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Determinants of two major early-childhood diseases and their treatment in the Philippines: Findings from the 1993 National Demographic Survey

Michael A. Costello, Lauro C. Lleno, and Eric R. Jensen

Michael A. Costello is director of the Research Institute for Mindanao Culture, Xavier University, in Cagayan de Oro City, Philippines. His areas of specialization include urbanization and rural-urban migration, ethnicity, and the demography of health and illness. Lauro C. Lleno is research coordinator of Ateneo de Zamboanga University, Philippines. He is completing his master's thesis (from Xavier University) on the determinants of unhealthy lifestyle patterns among adult Filipinos. Eric R. Jensen is associate professor of economics at the College of William and Mary, Williamsburg, Virginia, and a senior fellow at the East-West Center's Program on Population. His recent research has focused on assessing the prospects for family planning program sustainability and the costs of service delivery systems.

Using data on infants and children from the 1993 National Demographic Survey of the Philippines, this report investigates the conditions under which young children remain healthy or become ill with acute respiratory infection (ARI) or diarrhea and either receive or do not receive treatment. It focuses on three types of outcome: the current morbidity status for ARI and diarrheal disease of children under age 5, the type of health-care services used (if any) by parents of an ill child, and the mother's knowledge about and use of oral rehydration therapy (ORT). The objective is to identify the major social and economic determinants of these outcomes with a view toward improving health-care programs and ultimately children's survival prospects. The results are presented under the thematic headings of social and economic development, "culture," family and gender relations, parental underinvestment in children, and situational factors. The report concludes with a discussion of the policy implications implicit in the study's findings.

If the practice of mortality analysis can be described as relatively undeveloped in the Philippines (Flieger, Abenoja, and Lim 1981, 2), then the literature on morbidity patterns among Filipino infants and children must be judged as being virtually nonexistent. This is regrettable because the vast majority of childhood deaths must first pass through one or more intermediary disease states. As Mosley and Chen (1984, 41) have argued, "child mortality should be studied more as a chronic disease process with multifactoral origins than as an acute, single-case phenomenon."

An unfortunate consequence of this situation is that the intervening linkages, which are a prerequisite for any good theory, tend to slip from our grasp when we talk about social and economic differentials in mortality rates. Why do children born to poorly educated mothers have such poor prospects of surviving to adulthood? We think it is because they are more frequently exposed to disease-carrying pathogens. We believe as

well that, should they chance to fall ill, such children will be less likely than others to benefit from some form of speedy and effective health care. These, of course, are plausible hypotheses, but the actual evidence upholding them is generally weak or missing altogether.

The present study represents a response to this situation. Using national-level data from the 1993 National Demographic Survey (NDS), which canvassed approximately 13,700 Filipino mothers, we consider two of the most common and potentially lethal childhood ailments in the Philippines: diarrheal disease and acute respiratory infection (ARI). For each of these conditions, two separate questions may be asked: first, what factors influence the probability that a child will contract either diarrhea or ARI, and second, what factors determine the types of response (i.e., medical treatments) observed when a child does fall ill?

In delineating the major variables to be analyzed, we can perhaps begin with the second of the two study questions listed above. The theoretical underpinnings of such an analysis are simple and may be drawn from conventional theories of the diffusion of innovation (Rogers 1983). In general, we would expect mothers with greater access to information about modern health-care technologies (media users, the better educated, members of certain cultural or religious groups) to be more likely than others to follow a medically recommended treatment when their children fall ill. We can likewise hypothesize that parents with superior economic resources will be overrepresented among those choosing to use modern treatment options, particularly when those options are more expensive than traditional responses.

Another type of resource consists of parental availability to supervise children's treatment for illnesses. The children of working mothers and single parents, for example, may well fare poorly in this regard, although in the case of working mothers we can also hypothesize a counterbalancing effect due to increased household earnings. Geographic factors may also be important, as shown by comparisons among different regions of the country or among households located near or far from a health-care facility. Finally, it is possible that certain characteristics of the child (age, sex, birth order, whether the child's birth was desired or not) and of the morbid condition (severity of symptoms) will also play a role.

Many of these characteristics may be linked to the two serious childhood ailments of diarrheal disease and ARI. In general, we would expect that the social and economic variables most commonly associated with low rates of infant mortality—such as maternal education and urban residence—would also be correlated with low rates of these diseases (see Costello 1988 for a review of Philippine studies of infant mortality and its determinants). The argument here is that knowledge, economic resources, accessibility, and the like should lead to an improved standing on the various "proximate" determinants (Mosley and Chen 1984) of mortality, such as inadequate nutrition, poor housing, and lack of access to preventive health-care technologies, thereby reducing the chances of contracting a life-threatening disease.

Although the NDS data set on infant and child morbidity is extensive, previous analyses have been cursory at best. The final NDS report, for example, covers the issue of morbid conditions among infants and children with a seven-page segment from a single chapter (ROP, National Statistics Office, and Macro International 1994). We have therefore conceptualized the present research project as largely exploratory and cast a wide net in searching for potential determinants of morbidity and treatment.

A major objective of the analysis is to provide insights for policymakers. Geographic comparisons should give us some idea of differential program impact, as separate from any underlying differences in developmental status that may already exist among regions or between rural and urban communities. In like fashion, the study should serve to pinpoint those social and economic groups who are least able to protect the health of their children or to offer them appropriate treatment once they fall ill.

Of particular interest, for both theoretical and policy-related purposes, is the set of child-specific factors associated with parental underinvestment theory (Scrimshaw 1978). As originally formulated, this theory emphasizes the manner in which high rates of fertility in a society are linked to similarly excessive levels of infant mortality. The main idea is that frequent childbearing, combined with the economic limitations experienced by most Third World families, militates against the full expenditure of family resources to protect the health of each newborn child. Resignation and apathy in the face of repeated morbidity experiences become, as it were, rational strategies for "investing" familial resources in a situation where there is an "oversupply" of young children.

An observer working with a household-level data set might well hypothesize that unwanted or higher-parity children would be more likely to fall ill and less likely to receive adequate health care than children who were fully desired by their parents and born into a small family. Scrimshaw notes that "in general, the distribution of food in a household may favor some individuals over others; when scarce resources must be distributed among several children, the more wanted children may receive more and better food than the others . . . [whereas] the less valued child is more likely to be taken to a health practitio-

ner later in the course of the illness, if at all" (1978, 394–95). She also makes specific mention of the potential link between short birth intervals and parental underinvestment.

A somewhat analogous issue has been raised by economists concerned with the allocation of resources within households. What we find again is an underlying assumption that parents will not always use all possible resources to protect the health of their children. On the one hand, some children (e.g., those less than 1 year old) may be perceived as weaker or more vulnerable and therefore worthy of additional care. On the other, discriminatory attitudes may lead parents to give some children less attention in the form of nutritious foods or good-quality health care. A classic example of the latter pattern is found in the favoritism said to be exhibited toward sons in rural Bangladesh (e.g., Chen, Huq, and D'Souza 1981). While there appears to be less evidence, on the face of it, that parental discrimination against girls exists in the Philippines, it is of interest to investigate such a possibility. Parents may also make health-care decisions on the basis of quite rational criteria—for example, the severity of symptoms exhibited by an ill child. Birth spacing and parenting skills also have clear relevance to the underinvestment thesis.

