LSMS

Living Standards
Measurement Study
Working Paper No. 15

Measuring Health as a Component of Living Standards

Teresa J. Ho

LSMS Working Paper Series

No. 1. *Living Standards Surveys in Developing Countries.*

No. 2. *Poverty and Living Standards in Asia: An Overview of the Main Results and Lessons of Selected Household Surveys.*

No. 3. *Measuring Levels of Living in Latin America: An Overview of Main Problems.*

No. 4. *Towards More Effective Measurement of Levels of Living,* and *Review of Work of the United Nations Statistical Office (UNSO) Related to Statistics of Levels of Living.*

No. 5. *Conducting Surveys in Developing Countries: Practical Problems and Experience in Brazil, Malaysia, and the Philippines.*

No. 6. *Household Survey Experience in Africa.*

No. 7. *Measurement of Welfare: Theory and Practical Guidelines.*

No. 8. *Employment Data for the Measurement of Living Standards.*

No. 9. *Income and Expenditure Surveys in Developing Countries: Sample Design and Execution.*

No. 10. *Reflections on the LSMS Group Meeting.*

No. 11. *Three Essays on a Sri Lanka Household Survey.*

No. 12. *The ECIEL Study of Household Income and Consumption in Urban Latin America: An Analytical History.*

No. 13. *Nutrition and Health Status Indicators: Suggestions for Surveys of the Standard of Living in Developing Countries.*

No. 14. *Child Schooling and the Measurement of Living Standards.*

No. 15. *Measuring Health as a Component of Living Standards.*

No. 16. *Procedures for Collecting and Analyzing Mortality Data in LSMS.*

No. 17. *The Labor Market and Social Accounting: A Framework of Data Presentation.*

No. 18. *Time Use Data and the Living Standards Measurement Study.*

No. 19. *The Conceptual Basis of Measures of Household Welfare and Their Implied Survey Data Requirements.*

No. 20. *Statistical Experimentation for Household Surveys: Two Case Studies of Hong Kong.*

No. 21. *The Collection of Price Data for the Measurement of Living Standards.*

No. 22. *Household Expenditure Surveys: Some Methodological Issues.*

Measuring Health as a Component of Living Standards

The Living Standards Measurement Study

The Living Standards Measurement Study (LSMS) was established by the World Bank in 1980 to explore ways of improving the type and quality of household data collected by Third World statistical offices. Its goal is to foster increased use of household data as a basis for policy decision making. Specifically, the LSMS is working to develop new methods to monitor progress in raising levels of living, to identify the consequences for households of past and proposed government policies, and to improve communications between survey statisticians, analysts, and policy makers.

The LSMS Working Paper series was started to disseminate intermediate products from the LSMS. Publications in the series include critical surveys covering different aspects of the LSMS data collection program and reports on improved methodologies for using Living Standards Survey (LSS) data. Future publications will recommend specific survey, questionnaire and data processing designs, and demonstrate the breadth of policy analysis that can be carried out using LSS data.

LSMS Working Papers
Number 15

Measuring Health as a Component of Living Standards

Teresa J. Ho

The World Bank
Washington, D.C., U.S.A.

Manufactured in the United States of America
First printing April 1982
Second printing July 1985

This is a working document published informally by the World Bank. To present the results of research with the least possible delay, the typescript has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. The publication is supplied at a token charge to defray part of the cost of manufacture and distribution.

The World Bank does not accept responsibility for the views expressed herein, which are those of the authors and should not be attributed to the World Bank or to its affiliated organizations. The findings, interpretations, and conclusions are the results of research supported by the Bank; they do not necessarily represent official policy of the Bank. The designations employed, the presentation of material, and any maps used in this document are solely for the convenience of the reader and do not imply the expression of any opinion whatsoever on the part of the World Bank or its affiliates concerning the legal status of any country, territory, city, area, or of its authorities, or concerning the delimitation of its boundaries, or national affiliation.

The most recent World Bank publications are described in the annual spring and fall lists; the continuing research program is described in the annual *Abstracts of Current Studies*. The latest edition of each is available free of charge from the Publications Sales Unit, Department T, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from the European Office of the Bank, 66 avenue d'Iéna, 75116 Paris, France.

When this paper was first published Teresa J. Ho was an economist with the Population and Human Resources Division, Development Economics Department of the World Bank.

Library of Congress Cataloging in Publication Data

Ho, Teresa J., 1950-
Measuring health as a component of living standards.

(LSMS working paper, ISSN 0253-4517 ; no. 15 (Apr. 1982))
Bibliography: p.
1. Health status indicators. 2. Health surveys. 3. Cost and standard of living. I. Title. II. Series. [DNLM: 1. Health 2. Health Surveys. 3. Morbidity. 4. Socioeconomic Factors. WA 30 H678m]
RA407.H57 1985 614.4'2'072 85-12024
ISBN 0-8213-0042-3

MEASURING HEALTH AS A COMPONENT OF LIVING STANDARDS

TABLE OF CONTENTS

I. HEALTH AND THE STANDARD OF LIVING

There is a close interactive relationship between health and the level of income. The attainment of a higher income level affords an individual access to better health. He may not necessarily choose to maximize his health status (given his taste for commodities such as cigarettes or "junk food," for example) but he at least has the means to attain improved health. In general, health levels do improve with increases in income levels, as is quite dramatically reflected by the differences in health conditions among the less and the more developed countries of the world. A child born in a low-income country had a life expectancy of only 50 years at birth, compared with life expectancies of 61 years for middle- and 74 years for high-income countries in 1979 (World Bank, 1981) 1/

Differences in mortality rates among rich and poor countries are paralleled by differences in disease patterns. In the early stages of development, infectious and parasitic diseases coupled with malnutrition predominate, affecting infants and children especially. As income levels, environmental conditions and life styles change, problems of infectious disease and malnutrition are contained, and non-infectious diseases such as malignant neoplasms and diseases of the circulatory system emerge as principal causes of illness and death, affecting children less and adults more.

The relationship between low incomes and infectious disease is not coincidental. The crowded, unsanitary living conditions that mark poverty provide a thriving environment for transmission of fecally related

---

1/ If China is included, average life expectancy for low income countries increases to 57 years.

diseases such as intestinal parasitic and diarrheal diseases or airborne diseases such as tuberculosis and pneumonia. In addition, insufficient food consumption leads to diseases of malnutrition which may lead to death in severe cases or which, when present together with other illnesses, may lead to complications increasing the risk of death.

Improved health relates to income levels not only as an outcome of improved living conditions but also as an input to income generation itself. Together with education, health is the most significant form of investment in human capital that can be made, improvements in productivity generally following improvements in health status. In addition, significant wastage of resources is eliminated with the control of disease. Primary among such savings is the preservation of human lives. Further resource savings may include the release for productive use of otherwise fertile land in areas plagued by vector borne diseases such as malaria and onchocerciasis, the savings on food resources lost to diarrheal and parasitic diseases, and the improvement in rates of learning and retention levels among schoolchildren with better health and nutrition.

If one were interested in measuring health as a component of living standards, the foregoing discussion would seem to imply that the measurement of income and its distribution would serve as a good proxy for health as it does for many other components of the standard of living. In fact, it may not. In many countries, a substantial portion of health inputs are provided

free or at minimal cost through the public sector and differences in health status among population groups may relate to the availability and access to public health services, quite apart from differences in income. Education, particularly women's education, is another critical factor affecting health independently of income level (Cochrane, et. al. 1980). As a form of investment in human capital, health is also important as a measure of a household's stock of wealth, and hence of its current and future standard of living not necessarily reflected in current income. These features of health status suggest that the usual income measures of the standard of living may not sufficiently represent this one important component of living standards and will thus have to be supplemented with direct measures of health status.

This paper discusses measures of health status for use in a survey whose objective is to measure and compare levels of living among different population groups. Apart from measurement issues, it will attempt to discuss the relationship between health and other components of the standard of living and will suggest means by which such relationships can be analyzed and interpreted for the eventual determination of policies to improve health status and related components of living standards. Given the time and cost constraints of a multidimensional survey like the Living Standards Measurement Study, a detailed epidemiological profile of the population will not be attempted. Rather, emphasis will be given to general measures of health status as opposed to the identification of specific diseases, and to relating general health to the overall level of development.

II. THE DETERMINANTS OF HEALTH STATUS

This section presents a theoretical approach to the determination of health status in the framework of an economist's view of consumer behavior. This approach is taken not only because of the importance of income in the determination of health but more so because of the appropriateness of the economic paradigm of consumer choice in an environment of limited resources with respect to the use of health inputs and the determination of health status. An individual's health status is defined as the outcome of a process described by a health production function that relates health status to various health inputs such as medical services, diet, and environmental sanitation. The level of use of each health input is determined by the individual who, by combining market goods and time resources available to him, "produces" these inputs in the tradition of the household production function (Becker 1965). The idea is to distinguish between the biological and behavioral phenomena involved in the determination of health status and to emphasize the need to understand the relative importance (marginal productivities) of specific health inputs under various settings and for various population groups in the design of policies for improving health.

Some discussion of the importance of supply factors under certain circumstances highlights another critical aspect of the determination of health status.

Consumers demand the commodity "health" 1/ for both its consumption and its investment features. As a consumption commodity, good health generates welfare and hence enters the utility function directly. As an investment commodity, health enhances the quality of human capital by improving productivity, and the quantity of human capital by increasing the number of days available for productive activity. This last feature of health distinguishes it from every other investment commodity available to the consumer: by directly affecting the individual's life span, good health increases the total time resources available to him, which additional resource can be applied to any activity of his choice, be it leisure, market work, or productive work outside the market. 2/

It is helpful to think of the commodity health as the outcome of a production process combining various "health inputs" with genetic and other characteristics of the individual and his environment. This process can be described via a health production function

H = H(preventive inputs, curative inputs, efficiency factors, genetic and other individual factors, ecology, random factors).

The first two elements constitute the set of health-specific inputs such as

---

1/ In this section, the terms "commodity" and "production" are used in the broader sense applied in the new household economic literature where a commodity is that object which directly generates utility and is produced with combined inputs of market goods and time (Becker 1965, Lancaster 1966).

2/ It is helpful to distinguish between that feature of health which increases life span and that which decreases the number of days absent due to illness in a given time period (or otherwise reduces normal working hours). Absence from work due to illness is an (endogenous) choice made by the individual and related to his evaluation of the marginal returns to work given his reduced productivity and the disutility of working while ill. Hence, absence from work is a "corner solution" response to reduced productivity, given, among other things, increased disutility from ill health.

water and sanitation, immunization, and food intake--the preventive inputs--and curative health services and medication/treatment--the curative inputs. Factors affecting the efficiency of health production such as education or, more specifically, the stock of health information also determine the ultimate level of health.

Other taxonomies of health inputs may be used if preferred (e.g., "purchased inputs" and "publicly supplied inputs"; O'Hara, 1980) but this particular one has been selected to draw attention to an important distinction between preventive and curative health inputs in the manner in which they enter the health production function. The marginal product of a unit of curative inputs, unlike preventive inputs, is closely correlated (negatively) with the stock of health. An appendectomy, for example, benefits the person with an inflamed appendix but not otherwise. An immunization shot, on the other hand, generally benefits people equally regardless of their health status. Hence, any analysis of the demand for health and for health inputs involving curative inputs must take care to disentangle the two-way relationship between health status and the use of such inputs.

