administrative records were used and obtained from information systems developed to perform operational activities of the institutions, record health events or constitute national registries.

3.2 Selection of proxy variables of social stratification

One of the most important issues that arose when mapping resources for the BOHI was the comparability of indicators. For this purpose all the available documentation, data description, survey methodologies and the existing forms of dissemination for this data, were carefully reviewed. Under this review of sources, one crucial step for the selection of indicators was the definition of proxy variables of social stratification. For Brazil case, the income, as one of the most important proxy variable of social stratification because of its capability of indicating inequities, was not available in all of the reviewed sources. To overcome this difficulty, it was necessary to find another proxy variable that could be used when the income was not available.

In Brazil, in spite of recent progress in education, there is a stock of low-grade instruction adults that will most probably remain in this situation. This stock only decreases with the renewal of the adult population, (when the current better educated young age groups of population enter into adulthood). Household surveys show a strong relationship between educational level and household income per capita. The variable of “years of schooling” is easily accessible, even in the administrative record systems. Therefore it was decided that the BOHI would use years of schooling as a proxy for income, and the results showed a high degree of consistency. Moreover, this variable showed also consistency when was related to health inequities, such as access to information, healthy habits, access to prevention and others.
This experience shows that, arguably, the most crucial aspect to consider before and during the development of an observatory on health inequities is to make an accurate selection of proxy variables of social stratification that enable to build indicators on health inequities and the analyses that are derived from.

3.3 **Challenges found during mapping of available sources and indicators: the persistence of fragmentation and non-compatibility**

The great amount of data available and produced by Brazil’s information systems proved to be a challenge when the selection of consistent and reliable sources for indicators in health inequity for the BOHI had to be made.

As the information from the systems is produced by different operational areas of the institutions, its availability is also distributed in several databases. This situation causes a fragmented access to data information. Also, the data is collected, processed and organized under different logics, as a result of the segmented activity of the institutions working in the health sector. This, in turn, hampers the use of information for the construction of indicators. It can be said the fragmentation of the information systems is a reflection of the health system itself. But not only the information systems under the management of the Ministry of Health is affected by the fragmentation (and duplication) of information.

One solution for tackling fragmentation issues is the search for joint designs of surveys and instruments that assure compatibility in produced data across different health sectors and administrative units. For instance the Health Appendix of the PNAD and the AMS, both resulted from a partnership between IBGE and the Health Ministry. However, even in this kind of partnerships a more advanced integration will always be needed and implemented, and this is still challenging, for example: a need for more articulated and complementary sample designs of different sources; the possibility of extending data representativeness to smaller geographic areas (municipalities); and search for comparable and complementary design of administrative records and survey data.

Another example of the difficulty in articulating Administrative Records of different sources is the information on births and deceases. Except for some isolated initiatives, Brazil lacks a permanent, nationwide research agenda concerning the articulation of the Civil Register, under IBGE’s responsibility, with the Mortality and Live Birth Information Systems, under SUS’s responsibility. This raises important difficulties in overcoming existing problems. For instance, supposedly universal administrative records, such as those on births and deceases, still have unsatisfactory coverage in some regions of the country, both for the Civil Register and the Mortality and Live Births Systems. Similarly, information about hospitalization covers only those made by the National Health System, leaving aside those financed by private health plans or insurances, or paid directly by the patient. Information from the ANS systems and from the AMS is not enough to fill this gap.

**4. Definition of a core set of indicators**

As mentioned before, the definition of a core set of indicators on health inequities depends heavily on the availability of data sources. But it also depends on the priority
and needs in health inequities that are to be addressed and expressed through indicators. For a set of indicators, quality attributes are important such as integrity or completeness (complete data) and internal consistency (values consistent and not contradictory). The quality and comparability of indicators will be a consequence of the systematic application of operational definitions and standardized procedures for measuring and calculating. These are tasks to be developed by groups of experts, such as the ones working in RIPSAs’s committees.

As part of the design of the BOHI, an extensive list of possible and relevant indicators to monitor trends of health inequities and their determinants in Brazil was made. Several of the indicators were selected from the IDB RIPSAs as they were related to the social determinants of health (SDH). Then a review was made on the available documentation about the systems that provides the data to calculate the indicators: data description, survey methodologies and format of dissemination. Then, the core set of indicators was formed and grouped into three categories: general context and determinants of health; health status indicators; and health care indicators (Table 1).

