Determinants of Infant/Child Morbidity and Health Care Utilization: Findings from the 1993 National Demographic Survey of the Philippines

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ABSTRACT

This study analyzes data on morbidity for infants and children from the 1993 National Demographic Survey focused on three types of dependent variables: the current morbidity status (for acute respiratory infections and diarrheal disease) of children under five years of age, the type of health care services utilized (if any) in cases when the child fell ill, and the mother's knowledge about and use of oral rehydration therapy (ORT). It seeks to identify the major social and economic determinants of these variables in the hope of improving health care program design and implementation based on knowledge on such factors derived from the results of a series of multivariate logit analyses. Findings for the morbidity status and treatment variables may be grouped under several thematic headings including economic and social development, "culture", family and gender relations, parental underinvestment, and situational factors. Notable is the finding that in general, the data indicate that two of the "intermediate technologies" presently advocated as part of the primary health care program of the Department of Health, i.e., the use of ORT and of the barangay health stations, are being accepted more fully by lower status couples than by the wealthier and better educated parents. Several problems and a few suggestions associated with this pattern are discussed, from which policy implications of the study's findings are laid out.

INTRODUCTION

If the tradition of mortality analysis can be described as relatively undeveloped in the Philippine case (e.g., **Flieger, Abenoja,** and Lim, 1981, p.2), the literature on morbidity patterns among infants and children in this country must be judged as virtually nonexistent. This is unfortunate since the vast majority of childhood deaths must first pass through one or more intermediary disease states. As Mosley and Chen (1984, p.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 always a prerequisite for any good theory will tend to slip from our grasp whenever we begin to 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 to benefit from some form of speedy and effective health care. And these, of course, are plausible explanations. 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 a large and carefully conducted survey of approximately 13,700 Filipino households (i.e., the 1993 National Demographic Survey), it analyzes data on two of the most important and potentially lethal childhood ailments in contemporary Philippines: diarrheal disease and acute respiratory infection (ARI). For each of these conditions two separate questions may be asked: first, what are the factors which impact on the probability of catching the disease in the first place? And second, what are the determinants of the different types of responses (i.e., medical treatments) undertaken when a child does fall ill with either diarrhea or ARI?

In delineating the major variables analyzed in the present study, we can perhaps begin with the second of the two study questions listed above. The theoretical underpinnings of such an analysis are analytically simpler to understand and may be drawn from conventional analyses of the diffusion of innovations (e.g., Rogers, 1983). In general, we would thus 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 to follow a medically-recommended treatment when their child falls ill. We can likewise hypothesize that parents with superior economic resources will be overrepresented among those choosing to utilize modern treatment options, particularly when these are more expensive than traditional responses.

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

Many of the characteristics noted above may also be linked to the first of our two sets of dependent variables, i.e., the child's actual morbidity experience. In general, we would expect that the social and economic variables which have most commonly been found to be associated with lower rates of infant mortality--e.g., maternal education, urban residence--will also be correlated with lower rates of ARI and of diarrheal disease (cf. Costello, 1988, for a review of Philippine studies of infant mortality and its determinants). The argument here is that knowledgeability, economic resources, accessibility, and the like should lead to an improved standing on the various "proximate" (Mosley and Chen, 1984) determinants of mortality (e.g., adequate nutrition, better housing, access to preventive health care technologies), thereby reducing the chances of contracting a life-threatening disease.

While the NDS data set on

infant/child morbidity is quite wide, 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 (cf. National Statistics Office and Macro International, Inc., 1994). We have therefore conceptualized the present research project as largely an exploratory effort, and have not hesitated to cast a rather wide net when it comes to the exploration of potential morbidity and treatment determinants. If there are some in our audience who will deduce from the breadth of this net that we are engaged in a fishing expedition, so be it. As John Tukey (1977, p.3) observed, "exploratory data analysis can never be the whole story, but nothing else can serve as the foundation stone--as the first step."

But this, we hasten to add, will be a special type of exploration, one in which the early stages of the expedition have been purged from the final account of the journey, despite their obviously crucial character. For we have constraints of space and time to deal with which will not allow us to describe in loving detail the analyses of frequency distributions and bivariate cross-tabulations which comprised the bulk of our initial project reports. Instead, we confine our attention largely to the multivariate results, for these are not only more definitive but also more succinct. In any event, the reader can be assured that the final model specifications did draw heavily from these earlier forays into the NDS landscape.

We fully expect the study's findings to be policy relevant. For one thing, the geographic comparisons should give us some idea of differential program impact, net of any underlying differences in developmental status which may already exist among regions or between rural and urban communities. In like fashion, the study should also serve to pinpoint those social and economic groups which are least able to protect the health of their children or to offer them an appropriate curative resort 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 emphasized the manner in which high rates of societal fertility are linked to similarly excessive levels of infant mortality. The main idea here is that frequent childbearing, as 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. As such, an observer working with a household-level data set might well hypothesize that unwanted or higher parity children would be (1) more likely to fall sick and (2) less likely to be provided with adequate health care than children who were fully desired by their parents and born into a small family milieu.[1]

A somewhat analogous issue has been raised by economists concerned with the intrahousehold allocation of resources. What we again find in this case is an

underlying assumption that parents will not in every instance utilize all possible resources to protect the health of their children. On the one hand, some children (e.g., those less than a year old) may be perceived as weaker or more vulnerable and therefore worthy of additional care. In other cases, though, socially discriminatory attitudes may lead some children to be given less in the way of nutritious foods or good quality health care. A classic example of the latter pattern is found in the favoritism said to be exhibited towards sons in rural Bangladesh (e.g., Chen, Huq, and D'Souza, 1981). While there would appear to be less evidence, on the face of it, that a like pattern holds for the Philippine case, it would certainly be of interest at this point to check on such a possibility. Finally, parents may also make health care decisions on the basis of quite rational criteria, e.g., the severity of symptoms exhibited by their sick child.

The policy implications of the above line of reasoning are evident, particularly in an era where the allegedly beneficial impact of family size limitation upon maternal and child health is increasingly replacing the promise of macro-level economic gains as the major rationale for government-sponsored family planning programs. Concerning the effects of the child's wantedness status (i.e., whether the mother had wanted at the time to again become pregnant with a particular child), for example, Pachauri (1995, p.12) gives an optimistic assessment of a suggested set of "reproductive health programs (which) would become responsible for reducing the burden of unplanned...child bearing and (its) related morbidity and mortality" (emphasis ours). Issues of gender, birth spacing, and parenting skills are also of clear relevance to the underinvestment thesis, as reformulated above.

We have already noted the underlying conflict between our desire for brevity and the need to adequately summarize what has become a detailed analysis of a rich and varied data set. An additional consequence of this dilemma may be found in our decision to forego a conventional literature review, other than the few comments already delivered above. The balance of the paper may therefore be divided into three roughly equal sections: (1) a discussion of data and methods, (2) the statistical presentation proper, and (3) a final review of the study's major findings and policy implications. Again, readers interested to dig somewhat deeper into all of these are invited to peruse our earlier reports (cf. Costello and Lleno, 1995a through 1995e), as are available upon request.