The demand for health inputs is a derived demand, determined by the demand for health itself, the nature of the health production function and the total resources available to the household. The quantity and quality of the specific health inputs depend on the allocation of money and time resources to each input. For example, the quantity and quality of the household's water supply may depend on such factors as investment in a specific water system, time used to fetch water, time used to sanitize water containers and water itself, and investment in fuel to boil water. In deciding on this and

other health inputs, the consumer chooses to purchase market goods such as a water system (in the above example), medical services, or food to generate the desired stock of health in the most efficient way, given his available income and time resources.

In the special case of health, total time resources may be endogenous in the long run. A person could choose to invest thirty minutes daily in exercising or a couple of hours plus the cost of a doctor's fee for a visit to the doctor if he thought it might extend his life an extra five years.

Ultimately, the factors that determine health status will include the usual income, price and taste variables affecting the demand for health both as a consumption and as an investment commodity (including prices of and taste for competing commodities), factors affecting the efficiency of health production such as education, and the relative prices of various health inputs in terms of both time and market costs.

In many situations, the prices of health inputs are set within a market system that functions differently from the typical market for goods or services. For example, widely used systems of medical insurance (public or private) reduce the correspondence between the cost of a specific service and its value to the consumer (see Cullis, pp. 81-84). In less developed countries, a wide range of medical services are provided free or at subsidized cost by the public sector but such services may be available only at facilities that are nearly inaccessible to large segments of the population. In addition, the quality of services may be widely divergent among different facilities. Similar diversity in availability and quality exists in the provision of water and sanitation services which again involve significant public sector inputs. In such situations, more detailed information on supply may be needed in place of or in addition to simple price variables.

III. MEASURING HEALTH STATUS

The Elusive Concept of Health

The WHO Constitution (1947) formally defined health as "a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity." The intent was to move away from the traditional medical view of health as the absence of disease to a more positive concept of well-being. Unlike disease which manifests itself through a host of varied symptoms ranging from a headache to complete loss of consciousness, well-being does not lend itself to easy identification or measurement, and social and medical scientists attempting to operationalize the WHO definition of health as well-being have found themselves at a loss for such measures.

Positive measures of health are not altogether impossible to define, however. Measures of physical endurance, strength and agility or mental ability exist (e.g., athletic competitions) and could be used as positive indicators of health. As increasing numbers of people move into that spectrum of health status characterized by infrequent bouts of serious illness, aspiration for "fitness" will slowly become the norm 1/ and, of necessity, these and other positive measures of health will be refined. While such numbers remain in the minority--and in global terms they are indeed a small minority--health scientists would do well to concentrate efforts on the development of health indicators that measure freedom from disease, despite their negative connotations.

1/ Witness the current interest in physical fitness among middle and upper class Americans.

Note that symptomatic indicators of disease are themselves not ideal measures of ill health. The ultimate costs in welfare terms of ill health are the pain or discomfort and the reduction in functional ability that it causes. While some measures of functional ability can be defined (these are discussed below), absolute measures of pain that would allow interpersonal comparison cannot. Furthermore, the wide variety of possible symptoms and illnesses make even an ordinal ranking of degrees of discomfort due to various illnesses a gargantuan, if not impossible, task.

In developing health indicators, it is useful to think of an individual's health status within a three-dimensional framework, each dimension measuring one facet of the person's physical or mental well-being. These are

(1) duration of life

(2) freedom from disease

(3) growth and development

The first two of these are widely recognized components of health, most often represented by indicators of mortality and morbidity. The third, less often perceived as a component of health status although equally relevant, involves the attainment of the individual's full potential for growth, both physical and mental, and is particularly important for the monitoring of children's health status. This component is directly affected by nutritional status, particularly in the early years of childhood when most growth occurs.

Technical issues on the measurement of mortality and of nutritional status are discussed elsewhere in this series of papers on indicators of human development 1/, hence discussions here will center on indicators of morbidity. Other often cited indicators of health such as health services or water supply and sanitation are measures of the various inputs to health, the explanatory variables in the health production function. These are discussed in the next section. Later in this paper, the three output measures of health will be brought together again and compared in terms of their relative merits for inclusion in a health module for a living standards survey.

Measures of Morbidity

Unlike mortality which involves the patently observable phenomenon of death, morbidity or illness is a less well-defined state of health, manifesting itself through a variety of symptoms and in varying degrees of severity. Hence there is no simple single measure of an individual's morbidity status that would lend itself easily to comparison either for the same individual over time or among different individuals. When any comparisons are made, they are necessarily limited to specific symptoms or illnesses rather than to overall health status.

Morbidity information generally revolves around the description of symptoms that are obtained through direct observation of the person, through biochemical or other clinical tests, through reporting by the person himself, or through some combination of the above. Assuming that the appropriate symptomatic observations can be made through these means, interpretation of the findings may remain a problem. Observed symptoms are not always

---

1/ See Sullivan, Cochrane and Kalsbeek (1982) on mortality and Martorell (1981) on nutrition.

illness-specific and identifying the cause of a morbid condition may not be easy; highly specialized medical expertise may sometimes be required. In addition, many symptoms are manifested empirically on a continuum of values, rather than in a simple dichotomy, making it difficult to differentiate between illness and acceptable deviations from the mean (Cochrane, 1972). Finally, as mentioned in the preceding paragraph, it is difficult to combine various symptoms into a single measure of severity for comparison across different illness groups.

The above shortcomings, particularly the last, suggest that symptomatic or illness specific data may be of limited usefulness in a search for a single general indicator of individual or group level health status. Nevertheless, data on the incidence or prevalence of specific illnesses among a population provide valuable descriptive information about prevailing disease patterns, identifying the causes of poor health and indicating the measures most appropriate for improving overall health conditions.

While symptomatic indicators of morbidity do not permit comparisons of health status across illness groups, indicators of functional disability do. As the name implies, measures of functional disability focus attention on the effects of ill health rather than its causes, particularly on the extent to which normal human functions are disrupted by illness. Some attempts have been made to define a hierarchy of human functions to serve as a yardstick for measuring the severity of disability (Patrick, Bush and Chen 1973; Granger and Green 1976; Rosser and Kind 1978). In these exercises, activities such as dressing or feeding oneself, sitting up in bed, walking

with or without limitation and so on are ranked on some selected scale with respect to the ability to function independently and completely. The ranking is usually determined by subjective judgement of a group of medical professionals or laymen sampled for the purpose. The person whose health is being assessed is then rated, based on observations on his ability to perform the specified functions.

This method of assessing functional disability presents difficulties in the definition of a classificatory scheme of functional levels and in the need to observe various components of function for each individual being studied. A simpler method is to ask the subject whether and to what extent his "normal" activities have been disrupted by illness. The response would take the form of a fractional value (say 0, 1/4, 1/2, 3/4, or 1) of his normal activities that he was unable to perform over the duration of the illness (Paqueo 1976). This method of inquiry is a refinement of the usual question on the number of days absent from work/school due to illness, allowing for partial reductions in productive capacity. It can also be designed to include reductions in non-work or non-school activities if desired.

With this method of measuring functional disability the definition of the standard as well as the observation on the extent of disability relative to the standard are based on the subject's own judgement. Here lie possibilities for complication. A person's decision to work or not work when ill is dependent not only on the amount of discomfort he experiences or the reduction in his productivity but also on the relative value to him of an hour's work. Thus, a poor person with a high marginal utility of income may

be more inclined to work when ill than a rich person; similarly a mother with a young child would be more likely to do "home work" when ill than one without a young child. If such is the case then the observed reduction in work will not measure a pure "illness effect."

A second complication lies in the implicit definition of the standard as the person's "normal" level of activity. Abstracting from the possibility that low marginal productivities may force normal activities to remain below maximum potential, there is the further chance that chronic suboptimal health may itself cause the perceived normal levels to remain below maximum potential. Chronic undernutrition and anemia, for example, are two widely prevalent conditions that may cause substandard work performance. Unless these conditions are detected, the resulting lower work levels may mistakenly be taken as the norm. The norm must also be carefully defined for cases of permanent disability.

Despite these complications, measures of functional disability provide a useful indicator of morbidity status that cuts across the multiple dimensions of illness, this indicator being expressed in terms of equivalent complete disability days or, conversely, equivalent complete healthy days.

One recent development of the concept of functional disability has been to extend the definition of disability so that it allows the inclusion of mortality (death) as a possible value on the continuum of function states. Thus health status is defined as "a continuum running from dead to perfect health taking on a value from, say, 0 to 1 (0 for death, 1 for perfect health) for any individual at any given time" (Torrance, 1976).

Various versions of this unified health status index have been propounded, some embellished to represent "health expectancy," a form of weighted life expectancy which measures the equivalent in healthy years of life expected (in statistical terms) by the individual (e.g., Chiang 1965; Bush, Chen and Patrick 1972; Sullivan 1971; Morrow, Smith and Nimo 1980). They all share the feature of integrating mortality and morbidity into a single measure, a feature useful in comparing improvements in health status expected from alternative treatments or public health interventions and especially when expected results vary with respect to reductions in mortality and morbidity. This same feature, however, is a fundamental weakness of the unified health status index since it fails to recognize the qualitative difference between the states of death and life. The "quantum leap" between life (in any state of health or ill health) and death renders any attempt to combine them on a single scale crude at the least.

Measuring Health Inputs

The first step in the design of health input indicators is the selection of the inputs most critical to health under prevailing circumstances. In more advanced societies where basic health care and sanitation systems are universally available, the most important inputs may be an efficient hospital and fresh unpolluted air. In less developed communities, the elements of a primary health care system would constitute the main inputs to health. These include:

(1) education concerning prevailing health problems and the methods of preventing and controlling them;

(2) promotion of food supply and proper nutrition;

(3) an adequate supply of safe water and basic sanitation;

(4) maternal and child health care, including family planning;

(5) immunization against the major infectious diseases;

(6) prevention and control of local endemic diseases;

(7) appropriate treatment of common diseases and injuries; and

(8) provision of essential drugs. 1/

In defining specific input indicators care must be taken to distinguish between indicators of availability (or supply) and indicators of use. For example, the presence of a health care facility in a village would be an indicator of availability; similarly, information on distance of a facility from a home or the cost of specific services are indicators of availability. On the other hand, information on immunization rates, on use of oral rehydration or on consultations with indigenous medical practitioners are indicators of use. Analytically, "use" indicators are measures of (revealed) demand and "availability" indicators are measures of supply to be used as explanatory variables in the input demand functions.

1/ From the Declaration of Alma-Ata signed by participants of the International Conference on Primary Health Care in 1978.

A Morbidity Questionnaire

This section discusses the design of a morbidity questionnaire that is to form part of a health module of a multipurpose household survey instrument. The objective of the questionnaire is to provide the necessary information for the measurement of health status of household members as well as the accessibility and utilization of certain health inputs.

The questionnaire is designed to be conducted by interviewers who are nonmedical personnel and cannot be expected to make any medical diagnoses. While it is possible to train lay workers to identify a wide variety of symptoms and illnesses (WHO, 1978) such training is not recommended for a living standards survey for which only general measures of health status are required. As a consequence, morbidity information is based on subjective reporting by respondents and is likely to be biased by cultural or individual differences in the recognition of illness. Some of this bias can be reduced by careful probing (say, by listing the most common illnesses or symptoms) but others such as the greater awareness of certain symptoms by the more educated cannot. In general, subjective reporting will probably best cover those illnesses that interfere most with normal functioning of the individual by causing pain or debility.

The recommended format for a morbidity questionnaire is outlined in Table 1. The morbidity measures included are the incidence of long-term disability, the incidence and duration of illness in the last two weeks 1/

1/ The selection of a two-week reference period is based on an assessment of the trade-off between accurate recall and a longer period to reduce randomness in observed patterns of illness incidence.