### TABLE 1

#### Thematic groups of indicators for health inequities in Brazil

<table>
<thead>
<tr>
<th>GROUPS OF INDICATORS</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General context and determinants of health</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Demographic</td>
<td>Proportion of elderly in the population by years of schooling and region of residence</td>
</tr>
<tr>
<td>1.2 Socioeconomic</td>
<td>Gross national product per capita by region</td>
</tr>
<tr>
<td>1.3 Living conditions</td>
<td>Proportion of population served by sewage by years of schooling and region of residence</td>
</tr>
<tr>
<td>1.4 Lifestyles</td>
<td>Prevalence of tobacco use by years of schooling and region of residence</td>
</tr>
<tr>
<td><strong>2. Health status indicators</strong></td>
<td></td>
</tr>
<tr>
<td>2.1 Mortality and life expectancy</td>
<td>Infant mortality rate by years of schooling and region of residence</td>
</tr>
<tr>
<td>2.2 Mortality causes</td>
<td>Diabetes Mellitus mortality rate by years of schooling and region of residence (15 years old and over)</td>
</tr>
<tr>
<td>2.3 Morbidity</td>
<td>Diabetes Mellitus prevalence in population 35 years old and over, by years of schooling and region of residence</td>
</tr>
<tr>
<td><strong>3. Health care indicators</strong></td>
<td></td>
</tr>
<tr>
<td>3.1 Resources</td>
<td>Physicians per 1,000 people by region</td>
</tr>
<tr>
<td>3.2 Preventive care</td>
<td>Percentage distribution of women aged 59-69 by date of last mammography examination, by years of schooling and region of residence</td>
</tr>
<tr>
<td>3.3 Ambulatory care</td>
<td>Population aged 14 and over that had a medical consultation in last 12 months by years of schooling and region of residence</td>
</tr>
<tr>
<td>3.4 Hospital care</td>
<td>Population aged 14 and over that had a hospitalization in last 12 months by years of schooling and region of residence</td>
</tr>
</tbody>
</table>

It is important that the chosen indicators can be categorized according to different variables, so different ways of data presentation (such as cross-tabulation or graph depiction of gradients) is possible. This is a necessary condition for the making of relevant analyses on health inequities. Also, the possibility to categorize an indicator is dependent on the availability of information in the original data sources. As for the Brazilian Observatory, the basic set of indicators uses the following basic categorization:

- Region or macro-region: Brazil is a federation of 26 States and a Federal District, which can grouped into five geographical regions. Although the indicators refer to aggregated States, some studies indicate that the Brazilian regions exhibit a large degree of internal homogeneity and there are big differences among regions (Nunes, Silva Santos, Barradas Barata, & Magalhães Vianna, 2001). Table 2 shows the area and population of each region to the year 2013, in order to illustrate the size of this category.

**TABLE 2**
*Regions of Brazil*  
*Area and population 2013*

<table>
<thead>
<tr>
<th>REGION</th>
<th>AREA (KM²)</th>
<th>POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>North (7 states)</td>
<td>3.853.677</td>
<td>17.013.560</td>
</tr>
<tr>
<td>Northeast (9 states)</td>
<td>1.554.292</td>
<td>55.794.694</td>
</tr>
<tr>
<td>Southeast (4 states)</td>
<td>924.621</td>
<td>84.465.579</td>
</tr>
<tr>
<td>South (3 states)</td>
<td>576.774</td>
<td>28.795.762</td>
</tr>
<tr>
<td>Central-West (3 states and the Federal District)</td>
<td>1.606.404</td>
<td>14.993.194</td>
</tr>
<tr>
<td>Brazil</td>
<td>8.515.767</td>
<td>201.062.789</td>
</tr>
</tbody>
</table>

Source: IBGE ([www.ibge.gov.br](http://www.ibge.gov.br))

- Metropolitan region: It includes nine major urban conglomerations of the country: Belém (North), Fortaleza, Recife, Salvador (Northeast), Belo Horizonte, Rio de Janeiro, São Paulo (Southeast), Curitiba and Porto Alegre (South). The main metropolitan region of the Central-West Region is Brasília, but it was not used in this project because it spreads through two States and the Federal District, and the main surveys do not collect data for this part.

