Costs of Illness among Preschoolers of Low-Income Households

in Guatemala City*

Maarten D.C. Immink, José R. Cruz and Ricardo Sibrián

Institute of Nutrition of Central America and Panama,
Guatemala

1. Introduction

Urban migration is proceeding at a rapid rate in the developing world, exceeding often the general rate of population growth. In Latin America, the average population growth during the period 1973-83 was 2.5 % p.a. while the average rate of growth of urban populations was 3.5 % (World Bank, 1985). The same percentages for Guatemala are 3.5 % and 4.1 % respectively. As a result, in 1983, 40 % of the total population in Guatemala were living in urban areas (as compared to 34 % in 1965), with this percentage projected to increase to 50 % by the year 2000. The percentage of urban population in Guatemala estimated to live in some degree of poverty was 47 % in 1980 (ECLA, 1984).

Much of urban growth takes place in marginal areas of cities, which are characterized by high population density and lack of adequate housing, of basic sanitary facilities and public services such as water, sewage systems and garbage disposal. The incidence of infectious diseases in these areas may well be higher than national averages under such conditions. Especially the more vulnerable members of slum households such as preschool age children are likely to be subject to frequent episodes of diarrhea and upper respiratory infections. High incidence rates of infectious diseases among preschoolers may imply relatively high economic costs for low-income households. Little is known about the magnitude of these economic costs at the household level or about the health-seeking behavior of households living in marginal urban areas.

Episodes of infectious diseases in preschoolers can produce economic costs in two ways: (a) out-of-pocket costs in the form of purchase of medicines and special foods, and for outpatient medical services, transportation, hospitalization, etc., and (b) opportunity costs of time dedicated to the at-home care of the sick child, taking him/her to a health clinic or physician, and to obtain medicines. The magnitudes of these economic costs are

likely to depend on factors such as: (i). frequency and duration
of illness episodes, (ii) health-seeking behavior in relation to
episodes of specific diseases, (iii) household composition and
presence of alternative child-caretakers in the household, (iv)
normal activity pattern of primary child-caretaker, (v) avail-
ability of health care services, their distance from the home,
availability of transportation, etc.

The present study represents a component of a larger study which
deals with the etiology and epidemiology of diarrhea and acute
respiratory infections in children in a marginal urban area of
Guatemala City.

In this paper we document health-seeking behavior in relation to
treatment of diarrhea and acute respiratory infections in pre-
schoolers and provide estimates of the economic costs at the
household level of episodes of diarrhea and acute respiratory
infection.

2. Methods

2.1 Study Setting

The study was conducted in a marginal urban area of Guatemala
City, called "Colonia El Limòn". Data from a 1984 census under-
taken by INCAP indicated a total population of 7,308 persons and
1,156 households. There is a health post which provides free
medical services, staffed by nursing personnel and a part-time
physician. Detailed data from a sample of 200 households (17.3 %)
showed a median of seven persons per household. The median per
capita monthly income was found to be between Q .20 and Q .30
($ 8-12). Although a high percentage of the households have in-
door plumbing (93 %) and indoor toilets (98 %), water is normally
very scarce. Sixty-seven percent of the mothers were housewives;
the next most frequently reported occupations were street vendors

(7 %) and laundresses (5.5 %). Among male heads of household,
39 % were skilled and 30 % nonskilled workers.

During a period of three months (December, 1984 - February, 1985)
out of a total of 310, 206 children with acute respiratory in-
fections (66.5 %) were seen at the health clinic. Of these, the
common cold and bronchitis were the most frequently reported
diagnosis: 47.6 % and 11.2 % respectively. In a related study
conducted in Colonia El Limón, it was found that the overall
incidence of diarrhea in infants 2-3 months old was 7.8 % child-
weeks of observation. The mean duration of a diarrheal episode
was five days, with 16 % of the episodes having a duration longer
than seven days.

