

Research in Public Health

Technical Papers

Multicenter Study on
Health Inequities

22

Protocol of the Multicenter Study

Inequities in Health Status, Access
and Expenditure:

Using Secondary Data to
Inform Policy-Making



Research Coordination
Health and Human Development Division

Pan American Health Organization
525 23rd Street, N.W.
Washington, D.C. 20037-2895, USA

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These technical papers are conceived as a way of disseminating in an expeditious and timely manner research results, and are not publications scientifically evaluated or professionally edited.

The **Multicenter Project on Inequities in Health Status, Access and Expenditure on Health Care** will use secondary data to describe the levels and the tendencies in health inequalities in five countries (Bolivia, Brazil, Colombia, Nicaragua and Peru) with the purpose of making information available to decision makers and community leaders in the advocacy for and design of interventions to improve health equity in the Region. The project will also develop models for specified health indicators to improve the understanding of the relationships of health inequalities with their socioeconomic determinants.

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Research Coordination/Graphic Design Unit

Cover design and composition
Clara I. Rodriguez

Document layout
Suzanna Stephens, M.A.

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Protocol of the Multicenter Study Inequities in Health Status, Access and Expenditure: Using Secondary Data to Inform Policy-Making¹

INTRODUCTION

Considering the importance of health inequalities in the Region, in 1998 the Director of the Division of Health and Human Development of the Pan American Health Organization (PAHO/HDP) created an interprogrammatic group to propose research activities in this area. The group came up with a plan for a multicenter project that was submitted to the Internal Advisory Committee on Health Research (IACHR) for consideration. Said plan contemplated the analysis of secondary data sources as well as carrying out a household survey in different countries of the Region, with the objective of gathering primary data. The IACHR, recognizing the importance of the theme and the seriousness of the proposal but concerned about its feasibility, suggested that the interprogrammatic group consider preparing an alternative proposal covering only the part involving secondary data analysis. The members of the group took up the IACHR's suggestion and prepared this proposal, which was selected for funding following its presentation to the IACHR in 1999. In the final section entitled "Acknowledgments," a list is presented of all those persons who have contributed with their suggestions to the preparation of the initial proposal and to the part related to secondary data analysis.

1. JUSTIFICATION

The Universal Declaration of Human Rights¹ states that

“Everyone has the right to a standard of living adequate for the *health* and well-being of himself and of his family, including food, clothing, housing and *medical care* and necessary social services ...”

¹ This protocol is for the multicenter study of the same name coordinated by the Public Policies and Health Program (HDD), Division of Health and Human Development (HDP) of the Pan American Health Organization / World Health Organization (PAHO/WHO). The technical coordinator of the project has been designated as contact person: Dr. Norberto Dachs, Public Policies and Health Program, Division of Health and Human Development (HDP/HDD), Pan American Health Organization / World Health Organization (PAHO/WHO) in its Headquarters at the Pan American Sanitary Bureau, 525 23rd Street, N.W., Washington, DC, 20037-2895, USA. Phone (+202) 974-3223, fax (+202) 974-3675, e-mail dachsnor@paho.org.

It also states that

“Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.”

However, these ideals are still far from being achieved in the Americas. The Declaration is more related to the concept of discrimination than with equity in itself but gives us a starting point to mark an increase in the discourse about the subjects related to social justice. There are at least four main reasons why research on health inequities are important in our Region.

i) Inequity Is the Most Important Health Problem in the Americas

According to the 1998 PAHO publication *Leading Pan-American Health*², “inequity continues to be the leading health problem in the Americas.” This is a reflection of the major social inequalities present in the Region, made evident, for example, by the fact that Brazil, Guatemala and Paraguay rank 2nd–4th in the world in terms of income concentration³.

Research on inequities has been part of the WHO and PAHO agendas for many years. Since 1991, there has been interest within the Organization in promoting a systematic assessment of inequities in health in the Region⁴. In 1997, the Division of Health and Human Development commissioned leading researchers to carry out extensive literature reviews of the scientific production in this subject area in Latin America and the Caribbean⁵ and from the United States of America, Canada and Western Europe⁶, that have provided the background for the present proposal.

ii) The Literature on Health Inequities in the Americas is Limited

The scientific literature from developed countries is giving increasing importance to the study and understanding of the relations between living conditions and health, with a focus on inequities. A bibliographic database on this subject has now over four thousand items⁷, and concerns with equity have now reached the mainstream medical literature in the United States and Europe^{8/9/10}.

On the other hand, the literature is very scarce for those areas of the world where socioeconomic conditions present greater disparities, and in particular for Latin America. The comprehensive review by Almeida Filho lists 309 works, many of which are unpublished. He also notes a number of limitations of this literature:

- A large proportion of philosophical and theoretical considerations rather than results that can provide evidence for action.
- Studies addressing narrow age groups, with a particular lack of studies of adult health.
- Results that are often unreliable due to flaws in data quality, design or analysis.

This lack of information is particularly relevant for Latin America, where social inequalities and health inequities are so blatant. It also highlights the need to help develop local capacity for the analysis of inequities.

iii) Information for Decision-Making Is Urgently Needed for the Region

Decision-makers wishing to devise and implement interventions to reduce inequities do not have information that is relevant for their needs. Most of what is known about inequalities in health and health care and the consequent inequities is the result of research performed in developed industrialized countries of North America and Western Europe.

In a position paper about Poverty, Equity, and Health in the Developing World, D.R. Gwatkin of the World Bank states, “those concerned with equity (and poverty) in health are currently in a poor position to design and implement activities that can accomplish their objectives.”¹¹ He mentions three reasons for this, the second one being “deficiency of basic information about health conditions, concerns and practices, that prevail among the poor, either in absolute terms or relative to other socioeconomic groups.” Moreover, there is scarce knowledge of the relationships between economic inequalities and health inequities in Latin America and the Caribbean. All the evidence that exists seems to indicate that some of the richer countries in the Region have the greatest inequalities in health status as well as in the access to health care.