DATA AND METHODS

The NDS survey module on infant and child morbidity comprises 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 ARI and diarrhea, a question is asked about the occurrence of measles. A full gamut of potential morbidity and treatment determinants was also included as may be said to represent four distinct levels of analysis: characteristics of the child (e.g., age, sex); of the mother (e.g., highest grade 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 will differ according to the particular dependent variable under consideration. In general, these fall into three clusters: (1) morbidity status (measured separately for ARI and diarrheal disease), (2) acceptance of oral rehydration therapy (ORT) as a curative resort for diarrhea, and (3) the type of health care worker, if any, resorted to during incidents of ARI and diarrheal disease.

The questions on infant and child morbidity refer to all children of the NDS respondents who had not yet reached their fifth birthday as of the survey date. From this group, we eliminated all newborn infants (i.e., those less than one month in age) and all children living apart from their mother, thereby leaving a sample of 8,351 cases.[2]

The ORT variables deal with knowledgeability about and use of this therapeutic method and were therefore phrased with reference to the NDS respondents rather than their children. For the questions on ORT knowledge and use sample sizes consisted of 7,889 and 6,837 women, respectively.[3]

The data on curative report again refer to the infant/children data set. In this case, though, we experience a major reduction in sample size insofar as these questions were asked only with reference to children who had fallen ill with ARI or diarrhea during the two week reference period preceding the survey. The relevant sample sizes for this variable therefore stand at 1,721 (for ARI) and 838 (for diarrhea) cases.[4]

The NDS questions on respiratory morbidity were composed of three separate items which inquired into the presence in the child, of fever, cough, and short or rapid breathing during the study's reference period. Based upon a symptomatic definition of ARI provided by the World Health Organization (cf. Cabaraban, 1993, p. 9), we have determined the child's ARI status by combining these three indicators. All cases in which at least two such symptoms were present (a total of 20.7 percent of the infants and children in the sample) were thereby considered to have contracted an acute respiratory infection.[5]

In comparison, the presence of diarrheal disease was determined by a single question on whether the children in question "had diarrhea in the last two weeks." In all, 10.2 percent of the children under five experienced a bout with this disease during the reference period.[6]

For the question of knowledgeability about ORT, we coded as knowledgeable all women who affirmed either that they had heard about oral rehydration solution ("ORESOL") or that they had ever seen an ORS packet when shown one of these by the interviewer. Overall, 85.8 percent of the respondents were thereby deemed to know about this type of therapy. In comparison, the item on ORT use asked specifically about whether or not the respondents had ever prepared an ORS solution either for herself "or someone else to treat diarrhea" (only 55.6 percent of all women had ever done so).

It should be noted at this point that the study population of women included in the statistical analysis of ORT use consists solely of that subgroup of respondents who had ever heard of this remedy. The minority

of women who knew nothing about ORT had not been asked about this during the course of the NDS interview, on the assumption that, having never heard about it, they had surely never prepared it.

Of course, it could have been possible to use a computer recode to include the non-knowledgeable respondents in the base population for the analysis of ORT use. By following this strategy we could have come up with a set of conclusions about ORT use among the general population of all Philippine women. Nonetheless, we chose not to take this approach, mainly from a desire to focus explicitly on the decisional dimension of the problem Or, to put it another way, the data on ORT nonuse may now be understood to refer specifically to that subset of women who had the potential to use this method and who then went on from there to consciously and consistently reject it.[7]

Our third dependent variable deals with health specialist consultations. In this case we have combined information from an initial question which asked if any sort of "advice or treatment" was resorted to with that available from a follow-up item about the particular place or practitioner consulted.

Nine major categories were available from the latter question. These pertained to treatment at/by (1) a government hospital or clinic, (2) a Rural Health Unit (RHU), (3) a Barangay Health Station (BHS), (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 there are many ways in which these different options can be grouped, we have decided upon 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 (sub-categories 3, 6, 7, 8, and 9); and

(3) cases not referred to any health care worker at all.

Among all cases of children suffering from ARI, a total of 31.9 percent had visited a physician, 27.9 percent had gone to some other practitioner, and 40.2 percent had not utilized either of these two types of service.[8] Corresponding percentages for diarrheal disease were 23.1 percent, 22.0 percent, and 54.9 percent, respectively.

A somewhat more cursory presentation of the operational definitions used for the various predictor variables incorporated into this study has been given in Exhibit 1. Readers who are interested to know more about the distributional aspects of these factors may be referred to our initial project report (Costello and Lleno, 1995a).

Despite the wide range of variables included in the multivariate analysis, some observers may as yet note the absence of still other factors relevant for the study of morbidity conditions and their treatment. Major possibilities along these lines might include ethnic group affiliation, 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,

Exhibit 1. Predictor Variables Used in the Multivariate Analysis of the NDS Morbidity Data

Variable	Variable Name (s)	Operational Definitional
1. Rural-Urban residence	URBAN	Dummy variable coded as "1" for households located in barangays which have been classified as "urban" by the National Statistics Office and "0" otherwise
2. Region of residence	REGION 1 (Ilocos) REGION 2 (Cag. Valley) REGION 3 (Cen. Luzon) REGION 4 (So. Tagalog) REGION 5 (Bicol) REGION 6 (W. Visayas) REGION 7 (Cen. Visayas) REGION 8 (E. Visayas) REGION 9 (W. Mindanao) REGION 10 (No. Mindanao) REGION 11 (So. Mindanao) REGION 12 (Cen. Mindanao) MMANILA (Metro Manila)	Set of thirteen dummy variables representing the fourteen major regions of the country. The Cordillera Autonomous Region is excluded category.
3. Presence of electricity within the community	WITHELECT	Dummy variables coded as "1" for households located in barangays with an electrical connection, "0" otherwise.
4. Type of toilet facilities in local community	FLUSH (flush, water-sealed) ANTIPOLO (sanitary pit or antipolo type) PRIVY (open privy) DROP (drop, overhang, or other or type)	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."
5. Distance to the nearest health faciltity	DISTANCE	Dummy variable coded as "1" for households located more than one kilometer from a health facility, "0" otherwise.
6. Religion[a]	CATH (Catholic) PROT (Protestant) INKAG (INK or Aglipay) ISLAM	Set of four dummy variables representing five major religious groupings. The excluded category is "other" religious groups.
7. Marital Status	MARRIED1 (married, living together) MARRIED2 (married, living apart)	Set of dummy variables representing the respondents' marital status. (Widowed, separated, and divorced women represent the excluded category. Never married women treated as not applicable.
8. Maternal age	WIFEAGE	Age of the child's mother (in years) as of the survey date.