2.2 Sample Selection

The total sample size for this study was arbitrarily set at 250
households. No data were available with which to estimate
statistically the required sample size. Stratified random
sampling was used. The sampling universe consisted of households
with at least one child between the ages of one to five years.
Excluded were households which had been included in the health
clinic study. It was hypothesized that the economic costs of
childhood illness will depend on the occupation of the household
member in charge of the care of the preschooler. Thus, three
strata were defined as follows for households: (a) mothers who
worked outside the home, (b) mothers who worked at home for
remuneration, and (c) mothers who were essentially housewives.
Approximately eighty households were to be selected within each
strata, based upon previous survey data, and half of the house-
holds to be assigned at random to the substudy on diarrheal dis-
eases and the other half to the substudy on acute respiratory
infections (see below). Once the study was under way, it was
found that a high percentage of the mothers in the sampling
population were housewives. A few households originally selected
were replaced with others in which the mothers were working in-
side or outside the home.

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2.3 Data Collection Methods

A questionnaire was designed and pretested in a marginal urban area (Colonia Maya) contiguous to Colonia El Limón and quite similar to the latter. It became clear that health-seeking behavior in terms of utilization of medical care services, types of medicines and foods purchased was different depending on whether the episode was considered mild or severe. It also became evident that to obtain all required data related to episodes of both diarrheal and acute respiratory infections in the same household made the interview excessively long and reduced the quality of the data significantly. Thus it was decided that in half the sample data were to be obtained related to episodes of diarrhea and in the other half related to acute respiratory infections.

The final questionnaire consists of four modules. The first module obtains data regarding household composition and socio-economic characteristics. Modules 2 and 3 contain identical questions related to sources of medical attention, purchases of medicines and special foods, and expenditures on treatment, transportation, etc., during mild and severe episodes. Module 2 refers to episodes of diarrhea and Module 3 to episodes of acute respiratory infections, and for both the reference period was one year prior to the survey. Definitions of mild and of severe episodes of each type of illness were provided to help respondents distinguish between different episodes. The last module requests data about normal daily activity patterns, and activity patterns of the household member in charge of taking care of the child on days the child is ill.

In the event that a household had more than one child between the ages of one and five years, an "index" child was defined as the youngest child. Questions dealing with the morbidity patterns of preschoolers were then related to the index child.

The interviews were conducted during June and July, 1985, by experienced interviewers who were carefully trained and standardized to minimize inter-interviewer measurement errors.

3. Sample Characteristics

The median number of persons per household was six, with a range from two to 17 persons. Households reported to have been residents of Colonia El Limòn on average for 4.5 years (range: 1-6 years). Of the households included, 96.8 % had resided in other parts of Guatemala City before moving to Colonia El Limòn. Thus, the sample can be characterized as urban households.

Twenty-one percent of the sample households were female-headed. Male heads of household had generally completed more formal education than female heads: fourth grade versus third grade (median), with 21 % of male heads and 34 % of female heads not having completed any formal education. Female spouses also had completed on average third grade, with 29 % having no formal education. Thirty-nine percent of the male heads of household were skilled workers (mechanics, technicians, masons, bakers, shoemakers), 8 % policemen or guards, and 11 % semi-skilled; 13 % were unemployed. Twenty-five percent of the female heads of the household reported to be housewives, 13 % were laundresses, 13 % were self-employed at home (small shopkeepers, tortilla making), 17 % street vendors or salesladies, 9 % skilled salaried workers, and 9 % housemaids. Forty-two percent of female spouses reported to be housewives, with the remainder having occupations similar to female heads of household.

Fifty-six percent of the sample of "index" children were female, while almost 86 % were sons and daughters of the head of household, and the remainder were grandchildren.

4. Disease Patterns

Fifty percent of the index children were reported to have suffered two or more episodes of acute respiratory infections (ARI) during the five-month period (January-May) prior to the survey, while 21 % had suffered five or more episodes during that period. There was a tendency for most of these episodes to be mild: the median number of mild episodes was two, with 53.6 % of the children having two or more mild episodes, compared to 56.0 % reporting no severe episodes, and only 20.8 % having two or more severe episodes of ARI.

The incidence of diarrheal episodes was relatively low during the five-month period: one third of the sample of index children was reported to have no diarrheal episodes, approximately one third only one episode, and the remainder two or more episodes. Again the tendency was towards mostly mild episodes: 77 % reported to have had no severe episodes, while 46 % were reported to have had no mild episodes, and 29 % two or more mild episodes. The reference period for the incidence pattern was January-May which is part of the dry season, and thus the overall incidence of diarrheal disease may have been underestimated.