Table 1: GENERAL FORMAT FOR A MORBIDITY QUESTIONNAIRE

I. Does any household member have a long-term disability; for example, blindness, deafness, paralysis, disability from an accident, birth defect, mental retardation, mental illness or any other long-term disability?

IF YES, identify the person and the disability. For each disabled person ask:

Is this person unable to attend school or work because of his/her disability?

II. Was any household member ill or injured in the last two weeks; for example, did anyone have diarrhea, a cough or cold, a fever, an injury from an accident or any other illness?

IF YES, identify the person and the illness/symptom. For each illness episode ask:

How many days did it last?

Did the illness interfere with work, schooling or other activity?

IF YES, to what extent was activity affected?

Was any nonhousehold member consulted?

IF YES, who was consulted?
was any fee charged? how much?
how much time did consultation take, including travel time? who accompanied sick person?

Was any medication given?

IF YES, how much did it cost?

NOTES: 1. Endemic diseases may be added to lists of disabilities and illnesses where pertinent. A local term usually exists for these diseases, making inquiry easier.

2. This survey should also include questions on immunization, food consumption and water and sanitation facilities in the household and community level information on the use and availability of inputs. These are all discussed as part of the complete health module in the next section.

and the extent of functional disability resulting from the illness. While the respondent is asked to identify the specific disabilities and illnesses, such information is used principally for reference and for checking consistency during the interview and should be used sparingly or not at all in any data analysis. Finally, information on the use of curative inputs, specifically medical services and medication, is collected for each illness episode.

Appendix 1 presents examples of morbidity questionnaires that have been used in actual field surveys. The first was used in a Pilot Survey on Social Indicators in Batangas in the Philippines and illustrates the approach to functional disability measurement in terms of fractional portions of normal activity. In this survey, a disability card was presented to the respondent for selection of the appropriate response. Paqueo (1976) notes that 99.5% of those reporting illness responded to this question on functional disability.

The second example was used in a household morbidity survey in the Danfa Comprehensive Rural Health and Family Planning Project in Ghana and the third was one section of a lengthy questionnaire for a multipurpose household survey in the Bicol Region in the Philippines. This last example includes more detail than would likely be needed for LSMS but it illustrates well the nuances in phrasing of questions and precoding of answers needed in the questionnaire. One important feature is the inclusion of the indigenous health practitioner (herbolario/hilot) as a possible health consultant (question 8.9).

IV. RECOMMENDATIONS FOR THE LSMS

The Health Module

This section makes recommendations for a basic health status module for the Living Standards Measurement Study (LSMS). It takes into consideration various features of the LSMS that would influence the design of the health module including: (1) that it is a nationwide sample survey; (2) that interviewers will have had no medical training; and (3) that the survey instrument will cover numerous other aspects of a household's living standards including income, wealth, expenditures, household size, and schooling of children. As in all other surveys, it will aim for economy in questionnaire length and in other survey costs.

While designed principally to fulfill the requirements of the LSMS, whose objective is to develop measures of the standard of living of a population, the proposed health module could also form part of a national health information system such as that proposed by the WHO (1980). Depending on personnel and cost constraints on the survey, an expansion of the morbidity section to allow the identification of major illnesses would greatly enhance the programmatic application of the survey. This household-based health survey would complement data from other traditional sources if conducted routinely and on a national scale. Appendix 3 presents a discussion of the potential role of the household-based health survey in a nationwide health information system.

Table 2 lists the elements of the recommended health module. This module can be contracted or expanded to obtain a balance between logistical constraints and information needs for a particular survey. Additional information for the identification of specific illnesses would be a valuable but expensive direction for expansion. Conversely, if the purpose is simply to monitor changes in health status among different population groups or regions in a country then the inquiry could be limited to outcome measures only. In this case, the information generated would not be sufficient to identify the direct causes of poor health or to define specific health policy priorities. Another possibility for contraction would be to drop one or two of the three output measures, an option that is discussed further (and discouraged) in the ensuing paragraphs.

Ultimately, the decision will have to be made in each case as to whether the additional information gained from the individual blocks of questions is worth the extra cost in interview time and/or other logistical problems. 1/ The module recommended in Table 2 is believed to strike a fair balance between costs and returns for a Living Standards Survey that aims to monitor overall changes in health status in a developing country, identify regions or socioeconomic groups in need of special attention, relate health status to other socioeconomic characteristics and identify possible points of intervention for improving health status.

1/ The relevant logistical constraints to consider include not only the various field costs of the survey but also the costs of coding and processing every additional detail of information. Many surveys suffer from having collected random excess pieces of data which collectively amount to substantial portions of organizational and operational costs.

Table 2: DATA REQUIREMENTS FOR A BASIC HEALTH MODULE

HEALTH MEASURE	DATA REQUIRED
Outcome Measures	
1. Mortality	births and deaths in last year or child survival data or reference-period child survival data (Cochrane and Sullivan 1981)
2. Morbidity	a) permanent disability b) days of illness in last two weeks c) extent of activity restriction--for school-age children and adults
3. Nutritional status	a) height) b) weight) for children under six c) age) (Martorell 1981)
Input Measures: Household Level	
1. Service availability	distance to nearest public health facility
2. Use of curative services	for each illness episode: a) who was consulted? b) how much did consultation cost, in time and money? c) if medication was used, how much was spent?
3. Immunization	immunization of children five years or below
4. Water, sanitation and housing	a) type of water source and distance to source b) type of toilet facility c) type of housing; square footage per person
5. Food intake	a) 24-hour recall of household food consumption b) supplementary food consumption from feeding center, if any
Input Measures: Community Level	
1. Service availability	a) presence of a community health worker; hours of availability b) presence of a public health facility and type(s) of facility c) if none present in community, distance to nearest facility d) hours of operation of nearest health facility
2. Water and sanitation	a) condition of drainage in main roads b) normal water-use pattern in community c) normal toilet-use pattern in community d) population density
3. Prices: food, health services, drugs	prices of basic foodstuffs, health services, essential drugs

The recommended outcome measures give emphasis to the health status of children under five. Nutritional status data are collected only for this age group. Morbidity data are collected for all age groups (except for data on activity restriction which are relevant only for school age and over), but the analytical application will differ between the under five age group and the rest. In essence, the health module measures two basic aspects of health status in the population: the overall health status of young children with emphasis on the interrelationships among illness, nutritional status and mortality, and the effect of illness on activity of schoolchildren and adults.

Each of the three outcome measures involves special problems that require careful attention. With mortality, the (statistically) low incidence of death would result in very few observations of death in samples of about 5,000-10,000 households--the size generally considered for national sample surveys. This would mean that mortality data from sample surveys would be useful only for the most aggregated levels of analysis--e.g., for international, urban versus rural or, for larger samples, regional level analysis. Nevertheless, mortality is a critical measure of health conditions in developing countries and even the limited applications of mortality data would provide valuable information.

Morbidity data are limited by the multi-faceted nature of illness making unified measurement difficult, and the subjectiveness involved in self-reporting of illness. Furthermore, morbidity measures are sometimes considered redundant when used together with mortality data. For these reasons, morbidity information are seldom used as general health indicators. Actually, morbidity data are the most useful measures of health status of the majority of the population who stay alive during the survey period, describing a dimension of

health that significantly affects the standard of living of the living. In particular, functional disability data are the only way to directly measure the labor supply effects of poor health. In addition, the extent of correspondence between morbidity and mortality is not really known -- e.g., the prevalence of permanent disability may not necessarily decline (and may even increase) with declining mortality -- discounting the argument that mortality data are good proxies for morbidity information. Finally, the more frequent incidence of illness compared with mortality allows analytical exploration of the factors leading to disparity in health status among smaller aggregates in the population. The foregoing arguments make a strong case for the inclusion of morbidity measures of health in a living standards survey.

Nutritional status data have neither the sampling problems of mortality data nor the imprecision of morbidity data. Height and weight are clearly measurable concepts observable for each individual. When used to measure growth in children, anthropometric data provide a positive measure of health to complement morbidity and mortality which measure ill health. In addition, growth in children is more regular than illness or death and hence is a more stable measure of health. 1/ Finally, nutritional status measures

---

1/ Height is a particularly useful measure of long term developments in health since it is a cumulative measure of both nutritional and morbidity experience in the individual child and does not fluctuate with seasonal or other short term influences.

lend themselves to analysis on all levels of aggregation or disaggregation, from the individual level to national or international levels of comparison. 1/

Unfortunately, the collection of nutritional data in a sample survey presents the logistical problem of weighing and measuring subjects in the field. In addition to the encumberance to interviewers of weighing scales and measuring boards, the cost of the equipment may be significant as well. 2/ Such problems are not insurmountable, however, and the fact that several countries (including Costa Rica, Kenya, the Philippines, and Egypt) have successfully completed one or more nationwide nutrition surveys attests to the feasibility of collecting anthropometic data on a large scale. When such data are collected in conjunction with other socioeconomic and quality-of-life information, their value as indicators of health and general development could easily outweight the costs of data collection.

All things considered, each of the three outcome measures have distinct advantages that are believed to outweigh any disadvantages and all three are recommended for inclusion in LSMS.

Data on input measures will be collected at the household level and at the community level. The health inputs of greatest concern are health services, immunization, water and sanitation, and food intake. Health services

---

1/ There is some controversy as to whether international comparisons of height or weight are appropriate, given possible ethnic differences in growth potential. One study has shown, however, that children in a variety of developing countries representing different racial groups but coming from economically advantaged families grow nearly to the height and weight of European and North American children, whose height and weight are used as international standards (Habicht, et al., 1974).

2/ Martorell (1981) reports that a portable scale suitable for use in house-to-house surveys sells for $21.

are measured with respect to availability and use; in particular, the use of curative services (that is, those related to specific illness episodes) are identified. The principal preventive measures considered are immunization of children, the condition of water supply and sanitation, and the quantity and quality of food consumed.

Problems of recall and of verifying the efficacy of the vaccination tend to reduce the reliability of immunization data. Nevertheless, immunization of children is a key preventive health measure and the collection of immunization data should at least be field-tested. The increased number of countries using child health charts in their maternal/child health programs (with mothers often having their own copy of nutritional surveillance and immunization records) may reduce the problems of recall experienced in past surveys.

It would be helpful to explore the possibility of designing the expenditure module of the LSMS with sufficient detail on food expenditure and quantities consumed to replace the food consumption module. This would save considerable interview time, assuming that expenditure data are to be collected in the first place.

The environment and the availability of public health services are additional conditioning factors, though largely outside the control of the household. Some information on the community level--on population density, communally-shared sanitation facilities and on the accessibility of health centers--would be necessary, particularly in explaining health status differences between communities, urban and rural areas, and regions in a country. Among the relevant variables would be the availability of communal water sources, the state of garbage and drainage disposal, the presence of a community health worker or a health facility in the community or the distance

to the nearest health facility and the staffing and hours of operation of the health facility.

Appendix 2 shows a sampling of questions on water and sanitation facilities to be asked on both the household and community levels. Note that these questionnaires make the well advised distinction between wet and dry season water sources and that they include questions on garbage disposal and drainage.

