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POPULATION AND NUTRITION PLANNING: THE USEFULNESS OF DEMOGRAPHIC DISCIPLINE FOR NUTRITION POLICY IN LATIN AMERICA[1]

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Demography can make valuable contributions to food and nutrition planning. In this vein, preliminary results of a project being conducted by the Institute of Nutrition of Central America and Panama (INCAP) have shown how demographic data can contribute to diagnostic and evaualtive frameworks, provide analytical indicators, refine definitions of target groups, and set target group size goals.

Introduction

The rising number of malnourished children in many Latin American countries is a striking feature of the late 20th century (*1, 2, 3, 4*). The magnitude and geographic distribution of this nutrition problem are often hard to estimate, however, because information is lacking in many countries, and because nutrition surveys or surveillance systems have not yet been applied. As a result, decision-makers in countries with increasing magnitude of malnutrition tend to be either unaware of this trend or unwilling to take strong countermeasures.

This article seeks to show how the demographic discipline can effectively help institutional efforts to diagnose and plan to improve the nutrition situation in Latin America. In this regard, it will cite evidence from a recently initiated INCAP project (*5*) that suggests demography can provide orientation and important information for multisectoral food and nutrition planning efforts at both the national and local levels.

Until now, most literature and international assistance addressing the nutrition-population relationship has emphasized the "Population Problem" and population policy (*6-12*). Our experience in Central America indicates, however, that affected governments accord greater priority and significance to the "Nutrition Problem" and nutrition policy, and that this side of the relationship therefore merits greater attention from those who work in the population field (*13*).

For example, considering Panama and the five Central American countries together, only one of the six has a national population policy, while five of the six have or are developing national food and nutrition policies. Thus it seems that respect for nationally set priorities, at least in this region, demands that vital demographic information be provided within the context of food and nutrition policies.

Food and Nutrition Planning

In general, poor countries will attain an adequate nutritional status only when they can provide most of their people with a "minimum socioeconomic package" (permanent employment opportunities, adequate incomes, social security, effective levels of education and health, etc.), all of

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The rising number of malnourished children in many Latin American countries is a striking feature of the late 20th century. (Photo: INCAP.)

which will be possible only when historic conditions permit. In the short run, however, action programs and projects can be oriented to what might be called the "minimum standards" of food and nutrition—a diet that satisfies basic nutritional requirements, especially those of vulnerable groups such as pregnant and lactating women, children under five, unemployed male adults, etc.

Within this context, some Latin American countries have been looking for their own solutions to food and nutrition problems. One key way of doing this that is being employed in Central America and Panama is through multisectoral food and nutrition planning. This centralized planning is accomplished by a coordinating body that includes representatives from the most important ministries (i.e., health, agriculture, education, welfare, etc.) responsible for dealing with these problems. This institutional arrangement, in turn, is linked to the creation of a national capacity for analyzing the problem, formulating plans and programs, executing, administering, and evaluating those plans and programs, and reformulating them as needed.

Regardless of the approach used, however, the task of confronting these problems has proved neither simple nor easy. The first stage has usually involved a long and sometimes frustrating effort of promotion to make the public more aware of the seriousness of the situation and the close link between malnutrition and underdevelopment. After that, there is a continuing need for operational identification of the problems to be attacked, the most appropriate solutions, and the best ways of procuring the financing and manpower required.

Demography's Role

In recent years demographers have attempted to define the role of their field in

both development planning and agricultural planning, and numerous books, inventories, and manuals on these related subjects have been prepared (*14-26*). These works indicate that applied population studies can make a significant contribution to food and nutrition planning in information-poor Latin American countries. In particular, such studies can help provide (1) diagnostic and evaluative frameworks, (2) analytical indicators and indices, and (3) a definition of the nature, size, and distribution of the target groups.

The Diagnostic Framework

One reason nutrition planning has made limited use of demographic information in the past has been lack of a diagnostic model outlining possible relationships between population dynamics and nutrition. However, several models of relationships between population dynamics and economic development have recently been worked out (*28, 29*).

In this same vein, Figure 1 presents a conceptual framework that can be used to identify certain demographic data important in diagnosing nutritional situations. While nutritional status can be viewed in terms of human capital as having important effects on the development process (school performance, productivity, etc.), here we are mainly interested in the determinants of, and constraints on, nutrition. The purpose of the framework is to place the demographic components in their proper perspective so that the importance of the historical, structural, and institutional components of the system of underdevelopment that are, in fact, at the root of both nutrition and population problems, is not forgotten. Figure 1 postulates interactions of demographic processes (fertility, mortality, and migration) and structures (size, distribution, and composition) with the agro-economic structures and their effect on three critical areas: (1) family health; (2) food availability; and (3) demand for services. The three areas, in turn, directly affect both food consumption and biological utilization of food, the most immediate determinants of nutritional status.