If parental underinvestment in children exists in the Philippines, it clearly has policy implications—especially now, given the recent shift in rationale for government-sponsored family planning programs from the promise of macro-level economic gains to the beneficial effects of birth spacing and family-size limitation upon maternal and child health. Pachauri (1995, 12), discussing the effects of a child's wantedness status (i.e., whether the mother had wanted to become pregnant at the time of the child's conception), favors a set of "reproductive health programs [that] would become responsible for reducing the burden of unplanned . . . child bearing and [its] *related morbidity and mortality*" (emphasis ours).

In this report we summarize what has become a detailed analysis of a rich and varied data set. One consequence of striving for brevity has been the decision to forgo a conventional literature review, other than the few comments above. The balance of the report may therefore be divided into three roughly equal sections: (1) a discussion of data and methods, (2) the statistical presentation proper, and (3) a recapitulation of the study's major findings and policy implications. Readers interested in more details are invited to peruse our earlier reports (Costello and Lleno 1995a, 1995b, 1995c, 1995d, 1995e), which are available from the first author upon request.

DATA AND METHODS

The NDS module on infant and child morbidity comprised more than 70 items on such topics as disease prevalence, treatment patterns, preventive health practices (e.g., immunizations), and nutritional practices, particularly those pertaining to breastfeeding. In addition to questions about ARI and diarrhea, a question was asked about the occurrence of measles. The survey included a full gamut of potential morbidity and treatment determinants and may be said to represent four distinct levels of analysis: characteristics of the child (e.g., age, sex), of the mother (e.g., highest level of education completed), of the household (e.g., income, residential crowding), and of the local community (e.g., availability of health services).

Sample sizes for the present analysis differ according to the particular dependent variable under consideration. In general, the dependent variables fall into three categories: (1) morbidity status, measured separately for ARI and diarrheal disease, (2) knowledge and use of oral rehydration therapy (ORT) as a treatment for diarrhea, and (3) the type of health-care worker, if any, consulted during incidents of ARI and diarrheal disease.

The questions on infant and child morbidity referred to all children of survey respondents who had not yet reached their fifth birthday as of the survey date. From that group we eliminated all newborn infants (less than one month old) and all children living apart from their mothers, leaving a sample of 8,351 infants and children. Sample sizes for them and all other variables underwent an additional (minor) reduction during the multivariate analysis: all cases that had been scored with a missing value (no response, not applicable) on even a single predictor variable were automatically eliminated.

The ORT variables dealt with the mother's knowledge and use of this therapeutic method and were therefore phrased with reference to the NDS respondents rather than their children. Sample sizes were 7,889 women for the questions on ORT knowledge and 6,837 for the questions on ORT use. The second sample was smaller because women who knew nothing about ORT were not asked about its use.

The data on consultations with a health-care worker again referred to the infant and child data set. The sample size was greatly reduced because those questions were asked only with reference to children who had fallen ill with ARI or diarrhea during the two weeks preceding the survey. The relevant sample sizes for this variable were 1,721 for ARI and 838 for diarrhea cases. Because these samples were so small, we used the .10 level of probability (that is, a 10 percent margin of error) for statistical tests involving this particular dependent vari-

able. All other analyses set alpha at .05 (5 percent).

The NDS questions on respiratory illness were composed of three items that inquired into the incidence of fever, cough, and short or rapid breathing during the two-week period before the survey. Using a symptomatic definition of ARI provided by the World Health Organization (Cabaraban 1993, 9), we determined the child's ARI status by combining all three indicators. All cases in which at least two such symptoms were present we designated as having contracted an acute respiratory infection. They accounted for nearly 21 percent of the infants and children in the sample. This percentage probably represents a slight underestimate of ARI prevalence because the question on short or rapid breathing was addressed only to mothers of children who had experienced a cough. It was therefore not possible to identify any case with the two-symptom combination of fever and short or rapid breathing. (Marginal results for the three symptoms taken separately were 26 percent for fever, 33 percent for cough, and 9 percent for short or rapid breathing.)

The presence of diarrheal disease was determined by a single question about whether the child in question "had diarrhea in the last two weeks." In all, 10 percent of the children under age 5 experienced a bout of diarrhea during the reference period. A question was also asked about the incidence of both cough and diarrhea during the 24-hour period preceding the survey. In both cases the resulting levels were high enough to suggest that some cases of ARI and diarrhea that had occurred toward the beginning of the two-week period were not recalled by respondents (Costello and Lleno 1995d).

For the question on knowledge of ORT, we coded as knowledgeable all women who affirmed either that they had heard about an oral rehydration solution locally known as "ORESOL" or that they had ever seen an ORESOL packet when shown one by the interviewer. Overall, 86 percent of the respondents said that they knew about this type of therapy. The question on ORT use asked whether a respondent had ever "prepared" an ORS solution either for herself or for someone else "to treat diarrhea." Only 56 percent of all women had ever done so. As already mentioned, the population of women included in the statistical analysis of ORT use consisted solely of that subgroup of respondents who had heard of this remedy. In other words, the 44 percent who were not users of ORT all knew about the method but nevertheless had not used it. Those nonusers represented 52 percent of the total population of survey respondents. Some respondents reported using expensive or inappropriate medicines to treat diarrhea. For example, 17 percent of all children who were ill with diarrhea during the two-week period prior to the survey had been given antibiotics.

The third dependent variable concerned consultations with health specialists. We combined responses to an initial question about whether the respondent had obtained any "advice or treatment" with responses to a follow-up question on the particular place or practitioner consulted. Responses to this second question were assigned to nine major categories. These were treatment at or by (1) a government hospital or clinic, (2) a rural health unit, (3) a barangay (community) health station, (4) a private hospital or clinic, (5) a private physician, (6) a community health worker, (7) a pharmacy, (8) a traditional health-care worker (e.g., *hilot*), and (9) all other responses. While the nine options could be grouped in several ways, we chose the following three-category typology:

1. Cases referred directly to a physician or to a health center with an affiliated physician (subcategories 1, 2, 4, and 5 above)
2. Cases referred to all other health-care workers (subcategories 3, 6, 7, 8, and 9)
3. Cases not referred to any health-care worker

Among all cases of children suffering from ARI, a total of 32 percent had visited a physician or a health center with an affiliated physician (henceforth referred to simply as a physician), 28 percent had seen some other health practitioner, and 40 percent had not seen any health-care worker. The corresponding proportions for diarrheal disease were 23 percent, 22 percent, and 55 percent, respectively.

The box beginning on the facing page presents cursory operational definitions of the predictor variables. Readers interested in knowing more about the distributional aspects of those factors are referred to our initial project report (Costello and Lleno 1995d).

Despite the wide range of variables included in the multivariate analysis, some observers may note the absence of other factors that are relevant to the study of morbidity conditions and their treatment. Major possibilities include ethnicity, maternal literacy status, the use of breastfeeding and supplementary foods, and various community-level variables (e.g., type of water system, presence of a sewer system, type of access road to the barangay). These variables were eliminated from the final models because they would have led to an unacceptable reduction in sample size (the nutritional indicators and the community-level variables, for example, were elicited only within rural barangays), because their essential qualities were captured by some other highly correlated indicator (e.g., maternal literacy and highest level of education completed by the mother), or because the initial analysis indicated the possibility of data-quality problems. The last outcome was true for a number of the community-level factors.