Exhibit 1. -- (Continued)

Variable	Variable Name (s)	Operational Definitional
9. Children ever born	CEB	Number of children ever born to the respondent.
10. Maternal education	EDWIFE	Number of years of education completed by the child's mother
11. Maternal work status	WHITE (Professional, managerial, clerical) SSBLUE (sales, service, blue collar) AGRIC (farming and fishing)	Set of three dummy variables representing both the wife's labor force status and her current occupation (if employed). Unemployed women and those not in the labor force treated as the excluded category.
12. Paternal Education	EDHUSB	Number of years of education completed by the child's father
13. Paternal occupational status[b]	PROF (Professionals and managers) CLERK (clerical) SALES SERVICE BLUE (blue collar)	Set of five dummy variables representing the major occupational groupings. Farmers and fishermen represent the excluded category. (Unemployed and not in the labor force treated as not applicable.)
14. Ownership of consumer items	OWNSCALE	Score on a scale of consumer goods ownership, as taken from separate items on owner-ship of gas or electric range, television, refrigerator, bicycle, motorcycle, and car.
15. Housing quality	HOUSING	Score on a housing quality scale, as taken from survey items on type of toilet, source of drinking water, presence of electricity, type of flooring materials, and number of bedrooms in the home.
16. Household density	HDNSTY	Computed by dividing the number of people living within the household by the total number of bedroom.
17. Media use	NOMEDIA (score of "0") MEDIA (score of "1") BIMEDIA (score of "2")	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 receiving a score of "3" were treated as the excluded category.

Exhibit 1. -- (Continued)

Variable	Variable Name (s)	Operational Definitional
18a. Child's age	CHAGE	Age of child (in months) as of survey date.
18b. Child's age squared	CHAGE2	Squared value of child's age (quadratic term).
19. Size of child at birth	CHSIZE	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.
20. Sex of the child	MALE	Dummy variable coded as "1" if the child is a male and "0" if female.
21. Length of the preceding birth interval	BIRTHINT	Number of months elapsed between the birth of the child in question and the mother's previous birth (or, in the case of first parity births, since date of marriage).
22. Was the birth wanted by the mother?	WANTTHEN (wanted then) WANTLTR (wanted later)	Two dummies based on question about whether mother wanted "to become pregnant" at the time. or never again (the exclusive category).
22a. Presence of serious symptoms (ARI)	SYMPARI	Dummy variables coded as "1" if serious ARI symptoms (defined as having all three of the conditions asked about for respiratory infections) were present and "0" otherwise.
22b. Presence of serious symptoms (diarrhea)	SYMPDIA	Dummy variables coded as "1" if symptoms of a serious case of diarrhea (defined as having bloody stools) were present and "0" otherwise.

(Note. See Appendix A - "Notes to the Exhibits" - for footnotes a and b.)

type of access road to the barangay). In brief, these variables were eliminated from the final models either because they would have brought about an unacceptable reduction in sample size (e.g.,the nutritional indicators and those community-level variables asked only within rural barangays), because their essential qualities were captured by some other highly correlated indicators (e.g., maternal literacy and highest grade completed by the mother) or because the initial analysis had indicated the possibility of data quality problems (as was true for a number of the community-level factors).[9]

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

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

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

where P is the probability, say, of falling ill during the reference period and X1, X2, 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 in and of themselves. As such, it becomes useful for the analysis to be carried one step further by computing for the adjusted probabilities of becoming sick (cf. Retherford and Choe,1993, Chapter 5). This procedure is based upon a multiple classification analysis (MCA) of the dependent variable in which computations are made of the probability that an infant or child belonging to a certain social category (e.g., residents of an urban barangay or those aged exactly one 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 falling ill (or of using/knowing about ORT, bringing one's child to a doctor, etc.) for all variables found to be statistically significant. In this paper we will not report the first of these three parameters, although they are available from earlier publications (Costello and Lleno, 1995d; Costello and Lleno, 1995e). Significance levels are presented subsequently (cf. Exhibit 2); whereas the adjusted probabilities are found in Appendix Table 1-3.

As a methodological aside, it might be added at this point that the use of adjusted percentages produced by the MCA technique can be an extremely useful device for the purpose of disseminating project findings. Whereas a full comprehension of OLS or logit regression coefficients may require a level of statistical training not reached by many policy makers, this is not true for such MCA outputs as means and percentages. Adjusted statistics may also be displayed visually through the use of

Exhibit 2: Master Table Summarizing 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

Variable	Morbidity		ORT		Health Care[b]	
	ARI	Diarrhea	Knowledge	Use	ARI	Diarrhea
R-U Residence	.05*	.01*	n.s.	n.s.	n.s.	.05
Region	.001	.001	.001	.001	.001	.001
Comm. elect.	-	-	-	-	.05	n.s.
Comm. toilet facilities	-	n.s.	-	-	-	-
Distance to clinic	-	-	-	-	.10	n.s.
Religion	n.s.	.05	.001	.001	.001	n.s.
Marital status	n.s.	n.s.	n.s.	n.s.	-	-
Maternal age	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Children ever born	n.s.	n.s.	.001	.001	n.s.	n.s.
Maternal ed.	.01	n.s.	.001	n.s.	.10	n.s.
Maternal work status	.05	n.s.	n.s.	.05	.01*	n.s.
Paternal ed.	n.s.	n.s.	n.s.	n.s.	.01	.05*
Paternal occ. status	.001	.05	.001	.01	.01*	n.s.
Ownership scale	n.s.	n.s.	.001*	.001*	n.s.	.05
Housing quality	n.s.	n.s.	-	-	-	-
Housing density	n.s.	n.s.	-	-	-	-
Media use	n.s.	.05*	.001	.01	.001*	n.s.
Child's age[c]	.01	.01	-	-	.001	.05
Size at birth	.001	n.s.	-	-	-	-
Sex	n.s.	n.s.	-	-	n.s	n.s.
Birth int.	n.s.	n.s.	-	-	.01	n.s.
Wantedness	.001	n.s.	-	-	.001	n.s.
Symp. severity	-	-	-	-	.001	.01

(Note: See Appendix A --"Notes to the Exhibits"-- for the above footnotes.)

computer graphics.

FINDINGS

Exhibit 2 represents an organizing device, designed for the purpose of summarizing the results from our six logit models. Factors found to be significantly correlated with the dependent variable in question are indicated by their corresponding level of statistical significance; those not so associated are designated by "n.s." (not significant). Dashes have been used to show all cases where a variable was excluded from the model.

The exhibit may therefore be read horizontally so as to see the overall impact which each particular variable seems to be having upon the morbidity and treatment factors considered as a whole. Conversely, one can read the table in a vertical manner to get a feeling of the outcomes produced by each individual model.[10]

The nature of each significant association may be understood through two devices. In the first place, all significant relationships that operate in a manner contrary to that which might have been conventionally expected have been designated in the exhibit by an asterisk. To illustrate, adjusted morbidity levels for ARI and diarrhea (both marked with an asterisk) tend to be higher in urban than in rural barangays. In comparison, the significant association between rural/urban residence and diarrheal treatment may be taken to show (since there is no asterisk) that urbanites are more likely to treat infant/child diarrhea with a visit to a physician.

A more precise description of the study's relationships will be found in Appendix Tables 1 through 3. Shown therein are the adjusted percentages for all significantly correlated variables, thereby depicting clearly the magnitude of all inter-category differences. For the rural-urban comparison, for example, we indeed see that rural-based households have a slightly lower incidence of diarrheal disease (7.8 percent vs. 10.0 percent) once all other factors have been held constant.