Analytical Indicators and Indices

Nutrition planners diagnosing and evaluating nutrition problems—and setting goals and targets for their programs—can make good use of nutritional indicators and indices that incorporate demographic data. Some indices with demographic components, such as per capita food demand projections or "food balance sheets" (*15-23*), and some indirect indicators, such as infant and child mortality (*30, 31, 32*), have obvious importance. In addition, other analytical tools are being developed that need further refinement; among these are "nutritional density" (the amount of land cultivated in basic grains per agricultural worker), "rural displacement" (the rate at which farm families become unable to meet their own food needs), and the "standardized child mortality quotient" (the percentage of total deaths occurring among children 0 to 4 years of age, divided by the percentage of the whole population that is in this age range).

Clearly, social programs with nutritional goals (e.g., the World Food Program, food supplementation efforts, food stamp programs, land reform actions) need such demographic data to evaluate their effectiveness. In addition, undertakings such as "nutritional surveillance" systems need them to set up "critical level points" and "trigger points" that allow changes to be detected early and that permit improvement or deterioration of the situation to be predicted (*33, 34*).

Table 1 provides a list of demographic indicators and indices that could be utilized in the food and nutrition planning process. Among other things, the usefulness of each indicator or index will naturally depend on whether the information is generally

Figure 1. Relation between social structure and other factors that affect nutritional status with emphasis on their demographic components.