Of particular interest here is the child's breastfeeding status. Because the question on this topic was asked only about the youngest child, to include the responses would have resulted in an initial reduction in sample size. The relationship obtained at the bivariate level indicated that the effect of this factor depended heavily upon the use or nonuse of supplementary foods. Breastfeeding in itself was not associated with a reduction in the incidence of either ARI or diarrheal disease; if anything, the opposite tendency held. However, the minority of babies who were not given any supplementary foods did show a lower morbidity level for both conditions. Adding the question on supplementary feeding to the final model would have, again, greatly reduced the sample size because it was asked only with reference to breastfed children.

Given the categorical nature of each of the study's dependent variables, logistic regression ("logit") was an appropriate statistical tool for a multivariate analysis. In the case of morbidity status and ORT acceptance, this involved a binary choice model, whereas the study of health-care treatment required the use of multinomial logit regression.

Because the logistic function deals with estimated probabilities, our multivariate (binary) models can be written as:

$$\text{logit } P = \log (P/1-P) = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_k X_k + e,$$

where P is the probability, say, of falling ill during the reference period and X_1, X_2, etc., represent the various predictor variables included in the model. The resulting logit coefficients measure the effects of these factors and may be interpreted initially in terms of their sign (whether positive or negative) and statistical significance. Unfortunately, the absolute values of the logit coefficients are not easily interpreted. For this reason, we

OPERATIONAL DEFINITIONS OF THE PREDICTOR VARIABLES USED IN THE MULTIVARIATE ANALYSIS OF INFANT AND CHILD MORBIDITY DATA: 1993 NATIONAL DEMOGRAPHIC SURVEY OF THE PHILIPPINES

Community variables

Rural/urban residence: Dummy variable coded as "1" for households located in barangays that have been classified as "urban" by the National Statistics Office, "0" otherwise.

Region: Set of 13 dummy variables (Ilocos, Cayagan Valley, Central Luzon, Southern Tagalog, Bicol, Western Visayas, Central Visayas, Eastern Visayas, Western Mindanao, Northern Mindanao, Southern Mindanao, Central Mindanao, and Metro Manila) representing the 14 major regions of the country. The Cordillera Administrative Region is the excluded category.

Presence of electricity in the community: Dummy variable coded as "1" for households located in barangays with an electrical connection, "0" otherwise.

Type of toilet facilities in the community: Set of four dummy variables based on a question about the "type of toilet facilities used by most households in this barangay." The reference category in this case is "none."

Household variables

Distance to the nearest health facility: Dummy variable coded as "1" for households located more than 1 km from a health facility, "0" otherwise.

Religion: Set of four dummy variables representing five major religious groups: (1) Roman Catholics, (2) Protestants, (3) local Christian sects (Aglipayanism and Iglesia ni Kristo), and (4) Muslims.[a] The excluded category is "other" religious groups.

Marital status: Set of dummy variables representing the respondents' marital status. Widowed, separated, and divorced women represent the excluded category; never-married women are treated as not applicable.

Mother's age: Age of the index child's mother (in years) as of the survey date.

Children ever born: Number of children ever born to the index child's mother.

Mother's education: Number of years of education completed by the child's mother.

Mother's work status: Set of three dummy variables representing both the mother's labor force status and her current occupation if employed. Dummy variables are white-collar (professional, managerial, clerical), blue-collar (including sales and service), and farming or fishing. Unemployed women and those not in the labor force are treated as the excluded category.

Father's education: Number of years of education completed by the child's father.

Father's occupation: Set of five dummy variables (professional and managerial, clerical, sales, service, blue-collar) representing the major occupational groups. Farming and fishing represent the excluded category; those unemployed and not in the labor force are treated as not applicable.[b]

Ownership of consumer items: Score on a scale of consumer goods owned, as taken from separate items on ownership of gas or electric cook stove, television, refrigerator, bicycle, motorcycle, and car.

Housing quality: Score on a housing-quality scale taken from survey items on type of toilet, source of drinking water, presence of electricity, type of flooring material, and number of bedrooms.

Household density: Computed by dividing the number of persons living within the household by the total number of bedrooms.

Media use: Dummy variables representing four possible scores on a media-use scale. Questions referred to reading a newspaper or magazine, listening to the radio, or watching television "at least once a week." Respondents exposed to all three types of media were treated as the excluded category.

Child variables

Age: Age of child (in months) as of the survey date.

Age squared: Squared value of child's age (quadratic term).

OPERATIONAL DEFINITIONS ***(continued)***

Child variables *(continued)*

Size at birth: Dummy variable scored as "1" if child's size was rated by mother as either "very large," "larger than average," or "average" and "0" otherwise.

Sex : Dummy variable coded as "1" if the child was a male and "0" if female.

Length of preceding birth interval: Number of months elapsed between the birth of the index child and the mother's previous birth or, in the case of first-parity births, since date of marriage.

Was the birth wanted by the mother?: Two dummies based on a question about whether the mother wanted "to become pregnant" at the time, at some later time, or never again (the excluded category).

Severity of symptoms (ARI): Dummy variable coded as "1" if serious ARI symptoms were present, defined as having all three of the conditions asked about for respiratory infections (fever, cough, and short or rapid breathing), "0" otherwise.

Severity of symptoms (diarrhea): Dummy variable coded as "1" if symptoms of a serious case of diarrhea (defined as having bloody stools) were present, "0" otherwise.

a. For the analysis of health-care service utilization, the reduced sample size and additional categories made it necessary to recode religion into the following three categories: (1) Roman Catholics, (2) Protestants and local Christian sects (Aglipayanism, Iglesia ni Kristo), and (3) all other religions (including Islam).

b. For reasons given in footnote a, father's occupation was collapsed into four categories for the analysis of health-care services utilization: (1) professional and clerical occupations, (2) sales and service occupations, (3) blue-collar ("industrial") occupations, and (4) work in agriculture or fishing.

carried the analysis one step further by computing the adjusted probabilities of becoming ill (Retherford and Choe 1993, chapter 5). The procedure is based on a multiple classification analysis (MCA) of the dependent variable that yields the probability that an infant or child belonging to a certain social category (e.g., residents of an urban barangay or those exactly 1 year old) will fall ill once all other factors in the model have been held constant. We therefore computed three sets of statistics for each model—its associated logit coefficients, their significance levels, and the adjusted probabilities of a child falling ill (or of a mother taking an ill child for treatment or knowing about or using ORT)—for all variables found to be statistically significant. We will not report the first of these three parameters here; more detailed information on the statistical regressions is available in earlier publications (Costello and Lleno 1995a, 1995c).

FINDINGS

Table 1 summarizes the significance levels of results from our six logit models. Tables 2–4 give the adjusted and unadjusted effects of those predictor variables found to be significant.