5. Health Care Behavior

Public outpatient clinics and private physicians were the most often utilized sources of medical care for diarrheal disease and acute respiratory infections (ARI) in preschoolers. Other sources included the social security hospital and the local pharmacy. However, the rate of utilization for almost all sources was significantly lower in the case of mild episodes of diarrheal disease and ARI (Table 1-A). Whereas more than two thirds of the households used a public outpatient clinic or private physician in the case of a severe episode, the utilization rate drops to 24 % for mild episodes of diarrhea and 12 % for mild episodes of ARI.

<u>Table 1-A</u>

Health Care Behavior: Utilization of Different Health Care Sources during
Episodes of Diarrheal Disease and Acute Respiratory Infections (ARI)

%

Sources of health care	Diarrheal Episodes			ARI Episodes		
	Severe (n=52)	Mild (n=85)	Total (n=137)	Severe (n=76)	Mild (n=108)	Total (n=134)
Private physician	32.7*	8.4*	17.8	25.0*	2.8*	12.0
Public out-patient clinic	34.6**	15.7**	23.0	44.0*	9.3*	23.6
Hospital	5.8	1.2	3.0	6.7*	0.0*	2.7
Social security hospital	19.2**	6.0**	11.1	16.0*	3.7*	8.8
Pharmacy	7.7	4.8	5.9	14.7*	3.8*	8.3
Other	3.8	3.6	3.7	4.0	1.9	2.8

* p<.01   ** p<.025

Almost 50 % of the households purchased medicines in the event of
diarrheal disease or ARI (Table 1-B). The percentage of house-
holds which purchased special foods was significantly lower, and
lower for episodes of ARI than of diarrheal disease. Roughly the
same percentage of households purchased medicines during severe
and mild episodes, although the composition of the purchases may
be different. However, significantly fewer households purchased
special foods during mild episodes as compared to severe epi-
sodes.

Mild episodes of diarrheal disease and ARI were of shorter
duration (median: three days for both) than of severe episodes of
diarrheal disease (median: 4.5 days) and of ARI (median: 7.5
days). In approximately 80 % of the households it was the mother
who cared for the sick child. In the case of diarrheal disease
the person responsible for the home care of the child in 86.8 %
of the households did not stop working, while 4.4 % of these per-
sons stopped work partially, and 8.8. % stopped work completely
(Table 1-C). There was no significant association with severity
of episodes (x^2 = 4.56; p > .05). In 82 % of the households, the
person responsible for the care of the sick child did not stop
working in the case of episodes of ARI; in about 9 % each either
the person stopped working partially or completely. In the case
of ARI episodes, there was a significantly greater tendency for
mild episodes of ARI not to produce a partial or complete inter-
ruption of normal work activities by the responsible person when
compared to severe episodes (x^2 = 17.31; p < .01).

Considering the health-care behavior described above, we expect
that mild episodes represented lower costs than severe episodes
because mild episodes meant (a) lower levels of utilization of
health services, (b) less frequent purchases of medicines (in the
case of diarrheal disease only) and of special foods, (c) shorter
duration of episode, and (d) less frequent interruption of normal
work activities.

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Table 1-B

Health Care Behavior: Purchases of Medicines and Special Foods during Episodes of Diarrheal Disease and Acute Respiratory Infections (ARI)

%

	Diarrheal Episodes			ARI Episodes		
Purchases of	Severe (n=52)	Mild (n=85)	Total (n=137)	Severe (n=76)	Mild (n=108)	Total (n=184)
Medicines	94.2***	82.4***	86.9	86.8	90.7	89.1
Special foods	53.8**	32.9**	40.9	32.9*	15.7*	22.8

* p<.01   ** p<.025   *** p<.05

Table 1-C

Health Care Behavior: Interruption of Normal Work Activities during Episodes
of Diarrheal Disease and Acute Respiratory Infections (ARI)