A factor that relates critically to health status but is frequently overlooked is seasonal change. Seasonal fluctuations have been observed in the incidence of specific infectious diseases as well as in conditions of poverty that relate closely to health. Table 3 shows a set of hypothesized seasonal variations based on findings reported in a Conference on Seasonal Dimensions to Rural Poverty. The summary overview paper from this conference suggests that the worst times of the year are the wet seasons:

> (This paper) examines seasonal factors which are adverse for rural people, especially in tropical countries. It finds a common scenario in agricultural communities in which the worst times of year are the wet seasons when, at the same time, there are food shortages, high food prices, high demands for agricultural work, and high exposure to infection, especially diarrhoeas, malaria, and guinea worm. These factors combine to make the wet season a time of stress and crisis for all, but especially for women, children, and the poorer families. The wet season is marked by loss of body weight, low birth weights, high neonatal mortality, poor diet and malnutrition, poor child care, sickness, indebtedness and loss of production through sickness and weakness. It is a time when many poor people become poorer (Chambers, et al. 1979).

Any health survey, or for that matter any survey on living standards, must be designed to account for seasonal variations in social, economic and environmental factors. Ideally, multiple rounds of the survey

Table 3: SEASONAL FLUCTUATIONS IN HEALTH AND POVERTY

Factors		Seasons						
		Dry			Wet			Harvest
		Early	Mid	Late	Early	Mid	Late	
Diseases	C-S Meningitis			-				
	Malaria					-	-	-
	Diarrhoea					-	-	-
	Guinea Worm					-	-	-
	Skin Infections					-	-	-
	Filariasis	-						
	Schistosomiasis	-						
	Yaws					-	-	
Energy, Food and Nutrition	Agricultural energy demand	(-)	+		-	-	-	-
	" " Men		+		-		(-)	-
	" " Women	(-)	+			-	(-)	-
	Food stocks	+	+		-	-	-	+
	Prices for food purchase	+	+		-	-	-	+
	Food quality	+	+			-	-	+
	Body weight/ energy balance	+	+		-	-	-	-/+
Economic	Debt and repayment factors			(-)	-	-	-	-
	Screws and ratchets	+	+		-	-	-	(-)
Social and Demographic	Child care	+	+		-	-	-	-
	Deaths	-	+	+		-	-	-
	Neo-natal deaths as % of births					-	-	
	Conceptions		H	H				
	Births						H	H

Key:-

+ = a positive, favourable, condition or effect
- = a negative, unfavourable, condition or effect
(-) = a less marked or less widespread negative, unfavourable condition or effect
H = High

1/ 'Screws' are factors that press down on a regular basis but from which people recover as the cycle continues. 'Ratchets' are the irreversible effects where disability or misfortune, often linked with erratic climatic occurrences, force an irreversible downward shift from which recovery is not possible.

Source: Chambers, et al. 1979.

should be planned in order to keep track of variables which fluctuate with the seasons. This is especially important for those factors which cannot be reliably recalled for a yearly survey such as expenditure patterns, health and nutritional status, and time allocation. Multi-round surveys are expensive, however. Furthermore, access to the worst off areas may be difficult if not impossible during the rainy season, a situation which only reinforces the bias in a single-round survey. If it is not feasible to maintain a multi-round survey on a national scale, the extra round(s) can be done on a subsample, including representation from the most affected areas. At the least, such an experiment can be done on a one-shot basis to provide some indication of the extent of the variation between seasons.

Finally, effective health planning requires a look beyond the technical inputs to health into the process by which households decide about individual members' health status and the factors that shape and constrain such decisions. These include cultural beliefs, social norms and the economic resources available to the family, as reflected in the socioeconomic characteristics of the household and its members. Among the factors most likely to relate to health status are the individual's sex, age and position in the family, the educational attainment of the parents (particularly of the mother), and the household's size, income, expenditure, landholding and social standing. These variables constitute the core household level data needed for policy-oriented analysis of health status information.

Suggestions for Data Presentation and Analysis

Data derived from the health module may be interpreted on several levels of complexity. For example, they may serve as simple indicators of general health status or they may be used as dependent or independent variables in a multi-variate analysis of household behavior and household welfare. Table 4 lists a number of health indicators applicable for comparison of health conditions across time periods or among different groups in the population in simple two-way or three-way tables. Group differentials in outcome measures would identify the disadvantaged groups in the population while differentials in access to or use of input measures could suggest possible points of intervention. Table 5 illustrates the use of functional disability data derived from the Batangas Pilot Survey shown in Appendix 1. Tables 6 and 7 show results from the Danfa Survey and Figures 1 to 4 are graphical presentations of results on use of services from the Bicol Survey.

Multivariate analysis would be useful in understanding the more complex relationships involved in the determination of health status. Two key questions should be addressed. First, how do the various input measures combine to produce a given health status? This implies the estimation of a health production function described earlier in this paper with any one of the three outcome measures as dependent variables and the various input measures as independent variables. Two special analytical problems must be dealt with in the estimation of health production functions. The first is the two-way relationship between nutritional status and morbidity experience. Very little is known to date about the sequencing and lags involved in this interactive relationship and care must be taken in setting up estimating

Table 4: AGGREGATE LEVEL HEALTH INDICATORS TO BE COMPUTED FROM DATA IN BASIC HEALTH MODULE

Outcome Measures

1. infant/child mortality rates
2. proportion of population ill sometime during last two weeks
3. average effective work/school days lost to illness
4. proportion of children stunted/wasted

Input Measures

1. proportion of households within five kilometers of a health facility
2. proportion of illness episodes for which trained medical personnel was consulted
3. proportion of children five years or below immunized against major childhood diseases
4. proportion of households with safe water source (i.e., piped-in water, standpipe or hand-pump)
5. proportion of households with access to latrines
6. average caloric consumption per household, per capita, or per consumption unit

Table 5: *SELECTED MORBIDITY DATA BY SEX, LOCATION, EMPLOYMENT, POVERTY, AND MARITAL STATUS: FOR A REFERENCE PERIOD OF TWO WEEKS. BATANGAS: SEPTEMBER 1974*

	Prevalance Rate of Morbidity	*Disability Rate by Degrees of Restriction**					*Average Duration of Disability (in days)*	*Days of Disability Per Capita*	*Days of Disability in Complete Disability Days Equivalent Per Capita*
		Total	*(1)*	*(3/4)*	*(1/2)*	*(1/4)*			
			(Percent)						
Male	15.93	13.80	8.69	1.50	1.43	2.18	6.02	.83	.69
Female	17.55	15.77	7.84	1.12	3.24	3.57	7.17	1.13	.70
Rural	17.23	15.29	8.07	1.43	2.46	3.33	6.03	.92	.67
Urban	12.69	11.06	7.95	.30	2.22	.59	8.15	.90	.70
Employed	16.94	15.23	9.01	.94	1.61	3.67	5.67	.86	.62
Unemployed	16.92	14.65	7.13	1.79	3.72	2.01	7.37	1.08	.80
Above the Poverty Line	10.11	8.91	2.64	.60	3.18	2.49	7.92	.71	.33
On the Poverty Line	12.76	11.12	6.29	1.08	1.96	1.79	4.54	.50	.39
Below the Poverty Line	19.98	17.33	10.13	1.55	2.58	3.47	6.90	1.22	.92
Single	11.53	8.98	3.93	1.25	2.86	.94	5.14	.46	.33
Ever Married	18.47	16.73	9.50	1.29	2.35	3.59	6.54	1.09	.80

* 1 – Completely disabled
3/4 – Three-fourths of normal activities not indulged in
1/2 – One half of normal activities not indulged in
1/4 – One fourth of normal activities not indulged in

NOTE: Poverty status is determined by self-assessment rather than by an objective income measure.

Source: Paqueo 1976

Table 6: ILLNESS, RESTRICTED ACTIVITY AND WORK LOSS IN 6,242 PERSONS AGED 15-64 DURING A TWO-WEEK PERIOD

		Number	Percentage
Persons interviewed		6,242	-
Persons with illness		1,789	28.7
Persons reporting restriction in activity		742	11.9
Persons reporting work loss		572	9.2
Reported work loss			
Total days	3,214		
Average days*	0.51		

* For total sample (6,242).

Table 7: RELATIONSHIP OF DISTANCE AND TRANSPORTATION TO THE USE OF CLINICAL SERVICES IN FOUR AREAS

Area	Percentage who used clinics	Availability of transportation	Distance to clinic (miles)*			
			Health post	Health post	Hospital	Private clinic
I	37.6	Good	-	<10	17	-
II	24.7	Good	<10	-	15	-
III	14.7	Poor	10	-	24	-
IV	20.4	Fair	-	-	14	10

* Miles to health facility from the centre of each area.

Source for Tables 6 and 7: Belcher, et. al. (1976).

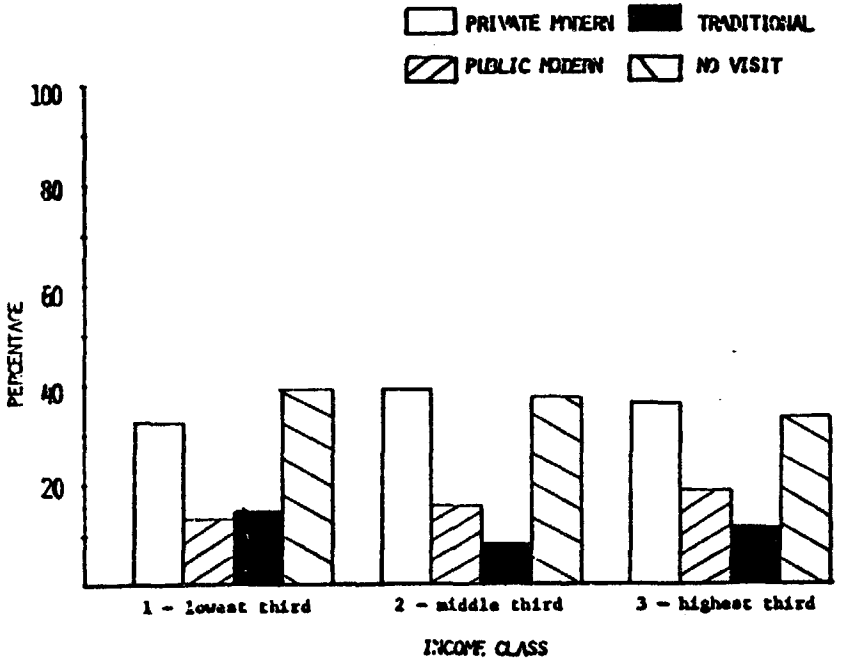
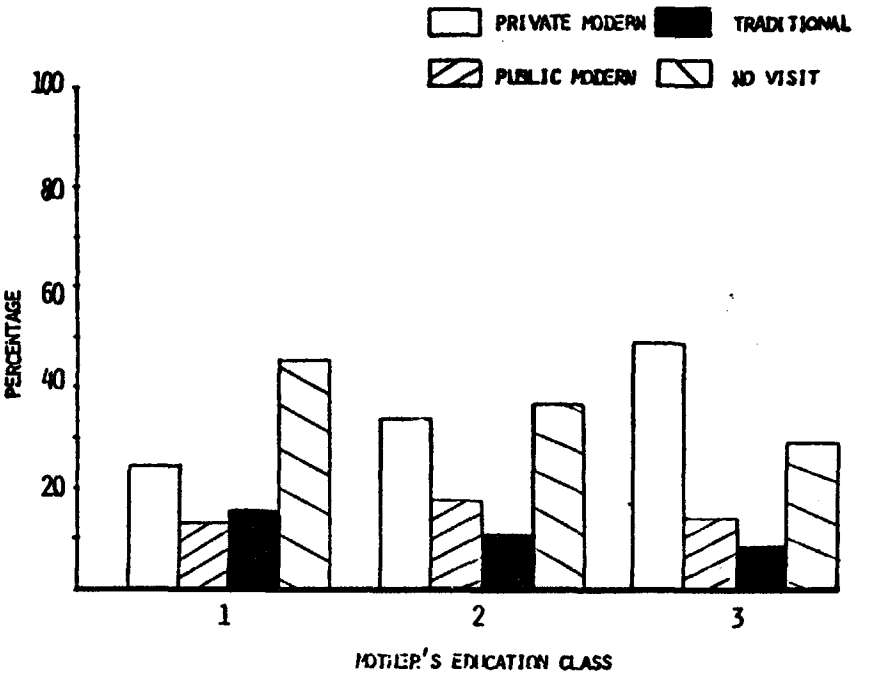