We have decided (chiefly for the purpose of brevity) to arrange our exposition according to the role played by each predictor variable in affecting the morbidity/treatment factors. The discussion will proceed according to the arrangement of variables found in Exhibit 2. In general, this will be from the community-level factors to the maternal and household variables, and from there, to characteristics associated with the child.

Rural-urban residence. This factor 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 are moderately higher in urban barangays. This, of course, is for the adjusted figures, which is to say that the relationship holds once all other factors have been held constant. In comparison, the bivariate (unadjusted) statistics show an opposite tendency, i.e., higher illness rates in the barrios (data not shown). What is apparently happening is that rural households experience greater overall morbidity, a finding which can be explained entirely in terms of their lower levels of educational attainment, income, etc. In comparison, the "pure" effect of rural living is basically positive.

Urban children who are sick with ARI are more likely than rural youngsters to be brought to a doctor, but less likely to go to any other curer. Rural-urban differences for those cases not brought to any healer at all are therefore slight.

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

Let us begin by terming Metro Manila, Central Luzon, and Southern Tagalog (possibly including the Central Visayas as well) as the "core" regions of the country. In general, adjusted morbidity rates for both diseases are low in this area, as are the knowledge and use of ORT (note that this latter finding does not hold for the Central Visayas). Physician usage is consistently high in Metro Manila but somewhat below average in the other three regions, especially as far as diarrheal morbidity is concerned.

The Cagayan Valley, Bicol, Western Visayas, and Eastern Visays are generally considered to rank among the poorest regions in the country. As a whole these locales have above-average morbidity levels along with somewhat greater knowledge about ORT. No clear pattern emerged within this group during the other three analyses. Of some interest in this regard are the surprisingly high levels of physician use in the Western and Eastern Visayas. While this might bode well for the health of children in these regions, the very low level of resort by Western Visayans to health care workers other than doctors has resulted in this region ranking among the very highest (on both diseases) when it comes to not exposing the child to any type of health care service at all.

For some reason, the Cordillera Autonomous Region rates particularly high on knowledge and use of ORT. Northern Mindanao also holds the noteworthy position of exhibiting very frequent resort to nonphysician health services (probably including the BHS), a finding which has consistently enabled it to rank among the lowest when it comes to bypassing any sort of curative resort at all.

Community electrification. This variable was included only in the two models of health care services utilization. The relationship for diarrheal morbidity was nonsignificant but, in the case of ARI, physician user rates were rather clearly higher (31.6 percent vs. 22.4 percent) in the electrified communities as compared to those deprived of this resource.

Community toilet facilities. The expectation that poor environmental sanitation, as indexed by a high proportion of households with inadequate toilet facilities or none at all, would raise the incidence of diarrheal disease was not borne out by the data.

Distance to the clinic. Are households located far from a health clinic less likely to seek treatment for their sick children? We found a weak ($p < .10$) tendency to this effect for cases of ARI but none at all for diarrhea.

Religion. Comparisons between Catholics, Protestants, and the residual "other" category uniformly failed to show any striking differentials. Members of the

Iglesia ni Kristo and the Aglipayan church seemed somewhat more favorable to ORT and the use of "other" health care services than the other groups. They also showed evidence for higher levels of diarrheal morbidity.

Muslim respondents scored low on both the knowledge and use of ORT. It is evident that the message to use ORESOL is not getting out to members of this group. Muslim parents are also significantly more likely (in the case of ARI) to not bring their sick child to any health care worker at all.

Marital status. Single parent families (in which the spouse is absent because of death, legal separation, or extra-community employment) are not associated with higher levels of infant/child morbidity. Nor does this factor have any discernible impact upon the acceptance of ORT.[11]

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

Children ever born. We had expected that higher parity children (i.e., those born to mothers with a large number of children ever born) might be more prone to illness. No evidence to this effect was found. Nor were high parity children any less likely to be offered adequate medical care once they fell ill.

Knowledge and use of ORT were both positively associated with the number of children ever born. To some extent, of course, this is self-evident. (The greater the number of children the more opportunities for the mother to be exposed to diarrheal incidents and, through this, to eventually learn about and use ORESOL.)

Maternal education. The higher the educational attainment of the child's mother, the greater the probability that he or she would have remained free from ARI during the NDS reference period. In the case of diarrhea, however, no significant relationship emerged.

Maternal education seems to facilitate learning about (but not use of) ORT. It is also associated positively with recourse to a physician--and negatively with recourse to other curers--for children who have fallen ill with ARI. (In the case of diarrhea, these same relationships were found to be statistically nonsignificant.)

Maternal work status. This factor was not found to be significantly related to the incidence of diarrhea. In the case of ARI, we find the lowest levels for this disease among the children of white collar workers and of women not in the labor force (housewives).

Workers in agriculture are somewhat less likely to have ever used ORT. This group also ranks low (as might well be expected) when it comes to bringing a child sick with ARI to a physician. What is perhaps most interesting for the health care treatment issue, though, is the pattern obtained for the white collar workers. Again, for the single case of ARI (no significant relationship was obtained for diarrheal treatment) what we find in this instance is a moderately high level of physician usage coupled with an extremely infrequent resort to all other health care workers. As a result, this group ranks highest in terms of not exposing their children to any extra-household curative resort at all. (To illustrate, 55 percent of the children belonging to this category were not brought to any

health care worker, as compared to only 39 percent of those born to mothers working in service or blue collar jobs.) A tentative hypothesis which might be suggested at this point is that women working in formal sector jobs do not have the full and flexible control over their time that would be needed for them to take care of an "unscheduled" emergency like a sick child.

Paternal education. This variable was not significantly related with either of the morbidity status measures or with knowledge and use of ORT. With regard to the treatment of ARI, the expected relationship holds. Poorly educated fathers are most likely to refrain from bringing their children to any curer at all, largely because of their low rates of physician resort. For diarrheal cases, though, a somewhat different pattern emerges. To be sure, the use of doctors is still lowest among the poorly educated. The relationship for use of nonphysicians, though, operates in the opposite manner and in an ever stronger fashion. (Children of fathers who never went to school are four times as likely to be brought to a health care worker other than a doctor than are those with fathers possessed of a college degree.) As a result, it is the better educated fathers who are most closely associated with the remaining option--to not bring the child to any health care worker at all.

Paternal occupational status. Disease rates tend to be highest among children with fathers employed in the agriculture and fishing industries. This pattern holds for both ARI and diarrheal disease.

Women married to white collar workers (here defined as those persons holding professional, clerical, or sales positions) are generally less knowledgeable about ORT and less willing to use it, even in cases where they know about this therapeutic strategy. A somewhat similar pattern prevails for health care treatment in the sense that this same group is also least willing to turn to a nonphysician in a case where their child has contracted ARI. As a result, conformance to the minimum standard of at least bringing the child to someone turns out to be highest among the wives of blue collar workers.

Ownership of consumer items. The ownership scale was not found to be significantly correlated with either of the two morbidity status measures. As would be expected, we find a clear tendency for physician usage (in the case of diarrhea, at least) to be highest among the wealthier families.