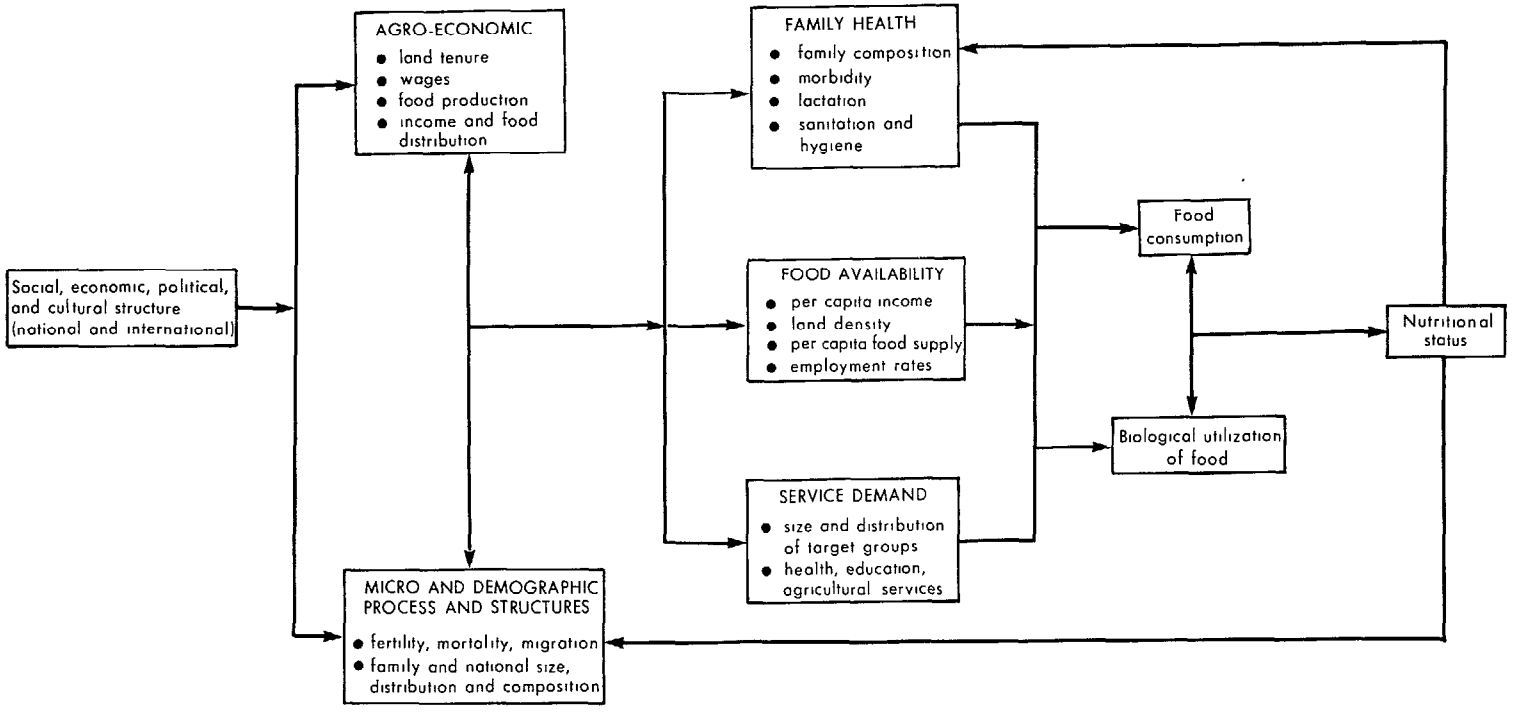

Table 1. Selected sociodemographic indicators and indices related to malnutrition.

Factors related to food and nutrition	Related data	Indicator or index
Mortality	1. Age-specific death rates	1. No. of deaths in specific age group (e.g., 0-4 years) / Total population in that age group (e.g., 0-4 years)
	2. Life expectancy at birth	2. No. of years a person is expected to live from birth
Maternal and child health and nutrition	1. Fertility	1. Average No. of live births per women
	2. Birth spacing	2. Proportion of birth intervals under 19 months, 19-24 months, 25-30 months, 31-36 months, and over 36 months
	3. Early and late fertility	3. Proportion of live babies born to mothers under age 20 and over age 34
Food consumption, child care	1. Lactation	1. Proportion of babies weaned at less than 1 month of age, at 1-3 months, 4-6 months, 7-9 months, 10-15 months, and over 16 months
	2. Family integration	2. Proportion of all live babies born to single women
Food consumption, crowding, environmental sanitation, demand for services	1. Seasonal migration	1. Proportion of the agricultural work force employed away from its place of residence one month or more per year
	2. Internal migration	2. Proportion of persons 15 to 29 that moved permanently in the last five years
Potential demand for food and services	1. Size and distribution of the population	1. Population growth trends and projection by age, sex, and area
	2. Size of vulnerable groups	2. Population growth trends and projections for vulnerable groups (newborns, children 0-4 years old, pregnant and lactating women, and landless agricultural laborers)
	3. Urbanization	3a. Ratio of urban population to total population 3b. Growth of urban population / Growth of rural population 3c. Growth of "marginal" settlements in the largest cities
Employment	1. Labor force	1. Size and proportion of the population economically active in agriculture (PEA/Ag.)
	2. Agricultural displacement	2. Growth of PEA/Ag. in rural areas / Rural population growth
	3. Density	3a. PEA/Ag. / Cultivated land area 3b. Total population / Cultivated land area in basic grains
	4. Dependency	4. Population under 15 and over 65 / Population 15 to 64

available, up-to-date, and of sufficient quality to be applied to the particular case or country involved.

Target Groups

It has been customary to define the target groups of nutrition programs biodemographically by age and sex (children under 5 years of age, pregnant and lactating mothers) (*31*). Now it also seems important to define other sociodemographic groups that can be "functionally classified" in terms of their impact on, and receptivity to, selected nutrition interventions (*35*). One needs to know not only who these groups' members are (as defined by census characteristics) but also their numbers and geographic distribution. In addition, planners will want to know how many members there will be in 5, 10, or even 20 years. For it is projections of nutritional need based on such data that can most adequately guide formulation of nutrition targets and ultimately promote rational resource allocation.

Advantage of Demographic Information

Our recent experience with national food and nutrition planning in Central America indicates that even despite deficiencies in data quality, demographic information has several advantages over other data, such as economic, agricultural, dietary, and health information. These advantages arise both from the nature of demographic variables and from the availability of the data—its being necessary to compile Civil Registry, census, and sample demographic survey information for other purposes. The following are among the principal benefits offered by demographic information:

1) Family level data: In nutrition analysis, the family is a key unit. Demographic data routinely measure the structure, characteristics, and composition of this unit, which is often both the producer and distributor of natural resources, as well as the socializer of health and food habits and beliefs.

2) Objectivity: Compared with other necessary data—such as statistics on income, diet, productivity, illness, habits, and values—demographic data are more easily quantified and comprehended. That is because most demographic concepts—such as birth, death, age, sex, and marriage—are very basic and are universally understood.