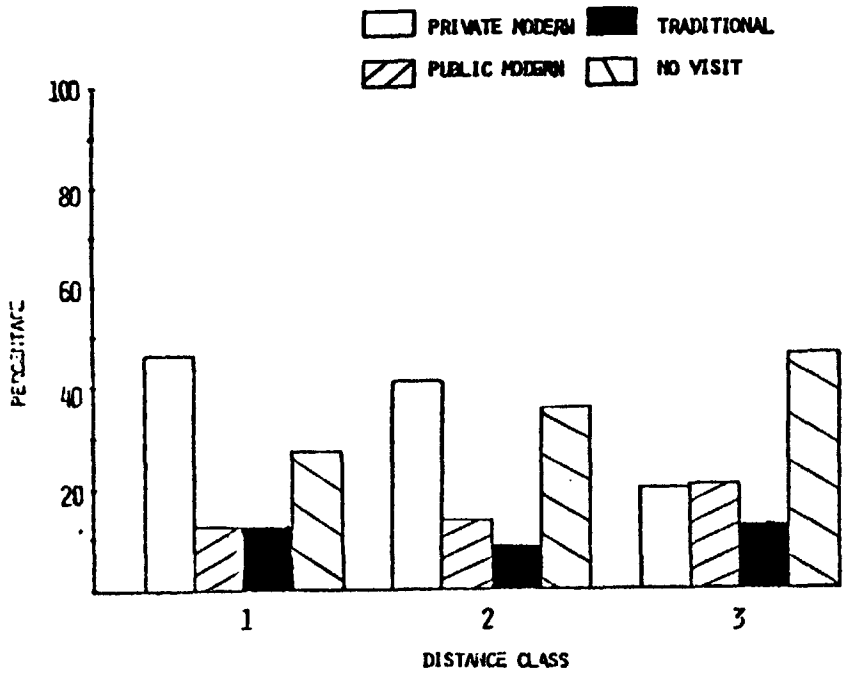
Figure 1: USE OF HEALTH SERVICES BY HOUSEHOLD INCOME

Source: Akin, et al 1980



* 1 = 0-6 YEARS of schooling (elementary school)
2 = 6-9 YEARS of schooling (high school)
3 = 9-17 YEARS of schooling (high school graduate and college)

Figure 2: USE OF HEALTH SERVICES BY MOTHER'S EDUCATION*



*DISTANCE-PRICE

1 = LOWEST THIRD, distance ranges from 0 to 2000 meters

2 = MIDDLE THIRD, distance ranges from 2500 to 8020 meters

3 = HIGHEST THIRD, distance ranges from 8035 to 35080 meters

Figure 3: USE OF ALL HEALTH SERVICES BY DISTANCE-PRICE OF PRIVATE MODERN MEDICAL FACILITIES *

Source: Akin, et al 1980

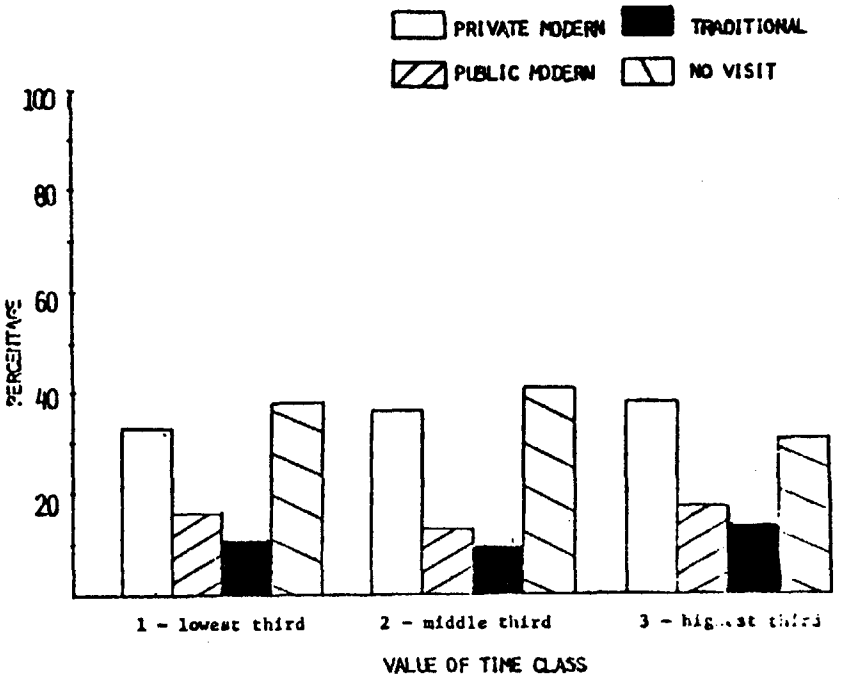


Figure 4: USE OF ALL HEALTH SERVICES BY VALUE OF MOTHER'S TIME IN USE OF PRIVATE MODEL MEDICAL FACILITIES

equations that will use cross-sectional data on a single point in time. Another problem is that of selectivity bias in the use of curative health services: while the use of these services should improve health status, the probability of using these services increases with a deterioration in health status. 1/ This could lead to a negative empirical relationship between health status and service-use instead of the positive relationship expected in the production function.

Estimation of a health production function will provide the technical coefficients that explain the link between health status and health inputs, hopefully identifying the most critical inputs in a particular setting or for a particular population. The second key step in the analysis would be to identify the socioeconomic correlates of access to or use of these health inputs, that is, to estimate demand functions for the various inputs. In particular, the determinants of health service use or of caloric consumption could be most useful in explaining differences in health and/or nutritional status of different groups in the population. The estimated demand functions will also be very useful for the design of cost recovery and pricing policies for public health services. In the analysis, it is important to account not only for the household and individual characteristics that determine demand but also for supply variables such as the availability and quality of health services in the community or the price of food. Table 8 presents the results of a multiple logit procedure to analyze the determinants of the choice of a particular type

---

1/ This problem is similar to that encountered in the use of family planning services, where couples with higher parity are more inclined to seek these services.

Table 8: MULTIPLE LOGIT ESTIMATION RESULTS: DETERMINANTS OF TYPE OF CHILD HEALTH SERVICE

$$\mathrm{Ln}\left(\frac{P(D_i)}{P(D_j)}\right) = X\beta_i$$

Coefficient (asymptotic t value in parentheses)

Type of Visit	Constant	Distances			Income Level	Mother's Level of Education	Time Cost		
		Private	Public	Traditional			Private	Public	Traditional
Modern public vs. Modern private	-.0301	.000001	-.00003	.00009	-.00001	-.071	.0002	-.0001	-.0003
	(-.061)	(.83)	(-1.36)	(.525)	(-.21)	(-1.26)	(1.01)	(-.62)	(-0.88)
Traditional vs. Modern private	-.1431	.00002	-.00001	-.0001	.00006	-.1227	.0002	-.0002	-.0002
	(-.27)	(2.05)	(-.729)	(-.46)	(1.03)	(-1.93)	(1.02)	(-0.99)	(-0.69)
Self-treatment at home vs. Modern private	.6472	.00002	-.00003	-.00002	-.00003	-.0429	.0004	-.0003	-.0003
	(1.65)	(2.04)	(-1.98)	(-.16)	(-.60)	(-0.997)	(2.07)	(-2.08)	(-1.05)

Source: Akin, et al 1980

Table 9: PREDICTED PROBABILITIES AND CHANGES IN PROBABILITIES, DEMAND FOR MODERN AND TRADITIONAL HEALTH SERVICES FOR CHILDREN AGED ZERO TO SIX YEARS 1/

	Private	Public	Traditional	Self-treatment
Probabilities at mean values of independent variables	.352	.163	.122	.363
Change in Probability when:				
Distance to private increased 1 S.D.†	-.089	-.011	.032	.067
Distance to public increased 1 S.D.	.066	-.022	.003	-.048
Distance to traditional increased 1 S.D.	.002	.018	-.012	-.007
Household income increased 1 S.D.	.007	-.005	.025	-.027
Mother's education increased 1 S.D.	.049	-.016	-.029	-.004
Value of mother's waiting time (PRIVATE) increased 1 S.D.	-.116	-.003	.001	.117
Value of mother's waiting time (PUBLIC) increased 1 S.D.	.234	.014	-.030	-.218
Value of mother's waiting time (TRADITIONAL) increased 1 S.D.	.173	-.048	-.025	-.100

1/ Based on Table 8 results for the multiple logit estimation of the model.

† S.D. = Standard Deviation

Source: Akin, et al 1980

of health service (modern private, modern public, traditional or self-treatment) using data from the Bicol Multipurpose Survey. Table 9 shows predicted probabilities and changes in such probabilities of demand for each type of health service based on the results of Table 8. These results, taken from Akin et al. (1980), are the only example of multivariate analysis of health services demand functions for an LDC that this author could find.

An alternative approach to the analysis of health status data would be to collapse the above two-part procedure into a single reduced-form estimate of a demand for health function. This is illustrated by Grossman's (1972) classic estimates of demand for health, two examples of which are given in Table 10. These equations would not be helpful in the evaluation of health-specific inputs for the improvement of health status but they do predict the changes in health status that could result from improvements in general economic conditions.

The outcome of the above analyses should be an understanding of the present state of health in a given population, of the factors that determine that state of health, and of the policy instruments through which it can be improved. As a side product, the analyses would answer at least partially a question raised at the outset of this paper on the extent to which income information alone can be assumed to represent variations in this one important component of the standard of living. What it does not do is look at the influence that health status in turn has on the level of income or on the various other factors that affect income. Principal among these are the effect of health status on the productivity of the work force or on the performance of

Table 10: DEMAND FOR HEALTH FUNCTIONS

Independent Variable \ Dependent Variable	Work-Loss Days 1/	Restricted Activity Days
ln (income)	-.280 (-2.03)	-.282 (-1.97)
ln (wage)	.554 (4.01)	.392 (2.74)
education	.046 (2.87)	.046 (2.77)
age	-.006 (-1.67)	.009 (-2.17)
sex	.010 (.08)	-.072 (-.54)
ln (family size)	.251 (2.46)	.226 (2.15)
$\bar{R}^2$	.087	.063

1/ Adjusted for variations in weeks worked.

Source: Grossman (1972).

children at school. While these issues are not pursued here, they are important applications of the health status data just described and are further examples of the usefulness of a data set that combines health status and socioeconomic data in a single survey.

Appendix 1

THREE SAMPLE MORBIDITY QUESTIONNAIRES

Example I: Batangas Pilot Survey on Social Indicators, Philippines

1. Were you ever sick during the past 2 weeks?

2. What were you sick of?

3. How many days were you sick?

4. During this period, to what extent were you limited by your sickness in performing your normal routine?
   Please specify disability in terms of the following numbers (show Card).

DISABILITY CARD	Disability
Not disabled	0
Only 1/4 of normal activities not indulged in	1/4
One-half of normal activities not indulged in	1/2
Three-fourths of normal activities	3/4
Completely disabled - no normal activities	1

Source: Paqueo (1973).