Findings for the two ORT variables are noteworthy. Women coming from wealthier homes are somewhat less likely to have ever heard about ORS and very much less likely to ever use it.

Housing quality. This factor was originally seen as a Mosley and Chen-type proximate factor which ought to mediate the (inverse) relationship between social class and morbidity levels. After controlling for all other factors in the model, though, it was found to be not significantly associated with the occurrence of either of the two conditions analyzed in this study.

Housing density. An essentially similar hypothesis to that described in the above paragraph also ended up experiencing the same fate.

Media use. The benign model of media exposure which was assumed to hold

in this case (i.e., that media use would increase maternal health knowledge and, through this, reduce infant and child morbidity levels) was not supported in any fashion. For the case of ARI, a nonsignificant relationship was obtained. In comparison, diarrheal incidence was actually found to increase in a more-or-less regular fashion as media use went up. A roughly analogous finding may also be noted for the treatment of ARI conditions. In this case, women scoring lowest on the media index were found to be the most likely to bring their sick child to either a doctor or any other health care worker. As such, this group ranked lowest by far when it came to the option of bringing the child to no one at all.

Somewhat more conventionally, media use was found to be associated in a positive fashion with both knowledge about and use of oral rehydration therapy.

Child's age. The relationship between child's age and morbidity incidence is in both cases curvilinear. Illness levels are moderately high and rising during the first year of life, eventually reaching their peak at about 18 months. After that a consistent decline sets in.

The younger the child the greater the willingness that parents seem to show when it comes to referring him or her to a physician. For the case of ARI at least, this means that older children are also less likely to be seen by any health care worker at all.

Size at birth. This factor was considered only for the two morbidity models. As would be expected, children with low birth weights are more likely to fall ill with ARI. For the case of diarrheal disease, though, an insignificant relationship was obtained.

Sex. All comparisons for this factor were found to be statistically nonsignificant. We could discover no evidence of discrimination against daughters. In fact, the logit coefficient for physician usage in cases of diarrheal morbidity showed a somewhat lower utilization level for sons, with this relationship barely missing significance at the .10 level of probability.

Length of the preceding birth interval. Longer birth intervals were not found to have any significant impact upon morbidity levels for either condition. They were, however, associated with better health care treatment (in the case of ARI at least). To illustrate, 61 percent of those children born after a fairly long interval (four years) were brought to some sort of health care worker as compared to 55 percent of those born after a one year interval.

Wantedness. There are three categories being compared in this case: children who had been a "desired birth" from virtually the point of their conception, children who were eventually (at some later date) accepted by their mother as a desired birth, and children who were still considered unwanted as of the survey date. The latter group is, of course, the key one and it by no means represents a negligible proportion (16.2 percent) of all births.

All four comparisons for this variable approximated the predicted direction; in two such cases (the incidence of and treatment for acute respiratory infections) statistical significance was achieved. Thus, 24 percent of not wanted children had fallen ill with ARI during the reference period as compared to 18 percent of the "always wanted" group. Similarly,

almost half (49 percent) of the former group did not have their ARI treated by any health care workers at all vs. 39 percent of those who had always been wanted.

Symptomatic severity. The greater the severity of the child's symptoms the more likely that he or she will be brought to a doctor. This pattern holds true for both diseases at the .01 level or lower.

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 is it that certain social and economic groups in the Philippines have such high rates of infant and child mortality. Have these expectations been justified?

Since we know that the infant/child mortality problem is felt most keenly in the country's marginalized groups (households headed by small farmers and fishermen, the urban poor, residents of peripheral and poorly developed regions, religious/cultural minorities), it would appear that a largely affirmative answer can now be given to this question. In general, morbidity rates are significantly higher in the poorer regions, as well as among the children of farmers and poorly educated parents. Access to modern health care services is also demonstrably lower among the poorer classes, rural folk, and Muslims. In that sense it is evident that continued efforts by the DOH to extend its services to these groups are still needed, despite the laudible gains in this area that have already been made. Complementary policies that would ensure that the benefits of economic development will in fact start "trickling down" to these groups must also remain a high priority, particularly in light of reports that this has not yet happened (e.g., Etemadi, 1995).

Some hypothetical linkages, of course, were not borne out very strongly by the NDS data. This was true, for example, of the two housing indicators and the community-level measure of local toilet facilities. While there are no doubt many reasons why the country should continue to press for an upgrading of these types of facilities, one should perhaps not expect that further improvements in this area will immediately result in an upgrading of the health status of younger Filipinos. The provision of additional health clinics in farflung areas must also be rated as a somewhat minor policy recommendation at this point, given the weak correlations found between the treatment and clinic-distance variables.

Nor was the study able to establish any convincing linkage between either morbidity status or health care provision and the sex of the index child. Theoretically speaking, this makes some sense insofar as earlier analyses have failed as well to show much, if any, evidence that Filipino girls are more likely to die in infancy than boys. Without discounting the continued importance of gender inequalities in Philippine society, we would therefore have to agree with Herrin (1994) that this issue has been relatively nonproblematic as far as the health care sector is concerned.

Our findings with regard to morbidity differences between rural and urban barangays are worth noting at this point. In both cases the multivariate analysis revealed a pattern which was opposite to that established at the bivariate level. Initial

tabulations had shown fewer cases of ARI and diarrheal disease, on average, in the cities. After controlling for such correlated factors as education, occupational status, and the like, however, these findings were reversed. What is particularly striking about this pattern is that exactly parallel results were also obtained by one of the best-known multivariate analyses of infant mortality yet to be conducted in this country (cf. Martin, et al., 1983). These findings raise serious questions about the environmental quality of Philippine cities and the type of living conditions now being experienced therein (also see Cimatu, 1995). The rapidity with which the country appears to be moving towards a highly urbanized future lends special emphasis to these concerns.[12]

The above example suggests that there can be some cases in which the impact of "economic development" upon the health of Philippine infants and children may not be entirely positive. Are there other examples of this same syndrome? One such possibility exists with regard to the family. If we assume for now that the number of working mothers and single parent families has been growing rapidly of late, chiefly due to structural and economic changes associated with the development process, it would seem plausible to argue that such changes could be adversely affecting child welfare. The absence of a spouse should make most child care duties, including the task of bringing a son or daughter to a doctor, more difficult. Similar problems might also arise among working mothers, although in this case the increased earnings generated by her employment can be used to improve the child's nutritional and health care status.

The bulk of our findings do not support the above speculations. Children living in one-parent households were not more likely to fall ill with either condition. For diarrheal disease, maternal work status was not significantly associated with either the probability of falling ill or the type of treatment subsequently provided. Results for ARI were mixed, although we did uncover an intriguing tendency for mothers employed in white collar and professional occupations to be overrepresented among those not bringing their child to any curative resort at all. We have speculated that strong time constraints on the part of women employed in formal sector jobs could well be the underlying factor at work in this case.