Of particular relevance is the lack of data from developing countries on the impact of health interventions on equity. A recent paper suggested that some interventions may in fact increase inequity, at least for a few years after initial implementation¹². Policies must be developed to ensure that new medical technologies will help reduce rather than exacerbate existing levels of inequity. Data originating from the present project will help understand how health interventions may affect equity over time.

iv) Existing Data Can Be Used to Fill In the Information Gap

Given the recognition by PAHO that inequities are the number one health issue in the Region, it is essential to help close this knowledge gap through high-quality, policy oriented research. The usual registration data (either vital statistics or public health surveillance) are not adequate to study many of the problems of interest, either because they do not include information on socioeconomic variables or due to problems with representativeness, coverage are and others. On the other hand, a number of different types of national household surveys have been carried out in the Region in the last couple of decades, and in many countries these are the only reliable source of information about the relationships between socioeconomic characteristics and health status, health care access and expenditures. However, the information provided by these surveys has been hardly used to study inequities in health in Latin America and the Caribbean.

In the present proposal, it is argued that existing household surveys, combined with data from national censuses, may provide an inexpensive and reliable source of data for analyses of the level, trends and determinants of health inequities in the Region.

v) How Can the Present Project Contribute to Improve Equity?

Although the evidence of poverty on health is indisputable the relationships between poverty and inequities in health and health care are much more complex. In some cases very poor countries or areas of the world have very small internal disparities in health whereas in some rich countries the inequalities are very large. A large number of studies have documented the differences between the poor and non poor in health outcomes, utilization of services and benefits received from government health services. However, much less is known about the levels of inequalities in health, the strategies for their reduction and elimination and the impact of previous policy decisions. Yet, it is clear that inequalities affect health in both the rich and the poor countries. This proposal therefore explores several challenges. First, it recognizes that there is a need to establish scientific and innovative ways of identifying inequalities at different levels of economic development. Second, the evolution and persistence of inequalities over time require continuous review of information and techniques for monitoring and measuring them. Third, while there is general agreement in principle of its importance, in practice inequities do not appear to be sufficiently high on the policy agenda, hence reliable data are needed to advocate changes in unfair and avoidable inequalities in health. Finally, the current health care reform movement may have important consequences on equity, and it is essential to have baseline data to document changes over time and to influence policy decisions.

There is a need in the Region to develop a comprehensive research project that addresses the need to understand better the relationships between the macro determinants of health (social, economic, gender, ethnical, etc.) and the inequalities at the local, national and regional levels. The present proposal will build upon other research initiatives on inequalities and inequities in health status and health care, among them the PAHO, World Bank and UNDP, Equilac project for Latin America and the Caribbean¹³, The PAHO-CARICOM project in the Caribbean¹⁴, WHO initiatives to study the problem worldwide¹⁵, USAID initiatives and the Rockefeller Foundation Global Health Equity Initiative¹⁶.

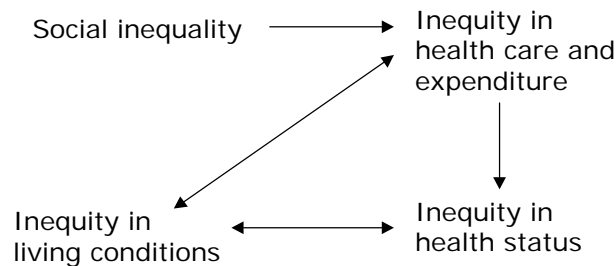
As a part of this greater effort, this proposal considers the exclusive use of secondary data from censuses and household surveys to further the knowledge about inequalities and the consequent inequities and to advance policy proposals on how to address them. Data from the same sources will be analyzed in different countries with a standardized analytical approach to ensure comparability between the results, and results will be widely disseminated not only to the scientific community but also to policy-makers and to the general public. The analytical approach to be used in this project includes some of the most advanced statistical methodologies presently available to study these types of data

2. CONCEPTUAL FRAMEWORK

In this proposal, a distinction is made between the terms 'inequality' and 'inequity'^{17, 18}. Inequality indicates systematic and relevant differences between individuals and social groups in a population, while inequity stands for inequalities that are not only unnecessary and avoidable but also unfair and unjust. The focus of the project will be on inequities. Equity means

that people’s needs, rather than their socioeconomic status (SES), guide the distribution of opportunities for well-being. Pursuing equity in health status and in health care means trying to reduce avoidable gaps in health status and health services between groups with different levels of social privilege.

Figure 1: Inter-Relationships between Social and Health Inequities



Although several comprehensive frameworks have been proposed to model the macro relationships between the social and economic context in a given society and the health status of its population,^{19, 20, 21} there is still a great need for the development of theoretical frameworks for the relationships between the macro socioeconomic environment, living conditions and health. Some of the existing frameworks have been useful to organize the discussion of possible determinants of health status and access to health care at the individual and household levels, for the study of relationships between macro economic and social policies, as well as for the detection of potentially important interventions to improve the health and welfare levels of the population in a given context. But they usually include factors that are very difficult to operationalize for statistical analysis. Since only secondary data are being considered, the framework that will be used here is inevitably limited by the available data.

Figure 1 represents a simplified framework of a complex web of determination. Social inequalities lead to inequities in living conditions as well as in health care (accessibility and quality) and in health expenditure, that in turn interact to cause health status inequities (see Figure 1). Throughout this document, the term ‘health inequities’ will be used to refer to inequities in health status, health care access and utilization, and health expenditure.