In Table 1 the factors (predictor variables) significantly correlated with a health outcome are indicated by their corresponding levels of statistical significance; those not significantly correlated are designated by "ns" (not significant). Dashes are used to show all cases in which a variable was excluded from the model. The table may therefore be read horizontally to see the overall effect of each variable on the morbidity and treatment factors considered as a whole. Conversely, the table can be read vertically to indicate the outcomes produced by each individual model. All the models were significant as a whole at well below the .001 level.

The nature of the significant associations may be understood through two devices. First, in Table 1, an asterisk designates each significant relationship that operates in a manner contrary to what might conventionally be expected. As an illustration, adjusted morbidity levels for ARI and diarrhea (both marked with an asterisk) tend to be higher in urban than in rural barangays. By contrast, the significant association between rural/urban residence and diarrheal treatment indicates that urbanites are more likely than rural residents to treat infant or child diarrhea with a visit to a physician. Because this latter finding accords with our expectation there is no asterisk. Second, by showing the adjusted percentages for all significantly correlated variables and thereby showing clearly the magnitude of all intracategory differences, Tables 2, 3, and 4 provide a more precise description of these relationships. For the rural-urban comparison, for example, we see that rural-based households have a slightly lower incidence of diarrheal disease (8 percent compared with 10 percent) once all other factors are held constant.

The findings are arranged according to the role played by each predictor variable in affecting the morbidity and treatment factors. Our discussion follows the sequence of variables in the list of definitions (Box). In general, we begin with community-level factors, then move on to maternal and household variables, and end with characteristics associated with children.

RURAL/URBAN RESIDENCE

Residence in a rural or urban area was not significantly related to either of the ORT variables or to the treatment of children with ARI. As mentioned earlier, rates of both ARI and diarrheal disease were moderately higher in urban barangays. This, of course, was for the adjusted figures, the relationship observed when all other factors were held constant. In com-

parison, the bivariate (unadjusted) statistics showed an opposite tendency: higher illness rates in the rural barrios. Apparently rural households experienced greater overall morbidity, but this could be explained entirely by their lower levels of such factors as education and income. In comparison, the "pure" effect of living in a rural area was positive.

Urban children with diarrhea were more likely than rural youngsters to be brought to a doctor but less likely to go to any other health-care practitioner. Rural-urban differences in cases not brought to any practitioner were slight.

REGION

Region of residence was associated with each of the six dependent variables at the .001 level of significance (1 percent margin of error). Its overall importance as a predictor variable is therefore clear. Unfortunately, the precise manner in which this factor affected both morbidity and treatment is less easily summarized.

Let us begin by terming Metro Manila, Central Luzon, and Southern Tagalog (and possibly Central Visayas) as the "core" regions of the country. Adjusted morbidity rates for both diseases were generally lower in that area than elsewhere (Table 2), as were the knowledge and use of ORT (Table 3). (Note, however, that the latter finding did not hold for Central Visayas.) Physician use was consistently higher than average in Metro Manila but somewhat below average in the other three regions, especially for diarrhea (Table 4).

Cagayan Valley, Bicol, Western Visayas, and Eastern Visayas are generally considered to rank among the poorest regions in the country. As a whole these locales had above-average morbidity levels along with somewhat greater knowledge of ORT. The other three analyses failed to reveal any clear pattern for this group. The surprisingly high levels of physician use in Western and Eastern Visayas are of some interest. While they may bode well for the health of children in those regions, the very low use of other health-care workers in Western Visayas made that region's ranking in the use of health-care services among the lowest of all regions.

For some reason, the Cordillera Administrative Region rated particularly high on knowledge and use of ORT. Northern Mindanao exhibited a very high use of nonphysician health services (probably including the barangay health services), and as a result it ranked among the highest in the use of health-care services.

Table 1. Summary results (significance levels for a series of two-tailed tests) from logit analyses of morbidity status, ORT acceptance, and health-care services utilization: 1993 National Demographic Survey of the Philippines

	Morbidity[a]		ORT		Health care[a]	
Predictor variable	ARI	Diarrhea	Knowledge	Use	ARI	Diarrhea
Urban residence	.05*	.01*	ns	ns	ns	.05
Region	.001	.001	.001	.001	.001	.001
Community electricity	—	—	—	—	.05	ns
Community toilet facilities	—	ns	—	—	—	—
Distance to clinic	—	—	—	—	.10	ns
Religion	ns	.05	.001	.001	.001	ns
Marital status	ns	ns	ns	ns	—	—
Mother's age	ns	ns	ns	ns	ns	ns
Children ever born	ns	ns	.001	.001	ns	ns
Mother's education	.01	ns	.001	ns	.10	ns
Mother's work status	.05	ns	ns	.05	.01*	ns
Father's education	ns	ns	ns	ns	.01	.05*
Father's occupational status	.001	.05	.001	.01	.01*	ns
Ownership of consumer items	ns	ns	.001*	.001*	ns	.05
Housing quality	ns	ns	—	—	—	—
Household density	ns	ns	—	—	—	—
Media use	ns	.05*	.001	.01	.001*	ns
Child's age[b]	.01	.01	—	—	.001	.05
Child's size at birth	.001	ns	—	—	—	—
Child's sex	ns	ns	—	—	ns	ns
Birth interval	ns	ns	—	—	.01	ns
Wantedness of birth	.001	ns	—	—	.001	ns
Severity of child's symptoms	—	—	—	—	.001	.01

Source: 1993 National Demographic Survey of the Philippines.

* The relationship is significant in a two-tailed test in which direction has not been predicted, but it operates in a manner opposite to that which might have been conventionally expected.

a. For the analyses of morbidity and ORT acceptance, significance tests for interval-type variables and dichotomized categorical types (dummies) were based on a *t*-test for the single logit coefficient in question. In cases where several dummies were entered into the model to capture more complex categorical-type variables (e.g., region, religion), a chi-square test for the set of all such dummies was used (see Retherford and Choe 1993, for a more extended discussion of these procedures). For the special case of health-care treatment, the interval-type and dichotomized predictors were associated with two coefficients—one for consultation with a physician, the other for consultation with any other type of health-care worker. The excluded category in this case was not consulting with any such worker. The two statistics sometimes present conflicting results; in the table we claim statistical significance even if only one of the two relationships achieved this standard. Wherever both coefficients were found to be significant, we report the significance level associated with the stronger of the two coefficients. (A similar problem does not hold for the multinomial categorical predictors because a single chi-square test still suffices in those cases.)

b. For the analysis of morbidity status, "child's age" and "child's age squared" were both entered into the logit model to capture the expected nonlinear relationship. For both ARI and diarrheal disease, the variable "child's age" is significant at .01, whereas "child's age squared" is significant at .001.