Example II: Danfa Comprehensive Rural Health and Family Planning Project, Ghana

Questions asked in the Morbidity Interview

1.	Did you have any sickness, injury, dental condition or disability during the last two weeks? (If no, end interview.)	Record 1, 2, 3, etc. conditions in the order given
2.	Was this the first time you had ...? Have you had it before? Has ... been present for more than two weeks?	Record as new, recurrent, or over two weeks' duration
3.	Did ... keep you from performing all of your usual activities? Were you completely disabled? Did the condition cause you to lose time from work (school)?	Record the number of days of restriction or disability and any work (school) loss
4.	During the past two weeks did you go to see anyone about ...?	Record place(s), person(s) visited, number of visits, hospital bed days, distance travelled, and any expenses incurred.

Source: Belcher, et al. (1976).

Example III: Bicol Multipurpose Household Survey, Philippines

A. Morbidity cases

(SAY TO R): Let us continue to talk only about your nuclear family--yourself, your husband, and your children.

8.1 (ACUTE DISEASES, PAST MONTH): Did you or any member of your family get sick at any time during the past 30 days?

1 Yes (PROCEED TO Q.8.2) 2 No (SKIP TO Q.8.22)

RECORD REPLIES TO QQ.8.2-8.21 BELOW IN CHART 8.01 OF REPLY FORM.

8.2 Who was this/were these family member(s)?

REFER TO CHART 1.01 EARLIER FOR NAME AND CODE NUMBER OF SPECIFIC INDIVIDUALS. MAKE SURE ONLY MEMBERS OF THE HH ALIVE WITHIN THE PERIOD OF ORIENTATION ARE INCLUDED.

8.3 What is the name of his/her illness? ASK OF EACH FAMILY MEMBER WHO WAS SICK.

IF NAME OF ILLNESS IS NOT KNOWN, PROBE: What major symptoms were noticed? Which major organ was affected?

8.4 How serious was his/her illness? ASK OF EACH FAMILY MEMBER WHO WAS SICK.

1 Very serious 3 Not serious
2 Serious 8 DK/NA

8.5 How many days was he/she sick? ASK OF EACH FAMILY MEMBER WHO WAS SICK.

USE TWO DIGITS FOR REPLIES: 00 FOR ONE-HALF DAY, 01 FOR ONE DAY, 02 FOR TWO DAYS, ETC.

88 DK/NA

8.6 Was (MENTION EACH FAMILY MEMBER WHO WAS SICK) kept from working/going to school?

1 Yes (PROCEED TO Q.8.7) 2. No (SKIP TO Q.8.8)

8.7. How many days was he/she kept from working/going to school? ASK OF EACH SICK FAMILY MEMBER WHO WAS UNABLE TO WORK/GO TO SCHOOL.

USE TWO DIGITS FOR REPLIES, AS IN Q.8.5, ABOVE.

88 DK/NA 99 NAP (not prevented from working/going to school)

8.8. Was someone consulted during the course of the illness?
ASK OF EACH FAMILY MEMBER WHO WAS SICK.

1 Yes (PROCEED TO Q.8.9)
2 No (SKIP TO Q.8.12)

8.9. Who was consulted?
ASK OF EACH FAMILY MEMBER WHO WAS SICK AND FOR WHOM CONSULTATION WAS MADE.

01 Doctor
02 Nurse
03 Pharmacist
04 Midwife
05 Sanitary inspector
06 Health aide
07 Herbolario/hilot (indigenous health practitioner)
08 Relatives/friends
77 Others (specify)_____
88 DK/NA
99 NAP (no one was consulted)

8.10. How many days after the onset of the illness was this person consulted?
ASK OF EACH FAMILY MEMBER WHO WAS SICK AND FOR WHOM CONSULTATION WAS MADE.

00 At onset of illness
01 One day after onset (second day of illness)
02 Two days after onset (third day of illness), etc.
88 DK/NA
99 NAP (no one was consulted)

8.11. Where did the consultation take place?
ASK OF EACH FAMILY MEMBER WHO WAS SICK AND FOR WHOM CONSULTATION WAS MADE.

1 At sick person's home
2 Not at sick person's home
8 DK/NA
9 NAP (no one was consulted)

8.12. Was (MENTION EACH FAMILY MEMBER WHO WAS SICK) brought to or treated in a health facility?

1 Yes (PROCEED TO Q.8.13)
2 No (SKIP TO Q.8.19)
88 DK/NA

8.13. What type of health facility was this?
ASK OF EACH SICK FAMILY MEMBER WHO WAS BROUGHT TO A HEALTH FACILITY.

01 Hospital (public)
02 Clinic (private)
03 RHU/CHO
04 Puericulture center
05 Nutrition center (malnutrition ward)
06 Herbolario/hilot's house
07 Hospital (private)
77 Others (specify) _____
88 DK/NA
99 NAP (not brought to health facility)

8.14. Is the health facility public or private?
ASK OF EACH SICK FAMILY MEMBER WHO WAS BROUGHT TO A HEALTH FACILITY.

1 Public
2 Private
8 DK/NA
9 NAP (not brought to health facility)

8.15. How much time (IN MINUTES) was spent in the total visit to the facility, that is, from the time of arrival to the time of departure?
ASK OF EACH SICK FAMILY MEMBER WHO WAS BROUGHT TO A HEALTH FACILITY.

USE THREE DIGITS FOR REPLY: 005 FOR FIVE MINUTES, 010 FOR TEN MINUTES, ETC. IF TIME IS GIVEN IN HOURS, CONVERT HOUR(S) TO MINUTES.

888 DK/NA
999 NAP (not brought to health facility)

8.16. How much time (IN MINUTES) was spent being examined at the health facility?
ASK OF EACH SICK FAMILY MEMBER WHO WAS BROUGHT TO A HEALTH FACILITY.

USE THREE DIGITS FOR REPLY, AS IN Q.8.15.

000 Health facility had no nurse/midwife
888 DK/NA
999 NAP (not brought to a health facility)

8.17. Was the sick person confined at the health facility?

1 Yes (PROCEED TO Q.8.18)
2 No (SKIP TO Q.8.19)
8 DK/NA
9 NAP (not brought to a health facility)

8.18. How much in all was spent for this sick person's treatment, confinement, and care?
ASK OF EACH SICK FAMILY MEMBER WHO WAS BROUGHT TO A HEALTH FACILITY.

RECORD TOTAL AMOUNT DOWN TO CENTAVOS; USE SIX DIGITS. INCLUDE COSTS FOR DOCTOR, HILOT, ETC. VISITS, BILLS FOR TREATMENT PLUS ANY INSTITUTIONAL STAY (E.G., HOSPITAL ROOM), AS WELL AS PAYMENT IN CASH AND KIND.

888888 DK/NA
999999 NAP (not brought to health facility)

8.19. How much was spent for the care and treatment of this sick person?
ASK OF
EACH SICK FAMILY MEMBER WHO WAS NOT BROUGHT TO A HEALTH FACILITY.

RECORD TOTAL AMOUNT DOWN TO CENTAVOS; USE SIX DIGITS.

888888 DK/NA 999999 NAP (brought to health facility)

8.20. Was any medicine purchased for this sick person?
ASK OF EACH FAMILY MEMBER WHO WAS SICK.

1 Yes (PROCEED TO Q.8.21) 8 DK/NA
2 No (SKIP TO Q.8.22)

8.21. What was the total cost of this medicine?
ASK OF EACH SICK FAMILY MEMBER FOR WHOM MEDICINE WAS PURCHASED.

RECORD TOTAL AMOUNT DOWN TO CENTAVOS; USE FIVE DIGITS.

88888 DK/NA 00000 No purchases for medicine

8.22. (DISABILITIES, PRESENT): Do you or any member of the family have any of the following disabilities at present? READ OUT DISABILITIES LISTED BELOW:

01 Disorders of vision such as blindness
02 Disorders of hearing such as deafness
03 Paralysis, partial, i.e., loss of sensation and movement in 2 extremities or less
04 Paralysis, total, i.e., loss of sensation and movement in 4 extremities
05 Harelip and cleft palate
06 Speech defects
07 Dental caries

1 Yes, to one or more of the disabilities (PROCEED TO Q.8.23)
2 No, to all of the disabilities (SKIP TO Q.8.31)

RECORD REPLIES TO QQ.8.23-8.30, BELOW, IN CHART 8.02 OF REPLY FORM.

8.23-8.24. Who is/are this/these household member(s), and the respective disability(ies)?

IF HH MEMBER HAS MORE THAN ONE DISABILITY, INDICATE THE DIFFERENT DISABILITIES BY SEPARATING THE DISABILITY CODE NUMBERS WITH A SEMI-COLON (;).

8.25. To what extent is he/she bothered at present in his/her everyday activities as a result of this condition?
ASK OF EACH FAMILY MEMBER WITH A DISABILITY.

0 None (not bothered at all)
1 25% of the time
2 50% of the time
3 More than 50% of the time

8.26. Did this condition keep (EACH FAMILY MEMBER WITH A DISABILITY) from working/attending school in the past month?

1 Yes (PROCEED TO Q.8.27)
2 No (SKIP TO Q.8.28)

8.27. How many days was he/she kept from working/going to school?
ASK OF EACH FAMILY MEMBER WITH A DISABILITY, WHO WAS UNABLE TO WORK/GO TO SCHOOL.

USE TWO DIGITS FOR REPLY: 00 FOR ONE-HALF DAY, 01 FOR ONE DAY, 02 FOR TWO DAYS, ETC.

88 DK/NA
99 NAP (not prevented from working/going to school)

8.28. Is (MENTION EACH HH MEMBER WITH A DISABILITY) under medical supervision at present?

1 Yes (PROCEED TO Q.8.29)
2 No (SKIP TO Q.8.30)

8.29. Who is the health personnel that attends to him/her at present?
ASK OF EACH HH MEMBER WITH A DISABILITY WHO IS UNDER MEDICAL SUPERVISION.

01 Doctor
02 Nurse
03 Pharamcist
04 Midwife
05 Sanitary inspector
06 Health aide
07 Herbolario/hilot
08 Relatives/friends
77 Others (specify) _____
88 DK/NA
99 NAP (not under medical supervision)

8.30. During the past year, how much was spent for the treatment of (MENTION EACH HH MEBER WITH A DISABILITY) relative to his/her disability?

RECORD TOTAL AMOUNT DOWN TO CENTAVOS; USE SIX DIGITS.

000000 (treated but no expenses incurred)
888888 DK/NA
999999 NAP (not treated during the past year)

Appendix 2

SAMPLE WATER AND SANITATION QUESTIONNAIRE

Bicol Multipurpose Household Survey, Philippines

Part I: Household Questionnaire

2.23. (Water, dry season): What is your usual source of drinking water during the dry season?

01	Piped, in house	06	Open well
02	Pump, in house	07	Spring, river, lake
03	Pump or piped, in yard	08	Purchased
04	Pump or piped, public	77	Others (Specify) _____
05	Rainwater, houseyard or roof storage	88	DK/NA

2.24. (IF R ANSWERED 03 to 08, or 77): How far (IN METERS) is this source from this house? _____ meters.

2.25. (Water, wet season): What is your usual source of drinking water during the wet season?

CODE AS IN Q.2.23.

2.26. (IF R ANSWERED 03 to 08, or 77): How far (IN METERS) is this source from this house? _____ meters

2.27. (Storage): Do you store your drinking water?

1 Yes (PROCEED TO Q.2.28) 2 No (SKIP TO Q.2.29)

2.28. (IF STORES WATER): What kind of container do you use for storing your drinking water?