3) Geographic coverage: Malnutrition has geographic dimensions as well as social, economic, and medical ones. At-risk groups—such as tenant farmers, seasonal migrants, and female-headed households—are often geographically concentrated. Nutrition surveys, which are relatively expensive, cannot hope to provide nearly the same coverage as Civil Registry statistics or a national census. Furthermore, improved computer facilities and new computer programs[5] now permit specified tabulation and analysis of census or Civil Registry data, organized according to the sociopolitical subdivisions desired (towns, cities, districts, departments, etc.).

4) Trends and projections: Demographic data can usually be expressed in terms of trends and tendencies, because the same information has been collected periodically for many years. Thus, if certain assumptions are made about the future, demographic data can be used to make long-term projections. And such projections (for example, of the nutritional needs of certain target groups or geographic areas) permit planners to estimate program costs and alternatives.

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[5]There are computerized statistical packages such as CENTS and COCENTS that greatly reduce the time lag between collection and publication of the data (*36*).

Of course, the quality of demographic data will have limitations related to problems inherent in the information systems of developing countries. Yet this traditional complaint no longer justifies failure to consider using corrected and adjusted data. And since new models, techniques, and data processing hardware for making such corrections and adjustments are now available in most countries (*36, 37*), the major limitations at present seem to be shortages of technical personnel with demographic training and lack of appropriate budgetary backing by government ministries, particularly planning ministries.

Recent Incorporation of Demography in Central American Nutrition Planning

In late 1976 the Division of Applied Nutrition at the Institute of Nutrition of Central America and Panama (INCAP) initiated a project called "The Sociodemographic Dimensions of Nutrition Planning." This was done within the context of a larger program aimed at strengthening nutrition planning capacities in Central America and Panama. The project set out first to determine how the countries define the importance and relevance of these sociodemographic dimensions, and then to generate a consciousness of their potential usefulness in the nutrition planning process. Work with the countries has then continued in an effort to strengthen their capacity to generate, organize, analyze, interpret, and use sociodemographic information for purposes of nutrition planning.

Three activities carried out with Central American professionals during the project's first year demonstrated the usefulness of this sort of demographic work. One activity involved working up a "Demographic Sourcebook for Food and Nutrition Planning" and applying it to the planning process (*17*); another dealt with incorporation of demographic components into a nutritional surveillance system; and the third sought to show how analysis of census tapes can make an important contribution to study of the functional classification of malnutrition (*38*).

The Demographic Sourcebook

This sourcebook was developed in response to data needs by the five Central American countries and Panama now in various stages of national nutrition planning. Its basic purpose is to overcome problems created by demographic data that are inaccessible, out of date, aggregated, or inconsistent in estimates of the same rates or trends—all obstacles that tend to inhibit the use of valuable sources of data. However, the sourcebook is not just another demographic yearbook or bulletin; rather, it is a working document that provides the basis for its own revision, adaptation, and updating by multisectoral planning groups in accord with specific needs.

Based upon the conceptual scheme explained previously (see Figure 1), the sourcebook divides its demographic information into three broad categories: (1) indirect indicators of protein-energy malnutrition (PEM); (2) factors conditioning or determining PEM; and (3) projections of demographic structures and nutritional target groups. These data are represented as historical trends and as geographic, social, and ethnic differentials in 40 to 50 tables.

The information provided, which is usually transformed into indicators or indices, can be appropriately utilized in one or more planning stages. Guatemala and Honduras have utilized the sourcebook in developing their national nutrition plans; Nicaragua and Honduras have shown interest in using it to help strengthen their nutritional surveillance systems; Costa Rica wishes to use it for development of a nutritional information system; and the health sectors in Panama and El Salvador

have found it useful in assessing their situations.

Table 2 presents a comparison of six sociodemographic indices and indicators for which relatively reliable data are available. Some of these figures have been affected by underregistration (e.g., mortality), or by changed census definitions (e.g., population economically active in agriculture), or by adjustments introduced by the Latin American Center for Demography (CELADE) to permit adequate comparison (e.g., total fertility rate, annual average growth rate, growth of vulnerable groups). Nevertheless, with only a few exceptions that are noted in the table, each index or indicator has been calculated in such a way as to give a fairly good idea of its direction and magnitude of change.

Although any thorough analysis of these figures would of course require an understanding of each country's historical, sociopolitical, and economic situation; and although regional and social class differences are important, the table does show several things. For one thing, it suggests that both Costa Rica and Panama are relatively far along in the demographic transition from high to low rates of fertility, child mortality, and population growth. This is especially true with regard to child mortality, the indicator most directly related to malnutrition.