Table 2. Probability of an infant or child falling ill with either acute respiratory infections or diarrheal disease: unadjusted and adjusted effects of significant predictor variables

	Acute respiratory infections			Diarrheal disease		
Predictor variable	Number	Unadjusted percentage	Adjusted percentage	Number	Unadjusted percentage	Adjusted percentage
Residence						
Urban	3,446	19.5	21.4	3,446	9.9	10.0
Rural	4,015	21.9	18.9	4,015	10.5	7.8
Region						
Ilocos	499	22.8	21.4	499	13.7	13.4
Cordillera Admin. Region	286	15.8	18.1	286	13.8	11.7
Cayagan Valley	370	24.1	22.5	370	12.0	10.5
Central Luzon	687	16.3	15.4	687	6.6	5.2
Metro Manila	633	16.3	17.7	633	7.3	6.7
Southern Tagalog	714	18.8	18.6	714	12.0	9.4
Bicol	617	29.4	26.3	617	15.5	13.2
Western Visayas	637	27.5	26.2	637	11.9	10.5
Central Visayas	615	15.9	15.5	615	4.8	4.3
Eastern Visayas	456	26.7	23.5	456	10.9	9.5
Western Mindanao	416	19.6	21.1	416	9.6	8.2
Northern Mindanao	484	18.9	16.8	484	10.2	9.6
Southern Mindanao	574	25.9	24.8	574	10.7	8.9
Central Mindanao	473	16.7	16.4	473	11.0	10.5
Religion						
Roman Catholic	—	—	—	6,250	10.1	8.7
Protestant	—	—	—	195	9.7	6.9
Local Christian	—	—	—	309	14.6	13.1
Muslim	—	—	—	232	10.4	10.9
Other	—	—	—	475	9.2	7.4
Mother's education						
None	—	—	25.3	—	—	—
4 years elementary	—	—	22.6	—	—	—
Finished elementary	—	—	21.4	—	—	—
Finished high school	—	—	19.0	—	—	—
College graduate	—	—	16.8	—	—	—
Mother's work status						
White-collar	618	14.7	18.2	—	—	—
Blue-collar/service	2,127	23.0	22.0	—	—	—
Farming/fishing	717	25.3	21.8	—	—	—
Not in labor force	3,999	19.7	18.9	—	—	—
Father's occupation						
Professional/managerial	278	13.7	15.0	278	7.0	7.1
Clerical	220	21.1	20.6	220	7.2	6.3
Sales	519	16.7	16.5	519	7.0	5.6
Service	403	18.6	18.2	403	8.7	7.9
Industrial	2,847	18.3	18.2	2,847	9.7	9.2
Farming/fishing	3,194	24.4	23.1	3,194	11.7	9.4
Media use						
None	—	—	—	501	8.5	6.1
1 type	—	—	—	1,623	11.3	8.7
2 types	—	—	—	2,189	10.4	8.2
3 types	—	—	—	3,148	9.8	9.7
Child's age						
6 months	—	—	22.6	—	—	12.4
1 year	—	—	23.8	—	—	13.2
18 months	—	—	24.3	—	—	13.3
2 years	—	—	23.9	—	—	12.6
3 years	—	—	21.0	—	—	9.2
4 years	—	—	15.8	—	—	5.1
59 months	—	—	10.5	—	—	2.3
Child's size at birth						
Large/average	6,110	19.7	19.2	—	—	—
Small	1,351	26.3	23.9	—	—	—
Wantedness of birth						
Always wanted	4,124	18.6	18.5	—	—	—
Wanted eventually	2,127	21.0	20.8	—	—	—
Not wanted	1,210	27.5	24.0	—	—	—

Source: 1993 National Demographic Survey of the Philippines.

COMMUNITY ELECTRIFICATION

Electrification was included in only the two models of health-care service utilization. For diarrhea the relationship was nonsignificant, but for ARI the physician use rates were higher in communities with electricity (32 percent) than in those without (22 percent).

COMMUNITY TOILET FACILITIES

It might be expected that poor sanitation—as indexed by a high proportion of households with inadequate or no toilet facilities—would increase the incidence of diarrheal disease. However, this prediction was not borne out by the data.

DISTANCE TO A HEALTH FACILITY

Are parents who live far from a clinic less likely than parents living near a clinic to seek treatment for their sick children? We found weak ($p < .10$) evidence of this effect for ARI but not for diarrhea.

RELIGION

Comparisons between Roman Catholics, Protestants, and the residual "other" category failed to show any striking differences. Members of the local Christian sects Iglesia ni Kristo and Aglipayanism seemed somewhat more favorable than other groups to ORT and the use of "other" health-care providers. They also showed evidence of higher levels of infant and child diarrhea.

Muslim respondents scored lower than other religious groups on both the knowledge and the use of ORT. It is evident that the message to use ORESOL is not getting out to members of this group. Muslim parents were also

less likely than other parents to bring a child with ARI to any health-care worker.

Muslims, who scored lower than other religious groups on both the knowledge and the use of oral rehydration therapy for diarrhea, were also less likely to bring a child with ARI to any health-care worker.

MARITAL STATUS

Single-parent families (in which the spouse was absent because of death, legal separation, or employment outside the community) did not show evidence of higher levels of infant or child morbidity than other families. Nor did this factor have any discernible effect on the knowledge or use of ORT. Marital status had to be dropped from the model of health-care service utilization because the number of single-parent households was too small for the results to be statistically reliable.

MOTHER'S AGE

Maternal age was included in all six models. In no case was a statistically significant relationship obtained.

CHILDREN EVER BORN

We had expected that high-parity children—those born to mothers who had already borne a large number of children—might be more prone to illness than other children, but the data showed no evidence of such an effect. Nor were high-parity children any less likely than other children to receive medical care once they fell ill.

Table 3. Knowledge about and use of oral rehydration therapy (ORT): unadjusted and adjusted effects of significant predictor variables

	Knowledge		Use	
Predictor variable	Unadjusted percentage	Adjusted percentage	Unadjusted percentage	Adjusted percentage
Region				
Ilocos	83.7	83.3	68.9	69.1
Cordillera Admin. Region	92.7	92.2	81.0	81.0
Cayagan Valley	87.1	89.9	77.7	79.8
Central Luzon	86.2	84.8	67.5	69.2
Metro Manila	75.9	72.2	62.1	66.6
Southern Tagalog	80.9	80.0	57.9	57.5
Bicol	88.5	90.0	64.4	61.4
Western Visayas	92.3	93.5	66.6	66.9
Central Visayas	95.1	96.1	75.7	77.3
Eastern Visayas	90.5	91.6	65.5	65.4
Western Mindanao	75.6	89.9	68.6	72.1
Northern Mindanao	92.5	93.6	65.6	64.5
Southern Mindanao	80.1	85.6	58.0	59.7
Central Mindanao	73.2	85.4	61.8	65.8
Religion				
Roman Catholic	85.8	88.8	65.9	67.9
Protestant	81.7	88.8	65.1	70.7
Local Christian	89.4	91.2	68.4	70.5
Muslim	55.3	71.4	52.1	50.9
Other	85.2	89.5	69.7	71.0
Children ever born				
1	—	85.9	—	56.1
3	—	87.6	—	63.4
5	—	89.1	—	70.2
7	—	90.5	—	76.2
Mother's education				
None	—	77.5	—	(67.5)[a]
4 years elementary	—	83.6	—	(67.7)
Finished elementary	—	86.1	—	(67.8)
Finished high school	—	90.2	—	(68.1)
College graduate	—	93.2	—	(68.3)
Mother's work status				
White collar	84.1	(87.0)	56.5	69.1
Blue collar/service	86.4	(89.9)	66.9	70.7
Farming/fishing	81.5	(89.2)	67.7	63.8
Not in labor force	84.8	(88.0)	64.5	67.0
Father's occupation				
Professional/managerial	u	83.8	u	60.4
Clerical	u	90.8	u	67.2
Sales	u	84.7	u	62.3
Service	u	89.8	u	73.3
Industrial	u	90.0	u	69.1
Farming/fishing	u	87.9	u	67.8
Consumer items owned				
None	—	89.6	—	70.4
2	—	87.2	—	64.7
4	—	84.3	—	58.6
6	—	80.8	—	52.2
Media use				
None	79.2	81.5	61.9	59.0
1 type	85.6	86.2	69.8	68.0
2 types	87.8	88.9	66.9	68.0
3 types	85.6	90.4	63.8	69.2

Source: 1993 National Demographic Survey of the Philippines.

u—data are unavailable.

a. In cases in which the relationship failed to achieve statistical significance (alpha = .05), adjusted percentages are reported in parentheses.