01	Water tank	05	Plastic containers
02	Jar, earthen	06	Bottles
03	Drum/banyera	77	Others (specify)_____
04	Cans (tin)		

2.29. (Water treatment): Do you or any member of the household usually treat water before drinking?

1 Yes (PROCEED TO Q.2.30) 2 No (SKIP TO Q.2.31)

2.30. What is the main method used?

1	Boiling	7	Others (specify) _____
2	Chlorination		_____
3	Filtration		

2.31. (Toilet facilities): What kind of toilet facilities do you have?

0 None (open fields, rivers, etc.)
1 Flush, inside house
2 Flush, outside house
3 Water sealed, inside house
4 Water sealed, outside house
5 Antipolo
6 Open pit
7 Others (specify) _____
8 DK

2.32. (Excreta disposal): ASK TO SEE THE FACILITY MENTIONED. WHAT IS THE GENERAL CONDITION OF THE AREA AS REGARDS EXCRETA REMOVAL? (OBSERVE)

1 Heavy defecation in area
2 Some defecation in the area
3 Very little excreta visible
4 No excreta visible

2.33. (Garbage): What is your main method of garbage disposal?

1 Collected by the garbage collector
2 Burning
3 Composting (decaying fertilizer)
4 Dumping
7 Others (specify) _____
8 DK/NA

2.34. (Drainage): IS THE AREA AROUND AND/OR UNDER THE HOUSE DRY, OR IS THERE STAGNANT WATER AROUND AND/OR UNDER THE HOUSE: (OBSERVE)

1 Area around and/or under the house is dry
2 Stagnant water around and/or under the house
8 DK

Part II: Community Questionnaire

7.1. Main source of drinking water supply in barangay during the dry season:

1 Piped into homes
2 Pump or piped in houseyard
3 Pump, public or communal
4 Rainwater, houseyard/roof storage
5 Open well
6 Water purchased
7 Spring, river, pond, lake, etc.

7.2. Main source of drinking water supply in barangay during the wet season:

1 Piped into homes
2 Pump or piped in houseyard
3 Pump, public or communal
4 Rainwater, houseyard/roof storage
5 Open well
6 Water purchased
7 Spring, river, pond, lake, etc.

7.3. Condition of water supply availability during the dry season:

1 Good/sufficient water supply
2 Moderate/barely adequate
3 Inadequate
4 Very inadequate

7.4. Condition of water availability during the wet season:

1 Good/sufficient water supply
2 Moderate/barely adequate
3 Inadequate
4 Very inadequate

7.5. Condition of water drainage in the main barangay roads:

1 No ditches/drains; stagnant water is present
2 Ditches are present but ineffective (stagnant water is present, especially during the wet season)
3 Good flow of water in ditches (i.e., an effective system of drainage exists)

7.6. Normal toilet-use pattern in the barangay:

1 Septic tanks are used
2 Pit privies are used
3 Open drainage ditches are used
4 Defecation in the river or lake

7.7. Describe the sanitary conditions in terms of the excreta removal source: (OBSERVE)

1 Heavy defecation in the area
2 Occasional defecation in the area
3 See very little excreta
4 See almost no excreta

Appendix 3

THE ROLE OF HOUSEHOLD-BASED HEALTH SURVEYS IN A HEALTH INFORMATION SYSTEM 1/

Most health information systems have three principal sources of data:

1) vital events register;

2) routine health service data;

3) epidemiological surveillance data.

Vital events registers are, in theory, supposed to record all births and deaths and hence serve as the primary source of mortality data. In many developing countries, vital events registers either do not exist at all, cover only selected parts of the country or, at best, suffer from gross underreporting. One major cause of underreporting is the failure to report births (and deaths) of infants that die soon after birth. When this happens, infant mortality rates derived from vital events registers are understated, a typical situation particularly among those countries with the highest mortality rates.

Official data on the prevalence or incidence of disease are derived principally from clinic records maintained at health centers. Records of immunization and possibly of height and weight of children could also be derived from such records, particularly from maternal and child health centers. Epidemiological surveillance for certain endemic diseases are another source of data, though these are generally confined to specific diseases and specific populations or geographical areas in a country.

1/ This discussion draws heavily from WHO (1980), pp. 29-36.

In general, record keeping in all but the largest health facilities tends to be of unreliable quality. In addition, even with well-kept records, the health service reporting system can only partially describe the health status of the population it is meant to serve since it covers only those cases for which its services have actually been used. Clearly, even the most efficient health service system cannot make contact with all cases of illness or every mother and child needing care. Furthermore, this incomplete coverage tends to paint a picture unrepresentative of the general population since the group that tends to have the most need of the services, the poorest in the population, are often unable to use them because of the high cost of the services or of reaching to sparsely distributed health facilites. Thus, health service records are limited as a source of data both for measuring morbidity rates (since they do not record all cases) or service utilization rates (since they do not identify the base population, i.e., all those in need).

Health information systems based on these traditional data sources are likely to improve as coverage by the health system itself improves. In particular, moves to promote primary health care delivery as the mainstay of the health delivery system may effectively bring health services closer to more people. If monitoring and recording are carefully designed and maintained at the primary health care level, a broadly based health information system could eventually be built around primary health care reporting. 1/ It will be years, however, before this system can take root over wide enough

---

1/ The WHO has designed a system by which lay or paramedical personnel attached to the primary health care system can be made responsible for collecting vital events data and other basic health data for surveillance and health planning purposes (WHO 1978).

areas in most developing countries to generate data representative of the country as a whole. In the meantime, alternative data sources must be explored to complement existing data systems. The most promising of these is the household sample survey.

Appendix Table 3.1 lists the various health indicators proposed in this paper and the traditional sources of data for these indicators. It also shows how all but one of these indicators can be derived from corresponding data collected through household-based sample surveys. If designed properly, the household survey has the advantage of reaching a more representative sample of the population than other health data sources. Hence, it is the best means by which to estimate the extent of the health problem or the size of the population in need of health services. In addition, it makes possible the collection of related socioeconomic information that may be linked to health status and would be useful in identifying special target groups for health planning and programming.

The main disadvantage of the household survey approach is its high cost. Such high costs may further rise above normal when the sampling needs of the variables of interest require unusually large samples. This is the case for mortality data (and related birth data) which, because of the infrequent occurrence of births and deaths, require larger samples to get statistically meaningful results.

In addition to sampling requirements, the costs of any health survey could rise dramatically when the information sought requires observation of the subject by trained medical personnel and/or any clinical or biochemical tests. In this case cost and other logistical constraints would

Appendix Table 3.1: SOURCES OF DATA FOR RECOMMENDED INDICATORS

P = primary source A = alternative source

INDICATOR \ SOURCE OF DATA	Vital events register	Routine health service data	Epidemiological surveillance	Household survey
Outcome Indicators				
Life expectancy	P			
Infant mortality	P			A
Child mortality	P			A
Disease-specific morbidity		P	P	A
Functional disability				P
Height and weight		P		A
Input Indicators				
Water and sanitation				P
Physical accessibility of health facility		P		A
Utilization of health facility		P		A
Coverage with immunization		P	P	A
Population/health personnel ratio		P		

Source: WHO 1980, Table 1, p. 31 (with minor revisions).

severely limit the size of the sample to be covered. One promising compromise would be to invest some extra time in training lay interviewers to recognize symptoms of at least the most important diseases using the WHO's system for such training. The resulting enhancement of the morbidity outcome measure would greatly increase the value of the health questionnaire and is likely to more than compensate for the extra cost of training in the long run. In this case, the household based sample survey built around the health module described in this paper would serve well in filling a wide gap in the information needs of most existing health systems.

Bibliography

Acharya, Meena. "Time Use Data and Living Standards Measurement Study" (Draft). July 1981.

Akin, John S., David K. Guilkey and Barry M. Popkin. "The Demand for Child Health Services in the Philippines," Social Science and Medicine (in press). March 26, 1980.

Becker, Gary S. "A Theory of the Allocation of Time," Economic Journal, 75 no. 299 (September 1965): 493-512.

Belcher, D.W., F.K. Wurapa, A.K. Neumann and I.M. Lourie. "A Household Morbidity Survey in Rural Africa," International Journal of Epidemiology, 5 and 2, Oxford University Press (1976): 113-120.

Birdsall, Nancy. "Child Schooling and the Measurement of Living Standards" World Bank LSMS Working Paper No. 14, April 1982.

Bush, J.W., Milton M. Chen and Donald L. Patrick. "Social Indicators for Health Based on Function Status and Prognosis," Proceedings of the American Statistical Association, Social Statistics Section, Washington, D.C., the Association, 1972:71.

Chambers, Robert, Richard Longhurst, David Bradley and Richard Feachem. "Seasonal Dimensions to Rural Poverty: Analysis and Practical Implications." University of Sussex Institute of Development Studies Discussion Paper No. 142, February 1979.

Chiang, C.L. An Index of Health: Mathematical Models, U.S. Department of HEW, Public Health Service, Publication No. 1000, Series 2, No. 5 (May 1965).

Cochrane, A.L. "The History of the Measurement of Ill Health," International Journal of Epidemiology 1 no. 2, Oxford University Press 1972.

Cochrane, Susan H., Donald J. O'Hara and Joanne Leslie. The Effects of Education on Health. World Bank Staff Working Paper No. 405, July 1980.

Ghana Health Assessment Project Team. "A Quantitative Method of Assessing the Health Impact of Different Diseases in Less Developed Countries." International Journal of Epidemiology, 10 no. 1 (1981): 73-80.

Goldsmith, Seth B., Sc.D. "The Status of Health Status Indicators," Health Services Reports 87 no. 3 (March 1972): 212-220.

Goldsmith, Seth B. "A Reevaluation of Health Status Indicators," Health Services Reports 88 no. 10 (Dec. 1973): 937-941.

Granger, Carl V., M.D. and David S. Greer, M.D. "Functional Status Measurement and Medical Rehabilitation Outcomes," Archives of Physical and Medical Rehabilitation 57 (March 1976): 103-109.

Grossman, Michael. "On the Concept of Health Capital and the Demand for Health," Journal of Political Economy 80 no. 2 (March/April 1972): 223-255.

Habicht, J.P., R. Martorell, C. Yarbrough, R.M. Malina and R.E. Klein. "Height and Weight Standards for Preschool Children: How Relevant are Ethnic Differences in Growth Potential?", Lancet 1 (1974): 611-615.

Martorell, Reynaldo. "Nutrition and Health Status Indicators: Suggestions for Surveys of the Standard of Living in Developing Countries." World Bank Population and Human Resources Division Discussion Paper No. 81-32, June 1981 (also available as World Bank LSMS Working Paper No. 13, Feb. 1982).

O'Hara, Donald J. "Toward a Model of the Effects of Education on Health" in Susan H. Cochrane, Donald J. O'Hara and Joanne Leslie, The Effects of Education on Health. World Bank Staff Working Paper No. 405, July 1980.

Paqueo, Vicente. "Social Indicators for Health and Nutrition" in Mahar Mangahas (ed.), Measuring Philippine Development (Report of the Social Indicators Project), Development Academy of the Philippines, 1976.

Patrick, Donald L., J. W. Bush and Milton M. Chen. "Toward an Operational Definition of Health," Journal of Health and Social Behavior 14 (March 1973): 6-23.

R sser, Rachel and Paul King. "A Scale of Valuations of States of Illness: Is there a Social Consensus?", International Journal of Epidemiology 7 no 4, Oxford University Press 1978:L349-358.

Sullivan, Daniel F. "A Single Index of Mortality and Morbidity." HSMHA Health Reports 86 No. 4 (April 1971): 347-354.