In addition, as would be expected, high

Table 2. Trends in several sociodemographic indicators useful in food and nutrition planning—Central America and Panama, 1960-1980.

Indicator or index	Years	Country					
		Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Mortality rates, 1-4 years [1]	1965	33 5	–	–	(8 4)[a]	6.0	7.5
	1970	27.0	(26 2)[2]	19.3[3]	(9 5)[a]	4.6	7.0
	1975	28.0	–	–	(3.4)[a]	2.1	3.3
Total fertility rates (Avg No. live births per woman)[4]	1965-1970	6.4	6.6	7.5	7.1	5.6	5.5
	1970-1975	6 1	6 2	7.3	6.9	4.7	5.1
	1975-1980	5.7	5.8	6.9	6.6	4.0	4.8
Average annual population growth rate[4]	1965-1970	2.8	3 5	2.9	2.9	3.0	2.9
	1970-1975	2 9	3.0	3.5	3 3	2.5	2.8
	1975-1980	2 9	3.0	3.4	3.3	2.3	2.6
Population economically active (PEA) in agriculture (% change)[5]	1960-1974	21.3	30 8	21.5	-16 2[b]	97	17.3
Nutritional density (total population land area in basic grains)[5, c]	1960-1964 (Approx)	8 0	6 3	4.6	6.8	8.5	5.8
	1970-1975 (Approx)	8.0	7 9	5.8	6.5	13.0	8.3
Growth of vulnerable groups	1975	1,105,903	741,335	588,288	451,167	293,249	266,609
Children 0-4 years[4]	1980	1,243,624	851,173	668,992	522,044	330,936	302,522
Pregnant women[6]	1975	388,495	259,877	212,088	159,611	94,611	85,972
	1980	426,642	277,667	236,604	181,522	105,250	96,723

Sources

[1] *Estadísticas Vitales*—death rate per 1,000 children 1-4 years of age.

[2] Puffer, R R., and C V Serrano (*28*) The data cited is for a rural area near San Salvador The rate reported for portions of San Salvador was 8.0.

[3] Ortega A., and M Rincón *Mortalidad Encuesta Demográfica Nacional de Honduras* (EDENH) Latin American Center for Demography (CELADE), San José, Costa Rica, 1975

[4] Latin American Center for Demography (CELADE), *Boletín Demográfico*, Nos. 17 and 18, Jan , 1976, July, 1976

[5] Calculations performed at INCAP with data from population and agricultural censuses and surveys

[6] Calculations performed at INCAP based on fertility rates from the *Boletín Demográfico* (CELADE), No 17, and fetal mortality rates from the Civil Registry.

[a] These figures indicate heavy under-reporting of child deaths

[b] These figures reflect apparent under-counting of the population currently active in agriculture. in Guatemala this was largely due to misinterpretation of a change from a "de facto" census (1964) to a "de jure" census (1973).

[c] Basic grains include corn, beans, rice, sorghum, and wheat

rates of fertility are related to high projected absolute increases in the nutritionally vulnerable groups of young children and pregnant women. Nutritional density, on the other hand, does not seem as directly related to population growth rates, because other factors, such as available frontiers (in Guatemala and Nicaragua) and changing technology and social infrastructure (in Costa Rica) alter this indicator's implications for nutritional well-being.

Nutrition and Food Surveillance

Nutrition and food surveillance systems are needed that will detect change early and predict deterioration. Specifically, it should be known when the situation in a given region reaches "critical levels" or passes "trigger points" signalling that corrective action programs should begin. In this vein, demographic information can help monitor (1) changes in an event (such as mortality); (2) changes in the size and composition of the general population in the service area; and (3) changes in vulnerable or "target" population groups (e.g., children 1-4 years of age).

It is often necessary to have auxiliary or volunteer personnel collect surveillance system data periodically at the local level, using simple data collection techniques and incentives. The data can then be utilized not only for monitoring the situation, but also for purposes of programming and evaluation. We have found that when field personnel are fully aware of the importance and usefulness of such data, the quality improves significantly. In this way the system can help to improve the quality of surveillance, to improve program relevance, and to reduce the time lost between data collection and analysis.

Costa Rica, El Salvador, and Guatemala have expressed interest in implementing this kind of system; Nicaragua has collected its base-line data; and Honduras has established such a system in one department on an experimental basis.