Without denying the importance of elaborate, comprehensive theoretical frameworks, in the present study specific conceptual models will be developed for guiding the analyses of each outcome, that include only those variables that are available in the data sets being used. These analytical models will be developed separately for each outcome, since their determinants are likely to vary. The models will respect the hierarchy by which socioeconomic factors represent the distal (or underlying) determinants of most health indicators²². The models will also take into account that the effect of socioeconomic factors is mediated through proximate determinants, including environmental, reproductive, behavioral and nutritional variables.

Due to the restrictions imposed by the exclusive use of secondary data access to health care and health needs will be considered here in very specific contexts and in very precise meanings for each analysis. One example is the need for adequate care associated with pregnancy and birth and the access to prenatal care and delivery attended by trained personnel or in an appropriate institutional setting.

Another important aspect that has been receiving growing attention in the literature is the importance of context in epidemiological analyses. Many conditions that influence health status and health care access and are not characteristics of the individuals, but of the physical, social and cultural environment where they live. These context²³ variables provide additional information to fill gaps in survey-based information, but foremost to bring in additional possibilities of studying the processes that determine the health status, care and expenditures. An excellent example of contextualization is the study of health status and income inequality^{24, 25, 26}. Other examples are land tenure patterns²⁷, percentage of population with basic unsatisfied needs in a certain area and others.

The plan for data analysis will take into consideration the concepts discussed above. Socioeconomic factors will be included in all analyses as the major underlying determinants of inequities in health. The interrelationships between health status, health care access and utilization, and health expenditures will be systematically explored. Different levels of geographical aggregation and sophisticated statistical approaches will be used to take contextual variables into account.

3. OBJECTIVES AND PURPOSE

The general objective of the present proposal is to use existing data from selected Latin American countries to describe levels and trends in health inequities and to understand their determinants, in order to make informed policy recommendations aimed at improving equity.

The specific objectives are the following:

- a) to document the existence of inequities in health status, health care (access, and utilization of health services) and out of pocket health expenditure, and to measure their magnitude;
- b) to describe time trends in health inequities;
- c) to assess levels of access and utilization according to specific needs for health care;
- d) to attempt to understand which socioeconomic factors are most strongly associated with inequities in health, at different levels of aggregation, identifying possible determinants and pathways;
- e) to develop methodological approaches for linking and analyzing different types of survey and census data.

The results will be disseminated and presented to government officials, politicians, NGOs and advocacy groups, and to the mass media to raise awareness and promote action on different policy alternatives for improving equity in health status, care and expenditure. The study will also provide inputs to the evaluation of the impact of policy changes on health inequities.

The results will also be useful to guide future research on the subject in Latin America, the Caribbean and other developing countries around the world. In addition to these objectives, the study may serve other purposes. The results obtained may be used to make recommendations

for future surveys on the types of socioeconomic and health-related variables required for the study of inequity, and to develop local capacity in the use of the methods used in this project.

4. DATA SOURCES AND ANALYTICAL APPROACH

Separate analyses will be carried out in five different Latin American countries, by local teams of investigators. Household survey and census data will be used in each country.

4.1 Household Surveys

The last decade has witnessed a sharp increase in the number and quality of household surveys carried out in Latin American and Caribbean countries, aimed at providing data necessary for the formulation of macro economic and social policies. Many of these were part of regional or global projects (MECOVI²⁸, LSMS²⁹), while others were national surveys³⁰. Many of these include modules on health status and/or access to health care as well as—in some cases—expenditures in health care. In addition, since the early eighties Demographic and Health Surveys (DHS)³¹ are being carried out in several countries in the Region. The original data for these surveys can be obtained either directly through the Internet or else from the national institutes of statistics. To understand and appreciate the importance and implications of this research proposal, it is necessary to describe the types of surveys, their contents and limitations.

The DHS collect information on fertility and family planning, maternal and child health, child survival, and other reproductive health topics. They include modules on the household, on women in reproductive age, and on the children born to these women. Health status outcomes and access to health services for specific conditions include incidence and/or prevalence of some diseases of infancy and childhood, mortality below five years of age (including neonatal, postneonatal and infant mortality), nutritional status of children, mother's nutritional status, access to prenatal and delivery care, breast-feeding, family planning and fertility. In some countries, additional modules were included to cover knowledge about AIDS and sexually transmitted diseases, human rabies, maternal mortality, cervical cancer screening, violence against women and other subjects. These surveys, however, did not include modules about household consumption and income (except for the Dominican Republic in 1998.) A few recent surveys have included modules with information on the husbands of the women in the sample.

Surveys included in the broad category of the Living Standards Measurement Surveys (LSMS) collect data on many dimensions of household well-being, including consumption, income, savings, employment, health, education, fertility, nutrition, housing and migration. Their limited health module includes questions on self-assessment of health status, access and utilization of different types of services, and expenditures in health care. These surveys have large modules to study the structure of household expenditures as well as to determine levels of consumption. In some cases, instead of consumption variables, the module includes questions to determine the household income.

Other national household surveys vary substantially from one country to another and even in the same country for different periods. The CASEN³² survey in Chile has modules for income and also for health, but the latter is very different from either that of LSMS or DHS. The Brazilian yearly survey PNAD³³ included modules on health in selected years. Mexico has now conducted three national health surveys and also has annual income and expenditure surveys.

From the information in these household surveys, it is possible to explore relationships between health status, care and expenditure, and socioeconomic variables such as dwelling structure, income, consumption, employment, occupation, educational levels, whenever these are present in the same survey. Unfortunately, DHS surveys do not usually include information on either income, household consumption or expenditures. In an effort to circumvent some of these difficulties and limitations a group of researches in the World Bank and at Macro International have created an index of household assets to be used in the DHS surveys.³⁴ This has made it possible to study infant mortality, nutritional status and other variables according to the distribution of assets in the household. The assumption is that this index keeps a close relationship with income and/or consumption in the household.