Increased use of the mass media represents a second institutional change associated with social modernization. Our findings here (with regard to the morbidity and treatment variables at least) are somewhat unexpected. As a minimum, increased media use cannot be said to be making any positive contribution along these two dimensions. If anything, the opposite pattern may well hold (cf. the study's findings for diarrheal morbidity and the treatment of acute respiratory infections). One should perhaps not make too much of this pair of findings, but a possible explanation for them is that media use encourages (overencourages?) household consumption to the point where little or no savings have been set aside for domestic emergencies.

Overconsumption of another sort can result when poor Filipino families end up treating their child's diarrheal disease with expensive and sometimes inappropriate

medicines, such as antibiotics. Both the Department of Health (DOH) and the World Health Organization (WHO) have recommended instead that this condition be treated by means of oral rehydration therapy. ORESOL tablets are available without prescription and have been given fairly wide publicity by the DOH under its current Primary Health Care program.

It is a sociological truism that culturally innovative behaviors usually begin in the higher social classes, diffusing downward from there to lower class and rural households (e.g., Sorokin, 1959). This pattern, however, does not appear to be holding for ORT. What we instead find in this case is several instances of an inverse correlation between knowledge and use of this therapeutic technique and the respondent's social or economic status. This was true, for example, for the consumer goods ownership scale and several of the regional comparisons. Somewhat similar results were forthcoming as well for morbidity treatment by nonphysicians, a variable which gives us an approximate measure of the general public's willingness to use a second type of "intermediate" health care technology--the Barangay Health Stations of the DOH.

To some extent, of course, this sort of pattern is only to be expected. After all, if one has sufficient cash on hand to bring the child to a private sector physician, why bother to first go to the local BHS? Nonetheless, these findings do raise a few practical concerns. For one thing, we know from survey evidence that many lower class mothers do not place much faith in the quality of services offered by the DOH in general and by the barangay clinics in particular (e.g., Costello and Palabrica-Costello, 1994; Palma-Sealza, 1993). It is possible that these doubts reflect, in some way, the deduction that since the better educated and higher status parents are not using the DOH services, they must therefore be of generally poor quality. Or (to view the same problem from a slightly different perspective) might it not be possible as well that the quality of care being offered in the DOH clinics would improve measuring if they could only start attracting at least a few higher status clientele? The logic here is that such persons can be expected to have the influence needed (particularly in a devolved set up) to insist on better service, improved technologies, and a more courteous demeanor on the part of local staff members.[13]

We found substantial gaps between the proportion of all NDS respondents who had (1) ever heard of ORT, (2) ever used this technique, and (3) used it during the most recent diarrheal episode. (The relative percentages here are 85.8 percent, 55.6 percent, and 18.1 percent--cf. Costello and Lleno, 1995a, Table 8). The major problem in this regard would therefore appear to be that of getting people to really believe in the efficacy of ORESOL tablets and to use them quickly and consistently. Again, the very strong (perhaps too strong) association between ORT and the government health service may be backfiring in this case, as too many members of the general public make the unwarranted assumption that ORT is a second-rate therapeutic technique suitable only for the mahirap (poorest families). Additional efforts are therefore needed to move this approach into the consumer/marketing mainstream, e.g.,

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 frequently. In general, the NDS data show that this latter dimension is definitely a weak link in the current program.[14]

We have also identified at least two population aggregates for whom a greatly strengthened ORT publicity campaign might well be appropriate. One such group consists of Filipino Muslims, most of whom have never used this approach on even a single occasion. In addition, and somewhat more surprisingly, we also found very low ORT knowledgeability levels in Metro Manila. (Metro Manila ranked lowest among all fourteen regions on this measure.) Nor is this finding some sort of statistical aberration attributable only to sampling error. Data from the 1987 National Health Survey, as reported in Herrin et al. (1993, Figures 2.10a and 2.10b), showed essentially the same pattern. As such, a more likely explanation for this pattern is that the DOH has so far been concentrating its ORT dissemination efforts in the more peripheral, rural areas of the country. If so, we would suggest that the time has now come to redress the balance in this regard, particularly given the continued and heavy movement of Filipinos to the National Capital Region (Costello and Ferrer, 1993).

A final idea which can be teased from our findings on the use of ORT and nonphysician health services is that the conceptual dichotomy between "modern" and "traditional" health care services will no longer suffice. In its place we would offer a threefold typology which sees two types of modern technologies, the first of which revolves around private sector clinics and hospitals, physician-specialists, and costly medicines produced by large-scale pharmaceutical companies. The residual category in this case therefore becomes all other types of modern treatments, which is to say those associated with the DOH, with paramedical health care workers, and with intermediate-technology types of medicines (e.g., ORT, local herbs, and ointments). We would suggest that the first of these two categories is consistently resorted to by members of the more affluent classes, even in those atypical cases where there are good scientific reasons for doubting its validity (e.g., the use of antibiotics for diarrheal disease therapy).[15] For their part, poorer Filipinos must content themselves with either of the other two approaches, although it would appear that the purely traditional techniques are now being resorted to less and less frequently.[16]

Our final comments bring us back to our earlier speculations on parental underinvestment theory. In general, we would claim an adequate level of support for this perspective. To be sure, family size was a consistent disappointment when it came to predicting either the child's morbidity status or his/her variety of health care treatment. But children born after longer birth intervals were indeed being given better health care treatment (for ARI) than those who followed soon after their next-oldest sibling. And the wantedness factor produced even stronger results, with unwanted children not only being more likely to fall sick with an acute respiratory infection but also to then be deprived of

adequate health care services. Such grandiose slogans as "family planning saves lives" and "every child a wanted child" would therefore appear to have more than just a grain of truth hidden within them.

Endnotes

1 "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....(while) the less valued child is more likely to be taken to a health practitioner later in the course of the illness, if at all" (Scrimshaw, 1978, 394-395). Scrimshaw also makes specific mention of the potential link between short birth intervals and parental underinvestment.

2 Sample sizes for these and all other variables underwent an additional (minor) reduction during the multivariate analysis insofar as all cases which had been scored with a missing value (no response, not applicable) on even a single predictor variable were automatically eliminated at this point.

3 A discussion of the reason for this disparity in sample sizes is given below.

4 Because of the substantial reduction in sample sizes implied by these figures we have used the .10 level of probability for statistical tests involving this particular dependent variable. All other analyses set alpha at .05.

5 The 20.7 percent statistic probably represents a slight underestimate of ARI prevalence since the question on short or rapid breathing was only asked in cases where the child had experienced a cough. It was therefore not possible to identify any case with the two-symptom combination of fever and short/rapid breathing.

Marginal results for the three items taken separately were as follows: fever (25.7 percent), cough (33.2 percent) and short/rapid breathing (8.8 percent).

6 A question was also asked on the incidence of both cough and diarrhea during the twenty-four hour period preceding the survey. In both cases the resulting levels were high enough to lead us to suggest that some cases of ARI and diarrhea which occurred towards the beginning of the two-week period had not been recalled by the respondent (cf. Costello and Lleno, 1995a).

7 In any event, we can still arrive at estimates of ORT use among all women by simply multiplying the percentage of women who are knowledgeable by the percent ever using (both statistics may be found in Appendix Table A-2; see larger reports) and then dividing by 100.