Functional Classification of Malnutrition (FCM)

The goal of FCM is to identify specific population subgroups in regions that are administratively, economically, and ecologically unified for purposes of program planning (*35*). One pilot FCM study recently carried out in El Salvador emphasized the role of detailed census data. The study identified distinct sets of vulnerable people in a given region and quantified the size of the groups involved and their respective problems. A variety of other data sources and collection methodologies were used too—including anthropometric and socioeconomic surveys, and anthropological studies.

In addition, copies of population and housing census tapes were used to obtain sociodemographic data on each of the more than 2,000 *cantones* (local political subdivisions) of El Salvador. This permitted the manipulation of variables relating to identification of small subregions and subgroups and their elaboration according to research needs. These census tape data were required early in the project for selection of regional samples used to evaluate nutritional status and the socioeconomic characteristics of families, and also to help orient selection of communities and families for social anthropologists' later in-depth studies.

Final Remarks

We believe that while solution of the basic protein-energy nutrition problem must await structural and orientational changes, there is an immediate need for improved basic information that reveals the problem's nature, extent, distribution, and probable future extent. Such information permits a more rational allocation of scarce resources to those groups most affected, and

also provides evidence that can motivate actions capable of bringing about more permanent improvements.

In the same way, if more attention is given to demographic factors relating to specific social and economic development problems like malnutrition, then such problems are likely to be given greater importance in development planning (*39*). Awareness of the fact that the number of malnourished children may be increasing in certain countries, for instance, could stimulate significant actions in both the nutrition and population fields.

SUMMARY

This paper reflects preliminary experience with a project on the sociodemographic dimensions of national food and nutrition planning.

In general, Central American planners and policy-makers responsible for development strategy have tended to place greater emphasis on the "Nutrition Problem" than on the "Population Problem." Nevertheless, there is widespread recognition of the need for demographic information in the various stages of the multisectoral nutrition planning process, particularly in the areas of diagnosis, goal-setting, and evalution.

Our experience to date indicates that demography can make particularly important contributions to nutrition planning by helping to provide a diagnostic framework, analytical indicators and indices, and definition of target groups' nature, size, and distribution. In addition, demographic information appears to be more useful than some other types of data in some areas of nutrition planning—partly because of its nature and partly because large quantities of demographic data are available—having been collected to meet other governmental needs.

To date, three projects carried out in Central America in connection with our work have provided good examples of the potential value of demography in nutrition planning. In particular, interest expressed in a "demographic sourcebook" of indicators and indices seems to demonstrate a felt need to improve national planning capacity with local demographic data that is available and not dependent upon external sources of information.

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DRUG-RESISTANT TUBERCULOSIS*

The U.S. Center for Disease Control reported (23 December 1977) an outbreak of drug-resistant tuberculosis in a rural northern Mississippi county. Since then, five more cases of tuberculosis due to organisms with confirmed primary resistance to isoniazid, para-aminosalicylic acid, and streptomycin (INH-PAS-SM) have been reported, bringing to 19 the total number of such cases since 1964. These 19 patients have been under alternative drug regimens, and all but one have responded favorably. One patient who was under treatment relapsed due to poor compliance, but her two-year old son was clinically diagnosed as having tuberculosis with negative bacteriology.

Four of the 19 cases occurred since 1976 in individuals who had received INH as preventive therapy. Records show that three of the four took INH irregularly; the fourth patient had taken 10 months of INH medication over a 12-month period. Nevertheless, it is possible that this patient had not been infected with *Mycobacterium tuberculosis* at the time he received INH, since the results of his tuberculin tests were questionable (5-mm reaction to tuberculin, PPD).

This outbreak is unusual because it is the first documented community outbreak of drug-resistant tuberculosis. Another unusual fact is that this strain exhibits considerable catalase activity. The catalase activity of INH-resistant strains of tuberculosis is usually absent or weak, and such strains exhibit diminished virulence in laboratory animals. The fact that the present strain retains its catalase activity may explain its apparent virulence. Officials from the Mississippi State Board of Health and from CDC are conducting ongoing surveillance and containment activities in relation to this outbreak, and special long-term follow-up activities are being initiated for cases and contacts thought to be infected with this drug-resistant strain.

*Taken from the *Weekly Epidemiological Report* (PAHO) 50(*44*):253-254 (1 November 1978). (Based on: *Morbidity and Mortality Weekly Report* (CDC) 27(*38*), 22 September 1978.