On the other hand, the LSMS surveys have in general a quite limited set of data on health status, but as mentioned above provide a large body of information on household economics.

Table 1 summarizes the types of variables available in each survey and in the censuses to investigate this association.

Table 1: Some of the Variables Related to Health Status, Health Care and Expenditure, and Household Economics in the LSMS and DHS Surveys

Variables	LSMS	DHS	Census
Health Status	<ul style="list-style-type: none"> • Self-assessment of health status • Child mortality • Days incapacitated to work 	<ul style="list-style-type: none"> • Fertility levels • Birth intervals • Breast-feeding • Child mortality • Child nutritional status • Diarrhea and ARI in children 	
Health Care Access and Utilization	<ul style="list-style-type: none"> • Consultations • Vaccinations • Prenatal care • Contraception use • Geographical access to health care • Health insurance 	<ul style="list-style-type: none"> • Prenatal and delivery care • Contraception knowledge and use • Vaccine coverages • Unmet family planning needs 	
Health Expenditure	Health care expenditure	No information	
Living Conditions And Socioeconomic Status	Very wide availability of socioeconomic variables	<ul style="list-style-type: none"> • Very limited set of variables • No information on income/consumption 	Dwelling conditions, sanitation, variables to compute unmet basic needs and others

The above discussion shows that neither type of survey is ideally suited to investigate inequities in health status, care and expenditure. Surveys must be combined with one another, or with external sources of information, to allow such investigation.

4.2 Census Data

In addition to the practical need of obtaining external data to that available from surveys, there are also theoretical advantages of including contextual variables, that have been discussed in section 2.

Since the households in the above-described surveys are identified down to the census tract level (or its equivalent) it is possible to associate with each unit of the sample in a given survey context variables at this level or above, obtained from national censuses. Censuses are ideal sources of such variables because—unlike sample surveys such as LSMS or DHS—they provide data on all households in the selected tract.

This allows the investigator to contextualize the study of determinants of inequalities and inequities in health status, care and expenditure.³⁵

4.3 Combining Different Data Sources

In the analyses of data from LSMS-type surveys, the large number of socioeconomic variables will be used to model and adjust the limited number of health related variables. To each record (either a household or an individual, depending on the response being considered) in the sample, contextual variables built with census data at the census tract level will be added. The same contextual variables will be added to woman's and child record in the DHS data.

It will not be possible to combine information directly for the LSMS and DHS surveys, since the census tracts sampled in each survey are unlikely to overlap. However, information from LSMS may be used to guide the analysis of DHS data, and vice-versa. For example, both surveys include common household variables. LSMS data will be analyzed to explore different combinations of the common household variables, in an attempt to construct indices of household socioeconomic status (SES) that may be used as proxies for household consumption and/or income. Such indices, if properly validated, may then be used in the analyses of DHS survey data in which income and/or consumption information is not available, and cross-tabulated with the wide range of health-related variables available on these data sets. Two types of SES indices will be investigated: the 'best' country-specific index and also indices that perform well across countries.

4.4 Choice of Countries

The choice of countries for the proposed analysis is limited by the availability of both DHS and LSMS in recent years. Table 2 shows the five Latin American countries for which both survey types are available.

Table 2: Latin American Countries with Both DHS and LSMS Surveys, Showing the Years in Which These Were Carried Out

Country	DHS Surveys	LSMS Surveys
Bolivia	1989, 1994, 1998	1995
Brazil	1986, 1991, 1996	1997
Colombia	1986, 1995	1998
Nicaragua	1998	1993
Peru	1982, 1992, 1996	1991, 1994, 1997

The analyses will therefore cover these five countries. Since Bolivia, Brazil and Peru each have three DHS surveys spread over 8–14 years, it will be possible to study time trends for these countries.

5. STUDY VARIABLES AND PLAN OF ANALYSIS

5.1 Defining Contextual Variables

The choice of contextual variables is limited to those available from census data. At least two contextual variables will be used, at two different levels, census tract and municipality:

- Percentage of population with unsatisfied basic needs.³⁶
- Percentage of population below the poverty line.

When the data allow it other contextual variables to be considered are as follows:

- Percentage of dwellings that are owned by the residents.³⁷
- Income inequality (either Gini index or 20/20 or both).

Each one of the contextual variables will be added to the corresponding records of both the LSMS and DHS surveys.

5.2 LSMS Data And Analysis

5.2.1 Defining a Proxy SES Index at Household Level

The LSMS and DHS surveys include at least eleven common variables related to household assets, namely:

1. Quality of the house (type of floor)
2. Size of the house (number of people per sleeping room)
3. Source of household drinking water

4. Type of toilet facility
5. Availability of electricity
6. Household possessions: Radio
7. Household possessions: Television
8. Household possessions: Refrigerator
9. Household possessions: Means of transport
10. Possession of farm land
11. Availability of household help

These same variables are also available in the LSMS surveys. Using LSMS data, the ‘best’ proxy for household consumption will be determined using these eleven variables. Several approaches can be explored, among them:

- *Linear regression:* Income or consumption as dependent variable, the eleven variables above as independent variables. Explore the minimum set and the equation to be used in each country. Explore the possibility of having a common predictor of income or consumption.
- *Discriminant analysis:* Income or consumption quintile as classificatory variable, the eleven variables above to construct discriminant functions. Explore the ‘best’ discriminant function for each country and also the possibility of having a common discriminant function that works well across countries.

The proxy(ies) and classification functions (henceforth called ‘proxy SES indices’) so determined will be used in the DHS to classify the household SES levels.

By analyzing DHS surveys, researchers at the World Bank and Macro International¹ developed an assets index for the household using eleven variables and performing a factor analysis. This obviates the need to have a dependent variable. This third alternative will be confronted with the other two to chose the most appropriate one(s).