- Age: To facilitate comparison and analysis, the population for some indicators was aggregated into age groups. In other situations, there are indicators limited to a specific age group, for example, the specific mortality rate for diabetes mellitus in the population aged 15 and over, or the proportion of overweight in adults. The age groups are not always the same, varying according the characteristics of the indicator. When the educational level is used, groups under 15 years old are generally not considered, since the fundamental cycle of education is not finished at this point.

- Sex: This variable is useful as a proxy for the observation of the inequalities and inequities by gender.
• Education: This variable is found to relate with several indicators such as the prevalence of overweight in adults, the proportion of the population served by water, sewage and garbage collection and mortality from specific diseases. Although, depending on the source, there are variations, years of schooling usually appears as follows: functional illiteracy (0-3 years of study), elementary education (4-7 years of study); incomplete secondary education (8-10 years of schooling), completed high school (11 years of study).

• Income: Few surveys include income of individuals or households as variables, such as the Household Budget Survey (POF) or the PNAD. Even within the Census, this variable has limitations. In the administrative record systems, this variable is typically missing, because it cannot be easily collected. Indicators that include this variable are presented by ranges and relate to the minimum wage: from 0.5 to 1, from 1 to 2; and 2 or more minimum wages\(^3\).

The core set of indicators were assigned according to thematic groups (Table 1) and then were placed in a matrix which contained a brief description of the data sources of the variables, the method of calculation, available categories, and the frequency and periods available for each indicator.

It is worth mention that the experience accumulated in building indicators and constant criticism on the used sources showed that it was indispensable to specify the interpretation limitations of each indicator in relation to their concept.

The matrix allowed comprehensive view of the availability of sources and the consistency as well as completeness of the categories. In addition to the selection of indicators, the availability of time series was considered. At least three time periods, preferably in the last decade (2000-2010), were needed to allow trend analysis.

The complete list of selected indicators for the Brazilian Observatory on Health Inequities is presented in the Appendix I.

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\(^3\) The minimum wage, set by the Brazilian Federal Government, is the lowest amount of wage that employers may legally pay employees. According to the Constitution of 1988, the minimum wage should meet the basic living needs of the worker and his family with food, shelter, education, health, leisure, clothing, hygiene, transportation and social security. Depending on the country, the poverty line can be defined as the income needed to purchase a basket or a certain amount of calories or a percentile relative to average income. However, in Brazil, the poverty line is normally defined as an amount of the per capita household income, typically half of the minimum wage; the extreme poverty is normally defined as 0.25 minimum wage as per capita household income.
5. Construction of selected indicators

One of the most useful features of a matrix is to provide a comprehensive overview of all the indicators to be used in an observatory, along with specific information of each indicator. The Brazilian Observatory on Health Inequities matrix enabled the creation of three types of documents with relevant information, easily and openly accessible to all audiences. They constitute the most important information the Observatory can provide:

- Indicator attributes sheet - Each sheet contains the detailed information for each indicator⁴:
  - Indicator name.
  - Description: with the conceptualization of the indicator.
  - Source: the systems or surveys that produced the data used.
  - Calculation Method: the formula used to calculate the indicator.
  - Categorization: the variable(s) which the indicator can be used with or combined to (sex, region, years of schooling, etc.)
  - Periodicity
  - Available time periods.
  - Notes: with notes and restrictions relating to the indicator.
  - Preparation: author and date.
  - How to cite: how the reference should be made by those who use the data.

- Tables - For each indicator, worksheets with the calculated values were created, according to the categories defined and available periods. Each table also included the sources and some foot notes.

- Graphs - From the data of each table, we selected some graphs for easy viewing of the trends shown by the indicator.

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⁴ It is important to mention that even though the matrix included a definition for the utilization of indicator, as a mean to express the use it could have by audiences and final users, it was not included in the Observatory because only a subset of indicators used (mostly the ones from RIPS) had such information available. For all available indicator attribute sheets please visit: http://dssbr.org/site/2012/03/lista-de-indicadores-todos/#a-Obs-Ind-DSS
FIGURE 2
Example of a downloaded graph from the Brazilian Observatory on Health Inequities
Crude death rate per year by region - Brazil (2000-2008)


The set of indicators, its attributes sheets, tables and graphs were placed since 2010 on the Web at Observatory on Health Inequities in Portal on Social Determinants of Health Brazil (http://dssbr.org/site/) in pdf format (Adobe) and Excel format (xlsx).