8 Strictly speaking, the above terminology is somewhat imprecise. What should have been stated was that 31.9 percent and 23.1 percent of the children had "visited a physician or a health center with an affiliated physician." For stylistic purposes we will use the abbreviated (albeit less accurate) alternative in this paper.

[9] Of particular interest here is the child's breastfeeding status. Because this question was asked only about the youngest child it implied an initial reduction in sample size. Further still, the relationship obtained at the bivariate level appeared to indicate that the impact of this factor is heavily dependent upon the use/nonuse of supplementary foods. (Breastfeeding per se 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 at all did show lower morbidity level for both conditions.) The inclusion of this factor in the final model, though, would have, again, greatly reduced sample size since it was not asked with reference to nonbreastfed children.

[10] Incidentally, all models were significant (as a whole) at well below the .001 level.

[11] Marital status had to be dropped from the model of health care services utilization due to problems encountered in attaining a sufficiently large number of single parent households.

[12] Census data show that the proportion of Filipinos living in cities grew from 37.3 percent in 1980 to 48.7 percent ten years later (Republic of the Philippines, National Statistics Office, 1992, Table A).

[13] More frequent use, by higher status couples, of the DOH clinics could also serve in some cases to improve the health of their own children. As we have seen, the multivariate analyses occasionally depict these groups as being most likely to not choose any curative resort at all, chiefly as due to their apparent disdain for treatment by a nonphysician.

[14] When the NDS respondents were asked if they knew of a person or place where ORESOL could be obtained, the three highest-ranking locales mentioned were all connected with the DOH. These were Barangay Health Stations (45.5 percent), Rural Health Units (26.4 percent), and government-run hospitals (14.3 percent). In comparison only 4.8 percent mentioned either a private physician or a privately-run hospital.

[15] In their analysis of the Egyptian DHS data, El-Zanaty, et al. (1993, Table 11.13) found a positive and statistically significant correlation between maternal education and the use of antibiotic therapy for infant/child diarrheal morbidity.

[16] Less than 4 percent of the children who were ill with either ARI or diarrheal disease were brought to a hilot.

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Appendix Table 1.MCA Table of Adjusted Effects of Significant Predictor Variables on the Probability of Falling Ill with Either ARI or Diarrheal Diseases; Infants and Children in the Philippines, 1993 NDS

Variable Predictor	n	Unadjusted Percent	Adjusted Percent
	I. Acute Respiratory Infections		
Residence			
Urban	3446	19.5	21.4
Rural	4015	21.9	18.9
Region			
Ilocos	499	22.8	21.4
C.A.R.	286	15.8	18.1
Cag. Valley	370	24.1	22.5
Cen. Luzon	687	16.3	15.4
M. Manila	633	16.3	17.7
So. Tagalog	714	18.8	18.6
Bicol	617	29.4	26.3
W. Visayas	637	27.5	26.2
Cen. Visayas	615	15.9	15.5
E. Visayas	456	26.7	23.5
W. Mindanao	416	19.6	21.1
No. Mindanao	484	18.9	16.8
So. Mindanao	574	25.9	24.8
Cen. Mindanao	473	16.7	16.4
Husband's Occupation			
Prof./Managerial	278	13.7	15.0
Clerical	220	21.1	20.6
Sales	519	16.7	16.5
Services	403	18.6	18.2
Industrial	2847	18.3	18.2
Farming	3194	24.4	23.1
Wife's Wrkg. Status			
White Collar	618	14.7	18.2
Blue collar/service	2127	23.0	22.0
Agriculture	717	25.3	21.8
Not in L.F.	3999	19.7	18.9
Wife's Education			
None	-	-	25.3
4 years elem.	-	-	22.6
Elem. grad.	-	-	21.4
H.S. grad.	-	-	19.0
College grad.	-	-	16.8

Appendix Table 1 (Continued) (Continued)

Variable Predictor	n	Unadjusted Percent	Adjusted Percent
Age of Child			
6 mos.	-	-	22.6
1 year	-	-	23.8
18 months	-	-	24.3
2 years	-	-	23.9
3 years	-	-	21.0
4 years	-	-	15.8
59 months	-	-	10.5
Size at Birth			
Large/average	6110	19.7	19.2
Small	1351	26.3	23.9
Wantedness			
Wanted then	4124	18.6	18.5
Wanted later	2127	21.0	20.8
Not wanted	1210	27.5	24.0
	II. Diarrheal Disease		
Residence			
Urban	3446	9.9	10.0
Rural	4015	10.5	7.8
Region			
Ilocos	499	13.7	13.4
C.A.R.	286	13.8	11.7
Cag. Valley	370	12.0	10.5
Cen. Luzon	687	6.6	5.2
M. Manila	633	7.3	6.7
So. Tagalog	714	12.0	9.4
Bicol	617	15.5	13.2
W. Visayas	637	11.9	10.5
Cen. Visayas	615	4.8	4.3
E. Visayas	456	10.9	9.5
W. Mindanao	416	9.6	8.2
No. Mindanao	484	10.2	9.6
So. Mindanao	574	10.7	8.9
Cen. Mindanao	473	11.0	10.5
Husband's Occupation			
Prof./Managerial	278	7.0	7.1
Clerical	220	7.2	6.3
Sales	519	7.0	5.6
Services	403	8.7	7.9
Industrial	2847	9.7	9.2
Farming	3194	11.7	9.4

Table 1 (Continued)

Variable Predictor	n	Unadjusted Percent	Adjusted Percent
Religion			
Catholic	6250	10.1	8.7
Protestant	195	9.7	6.9
I.N.K./Aglipayan	309	14.6	13.1
Islam	232	10.4	10.9
Others	475	9.2	7.4
Media Use			
None	501	8.5	6.1
One	1623	11.3	8.7
Two	2189	10.4	8.2
Three	3148	9.8	9.7
Age of Child			
6 mos.	-	-	12.4
1 year	-	-	13.2
18 months	-	-	13.3
2 years	-	-	12.6
3 years	-	-	9.2
4 years	-	-	5.1
59 months	-	-	2.3

Appendix Table 2. MCA Table of Unadjusted and Adjusted Effects for Predictor Variables Found to be Significantly Related to Knowledge About and Use of ORS, Philippines, 1993[a]

Predictor Variable	Knowledge		Use	
	Unadjusted Percent	Adjusted Percent	Unadjusted Percent	Adjusted Percent
Region				
Ilocos	83.7	83.3	68.9	69.1
C.A.R.	92.7	92.2	81.0	81.0
Cag. Valley	87.1	89.9	77.7	79.8
Cen. Luzon	86.2	84.8	67.5	69.2
M. Manila	75.9	72.2	62.1	66.6
So. Tagalog	80.9	80.0	57.9	57.5
Bicol	88.5	90.0	64.4	61.4
W. Visayas	92.3	93.5	66.6	66.9
Cen. Visayas	95.1	96.1	75.7	77.3
E. Visayas	90.5	91.6	65.5	65.4
W. Mindanao	75.6	89.9	68.6	72.1
No. Mindanao	92.5	93.6	65.6	64.5
So. Mindanao	80.1	85.6	58.0	59.7
Cen. Mindanao	73.2	85.4	61.8	65.8
Religion				
R. Catholic	85.8	88.8	65.9	67.9
Protestant	81.7	88.8	65.1	70.7
INK/Aglipayan	89.4	91.2	68.4	70.5
Islam	55.3	71.4	52.1	50.9
Others	85.2	89.5	69.7	71.0
Father's Occ.[b]				
Professional	*	83.8	*	60.4
Clerical	*	90.8	*	67.2
Sales	*	84.7	*	62.3
Service	*	89.8	*	73.3
Industrial	*	90.0	*	69.1
Agriculture	*	87.9	*	67.8
Mother's Ed.				
None	-	77.5	-	(67.5)
4 yrs. elem.	-	83.6	-	(67.7)
Elem. grad.	-	86.1	-	(67.8)
H.S. grad.	-	90.2	-	(68.1)
Coll. grad.	-	93.2	-	(68.3)