5.2.2 Constructing Concentration Curves for Health Variables

The number and type of questions related to health in the LSMS surveys is small although there are variations from country to country. In general they include at least the following:

1. Some form of self-assessment of health status (in general this was obtained by asking for each member of the household if he/she presented certain symptoms in the past four weeks), by sex.
2. Health care seeking in the past four weeks, including traditional health workers and pharmacists, by sex.

3. Expenditures in health care including consultations, hospitalizations and medicines.
4. Some measure of geographical accessibility that includes means of transportation and time taken to get to the health care provider, by sex.
5. Vaccination coverage.
6. Prenatal care (for women 15 to 49 years of age).
7. Contraception (for women 15 to 49 years of age).
8. Questions about children born and dead to allow computation of mortality rates for different age groups below 5 years (in some cases, only questions appropriate to indirect mortality estimation are available; for some countries, the LSMS questions allow direct determination of the probabilities of dying for different age brackets below age 5).

For all health status variables (including infant and child mortality), as well as for all variables related to health care utilization, it is possible to construct concentration curves—like a Lorenz curve³⁸—according to explanatory variables, including income/consumption, level of education, the proxy SES indices and other socioeconomic variables.

5.2.3 Other Analyses of SES, Health Status and Health Care

Most health status and health care variables are binary, such as consultation in the past four weeks (yes or no), type of health facility used (public/private), and purchase of medicines (yes or no). In these cases, logistic regression models should be used to predict the response variable, by using as explanatory variables income/consumption, employment status of men and women, education of men and women, sex, tenure of the dwelling, household structure, and others.

For surveys that allow the estimation of mortality below age five by the direct method, it will be necessary to construct an abridged life-table. It is then possible to develop a model for the hazard function of this table using SES explanatory variables. This type of analysis will be performed primarily with the DHS data, but repeating it here will allow cross-checking the consistency of both results.

5.3 DHS Variables and Analysis

The first step in the analysis will be to include in the DHS data records the proxy SES indices obtained in 5.2.1, as well as the values of the contextual variables at municipal and census tract levels.

5.3.1 Construction of Concentration Curves

With the inclusion in each record of the proxy SES indices it will be possible to construct concentration curves for the health variables in the DHS surveys, according to the proxy variables as well as other SES indicators, including educational level, number of durable goods in the household and others. The health related variables to be contemplated include (child health variables refer to age below five years):

1. Parity in high-risk age groups
2. Birth intervals
3. Contraception use
4. Child mortality
5. Child nutritional status
6. Prenatal and delivery care
7. Vaccine coverages
8. Prevalence of diarrhea and acute respiratory infections (ARI) in children
9. Breast-feeding

5.3.2 Other Analyses of SES and Health & Health Care Variables

These analyses will be similar to those that can be performed with the LSMS data and include logistic and survival analyses.

Many of the health status and health care variables are binary. In these cases it should be explored if logistic regression models are adequate to predict the response variable using different combinations of SES variables and others. Examples of these are: prenatal care (yes/no; or below/above a certain number of consultations; or first consultation within/after the first three months of pregnancy), death of a child below age one (or ages 1 to 4) in the past five years (yes/no), and others. Another possibility is to use logistic regression with the number of children born as the denominator and the number of child deaths as the numerator. The dependent variable is then

$$\text{Logit} (\text{children dead/children born})$$

The models obtained for mortality from ages one to four, infant mortality and neonatal mortality will show the relative importance of different types of factors for these two cases. It is expected that for infant mortality and specially for neonatal mortality the quality of care at birth and the use of prenatal services will play a larger role than with mortality below five. It will be very important to explore how these explanatory variables interact with other SES and context variables.

This could be restricted to children born in the past five years, and it could be better in some cases than treating child death as dichotomous³⁹.

The DHS data allow the direct estimation of mortality below age five. It is possible thus to develop models for the hazard function of this table using SES variables.

5.4 Contextualizing The Analysis

Since contextual census variables have been included in the records of both LSMS and DHS (see 5.1 above) it is now possible to contextualize the analyses. There are at least two types of analyses that can be done:

- Stratify the records of the survey according to levels of a contextual variable and explore differences in behavior of the concentration curves or of fitted models for these strata⁴⁰.
- Use both individual and contextual variables to fit again those models described in 5.2.3 and 5.3.2. These models are of the type known as multi-level (contextual) and require the use of appropriate statistical tools and software^{41,42}.

The combination of census, or ‘context’ data with survey data is the most innovative part of the proposed analysis. There are still few examples in health status and health care research using this type of approach, but these have reached striking results by using an adequate methodology to combine individual and ecological variables in the modeling of individual responses⁴³. The appropriateness of census micro-data to proxy for socioeconomic conditions is discussed in depth, from a purely statistical point of view, by Geronimus et al.⁴⁴

5.5 Analysis of Time Trends

One of the specific objectives refers to the analysis of time trends in equity. For three of the countries included (Bolivia, Brazil and Peru), there are three DHS surveys in different years (see Table 2). The main analyses described above will be repeated for the three surveys in these countries. This will allow the study of how equity is changing over time, and how these trends may be related to developments in health policy and to socioeconomic trends.

5.6 Analysis of Use According to Need

A major objective of the proposed study is to relate health care utilization and expenditure according to the need for health care. As Table 1 showed, however, the DHS survey is stronger on the health status side, while LSMS provides more information on health care. Also, health expenditure information is available only from LSMS.

Within the LSMS data sets, it will be possible to study health care utilization and expenditure according to self-assessed health. In the DHS data set, it will be possible to study utilization of MCH services according to several health status variables.

These analyses will be complemented by multi-level analysis.

Contextual data on families under the poverty line or with basic needs unmet will be cross-tabulated with all health care and expenditure variables.