Currently, the indicators are aggregated in three geographic areas:

- Brazil and Macoregions Indicators - contains information for the country as a whole and for the five regions of Brazil: Northern, Northeast, Southeast, South and Midwest. However, depending on the source, the data are available only for the capitals of the states that constitute the region.

- Indicators for Metropolitan Areas - some state capitals comprise also metropolitan areas, consisting of a central municipality (the capital) and the surrounding cities that are under its influence. The tables present values for the following metropolitan areas: Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo, Curitiba and Porto Alegre.

- Indicators for Northeast Region - Focus on the Northeast region: the region as a whole, which contains nine states and the metropolitan areas of Fortaleza, Recife and Salvador.

The indicators must be updated in a regular basis and constantly reviewed. New indicators may appear, enriching the observatory, making available a growing number of indicators of interest for the analysis of social determinants of health.
6. Final considerations

Although the Brazilian experience on building indicators on health inequities should not be taken as canonical procedure for the creation of another observatories, there are some punctual aspects that should be taken in account when planning and carrying out similar initiatives:

Before planning:

- National health priorities should always be the primary concern and driver for the creation of an observatory in health inequities. As Brazil’s case shows, it is of utmost importance to search and demand for information systems that can provide adequate data for the creation of indicators that reflect the health and social reality of the country.
- Global initiatives specifically addressed for the strengthening of information systems and monitoring health inequities, along with those more broadly defined by international agencies, such as World Health Organization’s “Health in all policies” and some open access resources such as the “Global Health Observatory” and the “Handbook on health inequality monitoring: with a special focus on low- and middle-income countries” represent the best set of resources and windows of opportunity to create international and multisectoral synergies, such as RIPA. These initiatives can lead to new local large-scale enterprises, like the BOHI.
- It is necessary to define several groups of experts in health and health related issues, such as social welfare/security, social development, socioeconomic conditions and population. It is advisable to form committees where these groups will work at defining the main topics to be approached by indicators.

During implementation:

- While making the mapping and selection of data sources for indicators, it is crucial to keep in mind –and even to expect– the need of technical solutions for the fragmentation of information systems and their means for obtaining relevant data.
- One of the most important issues to be defined at earlier stages of mapping data sources is the selection of the most consistent proxy variable(s) of social stratification in order to enable analysis of health inequities. As Brazil’s case shows, the variable “years of schooling”, as proxy of both income and inequalities, was the most consistent variable for making analysis on Brazil’s health inequities. Also it is one of the most frequently included variables across all information systems.
- Analysis on health inequities that are based on indicators tend to be more relevant when the geographic aggregation of data is defined from the beginning. In Brazil, health inequities indicators for the North East region show a high degree of homogeneity, whereas they show high heterogeneity when compared to other regions.
After disseminating:

- It must be considered that the construction of an observatory on health inequities is an ongoing process, which needs permanent update and review, and also the research and definition of new indicators. For the existing indicators of the Brazilian Observatory on Health Inequities, more detailed information may be needed to allow for deeper analysis, both geographic and social.
- While the Brazilian Observatory on Health Inequities primarily addresses an audience composed of policy makers, health service managers and researchers responsible for health and other social protection policies, it is also available to the general public and it should continue to be so.
- An observatory should render information necessary to describe the trends and current situation of health and its social determinants, showing the impact of public policies on health inequities.
- As an example of a good practice from BOHI, in order to engage further discussion with the observatory’s target audience the observatory can assign specific web based sections for discussion forums, and disseminate analysis that derive from the data produced and stored in its virtual location.

Finally, it is worth mentioning that an observatory can also encourage the dissemination of experiences on the SDH among other countries with similar socioeconomic conditions. Recently, RIPSA organized a series of meetings with member states from the Southern Common Market (Mercosur) with the main goal of constructing a common set of indicators on SDH, to support the monitoring of the region. However, if the information within a country already has significant conceptual differences, it is even more complex to reconcile data from different countries. Thus, a comparative study between Brazil, Argentina, Paraguay, Uruguay and Venezuela is being planned, and should be carried out in 2014.