%

	Diarrheal Episodes			ARI Episodes		
	Severe (n=52)	Mild (n=85)	Total (n=137)	Severe (n=76)	Mild (n=108)	Total (n=184)
1. Person respon-sible for child-care stops working (%):						
a) not at all	80.8	90.6	86.8	68.4	91.7	82.1
b) partially	3.8	4.7	4.4	14.5	5.6	9.2
c) completely	15.4	4.7	8.8	17.1	2.8	8.7

6. Economic Cost Estimates

As indicated in the introductory section two types of private costs were distinguished: (a) "out-of-pocket" costs which were defined as the sum of expenditures on medical care (physician's fee, clinic charge, etc.), on transportation to and from physician's office, clinic, hospital, etc., on medicines and over-the-counter drugs, and on special foods (i.e. foods which normally are not purchased except during episodes of illness of the preschooler) and (b) imputed time costs, which are represented by the lost household income (monetary) because of having to take the child to obtain medical attention and to take care of the child while convalescing at home. All costs were expressed on a per episode basis and are thus adjusted for the different lengths of the mild and severe episodes. All costs are expressed in local currency (quetzals). These costs were also calculated by sub samples of type of mother's occupation.

In Tables 2-A and 2-B are presented total out-of-pocket and total costs per episodes of diarrheal disease and ARI (based upon existing prices during the period January-May, 1985). Median estimates are given because of highly skewed within-cell distributions. From the data it is clear that severe episodes of both diarrheal disease and ARI involved considerably higher costs than mild episodes. For both mild and severe episodes, out-of-pocket costs represented the larger share of total costs. The time costs, as measured by foregone household monetary income, of mild episodes tended to be zero or very small even for households with mothers working outside the home. Expenditure on medicine and over-the-counter drugs represented by far the largest share of out-of-pocket costs. Total costs per episode also tended to differ depending on the mother's type of occupation. In relation to out-of-pocket costs, these differences may reflect, at least partially, different income levels; however, there was no consistent pattern among sub samples comparing Tables 2-A and 2-B.

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Table 2-A

Out-of-Pocket and Total Costs* per Episode of Diarrheal Disease of Preschoolers
January-May, 1985

(Medians)

	Mother's Occupation					
	Outside the Home Episode		Inside the Home Episode		Housewife Episode	
Costs	Mild	Severe	Mild	Severe	Mild	Severe
Out-of-pocket	1.11	8.35	0.50	8.05	0.52	8.59
Total	1.11	12.40	0.50	8.10	0.52	8.59

Table 2-B

Out-of-Pocket and Total Costs* per Episode of Acute Respiratory Infection of Preschoolers
January-May, 1985

(Medians)

	Mother's Occupation					
	Outside the Home Episode		Inside the Home Episode		Housewife Episode	
Costs	Mild	Severe	Mild	Severe	Mild	Severe
Out-of-pocket	0.68	10.57	0.36	11.83	0.27	7.33
Total	0.75	12.00	0.43	13.83	0.27	7.33

* in quetzals

Table 3-A

Total Costs* of Different Combinations of Mild and Severe Episodes of Diarrhea
in Preschoolers
                              January-May, 1985

                            Number of Mild Episodes

		0	1	2	3	4	5
Number of	0	0	0.69	1.38	2.07	2.76	3.45
severe episodes	1	9.82	10.51	11.20	11.89	12.58	13.27
	2	19.64	20.33	21.02	21.71	22.40	23.09
	3	29.46	30.15	30.84	31.53	32.22	32.91
	4	39.28	39.97	40.66	41.35	42.04	42.73
	5	49.10	49.79	50.48	51.17	51.86	52.55

* in quetzals

Table 3-B

Total Costs* of Different Combinations of Mild and Severe Episodes of Acute Respiratory Infections in Preschoolers

January-May, 1985

Number of Mild Episodes

		0	1	2	3	4	5
Number of	0	0	0.50	1.00	1.50	2.00	2.50
severe episodes	1	11.13	11.63	12.13	12.63	13.13	13.63
	2	22.26	22.76	23.26	23.76	24.26	24.76
	3	33.39	33.89	34.39	34.89	35.39	35.89
	4	44.52	45.02	45.52	46.02	46.52	47.02
	5	55.65	56.15	56.65	57.15	57.65	58.12