For the DHS data, these analyses will be repeated over time in the countries with multiple surveys.

5.7 Identifying Inequity among Inequalities

An important aspect of the project is to highlight the differences between inequalities and inequities, and to raise awareness about the latter. All inequalities detected in the analysis will be thoroughly assessed as to whether or not they are unjust and unfair, and—if so—whether they represent inequities. This assessment does not depend solely on statistical findings but also

on a value judgement of 'justice' and 'fairness'. For example, it may be argued that delivering a baby without being assisted by trained personnel is by definition unfair and therefore represents inequity. Likewise, any subpopulation with a prevalence of stunting greater than 5%, is being affected by inequity.

Although separating inequities from inequalities will involve some degree of subjectivity, it is expected that this discussion will enhance the political impact of the project.

6. USING THE RESULTS

There will be three main approaches to disseminating the results: scientific publications, interaction with policy-makers and through the mass media.

6.1 Scientific Publications

The results of this research will be published in country reports, and papers summarizing the most important findings will be submitted by each research group for publication in international and Latin American journals. The results from the five countries will be combined in a separate report to be prepared by the coordination of the project, and again summarized for publication in scientific journals. A summary of the work will be also published as a book with the following proposed structure: Introduction; Data sources; Methods; Country chapters; Inter-country comparisons; and Conclusions.

6.2 Interaction with Policy-Makers

An essential aspect of applied research is to interact with decision-makers whom the researchers would like to influence. In the present case, these decision-makers include senior officers at the Ministry of Health and at subnational (for example, state) levels, and members of the legislation (senators, representatives) with strong interest in health issues. Bringing them on board is essential to ensure that the results of the research will be acted upon.

Two rounds of interaction are proposed, possibly through short workshops to be carried out in the capital city of the respective country. In the first seminar, decision-makers and other social actors will meet with the investigators during the initial stage of the analyses, and their contribution will be sought regarding the type of analyses to be carried out. Towards the end of the project, a second seminar will tap their interpretation of the data analyses, so that the final analyses will take their comments into account.

6.3 General Public

The theme of inequity usually receives wide attention from the mass-media. In parallel with the scientific publication of the study results, press-releases will be prepared and the key mass media organizations in the country (television, radio, newspapers, magazines) will be contacted and asked to disseminate the study findings. Key non-governmental organizations (NGOs) in the health and human right fields will also be approached.

7. COORDINATION

A multicenter project, which implies several groups from different countries working at the same time and following the same protocol, requires well established mechanisms of coordination in order to ensure compliance with the plan of analysis and comparability among countries. These mechanisms are also important to detect the need and to provide technical support to overcome specific problems occurring during the research process.

This project will have several mechanisms of coordination and follow-up:

Coordination within each local research group: The research groups and their respective coordinators will be selected in each country through a competitive process. In the five countries where the project will be carried out, research groups with experience in the use of surveys for analysis of health situation will be invited to send their credentials. The selection of the research groups, based on these credentials, will be made by an interprogrammatic group comprised by representatives of the three HDP Programs;

General coordinator: A HDP staff member, Dr. Norberto Dachs, will be responsible for the general technical coordination of the project with the support of the HDP interprogrammatic group. The interprogrammatic group will meet at the end of each phase of the project to make a follow-up of progress and assess the need for additional efforts of coordination;

Communication among the research groups and between them and the general coordinator: A methodological workshop with the participation of all research groups coordinators will be held at the beginning of the project. An electronic network will be established for regular communication and detection of eventual problems or difficulties. Technical assistance will be provided by the general coordinator, by members of the research groups or by invited experts according to specific needs. The general coordinator will perform at least one visit to each group during the process;

Administrative coordination will be provided by HDR.

8. TIME FRAME

Tasks	Months																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Initial meetings, data collection	■	■															
Preparation of data files for analysis		■	■	■													
Initial data analyses				■	■	■											
Multivariate methods						■	■	■									
First draft of report									■	■							
Discussion of first draft											■	■					
Final draft of report													■	■			
Writing of scientific papers																■	■

9. BUDGET

The total budget for the project is US\$ 180,000.00 (US\$ 30,000.00 for each country and US\$ 30,000.00 for the activities of coordination and supervision).

The needed expenditures will vary from one country to another. The amounts shown are median values. Some of the research groups may need more for equipment, others to contract consultants in specific areas like health economics or statistics. Also, the amounts charged by the national institutes of statistics for census data vary from one country to another. The survey data are available free of charge, almost always on-line.

9.1 Country Budget

Item	Cost (US\$)
Personnel	
Local analysis coordinator, database manager, health economist, statistician	\$15,000
Equipment	
Computer (including laptop)	\$5,000
Other expenses	
Communications, bibliography office materials, computing materials and software, purchase of special census tabulations, final report, local travel	\$10,000
Total	US\$ 30,000

9.2 Coordination Budget

Item	Cost (US\$)
Coordination meetings	
Travel and materials for two meetings	\$39,000
Consulting	
Visits of project coordinator and/or statistician	\$12,000
Other expenses	
Final regional report and others	\$4,000
Total	US\$ 55,000

10. GROUPS IN THE COUNTRIES

In each of the proposed participating countries, there was at least one and in most cases several groups that could do the local research work. The final selection of the groups in the countries was made after the approval of the project and is shown on the following list.