References

Cited references


Websites


Other useful resources


Appendix I  
Brazilian Observatory on Health Inequities  
Core set of indicators  

1. Social determinants of health

1.1 Demographic Indicators

- Resident Population
- Sex ratio
- Proportion of elderly in the population
- Index of aging population
- Dependency rate
- Total fertility rate

1.2 Socioeconomic indicators

- Average household income \textit{per capita}
- Gross Domestic Product \textit{per capita}
- Proportion of population with less than half the minimum wage as \textit{per capita} household income (Population below the poverty line)
- Proportion of population with less than a quarter of the minimum wage as \textit{per capita} household income (Population below the extreme poverty line)
- Proportion of children in families with less than half the minimum wage as \textit{per capita} household income – Children below the poverty line]
- Proportion of children in families with less than a quarter of the minimum wage as \textit{per capita} household income (Children below the extreme poverty line)
- Income inequality
- Gini coefficient for income distribution
- Unemployment Rate (16 years and over)
- Child labor rate (10-14 years)
- Illiteracy rate (15 years and over)
- Proportional distribution of the population (15 years or more) by educational level
- Percentage distribution of population( 18-24 years) by educational level

1.3 Indicators of living conditions

- Prevalence rate of overweight in adults
- Prevalence rate of overweight for age in children under 5 years
Prevalence rate of overweight in the population 5 years and over
Prevalence rate of obesity in the population of 5 years and over
Prevalence rate of low weight in children under 5 years of age
Prevalence rate of overweight in the population 5 years and over
Prevalence rate of height deficit in children under 5 years of age
Prevalence rate of height deficit in children 5 to 9 years
Proportion of population served by water
Proportion of population served by sewage
Proportion of population served by waste collection

1.4 Indicators related to lifestyle

Prevalence rate of inactive individuals
Prevalence rate of smokers
Prevalence rate recommended intake of fruits and vegetables

2. Health Situation

2.1 Indicators of mortality and life expectancy

Crude death rate
Life expectancy at birth
Life expectancy at age 60
Infant mortality rate

2.2 Mortality rates per causes

Maternal mortality rate
Specific mortality rate for acute diarrhea in children under 5 years of age
Specific mortality rate for acute respiratory infections in children under 5 years of age
Specific mortality rate for AIDS in the population 15 years and over
Specific mortality rate for infectious diseases in the population 15 years and over
Specific mortality rate for ischemic heart disease in the 15 years and over population
Specific mortality rate for cerebrovascular diseases in the 15 years and over population
Specific mortality rate for diabetes mellitus in the 15 years and over population
Specific mortality rate for malignant neoplasms in the 15 years and over population
Specific mortality rate for transport injuries in the 15 years and over population
Specific mortality rate for homicide in the 15 years and over population
Proportion of deaths for ill-defined causes in the 15 years and over population
Specific mortality rate for acute respiratory infections in the 60 years and over population

2.3 Indicators of morbidity

Incidence rate of AIDS for the 15 years and over population
Prevalence rate of diabetes mellitus in the 35 years and over population
Prevalence rate of hypertension in the 18 years and over population

3. Health care

3.1 Indicators of resources

Coverage of health plans in the 14 years and over population
Per capita consumption of health goods and services
Proportion of public expenditure actions and public health services related to GNP
Public expenditure actions and public health services per capita
Proportion of household income spent on health
Number of physicians per 1,000 inhabitants
Number of nurses per hospital bed
Number of hospital beds per 1,000 inhabitants
Number of imaging equipment per 100,000 inhabitants
3.2 Indicators for preventive care

- Distribution of women aged 25 years and over by elapsed time since the last preventive cervical test
- Distribution of women aged 50 to 69 by elapsed time since the last mammography
- Proportion of children with complete basic vaccination schedule in the target age
- Proportion of live births with 7 or more pre-natal consultations

3.3 Indicators of ambulatory care

- Proportion of 14 years and over population who consulted a doctor within the past 12 months
- Distribution of population 14 years and over by the elapsed time since the last visit to the dentist

3.4 Indicators of hospital care

- Hospitalization rate of the population 14 years and over
- Proportion of hospital births