Appendix Table 2.--- continued

Predictor Variable	Knowledge		Use	
	Unadjusted Percent	Adjusted Percent	Unadjusted Percent	Adjusted Percent
Media Use				
None	79.2	81.5	61.9	59.0
One	85.6	86.2	69.8	68.0
Two	87.8	88.9	66.9	68.0
Three	85.6	90.4	63.8	69.2
Ownership Scale				
None	-	89.6	-	70.4
2	-	87.2	-	64.7
4	-	84.3	-	58.6
6	-	80.8	-	52.2
Mother's Work Status				
White Collar	84.1	(87.0)	56.5	69.1
Blue, collar, etc.	86.4	(89.9)	66.9	70.1
Agriculture	81.5	(89.2)	67.7	63.8
Not in L.F.	84.8	(88.0)	64.5	67.0
Ch. Ever Born				
1	-	85.9	-	56.1
3	-	87.6	-	63.4
5	-	89.1	-	70.2
7	-	90.5	-	76.2

[a] In cases where the relationship failed to achieve statistical significance (alpha = .05), adjusted percentages have been reported within parentheses.

[b] Unadjusted percentages for paternal occupational status not available at the same time when this paper was prepared.

Appendix Table 3 MCA Table Showing Adjusted Effects of Significant Predictor Variables on the Type of Health Care Service Resorted to in Cases of ARI and Diarrheal Disease : Infants and Children in the Philippines, 1993 NDS

Health Care Service Provision

Variable	None	Other	Doctor
	I. Acute Respiratory Infections		
Region			
Ilocos	39.0	29.1	31.9
C.A.R.	54.2	14.8	31.0
Cag. Valley	50.2	22.6	27.2
Cen Luzon	36.7	34.3	29.0
M. Manila	40.9	18.9	40.2
So. Tagalog	35.0	42.2	22.8
Bicol	47.7	29.5	22.8
W. Visayas	51.4	11.0	37.6
Cen. Visayas	35.3	27.3	37.4
E. Visayas	35.2	19.6	45.2
W. Mindanao	35.0	44.6	20.4
No. Mindanao	31.6	46.0	22.4
So. Mindanao	45.4	29.6	25.0
Cen. Mindanao	31.9	35.9	32.2
Religion			
R. Catholic	41.2	27.4	31.5
Prot., etc.	39.4	35.4	25.2
Islam/other	53.6	21.6	24.7
Father's Occupation			
Professional	46.4	23.3	30.2
Sales/Service	46.2	23.7	30.0
Industrial	36.8	29.6	33.6
Agric.	44.4	27.2	28.4
Father's Education			
None	49.0	30.6	20.4
4 yrs. elem.	45.5	29.1	25.3
Elem. grad.	43.6	28.3	28.1
H.S. Grad.	39.6	26.2	34.2
Coll. grad.	35.3	23.9	40.8
Mother's Education			
None	47.3	30.7	22.0
4 years elem.	44.7	29.2	26.1
Elem. grad.	43.4	28.3	28.4
H.S. grad.	40.4	26.5	33.2
College grad.	37.2	24.4	38.4

Appendix Table 3 --- (Continued)

Health Care Service Provision

Variable	None	Other	Doctor
Media Use	**I. Acute Respiratory Infections**		
None	28.6	36.0	35.4
One	44.0	26.5	29.5
Two	46.6	24.6	28.7
Three	40.0	28.8	31.3
Mother's Work Status			
White Collar	54.7	13.9	31.4
Service/blue coll.	38.9	29.1	32.0
Agriculture	44.7	30.7	24.7
Not in l.f.	41.7	27.7	30.6
Elec. Status			
Electrified	41.3	27.1	31.6
Not elec.	47.5	30.1	22.4
Distance			
More than 1 km.	45.9	22.6	31.5
1 km. or less	41.4	28.3	30.3
Symptoms			
Severe	34.2	25.7	40.1
Less severe	44.9	27.9	27.2
Child's Age			
6 mos.	35.1	28.8	36.1
1 year	37.1	28.5	34.4
2 years	41.2	27.7	31.1
3 years	45.4	26.7	28.0
4 years	49.5	25.5	24.9
5 years	53.4	24.4	22.3
Birth Interval			
1 year	45.3	26.5	28.2
2 years	43.2	27.2	29.7
3 years	41.1	27.8	31.1
4 years	39.0	28.4	32.6
5 years	37.0	28.9	34.1
Wantedness			
Always			
Later	38.8	30.2	31.0
Never	42.4	24.3	33.3
	49.2	25.6	25.2

Appendix Table B.3 --- (Continued)

Health Care Service Provision

Variable	None	Other	Doctor
	II. Diarrheal Diseases		
Region			
Ilocos	53.9	18.3	27.8
C.A.R.	53.7	20.5	25.8
Cag. Valley	62.7	20.8	16.6
Cen. Luzon	56.9	27.1	16.0
M. Manila	63.4	8.1	28.5
So. Tagalog	52.5	27.8	19.7
Bicol	60.8	16.3	22.9
W. Visayas	71.5	5.7	22.8
Cen. Visayas	60.7	22.9	16.4
E. Visayas	51.6	16.9	31.5
W. Mindanao	66.9	20.7	12.4
No. Mindanao	37.5	50.6	12.0
So. Mindanao	65.7	13.2	21.0
Cen. Mindanao	57.5	28.8	13.7
Father's Ed.			
None	50.0	38.1	11.9
4 yrs. elem.	56.5	27.1	16.4
H.S. grad.	58.8	22.3	18.9
Elem. grad.	61.3	14.6	24.1
Coll. grad.	61.3	9.2	29.5
Ownership Scale			
None	62.3	19.4	18.3
2	55.8	17.8	26.4
4	47.9	15.6	36.5
6	39.1	13.0	47.9
Residence			
Urban	61.0	14.5	24.5
Rural	58.5	23.3	18.2
Symptoms			
Severe	43.2	20.9	35.9
Less severe	61.4	18.6	20.0
Child's Age			
6 months	58.4	14.6	27.0
1 year	59.2	16.0	24.8
2 year	60.1	19.0	20.8
3 years	60.4	22.3	17.2
4 years	60.0	25.9	14.1
5 years	59.0	29.4	11.6