11. LIST OF RESEARCHERS

(BY COUNTRY, IN ALPHABETICAL ORDER)

Country	Researcher	Institution
Bolivia	Dr. Rory B. Narváez Guzmán rnarvaez@udape.bo	Unidad de Análisis de Políticas Sociales y Económicas (UDAPE) Avenida Mariscal Santa Cruz Palacio de las Comunicaciones P-18 La Paz
Brazil	Dr. César Víctora cvictora@zaz.com.br	Universidade Federal de Pelotas Departamento de Medicina Social Avenida Duque de Caxias, 250 3o piso BRA-96030-002 Pelotas, RS
Colombia	Dra. Carmen Elisa Flórez Nieto cflorez@uniandes.edu.co	Centro de Estudios sobre Desarrollo Económico (CEDE) Facultad de Economía Universidad de los Andes Cra 1-E No. 18-A-10 Santafé de Bogotá 4976
Nicaragua	Dr. Jaime Espinosa Ferrando euram@tmx.com.ni	Fundación Internacional para el Desafío Económico Global (FIDEG) Hospital El Retiro 1 ½ cuerdas al lago Apartado Postal #2074 Managua
Peru	Dr. Martín Valdivia jvaldivi@grade.org.pe	Grupo de Análisis para el Desarrollo (GRADE) Avenida del Ejército 1870 Lima 27

ACKNOWLEDGMENTS

This proposal expands and presents the details of the item 5.2 (National Level: Systematic Review of Existing Sources of Health Statistics) of the original profile presented to the Research Coordination Program of the Pan American Health Organization (PAHO/HDR) in January 1999: *Multicenter Study on Health Inequities in the Americas: From Nations to Neighborhoods*.

The original profile was written by Dr. César VÍctora of the Federal University of Pelotas in Brazil, with participation by members of the Interprogrammatic Group for Research on Health Inequities of the Division of Health and Human Development of the Pan American Health Organization (PAHO/HDP). In the preparation of the project, they took into account studies on production in this area in the hemisphere developed by Dr. Steve Wing and Dr. David Richardson of the University of North Carolina, Chapel Hill in the United States and Dr. Naomar de Almeida Filho of the Federal University of Bahia in Brazil. The two reports are available as PAHO/HDR publications from the Technical Papers Series *Research in Public Health*, Numbers 9 and 19, respectively. The members of the interprogrammatic group are Dr. Alberto Pellegrini, Dr. Elsa Gómez, Dr. Norberto Dachs and Dr. Edward Greene.

A preliminary version of that profile was discussed at an expert meeting in December 1998. The suggestions of this group were incorporated into the profile for the drafting of its final version. Besides the members of the interprogrammatic group and Drs. César VÍctora, Naomar de Almeida Filho and David Richardson, this group was made up of Dr. Paula Braveman of the University of California in San Francisco, Dr. Moises Goldbaum of the University of São Paulo in Brazil, and Dr. Pedro Luis Castellanos, PAHO consultant, Dominican Republic.

The preparation of this specific proposal using secondary data sources was coordinated by Dr. Norberto Dachs with the active participation of the other members of the interprogrammatic group from HDP and Dr. César VÍctora. All professional staff from the Program of Public Policy and Health reviewed the various versions and contributed actively to its improvement. The Internal Advisory Committee on Health Research (IACHR), in their review, made valuable comments to provide clarification on some points and for the overall enrichment of the proposal. The plan of analysis was laid out in detail in the first working meeting of the project, with participation from all the teams from the five countries in which the project is being carried out, as well as the Focal Points from the PAHO Country Offices in those countries. Dr. Norberto Dachs of the Public Policies and Health Program is in charge of the technical coordination for the development of the project.

REFERENCES AND NOTES

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- ² Pan American Health Organization (1998). *Leading Pan-American Health* (Official Document #287). Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO).
- ³ The World Bank (1999) *World Development Report 1998/99*. Washington: The World Bank.
- ⁴ Castellanos, P.L. (coord) (1991). *Proyecto: Sistemas nacionales de vigilancia de la situación de salud según condiciones de vida y del impacto de las acciones de salud y bienestar*. Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO), Programa Análisis de la Situación de Salud y sus Tendencias.
- ⁵ Almeida-Filho, N. (1998). *Desigualdades em saúde segundo condições de vida: análise da produção científica na América Latina e Caribe* (draft). Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO).
- ⁶ Wing, S. & D. Richardson (1998) *Material living conditions and health in the United States, Canada and Western Europe: A review of recent literature* (Technical Papers Series *Research in Public Health* #9). Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO).
- ⁷ Stronks, K.H. van Trirum & J.P. Mackenbach (1996) A Documentation Centre on Socioeconomic Inequalities in health. *J Epidemiol Comm Health* 50: 1.
- ⁸ Editorial (1998) Lower Socioeconomic status and increased mortality. *J Am Med Assoc* 279: 1745.
- ⁹ A recent study made by the editors of the Journal of the American Public Health Association shows that the number of papers submitted for publication on inequalities in health associated with socioeconomic conditions has increases threefold since 1996.
- ¹⁰ Canadian Public Health Association (CPHA) (1997) *Health impacts of social and economic conditions: implications for public policy* (Board of Directors Discussion Paper, p. 29). Ottawa: Canadian Public Health Association (CPHA).
- ¹¹ Gwatkin, D. (1999) *Poverty, equity and health. Evidence from developing countries*. Paper presented at the Ninth Annual Public Health Forum, London School of Hygiene and Tropical Medicine, 19–23 April.
- ¹² Víctora, C.G. (1999) *Reducing health inequalities: Can health interventions make an impact?* Paper presented at the Ninth Annual Public Health Forum, London School of Hygiene and Tropical Medicine, 19–23 April.
- ¹³ Preliminary results are now available for the five countries included in the project: Brazil, Ecuador, Guatemala, Jamaica and Peru. One of the important conclusions to be drawn from the draft reports is the need to study further the use of self-reporting instruments in the existing household surveys.
- ¹⁴ Pan American Health Organization / World Health Organization (PAHO/WHO) (1999) *Implementing Decentralization and Financing Strategies while Protecting the Poor: A Draft Policy Document*. Project documentation from PAHO/UNDP/CARICOM Project *Managing and Financing Health to Reduce the Impact of Poverty in the Caribbean*. Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO).
- ¹⁵ World Health Organization (WHO) (1999) *International Poverty and Health Network. Advisory Group Meeting Report*. WHO/HSD/99.1. Geneva: World Health Organization (WHO).