Both the knowledge and the use of ORT were positively associated with the number of children ever born. The reason for this finding is self-evident: mothers with more children tend to have more exposure to childhood diarrhea and thus more opportunities to learn about and use ORESOL.

MOTHER'S EDUCATION

The higher the educational attainment of a child's mother, the greater was the probability that the child had not had ARI during the two-week period before the NDS. In the case of diarrhea, however, no significant relationship emerged.

Maternal educational was associated with knowledge, but not use, of ORT. For children with ARI, maternal education was associated positively with the use of a physician and negatively with the use of another type of health-care practitioner. For children with diarrhea, maternal education had no significant bearing on the use of health services.

MOTHER'S WORK STATUS

Mother's work status was not significantly related to the incidence of childhood diarrhea. The lowest levels of ARI were found among the children of white-collar workers and women not in the labor force (homemakers). Mothers engaged in farming or fishing were somewhat less likely than others to have used ORT. As might be expected, this group was also less likely than others to bring a child with ARI to a physician.

What is perhaps most interesting for the health-care treatment issue, though, is the pattern observed for mothers in white-collar occupations. For ARI, we found a moderately high level of physician use coupled with an extremely infrequent use of all other health-care workers. As a result, this group ranked lowest in the provision of professional

Table 4. Type of health-care service used in cases of infant and child acute respiratory infections and diarrheal disease: adjusted effects of significant predictor variables

Predictor variable	Acute respiratory infections (%)			Diarrheal disease (%)		
	Doctor	Other	None	Doctor	Other	None
Residence						
Urban	—	—	—	24.5	14.5	61.0
Rural	—	—	—	18.2	23.3	58.5
Region						
Ilocos	31.9	29.1	39.0	27.8	18.3	53.9
Cordillera Admin. Region	31.0	14.8	54.2	25.8	20.5	53.7
Cayagan Valley	27.2	22.6	50.2	16.6	20.8	62.7
Central Luzon	29.0	34.3	36.7	16.0	27.1	56.9
Metro Manila	40.2	18.9	40.9	28.5	8.1	63.4
Southern Tagalog	22.8	42.2	35.0	19.7	27.8	52.5
Bicol	22.8	29.5	47.7	22.9	16.3	60.8
Western Visayas	37.6	11.0	51.4	22.8	5.7	71.5
Central Visayas	37.4	27.3	35.3	16.4	22.9	60.7
Eastern Visayas	45.2	19.6	35.2	31.5	16.9	51.6
Western Mindanao	20.4	44.6	35.0	12.4	20.7	66.9
Northern Mindanao	22.4	46.0	31.6	12.0	50.6	37.5
Southern Mindanao	25.0	29.6	45.4	21.0	13.2	65.7
Central Mindanao	32.2	35.9	31.9	13.7	28.8	57.5
Community electrification						
Electricity present	31.6	27.1	41.3	—	—	—
Electricity not present	22.4	30.1	47.5	—	—	—
Distance to nearest health facility						
More than 1 km	31.5	22.6	45.9	—	—	—
1 km or less	30.3	28.3	41.4	—	—	—
Religion						
Roman Catholic	31.5	27.4	41.2	—	—	—
Protestant/local Christian	25.2	35.4	39.4	—	—	—
Muslim/other	24.7	21.6	53.6	—	—	—
Mother's education						
None	22.0	30.7	47.3	—	—	—
4 years elementary	26.1	29.2	44.7	—	—	—
Completed elementary	28.4	28.3	43.4	—	—	—
Completed high school	33.2	26.5	40.4	—	—	—
College graduate	38.4	24.4	37.2	—	—	—
Mother's work status						
White-collar	31.4	13.9	54.7	—	—	—
Blue-collar/service	32.0	29.1	38.9	—	—	—
Farming/fishing	24.7	30.7	44.7	—	—	—
Not in labor force	30.6	27.7	41.7	—	—	—
Father's education						
None	20.4	30.6	49.0	11.9	38.1	50.0
4 years elementary	25.3	29.1	45.5	16.4	27.1	56.5
Completed elementary	28.1	28.3	43.6	18.9	22.3	58.8
Completed high school	34.2	26.2	39.6	24.1	14.6	61.3
College graduate	40.8	23.9	35.3	29.5	9.2	61.3
Father's occupation						
Professional	30.2	23.3	46.4	—	—	—
Sales/service	30.0	23.7	46.2	—	—	—
Industrial	33.6	29.6	36.8	—	—	—
Farming/fishing	28.4	27.2	44.4	—	—	—

Table 4. ***(continued)***

Predictor variable	Acute respiratory infections (%)			Diarrheal disease (%)		
	Doctor	Other	None	Doctor	Other	None
Consumer items owned						
None	—	—	—	18.3	19.4	62.3
2	—	—	—	26.4	17.8	55.8
4	—	—	—	36.5	15.6	47.9
6	—	—	—	47.9	13.0	39.1
Media use						
None	35.4	36.0	28.6	—	—	—
1 type	29.5	26.5	44.0	—	—	—
2 types	28.7	24.6	46.6	—	—	—
3 types	31.3	28.8	40.0	—	—	—
Child's age						
6 months	36.1	28.8	35.1	27.0	14.6	58.4
1 year	34.4	28.5	37.1	24.8	16.0	59.2
2 years	31.1	27.7	41.2	20.8	19.0	60.1
3 years	28.0	26.7	45.4	17.2	22.3	60.4
4 years	24.9	25.5	49.5	14.1	25.9	60.0
5 years	22.3	24.4	53.4	11.6	29.4	59.0
Birth interval						
1 year	28.2	26.5	45.3	—	—	—
2 years	29.7	27.2	43.2	—	—	—
3 years	31.1	27.8	41.1	—	—	—
4 years	32.6	28.4	39.0	—	—	—
5 years	34.1	28.9	37.0	—	—	—
Wantedness of birth						
Always wanted	31.0	30.2	38.8	—	—	—
Wanted eventually	33.3	24.3	42.4	—	—	—
Never wanted	25.2	25.6	49.2	—	—	—
Severity of child's symptoms						
Severe	40.1	25.7	34.2	35.9	20.9	43.2
Less severe	27.2	27.9	44.9	20.0	18.6	61.4

Source: 1993 National Demographic Survey of the Philippines.

health treatment to children with ARI. To illustrate, 55 percent of children with ARI whose mothers were white-collar workers were not brought to any health-care worker, compared with 39 percent of children whose mothers were service or blue-collar workers. A tentative explanation is that women working in formal-sector jobs do not have the flexibility to take care of an "unscheduled" problem such as a sick child. No significant relationship was obtained for diarrheal treatment, however.