Sullivan, J.M., S. H. Cochrane and W. D. Kalsbeek "Procedures for Collecting and Analyzing Mortality Data in LSMS" (Draft). March 1982.

Torrance, George W. "Health Status Index Models: A Unified Mathematical View," Management Science 2 no. 9 (May 1976): 990-1001.

World Bank. World Development Report, 1980.

World Bank. World Development Report, 1981.

WHO. Lay Reporting of Health Information. Geneva, 1978.

WHO. "Indicators for Monitoring Progress Towards Health for all by the Year 2000" (Draft). October 1980.

The World Bank
Publications Order Form

SEND TO: **YOUR LOCAL DISTRIBUTOR** OR TO **WORLD BANK PUBLICATIONS**
(See the other side of this form.)
P.O. BOX 37525
WASHINGTON, D.C. 20013 U.S.A.

Date _____

Name _____

Title _____

Firm _____

Address _____

City _____ State _____ Postal Code _____

Country _____ Telephone (_____) _____

Purchaser Reference No. _____

Ship to: (Enter if different from purchaser)

Name _____

Title _____

Firm _____

Address _____

City _____ State _____ Postal Code _____

Country _____ Telephone (_____) _____

Check your method of payment.
Enclosed is my ☐ Check ☐ International Money Order ☐ Unesco Coupons ☐ International Postal Coupon.
Make payable to World Bank Publications for U.S. dollars unless you are ordering from your local distributor.

Charge my ☐ VISA ☐ MasterCard ☐ American Express ☐ Choice. (Credit cards accepted only for orders addressed to World Bank Publications.)

_____ Credit Card Account Number _____ Expiration Date _____ Signature

☐ Invoice me and please reference my Purchase Order No. _____.

Please ship me the items listed below.

Stock Number	Author/ Title	Customer Internal Routing Code	Quantity	Unit Price	Total Amount $

All prices subject to change. Prices may vary by country. Allow 6-8 weeks for delivery.

Subtotal Cost $_____

Total copies _____ Air mail surcharge if desired ($2.00 each) $_____

Postage and handling for more than two complimentary items ($2.00 each) $_____

Total $_____

Thank you for your order.

IBRD-0053

DISTRIBUTORS OF WORLD BANK PUBLICATIONS

ALGERIA
Office des Publications Universitaires
1, place centrale de Ben-Aknoun
Algiers
Tel: 60-44-60, 60-54-60, 53 534

ARGENTINA
Cálies Hirsch, SRL
Galeria Guemes
Florida 165, 4th Floor-Ofc. 453/465
1333 Buenos Aires
Tel: 30-7122, 33-1787

AUSTRALIA, PAPUA NEW GUINEA, FIJI, SOLOMON ISLANDS, AND VANUATU
Info-Line
Overseas Document Delivery
Box 506, GPO
Sydney, NSW 2001
Australia
Tel: (02) 282-1614

AUSTRIA
Gerold and Co.
A-1011 Wien
Graben 31
Tel: (0222) 52 22 35

BAHRAIN
MEMRB
P.O. Box 22103
Manama Town 317
Tel: 232934

BANGLADESH
Micro Industries Development Assistance Society (MIDAS)
G.P.O. Box 800
Dhaka
Tel: 326427

BELGIUM
Publications des Nations Unies
Av. du Roi 202
1060 Brussels
Tel: 021538.51.69

BRAZIL
Publicacoes Tecnicas Internacionais Ltda.
Rua Peixoto Gomide, 209
01409 Sao Paulo, SP
Tel: (011) 257-1640, 258-8167, 258-8442

CANADA
Le Diffuseur
C.P. 85, 1501 rue Ampère
Boucherville, Quebec
Canada J4B 5E6
Tel: (514) 641-1334

CHILE
Editorial Renacimiento
Miraflores 354
Santiago
Tel: 35244

COLOMBIA
Enlace Ltda.
Apartado Aero 34270
Bogota D.E.
Tel: 245-0645

COSTA RICA
Libreria Trejos
Calle 11-13
Av. Fernandez Guell
San Jose
Tel: 303-2858 USA

CYPRUS
MEMRDB
P.O. Box 2098
Nicosia
Tel: 21-99333

DENMARK
SamfundsLitteratur
Rosenoerns Alle 11
DK-1970 Copenhagen V
Tel: 01-35 19 42

EGYPT, ARAB REPUBLIC OF
Al Ahram
Galaa Street
Cairo
Tel: 758333

FINLAND
Akateeminen Kirjakauppa
P.O. Box 128
SF-00101
Helsinki 10
Tel: 651-1221121

FRANCE
World Bank Publications
66 Avenue d'Iéna
75116 Paris
Tel: 723-54-21

GERMANY, FEDERAL REPUBLIC OF
UNO-Verlag
D-5300 Bonn 1
Simrockstrasse 23
Tel: (0228) 21 29 40

GREECE
MEMRB
24, Ippodamou Street
Athens-11635
Tel: 7018082, 7016965

HONG KONG, MACAU
Asia 2000 Ltd.
6 Fl., 146 Prince Edward Road, W,
Kowloon
Hong Kong
Tel: 3-805294/5

INDIA
UBS Publishers' Distributors Ltd.
Post Box 7015
Ansari Road
New Delhi 110002
Tel: 273601-3
10 First Main Road
Gandhi Nagar
Bangalore 560009
Tel: 28044, 29206
Apeejay Chambers, P.O. Box 736
5 Wallace Street
Bombay 400001
Tel: 260562, 260827, 266971
8/1-B, Chowringhee Lane
Calcutta 700016
Tel: 212451, 249473
7/188, 1(CA), Swarup Nagar
Kampu 208002
Tel: 81300
Sivaganga Road
Nungambakkam
Madras 600034
Tel: 476355

INDONESIA
Pt. Indira Limited
Jl. Sam Ratulangi 37
Jakarta Pusat
P.O. Box 181
Tel: 881-018

IRELAND
TDC Publishers
12 North Frederick Street
Dublin 1
Tel: 744835

ITALY
Licosa Commissionaria Sansoni SPA
Via Lamarmora 45
Casella Postale 552
50121 Florence
Tel: 579.751/2/3

IVORY COAST
Centre d'Edition et de Diffusion Africaines (CEDA)
04 B.P. 541
Abidjan 04 Plateau
Tel: 22-20-55 and 32-60-02

JAPAN
Eastern Book Service (EBS)
37-3, Hongo 3-Chome, Bunkyo-ku 113
Tokyo
Tel: (03) 438-2611

JORDAN
MEMRB
P.O. Box 3143
Jabal
Amman

KENYA
Africa Book Service (E.A.) Ltd.
P.O. Box 45245
Nairobi
Tel: 23641/330272

KOREA, REPUBLIC OF
Pan Korea Book Corporation
P.O. Box 101, Kwangwhamun
Seoul
Tel: 723-1421

KUWAIT
MEMRB
P.O. Box 5465
Kuwait
Tel: 421843

MALAYSIA
University of Malaya Cooperative Bookshop, Limited
P.O. Box 1127, Jalan Pantai Baru
Kuala Lumpur 22-11
Tel: 565-000

MEXICO
INFOTEC
San Lorenzo 153-11, Col. del Valle Deleg. Benito Juarez
03100 Mexico City D.F.
Tel. 559-5211

MOROCCO
MEMRB
2, rue Molière Racine
Casablanca
Tel: 259461

THE NETHERLANDS
Medical Books Europe, BV (MBE)
Noorderwal 38,
7241 BL Lochem
Tel: 05730-4866

NEW ZEALAND
R. Hill and Son Ltd.
Private Bag
New Market
Auckland
Tel: 54-8119

NIGERIA
University Press Limited
Three Crowns Building Jericho
Private Mail Bag 5095
Ibadan
Tel: 0-22 411356

NORWAY
Tanum-Karl Johan, A.S.
P.O. Box 1177 Sentrum
Oslo 1
Tel: (02) 80 12-60

PAKISTAN
Mirza Book Agency
65, Shahrah-e-Quaid-e-Azam
P.O. Box No. 729
Lahore 3
Tel: 66839

PANAMA
Ediciones Libreria Cultural
Panamena, S.A.
Av. 7, Espana 16
Panama Zone 1
Tel. 23-5628

PERU
Editorial Desarrollo SA
Apartado 3824
Ica 242, Of. 106
Lima 1
Tel. 28-53-80

THE PHILIPPINES
National Book Store
P.O. Box 1934
Metro Manila
Tel: 40-82-12

PORTUGAL
Livraria Portugal
Rua Do Carmo 70-74
1200 Lisbon
Tel: 32 82 20

SAUDI ARABIA
Jarir Book Store
P.O. Box 3196
Riyadh—11471
Saudi Arabia
Tel: 4773140

SINGAPORE, TAIWAN, BURMA
Information Publications
Private, Ltd.
02-06 1st Fl., Pei Fu Industrial Bldg.
24 New Industrial Road
Singapore 1953
Tel: 283-1798

SPAIN
Mundi-Prensa Libros, S.A.
Castello 37
28001 Madrid
Tel: 276-997

SRI LANKA AND THE MALDIVES
Lake House Bookshop
P.O. Box 244
100, Sir Chittampalam A. Gardiner Mawatha
Colombo 2
Tel: 32104

SWEDEN
For single titles:
ABCE Fritzes Kungl. Hovbokhandel
Regeringsgatan 12, Box 16356
S-103 27 Stockholm
Tel: 08 23 89 00
For subscription orders:
Wennergren-Williams AB
Box 30004
S-104 25 Stockholm
Tel: 08-54 1200

SWITZERLAND
Libraine Payot
6 rue Grenus
Case postal 381
CH 1211 Geneva 11
Tel: 31-89-50

TANZANIA
Oxford University Press
P.O. Box 5299
Dar es Salaam
Tel: 29209

THAILAND
Central Department Store
306 Silom Road
Bangkok
Tel: 233-6930-9

TRINIDAD & TOBAGO
Systematics Studies Unit
55 Eastern Main Road
Curepe
Trinidad, West Indies
Tel: 1-(809) 662-5654

TUNISIA
Société Tunisienne de Diffusion
5 Avenue de Carthage
Tunis
Tel: 255-000

TURKEY
Haset Kitapevi A.S.
469, Istiklal Caddesi
Beyoglu-Istanbul
Tel: 144 94 70/71

UGANDA
Uganda Bookshop
P.O. Box 7145
Kampala
Tel. 43756

UNITED ARAB EMIRATES
MEMRB
P.O. Box 6097
Sharjah
Tel: 592233

UNITED KINGDOM AND NORTHERN IRELAND
Microinfo Ltd.
P.O. Box 3
Alton, Hampshire GU 34 2PG
United Kingdom
Tel: Alton 86848

VENEZUELA
Libreria del Este
Aptdo. 60.337
Caracas 1060-A
Tel: 32 23 01/33 26 04

WESTERN SAMOA
Wesley Bookshop
P.O. Box 207
Apia
Tel. 22 822

The World Bank

Headquarters
1818 H Street, N W
Washington, D C. 20433, U S A

Telephone (202) 477-1234
Telex· WUI 64145 WORLDBANK
RCA 248423 WORLDBK
Cable Address INTBAFRAD
WASHINGTONDC

European Office
66, avenue d'Iéna
75116 Paris, France

Telephone (1) 723-54 21
Telex 842-620628

Tokyo Office
Kokusai Building
1-1 Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan

Telephone (03) 214-5001
Telex 781-26838

ISSN 0253-4517/ISBN 0-8213-0042-3