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- ¹⁶ The results of the project are to be published in a book later in 1999. There are only two countries from Latin America and the Caribbean included in the study: Chile and Mexico.
- ¹⁷ Whitehead, M. (1992) The concepts and principles of equity and health. *Int J Health Serv* 22: 430–445.
- ¹⁸ Braveman, P. (1998) *Monitoring equity in health: A policy-oriented approach in low- and middle-income countries*. Geneva: World Health Organization (WHO), Division of Analysis, Research and Assessment.
- ¹⁹ Samaja, J. (1994) *Las condiciones de vida y la salud*. HDP/HST Report. Washington, DC: Pan American Health Organization / World Health Organization (PAHO/WHO).
- ²⁰ Whitehead & Didericksen (forthcoming, 1999?) Conceptual framework. First chapter of a book scheduled for publication in 1999, to present the results of the GHEI project of the Rockefeller Foundation.
- ²¹ United Nations Fund for UNICEF (1993) *The UNICEF Nutrition Framework*. New York: UNICEF (Nutrition Section), 1993.
- ²² VÍctora, C.G., S.R. Huttly, S.C. Fuchs & M.T.A. Olinto (1997) The role of conceptual frameworks in epidemiological analysis: A hierarchical approach. *Int J Epidemiol* 26: 224-227.
- ²³ The term “context” is used here to indicate group- or macro-level variables that make it possible to incorporate multiple levels of determination in the study of health status, access, use and expenditure in health care. One reference that explains in depth the meaning and importance of “context” variables and contextualized studies is in note 41. There are also two Internet sites dedicated to multi-level, contextualized studies: <http://alliage.medent.umontreal.ca/multilevel/> and <http://www.educ.msu.edu/units/Groups/LAMMP/>.
- ²⁴ Income inequality is not an individual characteristic but one of a community, geographic region or administrative area. The following two notes present references to some of the extensive research work being done in relation to this variable and some of the discussions on why it may be important for health, besides income level.
- ²⁵ Wilkinson, R. G. (1996). *Unhealthy Societies: The Afflictions of Inequality*. London: Routledge.
- ²⁶ Kennedy, B. P., I. Kawachi, R. Glass & D. Prothrow-Stith (1998) Income distribution, socioeconomic status, and self rated health in the United States: multilevel analysis. *British Medical Journal* 317 (3/October): 917-921.
- ²⁷ Victora, C.G. & J.P. Vaughan (1985) Land tenure patterns and child health in Southern Brazil. The relationship between agricultural production, malnutrition and child mortality. *Int J Health Serv* 15: 253–274.
- ²⁸ The objectives of MECOVI (Programa para el Mejoramiento de las Encuestas para la Medición de las Condiciones de Vida en América Latina y el Caribe) are presented on the Internet at <http://www.eclac.org/espanol/estadisticas/mecovi/MECOVI.HTM>.
- ²⁹ The Living Standards Measurement Surveys project of the World Bank can be consulted online at <http://www.worldbank.org/html/prdph/lsm/lsmshome.html>.
- ³⁰ Some examples of these are the CASEN in Chile, the PNADs in Brazil and the Encuestas Nacionales de Salud y Encuestas Nacionales de Ingresos y Gastos de los Hogares in Mexico.
- ³¹ Information of the Demographic and Health Surveys (DHS) can be obtained online at <http://www2.macoint.com/dhs/>.
- ³² Available online at <http://www.mideplan.cl/casen2/index.html>.
- ³³ Available on the Internet at <http://www.ibge.gov.br/informacoes/pnad/Sint96/introducao.htm> and <http://www.datasus.gov.br/rnis/PNAD98/PNAD98.html>.
- ³⁴ The World Bank (1999). *Fact Sheets on Health, Nutrition, Population, and Poverty* (a tabulation of Demographic and Health Survey Data commissioned by the World Bank HNP/ Poverty Thematic Group). Unpublished report. Washington, DC: The World Bank.

- ³⁵. Diez-Roux, A.V. (1998) Bringing Context Back into Epidemiology: Variables and Fallacies in Multilevel Analysis. *Amer. J. Publ. Health* 88: 216-222.
- ³⁶. For details about computation of unsatisfied basic needs using census data, see Carrasco, Sebastián; Jorge Martínez, Jorge & Claudia Vial (1997) *Población y necesidades básicas en Chile: Un acercamiento sociodemográfico al período 1982-1994*, p. 363. Chile. Ministerio de Planificación y Cooperación Santiago, MIDEPLAN.
- ³⁷. Many times the dwelling is 'owned' by the residents but not the land on which it is built. It would be important to identify land ownership but this in general is not asked.
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- ⁴⁰. This is similar to the proposal made by Castellanos for the analysis of mortality and other variables using strata of living conditions. See note 2.
- ⁴¹. Duncan, C., K. Jones & G. Moon (1998) Context, composition and heterogeneity: Using multilevel models in health research. *Soc. Sci. Med.* 46 (1): 97-117.
- ⁴². Singer, J. (1997) *Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models*. Preprint. To appear in the *J. of Educ. and Beh. Stat.*
- ⁴³. An excellent example is the paper by Kennedy et al. of note 24. The references of notes 25 and 27 have lists of examples already published using this methodology.
- ⁴⁴. Geronimus, A. T., J. B. and L. J. Neidert (1996) On The Validity of Using Census Geocode Characteristics to Proxy Individual Socioeconomic Characteristics. *J. Amer. Stat. Assoc.* 91 (434): 529-537.

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