FATHER'S EDUCATION

Paternal education was not significantly related to either of the morbidity-status measures or to knowledge and use of ORT. In the case of children with ARI whose fathers were poorly educated, though, the expected pattern prevailed; they were less likely to be brought to any health-care worker, particularly a physician. For children with diarrhea, a somewhat different pattern emerged. Ill children of less-educated fathers were less likely than those of more-educated fathers to be taken to a physician but much more likely to be taken to another health-care worker. Indeed, children of fathers who never went to school were four times more likely to be brought to a health-care worker other than a doctor than were children whose fathers had a college degree. As a result, the children of better-educated fathers were the least likely group to be brought to any health-care worker if they contracted diarrhea.

Women in white-collar occupations whose children had ARI were extremely unlikely to use any health-care workers except physicians.

FATHER'S OCCUPATIONAL STATUS

Disease rates tended to be highest among children whose fathers were employed in agriculture or fishing. This pattern held for both ARI and diarrheal disease. Women married to white-collar workers (here defined as men holding professional, clerical, or sales positions) were generally less knowledgeable about ORT than women whose husbands were in other occupations; they were also less likely to use ORT even when they knew about it. A somewhat similar pattern prevailed for health-care treatment: for children with ARI, the wives of white-collar workers were less likely than other women to consult a health-care worker apart from a physician. As a result, the wives of blue-collar workers were more likely than the wives of white-collar workers to bring a child to any health-care worker.

OWNERSHIP OF CONSUMER ITEMS

The ownership scale for consumer items was not significantly correlated with either of the two measures of morbidity status. As would be expected, wealthy families tended to take their children to a physician, at least for cases of diarrhea. Wealthy mothers were somewhat less likely to know about ORT than poor mothers and were much less likely to have used ORESOL.

HOUSING QUALITY AND HOUSEHOLD DENSITY

Housing quality was originally seen as a Mosley-and-Chen-type proximate factor that ought to mediate the inverse relationship between social class and morbidity levels. After controlling for all other factors in the model, however, we found that it was not significantly associated with the occurrence of either ARI or diarrheal disease. The data also failed to substantiate an essentially similar hypothesis related to household density.

MEDIA USE

The assumption that media exposure would increase maternal knowledge and, though this, reduce infant and child morbidity levels was not borne out by the data. The relationship for ARI was not significant, whereas the incidence of childhood diarrhea tended to be higher, not lower, as media use went up. Results for the treatment of ARI were roughly analogous: women who scored lowest on the media index were most likely to bring a sick child to either a doctor or another type of health-care worker. By contrast, we found a positive association between media exposure and knowledge and use of ORT.

CHILD'S AGE

The relationship between a child's age and the incidence of illness was curvilinear. Illness levels were moderately high and rising during the first year of life. They reached a peak at about 18 months and thereafter declined. The younger an ill child was, the greater was the likelihood that he or she would be taken to a physician. In the case of ARI, older children were less likely than younger children to visit any type health-care worker.

CHILD'S SIZE AT BIRTH

Birth size was considered for only the two morbidity models. As expected, children with low birth weights were more likely than those with large or average birth weights to fall ill with ARI. For diarrheal disease, the relationship was not significant.

CHILD'S SEX

All comparisons for this factor were statistically nonsignificant. We could discover no evidence of discrimination against daughters. In fact, the logit coefficient for consultation with a physician in cases of diarrhea showed a somewhat lower utilization level for sons: the relationship barely missed significance at the .10 level of probability.

LENGTH OF PRECEDING BIRTH INTERVAL

Longer birth intervals did not have any significant effect upon morbidity levels. They were, however, associated with better health-care treatment, at least in the case of ARI. For example, 61 percent of children with ARI who were born after an interval of four years were brought to a physician or other health-care worker, as compared with 55 percent of children born after a one-year interval.

WANTED STATUS OF BIRTH

Three categories of wantedness were compared: children whose birth had been desired from virtually the time of their conception, children who were accepted by their mothers as a "desired birth" at some later date, and children who were still considered unwanted at the time of the survey. The last group is, of course, the key one. It included 16 percent of all children.

The four comparisons for this variable approximated the predicted direction, and the incidence of and treatment for ARI were statistically significant. Thus, 24 percent of not-wanted children had fallen ill with ARI during the two weeks before the survey compared with 18 percent of the "always wanted" group. Similarly, 49 percent of not-wanted children with ARI were not treated by any health-care worker, compared with 39 percent of those who had always been wanted.

SEVERITY OF SYMPTOMS

The greater the severity of a child's symptoms, the more likely was he or she to have seen a doctor. This pattern held true for both diseases at the .01 level or lower. The severity of symptoms did not affect the likelihood of a child seeing another type of health-care practitioner, however.

DISCUSSION

We began this inquiry in the hope that the study of morbidity and treatment differentials might lead us to a better understanding of why certain social and economic groups in the Philippines have such high rates of infant and child mortality. Have these expectations been justified?

We know that infant and child mortality are highest among the country's marginalized groups—households headed by small farmers and fishermen, the urban poor, residents of peripheral and poorly developed regions, and religious and cultural minorities. In general, our analysis has found that morbidity rates are significantly higher in the poorer regions of the country, among children whose fathers are farmers or fishermen, and among children whose mothers are poorly educated.

The study also estimated levels of health-care utilization. Overall, 52 percent of children who had suffered from an acute respiratory infection during the two weeks before the survey had seen a doctor or other health-care professional. Of the children who had suffered from diarrhea, 45 percent had seen a health-care professional, and 18 percent had received oral rehydration therapy. Clearly, the Philippine Department of Health needs to continue to extend its services, despite the laudable gains already made.

Some hypothetical linkages between childhood illness and general levels of poverty were not borne out by the NDS data. This was true, for example, of the indicators of housing quality, household density, and community toilet facilities. Although there are undoubtedly many reasons why the country should continue to press for improved housing and sanitation, further improvements in those areas may not have an immediate effect on the health status of Filipino children. The provision of additional health clinics must also be rated as a somewhat minor policy recommendation at this point, given the weak correlation found between the treatment of children and the household's distance from the nearest clinic.

This study did not establish any convincing linkage between either morbidity status or health-care provision and the sex of the index child. Earlier analyses also failed to show much, if any, evidence that Filipino girls were more likely to die in infancy than boys. Without discounting the importance of gender inequalities in Philippine society, we therefore have to agree with Herrin (1994) that this issue does not appear to have serious consequences for the health care of female infants and young girls.

We found some interesting morbidity differences between rural and urban barangays. For both ARI and diarrheal disease, the multivariate analysis and the bivariate analysis revealed opposite patterns. Initial tabulations showed fewer cases of ARI and diarrheal disease, on average, in cities than in rural areas. After we controlled for such correlated factors as education and occupational status, however, these findings were reversed. Exactly parallel results were obtained by one of the best-known multivariate analyses of infant mortality ever conducted in the Philippines (Martin et al. 1983). These findings raise disturbing questions about living conditions in Philippine cities (also see Cimatu 1995) and suggest that the effects of "economic development" on the health of Philippine infants and children may not be entirely positive. Current rapid rates of urbanization lend special emphasis to these concerns; census data show that the proportion of Filipinos living in cities grew from 37 percent in 1980 to 49 percent in 1990 (ROP, National Statistics Office 1992, table A).