* in quetzals

In order to obtain some estimates of the average annual costs of
episodes of diarrheal disease and ARI we calculated first a
weighted mean of the median cost estimates of the three sub-
samples, maintaining the distinction between mild and severe
episodes. Next we constructed tables which indicate the total
annual costs for a number of combinations of mild and severe
episodes (Tables 3-A and 3-B). For example, a household in which
preschoolers suffered three mild episodes and four severe epi-
sodes of diarrhea in a year faced a total cost of Q. 41.35; or in
the case of four mild episodes and three severe episodes of ARI a
year, a total cost of Q. 35.39; or in the case of five severe
episodes and four mild episodes of diarrhea and four severe
episodes and five mild episodes of ARI a year, a total cost of
Q. 98.86.*

The above costs, however, must be considered in relative terms.
In the first place, these estimates are based upon prevailing
prices during the five-month period prior to the survey and thus
will change as prices change. Secondly, these costs must be
related to the purchasing power (income level) of the household
to determine the relative economic burden that they represent. No
household income data for the sample households are available.
But taking the estimate of the monthly per capita income of Q. 25
provided by another study in this population, and assuming a
household size of six persons, we obtain an estimate of annual
household income of Q. 1800.** The costs associated with the

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* There may be some economies of scale associated with higher
numbers of episodes per year (e.g. unused medicines and drugs
being utilized in subsequent episodes), so that costs may not
increase linearly with the number of episodes. This effect,
however, is likely to be minimal.

** Since the 1984 survey which produced these data, economic con-
ditions have significantly deteriorated in Colonia El Limón,
while market prices of medicines, drugs and foods continue to
rise.

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sample incidence rates given in the previous paragraph would represent 2.3 %, 2.0 % and 5.5 % of total household income respectively. Although the magnitudes of these costs are not large, they represent only two types of a myriad of diseases to which preschoolers are exposed and exclude consideration of all other members of the household.

7. Discussion

The costs estimates provided above underestimate the real economic costs of episodes of diarrheal disease and acute respiratory infections in preschoolers. Firstly, there was frequent use of the public health clinic with medical care free of charge. This means that the social costs were greater than the private costs borne by the households in Colonia El Limòn. Secondly, the opportunity cost of time was measured only by foregone monetary income. Thus, time dedicated to the care of the sick child entered only the cost equation if household monetary income was lost. In the households where the mothers were classified as housewives, child care did not result in lost household earnings, but real income may have decreased as normal domestic economic activities were not undertaken on days that the child was ill. This may also have been true in households with employed mothers, where the presence in the household of a substitute caretaker did not result in lost household earnings.

Despite the underestimation of the private costs of diseases, in preschoolers only in this case, as a percentage of household income they appear high. In a survey of ten Latin American cities it was found that urban households (all income groups) spent on average from 1.62 % (Santiago) to 5.53 % (Caracas) of total expenditures on medical care (Musgrove, 1978). Results from a household income and expenditure survey in urban areas of Ecuador showed that the share of total expenditures spent by low-income households on medical care ranged from 2.3 % in some cities to 3.9 % in others (Immink, 1984).

The cost estimates obtained by means of a cross-sectional survey represent health care behavior at a point in time with given sets of prices for medical care, medicines, foods, transportation, etc. As these (and/or other) prices change, health care behavior will change as the results of both income and substitution effects. At the same time, as income levels change, there will be further changes in health care behavior. Thus, the private costs of episodes of illness are likely to vary over time.

With increasing crowding and poverty in marginal urban areas, the social costs of illness in preschoolers (and other age groups) will undoubtedly increase as a result of increased incidence rates. Private costs may decrease in absolute terms, or at least relative to social costs. With low-income urban households increasingly less able to bear a significant portion of the total social costs of illness, and national and local governments faced with increasing fiscal deficits, as is the case in Guatemala, reductions in public health services are likely to result, so that a greater share of the total demand for public health services will go unfulfilled. The result may well be increased incidence rates of illness among populations in marginal urban areas. Unless ways are found to reverse the trends in urban poverty, so that incidence rates of illness are lowered and households are able to bear a greater share of total costs of illness, this vicious circle will continue.