Children whose birth had been wanted were significantly less likely to have recently had ARI and significantly more likely to have been treated by a health-care worker if ill than were children whose birth had been unwanted.

Another concern relates to the rapidly growing number of working mothers and single-parent families, due chiefly to structural and economic changes associated with the development process. Are such changes adversely affecting child welfare? Not according to our findings. Children living in one-parent households were no more likely to fall ill than were children living with both their parents. For diarrheal disease, maternal work status was not significantly associated with either the probability of a child's falling ill or the type of treatment provided. Results for ARI were mixed, although we did uncover a surprising pattern: mothers in white-collar and professional occupations were less likely than other mothers to consult a health-care worker when their children suffered from respiratory infection. We speculate that women in those occupations may experience particularly severe time constraints.

Increased use of the mass media represents another institutional change associated with economic development. Our findings here were unexpected. Exposure to media was associated with better knowledge and use of oral rehydration therapy but was not associated with lower child morbidity or increased use of health-care practitioners. In fact, the data revealed the opposite pattern for diarrheal morbidity and the treatment of acute respiratory infections.

Both the Philippine Department of Health and the World Health Organization recommend the use of oral rehydration therapy to treat diarrheal disease. In the Philippines, ORESOL tablets are available without a prescription and have been given fairly wide publicity by the Department of Health under the Primary Health Care Program. Nevertheless, our study revealed that a number of Filipino families were treating childhood diarrhea with expensive, and sometimes inappropriate, medicines such as antibiotics.

It is a sociological truism that culturally innovative behaviors usually begin in the higher, more urban social classes and diffuse downward to lower-class and rural households (Sorokin 1959). This does not appear to be the pattern, however, for oral rehydration therapy in the Philippines. What we found instead were several instances of an inverse relationship between the respondent's knowledge and use of ORT and her social or economic status. This was true, for ex-

ample, for the scale of consumer goods owned and several of the regional comparisons. Results were similar for treatment by nonphysicians, a variable that provides an approximate measure of the public's willingness to use the barangay health stations.

To some extent these patterns are to be expected. After all, if parents can afford to bring a child to a private-sector physician, why should they bother to go to the local health station? Nonetheless, the findings do raise several concerns. Some of our multivariate analyses, for example, showed that high-status parents were less likely than poor parents to take their ill children to any health-care practitioner, presumably because of their disdain for treatment by a nonphysician. Yet in some cases greater use of government services might improve the health of children from wealthy families.

We also know from survey evidence that many lower-class mothers do not place much faith in the quality of services offered by the Department of Health in general and by the barangay health stations in particular (Costello and Palabrica-Costello 1994; Palma-Sealza 1993). Perhaps they have observed that better-educated and higher-status parents are not using the government facilities and therefore have deduced that the services must be of poor quality. To view the problem from a slightly different perspective, might not the quality of care improve if the Department of Health clinics could attract at least some higher-status clientele? The logic here is that such persons might be able to insist on better service, improved technologies, and a more courteous attitude from the staff.

We found substantial gaps between the proportions of respondents who had ever heard of oral rehydration therapy (86 percent), who had ever used ORT (48 percent), and who had used it during the most recent diarrheal episode (18 percent) (Costello and Lleno 1995d, table 8). A major challenge for the Department of Health is to convince people that ORESOL is effective and to persuade them, when a child develops diarrhea, to use the tablets quickly and consistently.

A major challenge for the Department of Health is to convince people that ORESOL is effective and to persuade them, when a child develops diarrhea, to use the tablets quickly and consistently.

The strong—perhaps too strong—association between ORT and the government health service may be backfiring. When NDS respondents were asked if they knew of a person or place where ORESOL could be obtained, the three most frequently mentioned locales were all connected with the Department of Health: barangay health stations (46 percent), rural health units (26 percent), and government-run hospitals (14 percent). In contrast, only 5 percent of respondents mentioned either a private physician or a private hospital. Members of the public may be making the unwarranted assumption that ORT is a second-rate therapy suitable only for the poorest families. Additional efforts are needed to move ORT into the consumer-marketing mainstream, for instance through the production and advertising of privately manufactured brands (possibly under a social-marketing program) and through a campaign to encourage private-sector physicians to prescribe ORESOL tablets more often.

Surprisingly, Metro Manila ranked lowest of all 14 regions on the level of ORT knowledge. Data from the 1987 National Health Survey, as reported by Herrin et al. (1993, figures 2.10a and 2.10b), show essentially the same pattern. Until now, the Department of Health appears to have concentrated its ORT dissemination efforts in the more peripheral, rural areas of the country. If that is the case, we suggest that the time has come to redress the balance, particularly given the continued movement of Filipinos to the National Capital Region (Costello and Ferrer 1993). Stronger efforts to encourage ORT use among Muslim Filipinos are also in order.

Our findings on the use of ORT and nonphysician health services also suggest that the conceptual dichotomy between "modern" and "traditional" health-care services no longer suffices for the Philippines. In its place we offer a threefold typology that distinguishes traditional services from two types of modern service. The first involves private-sector clinics and hospitals, physician-specialists, and expensive medicines produced by major pharmaceutical companies. The second comprises all other types of modern treatment—those associated with the Department of Health, with paramedical health-care workers, and with low-cost medicines such as ORESOL. More affluent Filipinos tend to use the first type of modern service, even in atypical cases in which there are good scientific reasons for doubting its validity (such as the use of antibiotics for diarrheal disease therapy).[1] For their part, poorer Filipinos must content themselves with the second category of modern treatment or with traditional treatment, although it appears that the purely traditional techniques are now being used less and less frequently: fewer than 4 percent of the children who were ill with either ARI or diarrheal disease were brought to a traditional healer.

[1] In their analysis of Egyptian Demographic and Health Survey data, El-Zanaty et al. (1993, table 11.13) found that better-educated mothers were more likely to use antibiotics to treat infants and children for diarrhea than were less-educated mothers.

Our final comment brings us back to our earlier speculation on parental underinvestment theory. In general, we found support for the theory. Family size consistently failed to predict either a child's morbidity status or health-care treatment, but children born after longer birth intervals were being given better treatment, at least for ARI, than those who followed soon after their next-elder sibling. And the wantedness factor produced even stronger results: unwanted children were not only more likely to fall ill with ARI but also less likely to receive adequate health care than were wanted children. The NDS findings thus tend to validate the slogan "Family planning saves lives," and they give practical meaning to the statement "Every child [should be] a wanted child."

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Correspondence to the authors should be addressed to Dr. Michael A. Costello, Director, Research Institute for Mindanao Culture, Xavier University, P.O. Box 24, 9000 Cagayan de Oro City, Philippines.
E-mail: mcostello@xavier.cc.xu.edu.ph
Telephone and fax: 63-72-32-28

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